MANDAKH RESEARCH

SCHOLARLY INTERNATIONAL JOURNAL

EDITORIAL BOARD

Сэтгүүлийн талаар санал, хүсэлтээ доорх хаягаар ирүүлнэ үү.

МАНДАХ ЭРДЭМ

ЭРДЭМ ШИНЖИЛГЭЭНИЙ СЭТГҮҮЛ

Дугаар 2, 2019

Улаанбаатар
CONTENT

INTERNATIONAL EXPERIENCE OF COUNTRIES PREPARING CONSOLIDATED FINANCIAL STATEMENTS OF THE GOVERNMENT, MONGOLIAN CHALLENGES

Bolormaa Budsuren [1, a] *, Javzandulam Altangerel [2, b]
[1] Senior officer, Accounting Policy Department, Ministry of Finance, Mongolia
[2] National consultant, Strengthening Fiscal and Financial Stability Project (SFFSP) at World Bank, Ministry of Finance, Mongolia
[a] bolormaa_bu@mof.gov.mn , [b] javzaacc@gmail.com

Abstract

Currently, public sector entities applied accounting guidelines and regulations approved by Minister of Finance rather than directly adopting IPSAS. Because accountants of budget entities only use the accounting standards in Mongolian. Such as, IPSAS 1-4, 6, 9, 12-13, 17 and 31 have been fully and partially applied according to a research conducted on accounting guidelines and regulations approved by Minister of Finance among accountants of budget entities and general budget governors. But IPSAS 32-40 have not been fully complied.

However, the researchers confirmed that the accounting guidelines and regulations are based on modified accrual basis and have not been revised since 2007. Also fully and partially

state-owned entities (SOEs) comply IFRS according to the Law on Accounting, it is still theoretical and methodological problem that how to consolidate SOEs into the consolidated financial statements of the government (CFSG).

In 2017, IFAC, Chartered Institute of Public Finance and Accountancy (CIPFA) and the University of Science and Technology have conducted the survey on accounting basis and accounting documents of the Central/ Federal Government Entities of countries. Based on the result, a few countries that representing developing countries and more developed countries were selected as research objects in following common characteristics: i) government, ii) basis of accounting is transferred to accrual or accrual basis, iii) applying IPSAS in directly or indirectly to public sector accounting, and iv) representative of the region.

Regarding the results of the study on consolidated financial statements of the government of some countries, international common practice is avoiding combining the elements of financial statements of a legal entities that uses different accounting principles and accounting basis. In other words, a single set of consolidated financial statements of the legal entities with same accounting policies and principles are prepared.

Based on above mentioned survey, there is a challenge for the current methodology for preparing consolidated financial statements of the government of Mongolia. Therefore, it is important to change the policy decision for fully implementing IPSAS in public sector reporting.

1. ADOPTION OF INTERNATIONAL PUBLIC SECTOR ACCOUNTING STANDARDS (IPSASS) BY COUNTRIES AT THE INTERNATIONAL LEVELS

Government accounting practices are generally classified into four categories, moving from the least to the most sophisticated side of spectrum (PwC Global, July 2015):

Table 1. The spectrum of government accounting practices

Cash accounting	Modified cash accounting	Modified accrual accounting	Accrual accounting
Cash payments and receipts are recorded as they occur.	Cash receipts and disbursements committed in the budget year are recorded and reported until a specified period after year end.	Accrual accounting is used but certain classes of assets (e.g. fixed assets) or liabilities are not recognized.	Transactions and economic events are recorded and reported when they occur, regardless of when cash transactions occur.

Classification in one of the four categories requires judgement and is inevitably somewhat subjective.

In 2017, IFAC, Chartered Institute of Public Finance and Accountancy (CIPFA) and the University of Science and Technology have conducted the survey on accounting basis and accounting documents of the Central/ Federal Government Entities of countries

The survey questionnaire was covered two main issues that are i) accounting basis and ii) financial reporting standards were/will be applied and in preparing the financial statements/reports for the Federal/Central Government for the most recently completed financial year.

The following figures of 1 and 4 show that survey responses of accounting basis and financial reporting adoption by country.
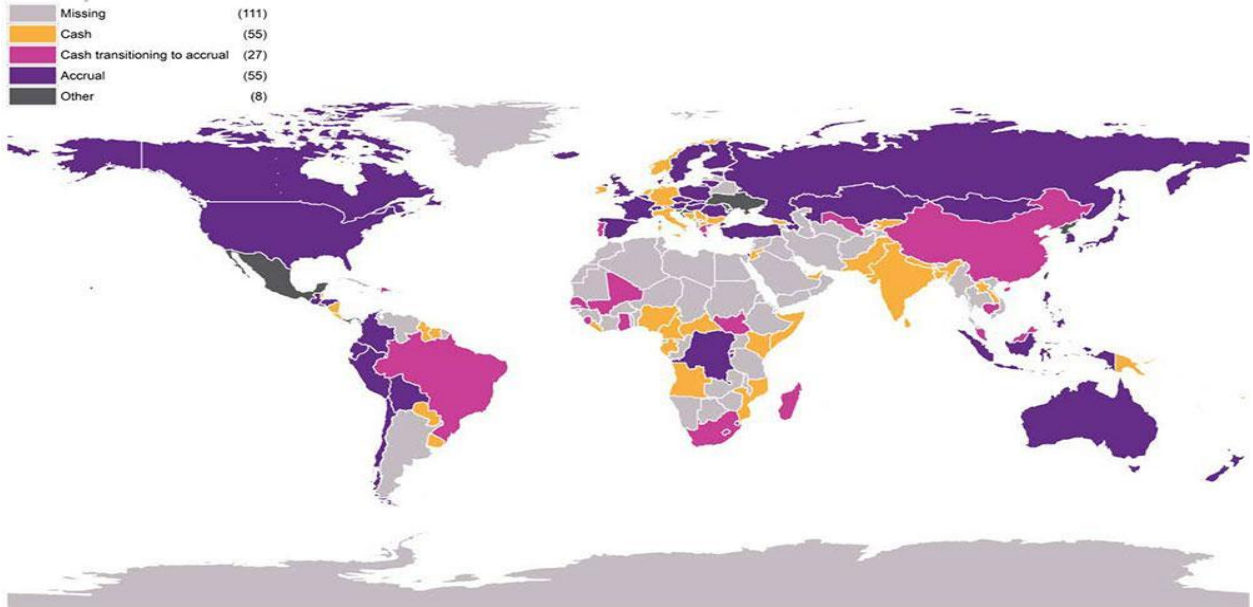
Figure 1. Accounting basis by country

The following figure shows the response of questionnaire of accounting basis by country. Answers from Government of 145 countries were submitted to this issue. Here are the responses given below:
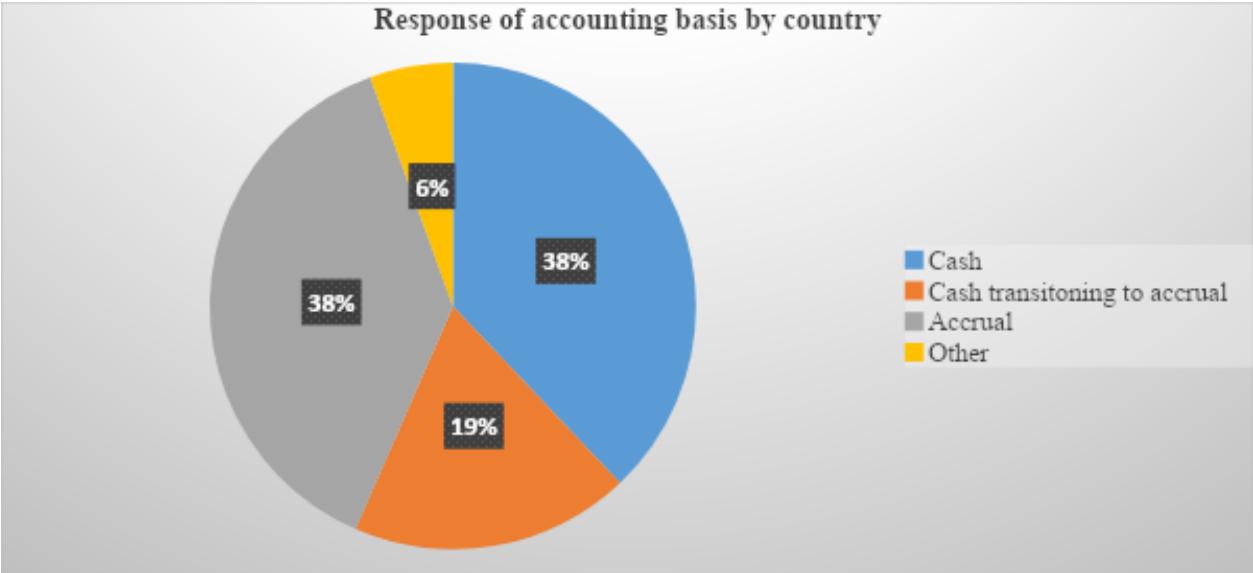
Figure 2 Survey result of accounting basis by country

According to the above survey, if the countries that are moving from cash transitioning to accrual basis to accrual basis will be applied in consolidated financial statements of the government in the future, approximately 60% of the governments will report on its accrual basis.
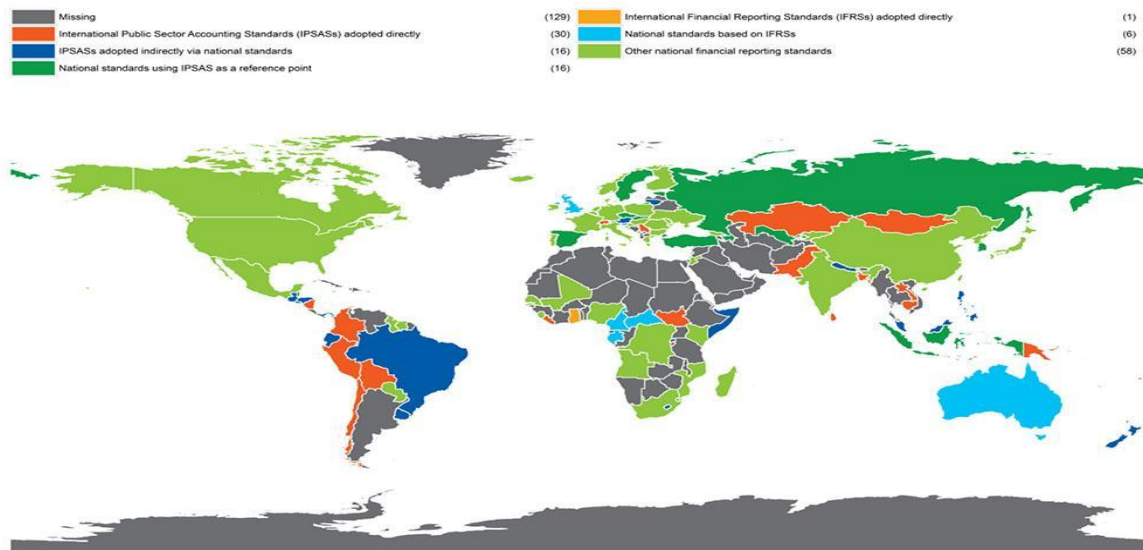
Figure 3. Financial reporting standards adoption by country

Answers from Government of 127 countries were submitted to the 2nd issue. Here are the responses given below:
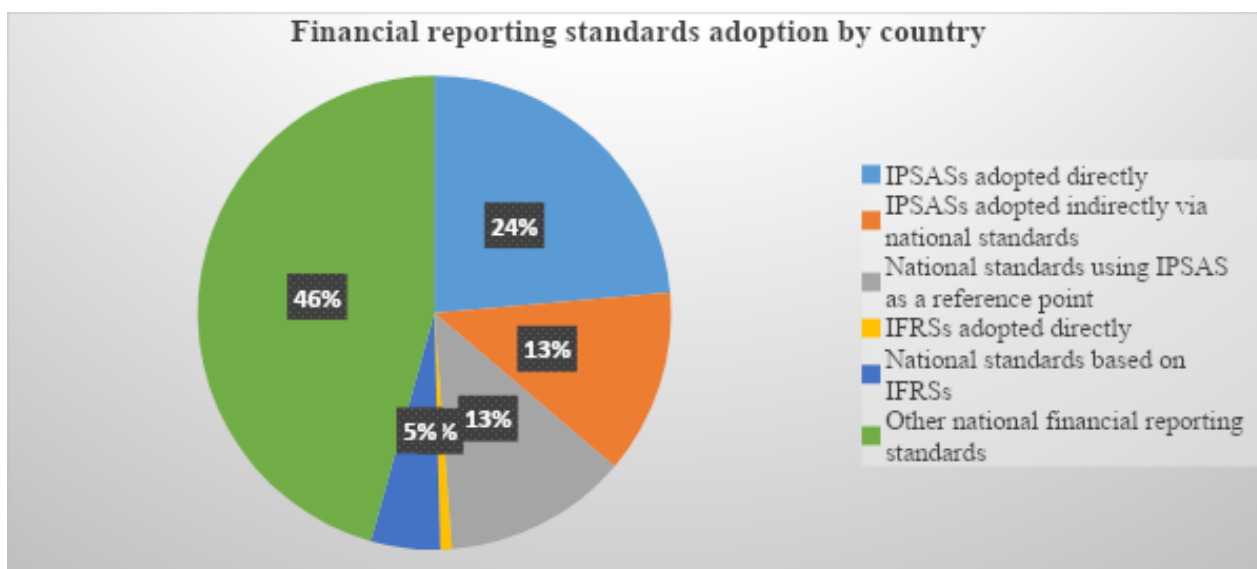
Figure 4 Survey result of financial reporting standards adoption by country

As a result of this surveys, IPSASs have been used in 62 countries as a direct or indirect.

2. THE STUDY ON CONSOLIDATED FINANCIAL STATEMENTS OF THE GOVERNMENT (CFSG) BY COUNTRIES AT THE INTERNATIONAL LEVEL

Based on the results of the above research conducted the implementation status of IPSASs at the international level, we selected some countries (including The South Africa, Kazakhstan, China, Japan, Malaysia, Philippines, Russia and Portugal) from among the developing and more developed countries and Australia, United Kingdom, New Zealand and Serbia/Switzerland to represent the best

9

international practice in a few common characteristics. The purpose of this international study is to compare the condition of Mongolia.

2.1. Selected rationale

The following indicators are based on the selection of countries. These include:
- Governance and administration are closely related to our country;
- The country's development level is similar or more developed to our country;
- Basis of accounting is transferred to accrual or accrual basis
- Applying IPSASs in any way to public sector accounting (directly or indirectly. See the Table 2)
- Representatives of the best regional practice, and
- Information availability

Table 2. Information from selected countries

№	Country	Region	Sub-region	Accounting basis	Financial reporting standards	Government
	Mongolia	Asia	Eastern Asia	Accrual	IPSASs adopted directly	Unitary semi-presidential republic
Selected countries as a research object (general):						
1	South Africa	Africa	Sub-Saharan Africa	Cash transitioning to accrual	Other national financial reporting standards	Unitary dominant party parliamentary constitutional republic
2	Kazakhstan	Asia	Central Asia	Accrual	IPSASs adopted directly	Unitary presidential constitutional republic
3	China	Asia	Eastern Asia	Cash transitioning to accrual	Other national financial reporting standards	Unitary one-party socialist republic
4	Japan	Asia	Eastern Asia	Accrual	Other national financial reporting standards	Unitary dominant party parliamentary constitutional monarchy
5	Malaysia	Asia	South-eastern Asia	Cash transitioning to accrual	IPSASs adopted indirectly via national standards	Federal parliamentary elective constitutional monarchy
6	Philippines	Asia	South-eastern Asia	Accrual	IPSASs adopted indirectly via national standards	Unitary presidential constitutional republic
7	Russia	Europe	Eastern Europe	Accrual	National standards using IPSAS as a reference point	Federal dominant party semi-presidential constitutional republic
8	Portugal	Europe	Southern Europe	Cash transitioning to accrual	Other national financial reporting standards	Unitary semi-presidential constitutional republic
Selected countries as a research object (the best practices):						
9	Australia	Oceania	Australia and New Zealand	Accrual	National standards based on IFRSs	Federal parliamentary constitutional monarchy

1 0	United Kingdom	Europe	Northern Europe	Accrual	National standards based on IFRSs	Unitary parliamentary constitutional monarchy
11	Switzerland	Europe	Western Europe	Accrual	IPSASs adopted directly	Federal semi-direct democracy under a multi-party parliamentary directorial republic
1 2	New Zealand	Oceania	Australia and New Zealand	Accrual	IPSASs adopted indirectly via national standards	Federal parliamentary constitutional monarchy

2.2. Legal entities included and excluded in the consolidated financial statements of the government (cfsg), their characteristics and the structure and content of the cfsg

Information on legal entities included and excluded in the CFSG, their characteristics and the structure and content of CFSG are summarized in the table below. These include:

Table 3. Summary information of CFSG from selected countries

№	Structure and content of CFSG	Methods used for preparing the CFSG
1	**South Africa**	
	Public Finance Management Act (PFMA) requires that the National Treasury (NT) preparing one set of consolidated annual financial statements (AFS) for national departments and public entities. Due to the significant different accounting bases being applied by departments and entities (modified cash and accrual), the Minister has allowed the NT to prepare separate sets of consolidated financial statements (CFS) for departments and public entities respectively. Consolidated AFS is included the following components of statements: 1. Department's Consolidated Financial Statement (modified caash basis accounting) 2. Public Entities' Consolidated Financial Statements (accrual basis accounting) 3. National Revenue Fund's Financial Statements The public entities that are consolidated also include unlisted public entities that are accountable to parliament. **Notable exclusions:** You can see the lists of entities not consolidated but included in the PFMA list from CFS's annexures	Consolidated financial statements of the government consist three statements comprising two separate set of consolidated statements for departments and public entities and National Revenue Fund's financial statement. Because the same accounting principles and policies do not apply, separate sets of consolidated financial statements are prepared by the National Treasury of Minister of Finance avoid the consolidating financial statement's elements in line by line. Method for consoliding line by line or equity method is selected and used for consolidation depending on the characteristic of the included entities in consolidated financial statements of the government and the accounting basis applied for the financial statements.
2	**Japan**	
	A consolidated accounts for (Japanese Government Financial Statement, 2009): 1. A general account 2. 18 special accounts of all the ministries **Notable exclusions:** No additional information is provided.	
3	**Malaysia**	
	The consolidated fund accounts including: 1. Consolidated revenue account	The financial statements' elements of entities invested by the government ownership with voting rights

	2. Consolidated loan account 3. Consolidated trust account	(0.2-100%) other than the main bodies of the government are not consolidated line by line, but their investments are consolidated and reported in the CFSG.
4	**Philippines**	
	A separate combined accounts for: (Annual Financial Report of Republic of the Philippines, 2016) Government owned or controlled corporations (GOCCs) include: ▪ Government Financial Institutions (GFIs) and their subsidiaries ▪ Water Districts (WDs), The Government Accountancy Sector prepares the Annual Financial Report (AFR) that covers financial condition and operation of the GOCCs, including GFIs and their subsidiaries, and WDs, collectively referred to as a Government Corporations (GCs).	AFR for the GCs consists two set of volumes. The first volume is consolidated financial statements that covers entities concerned with the government corporations, and the second volume is consolidated financial statements of WDs. The two separate set of statements are prepared depending on different principles in accounting.
5	**Portugal**	
	Appropriation Statement shows the some following financial information with below categories. These include: (Annual Report, 2016/2017) 1. Administration[1] 2. Legal and Governance[2] **3.** Portfolio Management and Strategic Partnerships[3]	There is no information about methodology for consolidation. But government financial statements show that some financial statements' elements of entities classified by each sector are consolidated.
6	**Australia**	
	Individual consolidated accounts for: 1. Commonwealth (federal) government 2. Each of the six state and two territory governments (e.g New South Wales, Victoria) 3. All local government municipalities **Notable exclusions:** No consolidation for the whole of Australia as a single entity	The country has own Board that approves the national standards. The CFSG is prepared according to the standard #1049 approved by the Board.
7	**United Kingdom**	
	A single set of consolidated accounts including: 1) Central government, 2) All local governments and 3) Public corporations **Notable exclusions:** i) Parliament, ii) National Audit Office[4] iii) Nationalized banks	Accounting system is based on IFRSs.
8	**New Zealand**	
	Consolidated reports for: 1. Central government (including Crown entities and state-owned enterprises) 2. All local government entities **Notable exclusions:** Central government consolidation separate from local government.	
9	**Canada**	
	Individual consolidated accounts for: 1. Federal government 2. Each of the 10 provincial and the three territorial governments (e.g Ontario, Yukon)	Combine like items of assets, liabilities, revenues and expenses in line by line. For this consolidation procedures, eliminate in full intra transactions and

---

[1] Including Ministry, Management, Corporate Services, Chief Financial Officer, Human Resources, Communications, Strategic Planning, Monitoring and Evaluation, Intergovernmental Relations, Internal Audit and Office Accommodation
[2] Including Management, Legal and Governance
[3] Including Energy and Broadband Enterprises, Manufacturing Enterprises, Transport Enterprises, Economic Impact and Policy Alignment and Strategic Partnerships
[4] Excluded to emphasis the importance of Parliament's role in holding government to account and hence it.

	3. All local governments **Notable exclusions:** No consolidation for the whole of Canada as a single entity. Government business enterprises (GBE) excluded	balances of relevant items. In some cases, there are adjustments for consolidation.
10	**Switzerland**	
	Generally, consolidation process is implemented as required in IPSASs because IPSASs are applied in public accounting sector.	

3. CURRENT SITUATION OF PUBLIC SECTOR ACCOUNTING OF MONGOLIA

The most recent IPSASs were issued in 2018 and a total of 40 standards. IPSAS 1-4, 6, 9, 12-13, 17 and 31 have been fully and partially applied according to a research conducted on accounting guidelines and regulations approved by Minister of Finance among accountants of budget entities and GBGs. Public sector entities applied accounting guidelines and regulations approved by Minister of Finance rather than directly adopting IPSAS. (Bolormaa.B, 2018)

It is one of the investors' requirement that the CFSG of Mongolia should be comply with the international standards. Accountants of public sector entities only use the accounting standards in Mongolian. Therefore, the MOF is going to translate the IPSAS as at 2018 funding by World Bank and to introduce the translated IPSAS to the public within 2019. Also, the MOF will train the trainers of IPSAS, strength the capacity of accountants of budget entities about accounting standards through the trainers and develop the regulations and guidelines of public sector accounting and CFSG compliance with IPSAS from 2019 to 2021. Also, ADB will apply accrual-based financial reporting for ADB-financed projects from 2nd quarter of 2019.

However, the researchers confirmed that the accounting guidelines and regulations are based on modified accrual basis and have not been revised since 2007.

The purpose of identifying the current situation and challenges in public sector accounting and consolidated reporting of the government (including the implementation of the guidelines in preparing the CFSG, how well the policy approach is being used, its practical application and difficult in consolidated reporting, the software used by the entity, how well they are compatible with software of other authorities, and the need to improve of the consolidation process in public sector) in practice related to prepare the CFSGBGs and the CFSG, we conducted at two main surveys follow as:

  I.   Review of documents relating to the preparation of consolidated financial statements of the public sector
 II.   Current practice of methodology of consolidation process in public sector
        a.   Interview with 41 staffs of 32 organizations (comprising 26 General Budget Governors (GBGs), one Central Budget Governor (CBG), two Direct Budget Governors (DBGs), three projects/ funds and an audit firm) from 29 June, 2018 to 16 August 2018.
        b.   Questionnaires were prepared in 3 types such as for i) GBGs and CBGs, ii) DBGs, and iii) SOEs and LOEs. As a result, 18 of 18 SOEs and LOEs, 10 of 54 GBGs, and 21 of 21 CBGs, 18 DBG submitted the questionnaires between 13-17 August, 2018.

Currently, the financial statements' elements of legal entities included in CFSG are combined line by line and reported. These are:

Table 4. Some information about applicable regulations of the preparation of CFSG

№	Type of legal entity	Accounting standards	Approved order	Notes

1	Budget entity	IPSASs	Order #388 of the Minister of Finance	Accounting guidelines and regulations are applied in financial statements and approved financial statements' templates of those entities are different from each other.
2	Treasury fund	IPSASs	Order #171 of the Minister of Finance	
3	Project and fund	IPSASs	Order #326 of the Minister of Finance	
4	State-owned entity	IFRSs	Depending on the type of state-owned entities, the following orders are in force: ▪ Joint order #A-294/340 of the Minister of Finance and President of Bank of Mongolia (**for banks**) ▪ Order #361 of the Minister of Finance (**for entities**) ▪ Order #386 of the Minister of Finance (**for NGOs**)	

Regulation for preparing the financial statements of the budgetary entities was approved by Order #388 of the Minister of Finance in 2006 that has been developed in accordance with IPSASs as of 2005. The line items of the financial statements are not consistent with each other and financial statements' formats are different because of differences in timing of the regulations for consolidated financial statements and budgetary entities and the newly accounting standards have not been included in these regulations. It creates uncertainty about whether or not to merge or split any of the line items because the line items and classifications contained in these regulations have not been provide any criteria and definitions.

Fully and partially SOEs and LOEs comply IFRS according to the Law on Accounting, it is still theoretical and methodological problem that how to consolidate SOEs into the CFSG. There are common issues related to elimination entries for CFSG and accounting on consolidation. Such as, i) only the balance sheet and transactions generated between the Treasury and GBGs and CBGs are fully eliminated in consolidated reporting. But the balance sheet and transactions generated between the budget entity, project/fund and SOEs are not eliminated ii) for local GBGs, duplication of transactions between provinces and soums or inter-soums is not eliminated.

It is impossible to get information and conduct research from the financial statements of the SOEs according to the financial reporting form in compliance with IFRS as stated in Article 4.1.1 of the Law on Accounting. Those entities are incorporated in CFSGBGs as stated in article 54.2 of Law on Budget. Therefore, there is necessity to convert financial statements of the SOEs to E-Report system with financial reporting form for public sector.

Accountants face difficulties because the software used for its own activity, other software systems (including E-Report, Freebalance, and Fiscal that used in Treasury and Fiscal Policy and Planning Departments at MOF) require different types of information input. It shows there is no unified policy from the government body and no integration system of those information submitted to the above mentioned soft wares. Therefore, MOF should require and monitor regularly software companies to develop continuously their programs based on the changes of the accounting standards followed by financial reports, instructions from orders by MOF, and E-Report documentaion changes.

Followings are the answers to the questions related to some difficulties between Financial Statement Program and E-report software system:
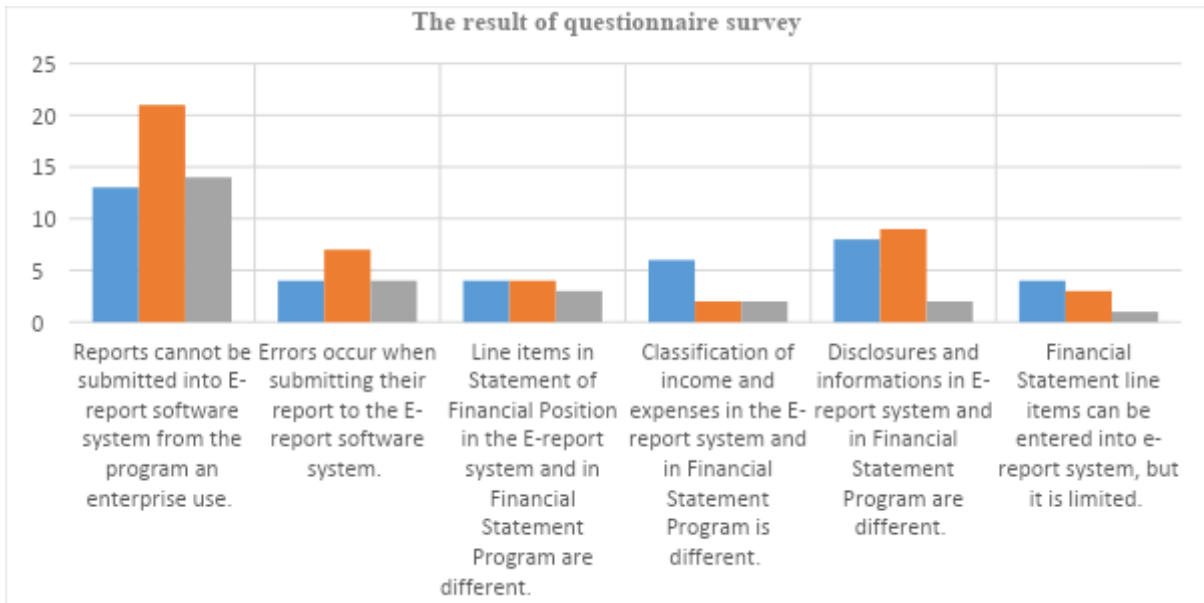
Figure 3 The result of questionnaire survey
Source: Researchers' survey

According to the main survey result, there is no chance for SOEs, LOEs, GBGs, CBGs, and DBGs to download their financial statement to the E-report software system automatically.

4. CONCLUSION

1. Regarding the results of the study on consolidated financial statements of the government of some countries, international common practice is avoided the combining the financial statements' elements of a legal entity that uses different accounting principles and basis in line by line.

2. Instead of that, the content, scope and structure of the consolidated financial statements are vary between them depending on the type of legal entities and government bodies involved in consolidated financial statements of the government by combining the financial results of legal entities that use the same accounting policies and principles and preparing a single set of consolidated financial statements. For countries covered by this study, the appropriate accounting methodologies (e.g. method for combining line by line, equity method) for consolidation process are selected and used depending on legal entities and government bodies included in consolidated financial statements.

3. It is reducing the opportunities of realistic and accurate representation of financial results because of combining financial statements of SOEs with more than 90% in line by line and there is no consolidation for SOEs with less than 90% in CFSG of Mongolia. Therefore, it is important to change the policy decision for fully implementing IPSAS in public sector reporting.

REFERENCE

1. Bolormaa.B. (2018). The Legal Reform Process and Challenges for Accounting and Auditing of Mongolia. International Conference of Accounting, Auditing and Valuation (ICAAV) (pp. 14-15). Ulaanbaatar: Accounting Department of Business School, National University of Mongolia.
2. http://www.fsc.go.kr
3. http://www.kpmg.com
4. http://www.deloitte.com
5. "Mongolia: Public sector financial management performance report". The International Bank for Reconstruction and Development/ The World bank. April, 2015
6. Accounting Policies for the Financial Statements of the Government of New Zealand. 2018
7. Annual Financial Report of Republic of the Philippines. 2016
8. Annual Report. 2016/2017
9. Consolidated Financial Statements of Republic of South Africa. National Treasury. 2017
10. Consolidated Financial Statments of Australia. 2017
11. Federal Consolidated Financial Statements. 2017
12. Federal Government Financial Statement. 2016
13. https://www.ifac.org/publications-resources/ipsasb-staff-questions-and-answers-state-owned-enterprises
14. Japanese Government Financial Statement. 2009
15. PwC Global survey on accounting and reporting by central governments 2nd edition "Towards a new era in government accounting and reporting" . www.pwc.com. (July 2015).
16. Whole of Government Accounts. 2018

THE RELATIONSHIP BETWEEN OWNERSHIP CONCENTRATION AND EARNINGS MANAGEMENT

- Evidence from Mongolian listed firms –

Narantsetseg Amarsanaa[1,a*], Odgarav Tserenchimed[2,b]
[1,2]Accounting Department, Mandakh University, Ulaanbaatar, Mongolia
[a]narantsetseg@mandakh.mn
[b]odko@mandakh.mn

Abstract
The purpose of this study is to examine the relationship between ownership concentration and earnings management of listed Mongolian firms in 2012-2018. Mongolia's soviet era economy was dominated by state-controlled, wide-spread inefficiencies resulting in poor investor confidence. Transition to market economy brought several types of ownership in companies. Therefore, the study focuses on ownership concentration. Proxy of earnings management is defined by discretionary accruals. The ownership is measured by percentage of shareholder's shares. A total of 122

Mongolian listed firms are chosen as a study sample and found that controlling ownership are positively and significantly related to earnings management.

1. INTRODUCTION

Before 1990, Mongolia had a centrally planned economy for seven decades and in 1990 it has transferred to free market economy. Mongolia has only one stock market named Mongolian Stock Exchange (MSE). The Mongolian Stock Exchange was established in 1991 to implement privatization and develop securities market.

In the beginning of 90's, citizens didn't have any knowledge of private property, market economy and money to buy state industries. So, in order to privatize, privatization process used investment vouchers, which consisted of one blue and three pink vouchers. The blue vouchers were used to buy large factories whereas the pink vouchers were used to buy small companies in trade and service. According to the Mongolian Civil Law, all vouchers were distributed to citizens free of charge. Citizens bought shares of large factories with blue vouchers and became its' shareholders. As a result of this process, 475 factories were registered on the stock market. In another words, 25% of large enterprises were privatized by blue vouchers. In this way, the state factories were privatized and changed their ownership status. Although the stock market was established, a secondary market did not develop well until 1995. After 1995, when the second security trading has started, shares were concentrated and held by people who had money, also knowledge on market economy and stock. As a result of the concentration, the companies' function was changed.

I.1. Research purpose

This research mainly focused on to investigate relationship between ownership concentration and earnings management of Mongolian listed firms. Mongolia's soviet era economy was dominated by state-controlled, wide-spread inefficiencies resulting in poor investor confidence. Transition to market economy brought several types of ownership in companies. Therefore, study investigates following: 1) level of ownership concentration 2) ownership concentration and earnings management's relation.

I.2. Research significance

In Mongolia, study on relationship between earnings management and ownership concentration is few. Studies related to corporate governance are few and all of them are conducted in a form of a questionnaire including small number of companies. The research is conducted using six-year panel data of listed companies.

I.3. Research method

The study uses multiple regression analysis to test our hypothesis using listed firms' data from 2012 to 2018. It determines the relation between earnings management and ownership concentration. The research uses discretionary accruals to measure earnings management. Using sample of 122 Mongolian listed companies, the research data are processed by SAS software program.

2. INSTITUTIONAL BACKGROUND

According to the Mongolian Company Law, companies have two main forms: a limited liability company and a joint-stock company. Mongolian company law coordinates joint stock companies, limited liability companies and state owned companies; other types of companies are regulated by another law. According to company law (2011), open and closed company's shares are owned by shareholders, while state-owned company's shares are owned by the state agencies and local administrations. As the end of 2017, 59934 limited, 234 stock and 86 state owned companies that have active operation are registered. Out of these companies, 218 companies are listed on the MSE, of which 188 are open companies stated owned companies and partly state owned companies.

Table1. Number of companies by type

	Form	Number of companies	Listed companies	TOP-100 companies
1	Stock companies	234	188	4
2	State and partly state – owned companies	86	30	7
3	Limited liability companies	59,614		
	Total	59,934	218	11

Table 1 shows that 99.4% of operating as of January, 2018 companies are limited companies. It is obvious from the table that limited liability companies dominate in Mongolia.

In case of Mongolia, ownership structure is very complicated, because shareholder's voting rights include not only his own hands stock, but also stocks owned by his family members, friends and affiliated firms. Multiple ownership types and high ownership concentration is the feature of

Mongolian companies. First, ownership is highly concentrated in Mongolian listed companies. The 2nd phase of Mongolian stock market development is period when this high level of ownership concentration has emerged. 94% of currently listed companies have been established as a result of privatization, and their shares are concentrated in the hands of same family members and friends. Thus, the ownership is highly concentrated. For the first time in December 2015, Financial Regulatory Commission (FRC) announced shareholders owning more than 5% of company shares. Report from The Financial Regulatory Commission shows that ownership concentration was 82.2% on average whereas my research shows 81.8%. It shows that ownership concentration is similar in my research and FRC report.

Table2. Ownership concentration

Concentration	Number of companies				
	Financial Regulatory Commission	Research data			
		Board 1	Board 2	Board 3	Total
5-60% ownership concentration	7	-	2	4	6
60-90% concentration	137	4	22	43	69
More than 90% concentration	49	2	6	39	47
Total	193	6	30	86	122

Table 2 shows comparison of ownership based on the report from FRC and the research data. It shows that this research includes twice less companies with 60-90% ownership.
Excessive concentration negatively affects the market development. Therefore, the Financial Regulatory Commission is taking measures to decrease concentration in companies with over 75% of it. In 2016, out of Mongolian TOP–100 companies, 83 were family owned companies as 80% and more of shares were owned by only three to five people. Dominant role of family and its members characterizes Mongolian ownership structure. Toshio Kikuchi (2011) found out that about 50% of the firms' owners and their families own more than 31% of shares. In other words, around half of listed companies are owned by founders or their family members, and therefore they have the characteristics of a family business. Gedajlovic et al. (2005) divided shareholders into three groups: inside investors, market investors and stable investors. The stable investors consist of insurance companies, banks and affiliated firms.

3. LITERATURE REVIEW

Earnings management issue receives significant attention in accounting research area. Related to previous studies, the study distinguishes following key approaches: ownership structure, institutional ownership, managerial ownership, government ownership and foreign ownership. The study shows a review of the literature on the relationship between earnings management and each aspect of the ownership concentration and in this chapter. Literature review refers to these contrasted results.
-        There aren't many researches on corporate governance and ownership, in Mongolia. However, the existing studies are conducted based on the survey results. Anderson, Korsun and Murell (1999) argued that 20.4% of outstanding shares are held by state, 44.9% - by outsiders, 34.8% - by insiders and their families, 11.0% - by managers in Mongolia. In the beginning, insider ownership did not arise because of preferred shares. Employees had preferred shares. When employees used their vouchers on the stock exchange, the company owners bought those shares. Kanichi Iijima (2011) document that in the founder or his acquaintances engaged in the management

of 69 companies (76%). They were mostly working as president, chairman of the board of directors and director.

- Regarding the negative relationship, Sandra Alves (2012) finds that the quality of annual earnings is increased by managerial ownership and ownership concentration which decrease the earnings management. Also, it suggests that managers owning a major percentage of the equity are less likely to manipulate earnings, while large shareholders decrease managerial opportunism.

- Prior studies show that managers engage in aggressive accounting discretion, when institutional investors are orientated on short term results and have passive monitoring. Bhide (1993) indicates that corporate governance of the firm does not involve active participation of institutional investors. Institutional investors sell their shares when it doesn't bring desirable returns.

- When managers' ownership share increases in a firm, it may be addressed using two hypotheses: managerial entrenchment and alignment of interest. Jensen & Meckling, (1976) identify that increasing managerial ownership decreases agency conflicts of managers and shareholders, consistent with the alignment of interest hypothesis. This reduces the opportunistic behavior of managers. Relating to this, Demsetz & Lehn (1985) discover that firm performance and managerial ownership have positive relation.

- Bauwhede et al. (2003) analyzed the Belgian companies' data and found that state ownership positively influences discretionary accruals, because it incentivizes to manage earnings upward. Both state and private Belgian firms take part in income smoothing and control earnings astutely to meet the target level of previous year income.

4. RESEARCH HYPOTHESIS AND METHODOLOGY

4.1. Research hypothesis

Shleifer & Vishny (1986) state that large shareholders are strongly incentivized to support and influence the company's monitoring management to protect their significant investments. Dechow, Sloan & Sweeney (1996) argue that managerial behavior actions are effectively monitored by large shareholders, which decrease managerial opportunism to participate in earnings management.

Minority shareholders are not interested in a company's monitoring because they do not influence earnings management and company's activity. Therefore, the study suggests the following hypotheses.

H1: The percentage of ownership concentration in the firm is positively related to earnings management, other things being equal. Alternative hypothesis

H2: Controlling shareholders have stronger relation to earnings management than non-controlling shareholders, other things being equal.

4.2. Research model

The study applies following regression research models to test the relationship between ownership and earnings management, with earnings management as the dependent variable and varied types of ownership such as ownership concentration, institutional ownership, managerial ownership, government ownership and foreign ownership and other control variables such as total assets, leverage and return on assets as independent variables. As suggested by previous literature (Klein, 2002; Sloan and Sweeney, 1995; Dechow, 1995), a group of control variables will be introduced to the estimation to control for other parameters that might influence the relation between earnings

management and ownership types. To this extent we will include: size (Size), cash flows from operations (CFO), leverage (Lev).

$$DACC_{i,t} = \beta_0 + \beta_1(OWN) + \beta_2(SIZE) + \beta_3(LEV) + \beta_4(ROA) \quad (1)$$

$$DACC_{i,t} = \beta_0 + \beta_1(MORE) + \beta_2(LESS) + \beta_3(SIZE) + \beta_4(LEV) + \beta_5(ROA) \quad (2)$$

Where:
DACC: discretionary accruals
OWN: percentage of shares held by shareholders, who own more than 5 of shares
MORE: percentage of shareholders, who own equal to or more than 1/3 of shares
LESS: percentage of shareholders, who own less than 1/3 of share
SIZE: the natural logarithm of total assets
LEV: total liabilities divided by total assets
ROA: net income divided by total assets

Measurement of Discretionary Accruals

Davidson et al. (1986) define earnings management as a process of making planned action steps to put earnings level in the limited range of GAAP. Schipper (1989) notes that managers and shareholders interfere external reports to get a private interest. Healy & Whalen (1999) identify that earnings management occurs through using decision on financial reporting and on structuring transaction of changing financial report in order to give stakeholders some misleading information and to influence contractual outcomes.

The study used the Modified Jones model introduced by Bartov et al., (2001) and Dechow et al., (1995) in order to test the association between ownership types and earnings management. I did following steps, to estimate discretionary accruals; the first step of this analysis will be the calculation of the total accruals (TA).

$$TA_{i,t} = \frac{\Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STD_{i,t} - Dep_{i,t}}{A_{i,t-1}}$$

Where:

$TA_{i,t}$: Total accruals

$\Delta CA_{i,t}$: change in current assets

$\Delta CL_{i,t}$: change in current liabilities

$\Delta Cash_{i,t}$: change in cash and cash equivalents

$\Delta STD_{i,t}$: change in debt included in current liabilities

$Dep_{i,t}$: depreciation and amortization

$A_{i,t}$: total assets

t : year index, range from 2009 until 2015

i : firm index, range from 1 to 122.

Following the calculation of the total accruals, the second step of the research methodology will be commented, which is the estimation of the industry specific regression parameters α1, α2, α3 by employing a time-series model for each firm using 7 firm-year observations on the below formula.

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\Delta Rev_{i,t}}{A_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}$$

Where: $TA_{i,t}$: Total accruals

$\Delta REV_{i,t}$: Change in revenue

$\Delta PPE_{i,t}$: Gross property, plant and equipment

$A_{i,t}$: Total assets

ε : Error term

t : Year index, range from 2009 until 2015

i : Firm index, range from 1 to 122.

The third step of the research methodology is calculating nondiscretionary accruals, after estimating the regression coefficients. According to the adjustment of Dechow et al. (1995), the nondiscretionary accruals will be estimated as follows:

$$NDA_{i,t} = \widehat{\alpha}_1 \frac{1}{A_{i,t-1}} + \widehat{\alpha}_2 \frac{(\Delta Rev_{i,t} - \Delta Rec_{i,t})}{A_{i,t-1}} + \widehat{\alpha}_3 \frac{PPE_{i,t}}{A_{i,t-1}}$$

Where: $NDA_{i,t}$: Nondiscretionary accruals

$\Delta REV_{i,t}$: Change in revenue

$\Delta REC_{i,t}$: Change in net receivables

$\Delta PPE_{i,t}$: Gross property, plant and equipment

$A_{i,t}$: Total assets

$\hat{a}1, \hat{a}2, \hat{a}3$: Estimated regression coefficients from formula

t : Year index, range from 2009 until 2015

i : Firm index, range from 1 to 122.

The fourth step of the research design will be performed following the calculation of the non-discretionary accruals. The fourth step is to subtract formula (9) from formula (7) in order to find the discretionary accruals which are the proxy for earnings management as following.

$$DACC_{i,t} = TA_{i,t} - NDA_{i,t}$$

Where: $DACC_{i,t}$: discretionary accruals

$TA_{i,t}$: total accruals

$NDA_{i,t}$: nondiscretionary accruals

Ownership concentration and its measure

Ownership concentration (OWN) is defined as the concentration of the company's shares and expressed as the percentage of the investors who own more than 5% of the company's shares. Zeskhauser & Pound (2015) studied the influence of major investors on the firm's finance decision. Findings show that major investors do not significantly affect firm's capital structure. Also, major investors have an important role in monitoring the management for the benefit of other investors. Large shareholders are motivated to monitor management, because the expenses of monitoring are less than the expected gains, because of their great equity assets. Ramsey & Blair (1993) suggest that high ownership concentration gives opportunity for large shareholders to incentivize screen managers.

Control variables and its measure

Size - measure is transformed by taking the natural logarithm of the total assets of firm.
LEV - measured by total liabilities divided by total assets. Evidence shows that leverage is concerned with accounting choice decision.
ROA is measured by net income divided by total assets. as suggested by Kasznik (1999) and Dechow et al. (1995). ROA is included to control firm's long term development forecasting error on manager's incentive for earnings management. Consistent with Kasznik (1999), ROA is expected to be positively related to DA. ROA is measured as changes in net profits before tax over previous year total assets.

5. DATA

5.1. Sample selection

Sample selection is based on the board firms of MSE. As of 31, December, 2017, 218 companies are listed on the MSE. 9 of those companies are listed on 1st board, 41 – on 2nd board and 168 – on 3rd board. The study selects 2009 as the starting period because data is not available before 2009. The research data is obtained from various resources. First, General information of companies is received from MSE web sites. Second, financial data from 2009-2011 is downloaded from e-balance of Finance Ministry of Mongolia and financial data between 2012 and 2015 is obtained from MSE web sites. Third, share concentration information is collected from Financial Regulatory Commission. All data is collected by hand.

The first sample comprising 1308 firm-years observation for the period between 2009 and 2015 is used to investigate the relation of earnings management and ownership structure. Firms with missing data will be excluded from the sample (80 firms). Ownership concentration data of some firms were not available, so those firms were eliminated from the sample (12 firms). The financial firms (4 firms) such as commercial banks, insurance, investment brokerage, etc. are excluded from the sample, as the nature of accruals for financial firms differs from other firms. (Klein 2002, Park & Shin 2003, Chung et al. 2002) Thus, the study has the initial sample composed of 122 firms. Finally, in order to control the influence of extreme value, dependent variable (DACC) and independent variable (SIZE, LEV, ROA) are 95% winsorized in the empirical analysis. The final sample consists of 732 firm-year observations used to test the hypothesis. The sample selection procedure is shown in Table 3.

Table3. Sample selection

Sample selection procedure	1st board	2nd board	3rd board	Number of firms	Firm-year observation
Firms listed on the MSE	9	41	168	218	1308
Less: continuous data unavailable	2	6	68	76	456
Owner concentration data unavailable		3	12	15	90
Financial firms	1	2	2	5	30
Initial sample	6	30	86	122	732

5.2. Descriptive Statistics

Table 4 provides descriptive statistics of dependent and independent variables. Table 5 presents the mean, standard deviation, minimums and maximums of variables. The mean of earnings management proxy DACC is 0.1928, with a minimum 0.0006 and maximum of 0.4587. The positive mean indicated that DACC is income–increasing. The average of ownership concentration (OWN) is 84.1 percent. Mean of shareholders, who own equal to or more than 1/3 of shares (MORE) is 78.0 percent, whereas mean of shareholders, who own less than 1/3 of shares (LESS) is 22.0 percent. The logarithm of total assets (SIZE) has a mean of 15.1 thousand MNT. Firm's average leverage ratio is 29.6 percent whereas the sample firms are profitable with a mean ROA of 12.1 percent.

Table4. Descriptive statistics

Variable	N	Mean	Std dev	MIN	MAX
DACC	732	0.1928	0.1783	0.0006	0.4587
OWN	732	0.8408	0.2863	0.1130	1.0000
LESS	732	0.2203	0.1118	0.1130	0.3303
MORE	732	0.7797	0.3725	0.4000	0.1000
SIZE	732	15.1427	2.3675	9.1951	21.2472
LEV	732	0.2961	0.3204	0.0004	1.7575
ROA	732	0.1214	0.0808	0.0000	0.3110

5.3.Correlation test

Table 5 reports Pearson correlation coefficients for the research variables. Earnings management proxy DACC is negatively and significantly correlated with shareholders who held less than 1/3 of shares (LESS) at 1% levels with coefficient -0.1614 respectively. Moreover, DACC has significant positive relation to ownership concentration (OWN). Control variables LEV and SIZE are positively and significantly related to earnings management at 1% levels. Control variable ROA is positively, but insignificantly related to DACC. The correlation coefficients indicate that serious multicollinearity problem do not exist.

Table5. Pearson Correlation coefficient

	DACC	OWN	LESS	MORE	SIZE	LEV	ROA
DACC	1						
OWN	0.2358* 0.0001	1					
LESS	-0.1614*** 0.0037	-0.6924*** 0.0001	1				
MORE	0.2297** 0.0001	0.9763*** 0.0001	-0.8322*** 0.0001	1			
SIZE	0.1120*** 0.0024	0.3787*** 0.0001	-0.2558*** 0.0001	0.3678*** 0.0001	1		
LEV	0.0978*** 0.0081	-0.0740** 0.0453	0.17660821*** 0.0262	-0.1098** 0.0029	-0.1866*** 0.0001	1	
ROA	0.0449 0.2250	0.0750** 0.0424	-0.1382*** 0.0002	0.0991*** 0.0073	0.0625* 0.0911	-0.0349 0.3458	1

Note: *, ** and *** indicate significance at 10%, 5% and 1% level, respectively

6. EMPIRICAL RESULTS

Table 6 provides regression results for equation (1) and (2) for the full sample. Model 1 shows the association between ownership concentration and the earnings management. The coefficient on ownership concentration (OWN) is positive (0.13983) and significant at less than the 1% level (5.81, p= 0.0001). So, the percentage of shareholders who own more than 5% of shares have significant positive association with earnings management. The result supports the hypothesis1. It means that the greater share concentration results in higher level of earnings management. This finding matches to research results of Yeo et al. (2002), Chung et al. (2002), DeFond & Jiambalvo (1994) and Koh (2003) that block owners have significant role in monitoring earnings management activities and agency costs.

Table 6, model 2 shows the association of controlling and non-controlling shareholders with earnings management. The coefficient on MORE is positive (0.12987) and significant at less than the 1% level (4.00, p=0.0001). Shareholders who held equal to or more than 1/3 of shares have significant positive relation to earnings management. Moreover, the coefficient on LESS is positive (0.09289), but not significant (0.88, p=0.3787). The results support the hypothesis 2. So, controlling shareholders manage earning more intensely than non-controlling shareholders. Findings show that there is an affiliation with strategic significance between controlling and other majority shareholders or there is a conspiracy between them. In other words, controlling shareholders are interested in increasing their firm value than non-controlling shareholders. This result is compatible with the views of Claessens et al. (2002). When there is collusion of controlling shareholders with other shareholders, the controlling shareholders voting rights are further magnified through pyramid structures and cross-holdings. So, the degree of earnings is manipulated upwards.

Table6. Model 1 and model 2 regression result

Variables	MODEL 1		MODEL 2	
	Coefficient	t-statistic (p-value)	Coefficient	t-statistic (p-value)
Intercept	0.05651	1.26 (0.2077)	0.08004	1.75* (0.0806)
OWN	0.13983	5.81*** (0.0001)		
MORE			0.12987	4.00*** (0.0001)
LESS			0.09289	0.88 (0.3787)
SIZE	0.00365	1.24 (0.2172)	0.00371	1.25 (0.2104)
LEV	0.06930	3.42*** (0.0007)	0.07097	3.45*** (0.0006)
ROA	0.06475	0.82 (0.4131)	0.06045	0.76 (0.4482)
F test :	14.08 (0.0001)***		11.29 (0.0001)***	
R^2 :	0.0719		0.0721	
Ad R^2 :	0.0668		0.0658	
N :	732		732	

Note: *, ** and *** indicate significance at 10%, 5% and 1% level, respectively
Model:

$$DACC_{i,t} = \beta_0 + \beta_1(OWN) + \beta_2(SIZE) + \beta_3(LEV) + \beta_4(ROA) \quad (1)$$

$$DACC_{i,t} = \beta_0 + \beta_1(MORE) + \beta_2(LESS) + \beta_3(SIZE) + \beta_4(LEV) + \beta_5(ROA) \ (2)$$

7. CONCLUSION

The purpose of this research is to examine the relation between ownership concentration and earnings management in Mongolian listed companies. Using a sample of 122 listed companies in the period from 2009 to 2015. The study presents following findings. The high controlling ownership concentration is related to powerful earnings management. When controlling shareholders manipulate earnings, stock return of minority shareholders decreases. In other words, study suggests that controlling shareholders disregard interests of minority shareholders by managing earnings. Minority shareholders' rights are not secured in Mongolia.

This research has been subject to several limitations, which will be discussed below.

1. 50% of companies listed as the end of 2017 included in the research and results of the research are limited by 2015. Important economic events of 2016 such as economic transparency law do not influence research results.

2. Research includes only 2 companies that did IPO, so, the results suggest whether there is association between ownership and earnings management in companies which surfaced as a result of privatization. Companies that launched IPO have limited results.

3. The explanatory power of the model can be limited by the absence of other variables that can interact with earnings management, but are not included in these models.

REFERENCE

1. Gedajlovic, E., T. Yoshikawa & M. Hashimoto (2005), "Ownership Structure, Investment Behavior and Firm Performance in Japanese Manufacturing Industries", Organization Studies, Vol.26, No.1, pp. 7–35.
2. Bhide, A. (1993), "The Hidden Costs of Stock Market Liquidity", Journal of Financial Economics 34, pp. 31-51.
3. Jensen, Michael C., and William H. Meckling (1976), "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", Journal of Financial Economics 3.4: 305-360.
4. Shleifer, A., & Vishny, R. (1997), "A Survey of Corporate Governance", Journal of Finance, 52, 737–783.
5. Klein, A. (2002), "Audit Committee, Board of Director Characteristics, and Earnings Management", Journal of Accounting and Economics, Vol. 33, No. 3: pp. 375-401
6. Chung, R, Firth M & Kim, J-B (2002), "Institutional Monitoring and Opportunistic Earnings Management", Journal of Corporate Finance, vol.8, pp. 29-48.
7. Park Y. W. & Shin H. H. (2003), "Board Composition and Earnings Management in Canada", Journal of Corporate Finance 10(3), pp. 431-457.
8. DeFond, M.L., and Jiambalvo, J. (1994), "Debt Covenant Violation and Manipulation of Accruals: Accounting Choice in Troubled Companies", Journal of Accounting and Economics, Vol. 17, No. 1/2: pp. 145-176.
9. Koh, P. S. (2007), "Institutional Investor Type, Earnings Management and Benchmark Beaters", Journal of Accounting and Public Policy, Vol.26, No.3, pp. 267–99.
10. Kanichi Iijima (2011) "Actual corporate conditions in Mongolia: An investigation into Corporate Governance of Ulaanbaatar listed companies"
11. Sandra Alves (2012) "Ownership Structure and Earnings Management: Evidence from Portugal" Australasian Accounting Business and Finance Journal, Volume 6 Issue 1

12. Jensen & Meckling, (1976) "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure" Journal of Financial Economics, October, 1976, V. 3, No. 4, pp. 305-360
13. Demsetz & Lehn (1985) "The Structure of Corporate Ownership: Causes and Consequences" Journal of Political Economy, Vol. 93, No. 6 (Dec., 1985), pp. 1155-1177
14. Bauwhede et al. (2003) "Earnings management in Belgium: a review of the empirical evidence", Research gate, January 2003
15. Dechow, Sloan & Sweeney (1996) "Causes and Consequences of Earnings Manipulation: An analysis of firms subject to enforcement actions by the SEC", Contemporary Accounting Research, Spring 1996
16. Zeskhauser & Pound (2015) "Does Ownership Structure Affect Jordanian Companies' Tendency to Practice Earnings Management?" Asian Journal of Finance & Accounting ISSN 1946-052X 2015, Vol. 7, No. 2
17. Healy & Whalen (1999) "A review of the earnings management literature and its implications for standart setting" Kelley School of Business, Indiana University, Bloomington, IN 47405-1701, 1998
18. Kasznik (1999) and Dechow et al. (1995). "Jones, dechow and kasznik models significance in the romanian economic environment" Annales Universitatis Apulensis Series Oeconomica, 12(1), 2010
19. Kasznik (1999), "On the Association between Voluntary Disclosure and Earnings Management" **Journal of Accounting Research, Vol 37, No 1, Spring 1999**

IMPLEMENTATION ISSUES OF INTEGRATED REPORTING

Choigunsen Chimidsuren[1a]
[1]Director General, Department of Accounting Policy, Ministry of Finance
[a] chimidsuren_ch@mof.gov.mn

Abstract
Integrated reporting aims to integrate financial and non-financial information and provide a concise overall value of the organization in complete picture. In practicum, this practice is early stage of development. There are doubts among many companies about what an integrated reporting is, what significance it has, and how to report it. These areas were discussed during 2014 Global Accountants' Forum (Italy), 2015 Asia-Pacific Accountants International Conference (Korea), 2018 International Integrated Reporting Councils and the Corporate Governance International Conference (Japan). During these conferences and meetings, the pioneers of the initiative, representatives of coordinating organizations, and researchers, based on their research studies, analyzed the current situation of the integrated reporting and how some countries are implementing it in the world.

1. INTRODUCTION

Nowadays, the primary purpose of any business entity is no longer only for profit-seeking, and on the top of the company's economic and financial benefits, they seek ways of running

environmentally friendly business activities, bring positive changes in surrounding environment, practice social responsibility, and emphasize sustainable development. In this regard, an integrated reporting on the company's financial statements, governance, business model, society, environment and perspectives is high in demand in the society. This demand comes from all interested parties, including investors, regulators, suppliers, consumers and employees (KPMG 2013). In the past, the financial statement report has showed only the financial position of the company, but today's integrated reporting provides a comprehensive overview of the company's value in bigger picture. Integrated reporting enables the company's strategy to be more transparent and creates stability of the company's business model. In recent years, demand for transparency is still increasing, but in the United States, Australia and Japan, only handful of companies develop integrated reporting (IIRC 2016). In Japan, 385 companies develop integrated reporting (ICGN-IIRC Conference 2018). In Russia, 166 companies report their non-financial information (rspp.ru/simplepage/157. 2017).

2. WHAT IS INTEGRATED REPORTING?

The International Integrated Reporting Council (IIRC) is a global coalition of regulators, investors, companies, standard setters, the accounting professions such as the International Federation of Accountants (IFAC), Global Reporting Initiative (GRI), and Prince's Accounting for Sustainability Project (A4S). The coalition is led by Professor Mervin King. Reporting the value creation should be the next evolution of the company's reporting (IIRC 2015). The IIRC is a "An integrated report is a concise communication about how an organization's strategy, governance, performance and prospects, in the context of its external environment, lead to the creation of value in the short, medium and long term" (IIRC 2015). The integrated report aims to integrate non-financial information on environmental and social performance with traditional financial information. Non-financial information creates business value in integrated reporting. Integrated reporting has been a lever to change the traditional reporting (Hoppman 2014). This report demonstrates the value of financial capital, manufactured capital, intellectual capital, human capital, social relationship capital, and the use of natural capital and its growth and decline. If the integrated report is fully implemented, it can bring the comprehensive picture of the company to investors and all other interested parties. There are many different types of reporting templates. Therefore, companies face difficulties with how to report their financial and non-financial information. The traditional annual report contains small portion of non-financial information. However, non-financial reports (governance reporting, social accountability reporting, greenhouse gas emissions reporting, extraction reporting, transparency reporting, etc.) tend to focus on a particular issue. Integrated reporting includes non-financial information to report business strategies; therefore, it plays a role of bridge between multi-stakeholders. Annex 1 and Annex 2 show seven different types of reports. These include Annual Financial Report, Integrated Reporting, Social Accountability Report, Greenhouse Gas Emissions Report, Sustainability Report, Governance Report, and Transparency Report of Extractive Industries.

3. ACCEPTANCE OF INTEGRATED REPORTING

Up until now, the only country that all its open companies develop integrated reporting is the Republic of South Africa. It is agreed that it is vital to create synergy for the companies of the above mentioned country when defining their business model while developing their integrated reporting (Roberts 2014). In the United States, integrated reporting is in the early stages of development, for

example 51 per cent of the top 100 companies incorporate financial and non-financial information into their annual reports. This is done for a specific purpose (KPMG 2013). This form of integration is a step towards preparing further integrated reporting. In Japan, over the last 5 years, some companies have already undergone this experiment (ICGN-IIRC 2018). However, with the framework of the IIRC, it does not show a complete picture of the company's business. About 5 percent of companies that report their corporate social responsibility develop their integrated report consistent with the IIRC concept. The research illustrates that the companies that develop integrated reporting, 71 percent of the companies in Asia and 73 percent of the companies in Europe have already begun to develop certain non-financial information in their reporting. In addition, stock exchanges in Republic of South Africa, Brazil and Australia have started recommending their companies to develop integrated reporting (KPMG 2012). The IIRC concept was formally adopted which creates an environment that supports the rapid development of integrated report in these regions and in other countries. It is, therefore, important to understand the concept of integrated reporting and its reporting process.

4. FIRST IMPLEMENTER – REPUBLIC OF SOUTH AFRICA (RSA)

History of the Integrated Reporting of South Africa is in the prime attentions of researchers. In fact, South Africa is home to an integrated reporting. The 2008 economic crisis proved that traditional annual reports of companies could not meet the needs of future stakeholders. The King III code accepted the distrust of public to businesses and it offered to provide information on financial and stability in a more integrated manner. Moreover, King-III code has provided a recommendation of "report or explain". Afterwards, the companies listed on the Stock Exchange were required to submit an integrated report. Since 2010, companies were required to develop integrated reports and in the case of not reporting, they have to explain the reason of not developing the integrated report. Now, the recommendation "Report or Explain" is in line with countries like Brazil, South Africa, Japan, Denmark and Australia (ICGN-IIRC Conference 2018).

Why has Integrated Reporting been brought to the center of attention?

Researchers and analysts have been discussing the importance of this report in recent years. The aim of the report is to integrate the environment, social and governance information with traditional annual reports. It also creates the internal and external benefits of the organization. It also recognizes and accepts the company's integrity and external and internal reports send information on the value of the company to its customers. It creates a possibility of gaining information that contributes to cost reduction by increasing the flow and quality of internal information and communication and create value. On the external side, it provides information on real value of the company to its current and future investors and all other interested parties. It could be concluded that Integrated Reporting is a big step forward and a new step in the reporting revolution. In the future, it will be a big step forward in building a business that will integrate business complexity and social significance into business and creating tools that are required to understand, manage, and measure the business.

Internal and external efficiency of integrated reporting

Internal. From the discussions and researches of regulators, speakers, and researchers, it was found that there are many benefits for internal efficiency. First, better understanding of value creation is

helpful in decision making. The study of IIRC, EY and KPMG also proven this. Innovation and learning attitude will become a cornerstone. Non-financial reporting is also a fundamental guide to the company's operations. Second, Integrated reporting will start when inter-departmental collaboration, understanding, and coordination are emerging. Integrated reporting allows companies to bring their issues together and work together. Third, the integrated report will improve the measurement.

External. Integrated reporting is a simplified reporting about the company value. During a number of international conferences, experts and researchers are discussing the application of integrated reporting, including shareholder decisions, law regulations, measurement indicators, reporting templates, and regulations of regulators. This reporting is used to communicate with many interested parties, such as current and future employees, partners, board of directors, regulatory organization, and so on. In other words, first, it reports the company's value. It also provides information on the company's financial value, production, and growth and decline of intellectual, human, social, and natural capital. Second, interested stakeholders and parties shall provide comprehensive information on the same time.

5. CONSIDERATIONS OF TRANSITION PERIOD TO AN INTEGRATED REPORTING:

5.1. Develop a unified and common ideas and thinking

Integrity creates stimulation in business processes. Integrated and unified thinking refers to the relationship between business operations and individual entities. It reduces the separation of departments and provides completeness and wholeness in business. Integrated and unified thinking brings many internal benefits. For example, it considers the value of business within the business model and preparing and developing integrated reporting improves state of the company and its reporting. Different reports are not important, but simplified and concise reports attract consumers and interested parties. Integrated concepts can run deep in the company's future activities, so the information can flow freely between departments, management decisions, and external reporting.

Usage and application of available guidance
The future trend of integrated reporting will be its common application among business for reporting. Application and concepts of a comprehensive reporting process illustrate the process to compare, to be compared, and develop trustworthy relations among investors. These comparisons and trustworthiness can be easily implemented and applied. The integrated report being voluntary make it not feasible to compare and compile. The IIRC believes that the most important means of achieving a consistent reporting is the principle of an integrated reporting. The principle will be the main guide for the dissemination of knowledge and information of integrated reporting. The principle of the integrated reporting seeks to report, measure, examine, and verify the information and data. In the future, the implementers of the integrated reporting should develop the integrated reporting principles as a general standard. (ICGN-IIRC Conference 2018)

5.2. Use of concise information

Integrated reporting is a new concept corporate reporting. Consequently, reaching the unified understanding on the information pertaining to an integrated reporting has been one of the challenges faced in the development stages of integrated reporting process. Concise data and information is essential for internal and external decision-making. Gathering concise and accurate information and data for integrated reporting is an endless process that requires time and effort. Information and data about future trend is more comprehensive than traditional data and information. Non-financial information is very messy, poorly regulated and enforced.

5.3.Understanding the consumers

A person in charge of preparing the integrated report should be well aware of who will use the report. The principle of IIRC integrated reporting seeks to present how the value of a company is created. Interested parties include investors, consumers, suppliers, employees, state and professional regulatory organizations, land owners, etc. With the release of integrated report, there is external efficiency of creating a multi-faceted relationship with current and future investors, customers, and consumers. Consumers and interested parties receiving required information and data creates possibility of defining the scope of the report. By reporting these interested information, it ensures customer satisfaction, meet the requirement and needs, and make decisions. To integrate financial and nonfinancial information to create value, an active relationship is vital. Therefore, an integrated reporting allows investors to make their decisions optimally.

5.4.Matters related to validation and verification of reliability and validity

The integrated report is new concept. Therefore, the issue of verification has just started. It would require time for voluntary verification. The validation and verification this reporting will take some time, but it is important that it is accurate, trustworthy, and reliable. Two issues related to integrated reporting verification. Firstly, the reports and researches reveal that there is a large variation in the data validation. There are many other validators who may be involved with the financial reporting validation. The availability of specialized professionals for the integrated report is still developing (ICGN-IIRC Conference 2018). Second, there is no standard for validation and verification. There is also a combined verification and validation. Causality validation and verification uses audit techniques. Limited validation does validation during the process.

Integrated reporting process

The IIRC constitutes information database of companies's reports, data, and information of the companies that develop their reports using integrated reporting. Currently, over 100 companies in different fields from over 40 countries are involved in experimental programs. The information database can be a leverage and support to companies that are first-time developing integrated reporting as well as companies that want to improve their reports.

Where are we heading

After analyzing and evaluating the research and presentation of international conferences, speakers and coordinators mentioned above, it could be concluded that integrated report is contributing to creating company value. This is confirmed by the major changes in business modeling and reporting. It is a fact that non-financial information that generates value is accepted and recognized. Integrated report is a mean of expressing unity. The integrated report has future of becoming an official report.

Here is a summary of the integrated report for our country (Mongolia):

1. There is no common understanding of integrated reporting. In other words, the concept of integrated reporting is very poor among all parties, such as society, the public, policymakers, legislators, investors, and all other parties.

2. State-owned and private companies make various reports that are unrelated and poorly coordinated at different times. These are usually financial statement reports. However, these reports include limited non-financial information such as governance, society, environment and sustainability. However, the public wants companies to make their values transparent, open and accountable way of reporting, and run socially and environmentally-friendly businesses.

3. The reports they developed do not fully report financial, industrial, intellectual, human, social, and natural capitals that are vital components to the value of the company. Most of our business organizations have a profit-driven business model. In other words, there is a lack of business model based on modern innovation and business value.

4. Legal environment for registration, measurement and reporting is inadequate and the role of government and professional regulators is lacking.

Therefore, it is proposed to adopt and implement the "National Program on the Integrated Report". This creates a possibility of implementing multi-stage activities such as conducting research, raise awareness, conduct baseline study engaging investors, open companies, and all consumers, define implementing stages, establish legal environment, establish state and professional regulators, and engage piloting companies.

REFERENCES

1. www.integratedreporting.org
2. www.icgn.org
3. http://www.wcoa2014rome.com/
4. http://www.capa.com.my/19th-capa-conference-a-success/
5. https://www.icgn.org/events/icgn-iirc-tokyo-conference-2018
6. IIRC 2013 The International Integrated Reporting framework
7. IIRC 2014 Realizing the benefits: The impact of integrated reporting
8. IIRC 2015 Integrated reporting
9. Ernst&Young 2013 EY's excellence in integrated reporting
10. KPMG 2013 Integrated reporting in practice: The South Africa story
11. 2014 Global Accountants' Forum (Italy)
12. 2014 World Congress of Accountants (Italy, Roma)
13. 2015 Asia-Pacific Accountants International Conference (Korea),
14. 2018 International Integrated Reporting Councils and the Corporate Governance International Conference (Japan)
15. 2018 World Congress of Accountants (Australia, Sydney)

THE EFFECT OF VALUE-ADDED TAX REFORM ON THE ENTITY INCOME AND EXPENSE REPORT

G.Chuluuntsetseg[1a], Ch.Davaasuren[2b] T.Bolor-Erdene[3c]
[1,2,3]School of Economics and Business, Mongolian University of Life Science
[a]chuluuntsetseg.g@muls.edu.mn, [b]davaasuren.ch@muls.edu.mn, [c]bolor-erdene.t@muls.edu.mn

Abstract

Value-Added Tax (VAT) is a type of tax that is of great value to the budget of Mongolia. In this study we aim to see whether VAT reforms can contribute to reducing the hidden economy, based on income and expense report of companies. As a result of estimating the fixed effect model using the difference-in-difference method, on the tax statement of 178 companies in 2015-2018 operating in Sukhbaatar district, the sales revenue of small businesses increased by an average of 102,833.9 thousand togrogs, which resulted in a reduction in the hidden economy. In addition, the sales of small enterprises with VAT payers increased by 135 million MNT in average, while sales revenue of small businesses, not the VAT payers, was lowered due to the citizens prefer to serve VAT payer companies to participate in the lottery.

Key words: VAT reform, hidden economy, reporting, difference-in-differences

1. INTRODUCTION

Tax is a payment for the benefit of social wealth and obligation for all society, with its help regulating the economy, redistributing revenues and providing equality. (Altanzaya, 2016).

In countries with over-dependence on natural resources and weak economic growth, tax revenue can be taxed by the state budget through tax policy, improving the structure of the economy, supporting other sectors, increasing investment and creating jobs through the improvement of taxation and the enforcement of tax laws.

For this reason, the Parliament of Mongolia and the Government of Mongolia have adopted a revised version of the current VAT value (VAT) law on promoting economic growth with tax policy, ensuring a fair and equitable tax regime, and international standards date of January 9, 2016 (General Department of Taxation - GIA, 2015).

The VAT law aimed at exposing the hidden and hidden income through the introduction of registration systems and consumer systems into the VAT base constituting 17-31 percent of the state budget's tax revenue is 17 to 31 percent.

It is necessary to recognize the hidden economy. There are few econometric approaches to government policy impacts in our country, and our research has the advantage of being the first work on this subject.

This article consists of four parts: the first part is the research review, the second is the data, the third is the survey methodology, the fourth is the evaluation, and finally the findings and conclusions.

2. RESEARCH REVIEW

There are many research works related to the VAT that constitute 17 to 31 percent of Mongolia's tax revenues. They have studied a number of aspects of VAT reporting, reducing the burden, improving the baseline, coverage and monitoring. For example, Gantulga et al. (2010) see that VAT is a reduction in the hidden economy by eliminating corporate entities or entities (ACBs) from preparing one or more accurate financial statements, as a reliable source for collecting tax-free tax information, etc. He emphasized that this was a related tax and that there was a need to improve VAT as a proper structure, organization and proper system that would be in the interest of all entities involved in tax relations. To this end, methods such as raising the VAT threshold, allowing citizens to get a refund of the VAT paid for goods purchased once a year, and applying a reduced tax rate on some consumer goods and services to reduce the tax burden on the poorest part are needed.

Darisuren (2013) explored the possibility of raising the VAT threshold by random sampling of 200 taxpayers, and raising the threshold by collecting and analyzing information by the questionnaire method reduced the number of VAT payers and the VAT income, but the corporate income tax (CIT) - has a positive effect on revenue.

Puntsag (2014) analyzed data from taxpayer's registration, refunds, and accounting reports, and selected ways to address the problematic problems. The data collection was collected by observers and interviews by 100 active accountants from active organizations. There is a tendency to keep the registration of fraudulent VAT records and keep records for non-legal purposes. The current situation of the VAT implementation complies with the taxpayer registration thresholds, but does not require registration, fraudulent, and problem-solving issues, as well as issues that need to be addressed in detail.

Sukhee (2014) states that the enforcement of the VAT Law has caused a great deal of conflict between the taxpayer and the tax authorities, and that this situation is likely to continue. The

violation has led to the fact that most taxpayers, especially small taxpayers and citizens, did not have a proper understanding of the VAT, some of the current provisions of the law were inadequate, and the rioters used the law to violate thousands of taxpayers. the Minister of Justice and the Supreme People's Court of Appeals, and their personal proposals to change the provisions of the law and the provisions of the law.

Undarmaa (2016) Recognizing that the VAT registration report is causing conflicts between taxpayers and tax authorities and determines that entities are unable to record tax laws and standards in the matter, the IAS 12 "Income Tax" and have the potential to be regulated according to.

Unumunkh (2017) graphically illustrates the current VAT trend in Mongolia and uses dashboards based on corporate data to analyze the possibilities and ways to improve controls with the use of information technology systems in force with the adoption of a new law. The collected statistics show that Mongolia's VAT has been found to be a relatively effective tax compared to the tax levy and levy, and that the VAT reward system is important to other taxes. In the future, the tax duty of the consumption tax will continue to grow in the future of the tax system in the future, and it is necessary to study it carefully and to develop it without changing its core structure and propose further refinement of the current VAT system through the dashboard.

Enkhsuren et al. (2017) intends to determine whether government can solve the VAT invasion, hide income and tax evasion through the end user using the electronic payment system system and improve tax education for citizens and procure documents for goods and services e -apparing that the typing lever on the paper is increasing VAT revenue. On the basis of this conclusion, the withdrawal of the lottery for the VAT payers has been refined, raising the return of 20 percent and promoting the final productions of small and medium-sized producers for export products.

Khishigbayar et al (2017) Although VAT revenues have been raised by the adoption of the revised VAT law, the tax revenue has been increasing significantly, but there is a lack of electronic payment receipts for consumers in some markets, markets and shops. disregarding the principles and negatively affecting the implementation of the law and providing discounting to companies for equipment and software, stabilizing tax training hood education proposes to enter into a required general education courses and universities.

3. NUMERIC FACTS

According to official sources, the revised tax law is characterized by the introduction of a new electronic registration system, e-barimt, which provides a legal environment for a business-friendly and equitable competition environment by reducing income disputes, reducing tax evasion and escaping disputes, and also incorporating VAT into that system. By providing incentives to registered citizens once a year, citizens will be able to request large numbers of e-mails from purchases of services from large and small-sized enterprises, and has been identified as useful for controlling taxpayers' participation in the law, improving taxpayer registration and control systems, and exposing the hidden economy. The share of the state budget revenue is shown in Table 1.

The law enforcement entrepreneur enters 38,825 taxpayers and legal entities using standardized registration machines and sends information to the settlement registration system, while the VAT increases the threshold for registration, but the sales revenue amount is 2,708 taxpayers registered as a new VAT GIA).

As VAT tax regime improved and the number of registered business entities increased, VAT revenue amounted to 553.2 billion MNT in domestic goods during the previous year, which has increased by 70 billion MNT compared to the 2015 performance. Also, in 2016, a taxpayer

granted a 3.6 billion tugrug lottery bonus (GIA) through 19 draws by registering as a consumer in the electronic payment document system.

Table 1. VAT tax revenue, share in state budget, in million MNT

Year	Total revenue and grants	Tax revenue	VAT tax	Percentage of VAT tax revenue	VAT share in total revenue
2006	1,360,410	1,128,141	241,283	21,39%	17.74%
2007	1,880,489	1,502,310	265,051	17.64%	14.09%
2008	2,170,370	1,890,897	368,049	19.46%	16.96%
2009	1,993,996	1,620,550	325,956	20.11%	16.35%
2010	3,122,464	2,688,236	579,120	21.54%	18.55%
2011	4,482,026	3,668,308	1,114,383	30.38%	24.86%
2012	4,981,777	4,203,321	1,296,451	30.84%	26.02%
2013	5,986,925	5,072,793	1,435,092	28.29%	23.97%
2014	6,316,523	5,157,025	1,371,725	26.60%	21.72%
2015	5,983,398	5,118,979	1,049,589	20.50%	17.54%
2016	5,835,044	4,950,950	1,140,721	23.04%	19.55%
2017	7,922,489	6,302,610	1,619,224	25.69%	20.44%

Source: www.1212.mn

Looking at the above statistics, VAT revenues have increased in the previous year, but it is wrong to explain this increase only with tax reforms. There are a number of reasons for the increase in VAT revenue, and when it is statistically significant to assess the effects of tax reforms, it is assumed that tax policies are in effect. Therefore, we tried to determine whether the tax policy had the effect of using the method described below.

4. RESEARCH METHODOLOGY AND QUANTITATIVE DATA

We have selected a random sample of 178 enterprises active in Sukhbaatar district, Ulaanbaatar, and their income and expenditure indicators for the 2015-2018 tax returns for 2010-2018 (GDP deflator, CPI refractive deflation). The design of the fixed effect model has been selected for the assessment and the design of the design can be determined as follows.

$$Dep_{it} = \beta_0 + \beta_x X_{it} + \beta_{sml} SML_{it} + \beta_{law} LAW_{it} + \beta_{DLD} SML_{it} * LAW_{it} + \partial_I + E_{it}$$

I - business entities; t - time; Deputies - depending on variables (sales revenue, sales costs, etc.); β - regression parameters; X - independent variables (economic growth rate, manufacturing sector); SML - dummy variable for malfunctioning small business; LAW - Dummy variable indicating the year of the new VAT law; - The nature of the business entity; E - Regression Random Error.

We selected variables based on the tax law reforms to determine the effect of sales revenues, sales costs, sales-management costs, and reporting on income tax expense. In other words, if the new law is implemented, it will determine whether it has been reported differently than previously reported. In addition, the sales growth of enterprises is dependent on economic growth, so the growth rate of the economy is chosen as an independent variable. In addition, sector variables were used to estimate disparities in the sector. The definitions of regression variables are shown in Table 2.

Table 2. The definition of variables

Variables	Explanation	Source
Sales	Sales revenue, MNT thousand At the price of 2010	Consolidation of the "Corporate Income Tax

Salecost	Sales cost, thousands MNT. At the price of 2010	Report" (Form TT-02), submitted to the tax department of Sukhbaatar district
Admcost	Cost of marketing and administration, MNT thousand. At the price of 2010	
Dumvat	The dummy variable to represent the VAT payer is VAT payer 1, otherwise 0	
gdp_growth	Economic growth as a percentage	World Bank database
Small	Small enterprise is a dummy variable that expresses small enterprise is 1 or 0 value	Small business with less than 250 million MNT sales revenue
Dumlaw	Dummy variable indicating the year of VAT is 2016-2018 if 1 or 0 value	
DID	The effects of the new VAT law were created by dummies small and dumlaw Variables multiplication	

It is also presented in Table 3 and Table 4, taking into account the statistical variables and the correlation matrix used in the study.

Table 3. Variables statistics

Variables	Observations	Average	Standard deviation	Min	Max
Sales	712	5646.202	10494.9	0	147059.4
Salecost	712	3042.088	6988.94	0	104449.3
Admcost	712	806.974	1261.19	0	14498.26
Dumvat	712	1	0	0	1
gdp_growth	712	3.949684	2.294143	1.168393	6.948839
Small	712	.994382	.0747949	0	1
Dumlaw	712	.75	.4333171	0	1
DID	712	.7457865	.4357243	0	1

Table 4.Correlation coefficient

	Sales	Salecost	Admcost	gdp_growth	Small	Dumlaw	DID
Sales	1						
Salecost	0.9806	1					
Admcost	0.2438	0.1029	1				
gdp_growth	0.1852	0.1683	0.1094	1			
Small	-0.5207	-0.5639	0.0428	-0.0000	1		
Dumlaw	0.1095	0.1095	0.0470	0.3954	0.0000	1	
DID	0.0283	0.0106	0.0520	0.3910	0.1287	0.9889	1

The previous model is assessed using Difference-in-differences (DID) and this method is one of the statistical-econometric methods of estimating policy effectiveness and is considered the most appropriate way of estimating the impact of the new law on the VAT.

There are three basic requirements to use the DID method:

1. Two main groups, namely the target group and the control group, are both distinguishable: The target group selected small businesses and small groups selected by the control group. The main target groups of the revised law are small entities whose income is uncertain, and their income is disclosed by citizen control[4]. Nonetheless, small enterprises considered that their revenues were relatively low and that they were relatively transparent and that they chose the control group.

   We tested that the average sales revenue before and after the revised tax law of non-small enterprises by T-Test, it shows t = 1.65, p-value = 0.106 and the statistical conclusion is there

is no difference between the two revenues and the average revenue before and after. It creates the conviction that our chosen group can become a control group.

2. Must be the data before and after the implementation of the policy: The data used in the survey of before period of revised VAT law /years of 2015/, and the after period /2016-2018/.
3. There is no similar policy in parallel with the policy to calculate its effectiveness: In addition to the revised VAT law in 2016, there has been no change in the type of taxation policy towards the entity. The survey finds that these three requirements are met.

5. THE RESULTS OF THE SURVEY

The model was evaluated using STATA software with three different coverage ranges for VAT purposes: all entities, VAT payer entities and non-taxpayers.

For statistical F and Housman tests (1) - (4) equations are statistically significant, but for DID variables, 1 percent for sales revenue and regression cost regression. In other words, the cost of sales-management and income taxes has not been affected by the law reform. For instance, when the economy grows by one percent, sales income increases by 746.74 thousand MNT on average. But the average sales income of entities increased by 102,833.9 thousand togrogs after VAT law revision.

The main variable of this study is DID, and its value is 108,931.2 thousand tugriks and statistically significant is the increase in the sales revenue of small enterprises selected as our target.

Table 5. VAT For the paying entities

Variables	Sales (1)	Sales cost (2)	Admcost (3)
Gdp_growth	746.74	451.55	58.18
Dumlaw	102833.9	72971.29	-6.99
DID	-102061.4	-72558.75	19.87
Idle member	1687.3	643.45	563.64
F statistic	89.51	95.10	6.32
Prob.F	0.000	0.000	0.003
Number of observation	712	712	712
Number of companies	178	178	178
R^2	0.335	0.349	0.0345

This means that the hidden income before the legal reforms has been disclosed by citizens to require their e-documents and the installation of e-documents system. While the average sales revenue for all firms decreased, the sales volume of small firms increased at a slight pace, suggesting that they were able to reveal a certain amount of hidden economy and meet their goals. Sales costs are the same as sales revenue.

The sales revenue of total entities increased by MNT 102,833.9 thousand since the beginning of the law.

In view of the overall picture of the assessment, the revenue of non-taxpayers' organizations decreased due to the fact that citizens became more accessible to organizations providing e-documents and, in turn, reporting on revenues from VAT payers.

Other indicators show that administrative expenses and income taxes have increased. The income tax increases when the sales revenue decreases and management costs increase, which means that the sales cost has fallen over sales revenue. This is a small business entity, not a VAT payer, buys

and sells its products and services at a cheaper cost and reduces inefficient costs; or costs and expenses that can be reported in the cost of sales, are reported to sales-management costs.

6. CONCLUSION

       This survey based on the 178 companies of Sukhbaatar district of Ulaanbaatar city on 2015-2018 years tax revenues and expenditure indicators has been used to curb the impact of tax reforms in the tax system in Mongolia. The VAT tax reforms and the fact that this law has achieved its purpose in influencing non-paid enterprises, and in particular the hidden income of small enterprises. However, our study does not cover all entities in our country and therefore avoids hurting the impact that Mongolia has on the whole. Thus, it is possible to determine the extent to which the data is available for taxpayers, for example, when the tax departments collect data on aggregate companies at the national level and broaden their scope and make such an analysis more realistic.

REFERENCES

1. Ebeke, C.H., Ehrhant, H. (2011). Does VAT Reduce the Instability of Tax Revenues?
Working Papers 201124, CERDI
2. Harrison, G., Krelove, R. (2005), VAT Refunds: A Review of Country Experience. IMF
Working Paper, WP / 05/218.
3. Komal (2013). An Analysis of the Impact of Value Added Tax (VAT) in Delhi. Global Journal of Management and Business Studies, 3 (3), 277-286.
4. Altanzaya, G. (2016). Tax registration and textbooks, Ulaanbaatar.
5. Gantulga, G., Unurjargal, Ch (2010). Some issues with VAT implementation.
6. Darysuren, C (2013). Opportunity to improve the likelihood of VAT.
7. Dashdorj, L (2010). Some studies on value-added tax.
8. Maralmaa, Ch (2014). Impact on the tax policy on the economy.
9. Oyunbileg, P. (2016). Optimization of value-added tax payments and control processes.
10. Unurmunkh, B (2017). Opportunity to use the RUND tool for VAT payment and control.
11. Puntsag, P. (2014). Improving VAT registration and reporting.
12. Susan, D (2014). Draft of the Value-Added Tax Law.
13. Undarmaa, E., Khishigbayar, L., Bolor, B (2016). Record of value-added tax and reporting issues and reports.
14. Khishigbayar, L., Lkhagvasuren, D (2017). Enhancing the e-Documentation (e), Accounting Theory and Practice, 1 (3), 51-58.
15. Tax Research team of "Hulk LLC" (2012). Improving tax policy issues.
16. Tsogt, O (2011). Implementation of the VAT law and its future trends.
17. Enkhsuren, M., Baatartsogt, B (2017). VAT implementation and results
18. Law on Small and Medium Enterprises, www.legalinfo.mn
19. Databank.worldbank.org. World Bank database.
20. www.1212.mn. Integrated database of National Statistical Office.
21. www.mta.mn. General tax office.

NATION BRANDING – PERCEPTION AND ATTITUDES ABOUT MONGOLIA IN CROATIA

Tihomir Vranešević[1], Tajana Marušić[2], Marko Družić[3]
[1]Full Professor, Faculty of Economic and Business,
University of Zagreb, Croatia,
[2]Lecturer, University North, Croatia
[3]Assistant Professor, Faculty of Economic and Business,
University of Zagreb, Croatia,
[1]tvranesevic@efzg.hr
[2]tmarusic@unin.hr
[3]mdruzic@efzg.hr

Abstract

Nation brand is not just a combination of brand's elements of identity (elements like a sign or a logo, a color, a slogan ...), but it implies a long-term strategic goal and organized efforts to determine what it wants to achieve and where to position the nation (country) on the perceptual map of the world nations. It is a prerequisite to look at the nation as a brand to gain proper position of the nation in the world.

A nation as a brand implies the active role of all citizens as they are an integral part of the national identity. This is why there are serious challenges in achieving the desired position which is under great influence of image and reputation of the nation and/or country. Although there are many challenges, there are also many advantages why the nation branding needs to be managed strategically and systematically in the long term. The main advantages are: eliminating negative stereotypes (if they exist), creating a positive image, achieving desired and possible world reputation and influence in today's and future international relations, building and maintaining tourist attractiveness for a specific (desired) groups of tourists.

The paper presents the research findings of the survey conducted in Croatia about the perception of Mongolia and current identity solutions of nation brand of Mongolia ie. sign/logo, slogan and other elements of the identity.

Keywords: Nation brand, branding, Mongolia, perception and attitudes, Croatia.

1. INTRODUCTION

A nation as a brand implies a different profile of people involved in various activities who are an integral part of the national identity. There are some challenges in building a desired position that can easily be described as an image and reputation of the nation and/or country. Although there are many challenges, there are many advantages why the nation and/or country branding needs to be managed strategically and systematically in the long term. The main advantages can be: eliminating negative stereotypes, creating a positive image, achieving desired and possible world reputation and influence in today's and future international relations, building and maintaining tourist attractiveness for a specific group of tourists. One must keep in mind that in contemporary society brands can spur affinity or discrimination, helping define both individual and collective identities (Saviola, Marazza, 2013). It is important to know the perception of the nation, and the reason why is for the proper construction and management of a nation brand. Brand perception depends on numerous factors and dimensions.

This article will present the result of seven dimensions: value system; quality of life; business potential; heritage (historical, artistic, cultural, natural); touristic potential; products produced in the Country; and sports and sports achievements. Of course, it should be taken into account that the article deals with the perception of Croatian students about Mongolia and Mongolia is an exotic and rather unknown country to them. Regardless of the real knowledge about the country and the possible similarities and differences, perceptions exist. Perception is a very real and dynamic category that can nevertheless be managed. This is not an easy process, and its starting point is knowledge of the current perception in order to determine the weaknesses and strengths that the national brand currently has. The strength of the nation brand is determined by the citizens of the country. Equally important is the perception of the nation brand by real and potential tourists.

In this case, it is the perception of Croatian students about Mongolia, the perception of the nation brand of Mongolia, and its tourist brand. Croatian students do not know Mongolia well enough and no participant of the research included in the sample (n = 140) has ever visited Mongolia. Their answers are only related to their perception without real knowledge about Mongolia but can be a good indicator, especially if their perception of Mongolia is put in relation to their perception of other known or equally unknown countries. To be more exact, how Mongolia is seen by citizens of other countries and how to "direct" their perceptions in the desired direction. This is a long-term but feasible process. For a good overview of the results obtained, it is useful to compare the results for several countries by the same or similar sample of respondents as well as to make a brief comparison of the country from which the respondents (Croatia) and the countries whose national brand is being surveyed (Mongolia). Although Croatia has more than one million inhabitants (Croatia 4.1 mils vs. 3.1 million Mongolia), Mongolia has a significantly larger land area (Croatia 156 594 km2 vs. 1 564 120 km2 Mongolia) Figure 1.

Figure 1. Mongolia vs Croatia – comparison of surface area in km2.
Source: https://mapfight.appspot.com/hr-vs-mn/croatia-mongolia-size-comparison; accessed 3.4.2019.

For a more detailed view of Mongolia and Croatia please see The Global Gender Gap Report 2018; World Economic Forum in Figure 2.

Mongolia

rank out of 149 countries **58**
score 0.00 = imparity 1.00 = parity **0.714**

0.40 — distribution of countries by score — 1.00

SCORE AT GLANCE

- Mongolia score
- average score

KEY INDICATORS

GDP (US$ billions)	11.49
GDP per capita (constant '11, intl. $, PPP)	11,841
Total population (1,000s)	3,027.40
Population growth rate (%)	1.54
Population sex ratio (female/male)	1.02
Human Capital Index score	64.35

	2006 rank	2006 score	2018 rank	2018 score
Global Gender Gap score	42	0.682	58	0.714
Economic participation and opportunity	21	0.704	20	0.780
Educational attainment	20	0.999	70	0.993
Health and survival	1	0.980	1	0.980
Political empowerment	101	0.046	109	0.102
rank out of	115		149	

COUNTRY SCORE CARD

	rank	score	avg	female	male	f/m
Economic participation and opportunity	20	0.780	0.586			
Labour force participation	75	0.811	0.669	55.9	68.9	0.81
Wage equality for similar work (survey)	31	0.720	0.645			0.72
Estimated earned income (PPP, US$)	19	0.742	0.510	11,094	14,945	0.74
Legislators, senior officials and managers	15	0.738	0.329	42.4	57.6	0.74
Professional and technical workers	1	1.000	0.753	64.6	35.4	1.82
Educational attainment	70	0.993	0.949			
Literacy rate	1	1.000	0.882	98.3	98.2	1.00
Enrolment in primary education	110	0.985	0.978	97.1	98.6	0.98
Enrolment in secondary education	1	1.000	0.967	86.1	77.7	1.11
Enrolment in tertiary education	1	1.000	0.939	76.4	53.5	1.43
Health and survival	1	0.980	0.955			
Sex ratio at birth	1	0.944	0.921			0.97
Healthy life expectancy	1	1.060	1.034	65.5	58.6	1.12
Political empowerment	109	0.102	0.223			
Women in parliament	101	0.206	0.284	17.1	82.9	0.21
Women in ministerial positions	100	0.154	0.208	13.3	86.7	0.15
Years with female head of state (last 50)	67	0.000	0.189	0.0	50.0	0.00

Croatia

rank out of 149 countries **59**
score 0.00 = imparity 1.00 = parity **0.712**

0.40 — distribution of countries by score — 1.00

SCORE AT GLANCE

- Croatia score
- average score

KEY INDICATORS

GDP (US$ billions)	54.85
GDP per capita (constant '11, intl. $, PPP)	22,670
Total population (1,000s)	4,213.27
Population growth rate (%)	-0.58
Population sex ratio (female/male)	1.08
Human Capital Index score	66.81

	2006 rank	2006 score	2018 rank	2018 score
Global Gender Gap score	16	0.714	59	0.712
Economic participation and opportunity	42	0.651	67	0.681
Educational attainment	51	0.990	44	0.998
Health and survival	36	0.979	1	0.980
Political empowerment	18	0.238	62	0.191
rank out of	115		149	

COUNTRY SCORE CARD

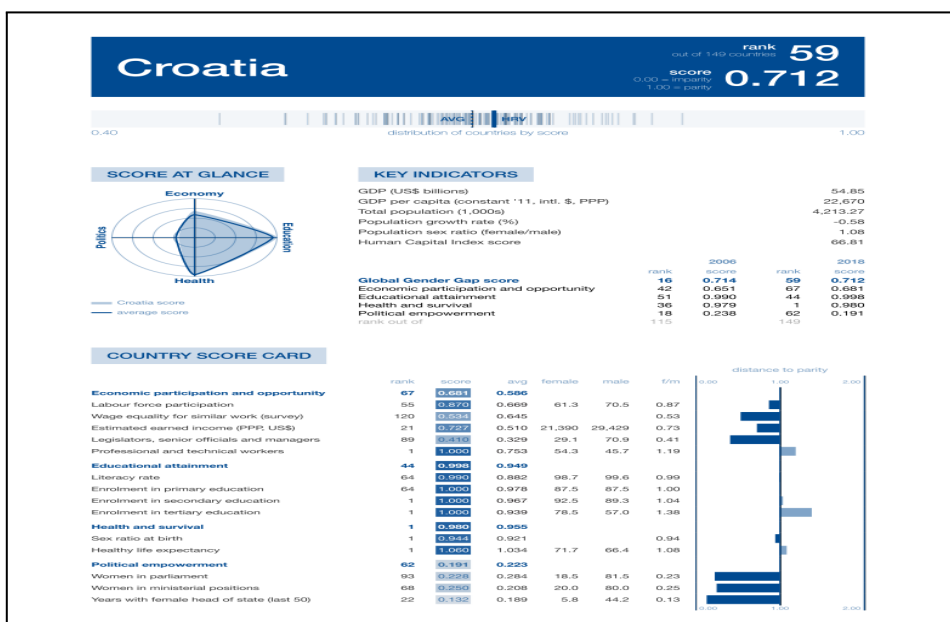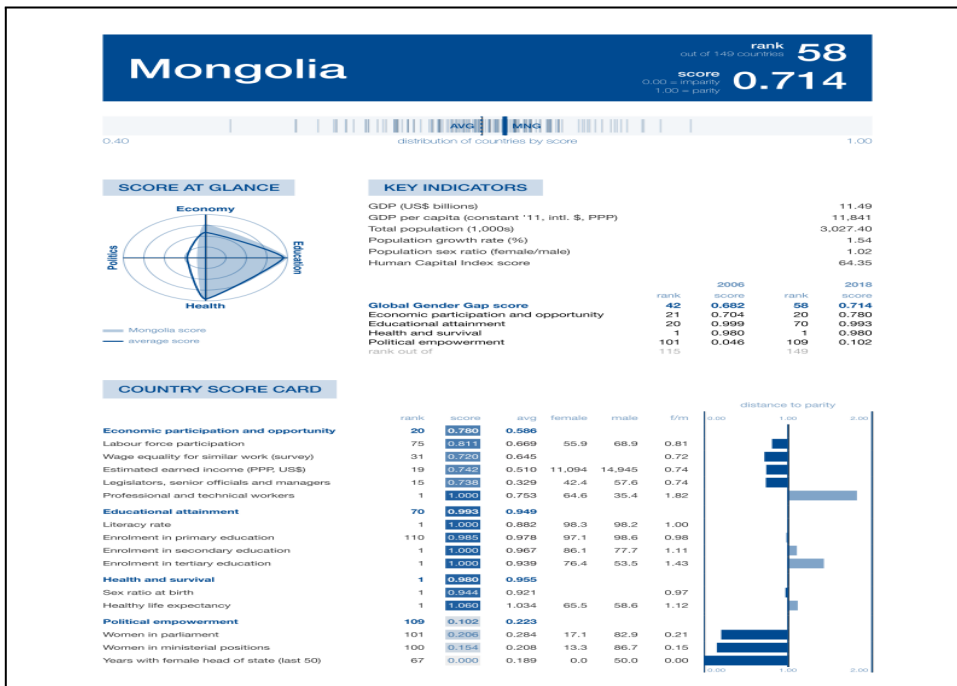|	rank	score	avg	female	male	f/m
Economic participation and opportunity	67	0.681	0.586			
Labour force participation	55	0.870	0.669	61.3	70.5	0.87
Wage equality for similar work (survey)	120	0.534	0.645			0.53
Estimated earned income (PPP, US$)	21	0.727	0.510	21,390	29,429	0.73
Legislators, senior officials and managers	89	0.416	0.329	29.1	70.9	0.41
Professional and technical workers	1	1.000	0.753	54.3	45.7	1.19
Educational attainment	44	0.998	0.949			
Literacy rate	64	0.990	0.882	98.7	99.6	0.99
Enrolment in primary education	64	1.000	0.978	87.5	87.5	1.00
Enrolment in secondary education	1	1.000	0.967	92.5	89.3	1.04
Enrolment in tertiary education	1	1.000	0.939	78.5	57.0	1.38
Health and survival	1	0.980	0.955			
Sex ratio at birth	1	0.944	0.921			0.94
Healthy life expectancy	1	1.060	1.034	71.7	66.4	1.08
Political empowerment	62	0.191	0.223			
Women in parliament	93	0.228	0.284	18.5	81.5	0.23
Women in ministerial positions	68	0.250	0.208	20.0	80.0	0.25
Years with female head of state (last 50)	22	0.132	0.189	5.8	44.2	0.13

Figure 2. Mongolia vs Croatia - facts according to WEF
Source: The Global Gender Gap Report 2018; World Economic Forum, ISBN-13:
978-2-940631-00-1, The Report and an interactive data platform are available at
http://www3.weforum.org/docs/WEF_GGGR_2018.pdf.

2. THEORETICAL FRAME

There are numerous examples in the literature about brand management and psychology of consumer behavior and the existence of strong emotions towards brands such as loyalty and/or love for individual brands. For example, du Plessis (2011) presents a paradigm about the role of emotions and that they assist reasoning and cause rationality. This paradigm also emphasizes that emotions attract attention which creates memories and influences our decisions. There is significantly less writing about negative emotions towards individual brands, but there are certainly strong feelings for both countries and their brands. These feelings include disliking certain brands of products and services, as well as countries and brands of nations. Ollins (2002) explains that concept of a country as a brand seems to encourage animosity in some people who think that re-branding is appropriate only for corporations, and not for countries because countries have a certain dignity and much more value than a product. Nation branding can also be described as a process through which countries tell their own stories in order to influence the attitude of international target markets (Yalkin, 2017). Yan (2010) on the other hand emphasizes that national branding goes beyond the narrow purpose of the country of origin or placing brands to promote specific economic interest.

Today it is easy to express different feelings through social media about everybody and everything from the safety of one's home and in general through the Internet. Besides the Internet, the entertainment industry also has a significant impact on a country´s image, especially in shaping perception about certain places, creating positive or negative perception and emotions (Kotler & Gertner, 2002). It is interesting that negative feelings towards a brand can have a greater impact than positive feelings. Negative feelings can turn into active hatred. Certainly, brand managers can avoid such feelings through active listening, involvement, and negotiation with participants of the target market. Listening implies an integral part of active communication. With the open communication channels, market research is a convenient way to find out what participants of the target market like or dislike concerning certain brand. Involvement includes active socialization with participants of the target markets and understanding of their feelings. Negotiation means finding a way to compensate for (un)favorable feelings. If clients' feelings about the brand are not recognized (especially hatred), and if this is not compensated appropriately, it may happen that long-term brands do not reach their full potential, regardless of the effort made to build the brand (Kucuk, 2016, pp. 125-135., adapted).

Promising the overall value of the brand makes no sense if it is not in accordance with the desires, expectations, and needs of the target markets - without forgetting that one of the more important target markets is the internal public or the country´s residents. In a competitive environment, competing activities should be taken into account, and the defense of one's own brand should be planned in a way to anticipate and expect that the competitors' goal is to take on new positions for which the brand of (our) country is already in place.

The first thing to keep in mind is that there are no gaps between what the target markets want and the values that the brand offers and advocates. But if that is not the case then recommendations for short-term activities can be given and what to do and not to do. What not to do: do not get greedy (you need to respect long-term and not short-term profitability), do not miss to motivate and keep your people (keep your experts by signing exclusive contracts to work only for you) and do not help your potential competitors (do not help your competitors with information how you built a successful brand - if you do not have at least the same mutual benefit). What to do: create fear of competitors (to encourage and maintain fear of attack by competitors in the way that brand managers do not think whether there will be a competing attack, but that they expect it and are ready to respond to it), focus on competitive intelligence (it is necessary to collect information constantly in order to anticipate competitive activities, which is the assumption of readiness to respond to attacks or, on the other hand, if competitors are perceived to consider the attack), set the right incentives (a rewarding program for the involved managers in the case of defense and not only in the event of an attack but also in the event of increase in the value of the brand), create loyalty (loyalty increases the likelihood of successful defense against a competitive attack because loyal customers are less interested in what they can be promised by a competitor - loyalty can be built by unconditionally delivering the promised value, unforgettable experience and everything related to advocates and brand ambassadors, build connections with government officials (for the purpose of institutional readiness for different responses from various attacks, not to mention that they should be permanently included as stakeholders of the brand), create intelectual property barriers (constantly explore and influence the development of discipline so that it is always a step ahead of all, and all the knowledge is protected so that competitors can not quickly imitate them), engage the channel (build special relationships and loyalty in channels of distribution and brand communication) (Calkins, 2012., pp. 220-234, adapted).

In general, in branding, the biggest challenge is to brand the nation or state. No nation or state is one-dimensional, and branding involves a complex approach for which there is no harmonized theoretical background or a single approach in practice. The basic thesis can be established to recognize the benefits of the country and/or nation, but it is less known how to actually do it. Another important element in the successful branding of a country is awareness as a key indicator of peoples knowledge about the existence of a country. Branding may be an elementary tool in enhancing awareness as well as altering or reinforcing stereotypical views (Hakala et al., 2013). Another view of the importance of awareness is that consumers view countries on macro and micro levels. Macro being associations and beliefs about the country and micro being associations and beliefs about its products (Pappu, Quester, 2010). The advantage of branding a country can be summarized as a desire to take and/or maintain a stable position in the virtual world map of countries in order to achieve long-term benefits. As in any positioning, it is necessary to answer the questions: why is it significant, to whom it is positioned - and / or what are the target segments in which we want to occupy a superior position according to our priorities and in relation to competitors, what is the basis of positioning of a brand, is the basis of brand positioning a long-term defense, and the most important issue being that often it is not very clear who is in charge of building and managing the brand of a country or a nation.

The advantages of good nation brands are quite easy to understand, because a good brand influences the perception of the country and increases the interest for foreign investments in the country, promotes the country as a desirable tourist and business destination of the world's "nomads" and it helps to promote state policy in international relations, encourages the international exchange of the country and ultimately but most importantly promotes the national cohesion of the country and its citizens. Source of nation branding lies in the concepts of national identity and country-of-origin that evolved due to the lowering of trade barriers between nations which resulted/s

in the emergence of the nation branding as countries turned to brand management techniques in order to compete effectively on the world stage. (Keith, 2008, p.38 - in figure 3).
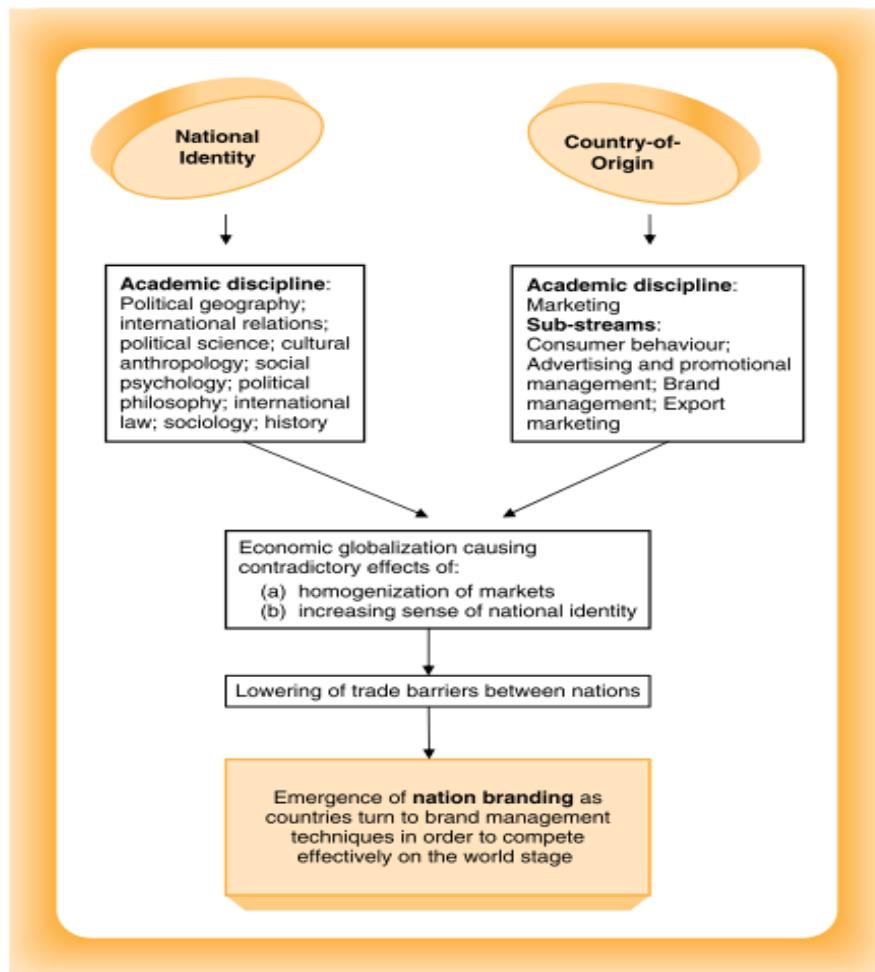

Figure 3. The evolution of nation branding. Source: Keith, D., Nation branding, Elsevier, 2008., p. 38

There are successful examples of changing perceptions of states that can be recognized as successful or less successful (re)branding. Spain, Ireland, and Croatia are such examples (Moilanien & Rainisto, 2014). In Spain, it can be said that this is a long-term strategic branding project that has helped to speed up the change of view from Franco's dictatorship to the perception of the modern country and the passion-embedded nation. Croatia's change of perception as a country affected by war can be thanked by the strong sports results and above all by the successful management of the tourist attraction that presents Croatia as a country "full of life". The example of Ireland can be seen through the fast-paced value of the national value which is accompanied (but also allows to some extent) by the change in the perception of Ireland as a poor emigration destination into the modern perspective of an immigration state ("fill your heart with Ireland"). These are the examples where the nation brand begins to develop from a tourist country to a destination. The danger of modern branding of a country is the uncritical long-term identification of the tourist brand with the brand of the country. The tourist brand promotes the country as a destination and is primarily targeted at tourists, while the brand of the country is not directed exclusively to tourists (real and potential) but to the entire public with a special emphasis on the countries inhabitants as one of the target segment

of national branding The brand must be supported by them whereby they, along with the "user" role, have a more responsible role of "creator and maintainer" within the country.

Perception of a tourist and a national brand as the same is often because the above-mentioned examples (Ireland, Spain, and Croatia) show how much a tourist brand can be successful in changing the perception and identity of the state in the function of creating a nation brand. Many authors point to this. Thus Anholt (2007) states that tourism is the most important "communicator" within the state. Tourism is certainly important because many nations/countries want to be stronger brands than others and take action to achieve this competitive advantage through tourism because it makes it easier and more justified. Branding through tourism is a good prerequisite and can serve as a starting point for a successful nation branding. However, one should keep in mind that in the long-term the brand of the state should be a higher concept of a tourism brand. For example, the nation brand has a major influence on foreign investments as well on support and improvement of the value of products produced in different countries - the "made in" approach. Of course, the question is what it is and how much it is "made in" when many components and final products consist of components produced in different countries of the world. For example, how many components (parts) of a VW car are produced in Germany and how many are produced in other countries, or whether the entire VW car is produced outside Germany, and VW, regardless what the answer is, still has a perception of a German strong brand. That is why new umbrella concepts such as "origin of the brand" or "cultural origin of the brand" are becoming more important (Olins, 2008) and not only is it very close to the brand of the state and/or the nation but can be seen and spread as regional multinational brands that "cover" a larger area than the states themselves or are in more states. Examples can be olive oil from Mediterranean countries, Danish wine, and Scandinavian design. Country-of-origin has a significant effect on consumer evaluation in cases where there is a strong link between a country and a product category (Andehen et al., 2015)

Numerous approaches to power measurement (and/or value) and methodology or procedure are not harmonized. By searching secondary data, different results were found using different approaches or methodologies for Mongolia and Croatia as seen in figure 4.

Mongolia	Rank 2011	Rank 2012	Rank 2013	Rank 2014	Rank 2015	Rank 2016	Rank 2017
Anholt – Gfk Roper Nation Brands Index	-	-	-	-	-	-	-
Anholt – The Good Country Index	-	-	-	109	-	119	-
Bloom Consulting Country Branding Ranking Trade	-	-	-	84	-	-	85
Bloom Consulting Country Branding Ranking Tourism	-	-	-	136	-	-	137
FutureBrand Country Brand Index	-	-	-	-	-	-	-
East-West Global Index 200	32	-	-	-	-	-	-
Portland Communications - Soft Power 30 Ranking	-	-	-	-	-	-	-
Digital Country Index	-	-	-	-	-	-	130

Croatia	Rank 2011	Rank 2012	Rank 2013	Rank 2014	Rank 2015	Rank 2016	Rank 2017
Anholt – Gfk Roper Nation Brands Index	-	-	-	-	-	-	-
Anholt – The Good Country Index	-	-	-	46	-	40	-
Bloom Consulting Country Branding Ranking Trade	54	70	81	88	-	-	84
Bloom Consulting Country Branding Ranking Tourism	29	19	27	28	-	-	27
FutureBrand Country Brand Index	40	41	-	44	-	-	-
East-West Global Index 200	40	-	-	-	-	-	-
Portland Communications - Soft Power 30 Ranking	-	-	-	-	-	-	-
Digital Country Index	-	-	-	-	-	-	60

Figure 4.Nation brand index - Mongolia vs Croatia.
Source: http://countrybrandingwiki.org/index.php/Rankings_-_Country_by_Country (accessed: 01.04.2019.)

According to this source and in accordance with different approaches, it is evident that the brand Croatia is stronger than brand Mongolia. Only at Bloom Consulting Country Branding Ranking Trade are almost equal: Croatia has 84 and Mongolia 85 rank.

For the purpose of considering the importance of branding of countries and the complexity of the concept we have tried to explore the brand of the country. We have decided on a methodology in which an important place has associations with the country. This methodology uses the instrument research - a survey questionnaire - which includes 6 dimensions of association: Value system, Quality of life, Business potential, Heritage & Culture, Tourism, Made-in Concept (Figure 5).

Figure 5.Main FutureBrand Rank dimension used for developing the research instrument
Source: Country Brand Index 2014-15 (Future Brand;https://www.futurebrand.com/uploads/CBI2014-5.pdf;
31.01.2019.)

With the FutureBrand Country Brand Index with the Associations, more categories are considered for the calculation of the final index: awareness, familiarity, preference, consideration and decision/visitation. This survey was not taken into consideration neither in the compilation of the research instrument nor in the analysis of the results because the research instrument which is a survey questionnaire was developed on the basis of the dimension of the association from the Futurebrand methodology with the appropriate adaptation of particular features in individual dimensions and adding a new dimension of sport & sport achievements because the assumption of whether sport and sport achievements had significance in the valuation of the state within wanted to be tested. Each dimension consists of 4 features as can be seen in Figure 6.

VALUE SYSTEM
· political freedom in the COUNTRY
· ecological standards
· legal equality
· tolerance towards others and diversity

QUALITY OF LIFE
· health care in the COUNTRY
· education
· life standard
· safety

BUSINESS POTENTIAL
· technological progress in the COUNTRY
· infrastructure
· entrepreneurial atmosphere
· openness for foreign investments

HERITAGE
· historical sites in the COUNTRY
· art
· culture
· natural beauty

TOURISM - TOURISTIC POTENTIAL
· given value for money in tourism in the COUNTRY
· number and variety of touristic attractions
· accommodation capacities
· gastronomy

PRODUCTS OF THE COUNTRY - ("Made in the COUNTRY ")
· the authenticity of products produced in the COUNTRY
· quality of products produced
· the uniqueness of products produced
· price of products produced

SPORT & SPORTS ACHIEVEMENTS
· level of support and investment in sport in the COUNTRY
· achievements of the sportsman on sport competitions
· the behavior of the sportsman in victories and defeats
· the behavior of the fans in victories and defeats

Figure 6. Features and dimensions of nation brand
Source: Vranešević, T., Perić, N., Vujić, N., Project: Developing instruments for measurement of the strength of state brands, 2018., developed and adapted according to Country Brand Index, Future Brand (https://www.futurebrand.com; 17.02.2018.)

3. RESULTS AND ANALYSIS

3.1. Methodology

A sample of respondents represented 140 full-time students of the undergraduate study at the Faculty of Economics in Zagreb. The sample was suitable - respondents/students who participated in the classroom and who expressed the willingness to participate in the research. The characteristics of the sample were 35% of men and 65% of women, all at the age of 20-30 years. In most cases (71.4%) come from a family of 3-5 members. Of the average income families (by their estimate only) 60% of respondents, 25% of respondents are from the family with above-average income and 15% of those with under-income income.

The survey was conducted online using Qualtrics program during March of 2019. Participants were questioned about Mongolia. Testing for Croatia and other emerging countries (India, Canada, Serbia) was conducted at the end of 2018, with the sample being 80 participants (n = 80). Participants were also students of the Faculty of Economics and Business at the University of Zagreb (in this case, students at postgraduate level included postgraduate level students in the sample). Samples were mutually independent. Research instruments followed same research logic.

3.2. Results

7 dimensions that were observed collectively have average grades for Mongolia ranging from 2.64 to 3.59 on scale 1-5 where 1 = Extremely negative, 2 = Negative; 3 = Neither negative nor positive, 4 = Positive and 5 = Extremely positive. The results are: for Croatia value system is 2.60, while for Mongolia value system is 2.84; quality of life 3.30 vs 2.66; business potential 2.74 vs 2.64; heritage 4,48 vs 3,59; touristic potential 4.16 vs 3.32 ;. products produced in the Country ("made in") 4.05 vs. 3.13; sports and sports achievements 4,25 vs 2,95. Results for an overall evaluation of Croatia and Mongolia as a brand are: Croatia - mean 3,65 vs Mongolia - mean 3,00 as seen in figure 7.

Dimension "I evaluate the ..." of the Country (Croatia vs Mongolia)	Croatia	Mongolia	Difference
... value system	2,60	2,84	-0,24
... quality of life	3,30	2,66	0,64
... business potential	2,74	2,64	0,10
... heritage (historical, artistic, cultural, natural)	4,48	3,59	0,89
... touristic potential	4,16	3,32	0,84
... products produced ("made in")	4,05	3,13	0,92
... sports and sports achievements	4,25	2,95	1,30
Overall evaluation of Croatia and Mongolia as a brands	3,65	3,00	0,65

Figure 7.Mean (average value) of dimensions and overall evaluation of Croatia and Mongolia as a brand

In the dimension value system, Mongolia was better rated. The biggest differences in Croatia's favor are in assessing sports and sports achievement, and the smallest difference is in business potential. All mid-grade differences are statistically significant (two-way pair sample test, p less or equal to .001) except for the business potential dimension where the difference is not statistically significant.

Within the explorative analysis of the results, it was necessary to check the predictive ability of the total and the same dimensions at the overall assessment of Croatia and Mongolia as a brand. By using line range regression - where the overall rating of the brands is used as a dependent variable and the dimension estimates as independent variables for Croatia are R = .627 and r2 = .393 while for Mongolia R = .588 a r2 = .311. This suggests that when it comes to the overall rating of the national brands Croatia and Mongolia, the dimensions for Croatia have a slightly higher predictive capability (at least considering simple linear regression) with respect to the dimensions of Mongolia. Simplified it can be concluded that the dimensions "explain" 40 percent of the Croatia rating as the brand and just over 30 percent of Mongolia as a brand. The difference is probably due to the fact that Croatian respondents do not know so well Mongolia as opposed to Croatia.

The value of the state as a brand may also be expressed through a relationship with the state, or how attractive it is for the respondents to live in it, to spend a vacation there, or to buy products produced in that country. For that purpose we have used the questions *I love to live in Croatia*; *I love to spend my vacation in Croatia* and *I love to buy products produced in Croatia*. For Mongolia – questioning was conducted in Croatia, where the citizens of Croatia participated in the questioning of claims: *I would love to live in Mongolia*; *I'd love to spend my vacation in Mongolia, I'd like to buy products that are produced in Mongolia*. Used was Likert scale where 1 = I strongly disagree, 2 - I disagree, 3 - I'm not sure, 4 - I agree and 5 - I strongly agree. Because all participants are Croats, Croatia was expected to have significantly higher ratings (I love to live in Croatia where mean is 4,16; I love to spend my vacation in Croatia (mean 4,34); I like to buy products that are Made in Croatia - mean 4,11) than for Mongolia (I'd love to live in Mongolia - 2,06; I love to spend my vacation in Mongolia - 3,14; I'd like to buy products that are produced in Mongolia (Made in Mongolia) - mean 2.97). Figure 8.

	Croatia (mean)	Mongolia (mean)	
I love to live in Croatia	4,04	2,06	I'd love to live in Mongolia
I love to spend my vacation in Croatia	4,29	3,14	I'd love to spend my vacation in Mongolia
I like to buy products that are produced in Croatia (Made in Croatia)	4,21	2,97	I'd like to buy products that are produced in Mongolia (Made in Mongolia)

Figure 8.The relationship between Croatia and Mongolia

For a more detailed view of the individual results, we give a comparison of the results on the same questions (but within another survey) for the countries of India, Canada, and Serbia (figure 9).

	Mongolia (mean)	India (mean)	Canada (mean)	Serbia (mean)

I'd love to live in the Country	2,06	1,83	3,23	2,04
I'd love to spend my vacation in Country	3,14	3,06	3,66	2,71
I'd like to buy products that are produced in the Country (Made in Country)	2,97	2,81	3,67	3,06

Figure 9.Mongolia, India, Canada & Serbia - comparison relationships to the Countries

Beside perception, it is very unlikely that respondents (all citizens of Croatia) are well acquainted with the situation in Mongolia because none of the respondents had ever been in Mongolia, but that is another proof that perception plays a very important role in the strength of a brand.

Respondents were asked to evaluate the tourism sign and slogan of Croatia and Mongolia and to evaluate the contribution of tourism sign and slogan to the perception of the country as a successful brand on scale 1-5; where 1 = Extremely negative, 2 = Negative; 3 = Neither negative nor positive, 4 = Positive and 5 = Extremely positive. The average grades are as follows: a) The average rating of the sign and slogan for Croatia is 3.95 and Mongolia is 3.71; b) Contribution of touristic sign and slogan to the perception of the Country as a successful brand - Croatia 3,48 and Mongolia 3,55 as seen in figure 10.

	Croatia (mean)	Mongolia (mean)	
I evaluate the touristic sign and slogan of Croatia	3,99	3,71	I evaluate the touristic sign and slogan of Mongolia
I evaluate the contribution of touristic sign and slogan to the perception of Croatia as a successful brand	3,48	3,55	I evaluate the contribution of touristic sign and slogan to the perception of Mongolia as a successful brand

Figure 10.Touristic sign and slogan and contribution to the perception - comparison Croatia vs Mongolia

As in the previous case, for a more detailed view of the individual results, we give a comparison of the results on the same questions (but within the second survey) for the countries of India, Canada, and Serbia Figure 11).

	Mongolia (mean)	India (mean)	Canada (mean)	Serbia (mean)
I evaluate the touristic sign and slogan of the Country	3,71	3,57	3,77	3,57
I evaluate the contribution of touristic sign and slogan to the perception of the Country as a successful brand	3,55	3,50	3,63	3,50

Figure 11.Mongolia, India, Canada & Serbia - comparison touristic sign and slogan and contribution to the perception of the Country as a successful brand

When interpreting the results of the questionnaires it should also be taken into account the ratio of respondents to the surveyed countries: all respondents are citizens of Croatia, Serbia was visited by 60% of respondents, Canada by 12.5%, India by 4.4% and Mongolia by no participants.

3.3. Research limitations

The limitations of the research were primarily related to the sample: a relatively small sample size (n = 140 and n = 80; sample composition - students of the Faculty of Economics Zagreb, comparison of the results of the research carried out at the end of 2018 with the research conducted in 2019; the samples of respondents are different, as well as the different levels of "knowledge" of individual countries by individual respondents. We consider that although there are limitations they are not of such nature that they would significantly undermine the indication of the obtained results.

4. CONCLUSION

Croatia students - none of whom had ever been to Mongolia - rated Mongolia as a brand with a average grade 3. The average rating for I'd love to live in Mongolia was 2.06; for I'd love to spend my vacation in Mongolia 3.14; for I'd like to buy products that are produced in Mongolia (Made in Mongolia) 2.97. Furthermore, the tourist sign and slogan of Mongolia was rated at a grade of 3.71 and a contribution of touristic sign and slogan to the perception of Mongolia as a successful brand with a mean grade of 3.55. In general, Mongolia has comparable results with other countries (India, Canada, and Serbia), while much higher ratings were given by Croatian students when asked to evaluate Croatia. An interesting exception is the value system dimension where Croatia students gave a higher rating to an unknown state than the country they live in. This is a good indication of the overall dissatisfaction of the people of Croatia with that dimension.

In general, the results indicate that the brand of the country is very complex to construct and that it needs to be further explored in order to exploit the significance of a brand in today's global circumstances and above all in the dominant globalization processes. The brand of a nation is not just about other people outside the country ("tourists") but - and it should be primarily - for the people who live in that country. Residents of a country are at the same time the creators and maintainers of the brand and as such act as the cause and consequence of the (non)successful branding within the state. The known deviation in predictable abilities of the chosen dimensions may indicate that it is easier to make and manage the brand of a country if it is directed to non-residents rather than residents. Perhaps this is because citizens of a country are better acquainted with the values on which the brand lies and are taking additional factors when assessing the state. This is quite challenging because there is no successful brand if it is not evaluated as such by clients - in this case, the residents of the country. It is encouraging that all tourist signs and slogans were positively rated above average and that their contribution to the perception of the specific country as successful brand was also assessed.

Certainly, this is a pilot study on a limited sample of students (n = 80) and it can be expected that a larger sample might get different results and thus this remains the recommendation for further research. The recommendation for further research may be a survey of the resident population of the surveyed countries and a comparison of their results with non-residents, and a concrete recommendation would be to conduct research on Croatia and Mongolia in Mongolia in order to compare the results. It is also recommended to conduct a more detailed and more specific analysis of the obtained results in order to examine the impact of certain features on individual dimensions and the impact of individual dimensions on the overall assessment of the state. The use of structural

modeling using Smart-PLS or Amos technique is recommended. For a more credible assessment of the state's brand strength, together with the respondents' perception should to some extent take into account other specific "firm" indicators of the country's performance, such as the standard of population, education opportunity, gender equality ... which only confirms the initial assumption that the brand is a complex construct in which perception - though significant - is just one of the many factors. Consequently, we hope that this approach and the results presented in the paper will be a stimulus for future research in the field of nation branding.

REFERENCES

1. Andehen, M., Nordin F., Nilsson M., Facets on country image and brand equity: Revisiting the role of product categories in country-of-origin effect research; *Journal of Consumer Behaviour,* 2015, Published online in Wiley Online Library (wileyonlinelibrary.com) DOI:10.1002/cb.1550
2. Anholt, S., *Competitive Identity*, New York, NY: Palgrave Macmillan, 2007, p. 78.
3. Calkins, T., *Defending your brand*, Palgrave MacMillan, 2012., pp. 220-234 du Plessis, E., The Branded Mind, *what neuroscience tells us about the puzzle of the brain and the brand,* 2011, MillwardBrown, London
4. Hakala, U., Lemmetyinen, A., Kantola, S., *Country image as a nation-branding tool*, Marketing Intelligence & Planning, 2013, Vol.31, No.5, p. 538-556.
5. http://countrybrandingwiki.org/index.php/Rankings_-_Country_by_Country (accessed: 01.04.2019.)
6. https://mapfight.appspot.com/hr-vs-mn/croatia-mongolia-size-comparison; accessed 3.4.2019.
7. Kucuk, S. U., *Brand Hate,* Palgrave McMillan, 2016, p. 125-135.
8. Keith, D., *Nation branding,* Elsevier, 2008., p. 38.
9. Kotler, Ph., Gertner, D., Country as a Brand, Product, and Beyond: A Place Marketing and Brand Management Perspective, *Journal of Brand Management*, vol. 9, No.4, 2002, p. 249-261
10. Moilanien, T., Rainisto, S., *How to brand nations, cities and destinations*, Pagrave, 2014., p. 5.
11. Olins, W., Brandovi: *marke u suvremenom svijetu*, Golden marketing, Zagreb, 2008., foreword Vranešević, T.
12. Olins, W., Branding the nation – the historical context, *Journal of Brand Management*, 2002, vol 9, No. 4, pp 241-248.
13. Pappu, R., Quester, P., *Country equity:conceptualization and empirical evidence,* International Bussines Review, 2010, Vol. 19, No.3, pp. 276 -291.
14. Saviola, S., Marazza, A., *Lifestyle Brands*, Palgrave Macmillan, 2013., p. 19.
15. The Global Gender Gap Report 2018; *World Economic Forum,* ISBN-13: 978-2-940631-00-1, The Report and an interactive data platform are available at
16. http://www3.weforum.org/docs/WEF_GGGR_2018.pdf
17. Vranešević, T., Perić, N., Vujić, N., *Project Developing instruments for measurement strength of state brands, 2018*., (https://www.futurebrand.com; accessed 17.02.2018.)
18. Yalkin, C., *A brand Culture Approach to Managing Nation -Brands*, European Management Review, 2018, Vol.15, pp 137-149.
19. Ying, F., *Branding the nation: Towards better understanding*, Place Branding and Public Diplomacy, 2010, Vol 6, No. 2, pp 97-103.

IMPLEMENTING ENTREPRENEURSHIP SUPPORT PROGRAMS IN MONGOLIA: WOMEN'S BUSINESS CENTER

Bat-Orshikh Erdenebat[1a], Bolortsetseg Gelegnamjil[2b]
[1]Development Solutions NGO, [2]Women's Business Center
[a]**batorshikh@dsmongolia.org**, [b]**bolortsetseg@dsmongolia.org**

Abstract

The aim of this article is to review the impact of entrepreneurship support programs in Mongolia in the course of about 30 years after taking the first steps of decentralization. Business incubation centers are very important means of supporting the development of micro, small and medium enterprises, which are known to create employment, generate income and contribute to economic development and growth. Currently, in Mongolia, there are dozens of business incubation and training centers addressing a critical demand to provide support services including training, consulting and assistance in gaining access to capital and markets. This article investigates the challenges faced by the existing business incubators and concludes that their support programs are still needed to be further developed and put into practice.

Keywords: Business Incubators, Management Practice, Support Programs, Performance

1. INTRODUCTION

A significant portion of Mongolia's private business sector is comprised of household and small medium enterprises (SMEs) as well as startups, highlighting this as an area of potential growth. SMEs contribute about 25% of GDP and employ roughly half of the total workforce[5]. In addition, as of the second quarter of 2018, 86% of all enterprises had less than nine employees (11% higher than the previous year) and 66% of were located in Ulaanbaatar city[6]. Particularly, in ger areas, entrepreneurs tend to establish more business workshops and factories utilizing affordable and available resources such as plots of land and low paid labor market. However, those entrepreneurs lack business services and financial supports to start and/or expand their businesses. Under these circumstances, it is crucial to support SMEs by addressing their specific needs, which are: business enabling environment, promotion of entrepreneurial culture, financing, business development services, innovation and technology development, adaptation and market access.

Business incubation centers play an important role in socio-economic development and address to a critical demand from local entrepreneurs to receive day-to-day professional and high-quality business support and development services in an enabling environment that fosters the entrepreneurship. In addition, the Government of Mongolia has adopted employment and SME support packages encouraging and promoting to increase SME access to local micro-financing fund and procurement activities.

According to the National Business Incubation Association, world's leading Business Incubator Association in the USA, critical considerations in the definition of an incubator include the provision of the following items: [7]

- Management guidance;
- Technical assistance and consulting tailored to young growing companies;

---

[5] National Statistical Office, 2018
[6] National Statistical Office, 2018
[7] National Business Incubation Association, http://www2.nbia.org/resource_library/what_is/index.php

- Access to appropriate rental space and flexible leases;
- Shared basic business services and equipment;
- Technology support services; and
- Assistance in obtaining the financing necessary for SME growth.

The goal of the Incubator is to implement the activities mentioned at above by building an enabling environment for local business entrepreneurs to start up and manage small and medium enterprises with the following three potential outcomes[8]:

1. Enabling inclusive environment created for entrepreneurs to receive business services and financial assistance;
2. More entrepreneurs start an innovative business as a result of gained competencies and skills;
3. More existing household businesses and SMEs run their business in the professional and sustainable ecosystem.

Several years ago, there was a government funded incubator in each district and aimag in Mongolia. Unfortunately, the boosting period did not continue longer because of its traditional model which did not help work sustainably. Statistically, there are up to 10 business incubators and 8 co-working spaces operating actively in 2018. However, they are still struggling to sustain their operations and offer customized business support services to the target beneficiaries. In order to enhance the aforementioned activities, international surveys present the following key challenges among the failing incubators:

- Uncomprehensive business plan and strategy;
- Outdated business development methodologies and programs; and
- Lack of performance monitoring and reporting.

In response to these key challenges, this paper examines the applicability of a new approach of business incubation model and explores the current status of relevant practices. Nevertheless, we will discuss the innovative determinants brought into the management practice, business support programs, and performance outcomes to potentially create more sustainable and demand-driven incubators in Mongolia.

2. METHODOLOGY

There was an end-line survey which aimed to capture the effectiveness, impact and sustainability of the Women's Business Center (WBC) Incubator. To do this, quantitative and qualitative data were captured through a desk study of relevant documents and a survey of 28 BI beneficiaries, which was incorporated with the findings from a focus group discussion (FGD).

Based on information collected through the desk study and field research, the survey highlights the incubator's management practice, support program, and performance monitoring in the following areas[9]:

- current business profile and involvement in the WBC project;
- changes in women's knowledge and attitudes towards business, and impact on business operations after involvement in the WBC; and
- satisfaction with the WBC project.

---

[8] MARS Incubation model, www.

[9] There is a research indicating that inactive incubators are lack of effective management policies, performance monitoring and evaluation procedures, and their value added support programs. Sarfraza A. Mian, The University Business Incubator: A strategy for developing new research/technology-based firms, The Journal of High Technology Management Research, Volume 7, p. 191-208

Applying a simple SWOT analysis on the WBC model to review the impact of determinants providing more opportunities to the beneficiaries. The participants highlighted the following strengths and weaknesses of the WBC project:

Table 1.Pros and Cons of the WBC project

Pros	Cons
Management practice-related: ● Comprehensive business plan ● Friendly staff and welcoming attitude ● Precise structure of the WBC office and staff's job descriptions ● Co-working office ● Regular communication and information sharing ● Fair BI participant recruitment ● The Project management is good ● Proper selection and recruitment of the stakeholders	***Management practice-related:*** ● Multiple stakeholders ● State-owned space, working timetable ● The procedure is very bureaucratic
Business support services and activities-related: ● High-level BI program ● Updated business information ● Good quality of training content and use ● Qualified trainers ● Library with business books ● A child-care corner, self-kitchen ● Efficient financial support ● Access to mentoring and exhibition free of charge ● Plenty of networking opportunities	***Business support services and activities-related:*** ● Poor choice of library books ● Lack of business mentors ● Lack of vocational training activities ● Not digitalized ● Overloaded classes
Performance outcomes-related: ● Exclusive focus on women (no age and disability discrimination) ● Frequent monitoring ● Feedback after each activity ● Software data collection and reporting program ● Updated data of BI programs	***Performance outcomes-related:*** ● Too many complicated indicators ● Reporting frequency is very high ● More time for data input

Source: Findings of the End-line Survey and FGD results

The SWOT analysis shows that the WBC has prepared a comprehensive business plan, BI program as well as the performance monitoring to run the operation sustainably.

3. WOMEN'S BUSINESS CENTER INCUBATOR MODEL

With pioneering support from the Korean International Cooperation Agency (KOICA), the Mongolian Chamber of Commerce and Industry, Golomt Bank, and Development Solutions, the Foundation and the City of Ulaanbaatar have established Mongolia's first Women's Business Center (WBC) to support women's entrepreneurship.
WBC is committed to help entrepreneurs to start and grow their businesses through educational workshops, one-on-one assistance, co-working and business facilities, and connection with local resources. Since opening in 2016, the WBC has already received close to 5,000 visitors, and registered over 2,000 entrepreneurs who are learning to access capital, loans, and customers; build networks; and market, manage, and grow their businesses.

The local incubation center clients are existing household businesses and SMEs as well as future businesses. They will have access to all programs and services available in the center as part of their monthly member/lease agreement. Per unit service fees will be required for additional office services and special programs from clients and other stakeholders.

In June 2017, the WBC opened a new business incubator (BI) to increase women's contribution to the Ulaanbaatar economy by providing women entrepreneurs with access to state-of-the-art facilities (including computers, sewing and handcraft rooms, and a food-processing unit). A four-month accelerated incubator program (for small and start-up businesses) includes operating space, training and mentoring, and access to a business development fund. Since the launching of the WBC, 28 participants have graduated from the BI.[10]

The BI management practice:

The Incubator was launched and implemented under the cooperative agreements and referral relationships with existing partners in Municipal/District and Non-Governmental sectors at macro, mezzo and micro level.

In the business plan of the Business Incubation Center will identify the potential stakeholders namely and their roles and responsibilities in details. The staffing, stakeholder communications, budget, financing and sustainability issues will be determined and planned based on the feasibility study, market analysis, financial analysis and preliminary draft of the incubator localization, analysis of engineering costs, architectural draft and etc. The private sector will be the main contributor in the facility development as expected.

There will be at least two staff in each incubation center. They are able to serve for clients and facilitate the center activities to assist and nurture local entrepreneurs. Each center may have the capacity to serve 100 clients at minimum per month, and nurture 8-12 businesses per annum, which is forecasted based on the current incubation centers' data. The Incubation Center is organized to implement the standardized client selection and graduation process, including application process, evaluation criteria and graduation policies, which is critical to a successful incubator.
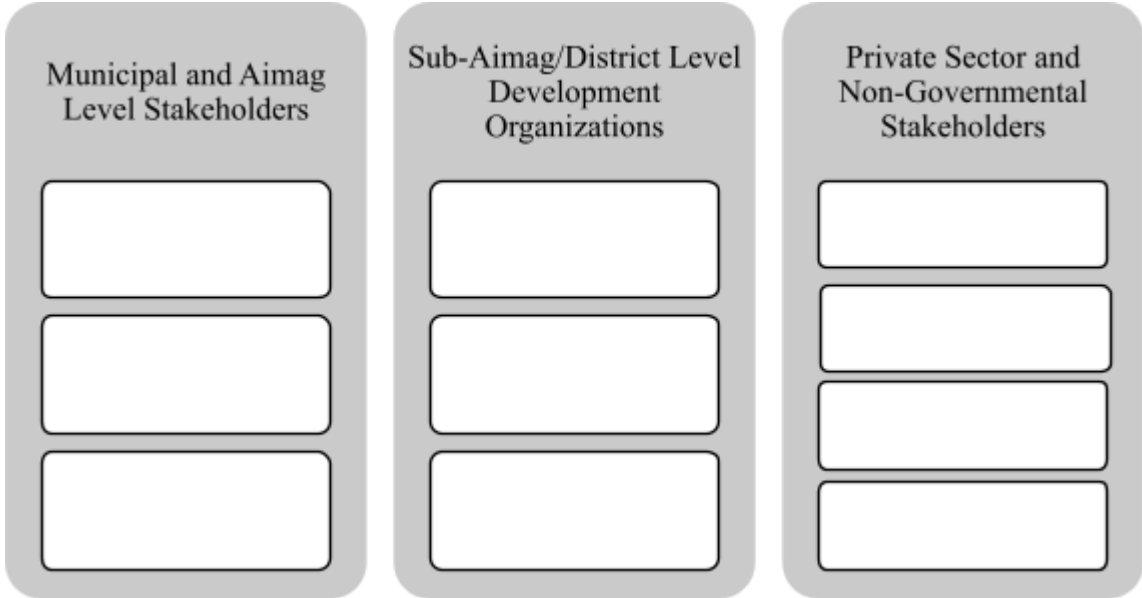

Figure 1.WBC Stakeholders

---

[10] ToR and WBC project documents

The daily operation of the Incubator can be financed from various sources in cash or non-cash forms. In the international practice, personnel and fringe cost is usually stated in the Municipal/District annual budget. And the operating costs, including utility, maintenance and marketing expenses are covered by income generated from business services. There are some other income generation opportunities, such as contractual work fee, donation or membership fee.

BI program:

The program, as the first-time pilot in Mongolia, provides four stages of intensive business support: business registration, product development, market penetration, and establishing binding contracts with investors and larger vendors. Incubator participants also have access to regularly organized pop-up-shop events and other sales or investment opportunities. Those without their own office may use the incubator at no cost while in the program. This four months of intensive development becomes a platform for networking and companionship, and alumni often return to the center to help other women. There is a mentorship component matching BI participants with mentors for a year-long mentoring relationship,

Performance outcomes:

Unlike other existing incubators, the performance reviews are conducted by the donors and partner organizations every quarter. To do this, WBC has identified its incubation program's goal, outcomes and outputs as shown at Figure 2.

Goal:
To increase the contribution of women's entrepreneurship to the urban economy in Ulaanbaatar

Outcome #1:	**Outcome #2:**	**Outcome #3:**
An enabling enviroment created for women entrepreneurs to recieve business services	An increased number of professionally run women-owned businesses as a result of the Women's Business Center	More women entrepreneurs start a business as a result of enchanced skills through the women's business incubator

Output#1:	**Output#2:**	**Output#3:**
Women's Business Center established	Comprehensive business service package developed and implemented	Women's Business Incubator established

Figure 1.WBC Goal, Outcomes and Outputs
Source: WBC Factsheet

In order to manage the vivid and fair monitoring and reporting, the incubator carefully collects and input data into the reporting system. Therefore, the number reports are easily produced at a given time and condition. The incubator staff and monitoring officer are highly responsible for the performance update and reporting to the donors.
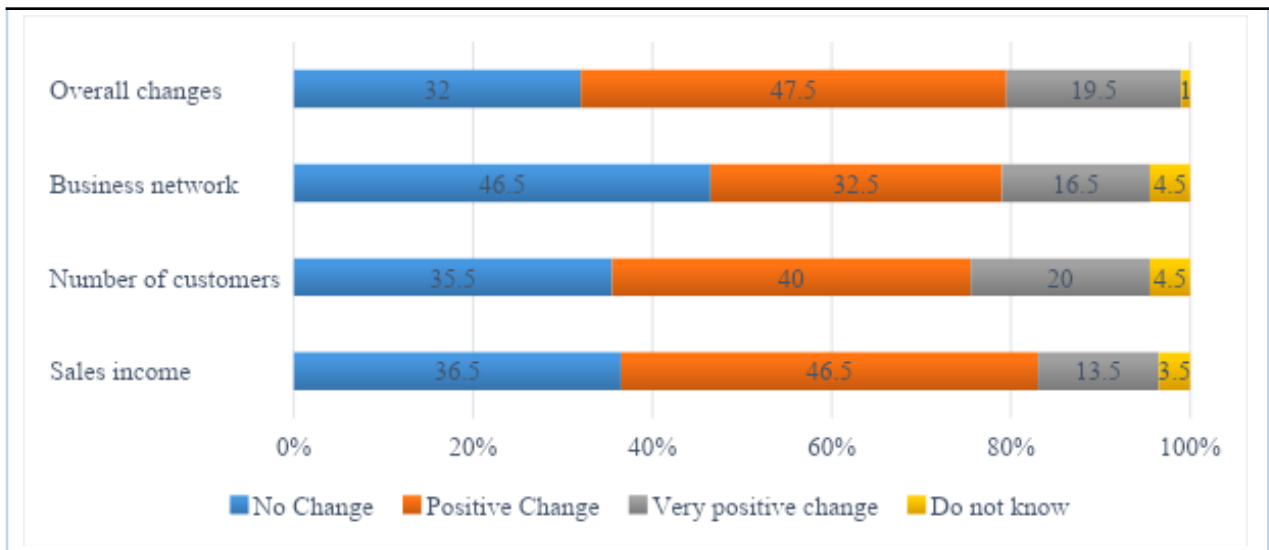
Figure 3. Changes after registering in the WBC project
Source: Findings of the End-line Survey

It is evident from the end-line survey result that the number of legally registered, taxpaying business, increased from 40% to 61% as compared to the baseline study. Also, the number of women running very micro businesses (revenue of less than MNT 10 million) decreased, and the number of small size businesses (revenues of MNT 10-50 million) increased as compared to the baseline.

The beneficiaries of the WBC project are satisfied with their registration and participation in the project. Most of the women-owned businesses highly rated the training and advisory services available to them through the project. The most satisfied participants are the businesswomen who graduated from the Business Incubator program. They saw the WBC project and BI program's approach was very innovative, needs-based, and an efficient means of support received as compared with the government approaches to small business support. In other words, the project's chosen theory of change, implementation methodology and performance quality was well received by their targeted beneficiaries.

Analyzing the BI participants' satisfaction was a crucial and critical part of the survey.[11] The training contents and trainers were very popular and innovative among the local incubators, so it was measured at 4.2. And the networking activities, mentoring and consulting services were highly satisfied with its organization and trendy styles. The co-working space is generally available in the most of incubators which is not a surprising service for the beneficiaries.

---

[11] The satisfaction on the trainings received the highest score, while satisfaction on the co-working space received the lowest score among the other services. The satisfaction index lies in the range of 1 and 5. 1-5 scale of influencing is the range from "Very unsatisfied" to "Very satisfied". Index is close to 1 is regarded as very low satisfaction, and it is close to 5 is regarded as very high satisfaction.
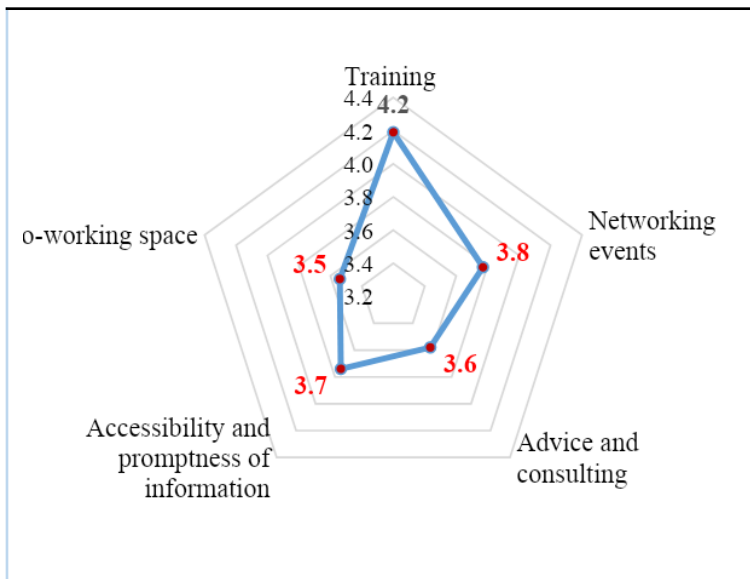
Figure 4. Satisfaction indices of key services
Source: The findings of End-line Survey

4. CONCLUSION

Even though there is limited service time and state-owned space, the incubator is working properly in the framework of the partnership among the government, donors, education and banking institutions as well as communities.

Another key aspect of the project is that women business owners are getting strong awareness of their potential for economic empowerment, which enables women to take on a more leading role in business and their wider communities. Due to the nature of the BI program's participatory and

collaborative approach, women have learned the importance of learning from each other and sharing knowledge, positive attitudes and enabling behaviour change. The WBC helped the women participants build a strong foundation for business creation; therefore, the project has achieved its initial purpose.

REFERENCE

1. National Statistical Office, 2018
2. National Business Incubation Association,
http://www2.nbia.org/resource_library/what_is/index.php
3. MARS Incubation model, www.mars.ca
4. Sarfraza A. Mian, The University Business Incubator: A strategy for developing new research/technology-based firms, The Journal of High Technology Management Research, Volume 7, p. 191-208
5. ToR and WBC project documents

ADVANCED LAND TITLE REGISTRATION SYSTEM BASED ON BLOCKCHAIN TECHNOLOGY

Nomin Uuganbayar[1], Yun Seon Kim[2], Soon Heung Chang[3]

[1] Information Technology and Statistic Center, General Department of Taxation, Mongolia
[2,3] Graduate School of Global Development and Entrepreneurship, Handong Global University,
[1]nomin.u@mta.gov.mn, [2]president@handong.edu, [3]sean0831@handong.edu

Abstract

All countries around the world have accepted that corruption and bribery are the root of an unequal distribution of political power and social wealth. Therefore, corruption in land management negatively impacts on the household livelihoods, people's behavior, public health, city plan and development, environment, bureaucracy in related institutions, trust between citizen and government, and public service quality.

In the last decades, The United Nations (UN) declare that Information and Communication Technology (ICT) is one of the effective anti-corruption instrument. Recently, Blockchain technology has gotten a lot of attention and widely discussed as it has potential to eliminate current issues of government registration system such as identity management, license management, and land title registration to prevent any types of manipulation through its trustful conceptual framework.

The study uses both Qualitative and Quantitative data and some chosen approaches for the data collection including a survey questionnaire, customer opinion interview, expert interview, case study of international practice and previous research works.

The study would suggest and recommend advanced land title registration system based on permissions-blockchain technology which shall improve quality of government service, equal benefits of citizens, destroy bureaucracy system, ensure transparency among related parties as well as prevent corruption. However, the technology is still immature that needs to be further developed and understood to bring out its real potential and risk.

Keywords: Blockchain, Land title register, Corruption, Prevent corruption, Decentralized database

1. INTRODUCTION

Countries of the world have accepted that corruption exists in their society[1]. The corruption creates an unequal distribution of political power and social wealth. People's lack of knowledge, lack of involvement in political decisions, weakness of public accountability, the uncertainty of government or public services or activities, dependent judicial system, non-transparent information in public expenditure, and unstandardized public formal promotion procedures are challenging the people to face various types of corruption in their daily life[1-3].

In the last some decades, ICT is overgrowing, and it has transformed society. Public services converged with ICT and introduced a new service to our life[4]. And the UN declare that ICT is one of the analytical anti-corruption instrument[3]. Mongolia highlighted as an e-ready country by UN's EGDI survey in 2012 due to its nationwide hardware infrastructure and quantity and quality of end-user devices[5]. Unfortunately, software infrastructure of the nation has been abandoned and still in the infant phase[6]. Fortunately, government and public recognize that ICT is a huge potential for extend service delivery channels. Nowadays, E-government index is an essential criterion of a nation's social and economic development. E-government index identified by infrastructure, online service, and human resource three significant consists. In mainly, ICT usage is overgrowing in Mongolia following by global ICT development trend[7].

Same as other developed and developing countries, the Mongolian government and public-sector organizations intention to disseminate their services to consumers equally through this ultimate ICT environment[8]. However, ICT convergence in Mongolia public and government sector has the challenge of the plan, policy, investment, security, legal framework, professionalized human resource, clear action plan, public education, confidentiality of information and general information technology literacy[3, 6].

One of the vulnareble sector of adopting ICT convergence in Mongolia is land administration and its ecosystem. The organization plays a crucial role in city plan, public health, citizen and legal entity's financial self-sufficient, public corruption level, administrative crime, and integrity. According to the judicial report 16.7 percent of the complaints related to land and its dispute between citizens and legal entities in Mongolia[9-11].

Land use cases are resolved about the life style, traditions, levels of development, and other characteristics of the country's economy[12]. People need to consider ecological categories just same as economical categories[13]. Public should understand, monitor and claim for proper use of land and it's the environment condition[8, 14]. Our land reform has not been completed, and after the market has begun to change some of the land legislation in the social system, the implementation of reform. The government is undergoing land reform through land management, but land management is weak in Mongolia. The study shall identify the current situation of land administration's service and its significant problem.

A technology that recently has gotten a lot of attention is the Blockchain technology[15, 16]. It can be described as a distributed database which was created as an enabler for the cryptocurrency Bitcoin by person or group of people Satoshi Nakamoto[17]. The majority part of the world has the problem of land register system. Pioneer project implementers view that blockchain technology has the potential to eliminate current issues of government register system such as identity management, license register as well as land title register. Therefore, this study has been investigating if the blockchain technology can enhance transparently, trusted land title register system within the land administration and its ecosystem[18, 19]. The study gathers data from the literature, survey, interviews as well as benchmarking of existing blockchain solutions in the related field. The issues found in the desktop research which consist of corruption issue in Mongolia.

Finally, the research suggests the proposed solution based on permissioned blockchain technology. However, the technology is still immature that needs to be further developed and understood to bring out its real potential and risk. Several of these issues can be prevented, or mitigated, by the similar kind of blockchain pioneer projects, which makes it to more practical and positive confidence to the project development.

Also, the study shall aim to suggest and recommendation for better e-government service implementation plan in land administration using of blockchain technology which shall improve quality of government service, equal benefits of citizens, destroy bureaucracy system, ensure transparency among related parties as well as prevent corruption.

2. LITERATURE REVIEW

The study suggests permissioned Blockchain solution in land title register system in Mongolia for improving the current situation and solves the problems. The problems include a group of public and private entities like a buyer, seller, bank, tax office, land authority, insurance company, public service providers, and public or social groups. The system ensures transparency among the parties, increase trust, fight with corruption or abuse in land authority, encourage responsibility of public.

Also, the system will help preclude the risk of such authoritative documents being lost, stolen, or tampered. Because every change would be recorded in the order and no one could not edit or erase the data which stored in the blockchain. Data is only updatable by the concept of technology. Therefore, everything will be saved permanently. The feature of the blockchain makes an obvious solution in the land-related ecosystem. However, Identity management system is one of the essential parts in the blockchain based land register system. The role is critical in identifying the owner of the land. It does not matter the type of owner; the only person will represent behalf of the legal entity owner like corporate and public organization.

The only way to steal property is through entering a new real estate transaction process with stolen or forged identification. The security of the ID solution can be improved according to the requirements of the system and technology development. The validation process is getting more serious, and the technology can check double of those criteria like photos of physical ID cards, biometric identification, signatures, etc.

The block will contain all necessary information of land title registration including cadastral mapping, survey information, legal describtion of the owner and tenure information. The block will contain the following information partly or fully.

The content of the block in the proposed system including permanent address,total size of the land, type of ownership, identity card or the birth certificate of the owners, certificate of legal entity (only for a corporation), decision on allocation of land, cadastral information (cadastral ma, land

cadastral research, land quality, economic inventory (Land value), tomographic image, service type, service price, signed by digital signature of authority staffs.

3. RESEARCH METHODS

The study uses both Qualitative and Quantitative data and the some chosen approaches for the data collection including a survey questionnaire, customer opinion interview, expert interview, case study of international practice and previous research works.

Qualitative data has a primary two source primary (survey questionnaire) and secondary (statistic information or report of government, International organization's survey and research work result). Quantity data widely uses an explanation of the qualitative and finding logic of the processes and phenomena. However, the study has 3 main phases; data collection, data analysis and finally conceptual framework development. Figure1, shows research design of the study.

RESEARCH DESIGN
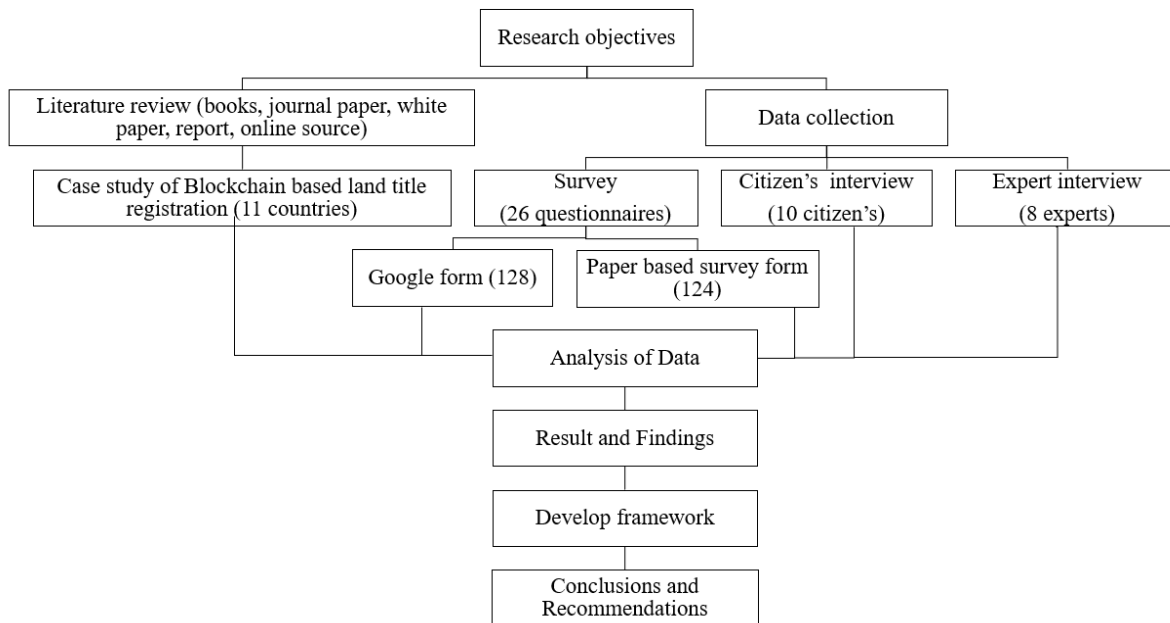
Figure.1 Research Design

3.1.Data collection

The study investigates theoretical and practical fields. Data collection occur mainly four fields including land administration (1), ICT convergence in government (2) socioeconomic life in Mongolia (3) and blockchain technology evolution (4) in global.

In these areas, a study will be conducted to case study research, identify problems and the relevance of causes and consequences which examine the following approaches:

Document collection and comparison methods: Data collected from online sources which are related to e-government, the blockchain, and corruption, land registration, and database are keyword and its principles. Some research approach is used for defining blockchain and general e-government trends and compares international e-government service coverage to the Mongolian e-government status. However, there are a limited number and content of e-government study in Mongolia. The expert

interview would explain tightly about the current situation and future expectation of ICT development in Mongolia especially in ICT implementation in the public sector.

Observation and interview methods: to research quantitative and qualitative data related to government service activities and challenges or benefits of ICT project implementation from specialists, ICT expert and CEO, ICT entrepreneurs, government project advisor, and government administration people.

Graphics and Quantitative Analysis: those approaches used for data processing, show results, and detect interdependencies.

3.2.The survey questionary

The survey investigates public opinion, addressed problems, and challenges citizens faced when they receive the service from land authority. The study of 252 adults across Mongolia including residents of cities, capital of provinces, Soum, and nomadic livestock holders from 18th August to 6th September in 2018.

Regarding the report of the Land authority office statistic 2017, total 570,771 citizens have acquired a total of 57767.26 hectares of land ownership which nominal in law. The number of the people those who registered and verified their land is about 18 percent of the Mongolian population. 82 percent of the population still did not register and confirm their private property.

3.3.Expert interview

The blockchain is one of the ICT solutions. The implementation of the project will similar to other centralized databased based solution. The only difference is the architecture of the system and used platform. So, the current ICT evolution stage and situation of Mongolia would help in defining the background of the project and seek the possibility of the proposed plan.

There are two purposes to conduct the interview discussion from experts. It is an essential tool to find the practical information within the context of the topic from a targeted group or person. In this study chooses eight expert in ICT sector and government administration including all the parties and positions those who contribute all the phase of the project from the preparation phase (1), project planning phase (2), investment phase (3), development phase (4), testing phase (5), correction phase (6), implementation phase (7), evolution phase (8), and finally maintenance phase (9). All the period of the project is equally significant for the result of the project.

At first, the research needs to clarify the representer of the all the parts of government ICT project from customer to system architecture who draw all concept of the system in reality from the initial idea. The research chooses the expert in the interview, who primarily considers their experience, background, implemented project, failure and success of the ICT project, product, and solutions.

Secondly, the research development and design the structure, content, question, ethical principles, related to an interview and personal interview technical. Based on desktop research about ICT and blockchain project in the government sector and interview technical, research prepares the questions for four different categories including ICT professional (1), ICT service, product provider (2), ICT project or division administrator (3), government administration (4).

4. RESULT

The study found some findings from each section of the research. The findings of the survey suggest that the following three main issues can be addressed regarding citizens' access to land privatization and other land-related services.

3.1 Survey Questioners Result

The findings of the survey suggest that the following three main issues can be addressed regarding citizens' access to land privatization and other land-related services.

Land office staff are inadequate to monitor the use of land. Citizens and business entities are insufficient to use area, use the property for others, disrupt the quality of soil, fraud, and alteration without permission. There is a constant controversy surrounding the issue. Land disputes are about 30 percent of the administrative court, indicating that citizens and entities do not sufficiently provide the lack of control and the enforcement of laws.

Experience from other countries demonstrates that land use is not only for the economy but ecology and the general population, but also for those who are residents of the land, monitoring land use, rehabilitation, and ownership activities. The issue of public control is a significant issue in our country. Federal oversight is essential for the improvement of land use, quality, and ownership of land. It also helps to minimize the impact of social and ecological implications. Therefore, it is imperative to make public control over and take action on the exploitation of land in Mongolia and citizens of arbitrary institutions.

The uncertainty of the information on all types of services related to land ownership, possession, and use, is common amongst consumers when they are dissatisfied with their services and have repeatedly returned to the service. Citizens believe that dissemination of information is not sufficient.

For example, in a community interview

It is therefore desirable for the public to communicate information and services to the public, and it is crucial to develop and facilitate the processing of various information channels. Citizens of the Land Agency and other government agencies are also considering introducing new generation technologies in their day-to-day operations and providing citizens with a non-staged, fast-paced service.

Citizens have a wide range of steps to ensure that information sharing and lack of coordination among government agencies are by Land Registration Law. As a result of sampling, it is necessary to pre-service the public and private sectors to get a service from the land office. If people do not know the list of required documents to get the service, it requires to register or submit their application for two or more visits to land departments. Once the request has been made, monitoring and information access are so scarce that it creates an attempt to minimize the quality of service and the time spent on the services provided by citizens to the public service.

The survey questionnaire conducted age group, participants classified following graphics. About 8 percent of total participants are over 60 years old. It may identify, elder citizens use internet much less than younger age groups. The majority of participants belongs active working aged people from 25 to 59 years old. 79% or 200 citizens are belongs to the age group.

The level of education is classified as four groups such as incomplete secondary school, secondary school, bachelor and above master. According to the survey analysis, 119 subjects have a bachelor degree, 7 have incomplete secondary school, 71 have a secondary school, 50 have a master's or higher education. Five people refused to fill out educational level. Employment was classified as a public servant, unemployed, student, self-employed, a private company employee and others. The table below shows the information covered by the survey. According to the Law on Allocation of Land to Mongolian Citizens, the number of people owning land free of charge 316321 at the end of 2017 is about 10 percent of the total population. These citizens have a right to hold their place of residence legally and to invest their long-term investments, to register with the State Registration

Office and land affairs department and to secure their right to own land. 144 or 58.78% of the surveyed residents owned land for family purposes, and 101 or 41.22% of them did not own the property in table 1.

Table1. Survey responder's statistic of land ownership information

Row Labels	Registration of the land title	Percentage
Yes	144	58.78%
No	101	41.22%
Grand Total	245	100.00%

Where did you know required document list? Most of the participants answered 217 questions of the question, and most of them received a list of required documents from the service staff.

11.52% of 25 participants responded that the information they received was not enough. The list of documents necessary to get the services is not required by citizens, but also by the land office and the website of the land office, which can not be time-consuming and difficult to obtain services. Citizens' opinion polls are often available from districts, soums, and bagh.

Also, we are exchanging information with others who have been contacted by the office and have the tendency to clarify the location of the service staff, related documents and operating order at the time. Detailed information of the response is listed below table 2.

Table2. Information source

Row Labels	Where did you know required document list?	Percentage
A. Information board	25	11.52%
B. Service Staff	82	37.79%
C. Website and online source	28	12.90%
D. Family, friends and other people	59	27.19%
E. Guidebook	5	2.30%
F. Other	18	8.29%
Grand Total	217	100.00%

Participants reported that 79.44% of the participants (170 people) did not have enough information, which resulted in difficulties in obtaining services, delayed delivery of services, and two or more departments. Distributing information efficiently to citizens gives citizens the opportunity to get quick service and same time land office has benefit of reduced work load. Detailed information is provided in table 3.

Table3. Information barrier statistic

Row Labels	Did you face any difficulty while you receive service which related to lack of information?	Percentages
Yes	170	79.44%
No	44	20.56%
Grand Total	214	100.00%

To underline, there is not much impact on the gap of information related with the age, education level, and employment status.

Exposure to information sharing between government agencies is lagging behind. The question of whether the land office needs to be served by the land department is answered by the following: Of

the 241 participants, 22% responded that they had one service, 17% responded that they had two organizations, and 18% responded that they had three organizations. However, a significant proportion (42%) provides services after 4 or more organizations. For the average facility, 2.7 organizations and services are required. Response detailed in table 4.

Table4. Necessary organizations information

Row Labels	How many organizations did you visit and take service before taking service from land office?	Percentages
1	53	22%
2	42	17.42%
3	45	18.66%
More than 4	101	41.9%
Grand Total	241	100.00%

It is required to obtain a service from the following agencies. Following organizations are related organizations to get the service from the land office. There is a need to exchange data between government organizations. The result of the questionnaire will help the new concept of the system in the land management ecosystem. 10 to 30 percent of surveyed participants said that there was a double need for a gracious service from a single agency and 70 to 90 percent of survey responders answered they have to do paperwork with two or more organizations. Detail is listed below table 5.

Table5. Related organizations list

Organization name	Answer quantity	Percentages
Local administration office	155	61.50794
Notary	148	58.73016
Bank	154	61.11111
Real state registration office	76	30.15873
State registration office	79	31.34921
Cadastral company	82	32.53968
Tax office	31	12.30159
Police	35	13.88889
Other land authority	38	15.07937
Other organizations	22	8.730159
Grand Total	252	

Also, study found that land offices have bureaucracy and multiple stage service that makes inconvenience to take service. 38.5 percent of survey responders meet one staff, 72.6 percent of survey responders meet two to three staffs, and 23.8 percent of the survey responders meet more than four staffs to accomplish the needed service. Response is detailed in following figure 2.
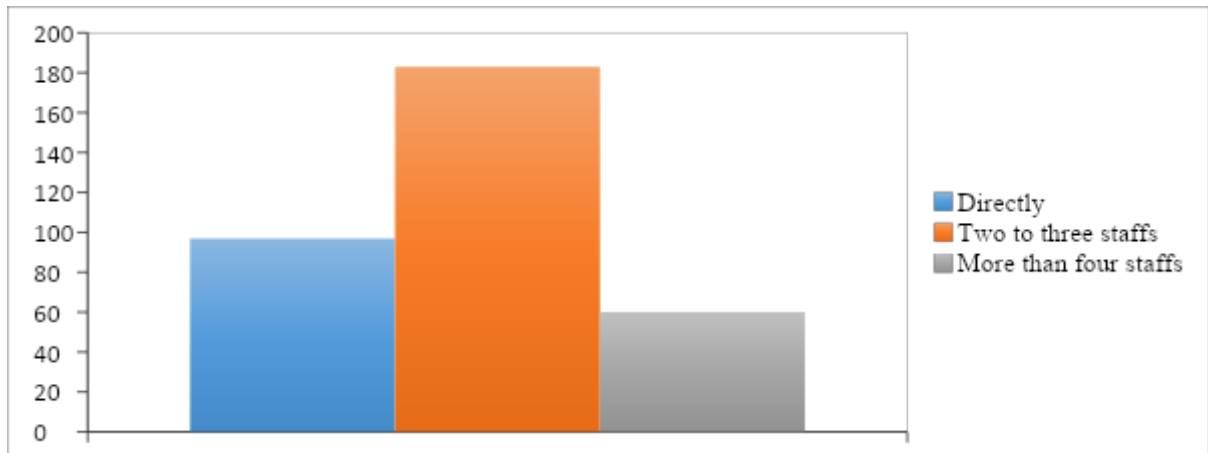
Figure2. Chart of Land authority inside operational stages

People want to take service from one staff. For citizens, It is challenging to meet inside officers in office by themselves. Also, interview responders said that management of operation is not efficient enough. The unbalanced working load often occurs in the office.

The survey observes the barrier of land management. Figure 3. shows the significant barrier of taking service from land authority.
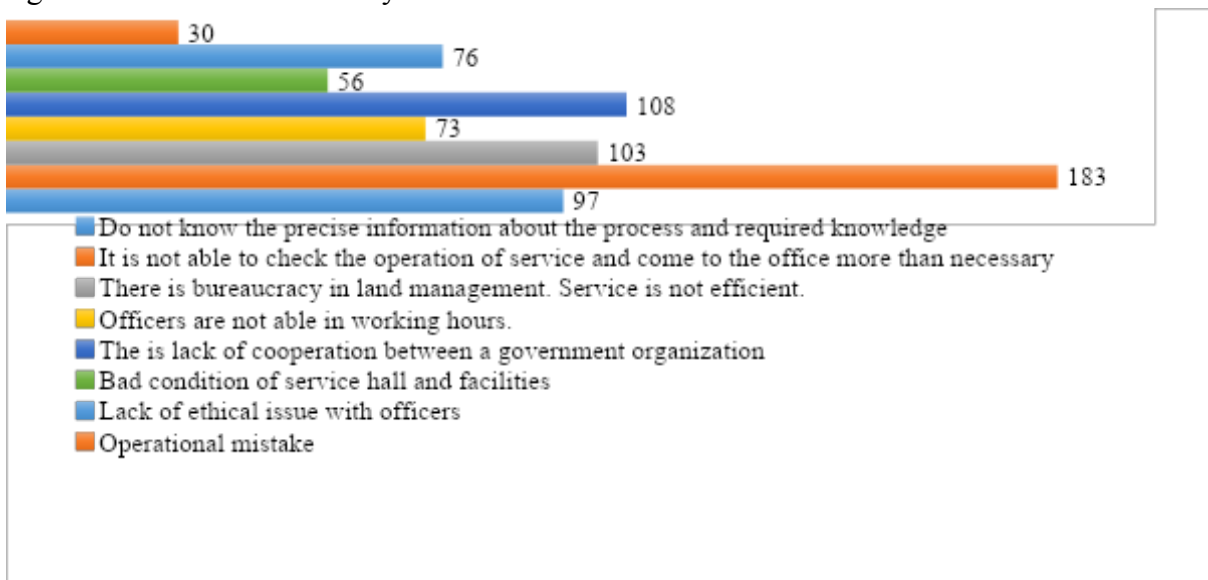

Figure3. The conventional barrier of land authority service

Majority of the responders 153 people had corruption or bribery experiences with land authority which is 60.7% of the responders. It shows the bureaucracy exists in Land authority. Also, 14.3 percent of responders had experience of exchange money with staffs. An unofficial source said that corruption is equal to 10% of the market price of the land nearby capital city of Mongolia and another economically advanced land. Corruption type and its quantity described in table6, below.

Table6. Corruption and bribery details by the survey

	Quantity	Percentage
Use relatives	133	52.8
Bribery	36	14.3
Offer service	42	16.7
Exchange gift	25	9.9

	Quantity	Percentage
Car service	46	18.3
Other	27	10.8

Corruption is often used by citizens to get quick service from land offices. Take targeted service and save time are the main reason for the corruption and bribery.

Table7. The reason for corruption and bribery

	Quantity	Percentage
Taking service	86	49.1%
Save time	106	60.6%
People's suggestion	27	15.4%
Other	43	24.6%

Additionally, people send the comment about current system issue and expected service.
1. People do not want additional verification like notaries and another government statement. They want government organizations should have the right to access data when the people request the service. Ontime, staff or system should check and validate information.
2. Land authority should ensure transparency of information. Empowered government officers and land authority's officer owned the beneficial lands. Public need information on available land.
3. Land management process takes a long time. The process needs to adopt modern technology and send notice immediately about the customer's property and continuing service status.
4. There are a lot of governmental organizations uses the integrated land cadastral information. However, they record the data individually. It is the main reason for debate.

5. DISCUSSION

The study identifies four major problems for taking service from the land authority and implementation of the land title registration based on blockchain technology: Information distribution and preparation, lack of information exchange government institutions, corruption, and trust.

Mongolia have several law related with citizens information right. Currently, most of government organizations including land office have lack of public information preparation and distribution method. Due to lack of information delivery process, citizens are burdened with government agencies. On the other hand, government have ineffective human resource usage. Good information and digital service delivery management have potential to reduce workload and expense of service.

Some organizations actively provide their information through online channel like a official website, television program and social media. Their information quality and content are not well organized sometime. Citizens have complain and suggestion that government organizations should prepare the information easy to understand.

Some information from some government agencies are simply general and old-fashioned. It is just poor law enforcement, such as the Law on Information Transparency and the Law on Glass Account.

Government organization does not have real time data exchange system. Some organizations exchange data in digital form. Most of those solutions have problem of time delay and data integrity.

Because, most organizations process the data before it transfer to the other organizations. Those mechanisms are relying on professional's skill and technical capability.

Last decades, government organizations aimed to contribute E-government national program and develop their own digital service individually. According to expert interview and citizens' survey response, most of those services are not good enough to use for long term. Also, they change the system frequently. It makes difficult to user adopt the system and could not give change to mature the system completely. One of main reason of weak system development made in plan and design stage of the ICT project. System designer who represents the sector are not common in Mongolia. Most of those experts do not have solid knowledge of ICT convergence. Also, majority of the experts said that ICT service development stage in Mongolia is early. Managers, architectures and system designers do not have experience of comprehensive ICT convergence in government sector. Within five years of time, managers are going to be mature case they are practicing and gaining knowledge from their current successful and unsuccessful projects.

If we implement the blockchain technology based land title registration system inside the land office, it could not effective or efficient. Government will receive the potential benefits of the technology when the system involves the complete ecosystem of the land matter. Therefore, central government support and legal framework update are needed.

Trust is principle of government service. Trust issues are often rising. We do not have trusted database solution. Most of government organizations use database management solution of Oracle, Microsoft and other well-known vendor's product. Case of, their product is developed and tested by global costumers. Currently, there are optional matured centralized database solutions available in market. However, no one guarantee the data integrity. So, it makes government data security is strongly rely on their chosen vendor. Many government pay attention to development of the blockchain technology. People consider blockchain is technology of establish secure database system for government as well as business too. Developing country's government invests for development of its own blockchain platform which helps them to release vendor factor. A blockchain moreover provides integrity protected data storage and allows providing process transparency. [20]However, technology benefit and risk have not yet certain. Blockchain technology could not solve the problem alone. It has only potential to solve the problems. Without well design of the digital service concept, the project may be failure just same as other ICT project.

6. CONCLUSIONS

The study proposes an advanced land title registration system based on blockchain technology which would reduce the gap between the developed and developing world, initiate effective monitoring mechanism in land management with public and government participation and contribute national economic development.

1. Unfortunately, Mongolia does not have specific research on the impact of land management. Because of that it is undoubtedly clear that current land management system could not solve correctly provide a solution for protecting owners right, resolve disputes, prevent all types of manipulation including sale fraud, corruption, and bribe.

2. Information security and privacy issue would be more considered in the future. The people, corporate and government need a secure data storage system.Data inside a block of blockchain is not able to erase or modify. The feature of the Blockchain technology specializes trustful database management solution in the public and private sector. However, the technology is still immature that needs to be further developed and understood to bring out its real potential and risk. Several of these issues can be prevented, or mitigated, by the

similar kind of blockchain pioneer projects, which makes it to more practical and positive confidence to the project.

3. People have a limited understanding of the tangible and intangible asset. Only twelve percent of the population verified their private land ownership within the last fifteen years in Mongolia

    In case scenario of the intangible asset, ICT budget and investment is a vulnerable component of the annual budget of the private and public sector excluding banking sector in Mongolia. ICT investment, especially software infrastructure investment has been eliminated firstly by the economic crisis and less productive phases. The condition and common understandings are changed smoothly.

Cadastral process and its information are not formulated as well as developed countries. People and executive companies do not pay vital attention to primary and particular cadastral process. It is essential to building an integrated cadastral database before introducing the blockchain based land title registration system.

REFERENCES

1. International, T., Corruption Perceptions Index 2017. 2018.
2. Corruption, I.C.A., Hong Kong Independent Commission Against Corruption.
3. Agency, T.A.-C., Annual report 2018. 2018.
4. Nations, U., United Nations E-Government Survey 2016. 2016.
5. Nations, U., United Nation's E-Government survey 2014. United Nations, New York, 2014.
6. Authority, C.a.I.T., Yearly report of information and communication sector. 2016.
7. Carter, F.B.L., The utilization of e-government services: citizen trust, innovation and acceptance factors. 2005.
8. Bit Land Global, Real Estate Land Title Registration in Ghana. 2016.
9. Foundation, T.A., Mongolian corruption Brenchmarking survey. 2017.
10. Малган, С.Ч.П.Л.Р., Ардчилал ба улстөрийн авилга. 2006.
11. Д.Төгөлдөр, Газрын наймаа буюу гишгэх талбайгүй төв шуудангийн урд хэсэг. 2016.
12. Lantmäteriet, C., Kairos Future, The Land Registry in the blockchain. Stockholm, Swedish : Lantmäteriet, 2016.
13. Nations, U., Sustainable Development Goal 2030. 2014.
14. C.Kombe, M.M.a.A.M., Design of Land Administration and Title Registration Model Based on Blockchain Technology. Journal of Information Engineering and Applications,, 2017.
15. J. M. R. W. Peter Lorentzen, Death and development. Journal of Economic Growth, 2008: p. 81-124.
16. J. William, Blockchain: The simple guide everything you need to know. 2016.
17. Scott, A., 11 countries where Bitcoin is still illegal. 2018.
18. MCMAHON, J., Kenya is Using Blockchain and Cryptocurrency to Settle Real Estate Sales. 2017.
19. Wüst, A.G.K., Do you need a Blockchain? Department of Computer Science,, 2017.
20. Karl Wüst, A.G., Do you need a Blockchain? Department of Computer Science, ETH Zurich, Switzerland, 2017.

PRELIMINARY RESULT OF ABSENTEEISM RELATED COST DUE TO AIR POLLUTION AMONG PRIVATE COMPANIES IN ULAANBAATAR, MONGOLIA

Mandukhai Ganbat[1,a*], Narantsetseg Amarsanaa[2,b], Nasantogtokh Erdenebileg[3,c], Chuluunbileg Batbold[3,c]

[1]Lux center, 1001, Zaigal Research Institute
[2]Mandakh University
[3] Lux center, 1001, Zaigal Research Institute
[3] Lux center, 1001, Zaigal Research Institute

[a]mandukhai@zaigal-institute.com [b]narantsetseg@mandakh.mn [c]nasantogtokh@zaigal-institute.com
[c]chuluunbileg@zaigal-institute.com

Abstract

Air pollution is a grave problem that impacts billions of people across the globe. According to the World Health Bulletin, the most polluted air in Mongolia is found in Ulaanbaatar, where 46% of the country's population resides. For companies in Ulaanbaatar, the medical effects of pollution may lead to higher absenteeism. The absenteeism rate is the number of absences per number of employee-workdays in a specified period, expressed as a percentage. High rates of absenteeism are costly, because fundamentally, absenteeism is a bottom-line killer for a company's finances. The

costs might include loss of salary, loss of productivity, loss of cash in the economy, the opportunity costs of missed days of work, and the costs in worker productivity associated with poor health.

Analyses will be conducted using these data to provide a comprehensive picture of absenteeism, its associations with pollution, and its causes and costs. We employed times-series cross-sectional study to assess cost.

Mean of individual cost estimation for children during high air pollution level is 95750MNT (35.000-500.000). Diagnosis related cost for employees without children is equal to 162 322 MNT and for employees with children – 159 890 MNT, which is statistically insignificant.

Key words: sick, employee, workday, salary, particle matter

1. INTRODUCTION

Air pollution is a grave problem that impacts billions of people across the globe. For example, it is the primary cause of death in India, killing over 1.6 million people a year[1]. In Mongolia, pollution may cause over 4,000 deaths annually, an incidence of 132 deaths per 100,000 people compared to the global average of 92 deaths per 100,000 people per year (WHO)[2]. According to the World Health Bulletin, the most polluted air in Mongolia is found in Ulaanbaatar, where 46% of the country's population resides[3]. The air pollution is defined as the high concentration of particulate matter measured in microgram (millionth of a gram) per cubic meter of air.

For companies in Ulaanbaatar, the medical effects of pollution may lead to higher absenteeism. Not only will employees themselves suffer the consequences of constantly breathing highly polluted air, but many employees must take time from work to care for sick children and other family members. This adversely affects the finances and productivity of both the employer and the employee. Since illness does not occur on a particular schedule, these absences are unpredictable and may be very disruptive. The employee is not available to carry out his or her tasks and the employee may lose income and incur additional expenses to care of the child. Moreover, employees may not be as productive if they are working while ill.

The absenteeism rate is the number of absences per number of employee-workdays in a specified period, expressed as a percentage. The period can be anything — a year, a month or a quarter. The resulting number will tell the percentage of days that staff members unexpectedly miss per period measured. Absences in this context include any unplanned absence from workday, as when an employee calls in sick or has child-care problems. It does not include the absences that are authorized and planned for, such as personal leave and vacation time.

High rates of absenteeism are costly, because fundamentally, absenteeism is a bottom-line killer for a company's finances. According to a report by the workforce performance solutions company Circadian, absenteeism in the shift-work sector costs businesses approximately $2,600 per shift worker per year. For a workforce of 50 workers on an hourly wage, these losses could reach $133,000 annually on direct absenteeism costs[4].

To date, the costs of absenteeism have not been carefully and thoroughly analyzed for companies operating in Ulaanbaatar. We hypothesize, however, that pollution and its health effects create a substantial loss of productivity that hurts both businesses and employees, this may reduce the productivity of Mongolia as a whole, as UB is the primary commercial center of the entire nation. Therefore, the impact of air pollution on corporate and employee finances, as well as employee health, may create significant societal costs as well. These costs might include loss of salary, loss of productivity, loss of cash in the economy, the opportunity costs of missed days of work, and the costs in worker productivity associated with poor health.

2. RESEARCH METHODOLOGY

Representatives of employers and selected employees will be surveyed using quantitative and qualitative instruments to characterize the specific issues that they face during the highly polluted months. Secondary data will also be used, where available, to provide more specific measures of the losses incurred and that the factors that trigger absenteeism. Analyses will be conducted using these data to provide a comprehensive picture of absenteeism, its associations with pollution, and its causes and costs. We employed times-series cross-sectional study to assess direct and indirect cost.

2.1. Company selection

We defined target private sector employers. This includes creating an inclusion and exclusion criteria. These criteria will likely encompass business type, employee numbers, availability of employee attendance records, format of records, quality and completeness of records and willingness to share records. Therefore, we selected 4 companies for analyzing preliminary result based on above mentioned criteria.

2.2. Quantitative data

Description of variables that come from quantitative questionnaire. Absenteeism related questions, air pollution related common symptoms and diseases questions, cost to employees' questions and demographic and behavioral questions will be asked through the survey.

Absenteeism data for the previous 5 years will be calculated in hourly, daily and monthly increments. For example, calculating the number of hours missed will allow data on employees reporting to work late to be incorporated into unexcused absenteeism data. This is the equation we will employ in the study.

$$Absenteeism(\%) = \frac{Number\ of\ hours\ taken\ off\ for\ absence}{Total\ hours\ scheduled\ by\ the\ work\ force\ over\ the\ period}\ x\ 100$$

Air quality data will be obtained from the Historical Daily Ambient Air Quality Data, released by the National Agency for Meterology and Environmental Monitoring. The UB air quality department has 11 monitoring stations, and accordingly we will able to obtain pollution data for both the site of employment and the location of domicile. Additionally, weather stations records including temperature, precipitation, humidity and wind speed will be obtained to account for weather conditions.

2.3. Qualitative data

We use 2 types of qualitative tools, focus group interview and individual interview, to uncovering costs that are not readily apparent to researchers such as personal costs from lost income or due to medical costs. Additionally, focus groups will help determine why company employees experience absenteeism. A focus group guide will be developed using three types of questions including probing, follow-up and exit questions. Focus group participants will be grouped to create homogeneity based on company employees' gender, age and hierarchy in the group to help participants feel more comfortable expressing their opinions. The inclusion criteria of the focus

group will be at least one sick absence during the past winter based on self-reported experience, and at least one child with under five in the household.

Face-to-face interviews will be conducted with key employer personnel to determine costs that are important to the employer and company's coping technique to prevent from air pollution. These will include two representatives from each company, including the director of human resource and accounting department.

3. COST ANALYSIS

We calculated the company direct cost including annual salary, social insurance contribution, bonus payments, contracted overtime and short-term disability cover.

Company costs will be examined by lost productivity and company human resources policies to respond to absent workers. In the case of manufacturing and production, these will be analyzed by records of goods and services produced. Other costs include sick pay, additional hiring and overtime.

Cost of air pollution for company: (DC1+DC2+DC3+DC4+DC5)
DC1- Bonus payment for employee DC2- contracted overtime DC3- travel allowance DC4- meal allowance DC5- private health care insurance
Individual cost to employees will be collected through questionnaires. Variables in the questionnaire to assess cost of the individual and his/her family members such as medical treatment, medicine, doctor's visit and laboratory tests and transportation. We will calculate hourly wage and multiply it by the number of hours or days that employee missed because of air pollution related sickness. For instance, if company employee hourly wage is 5000 MNT, and he/she missed work for three days (8 hours per day), and calculation will be: 5000MNT x (8 hrs*3 days) = 120000 MNT (total lost wages). For the employer they may have records of what is paid vs what is under contract. This data can be used to measure lost wages. If employees don't want to share their salary information, a crude measure will take annual turnover of the company divided by the number of employees then multiplied by the number of hours of absent employees.

3.1.Data analysis

After we have cleared the HR data, we have more than two groups, so we can estimate the difference in groups using the ANOVA test. Then evaluate the correlation and regression analysis and time series.

Correlations between high air pollution and absenteeism will be determined by analyzing absenteeism and air quality levels as officially recorded in a sample of air quality monitoring stations across Ulaanbaatar. We will correlate all air pollution indicators with cost. Two variables will be checked with normality assumption. If two continuous variables are normally distributed, we will use the Pearson correlation test. If two variables are not normally distributed, we will employ the Spearman correlation test.

Linear Regression Model
$$Absent_{ijkt} = a + b1P_{kt} + b2X_{ijkt} + b3Z_{ijkt} + b4V_{kt} + \varepsilon_{ijkt}$$
$Absent_{ijkt}$: absence of employee i, in company j, local area k and year t;
P_{kt}: pollution level in area k and year t
X_{ijkt}: time-varying individual characteristics (age, gender, education level, etc.)
Z_{jkt}: time-varying company characteristics (number of employees, sector, etc.)

Vkt: time-varying local area characteristics (for example, weather variables)

εijkt: error term

Poisson regression model

We will suppose that the Poisson incidence μ is determined by a set of k regression variables (the X's). The expression relating these quantities is:

$$\mu = t\exp(\beta 1 X1 + \beta 2 X2 + \ldots\ldots + \beta\kappa Xk)$$

$$Absence_t = \alpha + \beta 1 Pm2.5 + \beta 2 PM2.5_{t-1} + \beta 3 \text{weekly sum of PM2.5} + \varepsilon_t$$

In the event that absence data is over dispersed (variance significantly greater than mean), or if there are excess zeros in the data, we will consider alternatives to the Poisson model, such as negative binomial or zero inflated models.

Spatial modeling

Our investigation hypothesizes an exposure-response relationship that is inherently spatial. Specifically, we suspect that pollution levels are spatially heterogeneous, a possibility that can be supported with data from the 11 pollution monitoring stations distributed in the UB environs. Thus, it is natural to hypothesize that work absenteeism is related to (1) workplace location and/or (2) employee residential location, which will create spatially heterogeneous exposure to pollutants among the work force.

Geographic observations violate assumptions of independence in statistical models. Observations that are closer to one another geographically will tend to be related or non-independent, not only with respect to measured study variables but also unmeasured effects. Thus, without a modeling structure that accounts for this phenomenon of "spatial autocorrelation," models that incorporate spatial data may exhibit spatially clustered residuals or model error.

We will employ two strategies to account for spatial error. For models in which the observation is the individual employee, with her/his residential location encoded as a longitude/latitude coordinate pair, we will use an isotropic smooth function that will model spatially local variation in our outcome variable (count of absences or probability of absence). This can be accomplished using a generalized additive model, which employs nonparametric splines or Gaussian process smoothing ("kriging") to smooth the effect of coordinate space.[2, 3]

A second strategy will be for models that use 2-dimensional areas (i.e. neighborhoods) as a unit of observation. This is a convenient modeling strategy in that it allows us to (2) sample environmental variables within the boundaries of our neighborhoods and (2) incorporate census variables in some cases. To incorporate neighborhoods in a regression model requires an adjacency definition, which is a matrix defining how our areas neighbor one another in space. A regression model can then use a conditional autoregressive structure such as the Besag-York-Mollie autocorrelation function to simultaneously model both spatially correlated and uncorrelated random errors.[4]

Temporal modeling

Time can be modeled as both a continuous variable, from the initial to the final date in our study period, as well as a cyclic or seasonal variable with weeks, months, and seasons repeating annually. Using smoothing splines, statistical models can incorporate both of these conceptualizations as separate model parameters(5). This will allow us to evaluate linear trends in absenteeism while controlling for seasonality. Additionally, we will be able to evaluate the impact of seasonally variable exposures such as temperature and pollution, while controlling for seasonality.

Analysis control variables:

Control variables: Previous research has shown age to increase the risk for absences for both men and women, although there might be no clear pattern. Sickness absence seems to be higher for women than men. Although there are no clear differences between full- or part-time workers in

sickness absences, working hours affect the duration that one is exposed to a stressful working situation. Therefore, we will control for weather, age, gender, education level and employment factor, and time (day of week, month, and year) of absenteeism.

4. RESULTS

Total of 807 private companies' employees between the age of 19 and 64 participated in the survey. 54.6% /440/ of respondents was male, 45.4% /367/ was female and average age is 31.5±7.6. 90% of employees have 1-4 children. /table 1/

Table 1.Demographic information of employees of private companies

	Company 1		Company 2		Company 3		Company 4	
	Count	N %	Count	N %	Count	N %	Count	N %
Gender								
Male	145	57.1	60	57.4	142	78.5	93	34.2
Female	114	42.9	43	42.6	39	21.5	164	65.8
Total	259	100.0	103	100.0	181	100.0	257	100.0
Education								
Univeristy	132	52.8	101	100.0	137	82.0	235	91.4
Secondary	90	36.0	-	-	15	9.0	12	4.7
Technical	20	8.0	-	-	14	8.4	9	3.5
College	8	3.2	-	-	-	-	1	0.4
Primary	-	0.0	-	-	1	0.6	-	-
Do you have a child?								
No	25	9.7	4	3.9	43	23.8	9	3.4
Yes	234	90.3	99	96.1	138	76.2	255	96.6
Total	259	100.0	103	100.0	181	100.0	264	100.0
Work time								
≤8	86	34.7	56	56.0	151	86.3	150	63.3
≥9	162	65.3	44	44.0	24	13.7	87	36.7

Survey from employees of private companies showed that average work time is 9.5 ± 3.5. Distance from home to work is between 5.2 and 9.4 km on average.

Table 2.Individual sick visit by frequency

Variable	Diagnosis related visits	Medicine related visits	Hospitalization	Transportation and food
Mean(SD)	3.46 ± 1.8	5.52 ± 2.1	1.64 ± 0.8	7.72 ± 1.4
Max	20 times	30 times	10 times	60 times
Min	1 time	1 time	1 time	1 time

During winter, when the air pollution level is high, children get diagnosis 3.46 ± 1.8 times, get hospitalized 1.64 ± 0.8 times and buy medicine 5.52 ± 2.1 times. In addition, children get diagnosis 1-20 times and get treated 1-30 times during winter. When children get sick, their parents are fully responsible for transportation, meal and medical costs.

Table 3.Individual cost estimation for children during high air pollution level

Variables	Median /MNT/	Interquartile range		Min /MNT/	Max /MNT/
		25th	75th		
Diagnosis related costs	91 500	40000	150000	5 000	5 000 000

	100 000	40000	200000	3 000	1 500 000
Medicine related costs	100 000	40000	200000	3 000	1 500 000
Hospitalization related costs	200 000	100000	400000	10 000	5 000 000
Transportation and food related costs	70 000	30000	150000	1 000	1 000 000
Total costs	95 750	35000	500 000	19 000	12 500 000

Sickness related costs of employees with children and without children are statistically significant. Diagnosis related cost for employees without children is equal to 162 322 MNT and for employees with children – 159 890 MNT, which is statistically insignificant. Medicine cost for employees without children is 91 181 MNT and for employees with children – 154 503 MNT.
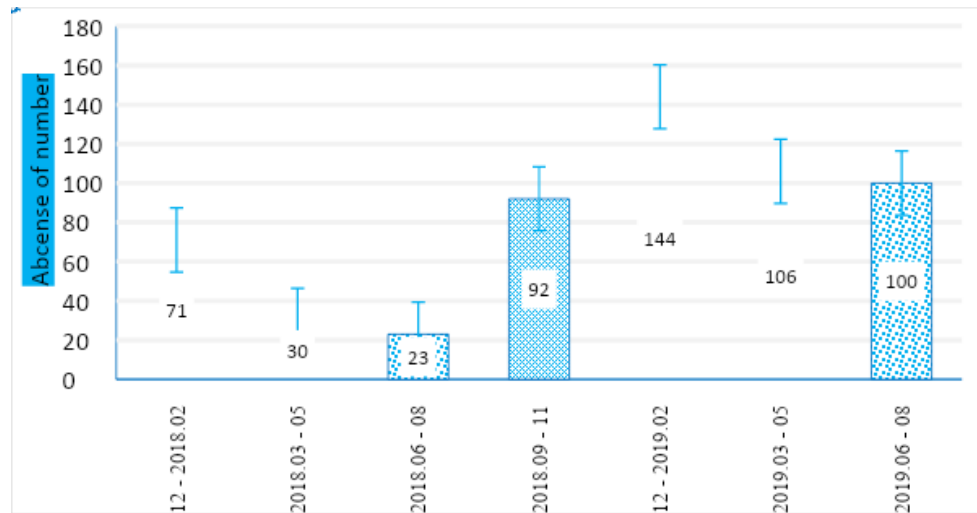
Figure 1. Absenteeism /days/

During from December to February, absence of number is highest through the 4 companies whereas it is the lowest in June, July and August.

Qualitative data results:

Diagnosis cost: there is no cost when visiting a family health center. Medical examinations cost 20 000 - 40 000 MNT and analysis cost 15 000 – 30 000 MNT in private hospitals.

Treatment cost: hospitalization costs 80 000 – 120 000 MNT per day in private hospitals. Medicine costs 30 000 MNT minimum, 150 000 MNT maximum. People mostly spend 40 000 – 50 000 MNT for medication. Most of the respondents do not precisely calculate money spent on meals and transportation and this cost is approximately 200 000 – 500 000 MNT.

5. CONCLUSION

In the winter, the disease related to air pollution is higher prevalence and the absence rate has high level in 4 companies. Company cost may have trend to increase as absence rate increasing. So there has necessary to involve many companies to explore deeply.

REFERENCE

1. Kalpana Balakrishnan, SagnikDey, et al. (2019). The impact of air pollution on deaths, disease burden, and life expectancy across the states of India: the Global Burden of Disease Study 2017. The Lancet Planetary Health. 3(1): 26-39
2. WHO(2018): Recommendations of Air Pollution
3. WHO(2019): Air pollution in Mongolia: Bulletin of the World Health Organization; 97:79-80
4. Caroline Cooke (2014). Shiftwork & Absenteeism. CIRCADIAN.

DISTRIBUTION OF MONGOLIAN MINERAL RESOURCES, TRANSPORTATION AND LOGISTICS ANALYSIS

Erdenechimeg E.[1,a], Asralt B.[2,b], Khurelbaatar G

[a]Asian Infrastructure Research Institute, Ulaanbaatar, Mongolia
[b]Science and Engineering Department, Mandakh University, Mongolia
[a]erdenechimeg@hotmail.com, [b]asralt@must.edu.mn

Abstract

Mongolia has vast mineral resources. But they are non-renewable resources, so we should seek proper use and appropriate measures such as putting environmental protection and to advance value-added products into the world markets with optimum prices at the forefront. Considering these thoughts this study identifies the ways to reach third country markets, the implementation of required development policies to resolve the railway, transportation and logistics issues and the development of future Mongolian mineral resource and mining industries.

1. INTRODUCTION

Mongolia ranks 7th in global resources with around 1170 known deposits and over 10'000 known occurrences of 80 different types of mineral resources (Mineral Resources Authority of Mongolia, 2017). These include: 1619 t gold, 227'000 t silver, 36.3×10^6 t copper, 660×10^6 t iron ore, 5.9×10^6 t zinc and 250×10^6 t petroleum resources. Deposits with large resources include Erdenet, Oyu tolgoi, Tsagaan suvarga, Gatsuurt, Tavt, Asgat, Mungun under, Bayngol iron ore, Tumurtei, Tumurtei ovoo and Bargilt deposits. Mongolia has discovered around 300 coal deposits from 15 coal basins. And, a total 9.8×10^9 t coal resources from 175×10^9 t inferred coal resources are guaranteed. The largest coal deposit of Tavan tolgoi has 7×10^9 t JORC compliant coal resources (3 billion coking coal and the remaining are good quality thermal coal) estimated. Out of the 6-7 known deposits and occurrences from 14 petroleum basins only the Zuunbayn and Tsagaan els deposits are in exploitation (Mineral Resources Authority of Mongolia, 2017).

Infrastructure and transportation especially rail transportation is important for both domestic and international trade. This study analyzes the outlook and future trends of mineral resource transportation in correlation with Government railway and mining policies. The study includes a matrix analysis of total 54 deposits (15 strategic deposits and 39 potentially strategic deposits) to classify the deposits by order of significance. The matrix analysis evaluates the internal (mining parameters) and external (infrastructural, economic, environmental, socio-political and legal parameters) factors. The matrix analysis results helped develop the regional mine development plan.

In correlation with this plan the current rail transport demand and future outlook of rail transport until 2043 were estimated by the ArcGIS and EMMA software programs to produce a recommendation for the implementation of railway development. These also include ways to connect with third country markets and sea-access.

2. CURRENT AND FUTURE OUTLOOK OF THE MINING INDUSTRY

The mineral commodities price rise in 2007 brought in large foreign interests of mining and exploration in Mongolia. This resulted in rapid development within the industry with mining producing 20% of total GDP in 2005. However in 2012 and 2013 these statistics decreased to 17.8% and 16.6% respectively. The mining sector provides 69% out of the total industrial sectors and mineral commodities account for approximately 90% of total exports (National Statistical office, 2013).

Consensus in 2013 showed 401 economic entities actively operating within the mining sector out of the registered 728. By August 4th of 2014, 1590 individuals and economic entities held 2798 active licenses (12.0 million hectare area), of which were 1349 for mining and 1449 were for exploration (Mineral Resources Authority of Mongolia, 2014).

Mongolian economy is too dependent on the mineral resources sector which could entail huge risks. The establishment of controlled sustainable mineral extraction, especially for mineral commodity exports to manufacture value-added products that meet international standards at optimum market prices are necessary as Mongolian mineral resources are non-renewable.

The basis of the industry development lies in the support and developments for infrastructure, ecology, geology and the future plan developments in accordance with state policies and socio-political factors. In this regard a matrix analysis of total 54 deposits (15 strategic deposits[121] and 39 potentially strategic deposits) was conducted. The matrix analysis evaluates the internal (mining parameters) and external (infrastructural, economic, environmental, socio-political and legal parameters) factors to classify the deposits in order of significance in correlation to the factors. The mining factors assessed by 6 groups of 18 inquiries and the infrastructural factors are assessed by 2 groups of 16 inquiries. The mining and infrastructural factor evaluation results were ranked "excellent", "good", "moderate" and "bad" by order of significance (Table 2.1). Table 2.2 shows the most significant factor for the mining and infrastructural assessment.

Table1. Mining and infrastructural assessment results of matrix analysis.

		Mining			
		Excellent	Good	Moderate	Bad
Infrastructure	Excellent	**Erdenet** (1.60; 1.78)	Nariin sukhait (1.50; 1.63) Bargilt (1.45; 1.59) Baganuur (1.63; 1.59) Tumur tolgoi (1.53; 1.56)	Ulaan ovoo (1.45; 1.41)	Nalaikh (1.38; 1.32)
	Good	Aduunchuluun (1.30; 1.78)	Oyu tolgoi (1.23; 1.66) Chandgan tal (1.33; 1.63)	Gurvan bulag (1.30; 1.54) Tsagaan davaa (1.23; 1.49) Dornot (1.30; 1.44) Tumurtei ovoo (1.23; 1.37)	Mardai (1.28; 1.32)

[121] The Gatsuurt gold deposit was still considered a potentially strategic deposit at the time of study.

r e				
		Alag togoo (1.23; 1.61) Tsaidam nuur (1.25; 1.61)		
	M o d e r a t e	Shivee ovoo (1.20; 1.78) Tavan tolgoi (1.20; 1.78)	Boroo (1.00; 1.66) Tsagaan suvarga (1.20; 1.61) Nuurst khotgor (1.03; 1.61) Khuot khonkhor (1.03 ; 1.59) Talbulag (1.15; 1.59)	Tugrug nuur (1.15; 1.54) Uvdug khudag (bituminous coal) (1.18; 1.51) Uvdug khudag (lignite) (1.15; 1.51) Khuot (1.13; 1.49) Tsav (1.00; 1.46) Baynteeg (1.08; 1.44)	Mogoin gol (1.13; 1.32) Tumurtei (1.20; 1.29) Saikhan ovoo (1.00; 1.27) Naran tolgoi (1.10; 1.24) Janchivlan group deposits (1.05; 1.05) Bayndavaa (1.05; 1.05)
	B a d		Tevsh gobi (0.93; 1.63) Mungun undur (0.85; 1.63) Shvden uul (0.85; 1.61)	Shavriin tsaram (0.88; 1.49) Ulaan (0.90; 1.49) Burenkhaan (0.88; 1.49) Zeegt (0.95; 1.44) Tsagaan Tsav (0.93; 1.44) Ongilog nuur (0.73; 1.41) Mankhan uul (0.85; 1.41)	Shiree uul (0.75; 1.34) Khar tarvagatai (0.78; 1.34) Asgat (0.85; 1.32) Tavt (0.75; 1.29) Lugiin gol (0.98; 1.27) Khongor (0.80; 1.22) Khukh adar (0.75; 0.95) Ulaan uul (0.70; 0.93)

Table2. The most significant factors for the mining and infrastructure analysis /ranked highest to lowest, number of deposits affecting/.

	Rank	Factors (Inquiry #)	Deposits
M i n i n g a s s e s s m e n t	I	Size of license area (3)	7
		Potential for reserve increase (9)	6
	II	Difficulty of environmental rehabilitation (18)	5
		Ownership of license (1)	4
	III	Whether the operating entity holds the license or not (2)	2
		Reserve ranking /by international standards/ (8)	2
		Foreign code for reserve classification (12)	2
I n f r a s t r u c t u r a l a	I	Deposit distance from Ulaanbaatar (23)	14
		How many energy sources (35)	14
		Deposit distance from province center (24)	14
		Distance to nearest border crossing (26)	14
		Distance to industrial and technological park	14
		If the deposit is linked by rail line (28)	13
		Distance to state roads (29)	12
		Whether connected to a power source (34)	12
		Groundwater reserves (32)	10
	II	Site geomorphology (20)	9
		Atmosphere (21)	7
		Whether if the local sum borders with neighboring country (25)	7
	III	Difficulty of exploitation regarding environmental and climate issues (22)	4

s s e s s m e n t		Whether if the deposit is connected with either paved or mine roads (30)	2

From the tables above, the 15 strategic deposits could be infrastructurally categorized into capable and incapable. For example: Erdenet, Oyu tolgoi, Shivee- ovoo, Nariin sukhait, Baganuur, Tavan tolgoi, Boroo, Tsagaan suvarga, Gurvanbulag, Dornot and Tumurtei-ovoo deposits could be categorized as infrastructurally capable deposits while the other deposits would be categorized as incapable deposits.

Table3. Mining and infrastructural assessment of matrix analysis, by type of minerals.

		Mining		
		Good	Moderate	Bad
I n f r a s t r u c t u r e	G o o d	Copper Coking coal Lignite Bituminous coal	Uranium Iron	Lead, Zinc
	M o d e r a t e	Salt	Gold Silver Zinc, Lead Zeolite Pyrope	REE Tin, Tungsten
	B a d		Phosphorite	Copper, Zinc Gypsum Fluorspar

The above table shows that the copper and coal deposits have relatively well infrastructure with good future prospects and the distributional pattern of mineral deposits are related to the infrastructural factors /iron, lead, zinc/.

Similarly the other external factors were evaluated in correlation with the internal (mining) factors. The results of this matrix analysis helped develop the regional mine development plans in tandem with the mining production estimates by the Mongolian Ministry of Mining (Fig 1)

Fig.1. Regional Mine development plan.

The first phase of the plan is to establish and develop:
- Erdenet-Darkhan region based on the Erdenet, Tumurtei and Ovoot deposits;
- Baganuur region based on the Baganuur deposit;
- Gobisumber-Choir region based on the Shivee-Ovoo and Tsagaan suvarga deposits;
- Umnugobi region based on the Tavan tolgoi, Oyu tolgoi and Nariin sukhait deposits;
- Choibalsan region based on the Aduunchuluun deposit.

3. ESTIMATIONS FOR MINERAL RESOURCE TRANSPORTATION OUTLOOK

The mineral commodities are transported by either road or rail line. Rail transport plays an important part in mineral commodity exports especially to third country markets. And the study of mineral commodities transportation outlook correlates with state policies on railway development (Fig. 4 and 5).

Figure.2. Future Mongolian railway development (Source: Ministry of Road and Transportation).
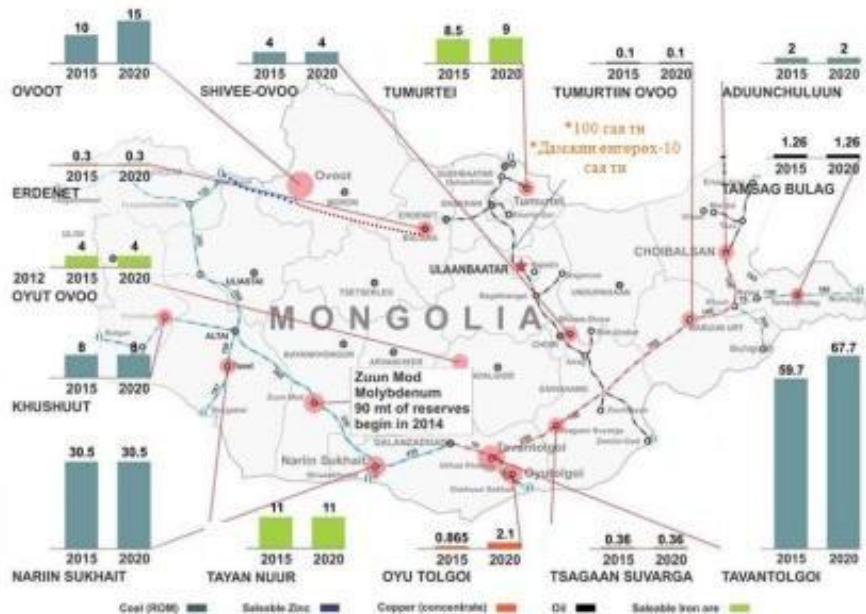
Figure.3. Railway connections with mineral deposit (Source: Ministry of Road and Transportation).

Currently 51% of total freight transport is international and 49% is domestic freight transport. In 2017 58.9% of total international freight transport was export with 24.1% import and 17% was transit transport. Of all the exports 96.42% went to China and 3.58% was transported to Russia. Iron ore transportation to China accounted for 77.09% of total exports. In 2017 Railway transport revenue increased 4.3 billion MNT or by 1% from its previous year to reach 420.8 billion MNT.

Fig. 6 shows the result of our O/D (commuter and freight transportation) traffic projection processed by ArcGIS and EMMA software based on the information of 2017 total railway transportation. It shows us most of Mongolian foreign trade occurs with China.
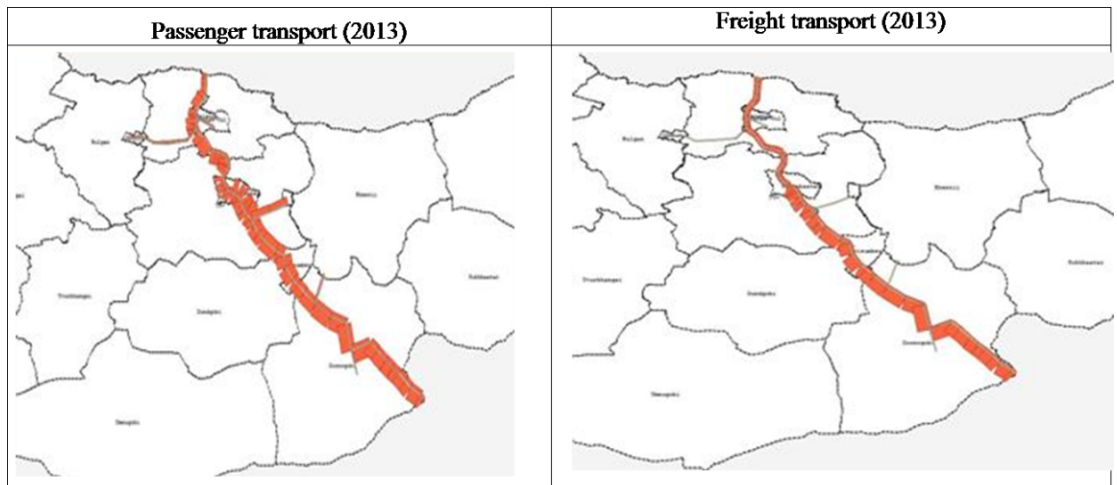
Figure. 4.Passenger and freight railway traffic.

The future rail traffic demand model was estimated to 2043 by selectig the year 2013 as the as year. The mineral commodities rail transportation until 2043 is estimated by daily transportation (Table 4.1 and Fig. 7). The next 30 year outlook of the mineral commodities transportation estimations show increases in the coal, fluorspar, zinc and copper concentrates of Selenge,

Uvurkhangai, Khentii, Umnugobi, Dundgobi, Dornogobi and Gobi-Altai provinces. Especially the Chandagan tal coal and Bargilt iron ore deposits of Khentii province; the Tavan tolgoi, Nariin sukhait coal and Oyu tolgoi copper concentrates of Umnugobi province; Uvdug khudag Khuut khonkhor coal and fluorspar exports show a sharp increase in their future trends.

Table4. Estimations for mineral resource transportation outlook until 2043.

Province	Mine	Product	Buyer	2018	2043
Orkhon	Erdenet	Copper concentrate, molybdenum concentrate, refined copper, copper	China, Russia, Third country	1,516.44	1,735.62
Darkhan-Uul	Tumur tolgoi	Iron ore	China	2,739.73	2,739.73
Selenge	Ulaan ovoo	Coal	Russia	5,479.45	1,643.84
	Tumurtei	Iron ore	China	4,657.53	5,479.45
Selenge	Mogoin gol	Coal	Domestic	82.19	82.19
Tuv	Tsagaan davaa	Tungsten concentrate	China	0.62	0.62
	Tsagaan davaa	Tungsten concentrate	Third country	0.62	0.62
	Bayndavaa group deposits	Tungsten concentrate	China	0.03	0.14
Uvurkhangai	Baynteeg	Coal	Domestic	191.78	547.95
Khentii	Chandgan tal	Coal	Domestic	1,369.86	5,479.45
	Bargilt	Iron ore	China	1,095.89	5,479.45
Umnugobi	Tavan tolgoi + other Private	Coal	China	54,520.55	95,890.41
	Oyu tolgoi	Copper concentrate	China	2,465.75	4,383.56
	Nariin sukhait	Coal	China	3,835.62	4,109.59
Dundgobi	Uvdug khudag + Khuot khonkhor	Coal	Third country	3,561.64	9,589.04
	Private (Tuv unegt + Zuun toirom)	Fluorspar concentrate	Russia	663.70	1,818.35
	Tevsh gobi	Coal	Domestic	136.99	136.99
Dornogobi	Tsagaan suvarga	Copper concentrate, molybdenum concentrate	China	360.27	553.70
	Private (Dornogobi Urgun)	Fluorspar concentrate	China	637.67	1,747.04
Sukhbaatar	Talbulag	Coal	Domestic	54.79	54.79
	Tumurtei ovoo	Zinc concentrate	China	273.97	328.77
Dornod	Aduunchuluun	Coal	Domestic	1,095.89	1,643.84
	Tsav	Zinc concentrate	China	2.74	27.40
	Khuot	Coal	Domestic	32.88	32.88
	Ulaan	Zinc concentrate	China	27.40	54.79
Gobi-Altai	Private (Tayn nuur, Gobi-Altai Tseel)	Iron ore	China	8,219.18	8,219.18
	Zeegt	Coal	China	1,369.86	5,479.46
Uvs	Nuurst khotgor	Coal	Russia	136.99	2,739.73
	Khar tarvagatai	Coal	Domestic	273.97	273.97
Total				77,669.86	137,083.49
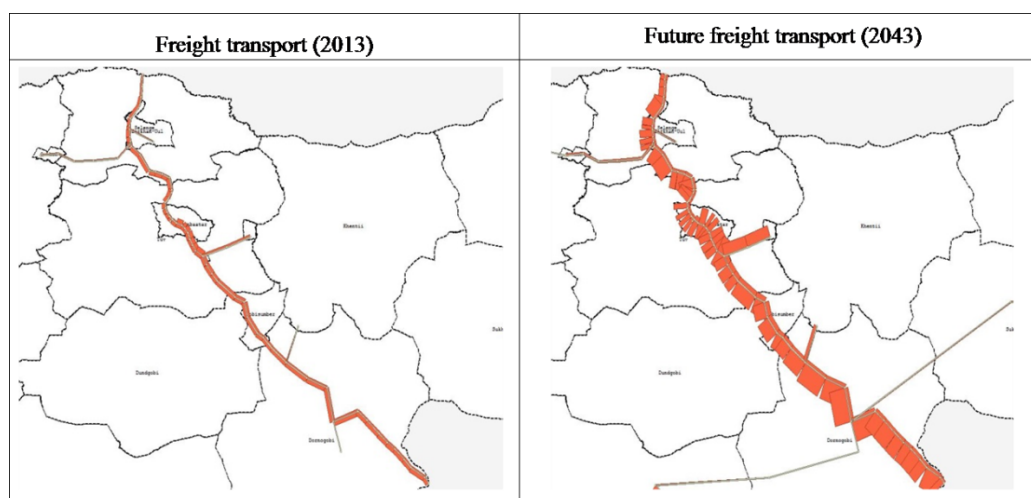
Figure. 5. UBTZ freight transport plan.

Mongolian government strategic policy for 2020 railway development seeks to develop the country economy with integrating the connection of mineral deposit exploitations to new rail lines in the eastern and gobi regions and commisioned to develop strategic plans and feasibility studies for the projects. However the construction of new railway systems requires large amounts of investment and has to be economically feasible. This study analyzes the railway traffic increase to 2043 in three stages of short-term (until 2025), mid-term (until 2035) and long-term (until 2043) (Fig 8). The railway development priority analysis was based on annual transportation estimates and other factors (Table 4.2 and Fig 8).

Table 5. Prioritized railway development plan.

Railway	Route	Length (km)	Freight transport 2043 (t/km/year)	Rank by amount of freight	Priority order	Development time
Ulaanbaatar Railway (UBTZ)	Bagakhangai - Baganuur	94	188,557.45	1	1	Short-term (until 2025)
	Airag - Bor-Undur	60	82,508.25			
	Sukhbaatar - Zamiin-Uud	1,112	56,949.19			
	Salkhit - Erdenet	164	14,228.32			
	Sainshand - Zuunbayn	47	5,940.96			
	Darkhan - Shariin gol	63	5,422.86			
Mongolian Railway (MTZ)	Tavan tolgoi - Gashuun sukhait	230	160,009.65	2	2	
	Nariin sukhait-Shivee khuren	45	32,970.33	3	3	
	Чойлбалсан - Khuot - Bichigt	320	890.83	4	4	
UBTZ	Arts suuri - Erdenet*	670	428.61	5	5	
MTZ	Choibalsan - Khuot - Numrug	540	527.9	6	6	Mid-term (until 2035)
	Tavan tolgoi - Zuunbayn	400	628.71	7	7	
	Tsagaan suvarga - Zuunbayn	200	430.7	8	8	

	Choibalsan - Khuot - Sainshand	550	1385.01	9	9	
UBTZ	Choibalsan - Ereen tsav	238	125.76	10	10	
MTZ	Railway for the western provinces	3600	188,557.45		11	Long-term

*Transit transport excluded
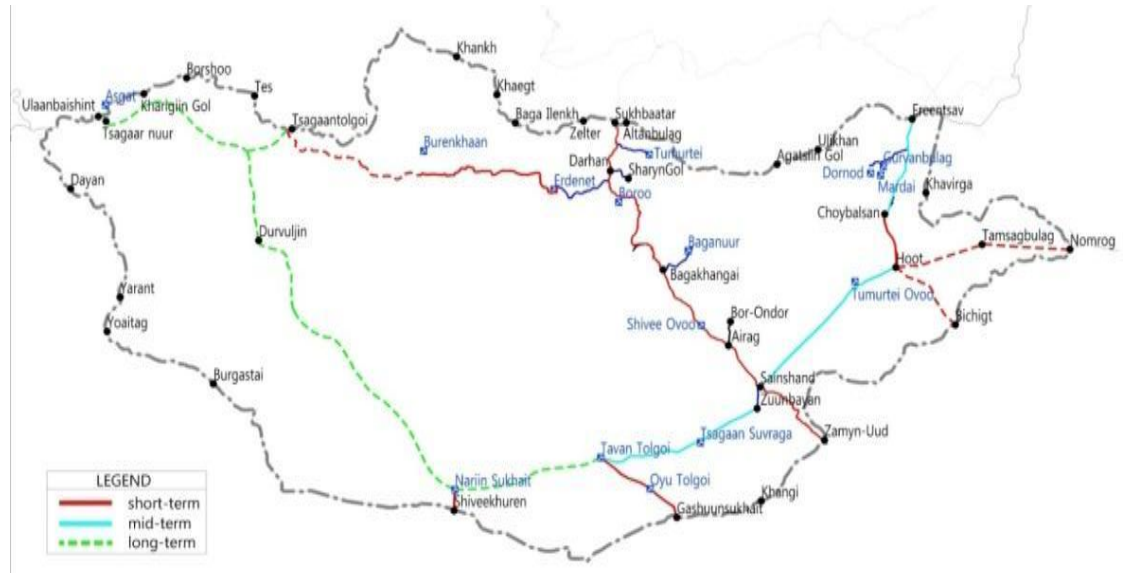
Figure. 6. Prioritized railway development plan.

The Tavan tolgoi - Tsagaan suvarga – Zuunbayn - Sainshand rail line should be established after the construction of the Sainshand Industrial Complex. Otherwise it is economically inefficient.

4. CURRENT AND FUTURE OUTLOOK OF THE ROAD AND TRANSPORTATION SECTOR

The lack of development in infrastructure, road and transportation means higher transportation and logistics expenses. This is one main cause in hindering the development of the mining industry. Mongolia ranked 119th with 3.1 rating out of 144 countries on the Global competitiveness report 2014-2015 published by the World economic forum. This shows that Mongolian infrastructure is unsatisfactory. There are 4 sub-sectors of transportation operating in Mongolia. These include the road, railway, air and sea transports (Fig 3).
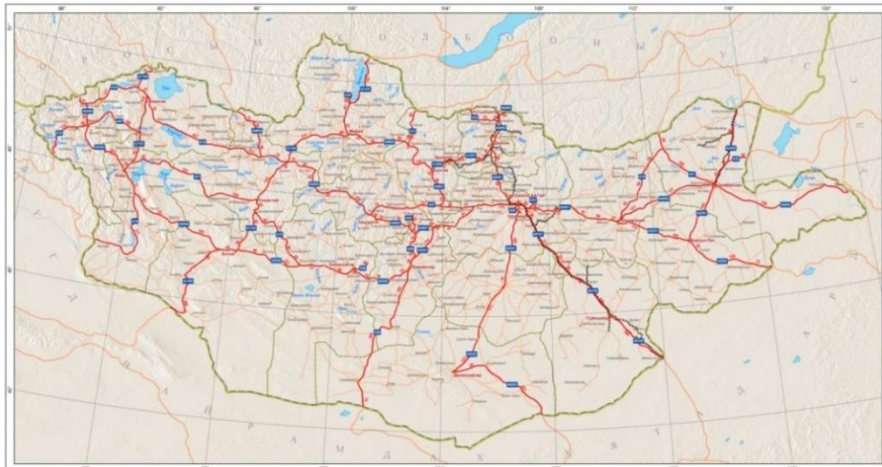
Figure.7. Mongolian road and railway system.

Mongolian transportation	
Road transportation	**Railway transportation**
Road	*Railway*
* Total length: 49,200.4 km:	* Total length: 1,815 km
o International road: 4,092.0 km	o Sukhbaatar-Zamiin-Uud: 1,577 km, 74 stations
o State road:12,722.0 km	o Bayntumen-Ereen tsav: 238 km, 6 stations
o Provincial road: 35,975.0 km	* Single line broad gauge (1,520 mm)
o Mine road: 553.0 km	* Freight capacity: 21-23 Mt
Road type	* Max speed (train): Commuter - 90 km/hour; freight - 80 km/hour
* Improved road: 8,875.6 km	* Train turnaround: 4, 5 days
o Paved road: 5,838.2 km	* Locomotive pull: 156 units
o Gravel road: 1,864.8 km	o Freight locomotive: 120 (48 locomotives are 20 years old)
o Improved dirt road: 1,172.6 km	o Substitute locomotive: 36 (28 locomotives are over 30 years old)
* Normal dirt road: 40,324.8 km	* Number of cars in operation: 2,949 (1,760 cars are over 25 years old)
Transportation	o Hopper cars: 1,447
* Freight: 28,747,5 kt	o Box cars: 491
* Freight traffic: 4,314.0 Mt.km	o Flat cars: 143
* Passengers: 304.2 million people	o Container cars: 448
* Passenger traffic: 1,941.9 million people km	o Other: 420
Number of Autmobiles	* Passenger cars: 284 (154 are over 28 years old)
* Total: 384,864	*Transportation*
* Passenger cars: 259,309	* Freight: 21,035.5 kt
* Trucks: 89,473	* Freight traffic: 12,076.5 Mt.km
* Buses: 20,400	* Passengers: 3.8 million people
* Special purpose: 15,682	* Passenger traffic: 1,394.4 million people km
Water transportation	**Air transportation**
Water	*Airways*
* Total length: 135 km (Selenge lake)	* Total length: 40,000 km
Transportation	* Number of Air routes: 79
* Passengers: 0.011 million people	* Aircraft with the certificate of airworthiness: 25
* Passenger traffic: 0.265 million people km	*Transportation*
* The number of registered ships in Mongolia: 3012	* Freight: 4,063.6 kt
(registered permament: 518)	* Freight traffic: 9.6 Mt.km
	* International passengers: 441.6 thousand people
	* Domestic passengers: 325.8 thousand people
	* Passenger traffic: 1,289.1 million people km
	* International flights: 92,386
	* Transit pass: 85,690
	* International landings and take-offs: 6,696
	* Domestic flights: 9,772
Electric transportation	**Pipeline transportation**
* Total length 10,000 km	* Only in urban areas

Figure. 8. Mongolian transportation statistics. (Source: National Statistical Office, Ministry of Road and Transportation, UBTZ)

Mongolia is a landlocked country between China to the south and Russia to the north. The only way to connect to third country markets is by crossing either Chinese or Russian borders. And this causes transportation costs dependent on our neighbors.

The Chinese president Xi Jinping state visit of May 8th, 2014 resulted in agreements over important issues of road, transportation and infrastructure and signing the Memorandum of Understanding. The agreements enable and increase the number of authorized use of Chinese seaports that are open to foreign trade to Mongolia. These seaports are the North Chinese regional and Northeastern Chinese regional open trade seaports of Dalian, Jinjou, Yingkou, Qinhuangdao, Huanghua, Huangdao and Tianjin. The previous 1991 agreement only authorized the use of Tianjin Xingang international port.

The principle agreements include no less than 40% tariff discount, customs and VAT exemptions for the Mongolian international transit cargo through Chinese territories and to run transportation of 1/3 of Asia to Europe transit cargo through Mongolian territories. This enables the opportunity to transport the Tavan tolgoi coal through China to third country markets instead of transporting it all to China. The agreement complies upon tariff discount that may lower the tariff more than their domestic tariffs. The Memorandum of Understanding between Ministry of Road and Transportation of Mongolia and Railway Authority of People's Republic of China on renewal of the 1955 "Mongolia and China Border Railway Agreement" includes the development of 4 (Shiveehuren-Sekhee, Gashuun sukhait-Gants mod, Bichigt Zuun Khatavch, Sumber-Ashaan) new border crosses.

The state visit of the Russian president Vladimir Putin in September 2014 resulted in signing 15 documents which include: Increasing capacity of the main rail line of Ulaanbaatar railway (UBTZ) to an annual capacity of 100 Mt, this is proposed by electrifying the UBTZ line, extending the Salkhit-Erdenet line to the border to the northwest, to open a new railway crossing linking to Kyzyl of autonomous Tuva of Russia which would enable Russian mineral commodities access to China through Mongolia, the construction of "Bogdkhan" rail line to increase rail transportation and the joint venture in establishing a new vertical corridor through Mongolian western regions. The bilateral meet also resulted in a share ownership of the Russian invested North Korean Rajin port. This provides the first time opportunity to own a seaport for Mongolia.

The Russian Government is favorable for the rail transportation of Mongolian mineral commodities, but the issue lies whether if the Russian rail line capacity is sufficient for Mongolian mineral commodity. At present there is only the line of the eastern region which can transport mineral commodities through Russia to third country markets, but this line is too long to be feasible.

5. OPPORTUNITIES OF EXPORTING MINERAL RESOURCE PRODUCTS TO THIRD COUNTRY MARKETS

Comparison of other landlocked country developments with Mongolia reveals added value in terms of distance to sea-access, number of neighboring countries, regional infrastructure and economic development. There is about 50% more cost in transportation for landlocked countries compared to sea-access countries, and this result in approximately 60% less trade. A 1995 study revealed that developing landlocked countries spend approximately 2 times more than other sea-access countries exportation revenue for transportation and insurances, and this is 3 times more when compared to developed countries exportation revenue. This shows that the infrastructure and the expenditure for such establishments from point A to sea-ports are important issues for landlocked countries.

The transportation from Mongolia towards the Russian far eastern Vladivostok, Nakhodka, Vostochniy, Zarubino, Posiyet and Vanino seaports impose railway complications, and limit the coal

transportation. Annual development plans and huge investments are focused in to increasing Russian sea-port capacities and their infrastructure. The far eastern sea-ports increased their export and imports with Asian and American countries which resulted in an increase of 12.3% to 162.5 Mt freight transport in 2014. Further increases in trade circulation are projected with the Elgin and Elegest coal deposits of Yakutia and Tuva respectively.

Huge investments and infrastructural developments of the Dadong, Dalian, Yingkou, Jinjou, Qinhuangdao, Tianjin and Huanghua coastal sea-ports of Dunbei and Huabei China makes just one of these ports to see more trade than all the Russian far eastern ports combined. At present Mongolia is authorized access to only Tianjin, and it is connected by the trans-Siberian railway of UBTZ. A 50 year agreement was reached for a "Transportation logistics project" at the Tianjin sea-port with 51% Chinese and 49% Mongolian investments.

Mongolia reached an agreement with the Russians to partner in ownership of the North Korean Rajin sea-port. Currently the "RasonKonTrans" a Russian and Korean joint venture is owned 70:30 to the Russian side for the next 49 years. The 56 km rail line of Hunchun to Rajin is improved to a double rail (1520 mm and 1435 mm gauges).

Figure. 9. Mongolian access to sea-ports.

The key to Mongolian development is to promote the continuously increasing regional foreign trade, integrating the regional road and rail transportation systems and at the same time to solve its transportation and logistics issues the most optimum way possible. 80% of Mongolian foreign trade is with northeastern Asian countries and this helps us determine whether the Mongolian transportation system is sufficient. The northeastern Asian regional transportation is expected to increase through Mongolia.

The establishment of new roads and expansions of transportation and logistics will solve a lot of Mongolian socio-economic problems and issues. An integrated and connected transportation system that extends to all corners of Mongolia, and international open border ports will be the foundation for the development of mineral resource, transportation, logistics, agriculture and further industries.

6. CONCLUSION

Mongolia is too dependent on its vast mineral resources, which are mostly non-renewable resources. This prompts us to seek proper use and appropriate measures such as putting environmental protection and to advance value-added products in to the world markets with optimum prices at the forefront.

This study includes a matrix analysis of total 54 deposits. The matrix analysis evaluates the current and future outlook of mining, production and processing integrated with an infrastructural factor assessments. The mining factors were assessed by 6 groups of 18 inquiries and the infrastructural factors were assessed by 2 groups of 16 inquiries. The matrix analysis yielded a prioritized regional mine development plan.

However the lack of developments in the road, transportation and infrastructure hinders the opportunities of development projects with high transport costs and bad competitive prices. Thus integrating the regional mine development plan and the state railway development policies, we've estimated the 2043 rail traffic using the ArcGIS and EMMA software programs. The phase priority suggestions for the planned rail line development plan were based on these estimations. Rail transportation is important for mineral commodity transport especially to third country markets, so railway development should proceed in economically feasible phases.

The development of these transportation and logistics system would solve a lot of Mongolian socio-economic issues. An integrated and connected transportation system that extends to all corners of Mongolia, and international open border ports will be the foundation for the development of mineral resource, transportation, logistics, agriculture and further industries.

Acknowledgements

Acknowledgements and Reference heading should be left justified, bold, with the first letter capitalized but have no numbers. Text below continues as normal.

Appendix A. An example appendix

Authors including an appendix section should do so before References section. Multiple appendices should all have headings in the style used above. They will automatically be ordered A, B, C etc.

A.1.   Example of a sub-heading within an appendix

There is also the option to include a subheading within the Appendix if you wish.

REFERENCES

1. Lukinskiy, V.S., Berezhnaya, V.I., 2004. Logistics of truck transport, in "Finance and Statistics" (Ed.). Moscow, pp 367 .
2. Asrart B., Ariunbayr S., 2009. Logistics management 1, National print UB, pp 349 .
3. Asrart B., Ariunbayr S., Ganbat D., 2012. Logistics management 2, National print UB, pp 367.
4. Master plan developmental study results for financing the Mongolian mining and infrastructure sectors, 2014.
5. National Statistical Office, 2017. Mongolian Statistical Yearbook. Ulaanbaatar, Mongolia.
6. Mineral Resources Authority, 2017. Mining industry statistics. Ulaanbaatar, Mongolia

DEVELOPMENT OF A FLAT PLATE SOLAR AIR COLLECTOR

D.Baatarkhuu[1, a*], J.Amgalanzul [2,b] , D.Myagmarsuren[3,c] , Ch.Turbadrakh[4,d]

[1,2,3] Department of electrical engineering and electronics, School of engineering and technology, MULS
[4] Science and Engineering Department, Mandakh University, Mongolia
[a]elec_eng@muls.edu.mn , [b]amgalanzul@muls.edu.mn, [d]turbadrakh@mandakh.mn

Abstract

Mongolian environmental pollution steady increased by usage of traditional energy resources for growth of energy consumption. 36.9% of air pollution in Ulaanbaatar is caused by utilization of raw coal for heating of ger district and Ulaanbaatar has second most polluted air in the world. Replacement of energy resources by the renewable energy is the one option to reducing of air pollution. Mongolia has lot of sunny days, therefore heating supply of buildings by solar energy is one of the most effective choice for both environmentally and economically. Results of experiment of air heating solar collector with heating spiral for buildings are shown in this research paper. Correlations of solar intensity, collector outlet temperature and ambient temperatures are studied for this research paper. The solar collector had 1064.65W power and 0.64 coefficients of efficiency and these values were almost same to other collector values, which are used in practice.

Keywords energy, heat, solar flux, air temperature

1. INTRODUCTION

Mongolian environmental pollution steady increased by usage of traditional energy resources for growth of energy consumption. 36.9% of air pollution in Ulaanbaatar is caused by utilization of raw coal for heating of ger district and Ulaanbaatar has second most polluted air in the world. Replacement of energy resources by the renewable energy is the one option to reducing of air pollution (Baatarkhuu, 2017).

As a heating device that produces and supplies hot water by using solar energy, plate type or vacuum tube type collectors have already been introduced into our lives. However a simple type of air pipe type collector is more simple than conventional solar hot water collection system and it can heat air at room temperature above 75℃ and can be used as heating energy for living space. Therefore, it has economic advantages and more convenience of device system than solar hot water collection system. The energy conversion efficiency of the air-heated solar collectors is expected to be over 70% and the efficiency of the collector is lower than that of the conventional flat or vacuum tube type apparatus, which is 85%. But in terms of production cost of the heat collecting device, it can be lowered by 40%, which is about four times the economic effect.

In addition, the temperature of air that can be produced through this device is more than 75℃ and the temperature that can be used for indoor heating in everyday life is more than 40℃. Therefore it has value of use in life. A solar air heating system is one of the wonderful renewable energy collection systems supplying hot air in our daily life (Venu Arun, 2013).

In this study, a simple flat plate type heat collector was designed and the heating performance of the system was analyzed numerically to understand the availability of the system for the practical application in industry.

2. HEAT COLLECTOR MODELING

When solar radiation is applied to an air heat flat solar collector, the surface of the tubes installed inside the collector's inner diameter increases and the internal air temperature rises. Due to this cause, the atmospheric pressure inside the tube is formed due to increased pressure inside the tubes, and the natural convection currents of air are formed. Production of warm air produced through this device can be found to produce warm air of up to a maximum of $161 \text{m}^3/\text{h}$ with a maximum discharge rate of 6 m/s.

Figure 1.Changes on ait temperature against output velocity of heat collector

Fiigure 1 shows changes in air temperature due to changes in output velocity of heat collector. When the output velocity of heat collector exceeds 6m/sec, the temperature of output air is increased to 40.5℃.
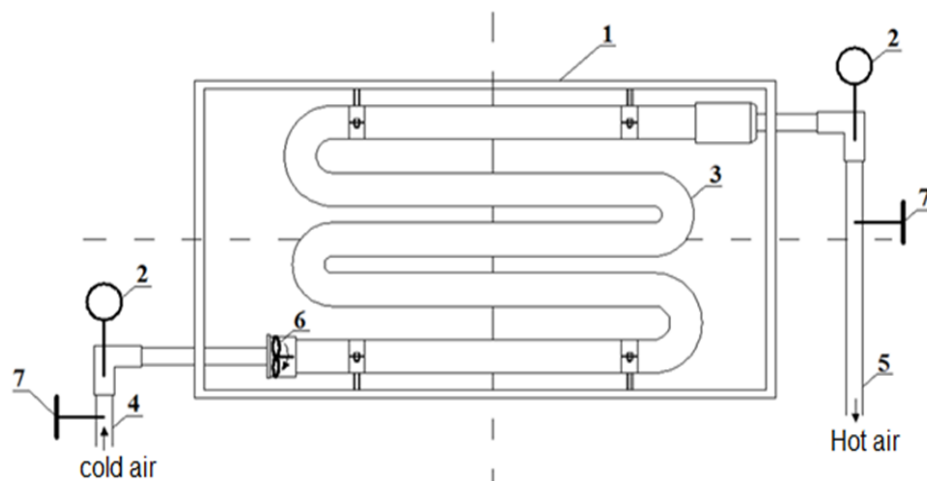

Figure 2. Schematic diagram of heat collector (1-collector trunk, 2-temperature sensor, 3-collector pipe, 4-cold air input, 5-hot air output, 6-circulated fan, 7-control valve)

Figure 2 shows schematic diagram of heat collector. In heat collector, heat collector consist of aluminum pipes (10cmΦ×60cm) and U-type pipes. The size of collector trunk is 105cm in length, 85cm in width and 20cm in depth. And the solar flux of heat collector was applied average 1.2kW/m2. The air velocity at the exit of the heat pipe installed in the heat collector was varied from 0m/sec to 6m/sec to see the change of the air temperature with the velocity.
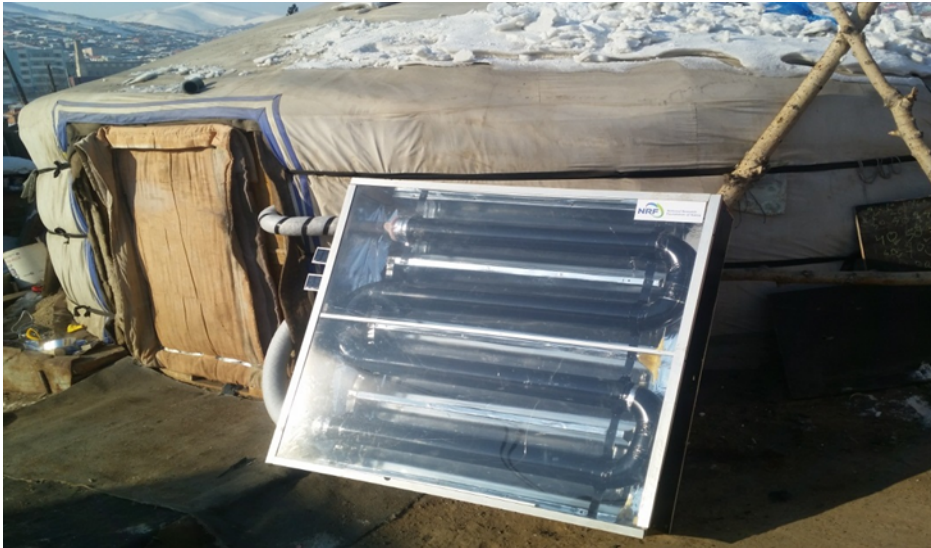
Figure 3. Actual air heating collector

3. RESULTS

Experimental work was conducted in Renewable Energy Polygon of Engineering and Technology School. After the installation instruments we recorded parameters of thermal collector repeated every 20 minutes. It has shown in table 1.

Table 1. Measurement value

№	Time, (Min)	Solar radiation w/m²	Output temperature	Ambient air temperature	Input temperature	Output speed m/s	Input speed m/s
1	10:37	1058	70	6	9.5	1.9	1.8
2	10:57	1061	81	7.5	9.5	2.6	2.6
3	11:17	1068	81	8.3	9.5	2.3	2.1
4	11:37	1068	82	10.2	9.5	2.3	2.3
5	11:57	1073	86	10.7	9.5	2.6	2
6	12:17	1073	87	10.8	10	2.6	1.9
7	12:37	1073	92	11	10.5	2.6	2.3
8	12:57	1074	92	11.8	10.5	2.5	1.8
9	13:17	1071	91	13	10.5	2.1	1.2
10	13:37	1073	89	12.8	10.5	2.1	0.7
11	13:57	1073	90	13.5	10.5	2.9	1.9
12	14:17	1076	88	13.7	10.7	2.5	2
13	14:37	1073	86	13.5	10.7	2.4	2.3
14	14:57	1073	82	13.3	10.5	1.9	1.9
15	15:17	1064	78	13	10	2	1.6
16	15:37	1055	74	13.2	10	2.1	1.7
17	15:57	919	63	12.8	10	1.3	1.3
18	16:17	902	61	11.4	10	1.5	1.1

| 19 | 16:37 | 754 | 53 | 11 | 10 | 0.7 | 0.7 |
| 20 | 16:57 | 734 | 46 | 10 | 10 | 0 | 0 |
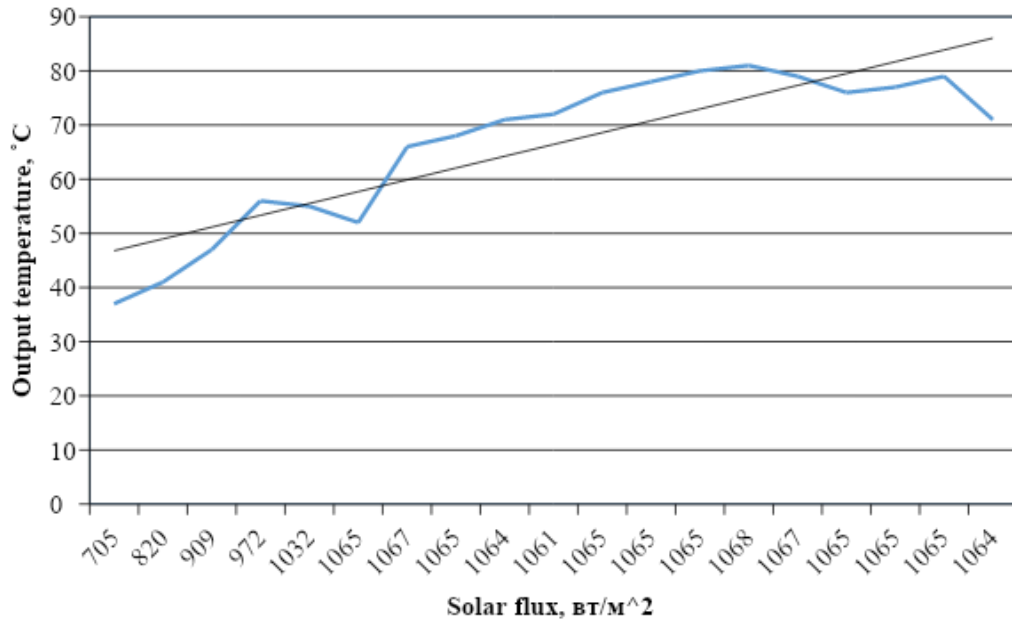
Figure 4. Collector output temperature against solar flux

In table 1, On the over time, the lower the temperature of the solar flux, the lower the temperature of heat collector. And indoor temperature appears the heat loss considerably according to ambient temperature.

In figure4 the heat collector efficiency is shown as function of collector output temperature against solar flux. In especially, the Mongolia has a natural condition of solar power plant that products solar energy because of its average solar flux, which has an average solar flux of 1.2kW/m² per year, compared with other countries. Thus, the temperature difference between sunrise and sunset shows a temperature difference of 10~20 degrees. Also the correlation coefficient related to solar flux and collector output temperature is 0.92 which indicates that all arguments of this model are relatively correlated.

The regression equation is

$$y = -0.2271x^2 + 6.7229x + 28.716$$

Under Fisher's indicators $F_{real} = 38.78$ but in theory $F_{theory} = 4.6$. If it is $F_{real} > F_{theory}$ regression equation is accurately 95%.

If we calculate useful energy of collector

$$Q_A = 1086.87 \text{ W}$$

Experimental work outcome shown efficient of collector

$$\eta = \frac{Q_A}{A*I_T} = 0.64$$

Where:

A –Collector squire m2

I_T–Solar radiation density w/m2 striking collector squire per share

4. CONCLUSION

Based on the purpose of using the solar energy heating system, the purpose of developing a simple type of solar powered air heating collector, the amount of usable energy was theoretically calculated, and the development model was actually produced. The air temperature produced by the size of the solar collector (105cm,85cm, 20cm) was 40.5℃, and the output of the air produced at this time was estimated at approximately 161m^3/h. The solar collector had 1064.65W power and 0.64 coefficients of efficiency and these values were almost same to other collector values, which are used in practice. In particular, it can be used as a good heating mechanism that can be used economically for the Mongolia as northern region, and preferably for future heating and development.

REFERENCES

1. Baatarkhuu, D., Amgalanzul, J. and Buuveibaatar, R. (2017). "Results of Experiment of Solar Collector with Spiral Tube" The 8th National Renewable Energy Forum. May. Ulaanbaatar. Mongolia
2. Venu Arun and P Arun.,(2013)" Simulation Studies on Porous Medium Integrated Dual Purpose Solar Collector". International Journal of Renewable Energy Research, Vol.3 No.1, pp 114-120.
3. Esen Hikmet., (2008) "Experimental Energy and Exergy Analysis of a Double-Flow Solar Air Heater Having Different Obstacles on Absorber Plates". Building and Environment., Vol.43 pp 1046–1054.

PIPELINE STEEL FRACTURE DURING SINGLE EDGE NOTCHED TESTING USING THE FEM

Turbadrakh Chuluunbat[1*], Cheng Lu[2], and Andrii Kostryzhev[3]
[1] Science and Engineering Department, Mandakh University, Mongolia
[2,3] School of Material, Mechanics and Mechatronic, University of Wollongong, Northfields Ave, Wollongong, NSW 2522, Australia,
[1] turbadrakh@mandakh.mn, [2] cheng@uow.edu.au, [3] andrii@uow.edu.au

Abstract

In this paper, fracture initiation and propagation was studied using the Finite Element Modelling (FEM) analysis during single edge notched testing (SENT) of pipeline steel. The Gurson-Tvergaard-Needleman (GTN) constitutive model has been used to simulate the growth of voids during deformation of pipeline steel. FEM simulations confirmed that the fracture was

initiated between the yield point and the peak load point on the load-displacement curve for both SENT test, which is in good agreement with the observations from the acoustic emission monitoring.
Keywords: SENT testing, pipeline steel, fracture simulation, AE

1. INTRODUCTION

In the pipeline industry, there is a significant issue to prevent the fracture of pipeline so it is basically demonstrated in terms of fracture initiation and fracture propagation of pipeline. The fracture initiation occurs due to manufacturing defect, design error, and mechanical damages, such as notch, crack, dent, and corrosion, and it reaches a critical defect length or a certain stress level and start to propagate [1, 2] . Once the fracture initiates, it may propagate for long distances in either fully brittle or fully ductile modes, and in theory, could propagate continuously unless arrested by crack arrestors and in practice, could stop itself by certain condition.

Pipelines can be subjected to severe deformations and local defects resulting from bending generated by ground/soil movement or washout during installation and operation, and biaxial loading originating from longitudinal straining and internal pressure [1, 2]. The static fracture toughness of pipeline steel can be obtained from a different type of fracture test, such as a SENT test [3]. Therefore, one of the representative specimens used to evaluate the fracture characteristics of the pipeline was designed to be compatible with a SENT test.

The fracture toughness data obtained from a SENT test can be more suitable for fracture predictions of pressurized pipelines and cylindrical vessels than data obtained from notched fracture specimens under bending and impact loading [4].
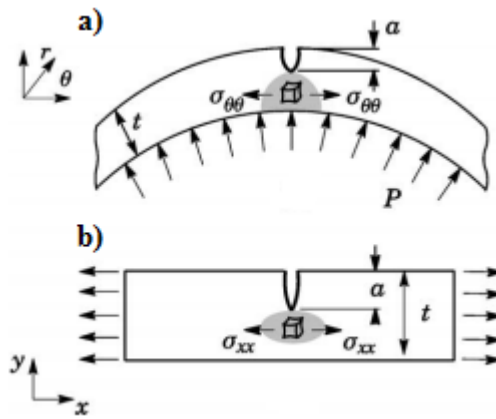
Figure.1 (a) Schematic loading condition for a pressured pipe; (b) SENT test specimen [4].

This is because a SENT test specimen notch resembles surface cracks in pipes more closely, and generates a similar stress field at the crack tip (Figure.1).

The ductile crack growth of the line pipe steels at ambient temperature proceeds via the nucleation, growth and coalescence of micro-voids. As the specimen is loaded, the local strain and stress at the crack tip become sufficient to cause nucleation of voids. These voids grow as the crack blunts, and link with the main crack [3] . The Gurson-Tvergaard-Needleman (GTN) constitutive model has recently become increasingly popular to simulate the growth of voids during deformation [5-8].
In regarding to fracture propagation control, it needs to determine ductile and brittle fracture point. Traditionally, it is assumed that fracture initiates at maximum load during SENT. However, FEM simulations show that the fracture is initiated before or after the load attains its maximum value.
In the present study, finite element simulation of SENT testing was studied to investigate fracture initiation and growth of pipeline steel. Three-dimensional fracture simulations of SENT test has been carried out using the commercial FEM software. These simulations provide a better understanding of the fracture and plastic deformation of the small scale specimen.

2. FEM SIMULATION

Finite element model
In the present study, the commercial FEM software "ANSYS/LS-DYNA" with dynamic explicit scheme was used to simulate the SENT test [9]. FEM model utilizing eight-node hexahedral elements for the SENT test is employed. The simulation model is shown in Figure 2. The total number of elements and nodes in the simulations are listed in Table 1.

Table 1. The total number of elements and nodes.

	Number of elements	Numbers of nodes
Simulation of SENT test	129640	140794

Figure 2. A scheme of SENT specimen used in finite element simulation.

The finite element analysis of the SENT specimen was performed using the mesh size of 0.2 mm around the notch area. A constant displacement rate of 20 mm/min was applied in the simulation.

The simulation parameters are shown in Table 2. The constant parameters ($q_1 q_1$, $q_2 q_2$) in Gurson-Tvergaard yield function is presented by Tveergard have been applied by many studies for the ductile fracture.

Table 2. GTN parameters used in the simulation.

GTN parameters	f	f_f	f_c	ε_n	s_n	q_1	q_2
Value	0.000125	0.06	0.0055	0.3	0.1	1.5	1

Test Material
The material used in this experimental work was API-X70 pipeline steel. The specimens were prepared from a 14.1 mm thickness and 106.8 mm diameter pipeline steel. The material composition is given in Table 3.

Table 3. Material composition of the X70 pipeline steel tested.

C	Mn	Si	Nb	Ti	V	Ni	Cr
0.0499	1.56	0.238	0.0576	0.0088	0.0256	0.214	0.028
Cu	Mo	Al	Ca	N	S	P	B
0.163	0.148	0.035	0.0015	0.0036	0.0014	0.0059	0.0001

The fracture toughness obtained using SENT specimens has been recommended by DNV-OS-F101 [10] and DNV-RP-F108 [11]. Recently, a British Standard for the SENT test method has been developed based on DNV-RP-F108. However, the toughness value obtained from the SENT test should be correctly applied to full-scale pipe components.

W (mm)	B (mm)	H (mm)	a (mm)	a/w
6	12	60	2	0.3
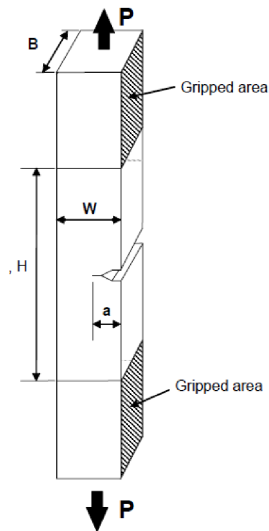
Specimen Geometry:
B- width
W- represent the pipe wall thickness (t)
a-Initial crack length
H- "Day-light between grips"
Requirement of the specimen geometer:
H=10W;
B=2W;
$0.2 \leq a/W \leq 0.5$;
If the reduction on wall thickness due to pipe dimension (D/t) will be more than 15% (w<0.85 t) the specimen width, B may be reduced but not to less than B≥W:

Figure 3.The geometry of a single-edge notched specimen used in this work.

3. RESULTS

Simulated Load-displacement/time curve
Typical load vs displacement/time curve obtained from the FEM simulation is shown in Figure 4. Similar to the analysis of the experimental results, the load-displacement curve is divided into three regions: I-before the yield point, II-between the yield point and the peak point, and III-after the maximum point till the final fracture. Four points, Points A, B, C and D, are marked in Figure 4..
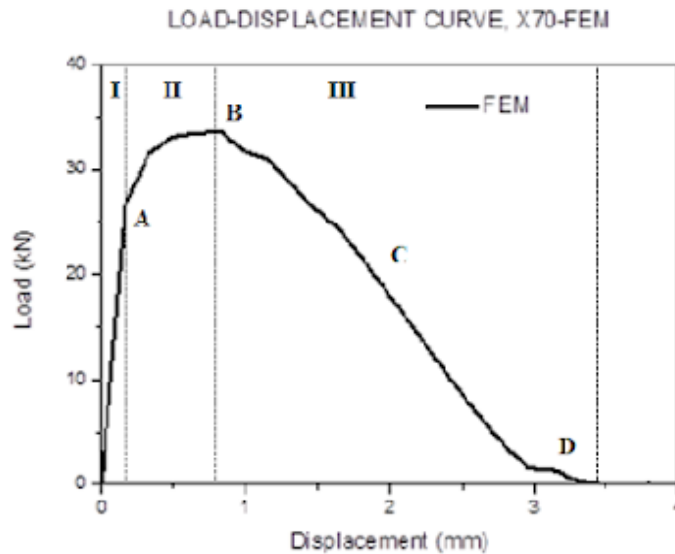
Figure 4. The simulated load-displacement curve, SENT-X70

It can be seen in Figure 4 that the load increases linearly with the displacement in Region I. At point A, which is the yield point, the material at the front of notch area starts to be deformed plastically.In

Region II, from Point A to Point B, the load continuously increases with the displacement. In Region III, the load decreases slightly while the crack propagates and the microviod comfluence exists. In Region III the specimen area reduces and the necking is observed. At Point D, the final separation is observed. FEM simulated load valuesare summarised in Table 4.

Table 4. Summary of simulation results for the SENT specimen.

Load at yield $P_{yield,}$ [N]	Load at crack initiation point $P_{c.i.}$ [N]	Maximum load $P_{max,}$ [N]
24855	33859	34058

Figure 5 compared the specimen geometries predicted in the simulation and recorded by high speed video camera for the four selected points. It can be seen that they are in reasonably good agreement. The determination of fracture initiation plays a very important role in the research of the pipeline fracture control. In this study, a high speed camera has been used to visualize the moment when the fracture initiates.
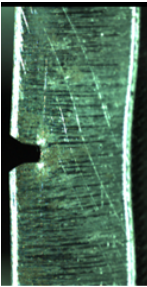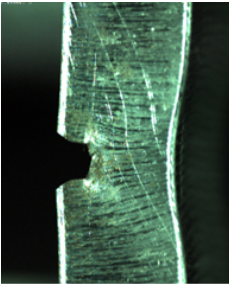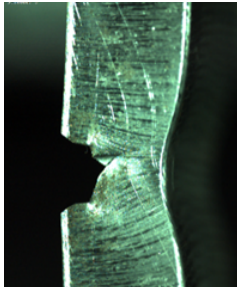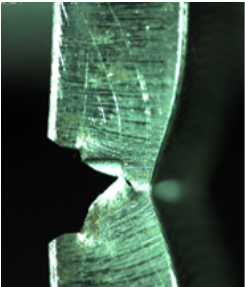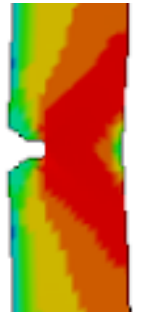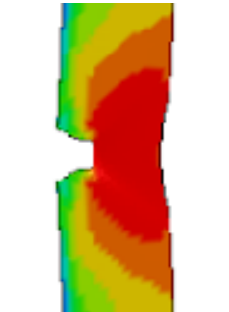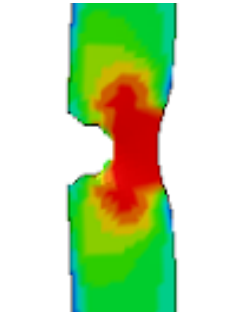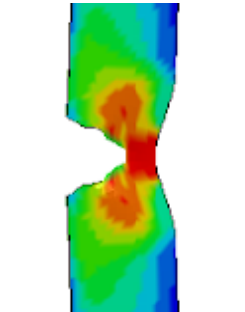
Method	Region I	Region II	Region III	
EXP				
	Selected video shots obtained by high speed camera			
FEM				
	0.33mm (at A point)	0.66 mm (Before B point)	2.15 mm (At C point)	3.24 mm (Before D point)
	Selected effective stress contour			

Figure 5.Fracture process of pipeline steel during SENT testing: Experiment and FEM simulation.

Figure 6 shows the simulated SENT fracture surface and the experimentally tested one. They are in very good agreement. The width extraction and shear fracture area can be observed in both pictures.
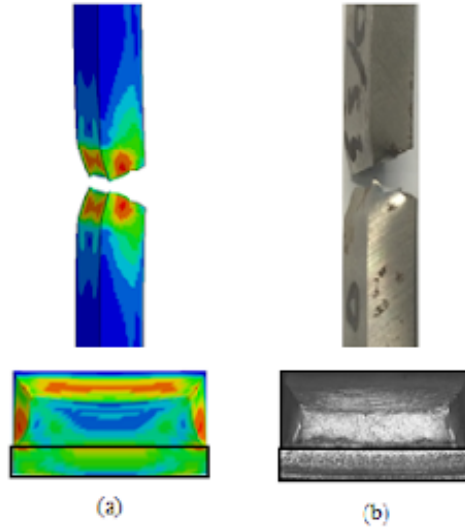
Figure 6. The fractured SENT specimen: Simulated specimen (a); tested specimen (b).

Analysis of crack initiation and propagation

The fracture simulation provides detailed information of the fracture initiation and propagation in a ductile SENT specimen. It has been found that the crack initiates at the displacement of 0.7 mm, which has been marked by a red circle in Figure 7. The effective von Mises stress distribution and fracture morphology corresponding to the crack initiation is shown. It is clear that, at this displacement, a crack nucleates at the notch tip. This simulation result confirms the experimental observations that the fracture initiates prior to the peak load. After the fracture initiation, the load still continues to increase. This is due to the work hardening effect induced by the plastic deformation.
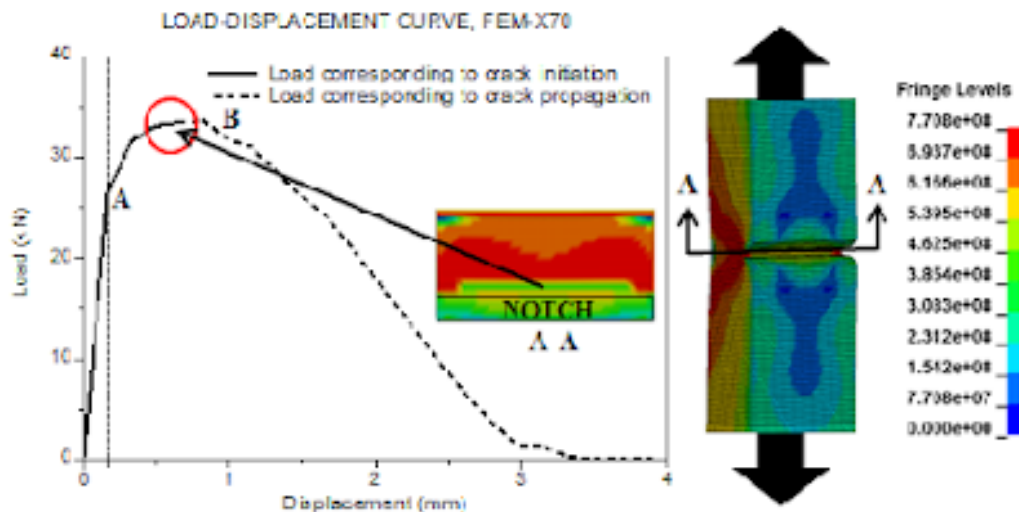

Figure 7. Fracture initiation point determination by FEM simulation for SENT specimen.

In order to analyze, the AE feature before fracture initiation (red circle), Figure 8 has been plotted in the following:
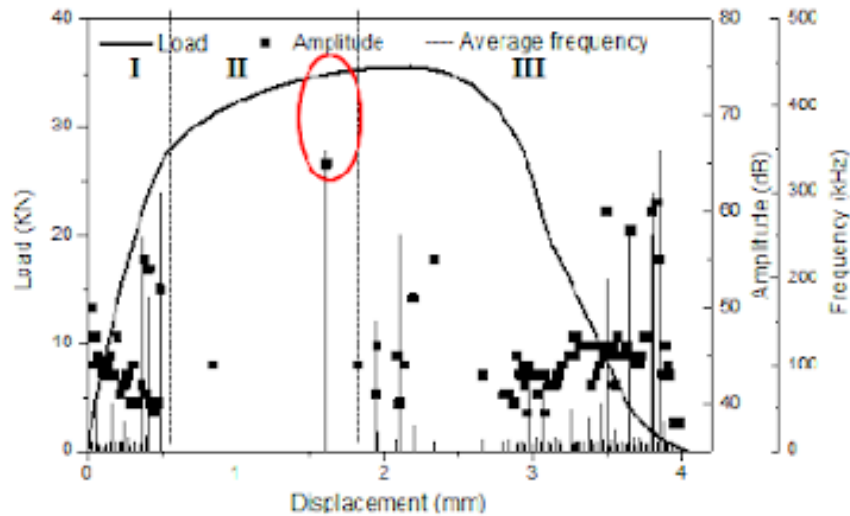
Figure 8. Load-time curves vs AE activity obtained during testing of SENT specimens

Figure 8 shows that there is a rapid change in AE activity; in particular an increase in the AE hit density, signal amplitude and average frequency at Region I. It can be concluded that the rapid change in AE activity in Region II is caused by the fracture initiation. The video data confirms that the fracture initiation is responsible for this event. This finding is similar to some earlier published data. During compact and bending tests of SA333 steel a sudden increase in AE cumulative count and cumulative energy was resulted from crack initiation [13].
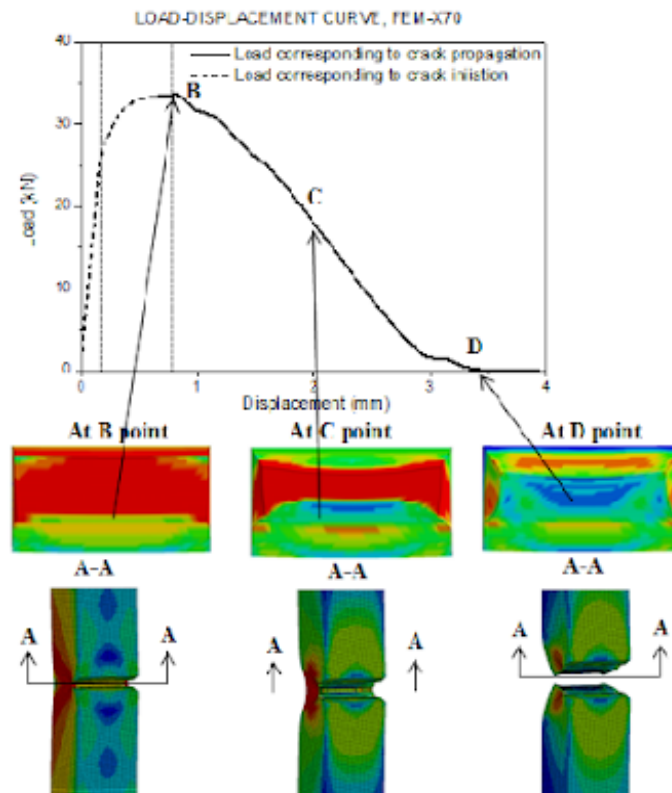

Figure 9. Fracture propagation by the FEM simulation for the SENT specimen.

Figure.9 shows that the effective von Mises stress distribution and fracture morphology corresponding to the crack propagation from Point B to Point D. It can be seen in Figure 8 that once the fracture is initiated (before B point), the crack propagates rapidly. After Point B the load decreases slightly. At Point C the fracture area continuously increases and the specimen completely separates at Point D.

4. CONCLUSIONS

It is believed that this work will help to achieve deeper understanding of fracture behavior of pipeline steel and in turn help develop a new pipeline fracture control model.

The research of this paper can be summarized as follows:
1) Three dimensional fracture models based on the finite element method have been developed to simulate the SENT test of the line pipe steel using the Gursen-Tvergaard-Needleman fracture constitutive model.
2) The simulated results are in good agreement with the experimental results in terms of stress distribution and fracture morphology for both SENT tests. The simulated specimen is capable to identify the major characteristics of SENT specimen, such as the fracture tunneling and the shear lip.
3) The fracture initiation can be predicted by the FEM simulation. It has been found that the fracture initiates before the maximum point on the load-displacement curve for both tests.
4) Finite Element Modelling (FEM) simulations confirmed that the fracture was initiated between the yield point and the peak load point on the load-displacement curve for both SENT test, which is in good agreement with the observations from the AE monitoring.

REFERENCES

1. 1. Rothwell A. B (2000) "Fracture propagation Control for gas pipeline-Past, Present and Future," Pipeline Technology vol. 01, pp. 387-405
2. Anderson T. L. (2005) Fracture mechanics: Fundamentals and Applications. FL: CRC Press
3. Chen Y and Lambert S. (2003) "Analysis of ductile tearing of pipeline -steel in single edge notch tension specimens," *International Journal of Fracture,* vol. 124, pp. 179-199
4. Kofiani K*., et al.,* (2013). "New calibration method for high and low triaxiality and validation on SENT specimens of API X70," *International Journal of Pressure Vessels and Piping,* vol. 111-112, p p. 187-201
5. Gurson A. L. (1997) "Continuum theory of ductile rupture by void nucleation and growth. Part I. Yeild croteria and flow rules for porous ductile media," Journal of Engineering Materials and Technology, pp. 2-15
6. Tveergaard V. (1981) "Influence of voids on shear band instabilities under plane strain conditions," Acta Materialia, vol. 32, pp. 157-169
7. Tveergaard V., (1984)."Analysis of the cup-cone fracture in a round tensile bar," Acta Metallurgica, vol. 32, pp. 157-169
8. Thibaux P., et al.,(2009) Ductile facture characterization of an X70 steel: Re-interpretation of classical tests using the finite element technique. Calgary
9. LSTC, LS-DYNA (2013) Keyword user's manual (updated manually),
10. DNV-OS-F101, (2000) "Offshore standard-submarine pipeline systems," ed. Norway: Det Norske Veritas,

11. DNV-P-F108, (2006) "Fracture control for pipeline installation methods: Introducing cyclic plastic strain," ed. Norway: Det Norske Veritas

12. Chuluunbat T., et al., (2015) "Investigation of API-X70 line pipe steel fracture during single edge-nothced tensile testing using acoustic emission monitoring," Materials Sceince and Engineering A, vol. 640, pp. 471-479

13. Roy H., et al., (2008) "Acoustic emissions during fracture toughness tests of steels exhibiting varying ductility," Materials Science and Engineering: A, vol. 486, pp. 562-571

DETERMINATION OF THE RESOURCE OF AGCO SISU POWER ENGINE BY ENGINE SOUND LEVEL

Munkhgerel Myagmarsuren[1a*]

[1] The Science and Engineering Department of Mandakh University

[a] munkhgerel@mandakh.mn

Abstract

This research represents an attempt to determine the sound level variance of AGCO SiSu Power using Sound Level Meter and measurements were taken during the fall harvest seasons of 2017 and 2018.

We measured the sound level in accordance with the methodology of standartization MNS 5044:2010 "The Requirements and Measurement Method for Vehicle Inspection Centers". From the results of measurement, the sound level varies with linear dependence when the engine gets old and the engine sound level increases when the engine years of operation increases.

According to the comparison made between the results of basic diesel engine and CRD diesel engine, it is proved that the sound level of basic diesel engine is 8% higher than the other one.

1. INTRODUCTION

There are large number of tractors including John Deere, New Holland, Challenger, Case, SAMPO that are being imported from Canada, the USA, Japan, Finland, Germany to the agricultural field of Mongolia and they are with AGCO SiSu Power diesel engine.

Among them, the "SAMPO" is one of the most well-known and suitable technic for agricultural production technology, agrotechnical requirements, technical operating conditions and the amount of grain grown in Mongolia.

There are totally 67 SAMPO combine-harvesters that imported by individuals, dealers and agricultural support fund in Mongolia. From them 55 SAMPO combines have already operated for 17 years (1).

Currently, there are 17 SAMPO in Bulgan province, 1 SAMPO in Darkhan-Uul province, 1 SAMPO in Orkhon province, 4 SAMPO in Tuv province, 1 SAMPO in Khovd province and 43 SAMPO in Selenge province. Among them, 12 SAMPO combine are with the AGCO SiSu Power CRD diesel engine, the others are with basic AGCO SiSu Power diesel engine. Hence, it is necessary to study the chances to determine the life resource and to assessment the technical state of engine. This condition reveals us that it is requisite to make a research to localize the modern machines in Mongolia, to improve the knowledge of technical operation, service, diagnosis and

usage for increasing the technical benefit and to fully use the technical life resource in condition of Mongolia (2).

2. METHODS AND TOOLS OF THE RESEARCH

2.1.**Study Objection:** AGCO SiSu Power diesel engine

We measured the sound level in accordance with the methodology of standartization MNS 5044:2010 "The Requirements and Measurement Method for Vehicle Inspection Centers"
- Measuring level of sound /Method A/
  - To express sound meter values with decibel.
  - There are 0.3-0.4 m between sound level measuring points and upper, middle and lower parts of engine.
- Location of measurement point
  - Sound level of measurement environment should be lower 10dB than the sound of engine including wind noise.
- Measurement tools
  - Sound meter tool has to be portable, to be accredited and to have technical definition of manufacturer,
  - Limit of measurement tool:
    Higher level: 70-140 dB
    Lower level: 30-90 dB
    Measurement presicion: 1.0 dB
- Measurement condition
  - The engine shall be heated to the working temperature (+80 - +95 °C).
  - The weather should be warm (-5 ° C - +30 °C), without precipitation.
- Requirement of sound level
  - Sound level depends on type of engine, year of manufacture
  - Sound levels are noted in the paper of technical inspection (3).

2.2.**Tools of the research:** Sound Level Meter used to measure AGCO Sisu Power engine sound level.

Figure1. Sound Level Meter- CENTER 322

3. RESULT and DISCUSSION

3.1. Mathematical process

Within the scope of field measurement and experimental purposes, we calculated that required number of measurements was equal to n = 36. This calculation is based on the mathematic statistical methods using preliminary measurements made with 10 combines with CRD power engine, 7 combines with basic diesel engine. We made also a mathematic statistical processing to define whether the numerical value created by field measurement meets the requirement of research. Student test is made to define whether there is any over-quantitative measurement due to the problem of observation during the measurement of engine sound level. The test of whether the measurement values are homogeneous is done by the dispersion of the parameters described by the test. Since the measurement value is n<50, Shapiro – Wilk W test is made to whether the line is normal and resulting it is subject to normal distribution rule.

The experimental curve is created with the data of sound level variance and operating years using the measured values. The experimental and theoretical curves based on measurable data of engine's operated years and sound level variance were created in Data Analysis of Microsoft Excel. The compatibility of mathermatic model is analysed with Fisher's exact test. According to our result, F_k =0.0027 < F_x =4.08 and F_k < F_x condition is proved that the mathematic model is fully compatible to our studying process (4).

Using the data above, it is determined that there is a linear relationship between operation years and sound level and the mathematical model that is able to fully express the arithmetic of the process and the theoretical and experimental curves are shown in Figures 2,3 and 4.

3.2. Analyze of the measurement results

In 2009, MUST researcher and Ganbat, D., Ph.D worked on a monograph "Diagnostic Survey of Diesel Engine Injection" and held the doctor's title, modifying injection design of CRD engine (5).

Also, MULS researcher doctorate Zolboo, N. and Hulan, B., MSc attempted to plan the operating repair and overhaul for Agco Sisu Power Engine in their last thesis "Determination Of The Resource Of AGCO Sisu Power Engine By Engine Oil Pressure And Soot In Oil" in 2019. In conclusion, they have planned that the operating repair needs be done in 2500-3000 moto-hours while the overhaul needs to be done in 5800 moto-hours. These values were also compared to the manufacturer's recommendations (6).

MULS researcher doctorate Zolboo, N and Hulan, B MSc have developed a theoretical model or nomogram that shows how engine oil pressure and soot will vary depending on operated years that demonstrates engine resource. We added a parameter of engine noise change to the engine oil pressure system and soot content, developing this nomogram (6).
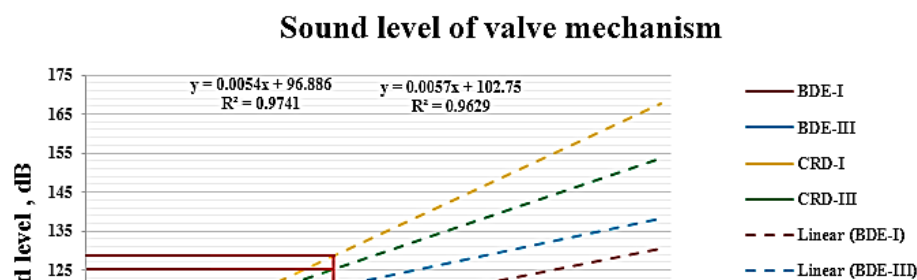

Sound level of valve mechanism

Figure 2. Relationship between operated hours and sound level of power engine

Sound level of cylinder piston parts
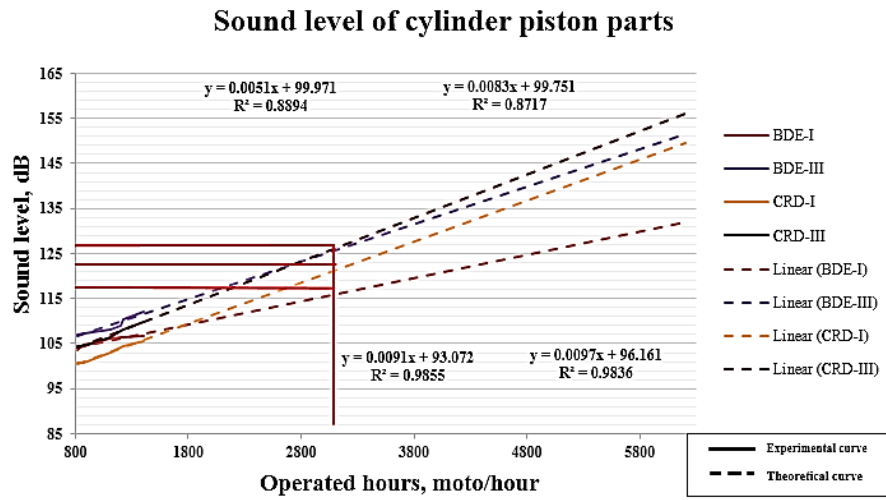
Figure 3. The relationship between operated hours and sound level of power engine
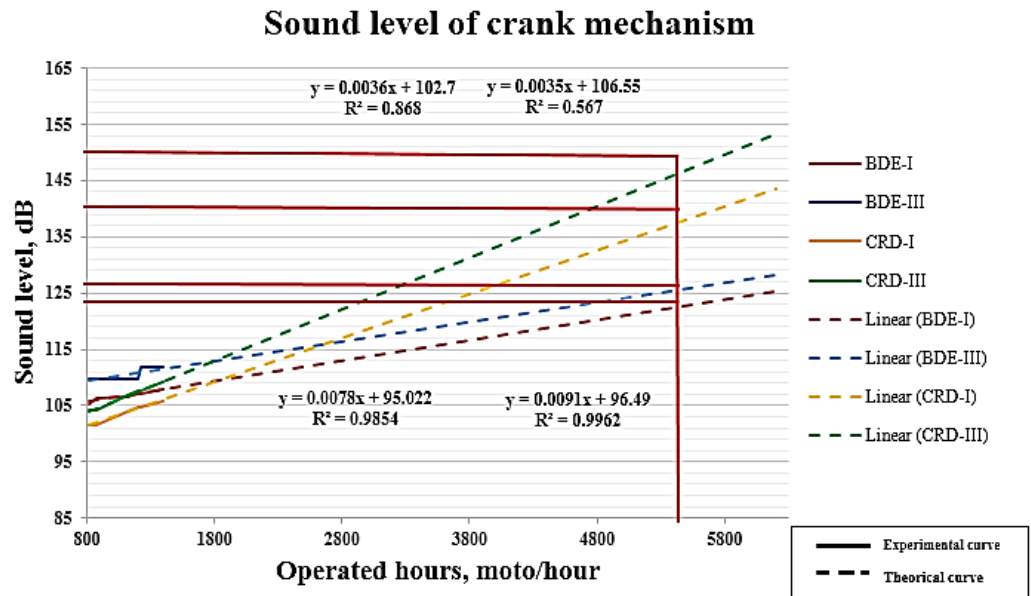
Sound level of crank mechanism

Figure 4. Relationship between operated hours and sound level of power engine

4. CONCLUSION

In the paper, we studied noise level change depending on the engine operated years and aimed to define technical condition and resource of AGCO SiSu Power engine and finally concluded below:

1.   According to the comparison of measurement value and theoretical curve of basic diesel engine and CRD engine, it is proved that the sound level of basic diesel engine is 8% higher in the idle speed of engine, 7% higher in the rated speed of engine respectively than the CRD engine.

2.   It is stated that operating repair is need to be done in 3000 moto-hours and overhaul is need to be done in 5800 moto-hours in condition of Mongolia. Hence, we determined corresponding sound levels to these hours of plan.

a.   Operating repair:

●For aspiration diesel engine:

o The sound level of valve timing parts is 113.09 Db in idle speed mode of engine and is 119.85 Db in rated speed of engine.

o The sound level of cylinder and piston parts is 115.27 Db in idle speed mode of engine and is 124.65 Db in rated speed of engine.

●For CRD engine:

o The sound level of valve timing parts is 127 Db in idle speed mode of engine and is 124.05 Db in rated speed of engine.

o The sound level of cylinder and piston parts is 120.37 Db in idle speed mode of engine and is 125.26 Db in rated speed of engine.

b.   Overhaul:

- For aspiration diesel engine: The sound level of crankshaft mechanism is 123.58 Db in idle speed mode of engine and is 126.85 Db in rated speed of engine

- For CRD engine: The sound level of crankshaft mechanism is 141.27 Db in idle speed mode of engine and is 149.27 Db in rated speed of engine

3.   The importance of the research is that determining noise level by the times of doing operating repair and overhaul, developing the nomogram for determination a CRD engine residual resources.

REFERENCES

1. Zolboo,N., Ulziibaatar,Ts. (2015). The difference between design, specification and principles of a modern internal combustion engine. Journal of agricultural engineering and technology, (1): 23-30.
2. Zolboo,N., Ulziibaatar,Ts. (2018). Analysis of AGCO SiSu power CRD Engine Working Capacity Factor. Journal of agricultural science. Ulaanbaatar.
3. Mongolian Agency for Standardization and Metrology www.estandard.gov.mn official web site. MNS 5044: 2010 Requirements for the vehicle inspection center.
4. Avdai,Ch., Enkhtuya,D. (2015). Methodology for conducting research. Ulaanbaatar.
5. Gandat, D. (2009). Diagnostic Survey of Diesel Engine Ijection. Doctor's dissertation. Ulaanbaatar.
6. Khulan,B., Ulziibaatar,Ts. (2019). Determination of the resource of AGCO SiSu Power engine by engine oil pressure and soot in oil. Master dissertation. Ulaanbaatar.