INTANGIBLE CAPITAL EVOLUTION SHAPED BY HIGHER EDUCATION: A PATH DEPENDENCY ANALYSIS ON MONGOLIA

by

Khishigbayar Tsogbadrakh

Department of Integrated Studies in Education

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ABSTRACT

This inquiry explores the evolution of intangible capital shaped by higher education in Mongolia through comparative historical research that primarily covers socialist (prior to 1990) and post-socialist (after 1990) periods based on Clark's triangle model as a conceptual framework. More specifically, the study examines how organized higher learning has shaped the country's human capital, social mobility, and knowledge creation as conditioned by socialist centrally planned economy and post-socialist liberal market economy. Employing path dependency analysis, this study collected data from documentary sources.

The empirical evidence shows that reactive and self-reinforcing path dependency is apparent in institutional transitions of Mongolian higher education since socialist institutional legacies largely define the path of development in the post-socialist period. The political and economic transformation in 1990 brought the logic of the neoliberal market into the Mongolian higher education system, which had been fully subsidized and centrally planned in the socialist era prior to 1990.

The two key findings describe the shape and dynamics of intangibles including human capital, socioeconomic mobility, and knowledge creation: (1) The socialist post-secondary education system with highly selective higher education admissions and centrally coordinated enrollments formed a tiny layer of professional intelligentsia, larger majority of proletarian skilled manpower, and shrinking herders who pursue mobile pastoralism in the country. The post-socialist massification and commercialization trends in Mongolian higher education system increase access to higher education, but it has implications for transforming the institutional landscapes rather than increasing the socioeconomic mobility for individuals; (2) The socialist government's top-down strategies and practices of governing knowledge creation achieved its aim to imbue the people with Marxism-Leninism and to build non-capitalist industrial

development in the country. By contrast, knowledge creation has been much democratized in the post-socialist period, and the Mongolian Academy of Sciences and its affiliated institutes undertake various scientific and academic research activities relevant to national social and economic situations in the country. This development is thanks to a solid base of scientific personnel and research institutes endowed from the Soviet-assisted training. However, dissemination and consumption of research products have not been a linear process in the post-socialist period due to weak state intervention and inability to adapt to free market economy based on consumer-oriented supply and demand. The thesis closes with a discussion of conceptual and methodological implications for the future research on higher education policy studies.

RÉSUMÉ

La présente étude explore l´évolution du capital intangible façonné par l´enseignement supérieur en Mongolie à travers une recherche historique comparative qui couvre prioritairement les périodes socialiste (avant 1990) et postsocialiste (après 1990) et qui est basée sur le modèle du triangle de Clark comme cadre conceptuel. De manière plus spécifique, l´étude examine comment l´enseignement supérieur organisé a façonné le capital humain du pays, la mobilité sociale et la production des connaissances telle que conditionnées par l´économie centralisée et planifiée et l´économie libérale de marché postsocialiste. En se servant de l´analyse de la dépendance historique, les données collectées dans le cadre de la présente étude sont des données documentaires.

Les preuves empiriques montrent que la dépendance historique réactive qui se renforce d´elle-même est apparente dans les transitions institutionnelles de l´enseignement supérieur en Mongolie dans la mesure où l´héritage institutionnel socialiste définit la trajectoire du développement dans la période postsocialiste. La transformation politique et économique de 1990 a amené la logique du marché néolibéral dans le système de l´enseignement supérieur de la Mongolie qui était entièrement subventionné, planifié et centralisé au cours de la période socialiste d´avant 1990. Les deux principaux résultats décrivent la forme et la dynamique des intangibles notamment le capital humain, la mobilité socioéconomique et la production des connaissances : (1) le système éducatif postsecondaire socialiste avec des admissions très sélectives dans l´enseignement supérieur et des inscriptions centralisées et coordonnées a créé une petite couche d´intelligentsia professionnelle, et une plus grande majorité de main-d´œuvre prolétaire qualifiée, ainsi que la réduction du nombre de bergers qui s´adonnent à la transhumance dans le pays.

Les tendances postsocialistes de massification et de commercialisation dans l´enseignement supérieur de la Mongolie ont augmenté l´accès à l´enseignement supérieur, mais elles ont des implications pour la transformation du paysage institutionnel au lieu d´accroître la mobilité économique des individus ; (2) les stratégies descendantes du gouvernement socialiste et les pratiques de gestion de la production des connaissances ont atteint leur objectif qui consiste à inculquer le marxisme-léninisme au peuple et à assurer un développement industriel qui n´est pas basé sur le capitalisme dans le pays. Au contraire, au cours de la période postsocialiste, la production des connaissances s´est beaucoup plus décentralisée, et des activités de recherche académique et scientifique pertinentes par rapport à la situation sociale et économique du pays sont menées par l´Académie mongole des sciences. Ceci a été possible grâce à la disponibilité du personnel scientifique et des instituts de recherche issus de la période soviétique. Toutefois, la diffusion et l´utilisation des résultats de la recherche n´ont pas été linéaires au cours de la période postsocialiste en raison de la faiblesse de l´intervention de l´État et de l´incapacité à s´adapter à l´économie de marché basée sur l´offre et la demande. La thèse se termine par une discussion des implications conceptuelles et méthodologiques pour les futurs travaux de recherche sur les politiques de l´enseignement supérieur.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
ASEM	Asia-Europe Meeting
CEOs	Chief Executive Officer
CMEA	Council for Mutual Economic Assistance
COMECON	Council for Mutual Economic Assistance
GDP	Gross Domestic Product
GER	Gross Enrollment Rate
GMIT	German Mongolian Institute for Resources and Technology
GPA	Grade Point Average
HEIs	Higher Education Institutions
IMF	International Monetary Fund
IP	Intellectual Property
IT	Information Technology
MAS	Mongolian Academy of Sciences
MECS	Ministry of Education, Culture and Science
MNT	Mongolian National Currency (tugrug in Mongolian)
MOL	Ministry of Labor
MPR	Mongolian People's Republic
MPRP	Mongolian People's Revolutionary Party
NRC	Nuclear Research Center

OECD	Organization for Economic Cooperation and Development
R&D	Research and Development
SDC	Swiss Agency for Development and Cooperation
STEM	Science, Technology, Engineering and Math
STF	State Training Fund
STF	Science and Technology Foundation
S&T	Science and Technology
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
UIS	UNESCO Institute for Statistics
UN	United Nations
USA	United States of America
USSR	Union of Soviet Socialist Republics
VAT	Value Added Tax
WB	World Bank
WIPO	World Intellectual Property Office

PROLOGUE TO THE STUDY

Part of my doctoral research on Mongolian post-secondary education policies came firsthand. Raised in a "ger" (yurt) in Khovd, situated at the foot of the Mongol Altai Mountains, I have lived in both systems – socialist and post-socialist – and experienced the Mongolian tertiary education as a student and an educator. Both my parents were from nomadic, livestock-herding families, and both attended socialist rural boarding schools for herders' children, later receiving training at vocational colleges that prepared the proletarian urban working class population in Mongolia in the socialist era. Thus, my parents are classic byproducts of the socialist centrally planned and fully subsidized post-secondary education system in Mongolia under the ideology of Bypassing Capitalism. I bore witness to how the concept of private ownership was new to Mongolians in the 1990s, why many Mongolian populations were hit hard when the privatization took place. Having lived the Mongolian tertiary education system as a student and an educator, I also bore witness to how commercialization and privatization took precedence in the Mongolian higher education during the transition period. Hence, my firsthand experience led me to inquire how organized higher learning has shaped the country's human capital, social mobility, and knowledge creation in the socialist and post-socialist eras.

My interest in the study of higher education policy dates back to my time as a graduate student at Loyola University Chicago, where I completed my Master's degree in Educational Policy Studies, with a concentration in Comparative and International Education, in 2009. Prior to my graduate studies in the USA, I taught at Mongolian higher education institutions for six years including the University of the Humanities (2002–2006) and the Mongolian State University of Education (2000–2002). Upon my return to Mongolia in 2009, I worked on several

policy research projects as a National Consultant for international development organizations, including the Asian Development Bank, and the Swiss Agency for Development and Cooperation. My consulting has been mostly in the areas of education sector policy analysis, skills development, vocational education, social development, gender and poverty analysis, and economic empowerment in Mongolia.

Having worked there for four years as a faculty member between 2002- 2006, this university, in many regards, has laid the foundation of my academic, intellectual, and professional pursuits. I witnessed many of the changes and evolutions this university has undergone as it is part of the Mongolian tertiary education system, and is a by-product of the transition from centrally planned socialism to a democratic society with free market economy. The University of the Humanities, in large part, reflects the country's higher education system on the eve of transition from its Soviet roots, which was highly specialized, to a relatively comprehensive institution, diversifying its degree programs in a variety of specialty areas to adapt to the free market economy.

The University of the Humanities was founded in 1979 as an Institute of Russian Language and Literature under the former State Pedagogical University, and then became an an independent university named as Institute of Foreign Languages in 1990 after it separated from the former State Pedagogical University. During the transition period in the 1990s, it was one of the reputable universities in Mongolia for its foreign language degree programs. Because many Mongolian people considered that majoring in foreign language studies would lead to overseas studies in western countries or would lead to opportunities to work shoulder to shoulder with international experts, the higher education degree programs in foreign languages, especially English, German, French, and Japanese were competitive and selective in the 1990s. After

Mongolia opened its doors to the outside world in the early 1990s, studying in western countries was an aspiration for many young Mongolians. During my time when I was a faculty member at the University of the Humanities, it underwent privatlization in 2003. It was one of the two state universities, which underwent privatization in Mongolia, following the World Bank technical advice for the privatization of the Mongolian higher education. The other privatized university, the Institute of Finance and Economics (former *technikum* of finance and economics during the socialist period), underwent a management privatization, while the University of the Humanities was fully privatized, as its all assets and properties were sold by the government to the management team of shareholders. As a result of this change in the ownership, the university had more freedom to introduce changes in the curricula and academic programs. Therefore, through both my experience as a student and a faculty member at the University of the Humanities, I have lived the Mongolian tertiary education system's transition from one extreme to the other. I have witnessed how people were coping with the changes and their adaptation to the changes.

Overall, my experiences of overseas studies in the United States for three years (2006-2009) and Canada for four years (2013-2017) as well as working for international development organizations as a national consultant for several years have provided me an opportunity to observe the situation related to my research topic from a position of an outsider with the insider's knowledge. Therefore, I wanted to interpret my insider's knowledge through the lens of intellectual and academic research.

CHAPTER 1: INTRODUCTION

1.1 Rationale for the study

Intangible capital (IC) is a relatively new concept, which is less than a decade old. In mainstream economics, intangible capital is defined as knowledge assets such as know-how embodied in employees and business organizations, innovations, organizations' social networks, clients, brands, reputations, and intellectual properties that could bring economic growth (Corrado et al, 2012; Hao et al, 2009; Corrado et al, 2009; Corrado et al, 2006; van Ark et al, 2009). This conventional definition in mainstream economics focuses more on business and economic dimensions of intangible capital, but ignores the aspects related to social and cultural resources. On the contrary, the behavioral economics lately brings more human development and well-being approach to the conventional concept of IC. According to the definition in behaviorial economics, IC includes human capital, social capital, and other intangible assets embodied in human capacity that aid to improve their quality of living in the society (Tomer, 2008; 2016). Yet, the role and impact of higher education policy in shaping intangible capital, have not been clarified in existing studies.

The organized higher learning, as a by-product of a particular social, political, and economic system, shapes the deficiencies, dysfunctions, and achievements in a country's intangibles such as human capital, social mobility, and knowledge creation. As tertiary education policy shapes the structure of the system, resources available, types of institutions, academic faculty, and student enrollment, it has important implications for shaping intangible capital. My doctoral research therefore aims 1) to clarify the higher education policy dimension of this emerging concept of intangible capital; 2) to explore the impact of post-secondary education in general, and higher education in particular in shaping the intangible capital in Mongolian

context; and 3) to provide empirical evidence of how organized higher learning has shaped the intangible capital in Mongolia by adopting approaches oriented to well-being as opposed to wealth. In order to achieve my research goals, I have taken the following specific steps:

➢ Historical research was necessary in order to study the changes the organized higher learning has produced in the lives of people, society, and institutions across different social, political, and economic conditions throughout the Mongolian history;

➢ Interdisciplinary and holistic approach was necessary, as the concept of intangible capital by definition encompasses human, social, cultural, and intellectual capital;

➢ Given that my research touches issues that are interlinked across a range of disciplinary areas in social science, my position as a researcher was a generalist as opposed to a specialist;

1.2. Why choose Mongolia as a research site for studying intangible capital?

The question of why Mongolia can serve as a research site for exploring the evolution of intangible capital shaped by higher education may arise among readers. Within the conventional concept of intangible capital in mainstream economics, a majority of studies have been analyzed particularly on emerging and advanced industrial countries, which are rich in knowledge-intensive activities, namely information and communication technology innovations. At the same time, existing research studies in mainstream economics increasingly stress that an investment in intangible capital is critical to less developed countries to close the competitiveness gap between developing and benchmarking countries. Yet, there is paucity of research studies that deal specifically with issues hampering the investment in intangible capital in developing countries. Within the concept of intangible capital as defined by behaviorial economics, the impact of intangible capital on countries' social and human development remains obscure, as existing

studies are heavily concentrated on macroeconomic performance indicators as opposed to social well-being indicators. Therefore, a research study that examines the historical, cultural, social, and economic factors shaping the evolution of intangible capital in developing countries like Mongolia, would contribute to identifying potentials and limits, which developing nations encounter, when facilitating the knowledge-based economy.

Mongolia is strategically located between China and Russia. The country has undergone a socio-economic transition from centrally planned socialism to liberal market-oriented democratic society since 1990. Along with this transition, Mongolia thus has faced to make new kinds of investment in its higher education system. Second, Mongolia's abundance in mineral resources and its geographic proximity to key large-scale economic markets of China and Russia has made the country as one of the attractive investment destinations for transnational corporations, operating business in extractive industry. Nevertheless, the country remains vulnerable, as its economy has become overly dependent on the export of copper, coal, and other raw materials. The question of where the wealth of the nation lies concerns more than its mineral resources. The answer lies in creating intangible capital such as virtue, political leadership, quality of governance, and equal access to quality education as opposed to its natural capital and mineral resource-based commodities. If the natural resource-rich developing countries like Mongolia have insufficient intangible capital to leverage their mineral resources to the benefits of their own domestic economies, then their natural resource will have no social and economic values to their national development and local populations. Hence, the implications for understanding the systemic, social, cultural, economic, and political issues that shape the evolution of intangible capital in Mongolia would provide empirical evidence to the human development dimension of intangible capital and intangible assets.

1.3 Outlining the research

As defined by David-Fox and Peteri (2000), the post-Soviet and post-socialist national higher education system is "historically, politically, and culturally contingent institutions and practices" (p. 5). There is scarce empirical research on the historical development of Mongolia's higher education to date that takes centrally into account its major social and economic returns across different historical periods. This dissertation studies how the organized higher learning has operated across varying political, social, and economic settings in Mongolian history. More specifically, my thesis is concerned with understanding how the organized higher learning has shaped the intangible capital, namely country's human capital, social mobility, and knowledge creation as conditioned by socialist centrally planned economy and post-socialist liberal market economy. Thus, it is a comparative historical analysis that primarily covers socialist (before 1990) and post-socialist (after 1990) periods. As it is a path dependency analysis, it also bears mentioning of pre-socialist social, political, and economic situations that conditioned the country to pursue the path of socialist development.

My methodological paradigm is based on Clark's triangle. Clark's triangle is used for my research as a means of organizing the empirical evidence and identifying the dominant force that led to the shape of higher education system in a particular historical period. The resultant shape of the triangle identifies the resource asymmetries and power dynamics affecting the higher education system. I employ the path dependency as an analytical tool to interpret the resultant shape of the triangle. Path dependency is a historical approach that examines the present situations based on antecedent historical conditions. I followed the two types of path dependency such as self-reinforcing and reactive as postulated by Mahoney (2000). The data sources for this

study comes mainly from documents, including both primary and secondary sources as well as mass media observations.

The Mongolian higher education system has a relatively short history. Its historical foundation dates back to 1942 when the National University of Mongolia, the nation's first higher education institution, was established. Prior to 1921 in the pre-socialist period, Tibetan Buddhist monasteries provided advanced education of medieval type in Mongolia, functioning as de-facto vocational training, but also institutes of higher learning specialized in various disciplines such as Buddhist philosophy, astrology, herbal medicine, and literature. As such, the religion played a central role in shaping the socio-economic and socio-cultural determinants of the demographic behavior of that time. In the socialist period from 1921 until 1990, the Mongolian political actors pursued the path that is in large part reactive to the antecedent historical conditions. Due largely to Cold War polarizations, which cut off Mongolia from the western higher education examples, the newly established Mongolian higher education system opted for a more politically aligned model with assistance from the Soviet Union. With the direct government control and full state subsidy, the socialist post-secondary education was largely based on Marxist-Leninist paradox, which further shaped the country's human capital, social mobility, and knowledge creation. Thus, Mongolia was able to accomplish for creating its professional and scientific manpower in a very short period of time.

The educational attainment in Mongolia in the second half of the 20th century progressed considerably thanks to the universal schooling policy during the socialist period with literacy rate reaching to over 98 percent in the 1960s. Though the access to higher education was restricted to only about 20 percent of the tertiary education age cohort due to the socialist centrally planned manpower policy, which determined the number of students to be enrolled in post-secondary

education establishments. Such a highly selective higher education admission and centrally coordinated post-secondary education enrollments formed a tiny layer of professional and scientific elite but the non-selected majority were absorbed into vocational establishments for skilled manpower to build the non-capitalist industrial development in the country. All advanced research was concentrated in the affiliated institutes of the Academy of Sciences, restricting universities to teaching and learning sites for training the country's professional manpower. The knowledge creation was highly coordinated by the centrally planned Five-Year socialist plans. Therefore, the dissemination and application of advanced academic research was a linear process as the state was the main and sole consumer of research products. Such a homogenous but centrally planned socialist education system, institutional separation of research and training, and the linear process of academic research and knowledge consumption succeeded in transforming the mono-cultural livestock-breeding nation into a semi-industrialized socialist nation.

In 1990, Mongolia underwent a socio-economic transition from centrally planned-socialism to a liberal market-oriented democratic society. The end of the centrally planned command economy necessitated fundamental changes in the structure and modus operandi of many social institutions, including those of education and science. The demise of the socialist centrally planned economy in 1990 had profound implications to the Mongolian tertiary education, resulting in a rather reactive sequence of path dependency. The number of educational policy reforms such as state deregulation, cutbacks in state subsidies by introducing tuition fees, and legalizing private higher education witness the reactive sequence of path dependency in the national higher education system. Access to higher education in Mongolia thus has increased dramatically in the past two decades due to state deregulation and legalization of private higher education.

With a pluralistic post-socialist system of public, private, and for-profit four-year undergraduate private colleges, the post-socialist Mongolian higher education system faces pressing challenges such as rising costs, declining public support, and high social demand. By the end of 1991, there were forty state higher education institutions but the number of higher education institutions reached to 150 in the 1990s and peaked at 180 in the 2000s. Due to the Mongolian Miniustry of Education, Culture, and Science's (MECS) tightening its accreditation process for for-profit diploma mills and the attempts to merge state universities in recent years, there are 95 higher education isntitutions by the latest count in 2016-2017 academic year. The gross enrollment rate for higher education grew from 18.2 percent in 1990 to 58.7 percent in 2012, exceeding the OECD's average of 55 percent. The absolute number of students increased by more than tenfold since 1990. The persistent high rate of underemployment among university graduates ranging from over 78 percent to 58 percent between 2001 and 2012 result in declined public and private returns to investments in higher education. Thus, the mass enrollment in higher education has transformed the institutional landscape rather than expanding opportunities and increasing economic mobilities for individuals, particularly for those students from lower socio-economic statuses and rural herders.

Moreover, the post-socialist knowledge creation process reflects that many current practices in Mongolian research system are rooted in a seventy-year historical legacy of socialism. The Mongolian Academy of Science (MAS) maintains its domination over research activities in both fundamental and applied research in key priority fields of studies. A few key specialized national universities are able to sustain some research standards in the country within their specialized areas, but many of the private institutes are more vocationally oriented professional training sites based on teaching and learning.

The knowledge creation has been much more democratized in the post-socialist period than in the socialist period. The scientific and academic research relevant to local social and economic situations in the country are undertaken in Mongolia thanks to a solid base of scientific personnel and research institutes endowed from the Soviet-assisted training and science management during the socialist period. However, dissemination and consumption of research has not been a linear process in the post-socialist period due to weak state intervention and heavy dependence on foreign technology imported from the developed countries. This situation, in turn, creates little incentives to capitalize the locally produced knowledge products. Therefore, my thesis concludes that an effective state intervention is essential to higher education policies in transition and developing countries like Mongolia. The current state intervention is essentially ineffective and weak in the post-socialist Mongolia due to the lack of political leadership and absence of quality governance.

1.4 Significance of the study

In general, my thesis adds knowledge to the field of higher education policy studies. It has two key contributions. First, the findings of this study will add knowledge to the existing studies of Mongolian post-secondary education in general and higher education in particular. Dr. Ines Stolpe, a German Mongolist scholar at the University of Bonn has laid the groundwork of the historical development of Mongolian education in her co-authored book titled *Educational Import: Global Forces with Local Encounters in Mongolia.* However, the book is specifically concerned with pre-tertiarty education system in Mongolia. In terms of historical development of post-secondary and higher education, the book gives a very little emphasis on the subject. Secondly, Ines Stolpe and Steiner-Khamsi examined the Mongolian education system through

the lens of an educational import, defining it as an imported but locally customized or 'Mongolized' construct. While extending their discussions, my thesis explores how post-secondary education in general and higher education in particular has shaped the country's human capital, social mobility, and social stratification, as well as knowledge creation (intellectual capital) within varying social, political, and economic settings in Mongolian history. This is an unexplored or otherwise scarcely investigated dimension of educational policy studies in Mongolia. Therefore, my doctoral research fills the void in the extant literature on Mongolian post-secondary and higher education development.

Second, the global ranking of universities and research performance have become increasingly influential in contemporary discourses of higher education policy studies. However, much of the contermporary discourses defined by such transnational actors as the OECD, UNESCO, and the World Bank are rather ahistorical, and give little consideration to the nature of local contexts. Therefore, my thesis aims to contribute to understanding the historical development and nature of Mongolian higher education, and how it has affected human, economic, and social development. When examining how higher education has shaped the country's human capital, social mobility, and knowledge creation, my dissertation adopts approach to well-being as opposed to wealth. Thus, my doctoral dissertation provides empirical evidence both to Mongolia specialists and practioners and to a wider readership with regard to the role and impact of higher education in shaping intangible capital.

1.5 Disciplinary approach

The study of educational policies has yet to reach maturity as an independent disciplinary field, but it bears many of the attributes as a scholarly field. In particular, the study of higher education policies remains premature as a field of study despite a growing number of universities offering academic degree programs in higher education policies. According to Goodchild (1991), majority of such degree programs reflects a predominant focus on administration related matters designed to train professionals and practitioners for bureaucratic management tasks. However, higher education, in many regards, shapes the country's social, cultural and economic facets. Thus, the study of higher education policies possesses many philosophical and theoretical attributes as a scholarly field. In that regard, the study of higher education is interdisciplinary in nature, drawing upon theories and applications from related fields such as sociology, economics, political science, political science, philosophy, anthropology, and history. Contributions from these disciplinary fields to the study of higher education policies, however, cannot not be unidirectional as many of the issues they address are interdependent and interlinked.

Dressel and Mayhew (1974) earlier addressed the lack of contributions from many of the above disciplinary fields to the study of higher education for developing theoretical and methodological framework in the study. Dressel and Mayhew's book *Higher Education as a Field of Study* (1974) actually redefined the study of higher education from a practitioner-oriented method to a scholarly field of study. Since the mid of the 1970s when Dressel and Mayhew's book, the emergence and growth of contributions from sociology and economics to the study of higher education have become instrumental. Except for sociology and economics,

many of the above disciplines remain scarcely touched research and scholarship in higher education as a field of study.

Furthermore, the rise of emerging transnational actors such as international development organizations including the OECD, World Bank, and UNESCO, have penetrated the study of higher education in a recent decade. The global rankers, international publishing houses, and internationally indexed journals nowadays have become increasingly influential in changing the field of higher education studies by constructing globally defined standards and global ranking of research performance. Nonetheless, they give a little consideration of how a higher education system of a particular country has evolved through their historical paths within different social and political settings.

Therefore, I have attempted to take a holistic approach to my research question by drawing from a cluster of insights that touch the power of scholarship in many of the above disciplines. I have achieved it by drawing upon a variety of literature sources in the aforementioned disciplinary fields such as philosophy, economics, sociology, and institutional theory. My prior educational and professional background helped me to draw on interdisciplinary inquiries. I obtained my Master's degree in Educational Policy Studies with a concentration on Comparative and International Education at Loyola University Chicago. As part of my graduate studies, I completed several foundation courses for educational policies taught by sociologists, anthropologists, political scientists, and educational physchologists whose research area emphasizes educational policy domains. Upon my return to Mongolia in 2009 from my overseas graduate studies, I worked on several policy research projects, addressing social, economic, and educational issues in the country as a national consultant for various international development organizations, including the Asian Development Bank and the Swiss Agency for

Development and Cooperation. My consulting has been mostly in the areas of skills development, vocational education, gender and poverty analysis, and economic empowerment in Mongolia. Such consulting research projects have provided me opportunities to work with international academics and practitioners from different professional backgrounds in social sciences such as economics, public policies, and anthropology. By professional experience, I have been therefore exposed to specialized knowledge in economics and public policies to a certain extent. Hence, my dissertation seeks to synthesize the perspectives, knowledge, interconnections, and epistemology in philosophy, economics, sociology, and institutional theory to construct how higher education has shaped the evolution of intangible capital within different political, social, and economic contexts in Mongolian history.

1.6 Thesis structure

Having set the thesis in a broader context of higher education policy studies, Chapter One lays out the rationale of my doctoral research, and presents the research objectives and key contributions to the field of higher education policy studies. Chapter One also addresses where the thesis sits in terms of disciplinary areas, and describes my educational and professional background that helped me form interdisciplinary reflections.

Chapter Two builds the theoretical framework and provides a critical review of several strands of intangible capital including human, social, cultural, and intellectual capital. Chapter Two further extends the discussion of Clark's triangle as an institutional framework. Clark's Triangle is used to identify the resource asymmetries and power dynamics in higher education system. I examine varied interpretations of Clark's Triangle as a means of organizing the empirical evidence of the dynamics of tertiary education system and the dominant forces that

shape the dynamics. Chapter Three explains my rationale for employing path dependency as an analytical tool and for selecting documenteray sources as major data sources.

Although this study focuses on socialist (before 1990) and post-socialist (after 1990) periods, the pre-socialist social, political, and economic situations deserve a mention as it is a path dependency analysis. Therefore, Chapter Four examines the pre-socialist legacy of Tibetian Buddhism and how it shaped the socioeconomic, sociodemographic, and cultural patterns in Mongolia, which conditioned the country to pursue the path of socialist development. In Chapter Four, *Intangible Capital Shaped by Religious Tenets*, I describe how Tibetan Buddhism was introduced to Mongolia and how it spread influencing every facet of social and cultural life of Mongols. It attempts to elicidate how Buddhist monasteries took control of the stock of tangible capital in the country and thus further shaped the intangible capital through its monastic education, providing social mobility, influencing the economically active labor forces of the country, and featuring the art, literature, and philosophy of that time in Mongolia.

Chapters Five and Six are empirical chapters that each examines how two different political systems -socialist and post-socialist democracy have characterized the country's higher education development and its accompanied social and economic facets. The ideological origins of the both political systems are examined. Chapter Five *Intangible Capital Shaped by Bypassing Capitalism Ideology* begins by examining how Marxism-Leninism penetrated the Mongolian academic discourses and further led to radical social, economic, and educational reforms in the country. More specifically, Chapter Five explores how Marxism-Leninism's ideological doctrine of "Bypassing Capitalism" played a key role in defining the post-secondary education policy in Mongolia during the socialist period. I explore how the socialist post-secondary education system such as university education and polytechnical education under the centrally planned

economy shaped the country's human capital, social mobility, and knowledge creation. More specifically, the chapter explores how such regimented post-secondary education system created social class structure, which consisted of herders, proletarian industrial workers, and intelligentsia in the country. The chapter also describes the early intellectual efforts to create the Mongolian Academy of Sciences and visible achievements of scientific research endeavours in all aspects of Mongolia's social, economic, and cultural life during the socialist period. It also examines the socialist government's strategies and practices of governing different stock of knowledge generations, which aimed to build socialist non-capitalist development in the country.

Chapter Six *Intangible Capital Shaped by Neoliberal Capitalism* covers the post-socialist period after 1990. The chapter begins by briefly describing the arrival of democracy and then examines the emergence of neoliberal capitalism in Mongolia. Through an investigation of the 'shock therapy' reform implemented by the Mongolian government under the leadership of the International Monetary Fund, which included privatization of publicly owned assets, liberalization of prices, reducing the state subsidies, and facilitating foreign direct investments, I explore how the economic reforms took precedence of educational policy reform during the transition in the 1990s. The chapter then examines implications of the transition to liberal market economy for transforming the institutional landscape of Mongolian higher education. In particular, Chapter Six examines the social, demographic, and economic factors that have led to higher education expansion and mass enrollment since 1990. The significant portion of Chapter Six explores the extent to which mass enrollment enables socioeconomic mobility and employment opportunities for graduates, and how graduates from certain segment of socio-economic background negotiate their life after graduation in a neoliberal free market economy. The chapter then explores the social class trajectories, which condition the unequal economic

resources to access to quality tertiary education in post-socialist neoliberal capitalism. Finally, Chapter Seven examines the research and development efforts and the extent to which it enables advancement to social, economic, and cultural lives in Mongolia. In so doing, the chapter describes the institutional structure of existing research system, scientific research cadre, and issues surrounding them.

This thesis concludes with Chapter Seven, *Conclusion*, in which I revisit the theoretical framework. Chapter Seven addresses how the study findings are related to the theoretical rationale of the Clark's Triangle. This concluding chapter closes with a discussion of conceptual and methodological implications for the future research on higher education policies.

CHAPTER 2: THEORETICAL FRAMEWORK

2.1 Introduction

Here I present an overview of the evolution of the concept of capital and its overarching forms within social, economic, cultural, and institutional contexts. This is essentially a selective discussion of elements in the history of economic thought, but it is not a comprehensive explanation of broader capital theories. I investigate the development of the concept of capital by considering the characteristics of capital and the explanatory role the concept has played in the history of economic thought. The findings from the review of the extant literature describe the way the concept has been evolving, which reflect the changes in the socioeconomic system under scrutiny as well as the emerging needs of those changes.

The definition of "capital" varies from author to author depending upon whether they take physical, personal, human, social, cultural, or intellectual emphasis as the benchmark, but there is a considerable overlap in the definitions. The question of what should be categorized as capital, who should receive a share of the return in the production of the capital and what kind of share in what proportions have become an expansive one. The concept of capital is thus a time-sensitive epistemology.

In general, a theory of capital is defined as an element of production that is produced from inputs featured by investments, ownerships, returns and consumptions. As the scope of capital has been extended more and more to less tangible resources concerning ownerships, investments, and returns, it has become necessary to study the concept more broadly in order to

determine whether a particular non-physical resource can legitimately be considered as capital or not.

As the definitional boundaries have been expanded to include notions of intangible and collective capital (e.g., human, social, cultural, and, lately, intellectual capital) the concept of capital is increasingly debated in academic discourses. Central to such an evolution of the concept is the notion that there are two types of capital: tangible (material form of capital and sometimes referred to as economic capital) and intangible (non-physical assets). The latter creates the former but they are inextricably linked as each requires the dependence on or need for the other.

In mainstream economics, the conventional concept of intangible capital refers to knowledge assets derived from information and technology advancements and innovations. Thus, existing studies have increasingly emphasized the investment in intangible capital as a key driver of national wealth, national competitiveness and economic development. Nonetheless, the concept of behavioral economics lately broadens this conventional notion of intangible capital to encompass various dimensions of human development— social, cultural, and intellectual that can aid to improving one's quality of life and well-being. This provides a more holistic approach to the study of intangible capital.

In questioning who owns the means of capital production and who gains benefit from the means of production, there are two major theories that introduce very diverging conclusions about how the economy and society should function: Adam Smith's *Wealth of Nations* in 1776 and Karl Marx's *Capital: Critique of Political Economy* in 1867. Smith advocated for what we today call a free market economy. According to Smith, individuals should freely pursue their own benefit through being both a consumer and a worker. For example, when a consumer

purchases a product, it helps a producer, who in turn might hire another worker, thus economic benefits would spread out to everyone in a society. Smith believed that in a free market economy, there should be less state or government intervention, but it is regulated by market. According to Smith, the role of the state lies in protecting the wealth of the nations, which was produced in free market economy. In contrast, Karl Marx theorized that capital is a surplus value generated and accumulated by capitalists or bourgeoisie by producing and circulating commodities at the expense of laborers. The laborers are paid for their labor with a wage that allows them to purchase the commodities circulated and sold in the consumption market by capitalists (Marx and Engels, 1984a;b). Thus, Marx asserted that this process of producing capital creates social relations, which are exploitative in nature, widening the social class differences and inequalities in wealth distributions. According to Marx, the capitalists who accumulate the surplus value make an investment, which maximizes both the surplus values and labor force in number and extent but not the actual wages of workers (Marx and Engels, 1984).

Marx's doctrine of surplus value was the most influential in Russia and Germany, serving as a corner-stone for socialist system. The Soviet Union, Eastern, and Central European communist regimes were based on Marx's doctrine in the early twentieth century. Marx not only critiqued the capitalist economy but also addressed the issues pertaining to social class relations, namely the capitalist class, who constitute the minority on one hand, and on the other hand, the proletarians or wage-workers, who constitute the masses, and whose life is increasingly dependent on capitalists. This was the essence of the profound influence of his doctrine to the establishment of these communist regimes.

Marx's theory of capital and capitalism is subject to many different interpretations depending on different historical conditions. Andrzej Walicki, a Polish historian, explains that

the collapse of communism in the Soviet Union and Eastern Europe was due to the faulty interpretation of Marxism, which is utopian in character, as they pursued a '*marketless society'* when tracing the historical development of Marxist thought (Walicki, 1995 p.2). According to Walicki, Marx's surplus value doctrine did not acknowledge political coercion in the form of dictatorship or totalitarianism, but it addressed uncontrollable forces of the market that should be compromised through rational planning to liberate the masses of working class from their dependence on capitalists. Hence, Walicki pointed out that the scientific and critical part of Marxist legacy can still serve as a method for critically analyzing the multiple shortcomings of capitalist societies.

2.2 Human capital

Influenced by Adam Smith's (1776) discussion of increasing the division of labor and skills as a main source of prosperity and wealth of a nation, the human capital theory emerged in the 1960s primarily through the work of American economists Theodore Schultz (1971), Gary Becker (1975), and Jacob Mincer (1958). It is at this point that human capital became a matter of public policy as well as market behavior. The earlier concept of human capital introduced by Smith postulated that increasing the productive capacity of workers is equally as important as machinery and other physical capital. However, Smith did not develop it as a theory, and the concept of human capital did not become a public policy until the 1960s. The human capital theory developed by the above American economists set the framework for the government policies in the 1970s, particularly in the United States. Such human capital-induced policies stressed the significance of investment in education, training, skills, and knowledge with certain expected returns that investment in education not only yields surplus value to individuals to

increase their earnings, and improve their health and quality of life, but also to their agents (firms and government) to increase their labor productivity (Schultz, 1971; Becker, 1975).

Theodore Schultz (1971), one of the pioneers of human capital theory, asserted that investment in human capital encompasses expenditures on education, health, policy-induced migration, and a number of other things, including leisure activities. Later, Gary S. Becker (1975) attempted to determine private monetary returns by measuring to see if there are positive correlations between the number of schooling years and the changes in individuals' wages and frequency of employment. Since the 1960s, the human capital theory has been a key argument behind the mass consumption of higher education, especially public higher education (Trow, 2006) in the United States.

Nonetheless, the human capital-induced policies did not account for the effects of complex human relationships in human history, in particular the systemic discrimination directed towards certain ethnic groups in society. The economic circumstances of certain segments of populations have deteriorated principally due to the declining valuation given to their human capital relative to the mainstream populations. Notably, African American populations in the United States and indigenous populations in the Anglophone countries such as the United States, Canada, Australia, and New Zealand could also evoke the consideration of insights from social history, social policy, and social institutions to particularly rigid mathematical modelling of human capital theory in mainstream economics.

Central to the concept of human capital as both individual and social assets, the question of what social returns human capital can generate in society has been subject to many other conceptual analyses and subsequent theoretical modifications, namely cultural capital (Bourdieu

& Passeron, 1977; Bourdieu, 1990), social capital (Lin, 2001), intellectual capital (Stewart, 1997; Lin et al, 2001), and intangible capital (Tomer, 2008; 2016).

2.3 Social capital

Social capital, as conceptualized by Lin (2001) and Lin et al (2001), is individuals' investment in both formal and informal social networking, through which they gain access to certain resources. There are two types of social capital: formal or organizational social capital, and informal social capital, namely, informal networking. The social returns to investments in formal or organizational social capital are defined as facilitated and coordinated actions, efficient public institutions, and effective sanctions, which collectively lead to greater economic growth (Tomer, 2016). The returns to investments in informal networking are embodied in individuals. Through informal networking, individuals gain access to resources and opportunities such as useful information, social influence, social credentials, and reinforcements (Lin, 2001; Lin et al, 2001). As described by Tomer, the intangible form of social capital "involves different relationship dimensions such as trust, norms, obligations, and identifications" (Tomer, 2016 p. 133).

Nonetheless, the standard social capital insofar falls short on capturing different dimensions of resources in different social stratifications, namely what social network provides more privilege and prestige than other types of social networks. For example, the social capital of working class communities are perhaps embodied in such safety nets as exchange of baby-care services or aid in housebuilding or moving houses, but fails to offer social prestige or access to building relationships with well-to-do members from affluent communities.

Furthermore, a relationship may be dissolved or interaction may be declined, when one of the parties from a low-social stratification becomes upwardly mobile and gets a better job or moves to a more affluent neighborhood. This flexibility raises questions of under what conditions might the dissolution not occur despite both the upward or downward mobility in both informal and formal social networks. Such questions remain relatively unexplored in the existing literature. The majority of existing social capital research is statistical, and rarely tells much about any individual's experience as he or she moves up or down the social ladder to access to his/her desired social network and to gain payoffs from social capital in a given society. Thus, it is also important to ethnographically study the notion of social capital solidarity versus social mobility routes and entry of specific social stratification groups to certain social networks. Also significant is that sex, race, migration, geographic references, political manipulations, and complex historical processes such as urbanization, industrialization, immigration, and globalization are important variables to define social capital formations and their inherent characteristics.

Additionally, the extent to which roles and values of social capital supress or contradict the meritocracy remains relatively unexplored and is not sufficiently theorized. The fact that higher education produces the characteristic forms of social capital and status attainment is seldom pointed out or otherwise problematized in the existing literature. Given that individuals' credentials and qualifications as reflected in their attainment of higher education is important determinants of social capital, one way of addressing the above question is to ask the following: under what conditions does higher education play an important role in one's social mobility, or conversely, to what extent does higher education create social stratifications?

2.4 Cultural capital

Cultural capital, as defined by Bourdieu and Passeron (1977), represents an investment in reproducing values of symbols and meanings, which are determined as norms by the elite class, and assumed to give individuals prestige and a higher status in society. As Bourdieu pointed out, cultural capital could become a major source of social inequality as certain forms of cultural capital are valued over others, and can help or hinder one's social mobility and credentials just as much as income or wealth. According to Bourdieu, there are three forms of cultural capital—embodied, objectified, and institutionalized. One's accent or certain style of language is an example of embodied cultural capital, while luxury items and belongings that one uses (for example, a car, clothing, and art collections) are examples of objectified cultural capital. The institutionalized cultural capital refers to credentials and qualifications such as degrees or titles that symbolize cultural competence and authority.

Bourdieu's cultural capital theory frames analytic tools, which can provide an understanding of not only micro but also macro forces that lead to social and economic inequalities. Thus, Bourdeau's theory may effectively explain the social phenomena of economic and educational inequalities, taking into account of the specific social and cultural conditions in a specific country but also in specific global regions such as a North and South divide. Cultural differences in a North-South construct and spaces for adaptations as ethical practices depending on their set of beliefs and value systems are nowadays major subjects of discussions among sociologists with regard to globalizations and international standards.

Drawing on Bourdieu's theory, in raising the question of whether or not cosmopolitanism is institutionalized as cultural capital, Igarashi and Saito (2014) concluded that the globalization of education institutionalizes Western academic qualifications as global cultural capital, but

access to this cultural capital is unequal among different groups of actors according to their geographical locations. There are two perspectives regarding the emergence of globalization among sociologists: one is due to the growth of transnational flows of people and cultures beyond national borders. Another is the universal institutionalization of discourses embedded in human rights and global ecological issues that take global citizens as a primary frame of reference rather than nationality (Beck, 2003; Calcutt et al., 2009; Phillips and Smith, 2008; Saito, 2011; Skey, 2012; Szerszynski and Urry, 2006; Woodward et al., 2008). For instance, in discussing the challenges and opportunities in protecting the Ethiopian coffee by Fair Trade (in order to protect Ethiopian coffee producers from the volatility of coffee prices on the international market), Hoffman and Boudry (2014) address the fact that certain developing countries may fail to meet the Fair Trade standards due to their existing cultural practices, as reflected in restriction of land ownership for women and involvement of child labor. In indigenous cultures, subsistent farming is often characterized by a structure in which the entire family participates, including children. Nonetheless, certain conditions of the Fair Trade standard ensure gender equity, no child labor and women's economic empowerment.

Hence, the question of who is to adapt to whose values is answered from two different approaches: universalist as opposed to relativist. While universalists propose a common set of values and common norms for all (Hollenstein, 1995; Evanoff, 2004), the relativists, on the other hand, argue that norms, values, beliefs, and rationalities are relative, depending on each particular cultural group. Thus, cultural diversity should be accepted and applied (Evanoff, 2004; Martin and Nakayama, 2009). In addressing the limitations of both approaches including universalism versus relativism, a constructivist approach arises, seeking common ground through a self-reflective analysis and the understanding of the other (Habermas, 1991; Ulrich, 2008).

Hence, the discussion of what cultural practices hinder the institutionalization of cultural capital and what cultural elements offer resources that can be capitalized within the context of globalization and the North-South construct is multidimensional in academic discourses. However, when it comes to international standards advocated by international organizations it is more unidimensional because a universalist approach is more institutionalized. For example, international standards attempt to ensure gender equity and no child labor regardless of different cultural practices.

2.5 Intellectual capital

Unlike human, social, and cultural capital that have been defined from such disciplinary perspectives as sociology and economics, intellectual capital is characterized by largely business related features. Despite the lack of consensus on its definition, the recent literature on intellectual capital is based on the concept envisaged earlier by Stewart (1997) and Edvinsson and Malone (1997). According to them, intellectual capital is a kind of property characterized by knowledge and information that can be put to use to create wealth for future earning capabilities. The existing studies identify four to five different components of intellectual capital, namely market assets, human capital assets, intellectual property assets and infrastructure assets (Brooking, 1996), but a consensus has yet to be reached.

According to Lin and Edvinsson (2011), national intellectual capital is primarily comprised of five types of components: human capital, market capital, process capital, renewal capital, and financial capital. Human capital as one of the components of intellectual capital, represents a nation's investment in training qualified human resources, such as overall higher education attainment, skilled labor, public expenditure in education, professionals and gender parity in STEM fields (Lin and Edvinsson, 2011; Lin et al, 2013). Market capital refers to the

presence of international trade in the country, openness to foreign investment and globalization, competitiveness and resilience of a national economy. Process capital represents the requisite physical and IT infrastructure, and the quality of scientific research institutions that enable R&D innovations, as well as a favourable legal environment for entrepreneurship. Renewal capital refers to a country's R&D expenditure, scientific publications, and patents, whereas financial capital represents a country's gross domestic product (GDP) per capita, external debt, and industrial production of major economic sectors. Yet, these concrete descriptions of components of intellectual capital fall short in addressing the interplay between intellectual capital and social well-being. Their net contribution to social well-being is often very ambiguous in existing studies.

Moreover, the available studies, in large part, used quantitative indicators based on a macroeconomic level, mainly the GDP per capita, R&D expenditure as a proxy to determine the correlation between investment in intangible assets and economic growth in countries (Lin et al, 2014; 2013). Although some studies used more scrupulous indicators, they are still numerical indicators, measuring the overall higher education attainment, university-industry collaboration, legislative and regulatory framework, research incentive mechanisms, national innovation policies, intellectual property systems, literacy rate, pupil-teacher ratio, internet subscribers, public expenditure on education, patents per capita (Lin and Edvinsson, 2011). Typically, such quantitative analyses based on macroeconomic indicators have yielded precise estimates of the effects of investment in intangible capital but have provided little insight into how and why it might be doing so. As defined by Nahapiet (2011), economic activity is a socially situated action, and economic institutions are socially constructed, the extant research on intellectual capital

needs to be extended to encompass the dimension of human development and well-being beyond mere economic performance.

Additionally, most of the studies on intellectual capital have focused on emerging and advanced industrial countries, which are rich in knowledge-intensive activities, such as the United States, Nordic countries, Japan, South Korea, Singapore, China, and Brazil. There is a few studies on developing nations. The type of activities considered as knowledge-intensive is, in large part, defined by IT-related innovations. However, the effect of such IT-related innovations or technological advancements on social and human development is largely neglected in the existing studies. Dean and Kretschmer (2007) described this situation as a post-industrial age characterized by knowledge-based economy. According to Dean and Kretschmer, this phenomenon is fundamentally shifting the traditional factors of capital production such as manufacturing and producing goods by the subsistence sector.

The conception of knowledge as a resource with commercial viabilities has spawned new theories regarding innovation and the knowledge-based economy (OECD, 1996). A wide variety of visions, ambitions, concepts, and strategies aimed at introducing and advancing the knowledge-based economy have been proposed by both academicians and practitioners for the past ten years, which define the line between benchmarking and bench-learning countries. However, such variety of visions and concepts has been also instrumental in widening the divide between centers and peripheries of knowledge, which can portray what Harold Innis (1951) defined as a "monopoly of knowledge". Yet, they rarely address how developing nations can participate in this knowledge-based economy monopolized by developed countries. The trademark dispute between Starbucks Company of the United States and the Ethiopian Intellectual Property Office in 2006 is a good example of the monopolized knowledge-based

economy. As Ethiopia was able to acquire the trademark for its four specialty coffees in the international market, the trademarking and licensing scheme immensely increased the income of Ethiopian coffee farmers and improved the living standards of coffee producers. Prior to the initiative to protect the Ethiopian coffee as an intellectual property (IP), the coffee farmers were making as little as US $1.00-$2.00 (approximately) against the final retail price, ranging from US $20.00 - $28.00 per kilogram in the international market (WIPO, 2009). After the IP protection, the Ethiopian coffee producers could secure their income at around US $6.00-8.00 per kilogram (WIPO, 2009). The Ethiopian Coffee Trademarking and Licensing Initiative has been instrumental in demonstrating how traditional knowledge protected by intellectual property rights can bring benefits to its indigenous people and communities. Thus, Hoffman and Boudry (2014) addressed the need to strengthen the capacity of the Ethiopian national Intellectual Property Office and to build greater awareness of intellectual property rights (IPR) in local universities and industries in Ethiopia in order to ensure greater sustainability of intellectual property assets of coffee producing. Therefore, strengthening the local universities and national policies relevant to IPR would certainly enable developing nations to eventually position themselves as active agents of knowledge rather than as objects of knowledge. It would also enable exchange of knowledge and knowledge transfer between North and South.

2.6 Intangible capital

Although the concept of intangible capital is rather new, a more assertive definition has been proposed by John F. Tomer, a behavioral economist, in his two books titled *Intangible Capital: Its Contribution to Economic Growth, Well-being and Rationality* (Tomer, 2008) and *Integrating Human Capital with Human Development: The Path to A More Productive and Humane Economy* (Tomer, 2016). In the quest to integrate human capital with human development, Tomer addresses a wide range of socioeconomic facets of human capital that are not accounted for in mainstream economics, such as obesity, adverse childhood experience, and chronic ailments.

Intangible capital, as defined by Tomer, refers to all the capacities and skills (mental, social, physical) embodied in humans and their relationships with one another. According to Tomer (2016; 2008), intangible capital includes not only the conventional human capital assets (knowledge and skills) but also the more intangible types of human capital such as personal capital (emotional intelligence and quality of personal attributes), social capital (quality of relationship in or outside organizations), and part of intellectual capital. As part of the last item, Tomer includes more personal aspects embodied in individuals such as personal, informal, and informational aides to improve work performance. But he excludes the institutional and structural aspects of intellectual capital such as intellectual property and knowledge protected by legal rights (copyrights, patents, trademarks, know-how). According to Tomer, despite their intangible nature, intellectual properties are not part of intangible capital to the extent that they are more disembodied knowledge assets than embodied in humans (Tomer, 2008).

Notwithstanding Tomer's exclusions, it is essential to expand the definitional boundaries of intellectual capital to encompass the dimension of human development in intellectual

properties. In other words, it is essential to account for the net contribution of intellectual properties to social well-being. To that end, intellectual capital in a form of intellectual properties could be considered as part of intangible capital. Therefore, I take a stance on including the institutional and structural aspects of intellectual capital as part of intangible capital in my dissertation.

Furthermore, Tomer's essence of the argument to integrate human capital with human development lies in addressing a socioeconomic dysfunction, which is attributable to a deficiency in some type of intangible capital causing each social problem (Tomer, 2016). He identifies the internal (low personal social, or health capital that individuals are endowed with) and external factors (technological change and an infrastructure of, for example, chronic ailments) that influence an individual's choice of diet, behavioral patterns and life. Thus, Tomer's theoretical proposition of intangible capital leads the direction of mainstream economics towards a well-being approach as opposed to a welfare approach. For example, Tomer notes that the innovations related to computer software programs are becoming more and more sophisticated in response to the degree of maliciousness of the hackers, phishers, and various types of viruses. However, the investment goes towards improving the technical competency of computers rather than reducing the malicious and antisocial human actions that cause harm to computer users.

Given the relative newness of intangible capital as a theory, which is less than decade old, there are no studies that either validate or negate the definitional, conceptual, methodological, philosophical, historical, and sociological factors of Tomer's novel views of intangible capital to date. According to the World Bank (2005) intangible capital includes raw labor, human capital, social capital, and other factors such as the quality of institutions, namely

quality of governance, rule of law, control of corruption, political accountability, political stability, and absence of violence. The World Bank (2005) further defines human capital as one of the intangible capital components including skills and know-how embodied in the labor force, while social capital encompasses the degree of trust among people in a society and their ability to work together for common purposes. The World Bank thus considers that investments in education and justice systems, and the policies aimed at attracting remittances are the most important means of increasing the intangible capital. Hence, the international development organizations such as the World Bank, OECD, and others have increasingly emphasized the investment in intangible capital as a key driver of national wealth, national competitiveness, and economic development.

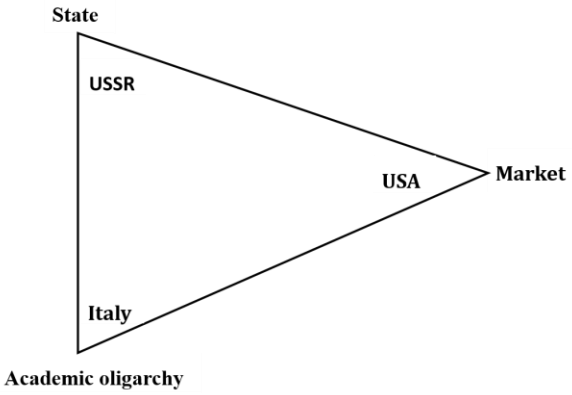
Apart from the concept of intangible capital as introduced by the World Bank, the existing studies in mainstream economics identify information and communication technology (ICT) related innovations as intangible assets. Thus, there is a great body of research in mainstream economics that increasingly emphasizes investments in R&D efforts in ICT sector (Corrado et al, 2009; Sanchez, 2000). In addition, the definition of intangible capital overlaps with the definition of intellectual capital in some studies (Cummins, 2005). The conventional concept of intangible capital, as defined in the mainstream economics, refers to knowledge assets derived from information and technology innovations but largely ignores the aspects related to individuals' social well-being and human development. Therefore, the concept of behavioral economics, as reflected in Tomer's work, broadens this conventional notion of intangible capital to encompass the dimension of human development and social well-being, giving a more holistic approach to intangible assets, including human, social, cultural, and intellectual aspects of human development.

2.7 Institutional framework

Any form of capital, including both tangible and intangible is created within a certain vacuum of institutional framework. My question here thus specifically concerns how certain types of institutional mechanisms or institutional changes affect the creation, deficiency, distribution, role, and value of intangible capital. As higher education has become recognized as the catalyst for social, economic, and cultural progress, my conceptual framework underlying the institutional framework, centres on Burton Clark's triangle of coordination as a paradigm for describing higher education systems and their interaction with three major forces — state, market, and academic institutions (Clark, 1983). The point of departure in this section, then, is to revisit key forces in higher education systems as an institutional dimension, which shapes the creation, deficiency, distribution, role, and value of intangible capital, when interacting with the state and market. Clark's triangle, as a methodological paradigm, is a means of organizing the empirical evidence. It does not depend on any particular definition of the above types of capital but recognizes varying push-pull effects on government, higher education, and market behavior that shape the intangible capital evolution.

When describing the complex system of tertiary education, Clark identifies the three dominant forms of forces situated within a two-dimensional space of a triangle (Figure 2).

Figure 1: Clark's triangle



Clark refers to these three forces as part of a separate system that has certain dynamics of its own. The location of any society within the space of the triangle represents different degrees of these three elements. According to Clark, the process of coordinating each of these three systems is complex in nature, encompassing political coordination, academic coordination, and market coordination. The political coordination refers to the fact that issues centering on higher education serve as an interest of political parties, involving ministries, parliaments, and jurisdictions of a country as well as their relevant policies and legislations.

Furthermore, Clark describes the academic coordination as a system of "academic oligarchy" which is one of the three vectors of the triangle. By this term, Clark means the ways in which academics seek hegemony in the system in a form of professional associations and science councils that can exert powerful collective voices at national, provincial, and local levels. Clark argues that prominent academics are able to transfer their power to bureaucratic and political levels within and across disciplines, within and across institutions, within and across sectors.

By contrast, Clark points out that a system may be coordinated primarily not by state, nor the academic oligarchy, but instead by the market forces. According to Clark, the market

interaction along with its three functions such as consumer market, labor market, and institution market, coordinates the behavior of individuals and organizations. The constantly changing labor market shifts consumer preferences from one field to another and one specialty to another. Whereas, the institution market, according to Clark, refers to the interaction between institutions and consumers in the market. In other words, Clark stated that privileged institutions are able to manipulate the state by maneuvering the consumer and labor markets as they "secure their brand name position in the consumer and labor markets" (Clark, 1983, p.171).

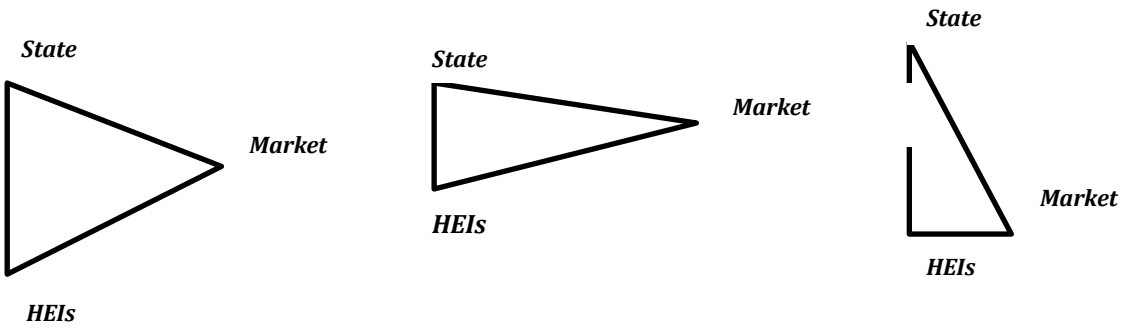
Moreover, the interpretation of Clark's triangle varies from author to author depending upon whether they view it as static or dynamic. Maggio (2012) calls Clark's triangle a "zero-sum effect model" (p.6), because the model situates the system of the three forces in one place within the triangle in a certain period, which allows for comparison of systems at any given historical period, but it does not capture the evolving dynamics of these three forces and their influences upon one another. In addition, contemporary scholarship offers a variety of versions to the triangle such as shifting from state control to state supervision (van Vught, 1995) and a state cooperation with the academe and the market (Jongbloed, 2003). For instance, Salazar and Leihy (2013) propose a neo-Clark's triangle, which they have called "microcosmographia". According to them, the neo-Clark triangle consists of multiple triangles that depict the major domains and their interacting forces. According to Salazar and Leihy (2013) and Lang (2015), the three points on the triangle are not fixed but have dynamic qualities and the forces changing the shape of the Traingle are altered due to wide-ranging changes occurring in the higher education system since 1983, when Clark's triangle was first published. Lang (2015) considers that the triangle has dynamic vectors representing multidirectional forces that define the shape and performance of a system, though it would always remain triangular in terms of its shape (Figure 2). According to

Lang (2015), the legs of the triangle are elastic, and they constantly change and interact with each other defining the force in the system. If the triangle is equlaterial, according to Lang (2015), there is no hierarchy among the three levels.

In addition, the academic oligarchy leg of the triangle is subject to various interpretations such as higher education institutions, namely colleges and universities collectively (Lang, 2015), "academe," (Jongbloed, 2003), "managers," (Salazar and Leihy, 2013), and "steering core" (Clark, 2004). Due to the institutional separation of research and teaching inherited from the socialist past, the following two versions apply to my doctoral dissertation: 'academic oligarchy' (Clark, 1983) and higher education institutions, namely universities and colleges collectively (Lang, 2015). The former version (academic oligrachy) applies to examining the interaction between the state and the Mongolian Academy of Sciences (MAS) for knowledge production. Historically, the MAS has been the main source of knowledge production in the country as research is mostly concentrated in its affiliated research institutes, while universities primarily has a training function. The latter version of the academe leg (universities and colleges collectively) applies to examining the interaction between the state, market, and higher education isntitutions in Mongolia.

Overall, if we consider Clark's triangle as dynamic, the resultant shape of the triangle identifies the forces inherent in the tertiary education system, and identifies the resource asymmetries and power dynamics affecting the deficiency, distribution, role, and value of intangible capital in societies.

Figure 2: Dynamic version of Clark's triangle



For example, if the university education and training are fully subsidized by the state budget, then the length between the state and HEIs legs would be shorter, while the length between the market and HEIs would be longer. If there is a decline in public funding for higher education, then universities would seek other sources of private funding or marketization processes, which would shorten the third leg of market in Clark's triangle. Hence, the strength and influence of one dimension results in different triangle shapes.

CHAPTER 3: METHODOLOGICAL FRAMEWORK

3.1 Path dependency as an analytical framework

My analytical process is an application of path dependency. In existing studies, there are two versions of path dependence: economic and historical. Although the historical version applies to my thesis, the economic version of path dependence deserves a brief explanation here. Path dependency was originally developed as a theory by economists in the 1980s to analyze technological adaptations and industrial evolutions (Stack and Gartland, 2003). The ahistorical approach, which termed as path independence and path creation, is mainly explained within the context of macroeconomic analysis in the existing literature. As presented in the works by (Arestis and Sawyer, 2009), the path independence considers that there is an equilibrium position, which is predefined, and is not affected by the actions that institutions take towards which economy or market will generally tend to move. In other words, path independence can be explained from the view of an endogenous growth. By contrast, the path creation narratives as presented in the works by Stack and Gartland (2003) focus on present-time effects as actors whether they be social, political, and entrepreunerial, shape the path of their own time by setting motions of social, economic, and cultural practices. In macroeconomic analysis, path creation focuses more on logical time versus historical time based on highly pre-determined statistical and mathematical models.

Furthermore, path dependency has been recently adapted as a methodological framework particularly in political science and sociology to conduct comparative historical analysis of social and political institutional development, namely in the works by Mahoney (2000) and Page (2006). The path dependency method, by definition, stresses that a contingent historical event triggers a subsequent sequence that follows a relatively deterministic pattern. The present

occurrences thus can be explained based on antecedent historical conditions. According to Mahoney (2000), the path dependency exhibits two types of path dependent sequences: self-reinforcing and reactive. In the case of a self-reinforcing sequence, initial steps in a particular direction induce further movement in the same direction, and over time, it becomes difficult or impossible to reverse the direction. In the case of a reactive sequence, each event in the sequence is a reaction to antecedent events, conditioning the subsequent events. In both cases of analysis, according to Mahoney (2000), the preceding events in the sequence are important to determine final outcomes.

Path dependency as a methodological framework for analyzing the development of social and political institutions has received certain critiques. The main strands of the critque in social sciences mainly target towards the conceptual clarity drawn from the theory of institutional changes. According to Thelen (1999) the vague notion, which simply assumes that history matters or that the past influences both the present and future, reinforces the "idea of institutional "lock-in" which makes change impossible or unlikely" (Rixen and Viola, 2009 p. 1). But Rixen and Viola (2009) assert that path dependence does not imply an incapability of any change but its concept needs further extension and taxaonomic development that enable to examine the endogenous and exogenous factors influencing the institutional trajectories and historical pathways of institutional development. In seeking to explain how and why institutional change occurs, Page (2006) suggests to identify whether certain process or system has a path-dependent consequence or historically independent stability. Hence, Page (2006) proposes two types of path dependence: path dependent outcome and path independent equilibra. Hence, the question arises that whether the subject of my research is path dependent or path independent.

As Mongolia is a post-socialist country, its seven decades of socialist legacy has had both enduring and evoking effects on present social, political, and economic transformations. In order to understand the current post-socialist transformations, it is essential to understand the nature of the socialist legacy that it entails (Kay et al, 2012). The post-socialist transition in the early 1990s entails transformations aimed at the dismantling of established socialist legacies of the centrally planned economy and the formation of new paths. The logic of centrally planned economy was to achieve a higher quality of living, while maintaining a more egalitarian society as postulated by Marxism-Leninism. Although the inquiry of why the socialist centrally planned economy became alienated from its original purpose is subject to various interpretations, but the logic of neoliberal path the country has taken in the early 1990s has led to a more complex socioeconomic situation in the aftermath of socialism. This is especially true in the case of higher education as the 1990-political and economic transformation brought the logic of neoliberal market into Mongolian higher education that was fully subsidized and centrally planned during the socialist period. It is witnessed in such government reforms as introducing tuition fees, legalizing private higher education, and cutbacks in state subsidies. The emergence of private providers and tuition-based public universities have introduced new lines of differentiation in terms of quality, prestige, and selectivity, which in turn create a new form of social stratifications. Al this witnesses more reactive path-dependent outcome. On the contrary, the institutional separation between teaching and research in post-socialist Mongolina higher education portrays more self-reinforcing path dependent outcome. The present limited research production at universities is a historically contingent practice. The advanced scientific and academic research was mostly concentrated at the Academy of Sciences, while universities had primarily a manpower training function due to the socialist legacy inherited from the Soviet

science management system. These special issues in post-socialist Mongolian higher education system clearly witness both self-reinforcing and reactive outcomes of path dependency as postulated by Mahoney (2000). Therefore, the historical version of path dependency applies to my doctoral research inquiry. Additionally, emplying path dependency as an analytical framework allows me to identify the institutional trajectories of Mongolian higher education and how such trajectories have been shaping the intangible capital evolution in the country, namely human capital, social stratification, and knowledge creation.

3.2 Data sources and data analysis

The data sources for this study came mainly from documents. Document analysis, sometimes referred to as a text analysis involves methods and techniques to examine, to analyze and to make inferences from a variety of written and oral sources (Berelson, 1971; Anderson, 1977). According to Bazerman (2006), document analysis is "The key to understanding the variety of methods of text analysis is to see that texts are parts of actual social relations—written in specific circumstances at specific times and read in specific circumstances at specific times, thereby realizing concrete social transactions" (p.77). I focused not only on the linguistic features of texts, but also on social, cultural, and political processes, within which the texts were constructed.

The sources of documents for my doctoral research came in a variety of forms such statistical bulletins, statistical repositories, government documents, legislations, regulations, policy notes, technical reports, and online news portals. I have also conducted mass media observations to determine the public discourses related to the topic of my research. According Hansen et al (1998), media content analysis is a means to monitor social and cultural climate.

Thus, mass media observations have also provided me a clue to what official documents, legislations and project reports to further check in order to determine the social and political conditions from which such message and particular social climate emerged. To ensure the quality of the selected documentary data, I employed the four criteria suggested by Scott (1990): *authenticity, credibility, representativeness,* and *meaning.* I sought to establish the criterion of credibility and authenticity of documents based on the origin, authorship, and ownership of documents.

The aggregated statistical data were retrieved from various sources such as statistical reports archived in the National Archival Office of Mongolia, statistical bulletins prepared by the National Statistical Office of Mongolia, and official databeses of the UNESCO, World Bank, and Ministry of Education, Culture, and Science of Mongolia (MECS). Additional background data was taken from various policy documents and legislations posted on the official websites of the MECS, Ministry of Labor (MOL), and the Mongolian Academy of Sciences (MAS). In addition, I retrieved data from a number of secondary sources and scholarly publications, particulary for data pertaining to socialist periods. However, it is important to note that such secondary research materials originally addressed different research questions than my doctoral research inquiries. Thus, they were used primarily for reanalysis. I have also used project reports that I produced as part of my independent consulting assignments for international development organizations such as the Asian Development Bank and the Swiss Agency for Development and Cooperation between 2010 and 2015. Other supplementary qualitative data was taken from newspaper news from major national newspapers archived at the Mongolian State Library, dating back to the socialist period before 1990 and the post-socialist after 1990.

Of note, there is no comprehensive longitudinal statistical analysis of Mongolian scientific and academic research productivity to date, thus the effects and causes of policy changes have not been traceable on that level. To this end, the numerical data on some R&D indicators and research outputs were retrieved from the annual reports of the Mongolian Academy of Sciences for 2005-2012. As there is no systematically collected historical data concerning the R&D indicators and research outputs of the country, I performed an analysis to provide estimates of annual research productivity of MAS using the data for 2012. In addition, I retrieved the qualitative data about ongoing and completed research projects undertaken by MAS from its annual reports. Each annual report of MAS consists of 250-280 pages in length.

In terms of data analysis pertaining to R&D indicators, I adapted the criteria codified in the OECD methodological handbook, known as the Frascati Manual. As Frascati Manual was only introduced in 1994, statistical data from earlier years during the socialist period was not available. Therefore, the research productivity during the socialist period is analyzed qualitatively using the data obtained from archives and a few UNESCO documents. The scope of research productivity during the socialist period is analyzed based on following indicators such as the growth in new research units, the growth in scientific personnel, growth in population, and other cultural advancements in arts and humanities.

Lastly, this study was exempt from the review by IRB (Institutional Review Board) as my doctoral research has used publicly available data. I tooke the necessary steps to ensure if the data sources fit within Research Ethics Board Office's (REB) guidelines at McGill University for research that does not require IRB review. REB staff at McGill confirmed that my doctoral research was exempt from IRB review after a face-to-face meeting regarding the proposed data sources for my doctoral research.

CHAPTER 4: INTANGIBLE CAPITAL SHAPED BY RELIGIOUS TENETS

4.1 Introduction

As the concept of path dependencies is utilized in my thesis within the framework of evolutionary development of intangible capital, I attempted to sketch pre-socialist social, cultural, and economic patterns, which conditioned the earlty 20th century socialist revolution in Mongolia. Many of the post-socialist tranformations can be understood in light of deep historical patterns including both socialist and pre-socialist periods. The chapter begins with an introduction to the brief history of how Tibetian Buddhism was introduced to Mongolia, and how it rose and prospered shaping the intangible capital in the pre-socialist period. It also examines how Buddhist monasteries took control of the stock of tangible capital in the country and thus further established the groundwork for establishing the organized learning in a form of monastic education. This chapter demonstrates that many of the key features of intangible capital including human, social, cultural, and intellectual capital was shaped by Tibetian Buddhist monastic education as the state was significantly weakened due to the external interventions.

4.2 Birth and rise of Tibetian Buddhism in Mongolia

At different historical times in the early history, the Mongols were part of nomadic states at the crossroads of Asia with a strong cultural demarcation between sedentary agriculturalists and nomadic pastoralists. Among the nomadic states at the crossroads of Asia, Mongols were unified as a nation under the leadership of Genghis Khan in 1206. The Mongol Empire period in the 13th century across Euroasia allowed the exchange of trade, technologies, commodities, and religious beliefs (Abu-Lughod, 1988). As described in a variety of historical accounts, different religious institutions coexisted relatively peacefully in Mongol Empire, and were exempt from

taxation and military services (Morgan, 1986; Juvaini, 1997; Dawson, 1980; Atwood, 2004; Purev and Purvee, 2008). As various historical sources indicate, the Mongol nobles were exposed to a variety of religious beliefs such as Buddhism, Nestorian Christianity, Islam, Confucianism, and Taoism. However, the commoner masses still maintained their traditional shamanistic beliefs during that period.

Tibetan Buddhism was officially introduced to the Mongols earlier in the 13th century. Khubilai Khan established the Yuan Dynasty in China and proclaimed Tibetan Buddhism as a state religion, while maintaining his laws in conformity with the religious tolerance for other religions (Baabar, 1999). With the fall of Mongol's Yuan Dynasty rule in China, the proselytization of Tibetan Buddhism did not extend to the Mongol masses beyond the nobles. However, in the mid 16th century, Altan Khan, one of the Mongol nobles, established an alliance with Tibet and conferred the title of Dalai Lama to the head of the rising sect of Tibetan Buddhism of Yellow sects. It was in part due to the increasing political conflicts among the Mongol feudal lords, who sought legitimacy to unite the fragmented Mongolian state through means of a spiritual faith (Baabar, 1999). Consequently, the preaching of Buddhism proliferated in Mongolia by Tibetan monks.

By the 17th century, the various fragmentations of Mongols were brought under the control of the Manchu-led Qing Dynasty in China. During the Qing Dynasty rule, Mongolia increasingly became a theocratic state as the Manchu-led Qing Dynasty institutionalized a theocratic society in Mongolia, providing financial and political support to establish monasteries in the country (Bulag, 1998; Baabar, 1999; Lkhagvasuren and Boldbaatar,1999; Bira, et al, 2003). The entire period of the Qing Dynasty's subjugation of Mongolia lasted until 1911, when the Mongolian independence movement took place. The varied patterns of Manchurian control

between northern and southern regions of Mongolia eventually divided Mongolia into Outer and Inner Mongolia. Outer Mongolia refers to the present-day Mongolia, while Inner Mongolia refers to the autonomous region of People's Republic of China.

4.3 Tangible capital accumulated at the Buddhist monastic structure

The Buddhist monastic structure became a focal establishment, through which both tangible and intangible capital were created in the country. Generally, in a nomadic society, the livestock served as the sole capital, income, and a measure of private wealth for Mongols. In Mongolia, pastoral nomadism was the predominant form of economic mode but rather mobile forms of agriculture were occasionally present depending on the ecological conditions in certain geographic areas. According to the Russian anthropologist Khazanov (1984), there was a communal ownership of pasture based on customary laws of nomadic Mongols, but the rights to use were subjected to different subdivisions of the society. As Buddhism penetrated Mongolia, some monasteries had the status of autonomous territories outside of the secular civil authority. For example, Ulaanbaatar, the present Mongolian capital city, was originally founded as a monastery complex in 1639, retaining autonomous territories, then eventually transitioned from a nomadic monastery to a settled complex in permanent structures. Hence, monasteries provided fixed locales, which grew into markets and then towns, resulting in gradual urbanization process in Mongolia.

By the beginning of the 20th century, Mongolia became an increasingly theocratic society and the Buddhist monasteries owned a large part of national wealth in the form of livestock and goods. As historical sources indicate, the Buddhist monasteries institutionalized their public funding through establishing *jas* (a public property in Tibetan language). The *jas* had the same

function as a national treasury system. Each monastery had its own *jas* of different sizes and numbers, depending on the size of the monastery. It was estimated that there were approximately 7000 *jases* by the beginning of the twentieth century (Bira et al, 2003). The financial sources of *jas* constituted offerings by lay Buddhist people and taxes, as well as entrepreneurial activities of monasteries such as trade, growing crops, caravanning for Chinese and Russian traders, who were engaged in trade activities in Mongolia (Bira et al., 2003). Some *jases* of larger monastery complexes were serving as commercial agents. The historical sources recount that paper money was being circulated occasionally in some larger *jases.* Given that it was a period where barter exchange for commodities was the predominant mode of trade and commerce, the evidence of paper money circulation at monasteries reveal that monasteries were playing decisive roles in the Mongolian economy during that period. As recorded in historical sources (Bira et al, 2003), the monastery establishments owned twenty percent of country's livestock and the annual income of the Buddhist institutions was estimated as equivalent to thirty-one million tögrögs (Mongolian currency), while that of the state was estimated as 37.5 million tögrögs by 1921.

4.4 Human capital shaped by monastic education

The monastic schools laid the foundation of the first formal education in Mongolia in the seventeenth century but they were only accessible to male population and largely confined to Buddhist doctrines. Elementary, intermediate, and advanced monastic education of a medieval type were provided in numerous monasteries, using Tibetan as the medium of instruction in pre-socialist Mongolia. The various advanced faculties of higher-level Buddhist doctrines were called "*dastan*", which were mostly based in larger monastery complexes. Monastic education in

a form of de-facto vocational training was also provided in various monastery workshops (Steiner-Khamsi and Stolpe, 2006).

Monastic education appealed to the commoner masses at large rather than just to the aristocratic rulers and nobles (Bita et al, 2003; Steiner-Khamsi and Stolpe, 2006). The tradition for boys and young male adults to be sent to a monastery to serve a monk in return for being taught the rudiments of reading and writing in Tibetan became widespread cultural norms among Mongolian commoner masses in the pre-socialist period. Nonetheless, from the examination of historical sources, monastic education apparently provided more religious career mobility rather than skills to increase household production for individuals. The graduates from monastic schools seemingly pursued different career paths at monastic structures. While some ended up holding clerical and administrative duties in monasteries, some learned trade skills to work in monastery's workshops such as erecting temples and making Buddhist objects for rituals. Hence, monastic education yielded a stock of specialized skills directed towards producing religious commodities rather than household production.

The advanced levels of "*dastan"* faculties were specialized in various Buddhist disciplines such as religious philosophy, astrology, traditional or herbal medicine, and literature in Sanskrit and Tibetan languages in addition to the primary importance of training monks to perform all kinds of religious rituals at monasteries. But a few became learned scholars of Buddhist doctrine and philosophy. Those few who successfully completed *dastan* were given certain Buddhist titles and academic grades to be engaged in religious services such as teaching Buddhist doctrines, propagating Buddhism among the believers, and practicing herbal medicine or astrology.

According to data provided in various sources, the enrollment in monastic schools apparently ranged between twenty to forty percent among the eligible male population between the late 18th and 19th centuries (Sharkhuu,1965; Rinchen, 1958). Consequently, Mongolia entered the twentieth century with an estimated forty percent of the male population, who were Buddhist monks, and an illiteracy rate over 90 percent in the entire population. The fact that Tibetan was a liturgical language in monastic schools, and was serving as a language of academic scholarship in Mongolia, the literacy rate in Mongolian script among the masses significantly deteriorated in the pre-socialist period. In addition, the increase in number of Buddhist monks influenced the economically active labor forces in both direct and indirect ways as the available economically active males were largely engaged in religious activities in the pre-socialist period. These patterns, to some extent, served the rationale for radical socialist reforms, which had profoundly altered the cultural and religious conditions prevailing in pre-socialist Mongolia. The number of socialist campaign works such as eliminating religious practices through secular education, combatting illiteracy, and creating the proletarian urban working class population witness such path dependent sequence reactive to the antecedent pre-socialist history.

Parallel to monastic education, two types of secular schooling started operating at different times in pre-socialist period: Manchurian-language scriber schools and European-oriented civil schools. The former operated specifically for training scribers and civil servants for the Manchurian administration in the 18th and the 19th centuries. It could not expand as successfully as monastic education due to social tensions against Manchu occupiers among Mongols. Such social tensions contributed to the apathy to enroll their children in scriber schools (Sharkhuu, 1965; Steiner-Khamsi and Stolpe, 2006). The European-oriented civil schools started under the reign of theocratic monarch in the early 20th century after the collapse of the Qing

Dynasty. The autonomous Mongolian government under the reign of Bogd Khan, the Tibetian-born theocratic monarch, provided an institutional support to increase the access to the European-oriented secular schools for all, including female students through establishing its first Ministry of Education and developing educational statutes with the technical assistance from Buryat Mongols, who were Mongol subjects of Russian Tsar. (Steiner-Khamsi and Stolpe, 2006).

Both secular schools could not successfully expand due to the de-facto status of Mongolian independence subjected to a series of external occupations. Nonetheless, the European-oriented secular education initiatives under the theocratic era launched the groundwork for institutionalizing universal secular education in pre-socialist Mongolia, but could not reach to the extent to shape the country's human, social, cultural, and intellectual capital in pre-socialist period as compared to the prevailing monastic education. Of note, many of the 1921 young Mongolian revolutionaries were educated through this pre-socialist European-oriented secular schooling. Thus, the European-oriented secular education apparently provided them an access to knowledge of the Russian proletarian revolution in 1917.

4.5 Intellectual capital shaped by monastic education

Given that numerous philosophical, theoretical, and literary works were produced through the scholarly activities in *dastan*, Tibetan Buddhism shaped the early intellectual capital in Mongolia. The Buddhist Mongolian scholars translated works in various fields of knowledge from Sanskrit and Tibetan, and created an increasing number of works of their own in Tibetan and Mongolian. Most of the monasteries had their own printing houses and comprehensive libraries during that period in Mongolia. However, thousands of monasteries and Buddhist art

reserves and literary treasures were destroyed during the cultural purges of 1928-1938 in the socialist period.

One of the significant literary sources was the Mongolian *Tanjur*, a collective work, which consists of 226 volumes and 107839 pages. *Tanjur* (a Tibetan word, which means a translation of treaties) is a large collection of over 3427 works on various sciences such as philosophy, technology, logic, medicine, philology, astrology, dance, poetics, Abhidarma, composition. *Tanjur* was originally created by ancient Indian and Tibetan scientists and was translated into Mongolian between 1741 and 1742 by over 200 translators. The Mongolian translation of *Tanjur* was printed in Beijing between 1742 and 1749 on thick Chinese *muutuu* paper with a red natural dust paint. In addition, Buddhism played an important role in early Mongolian fine art and aesthetic development. Zanabazar, a direct descendant of Genghis Khan and the Buddhist religious leader of Mongolia, was a prodigious sculptor, painter, architect, poet, costume designer, scholar, and linguist. He launched Mongolia's seventeenth century cultural renaissance by founding a fine art school in Mongolia.

As noted in Mongolian historical sources, the quality of monastic education to enlighten the masses started diminishing by the 19th century due to the uncontrollable increase in the number of monasteries and number of monks in the country (Baabar, 1999; Bira et al., 2003). The intellectual and philosophical essence of Buddhist preaching remained among the few elites, while the majority of illiterate lay masses practiced a rather superstitious and ritualistic version (Baabar, 1999). The fact that Tibetan was a liturgical language in monastic schools, serving as a language of academic scholarship in Outer Mongolia, could have contributed to the prevailing illiteracy in pre-socialist period.

4.6 Social capital shaped by monastic education

With the spread of Buddhism, the monasteries emerged as a considerable power to supervise lay subjects within their own monastery territory. Buddhist monks as a special-interest group did not belong to superior class but neither were they subordinate in Mongolian society. They had their own social ranks within the Buddhist hierarchical structure. Within the hierarchy of monasteries as a wealthy and semi-independent power, Buddhist monks emerged as a distinctive social class within the traditional social class structure in Mongolia with their de-facto nobility. The traditional social class structure in Mongolia consisted of two main hereditary classes based on the traditional kinship system: the nobles and the commoners. The herders of non-aristocratic descent were essentially belonged to the membership of commoner class called "*ard*" in Mongolian. These two social classes were distinguished by their customary style of dress, size of herds, the number of livestock, and political and administrative positions in the nomadic society. However, the main source of social differentiation and property inequality was the private ownership of the livestock.

According to Khazanov (1984), the social structure in nomadic societies was more fluid and subject to change due to the mobility of nomads and permanent instability of the pastoral economy. Khazanov postulated that the social stratification amongst nomads mainly developed as a result of their specific relations with the outside sedentary world (1984). The fact that the traditional aristocratic nobility began to lose its political role with the penetration of Tibetian Buddhism supports Khazanov's claim. For example, the Genghisid descent as an aristocratic lineage lasted until the end of the eighteenth century but it lost its political role with the introduction of the Tibetan Buddhist hierarchy and the jurisdicational administrative system introduced by Manchu-led Qing Dynasty. Hence, the evolution of social stratification in

Mongolia provides ample evidence for Khazanov's main argument, as the social class has always been shuffled in Mongolia due to major historical turning points.

As Buddhist monks were exempt from most taxes and the two obligatory services, including the military services and pony express services for escorting travelers, the commoners increasingly became monks to enjoy such privileges. This perhaps could explain the regular increase in Buddhist monks, constituting over 40 percent of total male population in Mongolia in pre-socialist period. Hence, Buddhist establishments provided opportunities for social mobility to those of commoner origins through their monastic education. The social standing of a person among Mongols was greatly shaped by the level of monastic education he obtained in Buddhist monasteries despite the presence of secular education, including the ad-hoc scriber schools and the short-lived European-oriented secular civil schools available to Mongolian people in the pre-socialist period.

CHAPTER 5: INTANGIBLE CAPITAL SHAPED BY BYPASSING CAPITALISM

5.1. Introduction

This chapter begins describing the essential features of Mongolia's transition to socialism bypassing the capitalist stage of development. It describes the social, political, and economic conditions specific to Mongolia with regard to implementing the Marxism-Leninism by examining the philosophical essence of Marxist theory, and how this theory was interpretated by early Mongolian scholars. It also bears mentioning that how Mongolia embarked on the path of non-capitalist development and carried out anti-feudal and anti-relgious radical reforms as well as livestock collectivization.

The sub-chapters 5.5 and 5.4 deal for the most part with a survey of the process of higher education development and post-secondary education establishment in general. The Mongolian post-secondary education during the socialist period aimed at the creation of the country's human capital, namely the skilled and professional manpower for building socialism and non-capitalist industrial development. On a broader plane, it created an urban population base from which to draw non-agricultural labor force recruits. Thus, these two sub-chapters examine the accompanied change in social and economic facets as shaped by fully subsidized and centrally planned human resource training in the country.

The sub-chapter 5.5 describes how the post-secondary education establishment developed the social mobility and social stratifications. More specifically, this sub-chapter examines the social and economic implications of the occupational class structure, which consisted of intelligentsia, proletarian workers, and herders as shaped by fully subsidized and centrally planned post-secondary education policies.

The sub-chapter 5.6 provides background on the development of scientific organizations, the training of scientific research and knowledge creation process and its net effects on the social well-being, economic, and cultural development. It also devotes attention to the pros and cons of top-down practice of governing stock of knowledge, and creation and growth of culture that is national in form and socialist in content under the tightly controlled socialist regime.

5.2 Arrival of "Bypassing Capitalism" ideology in Mongolia

The awakening for national independence, which began in 1911 under the leadership of the theocratic monarch continued to bear fruit after a decade of struggle against a series of external occupations, including Chinese troops and the Russian anti-Communist forces. Mongolia finally won soverign independence in 1921, as assisted by Soviet Russia. The Mongolian status quo as an independent country was recognized by international community in 1946 after the World War II. The choice of Mongolia to pursue the path of socialism is unanimously viewed by the scholars of Mongolian studies that Outer Mongolia had to lean on the then Bolshevik-ruled Russia for support against Chinese occupation (Baabar, 1999; Bulag, 1998; Bawden, 1968;). The abolition of the Buddhist monarchy and the proclamation of the People's Republic of Mongolia in 1924 were major turning points in pursuing the socialist path.

The Marxist-Leninist conception of non-capitalist development of so-called backward countries became the principal guide to action in the former Soviet Central Asian Republics and Mongolia. However, the level of socioeconomic development in the former Soviet Central Asian countries and Mongolia did not necessarily reflect the urban industrial revolution, growing rapidly in Western Europe. The "Bypassing Capitalism" doctrine was formulated by the Russian

revolutionary leader Lenin specifically for Mongolia. Lenin advised the young Mongolian revolutionaries to bypass the capitalist stage and move directly from feudalism to communism.

In order to understand Lenin's ideological advice of "bypassing capitalism" for Mongolia, the 19th century social theory of unilineal evolution certainly deserves an explanation. This Western European school of thought had a significant influence on Karl Marx and Friedrich Engels, who developed a theory of historical materialism. Karl Marx had theorized that humanity passes through five stages in a process of unilineal evolution, which consisted of the following order: tribalism, slavery, feudalism, capitalism, and finally, communism. As theorized by Marx, communism itself consisted of two stages: socialism and communism. Hence, the formations of these five stages are based on class societies but the transition from one stage to another occurs as effected by revolutionary change.

Marxism was, in fact, rooted in capitalism as it existed in Western Europe during the Industrial Revolution. Hence, Marx provided ample formulations for transitioning from capitalism to socialism, and eventually to the classless social system of communism under common ownership of the means of production, and with full social equality of all members of society. Nonetheless, the 19th century Western European social and economic conditions did not necessarily reflect the level of socio- economic development in Russia, former Soviet- Central Asian Republics, and Mongolia prior to the beginning of the non-capitalist stage of development. In the early twentieth century, the Russian economy was largely based on agrarian peasant subsistence farming, and urban industry was at a primitive stage. As Marxism empowered Lenin, who led the Bolshevik Revolution in Soviet Russia, Lenin therefore had to modify Marxism to meet the historical and regional conditions in the agrarian Russia and other Central Asian Republics in the early 20th century. The essence of Lenin's modifications to Marxism lies in his

belief that a revolution would not emerge spontaneously but there should be a professional revolutionary vanguard party to lead the proletariat working class to overthrow the capitalist bourgeoisie. Lenin's such theory became a doctrine known as Marxism-Leninism.

Furthermore, Marxism states that the material life conditions the social, political, and intellectual life (Marx, 1977). In a capitalist society, according to Marxism, those who own the means of production have the power and status, which they use to maintain their social stratification, namely the social values, ideologies, and norms. Ideally, in a communist society, according to Marx, everyone would share access to the means of production and the social stratification would be nonexistent. On the contrary, according to Lenin, communism is an egalitarian society, in which the state owns the means of production, and equally distributes resources among the members of the society. This is the essence of Marxism-Leninism, which distinguishes it from pure Marxism, and served as the principal method for Mongolian revolutionaries to impose socialism. The single-party authoritarian government owned the nation's resources and controlled their use under the leadership of the Mongolian People's Revolutionary Party. How the ideological foundation of Marxism-Leninism theory was interpreted by each successive era of Soviet Communist Party leaders of the Soviet Union became the political conditions of not only the Soviet Union but also its satellite country of the then People's Republic of Mongolia (MPR).

In the early twentieth century, subsistence nomadic livestock herding was the predominant means of livelihood and urban capitalist industry was essentially non-existent in Mongolia. The economic relations that existed in Mongolian society were largely based on private ownership of livestock and communal ownership of land but with an attribution of specific privileges to the ruling strata of nobles (Dubrovo, 1884). Such customary rules and

practices to use the pasture land in nomadic society are subject to arguments among the early scholars regarding the division of land and the attributed privilege as well as how to define such attributed privilege. The socialist Mongolian and Russian scholarship defined it as nomadic feudalism (Vladimirtsov, 1934; Dashjamts, 1973). However, Khazanov (1984) and Lattimore (1979) argued that the term of "feudalism", which refers to medieval Europe, could not reflect the characteristics of land ownership in mobile pastoral society in Mongolia. As defined by Lenin, Mongolia was at the stage of feudalism. Thus, Lenin's solution for Mongolia to join the socialist allies was to move directly from feudalism to communism bypassing capitalism. Such a theoretically driven and ideological advice for Mongolian revolutionaries became a famous rhetoric of socialist Mongolia: "Bypassing Capitalism".

5.3 Interpretation and implementation of Marxism-Leninism in Mongolia

The core principal features of Marxism were interpreted in socialist Mongolian scholarship as "Matter is primary and consciousness is secondary" or "*Mater anhdagch, uhamsar hoyordogch*" in Mongolian. The other common Mongolian interpretation is "Material culture determines consciousness" or "*ahui uhamsariig todorhoilno"* in Mongolian. These two key phrases and their semantic meaning explain how Marxist theory was interpreted in Mongolian academic scholarship. Its discourse in Mongolian language basically attempts to explain materialism as a form of philosophical monism. More specifically, these two phrases of Mongolian interpretations reflect the meaning of materialism, which holds that matter, as a fundamental substance in nature, is primary, and that all phenomena, including one's consciousness, are secondary as they are the result of interactions with material culture. Thus, the period between1961 and 1980 was determined as a milestone stage of "creating the material and

technical base of socialism" according to the socialist Five Year plans as described in the socialist literature (Shirendyb,1981).

In discussing how Marxism-Leninism was implemented in Mongolia, Dashjamts (1973) asserted that the dissemination of Marxism-Leninism in early revolutionary years in the 1920s was constrained by premature development of both the social and natural sciences in Mongolian scholarship. According to Dashjamts, what Lenin wrote about Mongolia earlier closely reflects the pre-revolutionary social and cultural condition that the scientific development was constrained by prevalence of religious superstition, enabling voluntarism and subjectivism to become dominant in the society. Pointing to some misconceptions of the Mongolian translations of Marxist theory in the early 1920s, Dashjamts further explained that the early interpretations and dissemination of Marxism-Leninism in Mongolia were constrained, in part, by lack of Mongolian intellectuals educated in philosophy. However, from my analysis of their interpretations, the early translations of Marxian theory indicate that Mongolian intellectuals were using their traditional Tibetan Buddhist philosophy as a reference, when interpreting Marxism. The 1930 manual lectures by Mongolian scholars, for example, translated the dialectical materialism into Mongolian language as "analyzing things based on *mahbodi"* (*mahbodi* in Mongolian but *mahabhuta* in Tibetan, which refers to four basic natural elements such as earth, water, fire and air) (Dashjamts, 1973, p. 211). In order to support the dialectic materialism and to oppose the idealism as appropriated by Marxism, the early Mongolian scholars translated the concept of idealism into Mongolian as "analyzing things based on spiritual beings or spiritual experience" (Dashjamts, 1973, p.211). Thus they defined idealism as a belief that spiritual being creates the *mahbodi* and in so doing they asserted that idealism contradicts the truth of materialism" (Dashjamts, 1973, p. 211).

In interpreting Marxism-Leninism into Mongolian, the early Mongolian scholars also sought to define the specific features of the 1921 Mongolian revolution within the concept of Marxism. According to them, the 1921 Mongolian revolution was different from the proletarian revolution against the bourgeoisie capitalists in Western Europe. In so doing, they identified the following social and economic conditions specific to pre-revolutionary Mongolia before Marxism-Leninism was introduced: absence of feudal society where bourgeoisie capitalists were non-existent and the revolution was for national independence from external occupations unlike proletarian revolution against bourgeoisie capitalists (Auysh, 1928; Dashjamts,1974). For example, Dashjamts (1974) argued that national capitalist elements were burgeoning in pre-revolutionary Mongolia, but had not reached to the stage of capitalism to become an independent social class like the bourgeoisie in industrialized Western Europe, who could exert their influence on politics, social ideology and values. Auysh (1928), on the other hand, pointed to the Manchurian colonization as compared to the Western bourgeoisie. Both herders as commoners and the so-called local Mongolian feudal lords, including the religious and traditional aristocratic nobles, were under Manchurian colonization prior to the 1921's Mongolian revolution. As Auysh argued, unlike the proletarian revolution in Russia, the 1921 Mongolian revolution was a revolution for Mongolian independence from external occupations and colonization.

These interpretations of the Mongolian scholars demonstrate that the early Mongolian intellectuals were not just recipents of Marxism-Leninism, but they aptly articulated their own country's social, political, and economic conditions with regard to the theoretical and methodological confines of Marxism-Leninism. As asserted by the early Mongolian scholars, the above two features, such as the absence of a capitalist bourgeoisie and the revolution for national independence from external occupations, served as a favorable condition to pursue a

non-capitalist industrial development under state-ownership. In addition to these social and economic conditions specific to Mongolia as identified by the early Mongolian scholars, the proletariat class, which is the dominant element of Marxist-Leninist theory, was essentially absent in Mongolia. Thus creating the urban proletarian working class was the major goal of the socialist post-secondary education policies.

Many socialist sources describe that the methods and approaches that Mongolia used to transit from pre-capitalist society to socialism, while bypassing capitalism, were based on a scientific theory. As is known, the scientific theory was originally conceived by Karl Marx and Friedrich Engels, and the practical applications of the theory were formulated by V.I. Lenin. In light of the concept of the non-capitalist path of development, the central party envisaged the following actions such as an abolition of private ownership, confiscation of livestock and properties owned by feudal lords, and eliminating the economic power of the Buddhist monasteries. The early years of such envisaged direct transition from feudalism to socialism underwent extreme events such as assassinations of Buddhist monks and Mongolian intellectuals through political purges and the decisive clash between leftists and rightists, which occurred in the late 1920s. Overall, many such features of the Mongolian experience to pursue a non-capitalist development have had both reactive and sel-reinforcing implications for the post-socialist social and economic conditions. The non-capitalist development of Mongolia was characterized by certain features specific to Mongolian pre-socialist condition such as establishing the urban industrial development in parallel with pastoral livestock herding, introducing the mechanized and modern-science-based agriculture, securing a collective socialized ownership of livestock, and a cultural revolution to eliminate illiteracy and develop

science, culture, and arts in the country. The fact of the matter was that the socialist education system proceeded along to accommodate all these needs.

5.4 Higher education development in centrally planned economy

The immediate demand for establishing domestic higher education institution was training local teachers to achieve universal access to education. A shortage of teaching resources was one of the serious problems facing the Mongolian educational system in the 1920s and 1930s. The early teaching pioneers were trained in Russia. As higher education institutions were established in Mongolia, it became available to locally train the teaching resources. The Evening Institute of Teacher Certificate was established in 1940. In 1942 the National University of Mongolia was founded with three faculties, including medical science, veterinary science, and teacher training. Later, the department of pedagogy separated to become a State Pedagogical Institute in 1951 to train teachers nationwide for all levels of education from pre-school to higher learning.

By effectively mobilizing local Mongolian teaching resources, Mongolia achieved the universal access to education in phenomenally short years. The eight-year compulsory education had undergone several stages, each progressing to a higher level as the nation's teaching resources and physical supplies became increasingly available, advancing from the four-year elementary school program in 1938 to the seven-year compulsory education program in 1963 with a system of 4+3+3. Then it moved to the eight-year compulsory education with a system of 3+5+2, including 3 years of primary, 5 years of secondary levels, and 2 year upper-secondary education in 1973 (see Appendix A). By the 1970s, 82.4 percent of the total Mongolian population had become educated—a major achievement in comparison to the situation in the

1920s of the early years of the revolution when 43.7 percent of the members of the central political Mongolian People's Revolutionary Party were illiterate and only 0.26 percent of female population could read as compared to 9.2 percent of males (Damdinsuren, 1969)[1]. The adult literacy had been achieved by the 1960s, reaching to 72.6 percent in 1963 and 93.3 percent in 1979 (Sharav, 2000) and Mongolia was recognized by UNESCO for successfully eliminating illiteracy (Dorjsuren, 1981). This clearly witnesses that centrally coordinated human resource planning and training during the socialist period effectively solved the acute shortage of national personnel capable of setting up a public education system in the country.

The National University of Mongolia (NUM) expanded its scope, and several of its faculties separated to become specialized institutions of higher learning such as Medical University and the Mongolian State University of Agriculture. The Polytechnic Institute was established in 1969 within NUM for training local manpower, namely engineers and specialists to work in major infrastructure sectors such as the power industry, light industry, food industry, transportation, and mining. In 1979, the Institute of Russian Language and Literature was established as part of NUM. All these national institutions of higher education were called upon to build the country's socialism through training of administrative professionals, political party bureaucrats, and specialists of above industries, science, culture, and education. In parallel to training the higher educated personnel domestically, a large number of Mongolians were trained in the former Soviet Union and other former socialist countries of the Eastern Block such as

[1] There are minor discrepancies but close approximations as compared to the data provided in the UNESCO report on literacy country study in Mongolia prepared by Embuu, B & Munkh-Erdene, Kh (2005).

Czechoslovakia, East Germany, Poland, Bulgaria, and Hungary. Those who studied abroad not only received higher education but also many received post-secondary vocational training.

In addition, educational facilities, teaching resources, and textbooks for local Mongolian institutes of higher learning were largely supplied by the former Soviet Union. Therefore, knowledge of Russian was necessary for advanced academic scholarship in Mongolia during socialist period as Russian textbooks were commonly used for scientific and technical subjects at Mongolian universities and institutes of higher learning. Notwithstanding to Russian serving as a language for academic studies, unlike the former Soviet Republics such as Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan and other Slavic countries, the Russian language had never been a medium of instruction in Mongolia. The adoption of Cyrillic alphabet in 1941 seemingly facilitated Mongolians to learn the Russian language and accelerated the adult literacy campaign as it allowed to sprint books, textbooks, and local Mongolian presses with Russian printing machines (Baabar, 1999; Steiner-Khamsi and Stolpe, 2006).

Nevertheless, an entry into universities and higher education institutions was restricted to 15 to 20 percent of eligible age cohorts as socialist higher education was subject to central planning, and higher education was fully subsidized by the state. The gross enrollment rate ranged between 18 percent to a little over 20 percent among the tertiary education age population during the socialist period. Students at all post-secondary establishments, including the higher education institutions, vocational and technical education schools, and *technikums* were provided stipends, and were guaranteed employment upon graduation. Thus, universities and institutions of higher learning were primarily utilitarian and vocationally orientated as their role was in training specialist personnel for industry, agriculture, educational organizations, and economic

institutions. The advanced academic research was typically carried out by the Mongolian Academy of Sciences and its affiliated institutes.

In summary, education of all levels in socialist Mongolia was organized through a highly centralized state-run system. It featured universal access to primary and secondary education, but highly selective entry into higher education. All levels of education, including the post-secondary vocational and higher education were free of charge and fully subsidized by the state. The positive legacy of such a system was that it succeeded in transforming the mono-cultural livestock-breeding population into an agrarian-industrial socialist nation. As such, the homogenous universal education during the socialist period in Mongolia essentially recognized socialist needs to supply the technological and administrative skills necessary to turn a primitive nomadic society into an agrarian-industrial economy. By closely integrating post-secondary education policies with economic and political objectives, the socialist Mongolian government was able to attain its desired goals faster with an enormous support from the Soviet Union and CMEA in supplying financial aid, technical assistance, and know-how.

5.5 Human capital shaped by centrally planned post-secondary education system

Mongolia was an economically undeveloped country whose economy was based on subsistence nomadic livestock herding prior to the socialist revolution. Urban industry was virtually non-existent during the early revolutionary period between the 1920s and 1930s. The proletariat class, which is the dominant element of the population according to the Marxist-Leninist theory, was essentially absent in the country. Therefore, the primary goal to achieve full socialism, bypassing capitalist stage, was industrial development and creation of urban

proletarian workers. This primary goal was stated in the socialist publication, which celebrated the sixtieth anniversary of the MPR's socialist development as follows:

> Lenin gave Mongolian revolutionaries this advice: "The revolutionaries will have to put in a good deal of work in developing state, economic and cultural activities before the herdsman elements become a proletarian mass, which may eventually help to 'transform' the People's Revolutionary Party into a Communist Party … The fulfillment of the above-mentioned socio-economic tasks was accompanied by great changes in the country's cultural life. A major achievement in this sphere was the elimination of the wholesale illiteracy. Enormous work was done to set up primary, secondary and vocational schools. A popular intelligentsia was born consisting of workers in the areas of education, culture, science and technology, literature and art, who made a valuable contribution to the country's development (Shirendyb, 1981 pp. 24).

The socialist ideology of social homogeneity and equal access to education dramatically increased the enrollment in primary, general secondary, and the specialized upper secondary education in short period of time. Yet, higher education enrollment was restricted to the eligible population due to highly centralized human resource planning, training, and manpower allocation system. The labor market essentially played no role in the school-to-work transition, as supply and demand was highly coordinated by the series of central Five-Year plans for social and economic development. The squeezed enrollment in tertiary education led to increases in enrollment in vocational and technical schools that train skilled manual trades and *technikum*—specialized post-secondary vocational schools that prepared non-manual semi-professionals. Such post-secondary education options resulted in a relatively larger industrial working class population and shrinking livestock herders but few intelligentsia.

The significant achievement of such centrally planned post-secondary education was the transformation of subsistence nomadic livestock herding-based economy into an agrarian industrial economy that featured processing of animal husbandry products, mechanized crop

raising, as well as service industries including transportation, communications, domestic and foreign trade, banking and finance. To meet the immediate needs for the skilled manpower to implement the non-capitalist industrial development in the country, the Mongolian government established a technical and vocational education training system in 1964. The vocational and technical education training system in Mongolia was modelled after the Soviet Polytechnical education. Polytechnical education is a concept derived from Marxism but stood as the basis of official educational policy for the Soviet Union and other socialist Eastern European countries to create proletarian skilled workers to build non-capitalist industrial development. The original concept of polytechnical education as proposed by Marx in his work *Capital* was to overcome the division of labor. Marx conceived that imparting scientific knowledge, humanistic and vocational education to the working class would enable them to voice their own demands in the social and political arena and to play an active part in technological progress. The polytechnical education, according to Marx, would also enable the working class to freely choose their occupations and master multiple trade skills to be versatile on the production front, which in turn would reduce their dependence on manufacturers and technological revolutions. Lenin adopted Marx's concept of polytechnical education to define the role of education in communist upbringing by adding some of his own ideological aspects to it such as developing creative technical abilities and inculcating a love and respect for physical labour and collective social work (Simon, 1954; Skatkin, 1963; Small, 1984;). Although it was written from a zeitgeist point of view, a Soviet educator and theorist Mikhail Nikolaevich Skatkin, wrote for UNESCO in 1963 that the Marxist concept of polytechnical education became the center of Lenin's propaganda to appeal to the young to join the collective labor force to rebuild the country's economy that was devastated by the First World War, famine, and mass illiteracy. This Marxist-Leninist ideology

and propaganda of polytechnical education served as an important component of socialist upbringing in Mongolia to build the modern industrial economy.

Polytechnical education in Mongolia consisted of two types of post-secondary establishments: technical and vocational education training school (TVET), which trained skilled workers; and *technikum,* which trained non-manual semi-professionals. While the former was a two to three-year trade school, the latter was a three-year specialized college /See Appendix A/. The category of *technikums*, unlike the purely vocational schools of TVET, aimed to train low and middle level (depending on profile) industrial managers, accountants, bookkeepers, nurses, medical technicians, foremen, coordinators, technical supervisors or semi-specialists in occupations that require skills more advanced than purely manual labor. For example, there were the *technikums* of finance, trade, telecommunication, healthcare, railway, construction, food industry, light industry, and veterinary *technikums*. After the 1990-transition, many of these *technikums* were renamed as four-year undergraduate colleges granting higher education degrees. The higher education institutions and universities were training the professional and scientific personnel, who formed the intelligentsia class in the country.

By 1988, there were already forty-three vocational schools, enrolling 30,000 students in 110 trade fields, and twenty-nine *technikums*, enrolling over 23,300 students as compared to 1965 when there were ten vocational schools, enrolling 4,761 students and eighteen *technikums*, enrolling 2,383 students (Ministry of People's Education, 1976; National Statistical Office, 1991). Such quantitative gains were achieved in Mongolia as the country received an enormous support from the Soviet Union and the Council for Mutual Economic Assistance (CMEA) in supplying financial aid, technical assistance, and know-how in polytechnical education. In addition to the Soviet Union and CMEA, Mongolia also received 1,760,000 USD from UNESCO

to build the Polytechnical Institute in Mongolia in 1963 after its admission to the United Nation in 1961 as a member country (Steiner-Khamsi and Stolpe, 2006). This clearly demonstrates that the promotion of polytechnical education was not just a socialist educational philosophy, it was an international development effort. However, what distinguishes the socialist polytechnical education from international efforts supported by international development organizations such as UNESCO lies in the socialist ideological propaganda. The economic demands of skilled manpower in former socialist countries were met by efforts based on socialist ideological propaganda rather than the labor market based supply and demand. Essentially, the labor market played no role in human resource training, as supply and demand was highly regulated by the state-defined tertiary education enrollments.

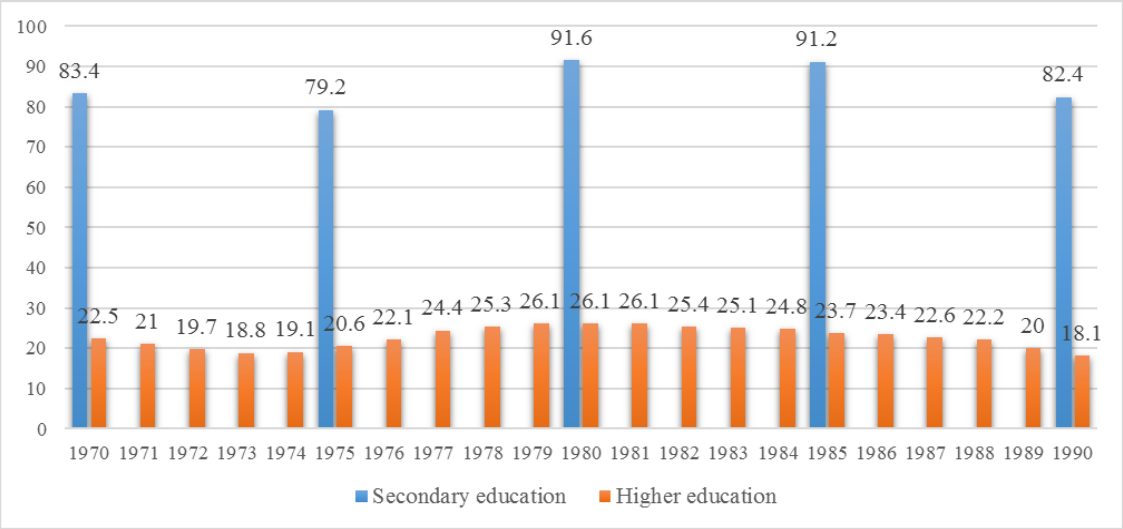
In addition, students enrolled in all forms of post-secondary establishments, including TVET, *technikums*, and higher education institutions received room and board and a monthly stipend. During their stints of practical work in factories or other state industrial enterprises, both TVET and *technikum* students received the normal salary for their work. In 1962, following the year after the UN admission, Mongolia joined the Council for Mutual Economic Assistance[2] (CMEA), an economic cooperation organization for socialist countries under the leadership of the Soviet Union. As such, many Mongolian students studied in Soviet Union and other Eastern European CMEA member countries, notably in former Checkslovakia, Poland, Hungary, and Eastern Germany, to obtain polytechnical education in various trade and technical fields. The Table 6 below shows the number of Mongolian students who studied in polytechnical schools

[2] Like OECD (Organization for Economic Cooperation and Development), CMEA (Council for Mutual Economic Assistance) or commonly referred English abbreviation as Comecon, was an economic cooperation organization established in 1949 under the leadership of the Soviet Union that comprised the countries of the Eastern Bloc along with a number of communist states elsewhere in Asia (Mongolia and Vietnam) and Latin America (Cuba). It was terminated in 1991 after the collapse of the Soviet Union.

abroad. For example, according to the statistical information, between 1961 and 1971 annually 400-300 students were sent for overseas polytechnical education in the above former socialist countries as compared to annually 2000 students were sent to study at overseas universities. In absolute number of total students, 3227 students studied at overseas vocational and technical schools in the Soviet Union and former Eastern European socialist countries as compared to 22065 students at overseas higher education institutions between 1961 and 1971. The number of students studying in overseas higher education institutions was far greater than the number students studying for polytechnical education during the socialist period. This demonstrates that the priority during this period was to eliminate the pronounced dependence of Mongolia on the Soviet and other Eastern European technical and advisory personnel. Thus, a large number of Mongolian youth were sent to the Soviet Union and other socialist countries for higher education in order to replace the Soviet personnel.

The prerequisite for admission to both TVET and *technikum* was the completion of eight-year compulsory secondary education. The students with diplomas of both TVET and *technikums* could apply for admission to higher education institutions. However, higher education enrollment was highly selective and the access to higher education was, though, restricted to only about twenty percent of the age cohort in accordance with the manpower planning nature of socialism. The series of Five-Year Plans for the development of the national economy used to determine the number of students in the priority disciplinary areas.

Figure 3: Gross enrollment rate for upper secondary and tertiary education (1970-1990)



Source: World Bank and UNESCO database

With the significant improvement in access to basic education, the gross enrollment rate for secondary education reached over 80 to 90 percent, as shown in Figure 5. However, the gross enrollment in tertiary education ranges between 18 percent to little overt 23 percent. At the highest, the tertiary education enrollment reached 26 percent in 1980. This clearly reflects that the squeezed enrollment in tertiary education led to increases in enrollment in TVET and *technikums*, which were alternative to higher education. Although the data on gross enrollment of TVET and *technikums* in percentage is absent in all available databases, the above figure reflects that the remaining 60 to 70 percent of youth, who completed their secondary education, went to *technikums* and TVET. The total enrolment in TVET and *technikums* are available in absolute numbers. As shown in Table 1 below, the total enrollment in TVET and *technikums* continued to increase during the socialist period. It increased from almost 4,493 in 1955 to almost 50,000 in the 1980s (See Table 1). The number of students in TVET and *technikums* grew during the 1960s at an annual rate of 14.7 percent and at a rate of almost nine percent during the

1970s. It continued to grow at a similar pace in the 1980s. The available data in Table 1 do not differentiate between TVET as a two-year post-secondary trade school and *technikums* as a three-year polyetechnical school that trains semi-professionals. The umbrella term of polytechnical schools referred to both the two-year TVET schools and the three-year *technikums* in the existing database.

Table 1: Number of students enrolled in polytechnical schools and HEIs (1921-1990)

Year	Number of students enrolled in poytechnical schools	Number of students enrolled in higher education institutions
1921		
1922	15	
1925	105	1
1930	145	1
1935	375	10
1940	1332	197
1945	1744	309
1950	3186	1476
1955	4493	3039
1960	8811	6909
1965	13992	10677
1970	21749	8427
1975	26948	13643
1980	40843	23214
1985	50696	24549
1986	52488	23516
1987	56045	22647
1988	56353	20723
1989	54671	19504
1990	47545	17338

Source: MECS statistical data

Hence, the socialist post-secondary education options resulted in a relatively larger industrial urban working class population in Mongolia and shrinking herders and agricultural workers, but few professional elites. The "intelligentsia" or "*seheeten*" in Mongolian is defined as those, who had acquired qualifications provided by tertiary education to do the white-collar jobs, including all the functionaries, bureaucrats, and officials of the Soviet-subsidized apparatus

of the Mongolian government, administrators of state farms and cooperatives, and professional workers in health, education and science, as well scientists, novelists, scholars, and artists. Those who were employed in newly emerged machine-oriented work at industrial establishments such as light and heavy industry factories, transportation, construction, and mining, were called "worker". Those, who followed their traditional economic activity based on livestock breeding and herding, were called "herders". Those, who were engaged in agricultural cooperative farming such as crop production and grain harvesting, were called "peasants", but this last group constituted only three percent of total population. The latter two groups of labor divisions were not officially regarded as inferior but were distinct entities in the socialist Mongolian labor force. The herders were considered as socialist allies coexisting in solidarity with urban industrial workers and professional intelligentsias.

Furthermore, the regimented and highly centralized socialist post-secondary education system transformed the mono-cultural livestock-breeding nation into an agrarian-industrial socialist nation. As defined by Khazanov (1984), the former characterizes pastoral nomadism, which is a single form of food-producing economy but is different from food extracting economies such as hunting, fishing, and gathering. And it is also different from horticulture-based food producing economy. The traditional animal husbandry techniques practiced by Mongolian nomadic people were a single form of food-producing economy, which is different from both food extracting and horticulture. The pastoral nomadic Mongols' traditional food-producing techniques could perhaps explain why it is different from food extracting and horticulture. The traditional techniques, that pastoral livestock herders' use to produce their food essentially harnes natural biotechnological capabilities of complex microbial cultures to create a unique array of dairy products such as cheese, dried curds (*aaruul*), sour cream, and other

various types of cream as well as different types of alcoholic beverages such mare's fermented milk (*airag*), camel's fermented milk (*khoormog*) and clear vodka distilled from milk. As socialist mechanized agrarian industry was introduced to Mongolia, it was not essentially the shift from pastoral nomadism to a horticulture-based food producing economy. Instead, pastoral nomadism coexisted with both horticulture-based agrarian industry and urban industrialization. Of note, the socialist education system brought the use of modern science to the traditional nomadic animal husbandry, and the socialist government brought a cooperative-based organized labor to the individual mobile pastoral livestock herding-based economy in Mongolia.

In general, the centrally planned post-secondary education system brought the following three major social changes. (1) It added an industrial dimension to the Mongolian economic life, which was previously predominated by subsistence nomadic livestock herding; (2) It created an urban population base from which to draw non-agricultural labor force recruits; (3) It changed the traditional role of women to industrial workers and intelligentsia professionals. The labor force statistics clearly reflect the above three major social changes. In the 1960s, factory and office workers constituted 46.5 percent of total population as compared to the 1930s when almost 90 percent of the population was engaged in animal husbandry-based agricultural pursuits (Central Statistical Board, 1986). By the 1980s, this percentage increased to 65.1 percent (Central Statistical Board, 1986). Concurrently, the percentage of herder population decreased from 53.3 percent in the 1960s to 34.9 percent in the 1980s (Central Statistical Board, 1986). As shown in Table 2 below, the significant change in the structure of employment reveals that the agricultural sector, namely the animal husbandry as a main provider of employment and livelihood, steadily diminished in the three decades between the 1960s and 1980s compared to the size of the labor force employed in the industry and other service sectors. The change in the

labor force reflected the change in share of major economic sectors in the national income aggregates. The share of agriculture constituting the national income aggregates dropped from seventy-six percent in 1940 to thirty-three percent in 1985, while the industry share rose consequently from seven percent to thirty-five percent (Asian Development Bank, 1992).

Table 2: Structure of employment by economic sectors in percentage (1960-1990)

Sector	1960	1970	1980	1985	1990
Material sectors	87	81	76	74	72
Agriculture	61	47	40	33	29
Industry	12	15	16	19	19
Transport	3	5	6	7	7
Construction	7	6	6	6	7
Others[1]	4	8	8	9	10
Nonmaterial sectors	13	19	24	26	28
Education	4	8	10	10	12
Health	3	5	6	6	7
Research & Development	-	1	2	2	2
Others[2]	6	5	6	8	7

[1] Includes forestry, communications, trade, and other material production
[2] Includes administration

Source: Asian Development Bank, 1992

The establishment of Erdenet, a joint Mongolian and Russian copper plant, which began operation in the 1970s, brought a significant change in the country's urbanization, trade, and industrial structure. Erdenet city, where the copper concentration plant operates, emerged as the third largest industrial urban complex in the country after the capital city of Ulaanbaatar and the other industrial city of Darkhan. During this period, copper ore constituted 40 percent of the country's total export (Asian Development Bank, 1992). The Erdenet plant generated an array of

supporting industrial activities including both light and heavy industries, which spawned an urban proletarian working class population in the country. These large-scale rapid industrialization projects were funded almost exclusively by foreign loans from CMEA, particularly the USSR. The CMEA, as similar to present IMF or the World Bank in terms of its operation and function, was structured in such a way that more better-off members such as the Soviet Union and former Eastern Germany, Checkslovakia, Poland, and Hungary provided technical and financial support to the least developed members. Almost three-fourths of CMEA's foreign aid went to its least developed members, including Cuba, Mongolia, and Vietnam (Dendeviin et al, 2003). Of these three least developed members, Mongolia annually received $ 1 billion of foreign aid from the CMEA (Curtis, 1992).

Of significance was that all these industrial establishments were built substantially by local Mongolian labor force, who were trained both domestically and abroad. The Soviet advisory and technical personnel were in the background in the early years of industrial development of Mongolia. However, Mongolian government made significant efforts to eliminate its pronounced dependence on the Soviet and other Eastern European technical and advisory personnel by sending a large number of Mongolian youth to the Soviet Union and other socialist countries for post-secondary education, including higher education and vocational and technical education. Already by the mid-1950s, Soviet personnel accounted for only 1.6 percent of the total labor force (Central Statistical Board, 1986). In addition to Soviet personnel, who constituted the most percentage of expatriates in Mongolia during the socialist period, the technical advisory personnel from Eastern European socialist countries also made a considerable contribution to Mongolia's industrial development, particularly in the light industry manufacture of finished products.

With the establishment of industrial urban cities and provincial towns, urbanization had accelerated at an unprecedented scale, generating mostly urban working class populations. From 1956-1969, the increase in urban population was three times, while the rural population grew only by ten per cent (Statistical Office, 1993). By 1980s, fifty-seven per cent of the total population lived in urban areas and in Ulaanbaatar compared to 1935 when the population of Urga, then capital city of Mongolia (present Ulaanbaatar), was only 10,400 (Statistical Office, 1993). Ulaanbaatar absorbed forty-two per cent of the growth in total urban population among the major three newly established industrial cities of Darkhan and Erdenet, and other provincial center towns. It is noteworthy that most of the urbanities were migrants or children of migrants to urban cities from rural herding lives, retaining close ties to their rural herder relatives. Hence, much of the herder population moved into urban areas, while those remaining in the rural areas began working in the collective livestock animal husbandry and crop growing agricultural state farms. Such an urbanization process was accompanied by tremendous growth of secondary schools and post-secondary education institutions. All of the country's universities were located in the capital city of Ulaanbaatar. The polytechnical schools and TVETs were located mostly in urban centers, spawning skilled workers for industrial and production centers, as well as the state agrarian farms. Such a dual process of urbanization and educational growth gave a rise to a distinct divide between urban and rural culture, which Mongolia is tackling in the post-socialist society.

As a result of Mongolian government's proactive policy to achieve equal access to post-secondary education for all, women's economic and social status had significantly elevated during the socialist period. Following the 1921 socialist revolution, the socialist constitution granted equal rights in education, employment, and political participation to Mongolian women.

Already in 1931, female students accounted for forty percent of school enrollment (Skapa and Benwell, 1996) compared to 1923 when there were only five female students in the first secondary school in 1923. However, the socialist political arena was considerably male dominant given that women accounted for thirty percent of the 600 people elected to local public bodies. Among those 30 percent of elected women, there were sixteen female public bodies including ministers, deputy ministers, and head of government agencies (Asian Development Bank, 1995). By 1989, women accounted for eighty-six percent of the workforce and forty-three percent of university and polytechnical college graduates, and the literacy rate for women was estimated ninety-six percent (Asian Development Bank, 1995). The Table 3 below reflects the gender relations with respect to labor force segmentations as of 1990.

Table 3: Women in professional fields (1990)

Professional fields	Percentage of women
1) Higher educated population	42.5
Engineers	23.6
Agronomists	44.6
Livestock specialists	29.5
Veterinary specialists	25.4
Public servants	74.1
Doctors	68.3
Economists	41.9
Computer and Electronic Technology Engineers	42.4
Lawyers	26.6
School teachers and Professors	55.2
2) Skilled workers with vocational training or semi-professionals	61.7
Technicians/Operators	38.6
Sewing	88.6
Food processing	78.8
Elementary school teachers	73.8
Culinary	87.8
Kindergarten teachers	98.9
Nurses	83.1

Source: *Women in Development: Mongolia* Asian Development Bank, 1995

As shown in Table 3, women dominated the service and production sectors such as education, health, trade and supplies. Some occupations had an almost exclusively female workforce with women accounting for 98.9 percent of kindergarten teachers, 83.1 percent of nurses, 73.8 of elementary school teachers. Women also constituted 74.1 percent of public servants, 78.8 percent of labor force in the food industry, 87.8 percent of restaurant cooks, and 88.6 percent of labor force in sewing. Despite the relatively high female labor force participation rate and levels of training (42.5 percent women with higher education and 61.7 percent of women with vocational training), the percentage of women in certain fields such as engineering and technology was considerably low during the socialist period. In addition, women were underrepresented in the following professional fields such as law and economics. The

underrepresentation in such fields limited their access to positions of decision-making power to a certain extend during the socialist period.

Nonetheless, the socialist centrally coordinated education system was path-breaking in its time, elevating women's role in building socialism in Mongolia. The increase in kindergartens and nurseries to improve the childcare facilities enabled women to actively participate in labor force and to attain post-secondary education. For example, in 1960, there were 160 kindergartens but this number increased to 483 in 1965 and 570 in 1979 respectively. Thus, the socialist system successfully mobilized women to enter the labor force, and elevated their historical role in professional fields as compared to the other developing Asia-Pacific countries.

5.6 Social mobility and social capital created by centrally planned post-secondary education system

As education is one of the important predictor of many forms of political and social engagement (Helliwel and Putnam, 1999), the relative and absolute effects of socialist centrally planned and fully subsidized post-secondary education system created both social mobility and social stratifications during the socialist period. In the pre-socialist period, livestock husbandry was the predominant economic pursuit of virtually entire Mongolian population. As discussed in preceding chapter, the pre-revolutionary traditional social class consisted of commoner *ards* and aristocratic nobles but there was no proletarian working class. As social stratifications have always been reshuffled by major historical turning points in Mongolia, the traditional class structure in pre-socialist Mongolia had been replaced by an occupational class structure created by centralized human resource planning and training. The traditional nobles and Buddhist hierarchies were eliminated completely. The fully-subsidized, centrally coordinated socialist

education system created literate herders, who completed compulsory eight-year secondary education, a large number of urban industrial workers, who completed vocational and technical schools, and a few professional, scientific, and political intelligentsia, who completed higher education. As the state played an important role in creating state-society synergy, social capital and social status associated with education during the socialist period in Mongolia could be examined, using a top-down approach.

Given that over ninety percent of the population was engaged in nomadic livestock herding pursuits as late as the 1930s (Central Statistical Board, 1986), the achievement in universal access to education and compulsory secondary education during the socialist period brought a greater social mobility among the overall Mongolian population. Yet, during the final years of the socialist period, including the 1970s and the 1980s, it is observed that parental education, parental occupation, and geographical origins (urban and rural) started becoming substantially influential to the children's access to post-secondary education and their occupational destinations. As higher education was fully subsidized and free of charge, admission to universities and tertiary education institutions was highly selective. Such a selective admission restricted, to a certain extent, the entry of a growing number of eligible population to universities. On one hand, the socialist higher education played an important role in social mobility in Mongolia. On the other hand, socialist higher education played a significant role in creating social stratification in the country.

The socialist Mongolian society was relatively meritocratic, but it was a state-sponsored mobility through closely integrated educational and manpower policies. Political conformity played the second important role after occupational qualifications in both physical and social mobility for individuals. The amount of political capital an individual had (e.g. member or not of

the Mongolian People's Revolutionary Party, the single political power in the country) provided opportunities to achieve success and to hold positions of bureaucrats and administrative personnel in the government or state administrative organizations. Hence, the social mobility during the socialist period was more state-sponsored and socialist ideology induced.

In Marxist-Leninist theory, all occupations are of equal status and all citizens, regardless of their occupational status, are provided with equal social services. However, in reality, these occupational classes were unequal in certain intangible assets such as social prestige, rural-urban division, and educational trajectories. The status of intelligentsia had certain intangible assets for their children as parental occupation greatly determined their children's tertiary education attainment and occupational destinations. The social prestige of intelligentsia was thus specifically advantageous to their children's educational achievement.

There are subistantial anecdotal evidence that direct inheritance, parental occupation, and family origins started becoming relatively significant in post-secondary education trajectories and occupational destinations of graduates in the later years of the socialist period between 1970s and 1980s. Many prominent Mongolian intellectuals, political, cultural, and artistic figures such as composers, musicians, actors, writers between the 1950s and 1960s, belonged to the generation, which allowed a greater social mobility, as they were borne out of traditional herder families. Thus, the entry of new intelligentsias in the early and middle years of the socialist period was relatively high. The fully-subsidized post-secondary education therefore served as a necessary precondition for the entry of new actors in the intelligentsia class in Mongolia. For those from the age cohort, who were born in the 1970s and 1980s, the evidence of direct inheritance from their parental occupation and family occupational class started becoming relatively significant. With respect to their economic status, there were no private material assets

for every citizen of Mongolia regardless of their social status and educational achievements under the common ownership of tangible capital. However, the intelligentsia enjoyed ample social privileges and advantages in terms of their children's post-secondary education trajectories and occupational destinations.

According to the Marxism-Leninism, proletariat class of industrial workers was at the forefront of the nation's economy and industrial development. Therefore, socialist government ensued a policy of pushing more young people into urban industrial employment. These policies were ideologically, politically, and economically driven. The highly selective squeezed higher education enrollment allowed an entry of many young people into vocational trade schools to implement the policy that workers would engineer the non-capitalist industrial development in the country. The industrial workers, herders, and agricultural workers constituted the largest portion of the Mongolian labor force, constituting 31 percent of industrial workers and 53.3 percent of herders in the 1960s (Central Statistical Board, 1986). The working class consisted of mainly the urbanized factory and industrial workers, and administrative and clerical personnel in general. Therefore, socialist propaganda created a relatively favoured status for the membership in the working class. Yet, in reality they did not always have the same social privilege as intelligentsia in terms of their social and cultural capital. With respect to their economic status, the proletarian workers were paid the same as intelligentsia or even more than intelligentsia if they exceeded the norm, which was set for their job grades, and if they produced an above-average output. These are common knowledge among the generation of Mongolian people who has experienced and lived the socialist system. Because of the difference in occupational and educational level, workers did not possess the same intangible assets as intelligentsia, which could be advantageous to their children's tertiary education attainment and occupational

destinations. However, through the fully subsidized, homogenous socialist education, the upward social mobility to pursue the path of professional intelligentsia was relatively high in Mongolia. Nevertheless, as mentioned above, it depends on certain years during the socialist period. The social mobility was greater in the 1950s and 1960s, while parental occupation and family occupational class started becoming relatively significant in the later years of socialism in the 1970s and 1980s.

The herders were a distinctive social class during the socialist period. They were primarily rural populations following the traditional Mongolian occupation of livestock herding. As animal husbandry was still the economic backbone of the country in parallel with industrial development, herders maintained the dominant population element accounting for over fifty-three percent of total population in the 1960s (Central Statistical Boadr, 1986). With the development of an industrial labor force, the herder population decreased to 34.9 percent in the 1980s (Central Statistical Board, 1986). In 1954, the government decreed that all livestock must be put into "*negdels*"- the state-owned collectives. By 1959, all herders joined the state-owned livestock cooperatives where they had to produce animal husbandry agricultural products according to the government-imposed quota specified in the State's series of Five-Year Plans for the development of the national economy. Thus, Mongolian herders became salaried employees of the state to produce and supply agricultural products such as wool, cashmere, milk, dairy products, and meat. As they were salaried workers of the state and a member of a state-owned livestock collective, they were provided social services such as healthcare and fully-subsidized boarding schools for their children. The *negdels*—collectivization of livestock and the establishment of state agricultural farms in the 1950s were instrumental in achieving universal access to education for all in Mongolia through the establishment of rural boarding schools. One

particular challenge for achieving universal access to education for all was the high proportion of the nomadic herder population, who lived in sparsely populated rural areas in Mongolia in the early decades of socialism. As late as 1940, almost 90 percent of the population were engaged in nomadic livestock herding in (Central Statistical Board, 1986). By establishing eight-year incomplete secondary boarding schools in *soums* (the smallest territorial administrative unit) the problem related to compulsory education for herders was effectively solved.

The rural boarding schools for children of herders were tailored to seasonally migrant pastoral herding in Mongolia. As Stolpe asserted, the Mongolian boarding school was unique of its kind that differed from the USSR model after which Mongolian education system was modelled (Steiner-Khamsi and Stolpe, 2006). According to Stolple, the Mongolian boarding schools during the socialist period were not a new phenomenon, but in large measure replicated the previously existing organizational structure of monastic schooling, where children resided at monasteries away from their families (Steiner-Khamsi and Stolpe, 2006). The achievements of providing compulsory eight year schooling for rural mobile herders was unarguably an indigenous Mongolian leadership.

Furthermore, herders were not considered as a subordinate class according to the Marxist-Leninist theory of classless society. Instead, as indicated in the socialist literature sources, they were considered as socialist allies, coexisting in solidarity with urban industrial workers and professional intelligentsias. However, in large measure, there were distinct differences in urban-rural lifestyles and unequal social prestige. Social mobility for herders increasingly required relocation to urban cities and occupational change through obtaining post-secondary education, including tertiary or polytechnical education. The *negdels*- state cooperative centers were serving all kinds of functions for both herders and state farm

agricultural workers, including the state rural administrative offices, warehousing, medical, and veterinary services for animals. Yet, the lack of urban amenities and disparity in quality of life between rural and urban existed during the socialist period.

According to the Marxist-Leninist theory of classless society, it was assumed that the above composition of social class— intelligentsia, working proletariat, cooperative herders, and state agricultural farm workers—existed in class solidarity based on complete equality and mutual assistance. As Shirendyb (1981) described, "Socialist ownership of the means of production became a firm economic foundation of Mongolian society which consisted of two friendly classes: the working class and the co-operative arats" (p. 27). The *arats* here refers to the cooperative herders and rural agricultural workers.

The compulsory eight-year boarding schools opened up new avenues of upward social mobility for children of herders, even in the most remote regions as their children expanded further post-secondary education training. Given that ninety percent of the population was engaged in nomadic livestock herding pursuits as late as the 1930s, the non-agricultural labor force, including both the intelligentsia and industrial workers, and even the political elites, were drawn from herder populations. Thus, there was a comparatively rapid rate of upward social mobility as a result of adding an industrial dimension to the Mongolian economy. Most urbanities were migrants or children of migrants to urban cities from rural herding lives, retaining close ties to their rural herder relatives between the 1960s and 1980s.

Overall, social capital in Mongolia during the socialist period was not a spontaneous interaction of citizens but was centrally organized in a form of collectivization and cooperatives for herders and collectivism for urban industrial workers. The socialist establishments such as collectivizations and state cooperatives to a certain extent created a safety net for a certain

segment of populations, particularly for rural herders. The few elites of political, professional, scientific, and artistic intelligentsia benefitted from their social capital and social privileges during the socialist period as the occupational classes were structured by socialist education system. Nonetheless, the membership in each occupational class was relatively open to any individual during the socialist period as socialist post-secondary education was fully subsidized. The urbanization and industrial development are correlated with a comparatively high rate of social mobility in the 1950s and 1960s. The evidence reveals that the first and foremost well-defined track for upward social mobility was led through educational pursuits, in particular, higher education. Political reliability was the second most important prerequisite. But ethnicity was essentially insignificant to the social stratification and social mobility during the socialist period in Mongolia.

5.7 Intellectual capital shaped by Bypassing Capitalism ideology

As I adopt well-being as opposed to wealth approach to the concept of intangible capital for my doctoral research, I have attempted to emphasize the interplay between scientific research and social well-being. The intellectual capital literature has largely overlooked the expected net contributions of scientific research to social well-being and human development. In socialist Mongolia, knowledge creation was a highly sentitive and tightly controlled process. More specifically, knowledge production, sharing, and diffusion were closely integrated with the state's aim to build the non-capitalist modern economy and Marxism-Leninism induced socialist society. The governance system of knowledge creation was modelled after the unique Soviet research system that institutionally separates academic research and teaching. This type of binary

system has more self-reinforcing effects to the post-socialist knowledge creation processes as discussed in the subsequent chapters.

The modern scientific research development in Mongolia has a relatively short history. The Mongolian Academy of Sciences (MAS) was established in 1961. The National University of Mongolia, the nation's first higher education institution, was established two decades earlier in 1942. The historical foundation of MAS dates back to 1921, when Mongolia gained its independence and the People's Government decreed the establishmnet of the Institute of Scriptures and Manuscripts (*Sudar Bichgiyn Hüreelen* in Mongolian) in 1921. The institute of Scriptures and Manuscripts was upgraded into the Committee of Sciences in 1930. Since then it took three decades to become the Academy of Sciences in 1961. In a country with no national system of educational institutions such as primary, secondary, or higher, this apparently was an enormously arduous task to develop it further as an Academy of Sciences.

In the early years of opening up, the Buryat Mongolian and Russian scholars took the lead in laying the groundwork for the Mongolian academic scholarship. As indicated in the existing literature, the Buryat Mongol intellectuals, who received solid academic education during the Russian Tsar period, were apparently instrumental in playing critical role in scholarship of Mongolian studies in the 1920s and 1930s (Steiner-Khamsi and Stolpe, 2006; Kotkin and Elleman, 1999). Among the Buryat Mongolian intelligentsias, the notable one was Tseveen Jamtsarano, who was educated in St. Petersburg University, and initiated the founding of the Institute of the Scriptures and Manuscripts with Russian assistance. In addition to Buryat intellectuals, the documentary sources highlight the Russian scientists Andrej Dmitrievich Simukov, Roerich family, and the Mongolian intellectual Jam'yan as pioneers, who made significant contributions to the early scientific and scholarly work of the Mongolian Scientific

Committee in the early revolutionary years. However, the 1930s political purges during Stalin's dictatorship disrupted the intellectual momentum of some of those scholars. The Buryat Mongolian scholar Jamtsarano Tseveen lost his life in the purges of 1939 and the Russian scientist Simukov became the victim of Stalin's purges in 1939. Compared to the Soviet Academy of Science that experienced incalculable losses in scientific talent during Stalin's dictatorship, the political disruptions apparently were relatively mild in scientific research activities in Mongolia. It is because MAS was established later during the period of the post-Stalinist thaw, which liberalized the scientific research atmosphere in the Soviet Union in the 1950s and 1960s. However, the intellectual efforts in the areas of social sciences and humanities were under a strict control of the central government censorship due to the heavy demands of allegiance to Marxism-Leninism.

With the Soviet assistance in the early stages of the partnership, MAS quickly developed its research capabilities and infrastructure. The early scientific research development endevours focused mainly on collecting and creating library sources, translating literary sources from Tibetan, Chinese, Manchurian, and other European languages into Mongolian, establishing national museums, and the archival office. By 1930, many academic research works were already published in a variety of fields such as health, society, economics, geography, ethnography, anthropology, history, paleontology, and archaeology. Its earlier published scholarship provides evidence that they were not yet fully committed to allegiance to Marxist-Leninist ideological purity as they mainly sought to respond to previously unattended needs for modern scientific discourses and to build a bridge between modern sciences and traditional Buddhist sciences. However, such intellectual momentum of scientific research pluralism was

disrupted as it became subjected to the heavy demands of allegiance to Marxism-Leninism in the 1930s.

In 1961, when the Committee of Sciences became the Mongolian Academy of Sciences, it had over 700 staff and published 4,439 research works on 676 subjects as compared with 393 research works on 56 subjects published in the 1930s. Mongolia received significant financial and technical assistance from the USSR and CMEA countries to establish its own research infrastructure, including the experimental laboratories, equipment, and other technical resources. Within CMEA each member socialist country played a certain role with their R&D efforts under the rubric of the so-called "internationalist socialist division of labor". In the early years, a number of Mongolian scientific personnel and technical cadres were trained abroad mainly in the former Soviet Union, former eastern Germany, Poland, Hungary, and formerly Checkslovakia. As the national universities extended their teaching and learning capacities, the scientific research staff of MAS were trained at domestic universities. As indicated in documentary sources, the Soviet academic scholars and scientists, who were working in Mongolia as invited guest scholars at the Mongolian Academy of Science, were also teaching at the National University of Mongolia in the early years of its inception in the 1940s. The international scientific research collaboration of the Academy was largely centered around Russia and other Soviet aligned socialist countries. However, some documentary sources indicate that the MAS scientists were also exposed to research collaboration with Mongol specialists from non-socialist countries such as France, England, Japan, India, and Finland. In addition, the documentary sources indicate the endeavors MAS to extend the scope of its scientific research beyond Mongolia to other international regions. For example, the Institute of Asian and African Studies and the Institute of Oriental Studies were present under MAS during the socialist period.

The research efforts of MAS were concentrated in key fields specific to the Mongolian natural and geographic conditions and social and economic characteristics of development. The priority areas of scientific research were determined according to the Five-Year Plan of the MPR. Unlike the Soviet Union, where the key priority for scientific research focused on strategically significant, defense-related fields, the MAS research focused on livestock breeding, economy, water conservation, medicine, history, literature, geography, geology, and botany. By 1967, MAS had ten research institutes, an astronomical observatory, a seismological facility, several experimental stations and laboratories, museums, a library, publishing house, and a printing house. Hence, MAS and its research institutes, its laboratories, and its scientific community, launched Mongolia into the age of modern science, bringing advanced intellectual efforts in all aspects of Mongolia's social, economic, and cultural life during the socialist period. However, what is worth knowing, worth preserving, and legitimate to be taught to others were highly regulated and tightly controlled by central government. My research evidence indicates that such centrally planned strategies and practices of governing stock of knowledge had pros and cons, which varied in different disciplinary fields.

The research fields in animal husbandry and veterinary medicine exhibited visible progresses during the socialist period. Traditionally, the nomadic herders have very good knowledge about ecosystems and geography. They can predict the weather for coming seasons and diagnose the animal diseases based on their intuitions and observations of animal behaviors and gestures. However, introducing the modern scientific research to the traditional animal husbandry reduced vulnerabilities of herders. The documentary sources reported the following achievements such as elimination of contagious and bacterial diseases of animals, improved livestock breeding for cattle, sheep, and goats, cross-breed cows capable of producing more milk

and quality meat, and improved seeds of various native Mongolian grains and plants. These documented achievements indicate that significant investments were made in zoo-technical and veterinary research works. More specifically, such research efforts provide clear evidence that knowledge generation and development of locally adapted agricultural innovations fit the local conditions as they incorporated the local expertise and the local epistemic cultures of Mongolian mobile pastoral livestock herding. Hence, knowledge generation-application nexus were obviously effective, particularly in the agriculture sector during the socialist period.

There was also knowledge generation that was new to the local epistemic culture but shaped by Soviet legacies and tendencies. A considerable number of Mongolian scientific manpower in the area of nuclear physics and aviation industry were trained in the country during the socialist period. The Nuclear Research Centre (NRC) was founded at the National University of Mongolia in 1965. Mongolian nuclear physicists were collaborating with Soviet nuclear physicists at the Joint Nuclear Research Institute in Dubna, Moscow Oblast according to international geo-physic programs. Since its inception until today, the NRC has been carrying out fundamental and applied research on low energy nuclear physics in Mongolia. However, its research efforts have been limited to only training the national scientific cadre in this field, and would be no use to the industry due to the absence of a nuclear energy sector and nuclear power stations in Mongolia.

Moreover, in 1978, two Soviet-trained Mongolian air-space professionals participated in the Soviet intercosmos training. The Mongolian cosmonaut J. Gurragchaa flew into space as a member of the Soviet team along with the Soviet cosmonaut Vladimir Dzhanibekov, carrying out experiments on earth science. This was marked as an important historical event, which highlighted the so-called fraternal Soviet-Mongolian relationship in the 1980s. The nuclear

physics remains as one of the disciplinary fields, which Mongolian scientific community has strength in. Yet, it never extended to innovations of civilian industrial technology, although Mongolia has substantial uranium resources and geological prospectivity discovered by geological surveys jointly undertaken with the Soviet expertise. It demonstrates that Soviet political leadership prioritized disciplinary fields that are significant for defense such as aerospace, nuclear physics, and aeronautics, while consumer oriented civilian industries occupied a lowly place in their research priorities.

However, there were extended R&D investments in the field of geology in Mongolia due to the Soviet large-scale effort to build a modern economy based on public ownership of productive property and centrally planned coordination of the economy. The Soviet government devoted significant investments to geological surveys in Mongolia as the country has Asia's largest deposit of copper ore. In the early 1960s, the Mongolian national geological organization conducted extensive geological investigations, and estimated enormous reserves of copper-molybdenum ores in Mongolia. As such, Erdenet city, along with its copper concentration plant, was built by Soviet technology with the help of Soviet specialists in the 1970s. As a result, Mongolia today has solid expertise in the field of geology. Also geology is a subject area in which Mongolian higher education training is strong. The Erdenet copper concentration plant still accounts for the majority of Mongolia's hard currency income, GDP, and tax revenue until today.

Furthermore, the medical science and health research were situated within the context of cultural revolution in Mongolia. In light of Mongolian condition, the nation was on the verge of biological extinction in the beginning of the 20th century with an estimated population of little over 600,000 by 1921. This was the legacy left by pre-socialist traditional Buddhist herbal

medicine in the matter of public health. One of the salient features of medical science research in Mongolia was that it started from scratch inasmuch as no formal health care legacy was left by pre-socialist traditional regime. Development of medical science and health research was one of the most important achievements in Mongolia during the socialist period. Basic health indicators attest to the fact that the net contributions of medical science and health research to the social well-being were linear. Infant mortality decreased almost fifteen-fold and maternal mortality more than eighty-fold (Statistical Office of Mongolia, 1993). As such, Mongolia's population increased almost four-fold in a short span of time. For example, the population of Mongolia was estimated at 732,000 in 1950 but grew to over 1,595,000 by 1979 and to over two million by 1989, according to the series of national censuses. In the 1920s, the life expectancy was below 40 but it increased to 64 in the 1960s. The decline in infant mortality rate is determined by the significant increase in live births per year. There were 33,000 live births per year between 1950 and 1955 versus 69,000 between 1980 and 1985 (Statistical Office of Mongolia, 1993).

Moreover, social sciences, arts, and humanities were among the priority fields of the national research policies and funding during the socialist period as the choice of a research agenda was exclusively top-down affair. It is mainly because they were instrumental in imbuing the people with the spirit of socialist values and Marxism-Leninism, which replaced the pre-revolutionary Tibetan Buddhist practices and values. The major subjects such as economics, political science, and sociology were thoroughly dominated by Marxist-Leninist ideology. Mongolian scholars and researchers published many research works that addressed such issues as class struggle, socialist revolution, political system, socialist economy, and religion versus atheism. However, their research studies had been heavily influenced by Marxist-Leninist ideology, and were aimed at legitimatizing the non-capitalist socialist system and the theoretical

justification of transition from feudalism to socialism. Neverthless, certain disciplines such as linguistics, paleontology, and early history of Mongolia, including the Stone Age and Bronze Age were less censored due to their purely scientific nature. Thus much knowledge hitherto unknown or understudied were generated by Mongolian scientists in such fields as paleontology and linguistics. For example, a number of joint Mongolian-Soviet paleontological expeditions in the 1960s made significant scientific discoveries in the study of the origin, development, distribution, and extinction of prehistoric reptiles and dinosours. But certain pre-revolutionary historical periods such as the Mongol Empire period, the rise of Buddhism in Mongolia, and the relevant historical figures such as Genghis Khan, the theocratic monarch Bogd Khaan in the beginning of the 20th century, and some other 1921 revolutionary figures, were heavily censored to appropriate to the ideological and political purity of socialism in the country. Hence, writing of history textbooks underwent significant appropriations under heavy censorship to appropriate the ideological and political thought of socialist society.

Moreover, the intellectual works in art and literature were created under heavy censorship to develop and create new culture that is national in form and socialist in content as part of the socialist cultural revolution. All cultural organizations such as museums, theaters, and libraries were operating under the Mongolian Academy of Sciences (MAS). Thus MAS was responsible not only for scientific research development but also for improving the cultural and educational standards of the population. In general, the socialist government's cultural policies were directed towards bringing both modern culture and traditional arts closer to the working class population in order to develop their aesthetic values but eliminate the so-called backward religious dogma. It is also because the traditional intellectual and cultural works created by Tibetan Buffhist intellectuals were not easily accessible to the commoners due to their illiteracy in pres-socialist

period. Therefore, many indigenous art and cultural works that reflect the both tangible and intangible traditional cultural heritages were created during the socialist period in a form of performing arts such as folk songs, folk music, national operas, national ballets, and symphonic works. They were national in form and socialist in content. Therefore, amateur cultural activities such as art or music courses, amateur theatricals, ensembles attached to clubs, recreational and reading clubs called '*red yurts*' and cultural palaces, and cultural organization of local provincial centers and livestock cooperative centers were largely targeted towards the working class populations to shape their culture and artistic value.

As illiteracy had been eradicated and universal education had been achieved in the beginning of the 1960s, the central government envisaged increasing the national literature sources for the Mongolian people as instrumental in creatively assimilating the population to socialist culture, and in introducing the Russian and European culture to the population. During the second stage of cultural development in the Mongolian People's Republic in the 1970s and 1980s, 1,200 works by national writers had been published with a circulation of nine million (UNESCO, 1982). In parallel with the development of modern Mongolian literature, numerious world classic and Russian literature were translated into a Mongolian language by (UNESCO, 1982). The study undertaken under the auspices of the Mongolian National Commission for UNESCO, reported that around 1,000 works by Mongolian writers were translated into nearly eighty languages. However, the contents and belles-lettres were often prescribed by the central party. Yet, there are many literature works by socialist Mongolian writers that masterfully reflected the issues related to such historical events as political purges, livestock collectivization, and elimination of Buddhism, while maintaining the socialist appropriations. In parallel with the development of national modern literature, the MPR took systematic measures aimed at

developing cinematography, with Soviet technical assistance. With the establishment of the Mongolkino studio in 1936, technical facilities became available to develop the national film industry in Mongolia, producing both documentaries and feature films. Permanent and mobile cinemas were established in both rural and urban areas to imbue the Mongolian people with the spirit of socialist values and to assimilate the experience of Soviet and the world socialist culture. The Mongolian film producers participated in various international film festivals during the socialist period and some of their works won international prizes. This indicates that the socialist allies such as the former USSR and other Eastern European, Latin American, and African countries had their own sphere of cultural exchange and celebration of diversity. Overall, the dissemination of research products and creation of intellectual capital in arts and huamnities was more a linear process because of the top-down nexus between knowledge generation and governance. Thus, the research results in these fields achieved their ends within a phenomenally short time during the socialist period. The result was very evident that the new generation of Mongolians from the socialist period grew up under a totally different set of beliefs and culture than the pre-socialist period.

As the social and economic system was characterized by social ownership of the means of production, a patent, intellectual property, and copyright as a private property right or for commercial uses were largely restricted. The state controlled all entities in the cultural sectors, such as broadcasting organizations, publishing houses, record companies. Therefore, all cultural entities were under state ownership. The free market competition were essentially non-existent. Neither did freedom of contract between authors and the socialist enterprises that commercialized their works existed during the socialist period. Intellectuals, artists, and researchers, who produced valuable intellectual capital, had no private returns, but were

guaranteed certain social status such as state honored titles, publicity, medals, and a chance to travel abroad. For example, the artists used to be awarded such titles as State Honored Artist, which still continues in post-socialist Mongolia. Nonetheless, the entrance of indigenous Mongolian scholars into the creation of scientific knowledge and cultural and artistic works was definitely the advantageous part of the educational and scientific development in Mongolia during the socialist period. The artists and authors, who created valuable cultural works, were able to receive social recognition, which did not exist in pre-socialist period, although they were not entitled to own intellectual property rights and copyrights individually.

Viewing the process of knowledge creation during the socialist period in Mongolia, much knowledge hitherto unknown and unexplored were created in many different fields, and were successfully disseminated throughout the country. However, the creation of knowledge was outrightly planned and monitored by the state. The creation of knowledge was not regulated by free market supply and demand. The knowledge-governance nexus was top-down. Thereofore, scientific research was more closely linked with the solution of urgent economic and other social problems. Its results were visible and applications into the production process were linear. Hence, the socialism backed by the Soviet legacy and its technical assistance endowed Mongolia with a considerable number of scientists, scholars, artists, and a relatively large number of research institutes despite the size of the population.

5.8 Concluding remarks

The twentieth century of Mongolia was largely shaped by “bypassing capitalism”, the core ideology of Marxism-Leninism, which was specifically formulated by Lenin for Mongolia whose economies were mainly based on subsistence nomadic livestock herding, and where urban

capitalist industry was essentially non-existent. Lenin's theoretically driven yet ideological advice for Mongolia became a famous rhetoric of socialist Mongolia, which led the social and economic development path for the country. As the means of production came fully under the state ownership, all forms of capital including human, social, human, cultural, and intellectual capital, was shaped by the state driven ideology of Marxism-Leninism under the common ownership of production.

The centrally planned post-secondary education achieved its end to create proletarian workers to build the non-capitalist industrial development based on public ownership. Such a fully subsidized and centrally coordinated socialist education system had shuffled the pre-socialist traditional hereditary class structure into an occupational class structure. The positive legacy of such centrally planned human resource planning and training was that it succeeded in transforming the mono-cultural livestock-breeding nation into a semi-industrialized socialist nation. Mongolia was ranked higher than China and other Southeast Asian countries such as Bangladesh and Sri-Lanka as measured by various indicators, including longevity, educational attainment, and health.

In particular, education was one of the important achievements of Mongolia during the socialist era as the country's education indicators were comparable to those of middle- income countries. By 1990, for example, the adult literacy in Mongolia was over 96 percent while it was 81 percent in China and 37 percent in Bangladesh. Until 1989, the gross enrollment ratios (GERs) in Mongolia were compared favorably with those in middle-income countries' education indicators as it was 98 percent in primary schools, 85 percent in secondary schools. These advances were a direct result of the socialist central government's commitment to ensure the equal access to education and social welfare among the population. The highly homogenous

education and equal access to educational and cultural endeavors created a relatively egalitarian socialist society during the socialist period. Despite a few quality indicators in particular for housing as there was a slim majority of urban population living in *yurts* and visible difference in urban and rural lifestyles, people were relatively equal in terms of haves and have nots under the common ownership of tangible capital during the socialist period as compared to the post-socialist period.

CHAPTER 6: INTANGIBLE CAPITAL SHAPED BY NEOLIBERAL CAPITALISM

6.1 Introduction

This chapter begins describing the Mongolia's transition from socialist centrally planned economy to democracy with liberal market economy in 1990. It examined the effects of the "shock therapy" reform program based on neoclassical prescriptions developed by Washington Consensus in the early 1990s on social and economic conditions in Mongolia.

The sub-chapters 6.2 and 6.3 deal for the most part with a survey of higher education expansion in the post-socialist period and the economic, demographic, and structural forces driving the increased participation in higher education. The cutback in state subsidies in higher education, emergence of private providers along with the legalization of private higher education, and introducing tuition fees to state universities have led to massifications and commercializations in Mongolian higher education in the post-socialist period. Thus the sub-chapters 6. 3 and 6.4 examine the social and economic implications of the mass enrollment. More specifically, these two sub-chapters describe why the increased access to higher education fails to enable social and economic mobility for a certain segment of the population.

The sub-chapter 6.5 provides the research and development efforts in post-socialist Mongolia and discusses the issues related to scientific manpower, institutional and systemic rigidity of the Mongolian Academy of Sciences. It also devotes attention to issues related to strategies and practices of governing different stock of knowledge, as well as issues hampering the effective dissemination and consumption of research products.

6.2 Emergence and effects of neoliberal capitalism in Mongolia

The seeds of political reform such as *glasnost* ("openness") and *perestroika* ("restructuring") to the former Soviet Union in the mid of the 1980s influenced the social and political climate in Mongolia. With official declaration of the transition from socialism to democracy in 1990, Mongolia, undertook the economic reforms called “shock therapy” prescribed across the former Soviet countries in Central Asia and Eastern Europe under the leadership of international financial institutions such as International Monetary Fund (IMF), World Bank, and Asian Development Bank. The “shock therapy” reform program based on neoclassical prescriptions envisaged a quick price liberalization, a massive privatization of publicly owned assets, and cutbacks in government subsidies. However, the transition to free market economy was chaotic and disorderly, bearing multi-dimensional changes in cultural, political, and policy areas in Mongolia. In the 1990s, Mongolia has undergone a series of economic crisis, which were reflected in high inflation in triple digits, rising unemployment and poverty, shortages of basic goods, food rationing, and interruption of basic imports such as fuel, energy, and machinery and construction materials.

The three types of privatization (livestock privatization, apartment privatization, and privatization of state-owned enterprises) during the 1990s lacked transparency and sufficient knowledge among the population. As part of the privatization of state owned enterprises, every citizen was given shares in a form of vouchers. In theory, those who were able to collect the greatest number of vouchers would become the owners of the enterprise. However, in reality the majority of the ordinary population lacked knowledge of stock exchange and stock market and of the potential value and investments of their shares due to the seven decades of Bypassing

Capitalism ideology. According to the above international financial institutions regarding the economic shock during the 1990s, Mongolia's overdependence on former CMEA, particularly the Soviet Union, for investment, technology, and foreign trade (export and import) undermined the economic resilience of the country to sustain or at least to retain its growth that Mongolia achieved during the socialist period. Notwisthstanding to the diagnosis of those international financial institutions, training the local Mongolian human resources for the requisite knowledge and expertise to undertake the envisaged economic reform was essentially neglected. If we take a look at that full history of the Soviet-sponsored centrally-planned economy in Mongolia, investment in human capital and training of the requisite Mongolian professionals both domestically and in CMEA countries took place in parallel with many of their radical socialist reforms. The investment in education and training for the requisite local Mongolian scientific, technical and professional cadres were important parts of the series of Five-Year plans of the Soviet-sponsored centrally command economy in Mongolia. Thus, the Soviet-trained local Mongolian human resources were at the forefront of implementing the socialist reforms, and were best utilized to build socialism in the country. But these international development organizations essentially neglect the potential of utilizing the local Mongolian human resources. All this recounts that economic reform took precedence of educational policy reform in post-socialist period.

According to the multifaceted nature of development, Mongolia was positive as measured by various indicators such as longevity, educational attainment, and health in the early 1990s. In particular, education was one of the important achievements of Mongolia during the socialist era, with its education indicators comparable to those of middle-income countries. However, for its

per capita income as a proxy for development, it was too low to retain such positive indicators endowed from the socialist system.

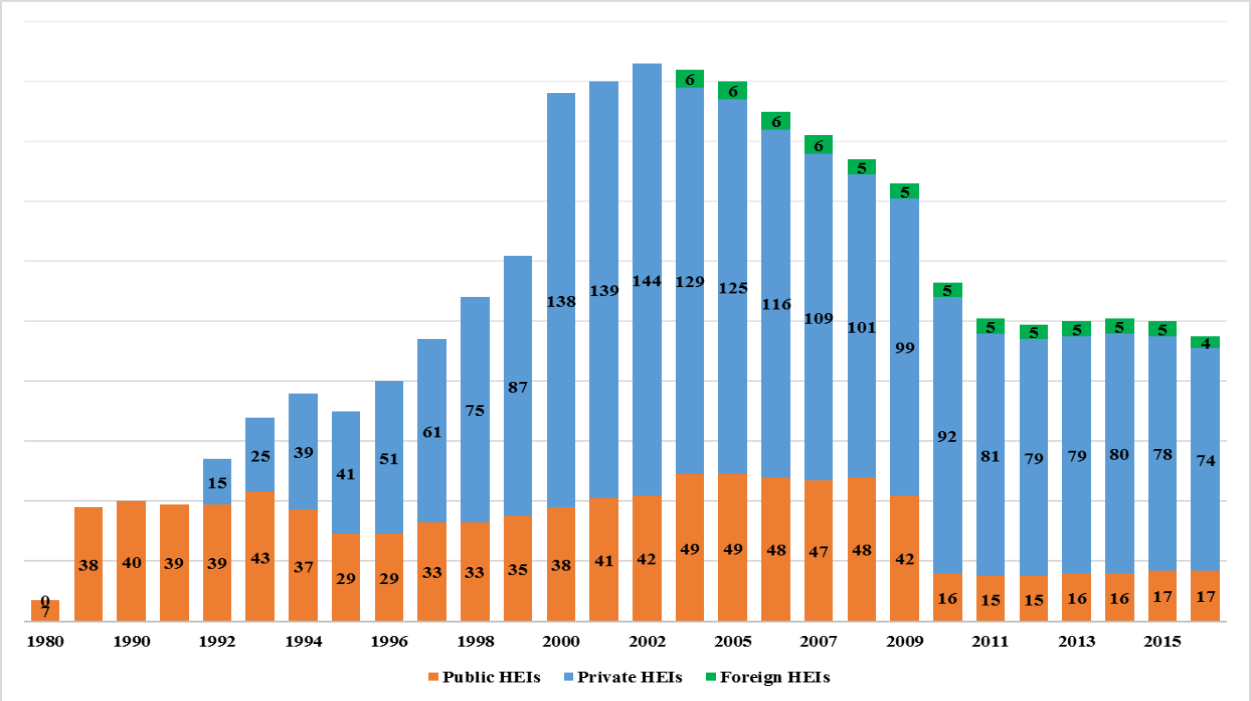
Unlike Marxism-Leninism during the socialist period, the neoliberalism has not been introduced to Mongolia as theoretical knowledge or ideology. Neither it is a widely discussed discourse in post-socialist Mongolian academic scholarship. Yet, it is an omnipresent phenomenon reflected in many of the government policies such as privatization of publicly owned assets, liberalization of prices, reducing the state subsidies, and enacting tax incentive policies to favor foreign investments. As such, the practical execution of neoliberal policies have led to the loss of social safety nets for a certain segment of the population. How Mongolian education system has adapted to neoliberal paradigm is discussed in the subsequent sections of this chapter.

6.3 Higher education development in free-market economy

Higher education during the socialist period reflected the ideological and industrial aims of the socialist regime and functioned to meet the socio-economic needs of the state. By the 1990–1991 academic year as the country transtioned from centrally planned economy to free market economy, there were 40 state higher education institutions operating in the country. With the liberalization of the economy and legalization of private higher education in the early 1990s, the number of higher education institutions (HEIs) increased exponentially, peaking at 180 in 2000–2001 /See Figure 5/. It should be noted, however, that the majority of the HEIs remain private, enrolling less than 50 percent of total number of students. The total number of HEIs has decreased in recent years due to the Mongolian Miniustry of Education, Culture, and Science's (MECS) tightening its accreditation process for for-profit diploma mills and attempts to merge

state universities. By the latest count in 2016-2017 academic year, there were 95 HEIs with 17 state universities, 74 private, and four foreign HEIs /See Figure 5/.

Figure 4: Number of higher education institutions including public, private and foreign



Source: MECS database

The decline of private HEIs in recent years in part related to short-term revenues and long-term viability as some missed their enrollment targets by huge margins and became unable to sustain their revenues for stable operation. With only two decades of development of private higher education in the country, the private HEIs are too small to be cost-effective. The legalization of private higher education also began the the process of privatizing public universities. Two state universities, including the University of the Humanities and the Institute of Finance and Economics were privatized in 2003, following the World Bank technical advice for the privatization of Mongolian higher education. The Institute of Finance and Economics underwent a management privatization, while the University of the Humanities was fully

privatized. The management privatization refers to transferring the public management to a private management team, but the university's assets are still under the state ownership. The University of the Humanities was fully privatized, as all assets and properties were sold by the government to the management team of shareholders. The privatization of higher education institutions was, in many regards, an attempt to diversify higher education financing by introducing new revenue streams, and by extending institutional autonomy.

The higher education expansion has transformed the institutional landscape more horizontally rather than vertically in Mongolia. The most common change was the introduction of private higher education and the relabeling of the traditional socialist types of higher education institutions and *technikums*. The specialized institutes were transformed into universities, comprehensive (classical) or specialized. For example, the Institute of Foreign Languages became the University of the Humanities and the Institute of Finance and Economics became the University of Finance and Economics. The former socialist *technikums* were transformed into four-year bachelor's degree granting institutes by increasing the number of fields of study. For example, the former socialist *technikums* of trade, telecommunication, healthcare, railway, construction, food industry, light industry, and veterinary technikums were renamed as four-year bachelor's degree granting institutes after the 1990 transition. Other transformations involved the differentiation of institutions by the level of degrees they can confer through accreditation (bachelor's degree granting four-year undergraduate colleges, Master's degree granting HEIs and post-graduate degree including doctoral degree granting universities), and the establishment of bilaterial state universities and branches of foreign institutions. The notable foreign invested universities include the German Mongolian Institute for Resources and Technology, American University of Mongolia, and the International University of Ulaanbaatar.

The German Mongolian Institute of Resources and Technology (GMIT) has been operating since 2011. It is a state-run university designed to provide academic teaching and research, catering for the new needs of emerging labor market demands in mining sector. Of note, tt is largely funded by the German government. In my view, GMIT indicates the Mongolian government's effort to establish a market-driven state managed institution. The fact that it is largely funded by German government makes GMIT more immune to the unstable political leadership and volatile Mongolian economy. The American University of Mongolia was founded in 2012 by Mongolian and American business and educational leaders as an independent, non-profit liberal arts university modeled after successful universities in the U.S. The International University of Ulaanbaatar was founded earlier in 1995 as Ulaanbaatar college for training Korean Language Teacher and Translator but it was later expanded into a university providing graduate and post-graduate degree programs including both Master's and doctoral degrees. The International University of Ulaanbaatar is largely funded by Korean investment groups.

These joint investments contribute to the changes in the institutional landscapes in Mongolian higher education. Neverthless, in most cases, the flagship traditional state universities from the socialist time maintain their advanced positions, enrolling the majority of students. The fact that those state universities enrolling a large number of students cannot accumulate greater resources for improving facilities, hiring strong academics, and investing in research, reveals more horizontal differentiation between higher education institutions. Both state and private universities cannot increase their tuition fees above the limit set by the government.

With the exception of the German Mongolian Institute of Technology and Resources, the majority of Mongolian private higher education institutions offer degree programs mainly in the humanities, social sciences, and business studies–a reflection of the low delivery cost of these

programs and the absence of costly learning infrastructures needed for programs in STEM fields. The private HEIs are too small to be financially viable. The government policy aimed at the marketization of the system in the 1990s also contributed to the stratification of domestic higher education institutions. The traditional state universities established during the socialist period, namely the National University of Mongolia (NUM), Mongolian University of Science and Technology (MUST) and the University of Health Science are considered as reputable, thus their admission is quite competitive through national university entrance examination tests, while the majority of private providers, in many regards, function as open-access HEIs.

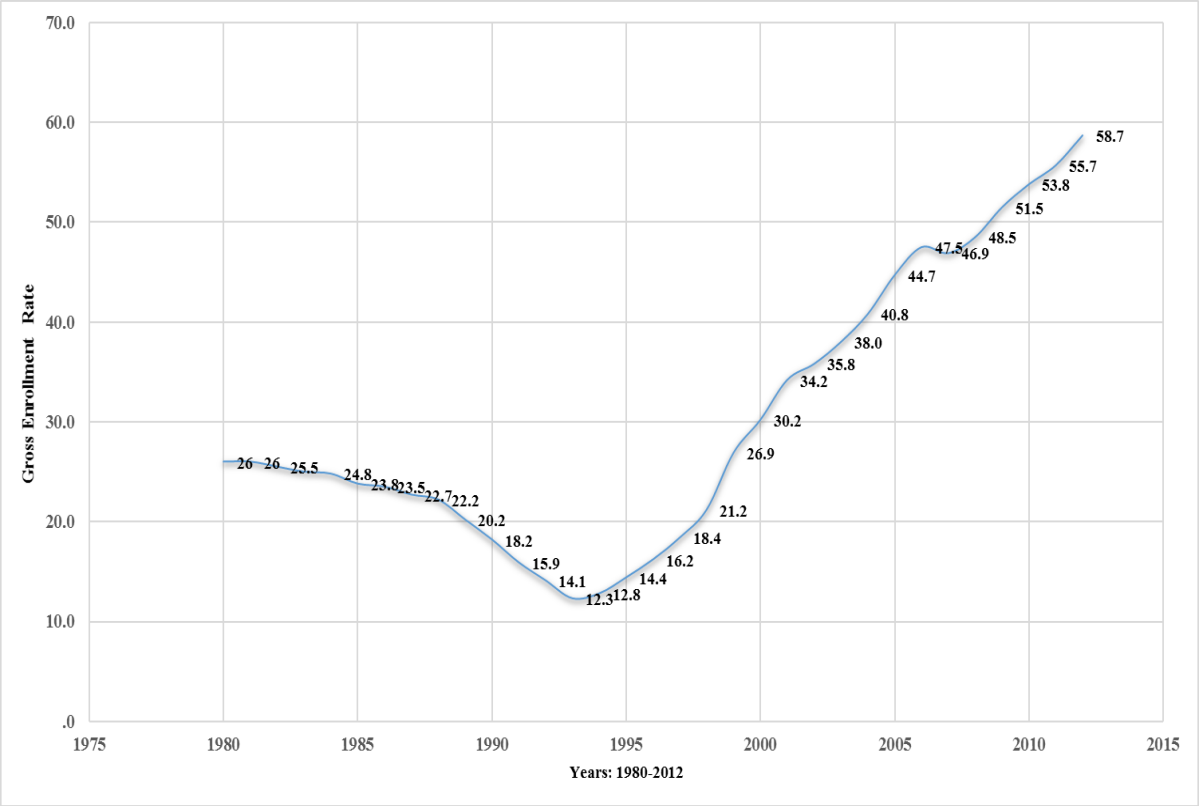
Furthermore, the other factor currently has a great impact on the dynamics of post-socialist higher education system in Mongolia is an institutional separation between teaching and research. It is a historically contingent factor inherited from the socialist past. The Mongolian Academy of Science (MAS) along with its research institutes maintain the major functions of producing research in the country in both fundamental and applied research in key priority fields of studies. A few key state universities, including NUM, MUST, GMIT, and University of Health Science are able to sustain some research standards in the country within their specialized areas, but many of the private HEIs remains as vocationally oriented professional training sites based on teaching and learning. The existing literature indicate that post-socialist Central Asian countries and Russia are struggling for a place in the emerging knowledge-based economy based on innovations due to the enormous impact that globalization is having on higher education worldwide. As Mongolia shares the same history of socialist past with those countries, it is faced with the same challenges of facilitating the shift to a university-based setting of scientific research and to increase the research capacity of Mongolian universities.

6.4 Massification of higher education versus human capital issues

During the socialist period, the centrally planned human resource training provided access to a slim minority of less than 20 percent of tertiary age cohorts. The transformation of the role of Mongolian higher education has shifted from being for a selected few to mass enrollment enrolling over 50 percent of relevant age cohorts. By the latest estimate, the gross enrollment rate reached to 68 percent in 2015. In identifying three stages in the development of higher education: elite (less than 15 percent of the tertiary age cohort), mass (50 percent), and universal access (above 50 percent), Trow (1973) defined that universal stage becames a social norm. Hence, the current mass enrollment in Mongolia has almost become a social norm. However, the rapid expansion of Mongolian higher education tranforms the institutional landscape rather than social and economic mobility of individuals. The mass enrollment has implications for the institutional stratifications rather than for the social stratifications in Mongolia.

Although the total number of HEIs has decreased in recent years from 180 in 2000s to 95 in 2016 because of tightened accreditation process and merging, the enrollment continuously grows driven by social aspirations of Mongolian families, the structural changes of institutions, and changes in the proportion of the relevant age cohort. The gross enrollment rate (GER) for higher education grew from 18.2 percent in 1990 to 58.7 percent in 2012, exceeding the OECD's average of 55 percent /see Figure 7/

Figure 5: Higher education gross enrolment rate (1980-2012)



Source: UNESCO Institute for Statistics database

As shown in Figure 7, the growth rate in number of students enrolled in HEIs has been 6.9 percent for the past 14 years from 2001-2002 academic years until 2014-2015 academic years. There has been tremendous growth in the absolute number of students for the last two decades by more than tenfold – rising from 17,338 students in 1990 to 178,295 in 2015.

There are two path dependent factors that driven growth in university enrolment and increased the social demand for higher education. The transition from socialist, centrally planned economy to market-oriented democracy characterized by deregulation, privatization, and price liberalization has served as a structural factor driving the dramatic increase in higher education enrolments. The structural transition brought several cost-cutting and cost-recovery measures, including freezing capital investment and reducing state subsidies in tertiary education by

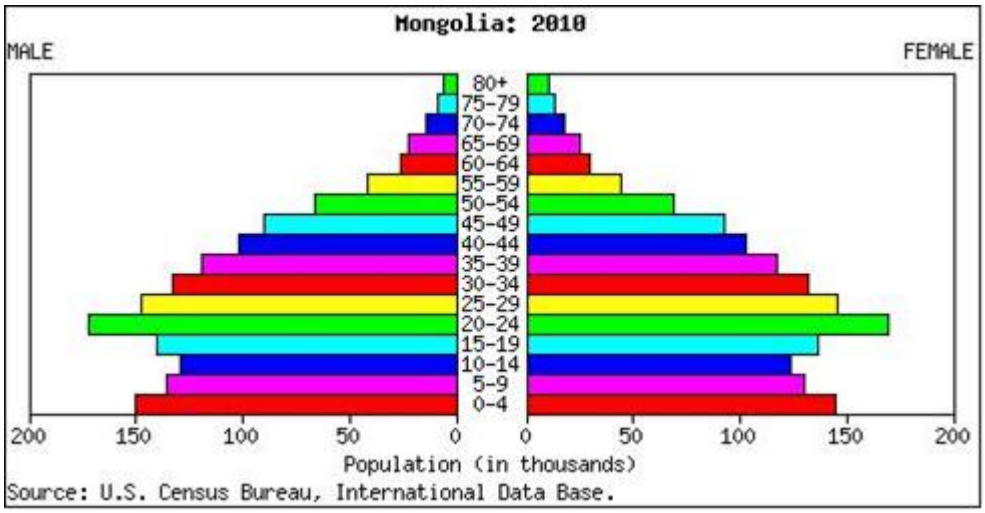
introducing tuition fees. Due to the cutback in state subsidies, state universities have undergone severe funding deficiencies, which resulted in increase in enrollment of tuition fee- paying students to cover their faculty salary and administrative costs. Particularly, the private HEIs rely on mass enrollment as tuition fee is their major source of revenue generation. Therefore, tuition fees have become the largest source of financing for both public and private tertiary education institutions in Mongolia. Yet, the HEIs cannot increase their tuition fees above the maximum limit set by the Government. Such conditions result in a horizontal expansion of higher education in the country. According to the World Bank (2010), tuition fee accounts for sixty-two percent of funding for private higher education institutions and fifty-eight percent for state universities.

There is an absence of consistent data on higher education tuition fees in Mongolia to enable a time-series analysis. In 2016-2017 academic year, the tuition fee for undergraduate bachelor's degree studies is 1,913,000 MNT (approximately 780 USD) on average at state universities and 1,952,200 (approximately 797 USD) at private HEIs according to MECS statistical information. These are only tuition fees and living expenses are not included. That is why the enrollment has grown irrespective of existence of tuition fees. The low tuition fee is associated with low opportunity cost, which affects the quality of education but increases enrollment irrespective of economic crisis. Yet, the tuition fee remains a burden for a certain segment of the population, especially rural herders and low-income households.

In addition to the structural changes, the demographic factors including the population growth for 18-24 years old cohorts have significant impact on increasing the aggregate social demand for higher education. In developing countries like Mongolia where tertiary education enrollment is almost exclusively domestic, the increase in the population of the tertiary education age coupled with the economic conditions, significantly affects the mechanic increase in higher

education enrollment. According to the US Census Bureau Projection, the age group of 20-24 years old constitutes the largest cohort in the population as of 2010 (see Figure 8).

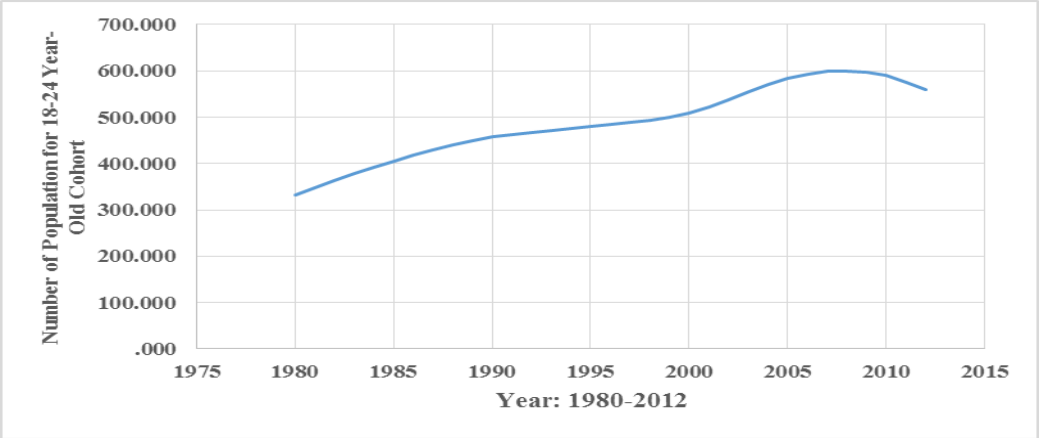
Figure 6: Population Pyramid of Mongolia 2010



Source: U.S./ Census Bureau, International database

The population for 18-24 years old in Mongolia grew at a rate of 5.7 percent annually between 1980-2012 years due to the 1970s and 1980s baby boom resulted from the socialist government's pronatal policy (Figure 9). Hence, the demographic rise in tertiary education age cohort from the baby boom generations during the socialist period, has also increased the aggregate demand for higher education enrollment in the post-socialist period.

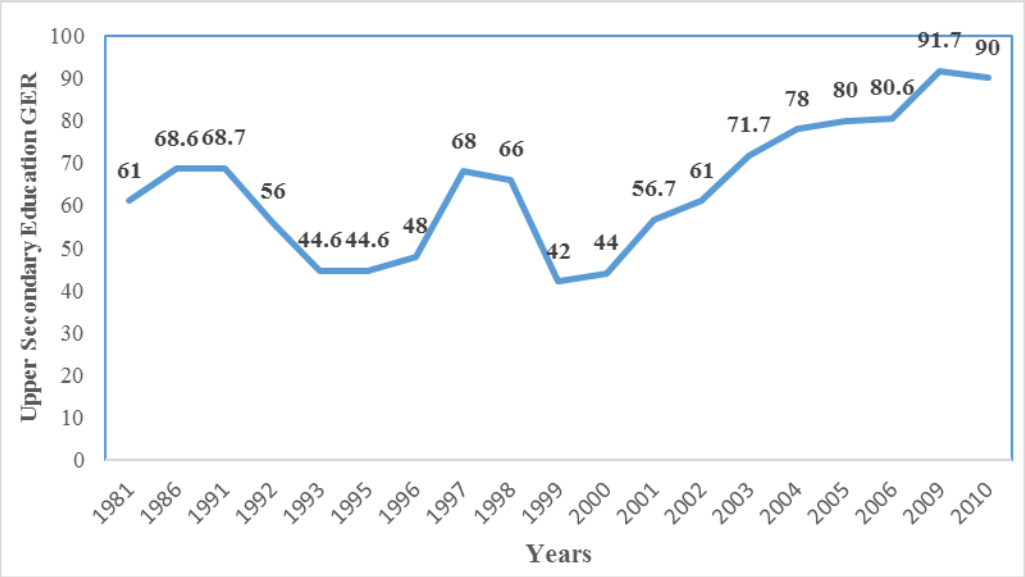
Figure 7: Annual growth of the population for 18-24 years old (1980-2012)



Source: UNESCO Institute for Statistics and the World Bank database

In addition to the demographic factors, the success rates in pre-tertiary schooling and the upper secondary education completion rates also have a significant impact on overall enrollment levels in tertiary education. The basic education, particularly upper secondary education enrolments, suffered a severe decline during the transition period of the 1990s due to the contraction of public financing and loss of social safety nets for the pre-tertiary education services in rural areas. However, the gross enrollments in upper secondary education have recovered over the past decade, reaching over eighty to ninety percent (Figure 10). As estimated shown in below Figure 8, eighty percent of secondary school graduates continue into postsecondary education. This clearly shows that the success rate in pre-tertiary schooling over the past decade has also increased the social demand for higher education in Mongolia.

Figure 8: Upper secondary education enrollments (1980-2012)



Source: UNESCO Institute for Statistics and the World Bank database

Vocational education could be an alternative to higher education for the growing tertiary education eligible population. However, the decline of large-scale industries in the 1990s during the transition period has significantly reduced the enrollment in technical and vocational education. During the socialist period, admission to higher education was limited to only a selected few and the remaining non-selected majority were absorbed into other post-secondary education options such as vocational education and *technikum* as discussed in the preceding chapters. As shown in Table 4 below, the number of students enrolled in TVET schools significantly decreased in the 1990s by over 78 percent from 54,661 in 1989 to 11,245 in 1999, while the enrollment in higher education institutions had dramatically increased almost four fold from 19,504 in 1989 to 77,281 in 2000. This demonstrates a limited post-secondary option alternative to higher education in the post-socialist period. The increase in enrollment in HEIs and the decrease in enrollment in TVET also reflect the shift from higher education being only for a select few to higher education being for the mass in post-socialist period.

Table 4: Number of students enrolled in TVET versus number of students enrolled in HEIs (1989-2009)

Year	Number of students enrolled in TVET	Number of students enrolled in HEIs
1989	54,661	19,504
1990	45,545	17,338
1991	35,031	16,801
1992	20,388	19,827
1993	14,116	24,247
1994	13,498	27,870
1995	13,571	31,973
1996	11,308	39,157
1997	12,320	44,864
1998	11,650	59,444
1999	11,245	67,554
2000	12,177	77,281
2005	23,249	123,824
2009	44,681	147,586

Source: *Foundation of Education Sector in Mongolia and its Development in 80 Years and MECS annual statistics booklets for the data of 2005 and 2009; MECS 2001*

The number of TVET schools started increasing from the mid-2000s as Mongolian government has initiated significant efforts to reform the TVET sector with support from the international donor organizations. However, many of their initiatives taken by joint efforts of the Mongolian government and international donor organizations has been more ad-hoc and donor-driven. In an effort to enhance the quality of TVET schools, significant investments have been made to upgrade training facilities and equipment and to introduce a competence-based training curriculum. However, the rates of private returns from these public investments are less economically attractive to individuals due to the number of factors such as poor public image of TVET and poor working conditions for skilled workers in Mongolia. The recent increase in

enrollment in TVET has in large part resulted from the monthly stipends given to TVET students rather than their informed choices to pursue skilled labor.

In addition, the current TVET system as a post-secondary education establishment provides a dual certificate that certifies the occupational (vocational) and upper secondary education completion. This prompts many students to obtain upper secondary education certificate in order to apply for admission to universities rather than acquiring trade skills and seeking employment as a skilled worker. Mostly those who failed to enter upper secondary education (9^{th} through 12^{th} grade) due to low GPA for junior secondary education have no choice other than entering vocational schools. As a result, TVET has enrolled students, who are academically less successful, and who come from poorer and disadvantaged families. In that regard, TVET essentially serves as a transition for those academically less successful and disadvantaged students to enter higher education institutions.

Furthermore, the increase in female participation rate in higher education is nowadays considered as one of the major determinants for higher education expansion, particularly in developing countries. In Mongolia, a high rate of female participation at all levels of education was achieved during the socialist era. The share of female students enrolled in tertiary education in Mongolia since the 1970s ranged from fifty percent to sixty percent. The highest it reached was seventy percent in 1994 compared to other Asian countries. For example, the share of female students ranged from twenty to forty percent in India and thirty to forty percent in Japan according to Nozaki et al (2015).

In subsequent years since 2000, women remain representing from fifty-nine to sixty percent on average in total higher education enrollments in Mongolia /See Table 5/.

Table 5: Share of female students in total higher education enrollments (2004-2017)

Academic year	Total number of students enrolled in HEIs	Female students enrolled in HEIs	Percentage of female students in total enrollment
2004-2005	123,824	76,049	61.4%
2005-2006	138,019	83,871	60.4%
2006-2007	142,411	86,183	60.5%
2007-2008	150,326	91,720	61%
2008-2009	161,111	97,796	60.7%
2009-2010	164,773	99,472	60.3%
2010-2011	170,126	101,455	59.6%
2011-2012	172,798	101,557	58.7%
2012-2013	175,591	102,427	58.3%
2013-2014	174,045	101,783	58.5%
2014-2015	178,295	102,520	57.5%
2015-2016	162,626	93,674	57.6%
2016-2017	157,138	91,526	58.2%

Source: MECS statistical data

Such a reverse gender gap phenomenon in Mongolian higher education is, in large part, due to the fact that many boys dropped out of schools and many men entered the informal labor rather than seeking higher education upon the completion of their upper secondary education during the transition period in the 1990s. In addition, the majority of Mongolian migrant workers seeking labor work in foreign countries, particularly in South Korea, are men. The government of South Korea estimates that one out of every two urban households in Mongolia has a family member working in South Korea. According to the data provided by Employment Service Center from Ministry of Labor of Mongolia, 22,441 people in total went to work in South Korea over the past ten years between 2004 and 2013. Of these people, 86.3 percent (19,371) are male and 3070 are female (Tsogbadrakh, 2013). The old cultural belief that men can rely on their physical abilities to make a living has been maintained among certain segments of the population—those with limited financial options. In contrast to males, females do not have the same economic

security as men, who can take jobs of hard physical labor. So, families with limited financial options prefer to invest in their girls' higher education to increase their self-sufficiency and employment opportunities. Such social and cultural factors have been the underlying reasons behind the reverse gender gap in Mongolian higher education.

Nonetheless, in recent years there has been a slight drop in the share of women's enrolment, from a peak of 70 percent in 1995, to 63.8 percent in 2000, and to 61.4 percent in 2005 and 58.2 percent in 2016 respectively. This marked decline in the share of female students is an indication that the number of male students attending tertiary institutions has rebounded in recent years. Indeed, male enrollment has grown gradually, which is an indication that Mongolian men nowadays appear to value higher education opportunities. Yet, a reverse gender gap still exists at the tertiary level as the ratio of women to men has relatively remained close to 1.4 over the past five years, making Mongolia an exception within Asian countries where the majority of university students continue to be men.

Additionally, the reverse gender gap in Mongolia is, to certain extent, related to an increasing number of private higher education institutions, offering degree programs mainly in the humanities, social sciences, and business studies, due the low delivery cost of these programs and the absence of costly learning infrastructures as needed for programs in science and technology. The fields of studies such as humanities, social sciences, and education are traditionally women dominated in Mongolia and in the other post-Soviet countries. According to the comparative study on gender gap and women's participation in higher education in Japan, Mongolia, and India conducted by Nozaki et al (2015), the fields of study including medicine and education are predominantly represented by women. For example, in 2005, female students represented 80.9 percent of those studying in health and welfare, 77 percent in education, 72

percent in humanities and arts, 64.6 percent in social sciences, business and law, and 60.3 percent in agriculture respectively (Nozaki et al, 2015). The fields of public service, including defense, police, transport, and environmental protection are the most male-dominated. Male enrollments also outnumber in the fields of engineering, manufacturing, and construction because female students accounted for 41 percent in engineering, manufacturing and construction and 47.4 percent in science in 2005 (Nozaki et al, 2015). Hence, the gender segregation by field of studies inherited from the socialist past has remained virtually unchanged in post-socialist period.

Moreover, the soaring enrollment in higher education has resulted in a high rate of underemployment among university graduates and low public and private returns to investments in higher education. The decline in private returns is reflected in the fact that higher education attainment cannot ensure employment outcomes among university graduates in Mongolia. The decline in public returns from investments in human capital is reflected in the fact that HEIs cannot produce graduates with degrees and qualifications that are relevant to the labour market or essential to the national development of the country. Under the centrally planned economy during the socialist period, the supply and demand for university graduates were coordinated by the state as rationally planned and specified in its series of Five-Year plans for social and economic development. In the post-socialist period, the government deregulation and economic liberalization result in horizontal institutional expansion in Mongolian higher education rather than expansion of opportunities for individuals. The rational planning, as it existed during the socialist period, is essentially lacking. Such a phenomenon in turn affects both the individual and social benefits.

Enrolment is only a measure of the degree to which demand for higher education is met. The political, economic, institutional, and demographic changes as described above have increased the social demand for university education in Mongolia. Consequently, the Mongolian HEIs do not have the requisite capacity, namely the available human and physical resources to meet this growing demand. Instead, the Mongolian HEIs, particularly the private ones, accommodate this booming demand through offering low-cost degree programs. Private colleges offer degree programs mainly in the humanities, social sciences, and business studies–a reflection of the low delivery cost of these programs and the absence of costly learning infrastructures needed for programs in STEM fields. This situation results in the imbalance between labor market supply and demand in Mongolia in recent years. The number of graduates in fields of humanities, business administration, and social sciences has been increasing rapidly for the past fifteen years (1996 to 2011), while the percentage of graduates specialized in engineering, architecture, town planning, and agriculture has been declining (see Table 6). Table 6 shows that graduates in the fields of humanities, business administration, and the social sciences outnumbered graduates in engineering and manufacturing by a significant margin with 66.2 versus 17.5. This clearly shows the supply gap in the 1990s.

Table 6: Percentage of total student graduates by field of studies (1996-2011)

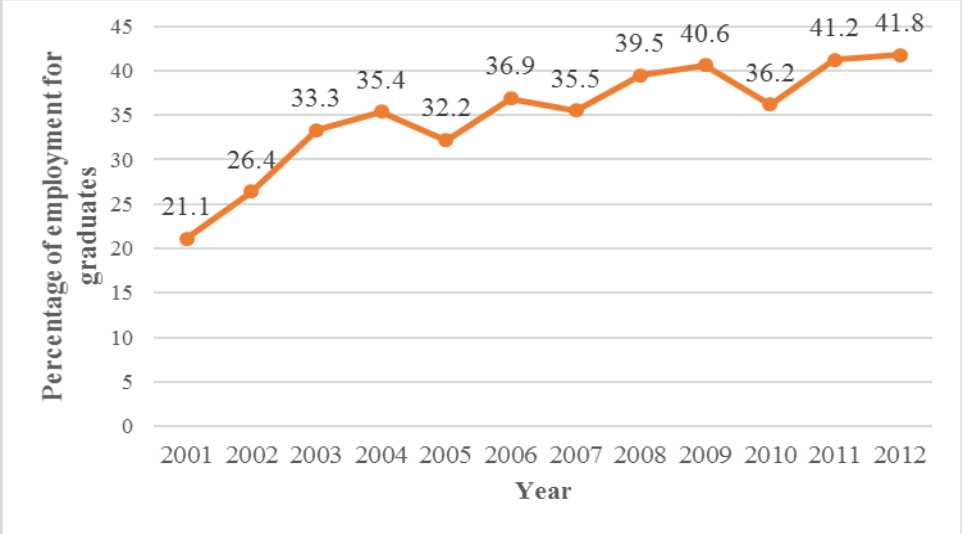
Field of study	1996		2001		2006		2011	
	Total number	%	Total number	%	Total number	%	Total number	%
Education Studies & Teacher	1415	20.4	2294	15.4	3262	12.6	6622	17.5
Arts and Humanities	1316	19	1522	10.3	2616	10.1	3304	8.8
Social Science and Law	347	5	2069	13.9	3729	14.4	4965	13.2
Business Administration	649	9.4	2644	17.8	7445	28.7	4589	25.4
Mass Communication and Journalism	116	1.7	133	0.9	340	1.3	541	1.4
Mathematics and Computer Science	80	1.2	324	2.2	740	2.9	1142	3.0
Service Sector	12	0.2	106	0.7	1413	5.4	2016	5.3
Natural Science	172	2.5	483	3.2	632	2.4	890	2.4
Medical Science	1271	18.3	885	6.0	1942	7.5	2981	7.9
Engineering, Architecture & Town Planning	769	11	1769	11.9	2012	7.7	4304	11.4
Trade, Craft, & Industrial Programs	222	3.2	434	2.9	-	-	-	-
Agriculture, Forestry & Fishery	219	3.2	391	2.6	711	2.7	835	2.2
Others	346	5.0	1814	2.2	1096	4.2	560	1.5

Source: National Statistical Office, Statistical Yearbooks 1996-2011

In terms of teaching capacity, HEIs in Mongolia have not been able to recruit enough fully qualified faculty members to accommodate this massive enrollment. The student-faculty ratio has risen twofold reaching to 22.8 in 2009 as compared to 11.5 in 1990 and 10.4 in 1992 respectively (Yano, 2012). On one hand, the dramatic increase in gross enrollment rate for tertiary education indicates the increased private investments in tertiary education among the Mongolian population over the past two decades. On the other hand, the rates of private return to private investments in tertiary education attainment are less economically attractive, given that there is a relatively high rate of underemployment among the higher educated population in the country. As shown in Figure 11, nearly 60-65 percent of graduates remain unemployed after

graduation from universities, increasing the number of higher educated jobless population in the past decade. This clearly indicates that such a sharp increase in tertiary education gross enrollment is a bubble enforced by marketization and other demographic factors, increasing the aggregate social demand for higher education. Yet, both private and public returns from investments in human capital are declining.

Figure 9: Percentage of graduates employed after graduation (2001-2012)



Source: MECS statistical data

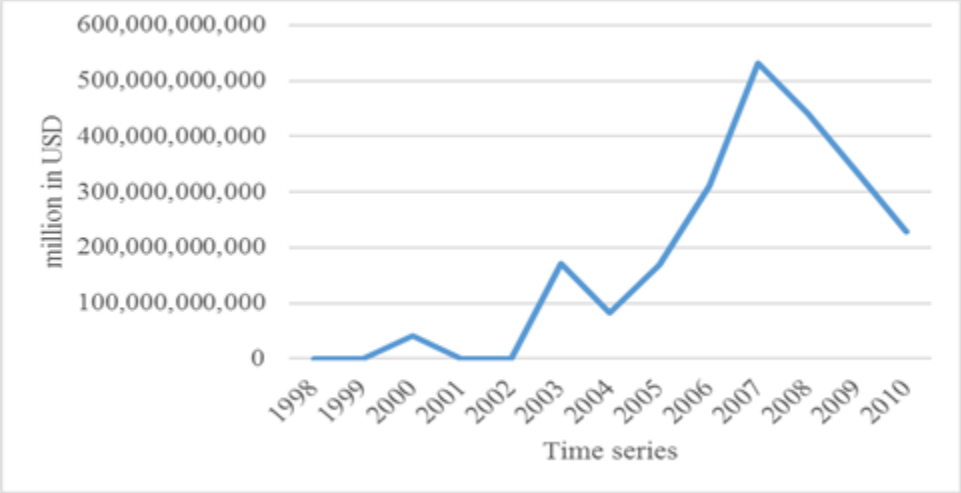
Many factors contribute to the relatively high rate of unemployment among university graduates. The well-known problems, as identified by existing studies by the World Bank (2010) and many of the project documents of the Asian Development Bank, are low-cost and low-quality education, a mismatch between the demand for and supply of skills. Yet, how certain segment of populations are directly affected by these problems, and how they mitigate the effects of these existing problems are less explored in existing studies. In addition, there is a considerable variation in graduates' mitigations to negotiate their life after graduation from HEIs depending on their family incomes and educational backgrounds. The caveat necessary to an

accurate interpretation of the information provided here is that the variations of their mitigations cannot be quantified. The absence of graduate tracer studies makes it difficult to quantify and their career destinations and personal life experiences after graduation are virtually impossible to quantitatively measure. However, the evidence reveals that the high underemployment of the university graduates lead to two types of migration: out-migration and and in-migration. The former refers to those seeking migrant work abroad, while the latter refers to the limited geographic access to higher education. The majority of HEIs are concentrated in the capital city Ulaanbaatar. Of 95 higher education institutions, 87 are located in Ulaanbaatar and only 8 are located in other provinces in 2016-2017. Therefore, the majority of tertiary education students are studying in Ulaanbaatar with 91.4 percent (143,684) while only 8.6 percent (13,454) are studying in rural areas. The greatest concentration of higher education institutions in Ulaanbaatar capital city and the limited physical access to higher education in other parts of the country increase in-migration to the capital city resulting in-country brain drain and a subsequent increase in socio-economic disparities between urban and rural peripheries.

As for out-migration, seeking migrant work to foreign countries is the most common mitigations for graduates to negotiate the Mongolian labor market after graduation. This is specifically common for those, who come from families with limited financial viabilities. Graduates from families with limited financial resources and lack of socially affluent connections often seek to migrate to foreign countries to do labor work. South Korea is the most common destination for Mongolian migrant workers. Interest in migration to the United States is soaring as well. As shown in Figure 13 below, the personal remittances have sharply increased in the first decade of the 2000s. Such an increase reveals that remittances from migrant workers have increasingly become a major source of income for many Mongolian households nowadays.

For example, the personal remittance reached to 531,374,750,341 USD in 2012 amounts to 2.6 percent of GDP.

Figure 10: Personal remittances in Mongolia (in USD)



Source: World Bank data

According to the data provided by the Employment Service Center (ESC) from MOL, in 2004-2013, totally 22,441 Mongolian went to South Korea seeking migrant labor work. Of this, 86.3 percent are male and 32.2 percent were between 18-24 years old and 56.2 percent between 25-34 years old. The higher educated migrant workers constituted 26 percent. South Korea thus absorbs, by far, the most of those young and relatively higher educated Mongolian migrant workers.

Overall, the free market economy and government deregulation in higher education has had profound effects on labor market supply and demand as well as the lives of Mongolian people. Many of the higher educated and economically active population are idle and are a source of unused human capital. Yet, Mongolia is exporting a big number of relatively young, higher educated labor force to South Korea to fill their skilled workforce but importing skilled labor force from China to fill the pronounced labor force shortages in the construction and road

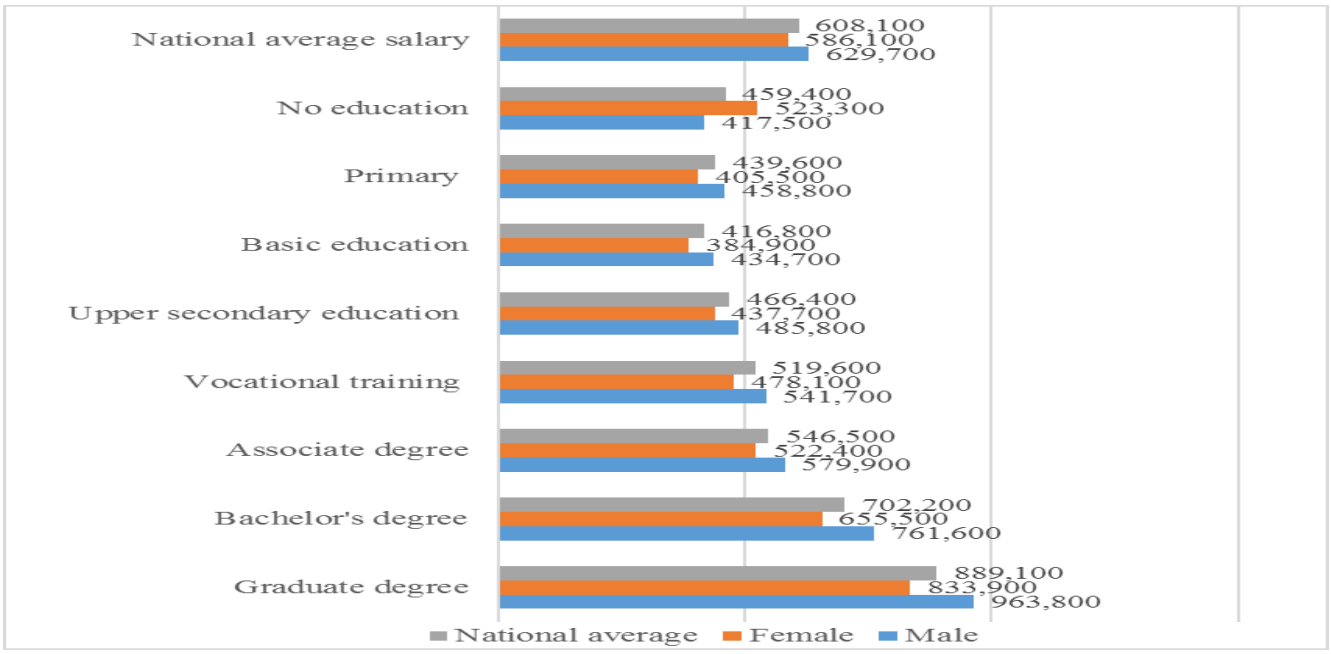
construction sectors. During the socialist period, the state used to coordinate the labor market supply and demand as specified in its series of Five-Year plans through its centrally planned socialist post-secondary establishments. The above discussions concerning human capital in a free market economy demonstrate that the expansion of higher education has implications for the transformations of institutional landscape rather than transformations of social and personal well-being. In other words, the massification of higher education expands institutional stratifications rather than expanding opportunities. Thus, the soaring enrollment in higher education has resulted in high underemployment among graduates but low returns to investments in higher education for both the individuals and the society as a whole.

6.5 Mass higher education enrollment versus socioeconomic mobility

The latest trend in the study of social mobility goes towards economic mobility of households rather than social esteem and social status. As I adopt well-being as opposed to wealth approach to my doctoral research, I have attempted to examine the extent to which higher education attainment contributes to economic mobility for individuals. According to human capital concept in both mainstream and behavorial economics, higher levels of education are associated with higher earnings, so that higher education attainment is a prerequisite for a comfortable lifestyle. Whether higher education attainment yields surplus value to individuals to increase their earnings and to improve their quality of life in Mongolia or not address a number of cross-cutting themes. The Ministry of Labor (MOL) conducted a survey in 2015 to determine the wage and salary structure in Mongolia. According to the survey results, the salary increases as the level of education increases (see Figure 12). In 2015, the average full-time year-round worker in Mongolia with a graduate degree earned 889,100 MNT monthly (equals to $364), or

52.5 percent more than the 466,400 MNT ($191) earned monthly by the average full-time year-round worker with only a high school diploma. The average full-time year-round worker with a bachelor's degree earned 702,200 MNT monthly, 66 percent more than what the average worker with only a high school diploma earned monthly.

Figure 11: Basic salary of employees by education level (MNT)



Source: Salary Structure Survey 2015. Ministry of Labor

By contrast, there is another salary survey conducted by "Mongolia Talent Network", a company that provides both local and international recruitment services as well as human resource recruitment coaching and training in Mongolia. The findings of the Mongolia Talent Network survey show higher rates of average and maximum salaries in Mongolia than the Ministry of Labor (MOL) survey findings. In addition, the Mongolia Talent Network survey findings provide information on changes in salaries based on English language proficiencies, level of seniority, years of work experience, and occupational types (See Table 7). The minimum

salary according to Mongolia Talent Network survey is almost close to the average salary yielded by the Ministry of Labor survey. The discrepancies in results of these two different surveys are in large part because the Ministry of Labor survey has recruited predominantly small and medium size enterprises (SME) with limited financial resources and public service organizations that employ the majority of lower middle- income populations in Mongolia. By contrast, the Mongolia Talent Network company apparently recruited individuals employed by more financially viable organizations such as banking and financial institutions and international and national corporations. The Ministry of Labor (MOL) survey recruited 25671 employers from 2175 enterprises and organizations in Mongolia. Of these 2175 employers, over 56 percent (1231) operate in the capital city Ulaanbaatar, and the remaining are based in provincial centers and rural areas. The sample size of the Mongolia Talent Network survey is 5255, which is nearly five times smaller than the MOL survey sample samples. Nonetheless, the indicators of these two different surveys indicate the gap in salaries between a few Mongolians, who have better off social and cultural capital and the majority with limited opportunities in Mongolia.

Table 7: Monthly salary range by level of educational degree according to the Mongolia Talent Network survey

Education level	Average range		Minimum range		Medium range		Above medium range		Maximum range		Number of respondents
	MNT	USD	MNT	USD	MNT	USD	MNT	USD	MNT	USD	
PhD degree	3,526,621	1808	830,000	426	1,200,000	615	400,000,000	2051	6,542,235	3355	57
MBA	2,947,639	1512	910,000	467	1,219,753	625	3,500,000	1795	5,413,531	2776	308
Master's degree	2,603,183	1335	850,000	436	1,209,000	620	300,000,000	1538	500,000,000	2564	930
Bachelor's degree	1,721,966	883	700,000	359	979,012	502	200,000,000	1026	300,000,000	1538	3,255
Vocational and technical education	1,387,415	711	600,000	308	856,439	439	1,704,938	874	2,362,848	1212	144
No higher education or associate degree	1,127,750	578	500,000	256	608,642	312	1,300,000	666	2,184,222	1120	299

Source: Mongolia Talent Network survey

Note: *USD conversion was calculated based on the median currency exchange rate of 2015*

According to the Mongolia Talent Network survey, the average full-time year-round employee with a PhD degree earned 3,526,621 MNT (1,443 USD), 49 percent more than the 1,721,966 MNT (705 USD) earned by the average full-time year-round employee with a bachelor's degree in 2015. The average full-time employee with a bachelor's degree earned monthly 65.5 percent more than the 1,127, 750 MNT (461 USD) earned monthly by the worker with a high school diploma. Those with master's degrees earned almost twice as much, and those with professional degrees earned over three times as much per month as high school graduates. Median monthly earnings for those with vocational and technical education but no higher education degree were 23 percent higher than those for high school graduates. In addition, the findings of the Mongolia Talent Network survey also revealed that the knowledge of English significantly affects the salary. For example, the minimum salary is approximately 500,000 MNT (205 USD) for employees with no knowledge of English, while the salary increases two-fold (

1000,000 MNT or 510 USD) for employees who speak fluent English or have no barriers in communicating in English. The average salary for employees with knowledge of English is approximately 3,200,000 MNT (1309 USD).

Despite the discrepancies in results of these two surveys, their findings demonstrate that average earnings increase measurably with higher levels of education in Mongolia. According to Mongolia Talent Network survey, the high paying sectors include banking, financial, and mining sectors. However, these high-paying sectors cannot provide employment for the majority in the country. Although mining sector has accounted for 15 to over 30 percent of GDP since 1990, its contribution to employment creation is relatively small as its employment share ranges from 3 percent to 5 percent over the past two decades. The highest its share of employment reached was 5.9 percent in 2003 to 7.3 percent in 2007 (Ronnas, 2011). It was mostly during the time when the world market prices of copper and gold underwent increases. Also mining sector is, by nature, capital intensive rather than labor intensive. Thus, it cannot provide the majority of employment itself. Yet, mining sector can generate jobs in other service sectors ancillary to mining, if it is properly planned and implemented. For example, the Erdenet copper mine, which was built by Soviet technology with the help of Soviet specialists, created a second big urban industrial city in Mongolia, spawning jobs in other industries, including a carpet factory, a food-processing plant, and a timber-processing plant during the socialist period. Unlike Erdenet, the Oyu Tolgoi copper mine, which is the joint venture between the Anglo-Australian Rio Tinto Group, Canadian Turquoise Hill Resources, and the Government of Mongolia, just operates as a mining site despite the fact that Oyu Tolgoi is bigger in size and more profitable than Erdenet. The workers of Oyu Tolgoi mostly live in the capital city Ulaanbaatar but they work at the mining site on a roster basis as the Oyu Tolgoi project has a site-based operation. Many of Oyu

Tolgoi's full-time workers commute by the company's charter flight to the mining site based in the Gobi desert. Given that the Oyu Tolgoi project cannot create an industrial city like Erdenet despite its larger size and resources, there is a skepticism among the general public regarding the Oyu Tolgoi project's impact on and contribution to Mongolia's social and economic development. While it is beyond the scope of the present study to elaborate on the details of this joint investment in Mongolian mining sector, these few considerations nevertheless deserve to be mentioned.

The employment in banking and finance provide ranges from 1.1 to 1.7 percent (Luvsandorj et al, 2012). Agriculture still absorbs the largest labor force, accounting for 40 percent to 30 percent of employment over the past two decades. Its share of GDP is approximately the same as its share of employment, ranging between 20 to 40 percent (National Statistical Office, 2016). It is, in part, because agriculture, by nature, is more labor intensive. Despite its biggest share in both GDP and employment, the poverty incidence among the agricultural labor force, namely rural herders, has increased sharply since 1990. The rural poverty is attributed to the impact of the three consecutive and severe *dzuds* (natural disasters caused by severe winters), which resulted in massive loss of livestock. The agriculture sector in Mongolia remains heavily focused on traditional animal husbandry, as 78,2 percent (289,646) of those working in the agriculture sector are herders in the traditional livestock sector, while 9.4 (34,800) are employed in crop cultivation, with the remainder primarily involved in the value-add activities. The tertiary service sectors, including education, public administration, health, social welfare, finance and insurance, information and technology, administrative support, science and technology, international organizations, real estate collectively account for 24.6 percent of total employment in Mongolia as of 2014 (National Statistical Office, 2016).

The statistical data on percentage share of higher educated workers by economic sectors is currently absent. The quantitative findings of the above two surveys show that the salary increases as level of education increases in Mongolia. Yet, qualitatively the average monthly salary for those with higher education cannot enable them to live a comfortable middle-class lifestyle in Mongolia. This is the essence of Tomer's argument for intangible capital to bring a more human development and well-being approach to the conventional mainstream economics.

According to the MOL survey, the average monthly salary is estimated as 889,100 MNT ($364 USD). However, the residential housing prices rose in major city center locations in recent years due to the economic growth between 2005-2012 fueled by high copper prices and large increases in gold productions. By the end of 2013, average per square meter prices across Ulan Bator's real estate markets was US$ 1,316. At the upper end of the market, prices stood at an average US$ 2,050 per square meter. The high-end projects featuring premium locations and luxury features maintained an even higher average price of US$ 3,228 per square meter. Ulaanbaatar is the city where a majority of the population live nowadays, but over half of the residents of Ulan Bator still live in *gers*, the traditional dwellings that are not connected to central heating and running water. Thus, the above monthly earning of 889,100 MNT ($364) for higher educated individuals is far from enabling them to purchase housing. Affordable housing is a major issue in Mongolia, particularly in Ulaanbaatar, where the majority of the population live, but over half of Ulaanbaatar residents still live in *gers*, the traditional settlements without water, sanitation or basic infrastructure. This indicates that the Mongolian higher educated individuals are more prone to the country's volatile economy that is overly dependent on natural resource-based commodity prices. The problems with affordable housing are also associated with a number of difficult condtions to access loans in Mongolia such as high interests, short-term

repayments, and limits on amounts of available collateral. Lending interest rate in Mongolia was last measured at 19.56 in 2015, while it was 3.26 percent in the United States in the same year, according to the World Bank. The nominal average annual lending interest rate in Mongolia was even higher in the beginning of 2000s ranging from 31.5 to 35.6 percent. The current interest rate for housing mortgage is eight percent. Hence, the average salary of 889,100 MNT ($364) for higher educated workers just provides their basic necessities, but not enough to be fully self-sufficient. In other words, it cannot yield surplus value to maintain a comfortable middle-class lifestyle in Mongolia. Hence, the private returns to investments in higher education in Mongolia, including personal, financial, and other lifelong benefits, are in large part more dependent upon the quality of Mongolian governance than an individual's education level, skills, and motivation.

Moreover, the persisten rate of underemployment of university graduates ranging from 50 to 60 percent over the years indicates the low private return to investments in higher education. During the socialist period, university graduates were guaranteed jobs after graduation as the relevant ministries used to place graduates in jobs according to the state manpower planning. With the collapse of socialism and transition from centrally planned economy to free market economy, finding jobs after graduation has solely become the individual's own responsibility. With state deregulation in Mongolian higher education, neoliberalism thus essentially has taken command of the job market. Thus, social capital and private connections have become instrumental in finding jobs after graduation, which could create barriers for university graduates from less resourceful families to enter the labor market competitions. In other words, the massification of higher education has implications for the transformations of institutional landscape of Mongolian higher education, rather than transformations of social and personal well-being of individuals. In Mongolia, as mentioned above, there are many open-access private

higher education providers, reputable traditional state universities, and foreign invested private institutes. In addition, there is a wide range of study abroad opportunities but access to such opportunies is unequal due to the differentiated amount of tangible and intangible capital available to individuals. Many families cannot afford the high opportunity cost of sending their children to reputable overseas universities that can lead to high paying economic sectors. Thus it has become necessary to examine the extent to which educational institutions reproduce inequalities in the society.

Furthermore, the research concerning the differentiated social needs for education in Mongolia, and how Mongolian education system has adapted to such differentiated social needs in the free-market economy is underrepresented in the existing studies. As the Mongolian education system has adapted to serve differentiated social needs for education in the free-market economy, it has also contributed to reproducing inequalities and accentuating social class differences in the post-socialist period. For example, there are nowadays costly private international secondary schools with tuition fees ranging from 4000 USD up to 36,000 USD, while the tuition fees for domestic higher education ranges from 780 USD to 797 USD according to the information provided by MECS. Compared to public schools, these private schools offer better learning resources in better-equipped and international culture. Most of their core teaching staff are expats from western countries. This clearly shows the widening gap in access to quality education and uncontrollable market forces entering the education sector in Mongolia. It also conditions the unequal intangible capital and different post-secondary education destinations for Mongolian youth. As evidenced in many of their graduates' success stories posted on their websites, these costly international private secondary schools guarantee admission to reputable overseas universities with high opportunity costs.

Futhermore, the consensus has not been reached on degrees of social stratifications in Mongolia in existing studies. The sociocultural background in post-socialist period is not as stable and structured as it was during the socialist period. Instead, it has been relatively changeable over time due to the current volatile social and economic situations. There are several versions of social class trajectories in Mongolia after 1990's transition to a free-market economy. The study conducted by the Institute of Philosophy and Sociology at the Mongolian Academy of Sciences (MAS) in 2001 recognized that the following three social classes exist in post-socialist Mongolia after the 1990 transition to a free-market economy: upper, middle, and lower classes. Interestingly, 65.8 percent of the Institute's survey participants self-identified themselves as middle class, while 0.8 percent self-identified themselves as upper class. Similarly, Gundsambuu (2002), a Mongolian sociologist, defines the current social class in the following stratifications such as upper, upper-middle, middle, lower-middle, and low or poor. Gundsambuu also identifies sub-class stratifications within the segment of urban and rural populations in such a social hierarchy. The social status of rural herders is ambiguous in contemporary Mongolian society. Unlike the urban poor and those living under the poverty line in urban cities, herders are economically active populations with certain means of livelihood based on pastoral herding. However, the growing disparities between urban and rural lifestyle highlights the cultural and social devide between urban and rural in post-socialist period. The loss of social safety nets due to the collapse of "*negdels*"- the state herder collectives from the socialist period has severely affected the access to education for herders' children in post-socialist neoliberal capitalism. The boarding schools for nomadic herders' children have severely deteriorated from lack of repair and upgrading due to the chronically low level of capital investments since the 1990 transition. According to the World Bank study (2010), about 67 percent of bank loan debts incurred by

herders were spent on paying tuition fees for their children's tertiary education. This indicates that herders are keen to invest in their children's higher education attainment. Despite the expansion of the number of higher education institutions, geographic access to higher education is more limited for children from rural herder families in Mongolia. The greatest concentration of higher education institutions in Ulaanbaatar limits the physical access to higher education in rural and remote provinces. This structural barrier raises concerns regarding education equity and equality, as well as subsequent increase in socio-economic disparities between major urban centers and rural peripheries.

Overall, the post-socialist educational stratifications provide substantial empirical contributions to the general study of social mobility trajectories and their effect on higher education attainment and occupational destinations in Mongolia. It also reveals that there is an increase in the magnitude of socioeconomic origin-based inequalities in access to secondary schools, which further impact the post-secondary education destinations among the Mongolian youth.

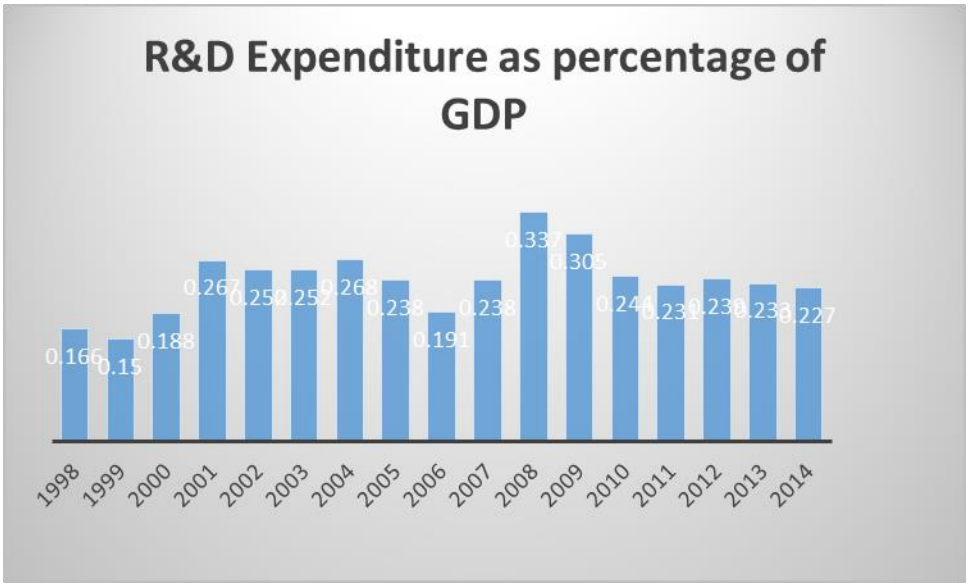
6.6 Intellectual capital in liberal market economy: Research and development efforts

For decades during the socialist period, research and development efforts were primarily guided by political objectives. Yet, societal benefits of such research and development (R&D) efforts were enormous during the socialist period. The socialist achievements in certain fields of studies indicate that the nexus between knowledge generation and governance were particulary effective. As described in the preceding chapters, their net effects on social well-being and economic development were significant. The achievements are reflected in significant increases

in health indicators for Mongolian population, veterinary medicine progress, rapid industrialization, elimination of animal diseases, as well as the radical transformation of Mongolia's social and cultural life.

Nonetheless, during the 1990s political and economic transitions in Mongolia, the scientific research institutes suffered from severe funding deficiencies and loss of human resources. In socialist period, the national R&D efforts and academic research in Mongolia were largely funded by CMEA. With the collapse of CMEA and the major macroeconomic recession in the early 1990s, neither the government nor private enterprises were able to continue R&D funding. The state budget allocation for R&D efforts in science and technology, education, and culture has been largely conditioned by the country's volatile economy.

Figure 12: R&D expenditure as percentage of GDP in Mongolia



Source: World Bank database

According to the Mongolian Law on Science and Technology, the scientific research is designated to receive 1.5 percent of GDP, but only 0.25 percent of GDP on average has been

allocated over the past decade as shown in above Figure 14. In 1993, the Mongolian government established the Science and Technology Foundation (STF). The STF is a quasi-government organization that finances state commissioned science and technology projects. According to the statistical information of STF, it manages 180-200 state commissioned research projects annually but 90 percent of STF funding comes from the government, while the remaining 10 percent is generated from non-government sources such as international development agencies. Hence, it appears that scientific research projects and science and technology sector activities are funded solely by the government. However, there is a lack investment from the private sector. Table 8 below shows research products from state commissioned research projects in 2009 and 2010. Scientific research publications constitute the majority of research products, while there are a very few patents and industrially applied products. This illustrates that basic research constitutes the majority of research products in Mongolian science and technology sector, but not much applied research activity is undertaken.

Table 8: Research outputs from state commissioned research projects (2009-2010)

No	Research output		Natural Science		Technology		Agriculture		Medical science		Social science		Total	
			2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
1	Single or co-authored publications, books		7	5	2	-	6	5	4	1	27	11	**46**	**22**
2	Research works for scientific degrees		1	2	-	-	4	2	1	1	-	1	**6**	**6**
3	New or renewed product model		5	-	6	-	13	-	11	15	2	3	**37**	**18**
4	New or renewed technology		-	-	4	1	2	-	10	-	-	-	16	1
5	Simulation		-	2	2	-	-	-	-	-	-	-	**2**	**2**
6	Recommendations		2	-	2	-	23	11	6	3	2	6	**35**	**20**
7	Guidelines		-	-	7	-	30	-	6	-	-	-	**43**	-
8	Patents		2	3	-	-	-	-	1	1	-	-	**3**	**4**
9	Feasibility study		1	2	1	-	-	1	-	-	2	-	**6**	**1**
10	Maps		10	2	-	1	-	-	-	19	-	-	**10**	**22**
11	Certificate for useful model		1	-	2	-	-	1	6	-	-	-	**9**	
12	Copyrights		-	-	-	-	-	-	1	4	-	-	**1**	**4**
13	Scientific research article	International	31	16	1	1	4	2	3	8	23	2	**62**	**29**
		Local	112	14	8	4	80	48	30	21	100	72	**330**	**159**
14	New theories or theorem		1	1	-	-	-	-	-	76	1	-	**2**	**77**
15	Scientific conference presentation	International	38	22	2	1	3	5	2	9	14	2	**59**	**39**
		Local	30	8	8	-	71	17	45	18	20	19	**174**	**62**
16	National standard		-	-	2	-	24	-	1	2	-	-	**27**	**2**
17	Industrially applied products		6	1	-	3	1	-	7	4		5	**18**	**11**
18	Citations		1	3	36	-	-	-	93	-	-	148	**130**	**151**
19	Methods		-	6	10	-	2	-	-	9	-	-	**12**	**15**

Source: Science and Technology Fund database

As of 2011, a total of 71 scientific research institutes were conducting publicly funded research activities, including nine state-owned research institutes and research centers, eleven private scientific research organizations and eleven universities/Appendix C, D, E/. The Mongolian Academy of Sciences (MAS), as an umbrella organization for more than 20 public scientific research institutes, has kept its role as the country's central scientific think-tank. Its institutes continue to produce a significant share of Mongolia's research, whereas universities have a much lower research profile and little direct funding exists for research as the majority of university funding comes from student tuition fees. According to UNESCO (2007), universities

consumed 20 of total R&D expenditures. This suggests that the scientific research personnel of Mongolian universities are not utilized to the fullest capacity despite the fact that the universities train the country's researchers and scientists.

The Ministry of Education, Science and Culture is the central state administering body that is responsible for developing nationwide policies relating to scientific, technological, educational, and cultural development. Since 1990, the Mongolian government has made efforts to establish a legal environment, and to formulate national policies for science and technology development in the country. Some of the major national policies, legislation and regulations include Government policy on Science and Technology (S&T) (1998), Law on S&T (1998), Law on Technology Transfer (1998), Law on Legal Status of the Mongolian Academy of Sciences (1996), Law on Higher Education (2002), Patent Law (1996, 2006), Copyright Law (1993, 2006) and Science and Technology Master Plan of Mongolia 2007-2020. Neverthless, limited funding results in limited access to large-scale research infrastructure and few opportunities for career advancement for young scholars in Mongolia. Under such circumstances, the scientific talents and qualified manpower in certain scientific fields have been depleted, if not in the total body of manpower. During the transition period in the 1990s, the most talented scientists and engineers moved to private sectors, seeking lucrative employment or business opportunities. In recent decades, with the increasing international mobility in higher education, the migration of young Mongolian talents to other industrialized and developed countries has been evident. This phenomenon certainly affects the retention and recruitment of the scientific workforce in Mongolia. Baark (1996) pointed to the presence of great conservatism in MAS due to the aging scientific staff, given that over 70 percent of MAS council was above the age 60 in the 1990s. The demographic trend has been changing in recent years. In 2012, the median age of scientific

manpower was 49 and people under 40 years old accounted for 30 percent of total scientists and scholars affiliated with MAS. As for all full-time staff at MAS, those up to 35 years old accounted for 47 percent, 35-50 years olds for 28 percent and those over 50 years for 25 percent respectively. The change in demographics of scientific staff is also evident at the national level including both MAS and research universities. In 2013, young people aged below 40 years old constituted 54 percent, while senior academics and scientists above 50 years old account for 25.7 percent according to the MECS statistical data.

Despite the inadequate funding for investment in R&D efforts, the pool of trained researchers and scientists in the country is incomparably greater than in other developing countries. According to the measures of UNESCO and OECD Frascati Manual[3], one of the indicators that measures the absolute R&D capacity of countries is the number of researchers described as full-time equivalent. Mongolia compares well with other middle-income countries for its number of researchers per 1 million inhabitants. The number of researchers in R&D per million people in middle-income countries ranges from 484 to 660 according to the World Bank data. Mongolia ranks higher than Southeast Asian developing countries such as India, Pakistan, and Sri-Lanka but ranks lower for its number of researchers per million population, when compared with former socialist Eastern European countries such as Estonia, Moldova, Poland, and Romania. The number of researchers per million population ranges from 120 to 150 in those Southeast Asian countries according to the World Bank data.

[3] The *Frascati Manual* is a document, which defines the methodology for collecting statistics about research and development (R&D). The Manual was developed and published by the OECD in the 1960s. It was initially drafted in June 1963, as OECD experts met with the National Experts on Science and Technology Indicators group at the Villa Falconien in Frascati, Italy.

Table 9: Number of full-time researchers per 1 million inhabitants

Year	Total number of full-time researchers	Number of population	Number of full-time researchers per million inhabitants
2007	1577	2,592,776	608
2008	1563	2,629,666	594
2009	1594	2,669,572	597
2010	1569	2,712,657	578
2011	1602	2,759,074	581
2012	1633	2,808,339	581
2013	1712	2,859,174	599

Source: Calculated based on MECS statistical data

Nevertheless, the country cannot make the best use of its scientific manpower. The social status is not as prestigious as it was during the socialist period. Such a phenomenon related to their social status in large part reflects the relatively low salaries and inadequate career advancements, coupled with lack of up-to-date facilities. These are major impediments to research and development efforts in Mongolia. As the Academy of Sciences remains an important establishment in Mongolian research system, top researchers are based at discipline-based academies that are usually attached to a research institute. Some of the Academy's key scientists have affiliations with universities, and occasionally teach courses there. But their main appointments and research work are based in the Academy's research institutes. Similarly, the top professors at universities are affiliated with the Academy and its discipline-based research institutes, contributing to their basic and fundamental research. Nevertheless, the institutional separation of research and higher education institutions inherited from the socialist past seriously affects the research funding allocations for universities.

In addition, certain hierarchical ranks and professional prestige inherited from the socialist past continue in Mongolian the research system. While a PhD (Doctor of Philosophy) degree is awarded by universities, there are two other higher post-graduate degrees above PhD in Mongolia: “Doctor of Science” and “Academician”. Only the Academy of Science awards these two degrees in recognition of a substantial and sustained contribution to scientific knowledge beyond that required for a Ph.D. An academician is an honorific title used to denote a full member of the Academy of Sciences. It is awarded to someone, who has a strong influence, and who makes a significant contribution to national scientific, artistic, literary, and scholarly life. In many cases, this title grants privileges and administrative responsibilities for funding allocations and research priorities in respective disciplinary areas. This is, in fact, a common system in Russia and other post-Soviet countries as well as some of the former socialist Eastern European countries. There are no western equivalents for these two higher degrees.

According to the MECS data, there were 1497 full-time researchers, holding graduate degrees as of 2013. Of them, 9.5 percent (143) hold Sc. D (Doctor of Science), 32.5 percent (486) hold Ph.D, while the remaining 56 percent have Master’s degrees. Additionally, there were 340 people, who have professorships such as academician, professor, and associate professor in 2013. Of 340 people who have professorships, academicians constituted only 14 percent. This reveals that the degrees of Doctor of Science and Academician are highly honorific titles awarded to only a handful of people among the academic research communities in Mongolia. Only 340 people held professorships nationwide shows the lack of faculty members, who have PhDs at Mongolian universities, which reflects the non-research nature of tertiary education in Mongolia.

Moreover, Mongolia compares well for its gender parity in R&D with countries such as the Republic of Korea, India, Japan, Nepal, and Cambodia. The gender parity in those countries is below the global average of 30 percent according to the UNESCO study in 2014.

Table 10: Gender parity in R&D in Mongolia

Year	Total number of full-time researchers	Number of women	Gender parity in percentage
2007	1577	786	50%
2008	1563	764	49%
2009	1594	794	50%
2010	1569	811	52%
2011	1602	821	51%
2012	1633	844	52%
2013	1712	863	50%

Source: Ministry of Education, Science and Culture

Nonetheless, the representation of women holding hierarchical academic degrees is not adequate within the research and scholarship communities in Mongolia. In 2013, women represented only 15 percent of those holding Doctor of Science, and 6 percent of Academicians. Women also represented 10 percent of full professors but constituted 40.5 percent of associate professors. By contrast, men represented 90 percent of full professors and 94 percent of Academicians and 75 percent of Doctor of Sciences, although male enrollment comprises 30 percent to 40 percent in tertiary education in the two post-socialist decades. While it is beyond the scope of the present study to elaborate on the reasons behind of the underrepresentation of women in both professorship and higher-ranking degrees in Mongolian research systems, androcentric academic culture in research and development efforts in Mongolia nevertheless deserves to be mentioned. The higher-ranking degrees and titles such as Doctor of Science and Academician grant

privileges and administrative responsibilities for funding allocation and research priorities. However, the fact that women significantly underrepresent in such high-ranking degrees that grant privilege for funding allocations suggests that better mechanisms for recognizing the value of contributions by female voices in national scientific, artistic, literary, and scholarly life is crucial in Mongolian research system.

The MAS continues as a powerful player in the country's research system, although it has been subject to pressures to be merged with universities. The MAS scientific academies directly carry out substantial shares of national scientific research with the assistance of government funding and other external sources such as international development agencies and foreign research foundations. Both fundamental (basic research) and applied research are undertaken by MAS. The supreme governing body of MAS comprises two types of assemblies: General Assembly and Sub-Assemblies. The General Assembly determines the research priorities to be undertaken by MAS, while the academic sub-assemblies discuss the progress and the results of scientific research conducted within each scientific sub-assembly. The sub-assemblies evaluate the research products and research outputs, including final reports of completed research projects, scientific publications, conference proceedings, and book publications. The sub-assemblies present the research findings to the appropriate organizations and local ministries. There are five academic sub-assemblies: Sub-Assembly of Biology, Sub-Assembly of Geology and Geography, Sub-Assembly of Physics, Mathematics and Chemistry, Sub-Assembly of Social Sciences, and Sub-Assembly of Technology. Such a highly hierarchical structure reflects a more top-down approach and a high degree of stratifications, which limit communication and dissemination of research products.

Despite limited funding, MAS has undertaken numerous research projects that address social, economic, political, and environmental issues over the past two decades. Table 9 below, for example, shows the annual volume of research outputs of MAS in seven major fields of studies as of 2012. The STF funded research projects constitute the majority of the Academy's research activities. As STF is a quasi-governmental organization that manages the state-funded research projects, the Academy of Sciences implements most of its research projects.

Table 11: Annual research outputs of MAS in 2012

Scientific fields	Single or co-authored books	Scientific publications		Conference proceedings		Field studies	STF Research projects	Grant research	Commissioned research	Innovation projects	Patents	Standards	Policy recommendations	Technical guidelines	Research projects applied to the industry
		International	Local	International	Local										
Social science and Humanities	104	64	260	109	181	40	29	13					21		
Physics, Mathematics and Chemistry	15	83	109	99	116		30			2	5	2		10	2
Geology and Geometry	21	82	150	70	108		21		18				10		
Biology	15	63	85	44	59		17	2	8			1		1	5
Engineering and Technology	3	8	24		3		6	1	7	9	9	8		7	
Agricultural Science	32	46	222	39	324	9	34	5	15	4	2	9		50	9
Medical and Health Science	204	144	479	372	720		34	6		1	18	32		29	4 (medical drugs)

Source: *Mongolian Academy Science annual report for 2012*

The MAS authors frequently publish in their own Academy's institutional journals, akin to a working paper series. In recent years, more publications have appeared in internationally indexed scientific journals but not much patenting activities in the field of engineering and technology and other applied science fields. Medical and health science obtained the most patents among the other disciplinary fields in 2012, in part because many herbal supplements and

some pharmaceutical drugs have been patented in recent years. Additionally, a considerable number of Mongolian scientists and scholars have published their research articles in journals and periodicals in Russian in order to reach the community of scholars and scientists in Russia and other post-Soviet countries. In 2012, medical and health science yielded the most publications both locally and internationally, while engineering and technology produced the least amount of publications (See Table 9). The social sciences and humanities developed the most policy recommendations among the other disciplinary fields in 2012. From the examinations of MAS's annual reports for 2005-2012, I was able to obtain the time-series longitudinal qualitative data to capture the progress, changes, and shortcomings as well as the path where the Mongolian academic research is heading towards.

In social sciences and humanities, much information and knowledge that were previously appropriated by Marxist-Leninist ideology, and that were understudied due to the Communist Party propaganda during the socialist period, have been studied with the spirit of reform. The changes that have taken place in post-socialist social science and humanities research, have reflected the de-ideologization of research, reinterpretation of history, adopting the Western influx of ideas on particular research fields such as philosophy, sociology, and economics. Their research projects also indicate efforts to import new methodological and philosophical concepts from the Western social sciences. In addition, much academic research in the humanities has been directed towards inquiring the traditional Mongolian worldviews to redefine national identity. The historical knowledge produced by post-socialist research and their reinterpretations of Genghis Khaan, the Tibetan-born theocratic monarch, and other historical figures have successfully shaped the post-socialist national identity despite the growing influence of cosmopolitan culture to the Mongolian modernization process. Some scholars, notably Kaplonski

(2004), Bulag (1993), Humprey (1992), and Myadar and Deshaw Rae (2014) conclude that the pre-socialist glorious history of the Mongol Empire period has inspired Mongolians to redefine their national identity. Apart from Genghis Khan as a national hero of Mongolians, the contemporary Mongolian academic scholarship nowadays tends to study his philosophical approaches embedded in his meritocracy-based governance, which reformed the kinship tribal system of nomads, and reintroduced ethical value-based law codes.

Furthermore, philosophy, political science, and sociology have gained much academic freedom in comparison to the socialist period when they were fully committed to the Marxist-Leninist ideological purity. For example, Buddhist philosophy has reappeared into the philosophical school of thought in Mongolia. In addition, the old Mongol philosophy rooted in ancient Mongols' beliefs and worldviews, which have a distinct cosmology and spiritual universe rather than any personal God endowed with human characteristics, have also begun to penetrate recent Mongolian philosophical school of thought. The research projects listed in the MAS annual reports indicate that some Mongolian scholars and scientists apparently study the distinct traditional Mongolian worldviews and philosophical concepts within the framework of various academic disciplines such as philosophy, metaphysics, epistemology, moral philosophy, and political philosophy. In addition, a considerable amount of scholarly works has been undertaken to adapt the traditional Mongolian philosophical views to the western philosophy as well. Such trends and changes in their research directions are evidenced in the following research projects undertaken by the Institute of Philosophy, Sociology and Law of MAS: "Studies of Western Philosophical Sources", "The 19th Century Western and Eastern Philosophy: Their Theories and Methodologies" "The Religiosity of Mongolians and Issues Related to National Culture and Morality", "Post-Modernist Philosophy and Its Basic Principles", and "The Early

19th Century Mongolian Buddhist Philosophy and Its Democratic Perspectives", and "Upbringing of a Mongolian Philosophy of Education". Given that a considerable number of senior scholars, who were educated during the socialist period, are still active in Mongolian academic scholarships, they have been quick to adopt pluralistic approaches in their post-socialist scholarship.

The post-socialist arts, culture, and literature have undergone sweeping changes in reflecting attitudes towards the celebrated Buddhist religious concepts, Mongolia's own long-standing nomadic cultural traditions, Genghis Khan, and the 13th century Mongol Empire elements, as well as vibrant urban contemporary cosmopolitanism and Western classical arts. In the post-socialist era, the Mongolian artists, composers, writers, and poets enjoy freedom of expression in their art works and creations. More specifically, Buddhist philosophy and the old Mongol philosophy rooted in ancient Mongols' beliefs and worldviews based on distinct cosmology and spiritual universe have also began to penetrate into contemporary Mongolian creative arts. Contemporary art works have become more thought-provoking and Mongolian creative artists desire to achieve more international audience in the post-socialist liberal market-oriented society. However, a growing financial, social, and cultural divide between the modernizing capital city Ulaanbaatar and stagnant rural areas limits access to such thought-provoking art and cultural works for certain segment of the population. The herders and rural populations living in depressed *aimag* and *soum* centers are essentially far removed from contemporary artistic ideas. In fact, contemporary art is in general not accessible to the poor working class and rural populations nowadays. By contrast, the socialist government's cultural policies were directed towards bringing modern culture and art closer to the working class

population in order to develop their aesthetic values and education. As neoliberalism has taken place since 1990, such creative intellectual artworks cannot reach the poor and rural herders.

Furthermore, many research projects have been undertaken by MAS affiliated scholars addressing such issues as political oligarchy, the shortcomings of the 1992 Constitution, urbanization versus nomadism, urban and rural poverty, balancing the power dynamics of China and Russia for Mongolia's foreign relations, and unequal distribution of natural resource revenues. In addition, their academic research is leaning towards more comparative and international studies, comparing Mongolian social, political, cultural, and philosophical concepts with other East Asian, Central Asian countries, and beyond globally. The examples of such comparative studies undertaken by MAS include "Best Practices for Development in Japan as compared to Mongolian Strategic Development Policies/The Case Study of Japanese Management, Policy and Practice in Small and Medium-Size Enterprises and Human Development", "Reform of Mongolian Foreign Relations: The Development Strategy of Russia and China-2025 (prognostic study)", "Role and Influence of International Economic Organizations for Mongolia's Development", "Comparative Study of Asian and African Nomadic Animal Husbandry", and so on.

Academic research on studies of international affairs emphasizes the balancing of power dynamics of China and Russia for Mongolian foreign relations and the significance of the figurative "third neighbor policy" as well as increasing the role and influence of Mongolia in Northeast Asia and other regional alliances such as ASEAN. The Mongolian government's recent efforts such as hosting the 2016 Asia-Pacific Europe Meeting (ASEM) and hosting the "Ulaanbaatar Dialogue on Northeast Asian Security" evidence that the scholarship and knowledge generated by these research projects are playing a significant role in defining the

country's current foreign policy agenda. The Institute for Studies of International Relations under MAS has undertaken, for example, the following research projects: "The Multidimensional Foreign Policy of Mongolia and Its Regional Cooperation Mechanisms "; "The Studies of Countries that Play a Leading Role in Mongolian Foreign Relations"; "Mongolia and the Contemporary Internal and Foreign Policies of People's Republic of China" (prognostic study); "Analysis on Development Assistance Provided by the United States and European Union for Mongolia"; "New Environment for East Asian Cooperation and Mongolia"; "Northeast Asian Energy Geopolitics and Mongolia"; "Development Strategy of Mongolia and Its Neighbour Countries"; "The Influence of Russia for Mongolian Independence"; "The Significance of Relations and Cooperation with the United States and European Union for Strengthening the Mongolian Economic Security".

Additionally, a great body of fundamental research (basic research) in such fields as linguistics, literature, anthropology, archeology, and paleontology has been conducted at MAS. The findings of such basic research mostly have added new knowledge to the existing knowledge or have aimed to improve scientific theories and methodologies with a specific reference to Mongolian geography, climate, cultural discourses, and dialects (for linguistics). As a result, numerious dictionaries, encyclopedias, maps, and atlases, reflecting the post-socialist changes, have been produced.

The above MAS research activities demonstrate that knowledge produced by contemporary scholarship in social sciences and humanities has been democratized in the post-socialist period. However, the impact of these research projects reaching beyond the academic communities in the country has been minimal. Many research projects and publications have addressed such issues as: political oligarchy; the shortcomings of the 1992 Constitution;

urbanization; urban and rural poverty; and unequal distribution of natural resource revenues. The examples of such research projects include: “The General Public’s Assessment of the Government Actions”, “Formative Evaluation of Mongolian Economy and Social Development during the Transition Period”, “Improving the Economic Structure and Competitiveness of Mongolia”, “Pressing Issues of Mongolian Constitution and Its Processes (Legislation, Election and Budget Approving Processes)”; “Sociological Studies of Urbanization and Its Process: Trends and Challenges”, “Development in Nomadic Civilization: Historical Practice, Development Challenges and Pathway”, “The State of Political Parties in Mongolia: Facts and Conclusions”, “Gentrification and Reusing the city resources”. Yet, whether their research findings have informed and influenced the government policies and whether their scientifically justified critiques have directly influenced changes in government policy and practices as well as political and social behavior are not very discernable. In more subtle ways, their research findings and justifications have no discernable effect on changing people’s knowledge, understanding, and attitude towards the existing social, political, and economic issues in Mongolia.

In economics, a number of studies has been conducted under MAS. For example, MAS has undertaken a research study commissioned by Mongolian government and the Office of the President to identify social and economic issues and potential solutions to such issues. As a result of their study, a number of policy recommendations were formulated such as creating government funds by effectively utilizing strategically important mineral resource deposits and equal allocations and distributions of mineral resource revenues to citizens. This commissioned research has formulated policy recommendations such as the setting up of a Sovereign Wealth Fund using mining royalties and tax revenues, and distributing part of the income from mining

activities to citizens to alleviate poverty, as well as diversifying the economy to reduce its dependence on mining and animal husbandry to avoid the so-called Dutch Disease. These issues are emerging subjects within the Mongolian economic and political arena in recent years. However, there is still lack of empirical research that scientifically justifies the emerging economic issues in relation to the state, society, politics, strategically important mining deposits, foreign direct investment, and evaluation of Oyu Tolgoi copper mining investment agreement in Mongolia. In addition, it is also worth noting that the international development organizations such as the Asian Development Bank (ADB), World Bank (WB) and the International Monetary Fund (IMF) largely dominate the intellectual space and applied economic research in Mongolia. These organizations are unarguably shaping the academic research in developing countries' economics. In addition, these international development organizations largely neglect the role and knowledge of local Mongolian academics and scholars in their various research-based technical assistance projects. Hence, the voices of local academics and scholars are missing in defining the intellectual space of development economics formulated by ADB, WB, and IMF.

In the natural sciences, both fundamental and experimental research projects have been undertaken at MAS and its affiliated research institutes. From the examination of MAS's annual reports from 2005-2012, many basic research projects have been undertaken by Mongolian scientists and researchers in such fields as theoretical physics, nuclear and elementary particle physics, solid-state physics, biophysics, optical spectroscopy, nanotechnology of fuel cells, thermal physics, and research of rare earth elements. A few examples of such projects include seismographic research to determine the earthquake activation and seismic features of Mongolian territory, astrometric and hydrodynamic research, a study to determine the number of astronomical observation hours for several sites in different regions of Mongolia based on long-

term meteorological data, research to determine desertification process of Mongolian and Chinese border plateau areas using GIS and research on synthesis of nano-sized materials and composites with a rare-earth element, and studies of their crystal structure, properties and applications. In addition, the MAS scientists have published a number of textbooks on theoretical physics in English. They are as follow: *A New Approach to Analytical Calculation: Derivation for Universal Formulas for Calculation of Definite Integrals, Fractional Derivatives, and Inverse Operators by Hand* by Kh. Namsrai, a Mongolian Academician in 2014, *Selected Problems of Contemporary Physics (non- local and non-cumulative points of view)* by Kh. Namsrai, published in 2015, *The Torus and Its Related Problems* by Kh. Namsrai, published in 2015, *A Short Course in Quantum Field Theory and Functional Integrals*", "*Stochastic, Quantum Fluctuations and Family of the Higgs Particles*" by Kh. Namsrai, published in 2015.

In addition, the scientists and researchers at the Institute of Physics and Technology of MAS are engaged in several applied research studies in electronics, automation, nuclear technology, solar energy, and electrical and thermal energy. The examples of such applied researches include determination of components of ecological complex systems by atomic spectroscopy and research to investigate heavy metals in urban area soils and to prepare a soil degradation map. Their scientific discovery of low-molecular weight bioactive compound with high levels of antioxidant to boost the immunity in animal body against plant alkaloids, has won a Mongolian state prize. As a result of their scientific discovery, they produced an antioxidant supplement for animals.

Also, the scientific research team from the Department of Biophysics at MAS has undertaken research studies on developing cashmere and wool dying technology using plant pigment extracts for clean manufacturing technologies. They received a patent in 2002 for their

technology. The research team from the Department of Material Science has produced thermal insulation material in the form of a foam glass and proposed their product for manufacturing. The Department of Technics and Technology of MAS is undertaking applied research on solar and alternative energy and converting solar energy into heat and electricity for innovative and high-efficiency technologies that can suit the geography and climate of Mongolia. In addition, the Institute of Chemistry and Chemical Technology at MAS has conducted several experimental research studies on coal beneficiation, coking coal, semi-coking coal, gasification and liquefaction for smokeless fuel as an alternative energy carrier.

In agricultural and environmental science, a number of applied research studies has been conducted utilizing biotechnology. The initiative to develop biotechnology in Mongolia started earlier, during the socialist period, as the former socialist central government formulated a national program: "Biotechnology Towards the Year 2000" in 1988. At present, the biotechnology scientific research activities focus on production of diagnostics for Hepatitis viruses, vaccines and bio-products for both human and animal health, development of cell culture techniques for increasing biological resources of useful and rare plants and development of embryo transfer techniques for increasing the quality of animal products such as milk, cashmere and wool. For example, with support and funding from the International Atomic Energy, the Mongolian researchers and scientists from the Division of Biotechnology at MAS have produced a genetically modified strain of the yeast *Saccharoyces cerevisiae*, which produces several different types of Hepatitis B virus antigens (Dashnyam & Zilinskas, 2003). This is of particular significance to Mongolia as it is a country with high prevalence of Hepatitis B and C virus and high rates of liver cancer. In addition, various fodder, fodder additives, and bio-fertilizers for animal husbandry are produced locally as a result of the biotechnological

research projects. Several embryo transfer techniques have been developed for use with native cashmere goats to increase the quality of cashmere fibers, and with cows to increase milk production. The Mongolian Veterinary Institute's Bacteriological Laboratory has developed five vaccines against various livestock infectious diseases such as brucellosis and salmonellosis for use in horses, goats, sheep and cows. Additionally, much experimental research has been conducted in the area of genetic engineering for livestock as the law on Livestock Gene-pool Protection and Health was approved by the Parliament in 1993. The MAS Institute of Animal Husbandry and the Mongolian University of Agricultural Studies have been undertaking many research activities for protecting livestock gene-pool of Mongolian Bactrian camels, enriching genetic resources of Mongolian horses by reserving frozen semen of highly productive breed and strain, as well as breeding groups of wild animals whose genetic resources are at risk of extinction such as the Gobi bear and others.

The above research activities in Mongolian science and technology sector demonstrate that knowledge is produced in the Mongolian intellectual and scientific landscape. More specifically, Mongolian scientists and researchers create new knowledge that is relevant to local social and economic development of the country. However, the extent to which the knowledge generated by these research activities contributes to, benefits and influences the society, culture, environment, and economy in the country, is not very notable. The problem lies in knowledge consumption rather than knowledge production in Mongolia. A number of factors explain why the locally produced knowledge is not effectively disseminated.

First of all, there is lack of involvement and support from the private sector industries. With the exception of a few local companies operating business in mining and agricultural sectors, most of the private enterprises in Mongolia are not financially viable to invest in R&D

efforts due to the elusive and volatile Mongolian market. In general, investment in scientific research is a bit of gamble for firms, unless there is an opportunity for profit. Supportive policies such as state subsidies or tax incentives to change the relative costs of research investments for private firms are essentially absent in Mongolia to date. At present, a few national companies are engaged in R&D activities in coal processing industries such as coal beneficiation, coking, semi-coking, smokeless coal briquette technique, and coal gasification and liquefaction. In addition, there are two scientific research enterprises, including SHIM Research and Production Co ltd and Monenzyme Science and Production Co ltd, undertaking research projects in biotechnology. These two companies were former state-owned enterprises during the socialist period. These two companies were privatized after 1990 as their key scientific engineers and researchers in biotechnology purchased the state-owned research enterprises. With the exception of these few companies and research enterprises, the private sector involvement is marginal and most of the country's R&D spending comes from the public sector.

Second, the increase in direct import of foreign technology and equipment in Mongolia significantly affects the demand for domestic technology, which could be produced by local scientific research institutions in the country. In addition, there is a gradual but definite traction towards a global economic climate where international trade flows dictate the patterns of specialization of countries in science industry. The knowledge hierarchy with centers and peripheries of the world science system, to a certain extent, shapes the behaviors and informed choices of consumers of knowledge products. For example, as described above, the Mongolian Academy of Sciences and its affiliated research institutes have undertaken numerous applied research projects on material science, namely production of construction materials and thermal and insulation techniques that suit the extreme climate conditions in Mongolia. For example, if

Mongolian construction companies advertise their buildings as being made of using construction materials and techniques imported from such countries as the United States, Germany, Switzerland, or Japan, then they are likely to attract more buyers. Thus the devaluation of Mongolian technology or of any other scientifically peripheral countries, to some extent, influences the consumption of knowledge produced by scientifically peripheral countries. Such biases shape the conventional mentality of potential consumers of knowledge products. As envisaged in international academic discourse central to peripheries and centers of the world knowledge system, some consider that developing countries should focus on raising the skills of the population to absorb foreign technology imported from established economies rather than aspiring to generate new knowledge (Schaaper, 2014). On the contrary, Altbach (2009) emphasizes that it is important to establish research universities in developing countries that can generate new knowledge relevant to local social and economic development. In Mongolia, many foreign technologies have been imported without any adaptation to the local conditions or training the experts with requisite skills in the foreign technology. Such phenomenon neglects the new knowledge relevant to local social and economic development generated by local scientific cadre.

Furthermore, translating research into practical applications is not a linear pathway in Mongolia. It involves a set of steps such as setting the media agenda, popularizing research findings, educating the public, and creating spaces for a debate. It could also depend a great deal on the capacity of the target users and audiences to absorb and to utilize research findings. During the socialist period, it was a linear process. Research priorities were defined by clear-cut national Five-Year plans, and the number of research and design institutes under various industrial ministries undertook the research projects as specied in the series of Five-Year plans.

The relevant ministries were assigned the responsibility of disseminating research results to the industries. Yet, not much consideration was given to the choices of end-users and consumers, as long as the research products met the established standards. On the contrary, in the post-socialist free market economy with a weak and inefficient government intervention and lack of rational central planning, translating research into practical application, and disseminating research results to the consumers has become a non-linear pathway.

Many research efforts to reduce the air pollution are clear examples of such non-linear pathways of translating research into application and disseminating research results to the broader society and consumers. MAS and its affiliated research institutes, Mongolian University of Science and Technology and several private companies have been undertaking applied research on producing charcoal made out of wood chunks, sawdust, and coking and semi-coking coal, as well as briquette coals in order to produce smokeless fuel for an alternative energy to reduce air pollution in Ulaanbaatar. If they are effectively translated into practical applications, such research projects could be a viable solution to the pressing issue of air pollution in Ulaanbaatar. The majority of Ulaanbaatar's air pollution comes from coal-fired power stations and raw coal burning traditional stoves used by households residing in *ger* (yurts) areas during the winter time. The above research products of smokeless coal have been piloted in industries. Currently, there are three private factories manufacturing briquettes out of sawdust. These factories mostly supply their smokeless coal to small-scale industries and heatboilers. However, such smokeless coals have not become a regular consumer product in the average household in *ger* areas. There is an affordability issue as the price of smokeless coal is higher than that of regular raw coal. In addition, there is an absence of law enforcements and state regulations that ban the consumption of raw coal. These phenomena demonstrate that translating research results

into application and disseminating them to the general public require efforts to improve consumers' knowledge of the smokeless coals and the public awareness of a raw coal consumption and air pollution. Ultimately, it requires joint efforts from individuals, educational and research institutions, business and government organizations.

The agricultural sector has a more tangible effect of translating research outcomes into practical applications. In particular, the applied research activities for producing specific fibers of cashmere, wool, and hair of animals have been generating added economic values to entrepreneurial ventures. The research products for producing high quality fibers have been effectively applied into entrepreneurial ventures, operating business in manufacturing garment and finished goods of cashmere and wool products. The cooperation between industry and research units undertaking the applied research activities is more discernable in this sector. A recent noteworthy example of indigenous technology developed by local Mongolian researchers is the new specific fiber made from the hair or down of yaks. The experimental research results have proven that yak down can produce more quality fibers, similar to goat cashmere, with even higher thermal features and less content of grease and dandruff. In addition, yak down has antibacterial and hydrophilic features that accumulate moisture in the fiber itself. It does not absorb odors and sweat, thus needs less washing and is more durable than other luxury fibers. The Mongolian researchers consider that such profitable marketing values of yak hair and yak down can give an incentive to herders to increase their number of yaks, which eventually would contribute to preventing pasture degradation and overgrazing. Yaks are well adapted to higher altitude areas with less oxygen due to their physical features. Therefore, they are a more environmentally friendly animal as compared to goats. An excessive increase in the number of goats among Mongolian herders in order to yield more cashmere, has led to overgrazing of the

pastureland, and is one of the factors accelerating the desertification process in Mongolia nowadays. This new technology could be one of the trademarks of Mongolia's traditional knowledge, which can enable the country to participate in this knowledge-based economy with its indigenous technology. It could also follow the path of the Ethiopian best practice of coffee production, using traditional knowledge protected by intellectual property rights, which has increased the income of Ethiopian indigenous coffee farmers.

Furthermore, a strong sense of the value of branding and trademarking knowledge products is essentially missing in Mongolia. There is no clear understanding that knowledge products deserve protection via copyright, not only among the general public, but also within the entrepreneurial ventures. In a centrally planned economy characterized by social ownership, private ownership mechanisms such as copyright and patents were non-existent. Today, the sense of private ownership of intellectual capital is evolving, but in practice, it has not been fully realized. Hence, there is a strong need for raising awareness of the importance of educating the government organizations, private ventures, research institutes, universities, and the general public about the importance of intellectual property rights and protection, and their benefits to individuals, firms, and the country as a whole.

Moreover, the institutional separation of research and educational institutions inherited from the past socialist system is the second major factor that contributes to a non-linear pathway to knowledge consumption. The Mongolian government faced with considerable resistance from MAS, when they initiated policy discussions to merge MAS and its affiliated research institutes with universities. The underlining goal of merging MAS into universities is to facilitate a shift to a university-based setting of scientific research and to increase the research capacity of Mongolian universities as well as to reduce the state budget in order to utilize resources more

efficiently. However, the government proposal for merger encountered considerable resistance from MAS and its academic staff.

While MAS and its academic members were strongly protesting the Government proposal, some university professors and some scientific thought-leaders outside the Academy were supporting the merger. In 2014, a preliminary discussion about a merger took place between MAS Presidium and some academic thought-leaders outside the Academy and representatives from government agencies. The discussion among opponents and supporters of the merger rasied a number of criticisms. The supporters of the merger were highly critical of the lack of transparency around the allocation of limited funds and the awarding of Doctor of Science degrees and academic membership. The opponents of the merger, including mostly the MAS administrative bodies, argued that Mongolian universities are not yet ready to be merged with the Academy and its research institutes due to their inadequate research capacity, lack of requisite human resources and low research profiles, although the opponents supported the government policy to develop university-based scientific research in the country. Pointing to 100 national Academies of Sciences around the world, which are members of the International Council for Sciences, as well the national research institutions in the United States, Japan, and Germany e.g. Max Planck Institute, the opponents of the merger argued that merging the Academy and its affiliated research institutes with universities is not a timely and wise move. The opponents of the merger warned that merging is unlikely to achieve improvement of research performance for both universities and MAS. Instead, it might diminish the existing research performance of MAS. They also warned that merging might require extra financial resources rather than reducing costs.

The supporters of the merger addressed a number of issues related to the Academy's current administration and management structure. The supporters of mergers presented a myriad of reasons for merging MAS with universities such as the academic culture, practice and research output. When they claim that Mongolian universities are ready to be merged with MAS, they specifically referred to the publication outputs of both Mongolian universities and MAS. As they stated, according to Thomson Reuters Web of Knowledge, MAS accounted for 34 percent of the country's total publications, while Mongolian universities collectively constituted 66 percent in 2013. Of the 66 percent, the National University of Mongolia solely constituted 34 percent. However, in 1990-2011, MAS accounted for 46 percent of the country's total publications, according TRWok, while National University of Mongolia accounted for 24 percent. As such, in 2013, MAS's publication output decreased by 12 percent, while the National University of Mongolia increased by 7 percent. Pointing to Academies of Sciences in former and current socialist countries such as Estonia, Russia and Cuba that have undergone major reforms or certain restructuring since 1990, the supporters of the merger argued that merging is a timely step.

Aside from the myriad criticisms of the detail, the supporters of mergers raised the following three main criticisms summarized as follows. First, the supporters of the merger argued that current administrative and management structure of MAS is authoritarian in character, as a few old academicians exert their power and influence over administrative decisions, allocation of resources and funding, alignment with the state apparatus, and control over scientific careers and privileges. Such an authoritarian nature hinders private sectors and other external organizations to invest in the Academy's research activities. It also thwarts the government's efforts to increase the state budget allocated to MAS. The higher degree of

stratification within MAS itself impedes the young Mongolian scientific talents to join the Academy.

Second, the supporters of the merger believed that the government intervention in MAS is essentially improper and ineffective. The government allocates a budget of 2 billion MNT annually to MAS without any performance evaluation and auditing of the Academy's research activities. There is a bonus pay provided to academicians on top of their basic salary. The pay scale is thus based on the title of "Academician" and the level of seniority rather than on merit. Annually, 348 million MNT is budgeted for such bonus pay for academicians. As suggested by the supporters of the merger, this budget should be devoted to research grants for young PhD researchers instead of paying bonus salary for academicians.

Third, the supporters of the merger argue that the current legal status of MAS cannot make the Academy independent of politics, and capable of providing expertise to the strategically important national projects. Hence, they believe that a plan to reorganize and restructure MAS should be formulated by independent experts. As they emphasized, the committee of independent experts should not include the representatives from the State Great Khural (Parliament), Government of Mongolia, Ministry of Education, Culture and Science, Mongolian Academy of Sciences, universities and research institutes. The then Minister of Education, Culture and Science responded to such public discourses that merging should not be mechanical and coersive but instead should be done step by step based on concrete plans that carefully consider the potential risks, opportunities and implications. The private entrepreneurs and for-profit organizations were silent in such discussions about reforming MAS. Thus, the private sector's voice was essentially missing in such public discussions. Finally, the merging plan has not reached a consensus in Mongolia. The discussion has eventually disappeared from

public attention. Yet, it was not the first attempt for the Mongolian government to merge MAS with universities. During 1992-1993, the Ministry of Science and Education prepared a policy document entitled "Conceptual Framework for Mongolian Science and Technology". One of the major guidelines formulated in this policy document was integrating scientific research with higher education (Baark, 1996). It was presented to the State Great Khural (Parliament) and was also highly supported by UNESCO. As a result, a few research institutes of MAS, were merged with universities including the National University of Mongolia, Mongolian State University of Agriculture and Mongolian National University of Medical Sciences. However, no concrete formal arrangements to integrate MAS and its research institutes with universities have taken place since then.

Due to the pressures to be merged with universities, the Academy has been making efforts to collaborate with universities in recent years. Nevethless, the collaboration is minimal and cannot go beyond the minor involvements of some university faculty members in the Academy's basic and applied research projects and occasional lectures given at universities by Academy's scholars and scientists, who have a double affiliation with a university. Aided by the increasing focus on shifting to become research-based universities, Mongolian universities nowadays have also expanded their roles in academic scientific research, but less rigorously. When all the outputs of the country's research institutes are aggregated, MAS has maintained its sustained domination over research activities in both fundamental and applied research in major fields of studies. There is a high degree of stratification within higher education system itself. A few key specialized national universities such as National University of Mongolia, Mongolian University of Science and Technology and Mongolian State University of Agriculture and Mongolian National University of Medical Sciences sustain high research standards in the

country within their own specialty areas, while peripheral private institutes have teaching and learning based functions.

Nonetheless, there are several conditions specific to Mongolia that impede the circulation of knowledge and talents in research and development efforts in the country. The law on the "Legal Status of the Mongolian Academy of Sciences" ratified by the State Great Khural (Parliament) of Mongolia in 1996 promulgated the Mongolian Academy of Sciences as the scientific research center with the aim to develop science and advanced technology in the country. The law states that the Academy shall be under the auspices of the state. According to this law, the Mongolian government shall approve the maximum number of Academy members and the Prime Minister shall endorse the President of MAS. MAS and its Great Assembly shall specify the research priorities and provide support and policy recommendations to the government for the development of science and technology in the country. MAS also shall provide scientifically justified policy recommendations and expertise to the Government concerning the social, economic, political and cultural issues in the country. As stated in the law, MAS shall be financed through the following four types of sources: 1) state budget; 2) project fund; 3) MAS's own income generated by its research activities; 4) other various sources. Yet, the law also states that the rules and regulations to finance MAS shall be established by the government. For example in 2012, MAS generated a significant amount of funding from non-government sources. The MAS annual report in 2012 stated that MAS and its affiliated research institutions generated funding of 2.8 billion MNT (equal to 2.5 million USD according to the current exchange rate) from nongovernment sources, including international private foundations and international development cooperation agencies. The presence of private sector in funding research efforts is still minimal in Mongolia. However, the majority of the Academy's funding

goes to its administrative and operational costs and very little is devoted to actual research activities. In 2012, over 75 percent of MAS's total funding, including both state subsidies and outsourced funds, went to its staff salary. Only 14.6 percent was spent on scientific research activities and 3 percent went to per diems of researchers for their field studies or international conference travels, while the remaining 6 percent went to the operational costs.

The legal status of MAS, as stipulated in the above legislature, has a number of ambiguities. First, it is not certain whether MAS is a non-government organization or government organization. Second, its governance is ambiguous. As stated in the law, MAS does not have a real autonomy. On one hand, the lack of autonomy reflects that the Academy cannot be independent from government and political parties. On the other hand, there is a resistance from MAS to any attempts by the government to reform the Academy and its structure. The Academy itself takes a defensive stance for its status quo as a state organization, and adopts a survivalist approach in order to maintain the state subsidy. As such, the Academy abstains from active engagement not only with universities but also with the government. The continuation of the socialist-era practice and rigidities reinforces the collaboration barriers for private sectors and business organizations.

These path-dependent internal patterns inhibit Academy's recognition among the general public, and constrain interdisciplinary and inter-institutional collaboration, yet reinforce MAS dominance in the Mongolian research system. Maintaining its status quo as a state organization enables MAS to have the privilege of controlling access to collaborations with prestigious international research foundations and international development cooperation agencies such German Max- Planck Society, Alexander von Humboldt Foundation, JICA (Japanese International Cooperation Agency), SDC (Swiss Agency for Development and Cooperation) and

Korean research institutions and other foreign academies, whereas such international links are often limited to universities. MAS owns most of the country's research facilities and is a focal point for research projects carried out by its affiliated institutes in various fields of studies. Given that the bulk of funding comes from the development aid and international cooperation agencies, the importance of international collaborations is more noticeable within MAS, which overrides the domestic inter-institutional collaborations with regional and peripheral institutes, universities, and private companies in the country. This trend contributes to limited interactions of MAS with other actors in the national system and to the lack of institutional diffusion of the knowledge produced by Academy's research activities. In addition, the regional dispersion of tacit knowledge transfer is relatively low, as MAS and its research institutes are predominantly located in the capital city of Ulaanbaatar, thus cannot reach the regional and geographically peripheral institutes in the country. Over 90 percent of the scientific research institutes are located and operated in the capital city of Ulaanbaatar /See Appendix C/. Furthermore, the insufficient funding from the government makes the Academy not an attractive place to work for young talents. In addition to the state funding, MAS depends slightly less on international funding and commissioned research projects. The state funding drops as the country struggles with economic recessions and volatility, but the Academy has been unable to replace or complement it with competitive research project funding. The relatively low salaries and inadequate career advancements result in a lack of newcomers, especially those who were trained overseas, and result in human resources brain-drain at MAS.

Many of these structural problems of the Mongolian research system also affect the rejuvenation of the Academy. This inertia further challenges MAS to regenerate itself. Since MAS has been resistant to any reform attempts by the government, it is important for the

government to support more endogenous change in MAS through facilitating the return of young talents to the scientific research institutes, including both MAS and universities, and encouraging recruitments of early career researchers at both universities and the Academy. From the examination of MAS annual reports, the demographic profile of the Academy indicates that a significant proportion of the full time researchers and scientists are young under 40 years old, but the old cohort of academicians is still dominant at the management and decision making level. Hence, an effective succession planning that ensures the generational transfer of leadership and sustainability in Mongolian scientific research landscape is important.

MECS has taken a number of initiatives targeted towards young scientists and early career researchers in order to prepare the successive generations of the scientific cadre. In addition, MAS established an Association of Young Scientists in 2002, and regularly hold annual seminars and conferences for young scientists. The young scientists and early career researchers present their research work at the annual conference, and a grant is awarded to the top scientific research works as selected by the Commission of Young Scientists. The MECS endorses the decision to select the young scientists to receive a grant for their outstanding research works. Among those, who were awarded the grant, were young scientists from MAS but also early career faculty members and academics from national universities. These initiatives are good startups to develop and to diffuse innovations that facilitate endogenous change and replenishment in both universities and MAS. Yet, the government funding still falls short in terms of diversifying the funding initiatives for commercializing research results and for encouraging collaborative research actions, community engagements, and for supporting women in science and technology. In addition, the degree of a diversity of funding sources is essentially

very low in Mongolia. MECS and the Mongolian government have taken no efforts to date to diversify the funding sources.

Moreover, the current legal status of MAS as a scientific research center under the auspices of the state is ambiguous. Therefore, it is difficult to define the role of the Academy in Mongolia's current research landscape. In the socialist era, the role of MAS was to conduct fundamental and advanced research, which was separate from applied industrial research in specialized institutes under various ministries. Thus, MAS used to undertake basic research but the application of research was the responsibility of various ministries during the socialist period. With such a path dependence, the Academy's strength still lies in basic research. Changing the Academy's status to a non-government organization with a view to making MAS more competitive and fully grant-based was also raised during the public discussions about merging MAS into universities. With the change in its status, Academy can replace its funding with competitive project funding and commercialized research activities. If implemented, such a reform would reduce the state funding relied on by the Academy, and would require MAS to compete with universities and other research organizations for public research funding. However, discussions of such a reform were controversial and resented by many MAS members and staff. Despite the fact that MAS receives significant funding from both the government and external sources, there are no monitoring and evaluation mechanisms that exist in the Mongolian research system. One of the main functions of STF (Science and Technology Foundation) is to evaluate the research projects funded and managed by STF and to monitor the funding expenditures of research projects as well as to conduct evaluations of the level of expertise on research projects in collaboration with MECS. However, there are no established monitoring and evaluation mechanisms for government funded research activities and there is no publicly

available information on such matters. Although the validity of knowledge is a relative concept, and there is no universally accepted tool that evaluates research quality across different disciplines, the absence of monitoring and evaluation mechanisms leads to limited accountabilities. MAS currently assesses research productivity of its affiliated research institutes and scholars based on the amount of published output and quality of output (local or international or citations), conference presentations and proceedings, patents, certificate for industrial application (*"ashigtai baidliin gerchilgee"* in Mongolian, which means a certificate that is awarded to completed applied research products that can be applied to the industry) and "*Zehets ajil*"– (the phrase in Mongolian, which means "available or completed work" of an applied research project that can be used for commercialization). In addition, policy recommendations, technical guidelines, and standards, which have been developed by MAS research institutes and scientists, also count towards research outputs.

Nonetheless, there are currently no evaluation mechanisms that could help create competitive research environments, where ambitious and talented researchers could strive to access greater resources and support except for the above-mentioned selective grant for young scientists. In light of increasing the quality of domestic human capital in the country's scientific research, the Law of Mongolian Science and Technology in 2006, stipulates that the scientific research personnel must be accredited once every four years. The accreditation is designed to evaluate their competence, qualifications, and research productivity, and to promote their degrees. The law specifies a hierarchical ranking structure of four degrees such as leading, senior, associate, and assistant scientific personnel. The MECS administers the accreditation for the scientific personnel certification. The Minister of Education, Science, and Culture approve the criteria, competence, and credentials for the four degrees of personnel certification and other

scientific titles in 2012. As described in the MAS annual report for 2012, totally, 398 scientific personnel from the Academy underwent the accreditation proces in 2012. Of those accredited personnel, 118 were certified as leading scientific personnel, 74 as senior and 199 as associate respectively. The MAS annual report described that the number of leading scientific personnel had increased by 1.3 percent since the 2008, and approximately 50 percent of the total Academy's scientific research personnel were to receive a salary bonus for their certified professional degrees on the top of their base salary, beginning in 2013. Accreditation may be viewed as a merit-based evaluation, and the prestige may accrue to the scientific personnel, who are accredited for their professional ranks in Mongolia. However, there are no such established standards that exist to certify the professional credential of scientific personnel both nationally and internationally. Moreover, an accreditation process itself is questionable, given that considerable variations exist between different disciplinary areas in terms of available resources. The knowledge and competence of scholars in social sciences cannot be concretely validated through accreditation criteria. In addition, the salary of research personnel is significantly lower than the professionals in the domestic private sector or in comparison to their international academic peers. Hence, certifying their professional competence through accreditation may have a negative impact on the morale of young scholars, while limited financial incentives exist, unless accreditation's essential purpose is to provide professional judgement and to encourage continual improvement. A certain scientific disciplinary field in Mongolia may need to seek validation of their experts' knowledge and competence to ensure whether they conform to common international expectations and expertise. Yet, such evaluation would be better served if externally determined and reviewed by a visiting team from respective international scientific professional associations. No efforts have been taken so far to involve such external reviews.

While periodic evaluation of scientific research productivities is necessary, the current system of accreditation may actually hinder progress in the Mongolian research system.

In addition, there is a lack of efforts to collaborate with Mongolian researchers, who work abroad at international research institutes and universities. A considerable number of Mongolian nationals nowadays have successfully pursued their scientific and scholarly research careers at prestigious universities and research institutes abroad in scientifically leading countries. They not only can add to a country's scientific prestige abroad but also can contribute to an exchange of knowledge and expertise with their fellow Mongolian researchers working at domestic research institutes. Such collaboration can facilitate endogenous change in research institutions to rejuvenate themselves and to circulate talent, knowledge, and skills in Mongolian research system.

Through the examination of publication outputs and research projects as illustrated in MAS annual reports between 2005 and 2012, the Academy seemingly produces new knowledge in both social and natural science domains. Yet, the knowledge is not diseminated due to lack of advocacy at the government's policy making bodies and lack of integration with the industries as well as a lack institutional diffusion. The fact that the number of patents constitutes a relatively small proportion in total research outputs of MAS and nationwide as shown in Table 7 and Table 8 demonstrate a very ineffective utilization of intellectual capital. Neither are there any efforts to protect their discoveries with patents. In the socialist period, feeding research-based evidence into policy and practice was more a linear process. Also the state was the main and often the only client and the consumer of research products, thus protection of intellectual capital was not a concern for the research institutes as long as they met the established principles and requirements. The socialist ideology of social ownership of means of production also highly

restricted patent, intellectual property, and copyright as a private property right or for commercial uses. With a liberal market economy, it is more multifactorial and non-linear in post-socialist period. Research alone is not enough. In order to maintain the state-awarded budget subsidy, MAS is deliberately negligent to ensure that findings of their research projects influence change in government policies. The knowledge they produce is much more democratized, and the Academy's scholars have much more academic freedom than they had during the socialist period. On the other hand, in the post-socialist multi-party political system, Mongolian policy-makers often tend to be more heavily influenced by their own parties' values and agendas, the influence of lobbyists, and pressure groups rather than research-based evidence. Additionally, national policy processes are often heavily influenced by the agendas of international donor organizations such as the ADB, WB and IMF rather than research-based evidence provided by local scientific personnel and academics.

The Academy and Mongolian universities therefore have to go through all these complex processes and to deal with various stakeholders in order to ensure that their research results actually impact and shape the government policies. The recent government's call for Mongolian scientists to find the most feasible solutions for the devastating air pollution in the capital city highlights some efforts on the part of the government to increase the political and public awareness of effective use of research-based knowledge in their policy and practice. In response to the call from the Mongolian government, the MAS took a responsibility for proposing a concrete plan to reduce air pollution based on scientific and pragmatic approaches. The working group, which comprised of leading local scientists and researchers, has been established by the Academy and a proposal is currently underway at MAS. The Prime Minister addressed to the gathered local scientists that Mongolian people trust in their local Mongolian scientific

community and are seeking their help to reduce air pollution in Ulaanbaatar. This public address has set high expectations for the Academy and local Mongolian scientists. Yet, it is worth to note that the use of research-based evidence in development policies and practices requires effort at individual, organizational, and institutional level, involving all stakeholders – research providers and research consumers as well as the mass media and press as intermediary groups.

To sum up, many current practices in the Mongolian research system are rooted in a seventy-year historical legacy of socialism. For instance, the lack of institutional diffusion in the Mongolian research system today is due to the institutional separation of research and higher education in the Soviet-based science management. Yet, new knowledge that not only is relevant to national social and economic situations but also contributes to the general theoretical knowledge is created in Mongolia thanks to a solid base of human resources and research institutes endowed from the Soviet backed socialist training. Nonetheless, the consumption and utilization of knowledge is non-linear and chaotic due to post-socialist transformations characterized by free market supply and demand, weak government intervention, heavy dependence on imported foreign technology, and increasing intervention from international development organizations. The country's economy is heavily dependent on foreign technology imported from the developed countries. This phenomenon, in turn, creates little incentive to socially and economically capitalize the locally produced knowledge in Mongolia. With its institutional inertia, MAS cannot adapt to the new conditions of a non-planned economy based on the competitive market supply and demand, while the universities are suffering from lack of state support and funding due to the institutional separation of research and education inherited from the socialist past.

6.7 Concluding remarks

This chapter explores how neoliberal paradigm – and related economic policies – has been implemented in the once-socialist Mongolia. Specifically, the issue argues that such neoliberal economic policy as implemented through immediate liberalization of trade, privatization of publicly owned assets, and state deregulation undergoes both reactive and self-reinforcing sequences as it meets post-socialist conditions. Since the transition from socialism with centrally planned economy to democracy with free market economy, Mongolian higher education system has changed and developed under the influence of internal (demographic, political, social, and economic) and external factors (involvement of international development organizations). With the increased interest in private institutions and emerging need for meeting the social demand for higher education coupled with state deregulation, cutbacks in state subsidies by introducing tuition fees, and legalization of private higher education, both the number of higher education institutions and enrollment have dramatically grown in the past two decades. The mass enrollment and dramatic expansion of higher education witness the reactive sequence of path dependency in the national higher education system. The transformations in the Mongolian higher education system in the form of differentiation at diverse levels, including traditional state universities, private higher education institutions, and four-year undergraduate degree granting institutes, is an apparent trend in the country. Considering the fact that drivers behind this differentiation are predominantly market requirements, the increased access to higher education expands the institutional stratifications rather than expanding opportunities for individuals. Due to lack of financial resources, the majority of HEIs offer degree programs in humanities, economics, and social sciences, while the labor market could not absorb the graduates. Therefore, the mass enrollment in higher education fails to ensure economic mobility,

particularly for those students representing certain segment of the population such as low socioeconomic households and rural herders, who cannot afford the high opportunity cost of enrolling their children in field of studies of high paying economic sectors.

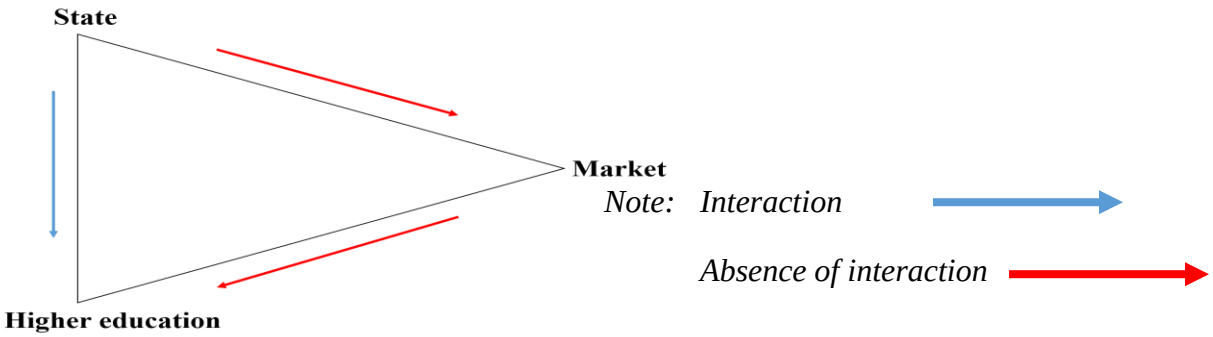
Moreover, the resistance to the Mongolian Academy of Sciences to the government's efforts to facilitate a shift to a university-based setting of scientific research through merging MAS with universities reflects a self-reinforcing sequence of path dependence. Many current practices in Mongolian research system are rooted in a seventy-year historical legacy of socialism. The inability to capitalize knowledge products both socially and economically is, in large part, due to the preceding socialist system with centrally planned economy. Because the state was the main and often the only client and the consumer of research products, the dissemination and marketability of research products were not a concern for the research institutes as long as they met the established principles and requirements. Consequently, there is a persistent lack of institutional diffusion of the knowledge produced by Academy's research activities. MAS as the country's central scientific think-tank cannot adapt to the new conditions of free market economy based on supply and demand in consumer market. With the solid base of scientific personnel and research institutes endowed from the Soviet-backed socialist training, knowledge is actually produced in the country. With the volatile supply and demand in free market economy and the lack of political leadership, the consumption and utilization of knowledge have been a non-linear and chaotic process in the post-socialist era.

CHAPTER 7: CONCLUSION

7.1 Final discussions: Theoretical framework revisited

The Figures below are a visual depiction of a conceptual framework revisited, depicting the institutional pattern of interaction between institutions collectively (universities and the Academy of Sciences), state, and market forces. Due to the institutional separation of higher education teaching and research production, each period (socialist and post-socialist) has two triangles of its own. The Figure 14 below portrays the socialist period of Mongolia, when higher education was fully subsidized by the state and enrollment was centrally planned.

Figure 13: Triangle of coordination for higher education institutions during the socialist period

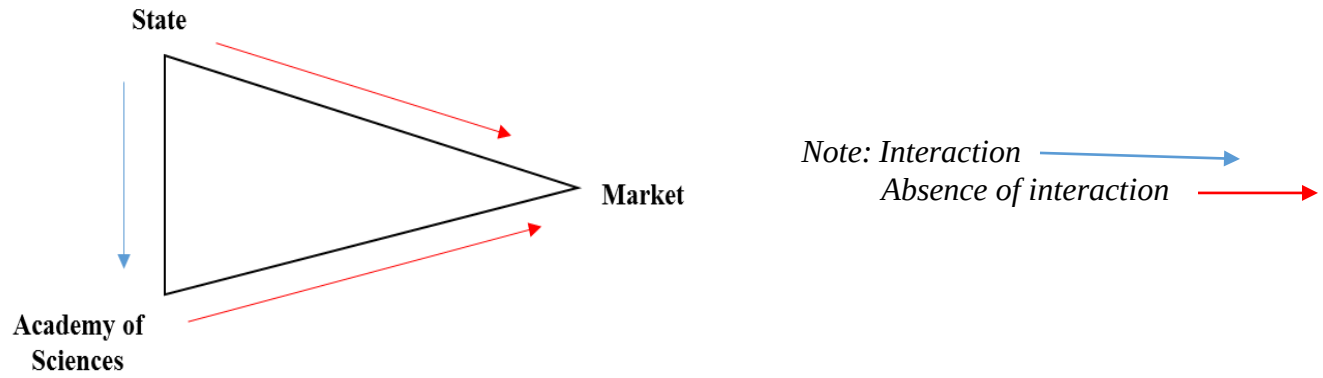


The resultant shape of the triangle in Figure 14 above identifies that the state was dominant in the overall tertiary education system during the socialist period in Mongolia. The state power was more interventionist and the state was the sole provider of welfare services as well as universal, free, and compulsory education. The state coordinated the country's economy and civil society through its central planning. In such a socialist system, education was considered as a public good, which was aimed to inculcate the moral, ethical, social, cultural, and political ends that the state desired for all citizens. Thus, the socialist ideology of equal access to education and social homogeneity increased the access to education from primary to general secondary

education, but higher education enrollment was limited to only 18 to 20 percent of the eligible age cohorts due to the centrally coordinated human resource planning and training. The non-selected majority was absorbed into vocational and technical education to create the forefront proletarian working class, which is an essential element of the Marxist-Leninist ideology to build the non-capitalist industrial development. The labor market essentially played no role as supply and demand were highly coordinated by the state-defined manpower planning specified in the series of Five-Year plans, which guaranteed jobs for graduates from universities, *technikums,* and vocational schools.

The Figure 14 below depicts the interaction between the research institute, state, and market during the socialist period.

Figure 14: Triangle of Coordination for the Academy of Sciences during the socialist period

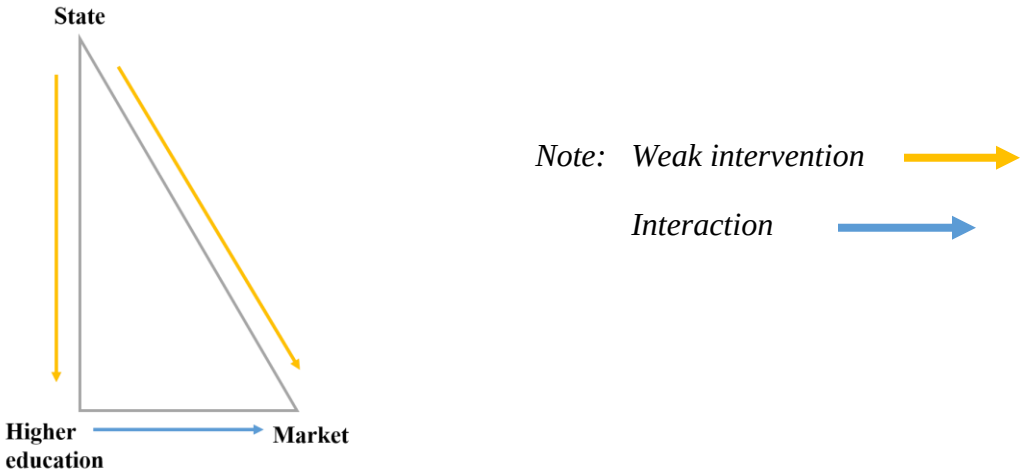


The research undertaken at the Academy of Sciences was a tightly controlled by the state. Thus, knowledge production, sharing, and diffusion were closely integrated with the state's aim to build the non-capitalist modern economy and Marxism-Leninism induced socialist society. As far as the purpose of knowledge creation concerns in the socialist system, the socialist state considered that worthwhile knowledge satisfies society's needs and development. In that regard,

the research priorities were defined by clear-cut policies specified in the series of socialist Five-Year plans. The consumption of research products was not regulated by free market supply and demand, as state was the only client and the ultimate consumer of research products. The governance of knowledge generation and dissemination was top-down. As such, the dissemination and application of research products was more a linear process.

The Figure 16 below portrays the post-socialist period of Mongolia characterized by free market economy and state deregulation.

Figure 15: Triangle of interaction for HEIs in the post-socialist period

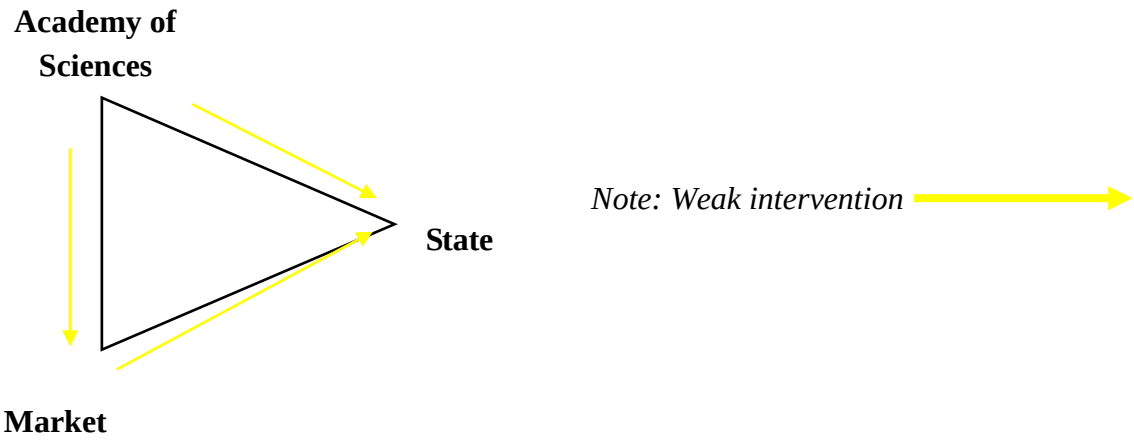


The resultant shape of the triangle in Figure 16 above identifies that neoliberal market is the dominant force inherent in the overall tertiary education system in Mongolia that leads to higher education expansion in the post-socialist period. Most significantly, the neoliberal market economy exerts an overarching influence on social, cultural, and political processes in Mongolia. The state has been essentially weak to effectively regulate the free market, hence higher education institutions are more responsive and subject to the uncontrollable market forces due to cutbacks in state subsidies after the country transitioned from a socialist to a market-oriended democractic country in 1990. This phenomenon leads to massification, marketization, and

commercialization trends in Mongolian higher education. Although massification increases access to higher education, but it has implications for transforming the institutional landscapes of higher education institutions rather than increasing the economic mobility for individuals. In addition, the lack of public resources has led many private provders to offer higher education degree programs in humanities, social sciences, and other vocationally oriented subjects such as foreign language translator etc. This has resulted in labor market mismatch in post-socialist period. During the socialist period, the labor market supply and demand were highly coordinated by centrally planned economy.All these reveal sequences of path dependency that is reactive to the antecedent historical condtions.

The Figure 17 below portrays the interaction between the Academy of Sciences, state, and market for knowledge generation. The resultant shape of the triangle for the interaction between the Academy of Sciences, state, and market in post-socialist period is equilaterial, which means there is no hierarchy between the three. However, this equilibrium indicates the weak state intervention, resistance from MAS to any attempts by the government to reform the Academy's institutional structure, and no interaction with the market to capitalize the locally produced research products. This can reflect the "academic oligarchy" in which academics seek hegemony in the system in a form professional associations and science councils as postulated in Clark's triangle of coordination.

Figure 16: Traingle of interaction for the Academy of Sciences in post-socialist period



Moreover, as far as the purpose of knowledge concerns in a free market neoliberal economy, knowledge is a form of capital. Consequently, creating knowledge that has market values is important. In other words, knowledge creation should be responsive to the consumer market, thus knowledge is assessed and filtered through its usability. Consumers, who consist of both individuals and industry, are the best judges of the knowledge products in a free market economy. Consequently, the consumption and utilization of knowledge have become a non-linear and chaotic process in the post-socialist era due to the uncontrollable free market forces, free flows of international free trade, and the lack of political leadership.

Finally, Clark's triangle is a means of explaining the forces that led to the shape of the higher education system in each of the two historical periods including the socialist and post-socialist, but it is not a means of validating any particular policy viewpoints.

7.2 Implications for future research

My doctoral study, being of an exploratory and interpretive nature, raises a number of opportunities for future research, both in terms of theory development and concept validation of intangible capital. More research will in fact be necessary to refine and further elaborate the findings of this research.

First, while I have generated a number of new and I believe useful conceptual categories on exploring how organized higher learning has shaped the evolution of intangible capital, namely human capital, social mobility, and knowledge creation, very little quantitative estimates have been provided. My study thus can be extended in search of statistical correlations rather than analytical, generalisability, as I have sought here.

Second, my study offers the opportunity to refine and validate the concepts and constructs of intangible capital that emerged from my inductive analysis. For example, the idea of net effects of research products to social well-being will need further refinement and elaboration, in terms of both its component elements and its internal dynamics. One could also ask whether and to what extent it is possible to identify the net effects of research products to social well-being in different disciplinary areas, so that a typology of knowledge products and their utilizations and consumptions can be constructed.

In addition, the aspect of social mobility and social stratifications created by post-secondary education could also be used to generate a number of hypotheses for further empirical testing using a broader sample and quantitative research methods in Mongolian context. Questions for further quantitative study could include the following:

Is there a statistical correlation between the types of post-secondary institutions and the socioeconomic statuses of students enrolled in Mongolia?

Is there a statistical correlation between the types of higher education institutions and the other outcome measures such as employability and earnings of graduates?

This study could also be extended in longitudinal for certain segment of the population to examine the evolution of intangible capital. In addition, the findings of my research could provide valuable information for developing survey instruments for graduate tracer studies. Overall, my analysis of the findings can provide the groundwork for future work in the area of higher education policy studies not only within Mongolian context but also within other post-socialist developing countries.

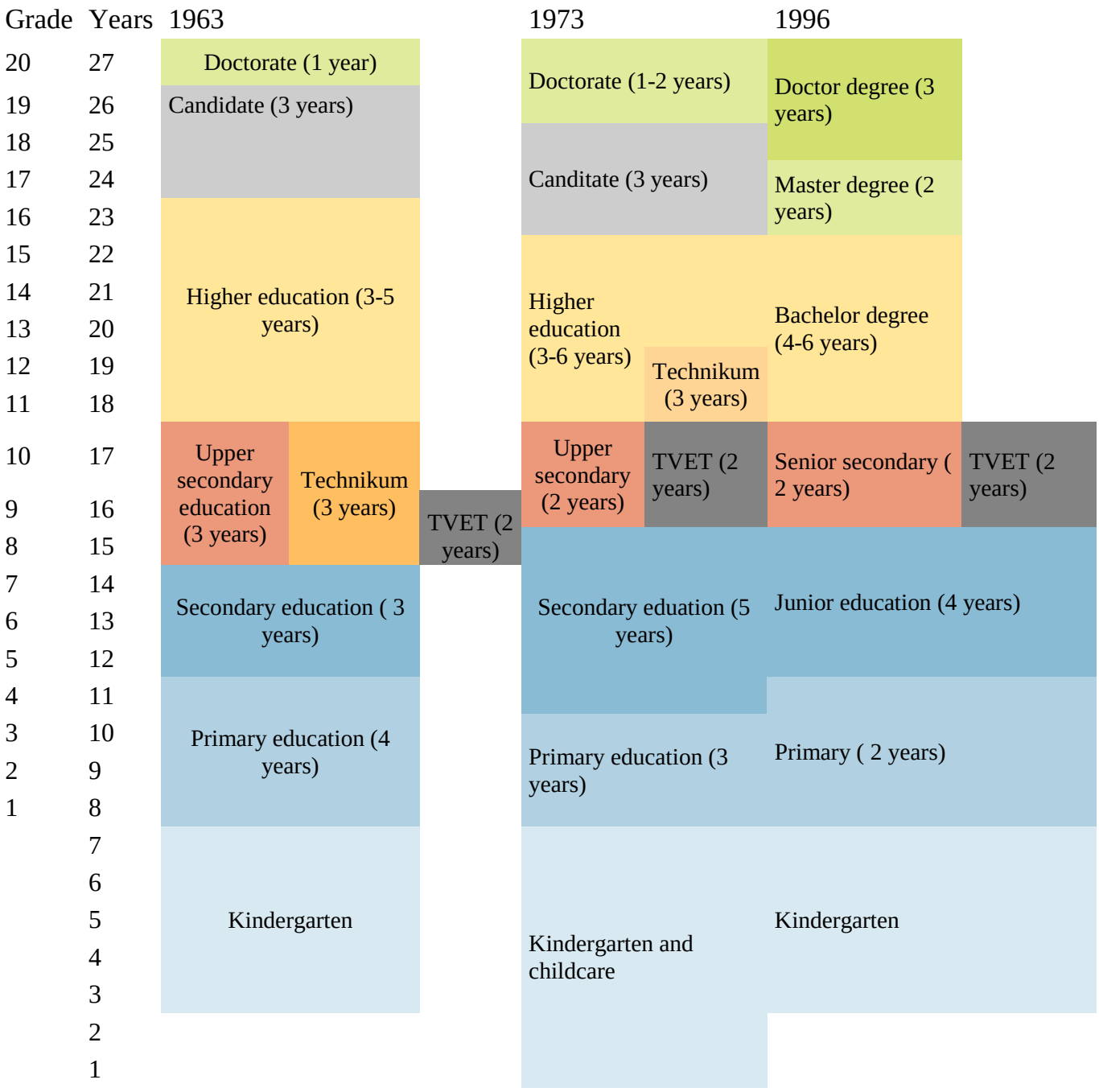
7.3 Limitation of the study

The aspects addressed in this doctoral study lack overall statistical estimates. The absence of time-series historical data that address certain issues such as socioeconomic mobility in socialist and post-socialist periods make the study findings limited in terms of determining the quantitative estimates of the phenomena revealed by this study. Large-scale surveys such as graduate tracer studies to determine the employment patterns of university graduates are essentially absent in both periods. There are no disaggregated data on social and economic backgrounds of students enrolled in Mongolian universities to determine the correlation between social stratifications and university education attainment. The absence of such data may make this study limited to provide numerical estimates to the findings of this research. In addition, there is no systematically collected data concerning the R&D indicators and research outputs of

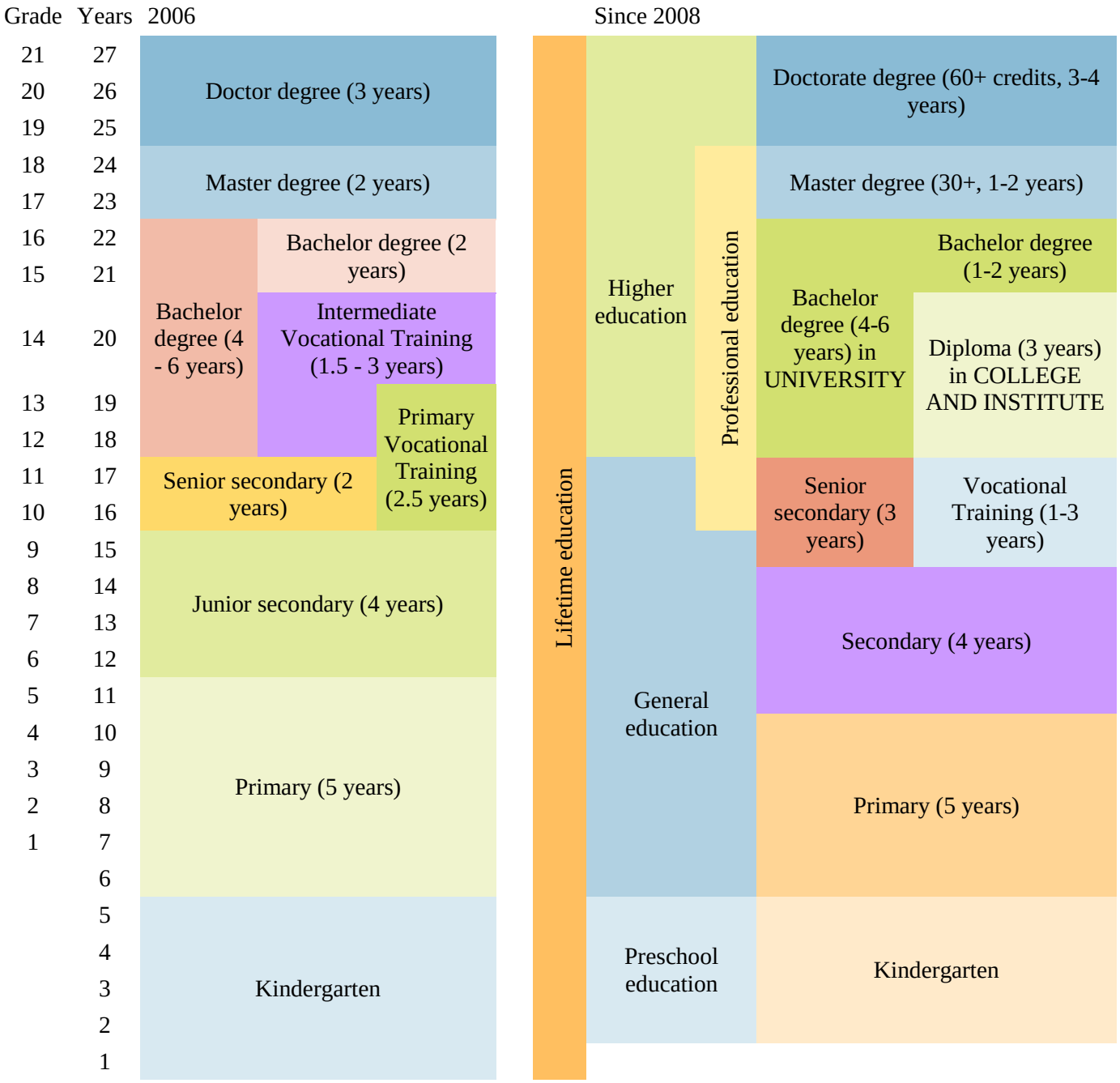
the country. No national survey has been carried out to date on innovation and R&D efforts in Mongolia. The UNESCO Institute for Statistics (UIS) provided training on international guidelines to collect data on research products and innovations in Mongolia in 2016. The UIS training was provided to the country's specialists and officials from different national institutions, including the current Ministry of Education, Culture, Science, and Sports, Mongolian Academy of Sciences, and the National Statistical Office. Mongolia is planning to conduct a national innovation survey this year.

Therefore, the findings of the present study are principally based on the analysis of the documents and mass media observations. I have sought to reduce the researcher's biases by referring to the available statistical data. Nonetheless, the study findings contribute to an in-depth understanding of how organized higher learning has shaped the country's human capital, social mobility, social stratifications, and knowledge creation within different political and social settings in Mongolian history.

APPENDIX A: MONGOLIAN EDUCATION SYSTEM IN THE SOCIALIST AND POST-SOCIALIST PERIODS



APPENDIX B: MONGOLIAN EDUCATION SYSTEM IN THE POST POST-SOCIALIST PERIOD IN THE 2000s



APPENDIX C: PUBLIC RESEARCH ISNTITUTES

No	Name of research institutes	Location	Central administrative body
1	Academic Research Institute for Defense	Ulaanbaatar	University of Defense
2	Agricultural Science and Technology Production Corporation	Ulaanbaatar	
3	Archeological Institute	Ulaanbaatar	Mongolian Academy of Sciences
4	Astronomy and Geophysical Research Center	Ulaanbaatar	Mongolian Academy of Sciences
5	"Erchim" Science and Technology Corporation	Ulaanbaatar	
6	Forestry Trainings and Research Institute	Ulaanbaatar	Mongolian Academy of Sciences
7	Institute for Mining Research	Ulaanbaatar	Mongolian University of Science and Technology
8	Institute for National Development	Ulaanbaatar	Mongolian Academy of Sciences
9	Institute of Physics and Technology	Ulaanbaatar	The Office of the President of Mongolia, Mongolian Academy of Science
10	Institute for Philosophy, Sociology and Law	Ulaanbaatar	Mongolian Academy of Sciences
11	Institute of Chemistry and Technology	Ulaanbaatar	Mongolian Academy of Sciences
12	Institute for Mineral Processing Technology	Ulaanbaatar	Mongolian Academy of Sciences
13	Institute for Economics Studies	Ulaanbaatar	National University of Mongolia Ulaanbaatar
14	Institute for Biological Studies	Ulaanbaatar	Mongolian Academy of Sciences
15	Institute of Education	Ulaanbaatar	Ministry of Education, Culture and Science
16	Institute for Botanical Studies	Ulaanbaatar	Mongolian Academy of Sciences
17	Institute for Disaster Studies	Ulaanbaatar	National Emergency Management Agency
18	Institute of Geography	Ulaanbaatar	Mongolian Academy of Sciences
19	Institute for Geology and Mineral Resources Studies	Ulaanbaatar	Mongolian Academy of Sciences
20	Institute of Geology	Ulaanbaatar	Mongolian Academy of Sciences
21	Institute of Informatics	Ulaanbaatar	Mongolian Academy of Sciences
22	Institute for Agricultural Science	Ulaanbaatar	Mongolian State University of Agricultural Science
23	Institute of Mathematics	Ulaanbaatar	National University of Mongolia
24	Institute of Linguistics and Literature Studies	Ulaanbaatar	Mongolian Academy of Sciences

No	Name of research institutes	Location	Central administrative body
25	Institute for Insulation Technique and Industrial Ecology	Ulaanbaatar	Ecology Mongolian University of Science and Technology
26	International Institute for Nomadic Civilization Studies	Ulaanbaatar	
27	Institute of Knitting and Textile	Ulaanbaatar	Mongolian University of Science and Technology
28	Institute for International Studies	Ulaanbaatar	Mongolian Academy of Sciences
29	Institute for Veterinary Studies	Ulaanbaatar	Mongolian State University of Agricultural Studies
30	Institute for Culture and Art Studies	Ulaanbaatar	University of Arts and Culture
31	Institute for Strategic Studies	Ulaanbaatar	Mongolian National Security Council
32	Light Industry Research and Development Institute	Ulaanbaatar	Mongolian University of Science and Technology
33	Light Industry Science and Technology "Armono" Corporation	Ulaanbaatar	
34	Medical Science Institute	Ulaanbaatar	Ministry of Health
35	Meteorological Institute	Ulaanbaatar	Ministry of Nature, Environment and Tourism
36	National Center for Legal Studies Ministry of Law and Internal Affairs	Ulaanbaatar	
37	National Center for Distance Education	Ulaanbaatar	Ministry of Education, Culture and Science
38	Nuclear Research Center	Ulaanbaatar	National University of Mongolia
39	Paleontological Center	Ulaanbaatar	Mongolian Academy of Sciences
40	Plant Science and Agricultural Training Research Institute	Ulaanbaatar	Mongolian State University of Agricultural Science
41	Plant Protection Research Institute	Ulaanbaatar	Mongolian State University of Agricultural Science
42	Public Health Research Institute	Ulaanbaatar	Ministry of Health
43	Research Center for Infants	Ulaanbaatar	Ministry of Health
44	Research Center for Fishery	Ulaanbaatar	Mongolian Academy of Sciences
45	Science and Technology Production Corporation of Traditional Medicine	Ulaanbaatar	
46	Social and Economic Research Center	Bayan-Ulgii	Mongolian Academy of Sciences
47	Technological Incubator	Ulaanbaatar	Mongolian Academy of Sciences

APPENDIX D: PRIVATE RESEARCH ENTERPRISES

No	Name of research corporations	Location	Type of research			Field of studies				
			Basic	Applied	Experimental	Natural science	Technology	Agriculture	Medical science	Social science
1	Electronics Machinery Studies Consortium LLC	Ulaanbaatar			√		√			
2	"Mon-enzyme" Biotechnology Institute	Ulaanbaatar	√	√	√	√				
3	Mongolian Lifestyle Scientific Research Institute	Ulaanbaatar	√	√		√				
4	Pharmaceutical Studies Institute "Monos Farm"	Ulaanbaatar	√	√	√	√	√	√	√	
5	Samo institute LLC	Ulaanbaatar		√			√			
6	Science and Technology Production "MonChemo" LLC	Ulaanbaatar	√	√	√	√	√	√	√	
7	Science and Technology Production "Akhnii Anjis" LLC	Ulaanbaatar		√	√		√	√		
8	Scientific Research Production "Shine Ekhlel Tum" LLC	Ulaanbaatar		√	√			√	√	
9	Science and Technology Production "Construction-Architecture" Corporation	Ulaanbaatar		√	√					
10	Water Research and Development Institute			√	√	√		√		

APPENDIX E: RESEARCH UNIVERSITIES

No	Name of universities	Location	Type of research			Field of studies				
			Basic	Applied	Experimental	Natural science	Technology	Agriculture	Medical science	Social science
1	Academy of Management	Ulaanbaatar	√	√	√					√
2	Khovd University	Khovd	√	√	√	√		√		√
3	Mongolian State University of Agricultural Science	Ulaanbaatar	√	√	√	√	√	√		√
4	Mongolian University of Science and Technology	Ulaanbaatar	√	√	√	√	√	√		√
5	Mongolian State University of Education	Ulaanbaatar	√		√	√				√
6	National University of Mongolia	Ulaanbaatar	√	√	√	√	√	√		√
7	Orkhon University	Ulaanbaatar	√	√						√
8	Otgontenger University	Ulaanbaatar	√	√						√
9	University of Humanities	Ulaanbaatar	√	√						√
10	Ulaanbaatar University	Ulaanbaatar	√	√						√

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