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M.S. Thesis in Engineering

**THE RESEARCH ON HUMAN
RESOURCE DEVELOPMENT OF
THE ICT SECTOR IN MONGOLIA:
In terms of Employers' Satisfaction**

August 2018

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Technology Management, Economics, and Policy Program

College of Engineering

Seoul National University

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이 논문을 공학석사 학위논문으로 제출함

2018년 8월

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Abstract

THE RESEARCH ON HUMAN RESOURCE DEVELOPMENT OF THE ICT SECTOR IN MONGOLIA: In terms of Employers' Satisfaction

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The Labor Demand and Supply Survey (Labor Barometer-2017) in the Mongolian markets concludes that the demand for new jobs in Information and Communication Technology in 2017 increased by 3.6 percent but the number of enrolled graduates in the industry surpassed that demand. However, the demand for newly-created jobs remains high, with the unemployed graduates still growing as indicated by the reports of relevant organizations. When identifying the difficulties in the labor relations as encountered by the organizations taking part in the survey, the most common problems were the inadequacy of employees' experience and they emphasized the need for time and financial resources for the staff to be trained are

huge. 31.5 percent of employers participated in the survey stated that job seekers' skills and experiences were lacking, and 23.5 percent of the respondents said the candidates did not meet the requirements of education, professional level and job requirements. However, there have been no researches conducted in this area by professional and relevant government agencies in Mongolia. Therefore, in order to identify the issues of human resources in the Information Technology sector of Mongolia, the employers are asked what kind of skills they want from their employees and what policies they need in the industry.

The purpose of the study is to research the human resource development of Information Technology in Mongolia through enterprises or employers operating in the industry. The survey concludes the level of satisfaction of employers in the profession and other skills of new employees graduating from the Mongolian universities and colleges in the last five years and measures the level of human resource development in Mongolia IT industry.

The thesis used the mixed methods - the quantitative and qualitative methods both. To clarify the reality of Mongolian ICT sector's human resource skills and suggest policy implications, we used the empirical analysis based on the survey data in the initial stage. In the later stage, a qualitative method, the in-depth unstructured interview, was conducted in order to confirm factors which were already suggested in the quantitative part. The approach helps us corroborate the results by comparing by using different methods on the same topic. The result suggests that employer's satisfaction about employees' skills is not satisfactory. To improve the skills and

satisfaction, the ICT education system's improvement plans such as modification of the enrollment requirements for high school students, the upgrade of universities' human resource and the promotion of career opportunities through cooperation with the industry to improve their practical experience with cutting edge technology are implied in the study.

By understanding these improvement possibilities, Mongolian policy makers can make a policy directed into improve the human resource' skills in the ICT sector and further increasing the efficiency and effectiveness of the sector.

Keywords: ICT Human Resource Development in Mongolia, ICT Skills, Employers' Satisfaction Survey (ESS)

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Chapter 1 Introduction

1.1 Introduction

According to the annual research of Development of Information Technology around the world by International Telecommunications Union, usage of information technology has been rising rapidly in the developing countries like Mongolia (web site of ITU).

It has been 22 years since Mongolia first introduced Internet (www.datacom.mn). Aligning with the internet usage, the new technology utilization based on information technology is increasing as well as the world development. Following this, The Labor Demand and Supply Survey (Labor Barometer-2017), the study conducted by Ministry of Labor and Social Protection of Mongolia, pointed that the job positions which requires information technology utilization skills are increasing in the labor market in addition to the main profession. Not only Information and Communication technology (ICT) industry, companies in other industry using new technology based on information technology extensively and employers started aiming to gain profits effectively and efficiently with less cost by taking advantage of information technology. The Labor barometer-2017 have shown that employers require adapted skill of information technology furthermore to be experienced at it as equal level to professional skills for the new vacancies. However, it draws attention that no research has been conducted yet by any university or state institute regarding what skills employers require from new graduates of information

technology, job applicants, and employees especially in Mongolian information technology industry and whether graduates and employees meet those new requirements of the employers. This causes confusion about the strategy and technology development of institutions in charge of providing the human resource and whether they are associating with the world trend or not.

There are practices of other countries how constant they adopt their strategies compliantly to the studies on grade and tendency of education sector through their graduates and employees. For instance, Australia performed “Employers Satisfaction” research within 2749 graduates and 539 supervisors of 4 universities (ESS, June 2014). The research objective is to define higher education performance, direction, education quality of Australia and determine future goals. Industry of information technology is evolving at the speed of light and it is different from other industries due to ability to explore ever growing demand at each level in short term therefore, modifying the policy documents when it is needed allows the country to have every opportunity to innovate and introduce new technologies. Therefore, Mongolian Information Technology industry is facing a need to conduct a research on particular topics which have not been studied up to date with the team of graduates and new employees moreover employers need to define what skills they want for new vacancies as well from their current employees and produce guidelines according to the technology development.

Today, Mongolian IT companies are facing a competitive and continuously changing situation which is to create new products for a variety of causes. Even

though most companies are trying to make efforts to introduce new products that meet the customer needs more effectively than competitors' products, some of them are unsatisfactory, yet. The main reasons for the situation are IT companies' unskilled human resource and inefficient human resource management. Human factors are significant key elements of successful innovation products (Tohidi & Jabbari, 2012). In the Forum of Mongolian Software Suppliers 2016, Mongolian IT companies' top managers state that although there are good technologies in the world, there are no good specialists who can adequately use them and get benefit from them. To improve the situation, the following actions can be implemented to do adoptive innovation (Ivanova & Borisova, 2015): hiring people who can "Think outside the box"; building a positive organizational culture of innovation; training and prizing for innovation.

The IT industry is deeply dominated by human factors than other industries because software development process is complex and purely intellectual as well as it accomplished through cognitive processing abilities (Khan, Brinkman, & Hierons, 2011). An unskilled employee produces poor quality products as well as consistency of the business is dependent on what kind of products or service the company is offering to the consumer. If a business fails in that aspect, low quality of products eventually leads to dangerously low profits. Thus, the human resource development of Mongolian ICT sector is necessary and unavoidable issue to discuss.

1.2 Research Motivation

1.2.1 The justification based on the demand side - from the employers' perspective

The current state information about the Employers and employees and the Labor barometer 2017, conducted by the Ministry of Labor and Social Protection, state that there is a scarcity of labor force in the labor market last year (2017).

Also, the research was conducted to identify the outspread of the above problems in the economic sector and regions, to determine the labor force scarcity, and to explore the complications of the hiring process of new employees. It is noticeable as the 11.5 percent of the entities participated in the study has responded that due to the unavailability of the candidates who met the requirements, companies were not able to hire a new employee and spent the whole year with scarcity. The study showed the 2.2 percent of entities of the information and communication technology sector were not able to hire the employees that met the requirement of the job description.

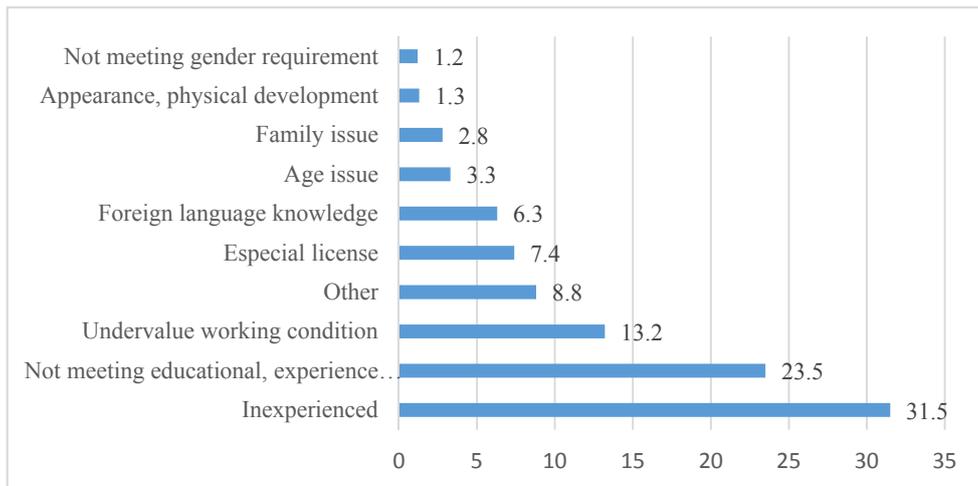
In the study, participating entities has responded on the communication complications of the job position is that most common issue is the job applicants' inexperience of the announced position and the amount of time that needed to spend on the preparation or training for the position was too long. For instance, 31.5 percent of the employers stated that applicants' were inexperienced and 23.5 percent mentioned that applicants' education and professional background did not meet the

requirements. Even though they mentioned the lack of experience as the reason of the mismatch between employers and employees, the survey did not clarify the types of skills in detail. In other words, the survey provided the general picture of the problem, however it was not sufficient to explain the whole situation.

Also, aside from above reasons employers also answered applicants' personal discipline, maturity */such as irresponsible on the job, undervalue salary, instable on the position/* had 8.8 percent, 13.2 percent undervalued the work place and environment. Even though applicants' inexperience, education, knowledge, skills are taking majority issues, the individual discipline, maturity, approach, stability on the position, responsibility are still considered huge contributing factors of problems (Figure- 1).

Below Figure shows the general complications employers face during the hiring process of new employee. Each issue is given percentage compared to general/total complications.

Figure– 1. Complications employers faced: Common complications of hiring and employing new employee /percent/, (Research Institute of Labor, Social Protection)



As shown in the Figure – 1, the highest percentage issue was Inexperience which took 31.5 percent. However, the study did not identify the understanding of experience, what kind of experience and skills that employers required was never made in the both governmental and private sectors’ level.

Also there are no research has been conducted in the information and communication sector of Mongolia which determines the demand and skills required from the applicants that satisfies the employers. Therefore, it is required to do the research specialized to determine the requirements from the applicants and the employees that can satisfy the employers of the information and communications technology sector, based on the current results of the study that showed the hiring and employing process complications.

1.2.2 Justification based on the supply side – Employees

In 2016, Research institute of labor, social protection conducted “Employment survey of graduates” for the first time among graduates from higher

education institutions in 2010-2011, to determine newly graduates' employment status. Total of 982 out of total 35,847 University level graduates, in 22 types of professions, from 2010-2011 were participated in the survey. Survey was done in trace-back method in 2014-2016. Survey determined only employment level, not whether graduates are working in their respective professional fields. As of today, there is no research which determines whether graduates from information and communication fields are employed in their own field or not and the percentage they hold in the employment index has been done in the labor market. Thus, let's take the graduates from School of Information and Communication technology Mongolian University of Science and Technology (MUST) as representatives (Any detailed survey was not made in other schools) of the students of this field. From the detailed survey conducted on the School of Information and Communication technology, the percentage of graduates having employed in their respective fields, is more than 50%, still number of employed graduates who are not working in their field is relatively high. It is shown in numeral and percentile. Herein:

Table-1. Detailed survey of graduates from School of Information and Communication technology (Information, communication school of MUST, "Employment survey of graduates - 2016")

Name of the profession	2015 - 2016			2016 - 2017		
	Graduate	Employment in their major field	Employed	Graduate	Employment in their major field	Employed
Communication networks,	59	30%	24	43	24%	19

communication technology						
Wireless communication	67	28%	21	49	21%	18
Broadcasting technic, technology	9	5%	6	8	4%	3
Information technology	54	31%	28	52	28%	17
Electronics in Information Measurement	17	8%	5	8	6%	3
Information Network	80	42%	33	58	31%	25
Automation in information technology	10	6%	4			
Communications /postal/	8	5%	4	2	2%	2
Communication in Optics	21	14%	12	13	6%	5
Electron system	22	13%	10	13	7%	8
Information system	23	14%	15	38	19%	14
Information technical supply	16	8%	7	4	3%	2
Monitoring systems in computer	17	8%	7	6	2%	1
Software engineering	41	33%	32	37	23%	19
Security systems	28	16%	15	24	13%	11
Total	475	54.95%	222	359	53.54%	147

Comparing the above table with lists of current and future work force demands of Information and communication field from World Economic Forum, it can be evaluated the professions practicing in Mongolia are too outdated. The above mentioned jobs are not evolving towards the new era where Mongolian ICT entities

are also required to innovate and use new technologies as other ICT companies in the world are doing. Comparing with the Labor barometer-2017, the percentage of labor force demand was 2.1 and scarcity of labor force was 3.6% in Information and communication technology industry. It shows there are still workforce demands in labor market. On the other side, “Employment survey of graduates - 2016”, performed by the School of Information and Communication technology of Mongolian University of Science and Technology (MUST) shows the result of supply surpassing the demand. However, it has noted in the result of the survey taken from employers shows that in 2017, employers had 3.6 percent of available job, which means job position supply was unavailable. It is suspected from here that Mongolian Information and communications technology sector graduates’ skills and capabilities do not satisfy the employers’ expectations and requirements. Thus, based on this assumption, the second objective of study which the necessary skills required for the graduates to learn can be fulfilled.

1.3 Purpose of Dissertation

According to the Labor Barometer - 2017, there are new job positions in Information technology sector. However, those demand has not met. On the other hand, the supply or the number of newly graduates is sufficient enough to meet the demand, it has shown in the study, that it still cannot satisfy the both sides. However, there is no studies that identified the causes have been conducted in this field. Therefore, it is necessary to conduct detailed research on the cause of the human resource supply and demand situation in the information and communication

technology industry and furthermore, it is necessary to study how to develop human resource and what education policies required to be implemented.

There is no complex research on interrelation of demand and supply of Mongolian labor market yet. Several public organizations performed research independently; however, the conclusion is considered too general and is not in the state to make a resolution. In other words, the recent study showed only statistical data, not data analysis. Information technology sector is growing rapidly as followed by worldwide development hence it needs yielding policies. Therefore, new promising opportunities would be allowed by conducting research which benefits employers of information and communication industry so that employers would develop new technologies and invest in innovations.

It can be noticed from the annual statistic data of Mongolian Ministry of Education, Culture, Science and Sports that there are no detailed studies conducted regarding the unemployment level of graduates and associating causes. Moreover, information and communication institutes do not conduct research about employment rate of their graduates, unemployed graduates and reasons why they are unemployed. In 2016, the research institute of Labor and Social Protection conducted an employment survey of graduates for the first time. However, it has been observed that the research lacked in terms of sector specification and was too general. In other words, it had no evaluation of the outcome and no performance guideline. Therefore, this paper has identified the research objectives as following based on the evidence.

The basic capabilities of human resource which is base of Mongolian Information Technology and Communications Industry's development will be identified, furthermore, the most needed skills to introduce new technologies and create innovation will be determined in terms of employers' satisfaction. The paper will produce recommendations of policies on educating graduates of the ICT sector depending on the research outcome for the associating public institutes, universities and schools. As a result, it is predicted that the paper recommendations would contribute in the preparation of skilled specialists to develop new technologies and introduce innovations through amending the policy based on demand of labor market or employer satisfaction in the Mongolian information and communication technology industry.

Research objectives consist following subjects. Herein:

First: The human resource development of the industry will be defined by the satisfaction level of employers of the Information and communication technology companies and government employers regarding the new graduates' skills and capabilities. As a result, skills needed to be improved will be determined.

Second: Necessary policies to be implemented will be deducted by the identification of the skill requirements based on the labor market trend of actively operational Information and communication technology public and private organizations.

Third: To compose conclusion based on the findings from the above two objectives. Also, the objective is to produce a skill development and human resource policy

recommendation to improve the human resource development of Information and communication technology industry of Mongolia.

Based on the objectives of the research, the research questions of the thesis were defined. The development of new technology and innovation is relatively lower which is stated in the statistics of the development of ICT sector in Mongolia (White book-2017). Moreover, this reality is proved in the Information and Communications Technology Development Index /IDI/ indicators stay much lower than the World average. As stated in the report prepared by the universities that are specialized in educating IT professionals and the Labor Barometer 2016, even though the infrastructure of the ICT is highly prepared, problems of the human resource development in the sector have been ignored. In the study, 31.2% of the ICT sector employers stated that they are highly dissatisfied with their employees' skills. However, the study did not explore which skills are lacked. Thus, the following research questions are asked to explore what skills are more required by employers in Mongolian ICT sector and what education policies are required to improve the situation.

1. What skills are important in ICT sector to meet employers' expectation?
2. What kinds of education policy are required to develop qualified Human resource in universities?

The second research question is defined based on the first one since the thesis is directed to use the mixed-methods. The first one explores the reality of the skills that are required from the employers' perspectives and the second will suggest

potential education policies to improve the reality. As the economic development is directly related to the human resource development, the objective of the paper is to define the education policies to develop the ICT sector in Mongolia.

Chapter 2 Country background

2.1 Current situation of Public and Private Employers

Mongolia is a democratic country with 1.5 million km area, population of 3.2 million and bordered by Russian Federation and People's Republic of China in the continent of Asia. Mongolia switched into democracy in 1990. Since then, the market economy is strengthening for the last 28 years. The concept of public and private sector was introduced in the last 28 years and private sector is developing by way of legal environment likewise the other countries where adopted democratic society. There have been several studies about the differences between private and public sectors. Various researchers have made numerous conclusions. Murray (1975) concluded that despite of many differences in how public and private sector organizations can be defined; the management of both sectors are similar in many areas, whereas Rainey et al. (1976) argued that the private and public organizational management should be different. As for Mongolia, the private sector has been developing as the similar context what researchers have concluded.

There are 4299 government organizations and 188,974 government officials employed up to date while public and private sectors coexist and support each other in Mongolia (Mongolian Statistical Information Service).

The percentage of specialists who work for information technology and communication sector is relatively low considering the number of officials mentioned above (Table-2). Herein:

Table-2. Professional status of public servants

	Type	Total
1	Lawyer	14,022
2	Engineer	6991
3	Teacher	44,736
4	Agriculture	3,771
5	Information Technology	620
6	Geology, mineral industry	865
7	Physics, chemistry, mathematics	221
8	Biology, ecology	400
9	Architecture	101
10	Language, criticism, journalism	228
11	Community, history	599
12	Business, economist	11,371
13	Science of medicine	11,497
14	Other	70,680
15	Unprofessional	22,872

According to the above table, there are 620 information technology employees which is only 0.3% compared to the total number of government employees of Mongolia. This indicator shows that there is a hypothesis of low utilization of information technology and introduction of new technology in the current activity of government organization.

As of March 2017 nationwide in Mongolia, the 3056 entities of 150,271(Statistics from Mongolian Statistical Information Service) operational entities are in the Information and communications technology industry which is covering the 0.5 percentage of total entities. Total of 18100 employees are currently working in the Information and communications technology entities (Report 2016, National Statistics Office of Mongolia). Also, 95.1 percentage of the 3056 software manufacturing, information technology service provider entities are limited liability companies. (*Communications and information technology authority, ICT Year book*

2017). The ownership type percentage of the entities operating in information and communications technology industry are shown in the following table.

Table-3. Ownership type of the software manufacturing and information technology service provider organizations

	Ownership type	Amount	Percentage
1	LLC	3056	95.1%
2	LLC (Foreign investment)	57	1.9%
3	State owned enterprise	1	0.0%
4	GO, Department, State budgeted enterprise	6	0.2%
5	LLC (Audit)	3	0.1%
6	The province budgeted enterprise	2	0.1%
7	Citywide organizations	61	2.0%
8	JSC	2	0.1%
9	Foundation	4	0.1%
10	COBs	10	0.3%
11	LP	4	0.1%
Total amount of entities		3056	

Total of 3056 entities are in the Table 3 and the ownership type shows 95.1 percentage is under LLC which could become the basis of hypothesis that majority of the employers introduce new technology and make innovations in the information and communication technology industry.

However, following table shows the operational period of the entities that actively operates in the information and communications technology industry. Because, the operational period will be considered during the data collection and planning to include representations from all periods. Herein:

Table-4. Operational period of the software manufacturing and information technology service provider organizations

Operational period	Quantity	Percentage
1 year	264	8.8%
2 years	381	12.7%
3 years	427	14.3%
4 years	464	15.5%
5 years	349	11.7%
6 years	1106	37.0%

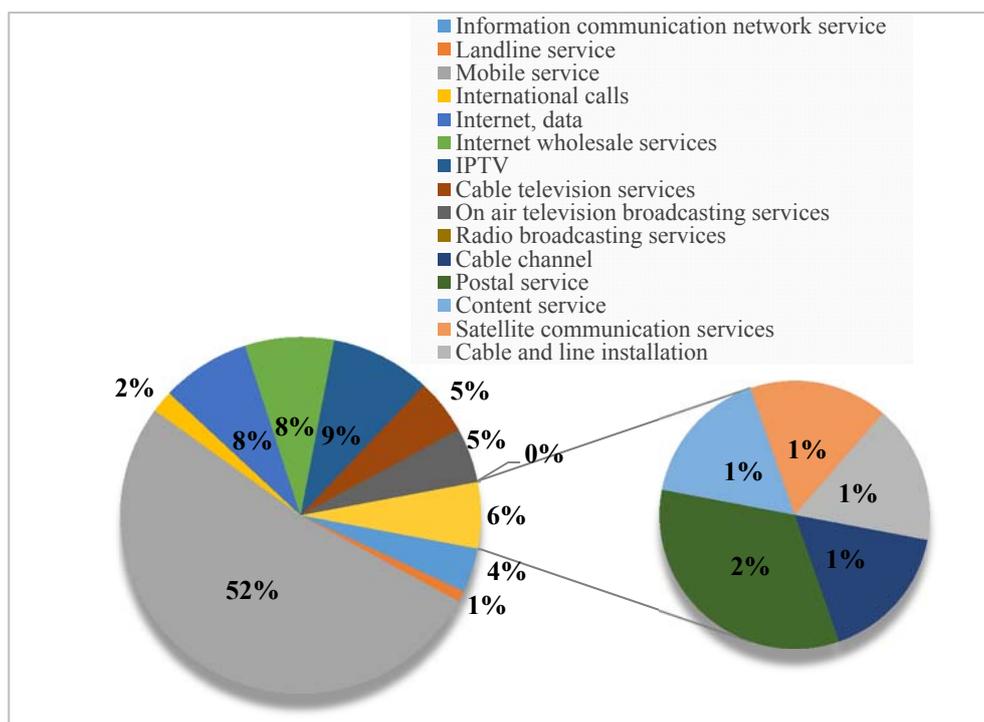
Table – 4 indicates that the 37 percent of the total amount of the employers have more than 6 years of stable operations. The organizations that are going to be in this study will be chosen by the operational period which could ease the selection criteria and the longer period of operations of the entity could indicate more stable human resource policy.

2.2 Current economic potential of the software manufacturing and information technology service provider organization

Based on the amount of tax payment ranking of the software manufacturing and information technology service provider entities, natural resources and internet, communications companies are ranked high. It is pertaining to the industry's operational volume and range. As of 2016, information and communication technology industry income is 965 billion MNT which is 386 million US dollars which has increased by 3.3 percent compared to the previous year income. Following Figure – 1 illustrates the information and communications industry income categories by percentage. Main reason to illustrate this Figure is that investors and companies of the industry may focus on the category that brings most

income and requires these types of specialist and demands employees to have the skills for those direction of work.

Figure-2. Service percentage rate in the industry income (CITA. ICT Year book 2017).



According to the Figure, mobile services occupies the highest 52% percentage. Therefore, the information and communication technology industry might be focusing their attention to the skills and qualification issue of the technical specialists of the mobile services and its' engineering. However, the category of new technology and innovation has not been included in the list could indicate the industry organizations did not make advance in these categories. Following table – 5 exhibits the outstanding tax payers of the information and communications

industry by chronologically. The 2016 report of communications and information technology authority stated only 28.8% of the total entities are actively operating.

The barometric study of Ministry of Labor and Social Protection noted that lowering the operations of the industry organizations does affect the employee responsibilities and as the result, one employee have to perform numerous of tasks at the same time.

Table - 5. Information of the outstanding tax payers of the industry and economic indicator (Mongolian Tax Administration). /mil, MNT/

Outstanding tax payers							
Tax payer organizations	2012	2013	2014	2015	2016	TOTAL	PERCENTAGE
Energy resource Unitel	102,159,950	59,519,601	31,238,540	35,846,967	6,284,505	235,049,562	72.0%
Newcom	780,232	1,147,348	835,917	1,041,206	9,769,667	13,574,371	4.2%
Mobinet	2,171,869	2,539,467	1,980,873	2,213,580	1,779,051	10,684,840	3.3%
IT zone	874,551	1,153,875	1,540,177	982,497	837,006	5,388,106	1.6%
Greencity	432,041	302,711	613,725	560,222	2,087,347	3,996,047	1.2%
Taigam-Altai	456,032	1,440,352	637,832	348,409	360,188	3,242,813	1.0%
Interactive BI	560,353	464,365	563,880	448,339	450,228	2,487,164	0.8%
Uplanet	0	474,299	564,879	649,837	702,326	2,391,341	0.7%
Skynetworks	62,605	415,840	281,006	517,049	655,684	1,932,184	0.6%
Grapecity Mongolia	357,865	461,903	213,101	336,873	440,630	1,810,372	0.6%
Skymedia corporation	145,724	357,436	464,748	304,342	247,468	1,519,718	0.5%
Interactive	783,683	127,037	190,483	207,849	64,314	1,373,366	0.4%
MCPCGR	116,799	245,894	769,967	63,910	135,461	1,332,031	0.4%

Monlogos	213,971	314,707	226,092	289,341	279,478	1,323,590	0.4%
Summit computer technology	299,351	130,016	210,209	249,615	199,174	1,088,364	0.3%
Ulaanbaatar smart card	0	0	0	600,418	469,923	1,070,341	0.3%

According to the above table, tax payment has been increasing year by year. There are organizations implementing new technology and delivering it to the customers. It shows various organizations are successfully implementing new technology. Along with the introduction of new technology, employees' technical skills are needed to be improved and also there are new job positions are being created. As noted in the labor market demand section of the Labor Barometer-2017, there is 3.6 percent of new job position demand was created in the information and communication industry in 2017.

Software manufacturing and information technology service provider organizations of Information and communications technology industry are categorized by the employee number in the below table (see table-6). Following table aimed to show the operational employee numbers of the registered entities. Herein: Table-6. Software manufacturing and information technology service provider organizations' employee count.

No	Employees	Registered entities
1	1-10 employees	714
2	11-50 employees	76
3	50-100 employees	11
4	101 and more employees	7
5	0 employee	315

Above Table-6 shows majority of the entities employs 1-10 employees. This exhibits information and communication technology industry's market rate to the gross domestic product and the market place ranking.

The reason is that the majority, 714 entities, of the all entities have one to ten employees. The operation of these entities are not directed into implement new technology or innovation, instead they are all start-ups in the early stage of the development and cannot be powerful competitors in the market. ("White Book - 2017").

Above organizations are all registered in the social insurance fund and pays social insurance regularly. The other 2280 organizations are not registered in the social insurance fund and existing information of the employees is unclear.

2.3 Implementation of Information Technology, Current State and International Index

Utilization of information technology sector increases due to outcome of projects implemented nationwide for the last 10 years to create infrastructure of information technology therefore technology usage, demand, implementation have been grown and this is generating concern for technology application skill of specialists as well.

The World Telecommunication/ICT Indicators 14th Symposium (WTIS) is organized by the International Telecommunication Union every year and the symposium has legalized and renewed "The ICT Development Index" based on sustained growth of

ICT which demonstrates benchmark of level of ICT development in countries across the world. Herein:

- Access
- Utilization
- Skill are 3 sub-indexes combining 11 indicators and two indexes are eliminated that number of telephone booth per 100 person and fixed telephone subscriptions per 100 persons.

ICT development benchmark across the countries are analyzed by 14 indicators by adding 5 sub-indicators such as percentage of the population covered by mobile networks /at least 3G and at least LTE/WiMax/, mobile-broadband Internet traffic per mobile-broadband subscription, fixed-broadband Internet traffic per fixed-broadband subscription, percentage of individuals who own a mobile phone, proportion of individuals with ICT skills.

Mongolia has made progress from previous year by ranking 90th out 175 countries in The ICT Development Index Global Analysis 2016.

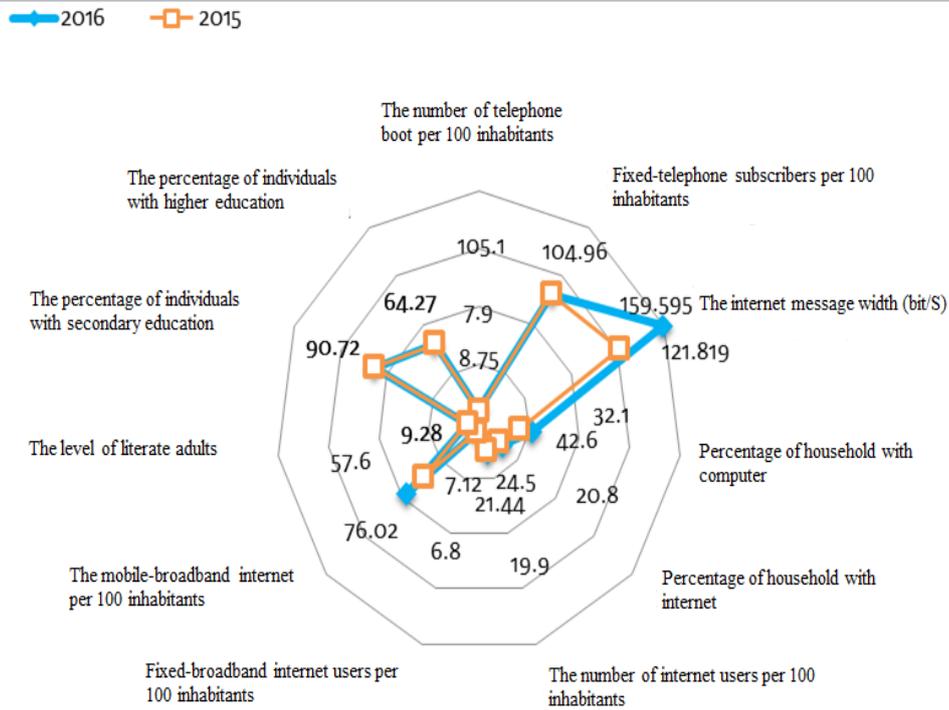
Table -7. Development indicator of Information and communications technology industry (CITA. “White book – 2017”)

Indicator	World average	AP region average	Mongolia	
			2016	2015
Development order			90	93
ICT development index	4.94	4.58	4.95	4.54
ICT ration sub index	5.58	5.18	5.12	4.77
Telephone booth per 100 person	14.34	11.00	8.75	7.9
Mobile service user per 100 person	98.61	93.00	104.96	105.1

Internet broadband	61.030	34.811	159.595	121.819
Households with computer	45.63	36.00	42.60	32.1
Households with internet	49.03	36.00	24.50	20.8
ICT consumption sub index	3.91	3.53	3.64	2.97
Internet users per 100 person	43.83	38.20	21.44	19.9
Fixed broadband internet users per 100 person	11.21	8.90	7.12	6.8
Wifi internet users per 100 person	44.17	37.70	76.02	57.6
ICT capacity sub index	5.74	5.48	7.23	7.23
Literacy level among adults	8.30	7.76	9.28	9.28
Secondary education holders ratio	82.97	81.22	90.72	90.72
Higher education holders ratio	37.61	33.22	64.27	64.27

Asia Pacific regional 15 countries (out of 34 countries) index has been decreased and 7 countries indicators have kept the same level as the previous year. As for our country, the ICT index has increased, however the consumption index is still lower than the world average. It is a good news for Mongolia that the secondary and higher education holders' information and communication technology capacity is higher than the world average, however it still remains mystery whether it is high enough to reach the requirements of the employers. Because there is no detailed study conducted on this matter.

Figure-3. Mongolian ICT Development Index



2.3.1 Current state of the Education quality & supply

It has been recorded in the statistical data there are 95¹ higher education institutions are operating in Mongolia this academic year as “Higher Education Sector – Statistic Data of Academic year 2016-2017” published by Ministry of Education, Culture, Science, and Sport of Mongolia (Table-8). It allocates one university per 32,632 citizens if the Mongolian population is estimated at 3.1 million and this is relatively high rate comparing to other country’s reference. The

¹ Mongolian Statistical Information Service. www.1212.mn

quantitative indicator has been compared to South Korean ratio of total population versus the number of universities. South Korea has total of 222 undergraduate courses, 40² graduate schools and the total population of 51.45 millions as of 2017. The ratio would be one school per 212.604 citizens. The assumption that this ratio might increase the competition level and opportunity to gain education at the university can be made. Even though Mongolia might possess one of the highest ranking via number of universities and institutes per person, according to the information of world association to determine university qualification ranking, Mongolian best school “Mongolian University of Science and Technology” ranks at 4220³ and it is unsatisfactory performance. Following Table 8 shows number and classifications of educational institutes in Mongolia. The classification indicates that Mongolia has a difference from other countries as structure differentiating university and institute. This depends on the educational institutions’ majors, degrees they offer and standardization of the ministry.

Table-8. Number of Higher Education Institutions (by classification)

Higher Education Institutions					
Academic year	Total	University	Institute	College	Overseas branch schools
2012-2013	99	17	58	19	5
2014-2015	101	18	70	8	5
2015-2016	100	25	64	6	5
2016-2017	95	31	57	3	4

² Ministry of education Republic Korea. www.english.moe.go.kr

³ Ranking web of universities. www.webometric.info

The table shows the number of schools had been reduced although, the statistical data indicates there are not enough actions to check the quality assurance and whether the universities and institutes are meeting demand of specialist's labor market or no. It can be confirmed from the rankings of Mongolian universities listed in the World Universities rankings.

2.3.2 Students' educational discipline and current state

Starting from 2014-2015 academic year, in order to determine the educational discipline and index of the newly accepted students' bachelors, masters, and doctorate degrees will follow the approved order of occupational (curriculum) discipline and index of the Minister of Education, Culture, Science and Sport, the students accepted before 2014-2015 academic year will follow the 2010 "Reform of the Occupational discipline and index" order of the Education, Culture, Science and Sport Minister until their graduation in the respective educational institution.

Therefore, renewed professional discipline (curriculum) according to the confirmed index adjusting to the old index system breaks down into following majors: 14% education; 7.5% art and humanitarian; 5.2% social science, information, journalism; 26.7% business administration, legislation; 3.6% natural science, mathematics, statistics; 2.7% information, communication technology; 17.3% engineering, manufacturing, invention; 2.6% agriculture, forestry, fish ranching, veterinary medicine; 11.8% health care, social protection; 4.0% service; 4.6% others (unavailable to regard to above majors up to date)(Table 9). Below is shown as a table.

Table-9: Percentage of students' occupational discipline at institution of higher education (2009~2016)

Name of the discipline (program)	Percentage of occupational discipline among total students (%)							
	2009	2010	2011	2012	2013	2014	2015	2016
1. Education	13.3	13.2	13.0	12.6	12.6	12.7	13.6	14.0
2. Culture	8.6	8.7	8.6	7.6	7.1	7.1	7.1	7.5
3. Social science, information, journalism	35.8	34.5	35.3	34.8	34.6	7.0	6.3	5.2
4. Business administration	Included in above "Social science"					26.1	26.7	26.7
5. Natural science, mathematics, statistics	7.0	7.0	6.9	6.7	6.6	4.6	4.1	3.6
6. Information, communication technology	Computer science included in "Natural science", others included in "Engineering"					2.8	2.7	2.7
7. Engineering, manufacturing, invention	17.1	17.6	18.9	19.2	19.5	18.6	19.0	17.3
8. Agriculture, forestation, fish ranching, veterinary medicine	2.8	2.9	3.1	3.5	3.3	2.9	2.7	2.6
9. Health, social security	9.8	10.6	9.2	10.0	11.0	11.6	11.8	11.8
10. Service	5.6	5.5	5.1	5.5	5.4	4.0	4.0	4.0
11. Other	Other included in "Service"					2.6	1.9	4.6
Total	100	100	100	100	100	100	100	100

As seen from table-9 between 2009-2013 information and communication sector was included into "Natural science" field. This shows affiliated ministry's operation didn't pay special attention to the training of industry specialists. And from the following table, it is available to see the disciplines of Information and

Communication school, including the number of students between 2011-2016, segmented by each field. Herein:

Table-10. Supply of specialists trained in Mongolia (Statistics from, Information and communication school of MUST- 2016)

Name of the profession	2011	2012	2013	2014	2015	2016
Engineering in Radio Electronics	54	56	58	59	61	62
Engineering in Telecommunications	55	53	52	50	49	48
Software Engineering	497	529	556	580	601	619
Information Systems	41	42	43	44	45	45
Electronics	102	108	113	117	121	124
Technical Computing	74	74	75	75	75	75
Information Technology	121	123	125	127	129	130
Computer Networking	92	101	109	116	122	128
Computer monitoring in manufacturing	6	5	4	4	3	3
Information Systems Management	46	47	48	49	50	51
Communications Management	21	21	21	22	22	22
Broadcasting technology, technique	28	30	32	34	36	37
Automation in Information, Library	8	9	9	10	10	11
Information Networks	67	73	79	83	87	90
Electronics in Data Measurement	41	42	43	43	44	44
Telecommunications	18	20	21	23	24	25
Physics-Electronics	7	5	3	1	-1	-2
Mathematics – Software Engineering	24	24	24	24	24	24
Design in film, television, theatre	0	0	0	0	0	0
Figure design, multimedia	20	21	21	22	23	23
Information systems administration	0	0	0	0	0	0

Business Administration in Hardware Engineering	11	10	9	8	7	6
Information and communications technology	43	48	52	55	58	61
Technology in Multimedia Communication	33	36	39	42	44	46
Instructor, mathematics-information science	29	29	30	30	30	31
Computing and mathematics teacher	32	33	34	35	36	36
Instructor, Information science	43	43	44	45	45	46
Total	1517	1589	1650	1703	1749	1791

Table – 10 shows some of the professions did not have recruits at all for several years. There is a suspicion of universities and the institutes of information and communication technology sectors school are not implementing policy reform based on the market intuitiveness, professional demand and conditional evaluation on the current situation of the universities and institutions.

2.4 Demand, supply and current situation of labor market

In 2017 (for the first time ever) Ministry of Labor, Social Protection and Research Institute of Labor, Social Protection cooperated in the barometric research, which provides data and information to educational, training and employment strategists, decision makers and researchers of labor and educational system. Research identifies short term demand of labor market, workforce prediction of the following year by profession and geographical locations.

Barometric study was taken from 2,433 entities and 3.8 percent of the actively operational and registered 64,301 business entities in the business registration agency by the end of 2016, participated from Ulaanbaatar city (all 9 districts) and 21 provinces. The 67.6 percent of the total participated entities which is 1,645 entities in the study were from Ulaanbaatar, and the remaining 788 entities sampled out of 21 provinces. Entities with more the 150 employees were sampled by outreach approach and 546 entities met the requirement and participated in the survey. 10,526 employees from information and communication technology sector participated in the survey and it is 5.8 percent of total employees participated.

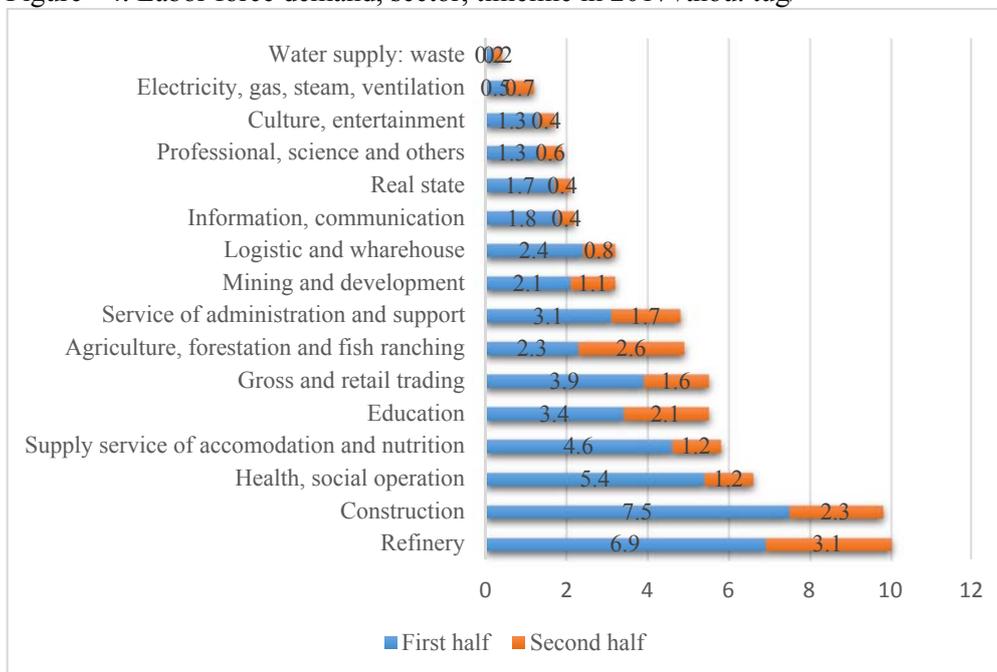
31.2 percent of entities who took part in the study answered to hire new employees in 2017. It is lower by 9 point from previous year. Region wise, 45.6 percent of the entities who operate in the central region and 30 percent of the entities in the other regions are planning to hire new employees. From the survey data, total number of available and new workplaces in 2017 of all the entities participated given was 70,000 which is a positive result for labor market.

In the survey conclusion, out of total demand in labor force is 70.4 percent which is 49.7 thousand will be available in first half of the year, remaining 29.4 percent or 20.9 thousand will be available in the second half of the year. Also, 70 percent of job positions are permanent, 60.9 percent is new and 39.1 percent will be available job positions.

Above survey result shows, as a nationwide in Mongolia, it looks as if new recruitment demand is increasing however, following Figure shows comparison of

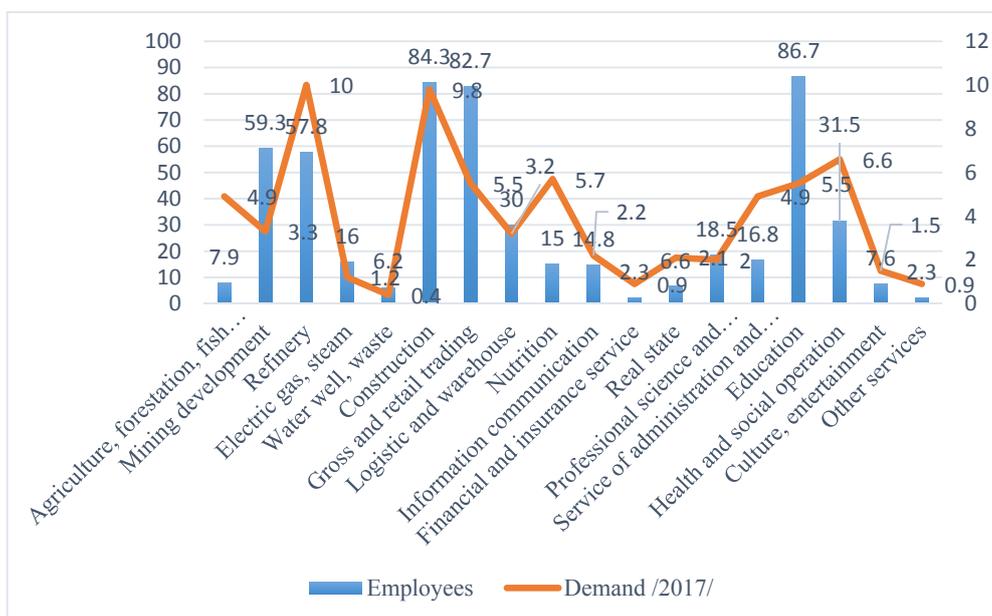
the job position demand created among the Information technology industry employers and other industries. Herein:

Figure - 4. Labor force demand, sector, timeline in 2017 /thou. tug/



From above Figure-4, demand of labor force in information technology sector covers only 2.2 percent of total demand and comparing to other industries it is relatively low percentage. It is assumed that development of information and communication technology sector of Mongolia is directly related to the strategy and policy implemented by government. Also, specific denotation shows some interesting result. From the report of National Statistics Office, total percentage of entities operating in information and communication sector is 2.2 percent, and total percentage of employees working in information and communication sector in

Figure – 5. Labor force demand, by sector category in 2017 /thou. tug/



Mongolia is 2.7 percent. Comparison of the above denotation and current employees' number with demands are shown below. Herein:

Comparison between current number of employment and demand in labor force illustrates relative stability in human resource of information and communication technology sector, however, comparing to other industries, there are signs of extremely slow development, lack of implementation of innovation projects and programs, and insufficient strategical policy and operation from the government.

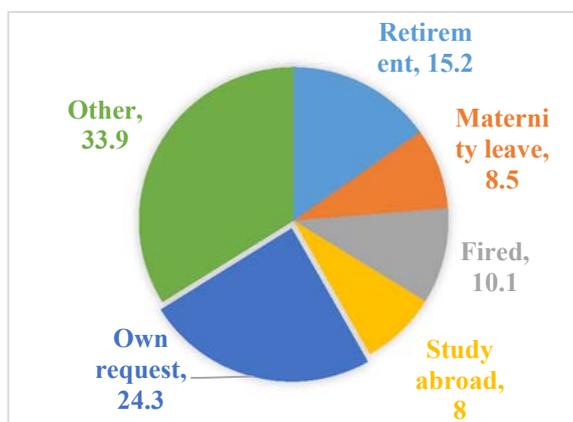
Barometric study, conducted by Ministry of Labor and Social Protection, shows economical labor force demand's 82.5 percent of real state, 82.4 percent of culture, entertainment, 81.7 percent of health and social security, **80.7 percent of information and communication technology**, 79.6 percent of accommodation and

nutrition will be available in first half of the year. To be more accurate, information and communication sector's labor force demand for 2017 was 2,227 and in the first half of the year number was 1,798, or 3.6 percent, and in the second half 429 or 2.1 percent.

Survey results show that out of total entities participated in 2017, 31.2 percent had new or available job positions and private sector had 77.9 percent, foreign investment organizations had 1.5 percent and governmental organizations had 16.1 percent. In other words, this proves private sector companies are major player in the labor market as it has 4/5 of the total demand of the available job positions in 2017. The calculation was made that the permanent job positions are 76.4 percent or 37.8 thousand of the total demand and it will come from private sector and 1.6 percent or 0.8 thousand of the demand will come from foreign investment companies. As for temporary job positions, 81.2 percent belongs to private sector organizations and remaining job positions will come from other ownership types of the employers.

According to the study, with new job positions demand also term of available positions are coming along and study concluded the followings are key factors. As shown in the below Figure. Herein:

Figure-6. Reason and percentage of available job positions (Ministry of Labor and Social Protection. Barometric Research)



Clarified factors for available job positions are 10.1 percent for getting fired, 24.3 percent by own request and other reasons, such as individual discipline, maturity, communication were 33.9 percent. This illustrates labor

forces' job position stability is still inconsistent, although there is no detailed study in this field, plus there are no source or evidence of survey. Continuation of the study stated that the 7 out of 10 available job positions in 2017 will be permanent job positions. In other words, 70 percent or 49.5 thousand of the total job positions will be permanent job position and 30 percent or 21.2 thousand will be temporary job positions. Thus, quantitative value of this study exhibits labor force demand of Information and communication technology industry in labor market of Mongolia is constantly increasing. It is suspected that as new technologies emerging, the new job positions follow.

Chapter 3 Literature Review

3.1 Human resource development in ICT sector

Majority of the researchers deduces that human resource development is undividedly relevant to all the other industries' development, not just information technology industry alone. Therefore, information and communication technology industry's human resource developmental matter studies are examined here.

Operational objectives of Human Resource Development (Haslinda, 2009) is directed to increase the employees' skills and to provide job adaptability and flexibility in order to meet the demand of the organization's present and future state. As stated by Haslinda, however, overall objective of Human Resource Development is to reach high operational performance by developing the skills of employees. Furthermore, Haslinda noted in Human Resource Development (Haslinda, 2009) operations includes followings. Herein: Training and development, feedback and appraisal, career planning and development, and change management are included. Also, Researcher Lucas stated "Highly skilled human resource has the important obligation to create industrial enterprise and conserving the stable performance" (Lucas Jr, 1988) that concluded to new technology and root of innovation is based on highly skilled human resource based on his research. As above researchers viewed, numerous factors such as skills development based on the present and future state of the organization is relevant to the human resource development. Examination of

human resource developmental requirements for the employees asked by the information technology industry organizations are conducted in the following.

Particularly, numerous type of skills are required from the employees in the information technology industry in recent years and researchers Yoon and Choi concluded “... specially in both domestic and international ICT companies and other companies that utilize ICT companies need employees with not only high ICT skills but also other various skills, however, employees with these skills are insufficient...” (Yoon & Choi, 2017).

Concluding from above, human resource development is inherently relevant to the ICT industry development, new technology and innovation introduction and therefore, it is necessary to identify and establish the required skills needed. However, it can be seen from the conclusions of several researchers that there is a tendency to demand those skills to be ready from the employees when they first get hired appeared among the employers.

In particular, even though human resource development is rapidly developing in recent years (Al Qubaisi, 2012), generally employers bear the employees' training expenses for the skills development by themselves. Therefore, employers prefer to hire new employees who already has developed their skills. The researcher showed investment matters of human resource development training for the newly hired employees becomes a burden to the employer, therefore, people who possess professional and other skills are preferred to get hired.

As the conclusion of the researcher, it has identified that individual's professional and other skills has a lot of impact on the decision of the employers to make the selection for the new job position. During the examination of types of skills that are preferred from job seekers that are required by employers', it has been noted that thoughtful skills, affective skills, physical skills that are strength, coordination and dexterity and psychological skills which are income increasing method to other skills. (Tauman, 1975)

The Research stated, depending on the characteristics of the workplace of the employer, above skills are expected from the employee. However, researcher AI Qubaisi (Al Qubaisi, 2012) stated, from above four skills, it is suffice to possess not all but necessary skill that is needed for the job position. Thus, above four types of skills are common skills that employers expect from the employees, however, it can be viewed the employee could possess the skill based on the workplace demand. However, researchers did not specify whether employers expect specific type of skills from the employees for their company's working premises.

The research of several researchers on employers' expectation of certain types of skills from the employees are shown above. But on the other hand, to see the research on the relevance of human resource development matters and other factors. Becker stated employees' high salary and incentives depends on their basic skills specialty which is relevant to the knowledge and skills (Becker, 1964b). Also, (Becker, 1964a), (Al Qubaisi, 2012) established during the research that employers provide higher compensations to the employee with high skills and abilities that

meets the employer's demand. It shows that nowadays employers are reluctant to spend additional expenses to the employees who have high professional and other type of skills. It draws attention that the conclusion was made hiring a new employee with good development of human resource skill brings immediate results to the company operations.

By examining the research conclusions, it can be deemed that employers prefer the job seekers possess professional and other types of skills and the human resource development trend gravitate towards that employees should learn those skills during their educational period not when they are in workplace and relearn. Therefore, it necessary to conduct a study to examine the need for which types of skills should be occupied and when is the appropriate time to learn these skills.

3.2 Higher education policy of ICT in Mongolia

Based on the previous section 3.1, it is appropriate to consider the human resource matters as a policy not just developmental matters. Because human resource development matters based on a correct policy will have fewer adversity. Therefore, as my main research direction, "on what level, policy matters of university and institutions that prepare human resource for Information and communication technology industry of Mongolia has been studied?" Has been examined.

The examination of research on the understanding of policy shows policy is an operation, in other words, it is a product (Wildavsky, 1979). These operations and products are utilized in the decision making process. Policy is also what is needed

and what to talk. Policy is to remove the prerogative of individual's interest and therefore to ensure the public's interest.

However, policy of educational sector (Association, 2006) depends on the principles of educational sector and policy of politics, not just from the legislation and regulations to manage educational sector alone. Educational policy covers all the matters that educational sector faces from the higher education to others.

As for country of Mongolia, the Information technology industry policy matters are developing as the same standard as the other developing countries by following the technological introduction. (Uyanga, 2014) The policy of educational sector is organized by following stages. Herein: First, Ministry of education, culture, and science (MECS) defines the nationwide policy. Secondly, a province education center should be established and on this level, this center implements the province wide educational policy that has issued from the ministry. In the final stage, department of education in district and soum (Soum is the smallest administrative subdivision of Mongolia), school council, and province high level educational agency works to provide the policy implementation. The educational policy of Mongolia is generated by the higher administration such as the Ministry and through its the structural organizations the implementation carries out and it generates based on these organizations.

The essential part of the policy of Information technology industry of Mongolia approved by The Great State Hural (Parliament) are follows (Uyanga, 2014):

Science and Technology Master Plan of Mongolia 2007–2020. The Master plan contains following five main goals, which are to be implemented through stages: 2007–2010 (1st), 2011–2015 (2nd), and 2016–2020 (3rd stage):

1. Establish and develop a competitive R&D sector.
2. Create an effective national innovation system.
3. Create a legal and institutional system of protecting and utilizing the results of R&D.
4. Reforming the economy on the basis of technological innovation.
5. Develop effective international co-operation in science and technology.

The Master plan includes the models for six targeted programs, which will serve as the main mechanism for the implementation of the objectives and activities of the Master plan:

Identifying and implementing S&T priorities and key technologies of Mongolia.

1. National Innovation System Development.
2. Enhancing S&T Information, Monitoring and Evaluation System.
3. Development of Advanced Technology in Mongolia.
4. Training and supporting young researchers.
5. Supporting university R&D (MOECS, 2007).

By taking the currently implementing and to be implemented policies into sections, there is no section that projects the individual's development matters and this part basically projected as general context (Uyanga, 2014). It stated in the conclusion of the study that just recently country of Mongolia mainly concentrated to create the

infrastructure and teach computer language, however, in present days it is necessary to advocate the ICT industry at policy level, modify the professional curriculum of the students and introduce necessary skills trainings additionally.

It can be concluded as there is a need for the skills development curriculum that meets the requirement of the Mongolian Information and communication technology industry policy makers and implementing organizations' level in addition to the existing educational curriculum of the students and the graduates. However, there is no specific studies that have conducted on this matter in Mongolia.

3.3 The Quality and Necessity of Higher education

During the examination of employers' satisfaction level of human resource development matters of information technology industry, the matters of higher education quality has been raised. Fundamental human resource capacity matters affect the higher education quality matters. Therefore, the understanding of higher education quality and studies in this topic are explored here.

Fundamental definition of higher education quality (Hirst & Peters, 1970) is "the development of desirable qualities in people". There is a matter of paying more attention to the quality due to the direct impact on the life of graduates with higher education (Trow, 2007). Researcher concluded in terms of historical development, after the World War II, higher education is not just the education for the traditional elites, but it got approachable to whole society. Thus, the higher educational system expansion directed at all level.

Above researchers stated higher education development rapidly progressed after the second world war. Researcher noted there are several factors that significantly impacted the rapid development of higher education in modern days (Marginson, 2016). Following this and other researchers' emphasized matter, herein: **Firstly**, Focus on the higher education has increased due to the successful implementation of medium term policy by the government improved the household livelihood and solvency. In regards to this, the demand for the higher education has increased.

Secondly: Increasing the national economic competitive capacity in the education based economic environment presents significant importance of citizens with higher education, therefore, there is a need to create knowledge and high skills (Bloom, Canning, & Chan, 2006).

Thirdly: Liberalization of private sectors has occurred; also business profit segment has been establishing rapid increase for businessmen by market methods (Kinser et al., 2010). Examining the researchers' conclusion, as the need for higher education increases, the quality matters that follows it increases.

Quality matter of higher education has made significant impact on the new technology, innovation, and new business in modern days.

There are many studies conducted on the general understanding of higher education quality matter. In particular, researcher McCowan (McCowan, 2018) made conclusion on his study and noted "Higher education quality is relevant to each

and every direction of university, specially researches and public participation activities”.

However, Harvey and Green mentioned that the final measurement of higher education quality is positive internal changes of the student (Lee Harvey & Green, 1993). In other words, it has significant correlation that the product definition should have the highest level of coherence.

In recent years, Information and Communication Technology is widely utilized in higher education and it is also affecting the higher education quality. Researchers Pavel, Fruth and Neacsu viewed one of the main objectives of the information and communication technology is globalization and technological change (Pavel, Fruth, & Neacsu, 2015). Researchers stated, in this regard, general education and higher education sectors need to change. Researcher noted based on their research, new technology of information and communication technology industry has been changing the training process of higher education significantly. Higher education based on information and communication technology encompasses larger scale, therefore, skills and quality management system and quality management has substantial importance.

The higher education quality understanding has shifted its traditional model, and by the researchers’ conclusion, it is shifting towards the aspect where it is based on new technology and utilizes the advantages of information technology. It is observed that the industry is affecting the general higher education quality rather than the information technology industry.

3.4 Skills concept

History of skill concept

It can be seen from the studies of human resource development, policy, and higher education quality, the employee's skills became fundamental problem when examination of human resource development matters of Information and communication technology industry from the perspectives of employers' satisfaction. The conclusions drew from the researches on the understanding of skills and its direction as follows.

Historically, researching the skills were determined, the person, who had public speaking or verbal knowledge, used to be considered as skilled person (Sousa & Rocha, 2018). However, Researcher Prochno (Prochno, 2001) ideologically reckons that understanding of skills covers wide range and it is very difficult and complicated to understand.

Whilst at present time general meaning of skills has been changed as compared to its historical meaning; moreover, it became one of the matters on which employers should pay a lot of attention in business sphere. In this connection researchers (Nyhan, 1998) have made a conclusion saying that skills have big significance in determining competitive capacity of the market and it became important strategy and management method to surmount current business environment.

In XXI century the concept of skills has been used mainly in information and communications technology sector, (Ferrari, 2012) and became concept of

“digital skills”. Concept of “digital skills” describes what kind of abilities citizens require for their social knowledge. Even though “digital” means quantitative terms, however in XXI century it is understood as professional skill of information and communications technology. Digital skills have been concluded as conception of information management, collaboration, communication and sharing, creation of content and knowledge, ethics and responsibility, evaluation and problem solving and technical operation. On this basis, the understanding of ICT skills covers wide range and every researcher has made it in appropriate line of trend.

It is concluded that “perfect execution habit and skills of completing the given task in workplace” is the definition of skill. According to the Cambridge Dictionary (n.d.), a skill is “an ability to do an activity or job well, especially because you have practiced it” (Kaushal, 2016). However, researchers (Tricot & Sweller, 2014) categorized skill as domain-general skills and domain-specific skills in order to understand skills. Greiff stated that domain-general skills are efficient in all types of workplace and can be utilized by all (Greiff et al., 2014). However, (Laker & Powell, 2011) noted domain-specific skills are soft skills and it can be used only in certain workplaces.

The classification of skills

As the purpose of the thesis is to find the specific skills required by employers in the workplace, the classification of skills is the most important part to discuss.

Researcher Marcel.M Robles categorized the skills that employers' demand in modern days into hard skills and soft skills (Robles, 2012). It stated soft skills did not appear suddenly, it was introduced long time ago in business environment and it has been developed in the educational environment (Evenson, 1999). Investopedia (2012) mentioned, employee's professional level, work experience, knowledge, and education are included in the hard skills. In other words, job skills such as writing, typing, reading, calculating, and ability to use software are classified as hard skill.

Researchers are studying employers' interest in the types of technological skills they require from new graduates and what types of abilities affects them in recent years (Mitchell, Skinner, & White, 2010). It is stated, historically, the most important skill in workplace is technical skill which is hard skill and conducted studies in the direction of hard skills (James & James, 2004). However, this context is changing recent years and researchers introduced new concept. It is now viewed by the employers that new employee's possessing only technical skills or hard skills in workplace is not sufficient. Because it is pointed, in modern days employers emphasize soft skills aside from the technical skills and have interest in employee who already developed those skills and also develops these skills (Learning, 2005).

Understanding about skills in technology, especially in information technology sector (Acemoglu & Autor, 2011) has been started to develop since 1980 and became very important factor in economics, institutions, and technology. It is possible to identify in the literature a complementarity between technology and high-skilled labor, or skill-based technological change. (Sousa & Rocha, 2018). Also

researchers consider skills to be connected to the self-discipline of the individual; and company, which was able to choose an individual with self-disciplined skills, creates competitiveness and efficiency.

In the XXI century in the range of mutual cooperation to concept there were concluded three types of skills. Hereto: learning skills (creativity and innovation, critical thinking and problem solving, communication and collaboration), literacy skills (information, media and ICT literacy) and life skills (flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, leadership and responsibility). As we can see from here, general understanding of skills is internally divided into cluster (Van Laar, van Deursen, van Dijk, & de Haan, 2017), (Binkley et al., 2012).

Many researchers have made similar to above studies and have made conclusion based on their own research (Leahy & Dolan, 2010). According to the researcher's opinion, in the XXI century skills can be classified as follows: Ways of Thinking (creativity and innovation; critical thinking, problem solving, and decision making; learning to learn and metacognition), Ways of Working (communication; collaboration and teamwork), Tools for Working (information literacy; information technology and communication literacy), and Living in the World (life and career; personal and social responsibility). As we can see from researcher's conclusion, same contest as above mentioned is duplicated and it shows that general understanding of skills contains many skills in it. Revising all above, we can see the understanding of the fact that employers' satisfaction can be measured based on the

employee's key skills and obtained skills. Therefore, the research model is made to be investigating the employers' satisfaction basing on skills.

Only few number of researchers have conducted study on the skill preference of the employers and types of skills more utilized in workplace. According to researcher Markes.L, employers have high interest to hire engineers who possess the domain-general skills and also have the knowledge of hard skills and soft skills.

3.4.1 Communication skills

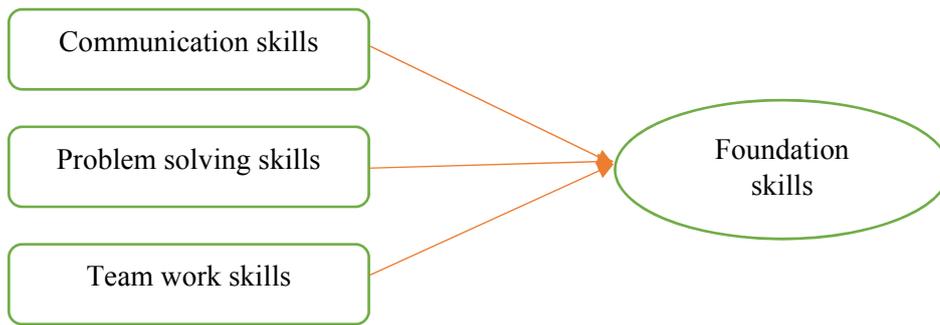
Employer satisfaction survey conducted from the Australian government in every 2 years have analyzed numerous skills and developed the questionnaire with peculiar skills to conduct the survey. The communication skills considered as the fundamental skill and have been studied. Thus, as the result of the research, this skill is now required from all the employees in this modern time. Therefore, further study of the communication skills by other researchers have been examined.

During the selection of a new employee, employers listen to the opinion of the candidate carefully and prefer an employee who can directly express their opinion to increase the productivity (Carnevale & Smith, 2013). In other words, a job seeker's skill to speak and write in a precise and short way are the most demanded and appealing to employers (Shokri et al., 2014).

Researcher (Puranik, 2015) published an article about the communication skill that can be considered as a second language for information technology industry and concluded that the level of English language of engineering graduates is

connected to the communication skills. Also, researcher Nguyen (Nguyen, 1998) pointed that engineers need to learn two types of language in modern times, but also need to learn written and verbal communication skills that employers should train them in order to communicate with customers and public. When discussing ICT sector engineers in modern times, the perception that engineers should possess the communication skill or should be trained despite their characteristics of their profession has been created. The idea of focusing on communication skills has been raised during the human resource development of ICT sector research from the perspective of employers.

Some researchers consider communication skills belong to foundation skills (de Guzman & Choi, 2013). It has concluded it as a cluster that holds various skills. The included skills are shown as following: writing communication, teamwork, problem solving, self-management, planning and organizing, technology, life-long learning, and enterprise skills. The established foundation skills have to possibility to alleviate the job transition between the organizations (Morrison & Hall, 2002). The communication skills helps studying useful skills surrounding workplace and by doing so increases to productivity (Kazilan, Hamzah, & Bakar, 2009). This skill might be the important factor that impacts the employers' satisfaction. It has also been used in the researches. Researchers (de Guzman & Choi, 2013), (Kazilan et al., 2009), (Freeman), (Damian Oliver, Brigid Freeman, Cr Young, S Yu, & G Verma, 2014) viewed that following skills are included in foundation skills. Herein:
Proposed model (de Guzman & Choi, 2013)



As about the above skills which are included into foundation skills, If to see the conclusion of the research on employers' satisfaction made by Australian researching organization, it was identified that newly graduated students had insufficient level of problem solving, creativity and flair, and verbal business communications skills (Neilsen, 2000). Therefore, assumption that will be correct to research above skills as the model of skills influencing employers' satisfaction.

3.4.2 Employability skills

Employability skills are called soft skills; and it is the concept when graduate gets a job by the profession which he got from the university and becoming successful and leading the team, economics, society with your own professional skills (Yorke, 2006). Therefore in modern days to start working, graduates require wide range of working abilities besides their personal skills (Cranmer, 2006).

Researchers have researched "employability skills" from the employer's perspective (Misra & Khurana, 2017). Theoretically researchers have studies several options. Particularly, researcher Hillage (Hillage & Pollard, 1998) highlights that employability skills depend on main four factors. Herein: In his opinion, 1. assets

(consists of knowledge, skills, and attitudes), 2. deployment (career management skills), 3. presentation (job getting skills) 4. external factors (such as labor market factors, macro-economic).

However Hillage & Pollard have judgmental opinion about researcher Harvey's position (Misra & Khurana, 2017). Harvey assumes that employment can't be measured on the basis of results (Misra & Khurana, 2017). He developed "magic bullet mode" of employment. His initiated model is the model of intellectual development by adding employability skills into training program. Harvey considers that employers input is very critical. When employer hires someone, employer should pay attention on general skills of employee. Moreover, he states that capability of employability skills are connected to two interlinked matters. Firstly: employment capability should be considered with employment level of graduates. Secondly: employment capability should be compared not to the skills which can be obtained by individual but more to the organizational success (Lee Harvey, 2001).

However, researchers (Williams, Hesketh, & Brown, 2003) note that despite the impact of individual factors to the market, the demand of labor market chooses the employee with employability skills who can perform better. As we can see from all of it, from one point employers' tendency depends on demand of labor market, however from another hand because of technological innovations employer is willing to have more than general abilities.

Beside the researchers, in last years developed countries studied skills of their own country graduates; moreover, they research satisfaction of employers as

well. This may be significant acceptance of identifying how to prepare future professionals, adding it into programs of universities, considering impact of policy solution and etc. Employability skills context includes Employability skills, Technical or Discipline-Specific skills, Core Language, Literacy and Numeracy (LLN) skills (Ithana Group, 2012).

The framework of employability skills covers environment which impacts development of individual skills and employability skills (D Oliver, B Freeman, C Young, S Yu, & G Verma, 2014). Considering, in the frame of main solution of learning main skills in technical and professional discipline of Australian graduates, the training program of general education school and universities include numeracy, oral communication, writing reading, literacy and numeracy, core language (Ithaca Group, 2012, p.4). As we can see from the research, the employability skills framework includes above mentioned skills.

Moreover, beyond above mentioned skills there are eight skills included in employability skills (Mayer & Committee, 1992). Hereto: communication, teamwork, problem solving, initiative and enterprise, planning and organizing, self-management, learning, and technology This concept has become more expanded concept of present manpower understanding (McKenzie, Weldon, Rowley, Murphy, & McMillan, 2014).

By concluding from above, for the employers, employability skills are more relatable to the fundamental skills rather than a special demanded for employee, and it should be specified in this research in order to explore how employers view this

skill and how it impacts the activities of the organization. Above researchers concluded from this perspective as well.

3.4.3 Teamwork skills

The researcher Salas, Sims & Klein (Salas, Sims, & Klein, 2004) defined teamwork “Team members have coordination with each other by thought, mind, action, and feeling”. It is stated that employers are interested to hire newly graduates that can collaborate and work together for common purpose (Kaushal, 2016). He also concluded that group cooperation and mutual respect is a winning combination. Employees who can create a collaborative environment with the colleagues immediately appointed to job. It has been proved in his research that newly graduate who have the teamwork skill has advantage that employers prefers to choose. Researchers proved that teamwork skill is an advantage that all level of specialists can have despite the characteristics of their profession.

There are numerous researches made in regards with teamwork and each researcher has made its own conclusion based on their research. Researchers perceive that teamwork requires planned coordination and execution according to the cooperation plan (Reason, 1990) & (Ramaswamy, Tiwari, Ramaswamy, & Akinwande, 2017). When the team executes the proposed plan, each member of the team shares personal internal plan and mental model. We can see that according to the researchers’ opinions teamwork depends on the input of every individual. However, from another hand, it requires to have teamwork skills.

In order to get above mentioned skills teamwork and communication skills aim to improve students evaluation of working in team (Cumming, Woodcock, Cooley, Holland, & Burns, 2015). In any teamwork project, there are common complaints within the team (Parmelee, DeStephen, & Borges, 2009). For example: not equal assignment of work to each team member, less contribution to the teamwork project, receiving bad evaluation due to the poor performance of some members (Yang, Woomer, & Matthews, 2012). Considering this conclusion of the researchers, contribution of every member is significantly important for each new product, innovation; and if per above conclusion, it is not equal we can see a tendency that the results will be negative.

According to the National Association research of colleges and employers on how to give highlighted skills to employees. It was identified that the most difficult and demanding skills which needs to be taught to present graduates is the teamwork skills or ability to work by team; it was concluded that this fact is not something to wonder about (Loughry, Ohland, & Woehr, 2014), (Waddock & Lozano, 2013). As it is noted in McKinsey report, the efficient performance of a team depends a lot on team member skills, and it was concluded that “the soft stuff matters – and is hardest to get right” (Keller, Kruyt, & Malan, 2010).

The teamwork skill belongs in same cluster as the employability skills and foundation skills, however, it is mentioned that it should be studied as an independent skill (Damian Oliver et al., 2014). Team work skills one type of cluster that contains the understandings such as capacity for co-operation and teamwork, getting on well

with colleagues and co-workers, collaborating effectively with colleagues to complete tasks.

Engineering school of Malaysia has included several skills in their research about employers satisfaction level on the graduates' skills (Omar et al., 2006). The research studied the teamwork skill as one specific group. Research conclusion implied that teamwork in modern day is an important factor to introduce innovation and new technology, and it stated employers now prefer to hire new graduates who has ability to work in team.

3.4.4 Adaptive skills

A person acquires adaptive skills during their childhood into their consciousness and in any live stages (Cronshaw & Jethmalani, 2005).

It has determined that adaptive skill and flexibility of the newly graduates are the combination of practice, ideology, and social skills that us necessary for everyday life. This skill and ability is indicator of employee's everyday performance (Tassé et al., 2012).

The concept of adaptive skills is similar research work that accommodate the long term professional research programs concept of career development (Super, 1942), adjustment mechanisms (Crites, 1976) and vocational choice without overlapping (Holland, 1997), (Raines, Gordon, Harrell-Williams, Diliberto, & Parke, 2017), (Dawis, 2000).

Researchers explain adaptive skills with their own perspectives. Particularly, timely changes in understanding, plans, goals, and methods in response to either an

altered situation or updated assessment of the ability to meet new demands, that permit successful efforts to achieve intent (Ward et al., 2016) (p. 20), or successful efforts to realize alternative statements of intent that are not inconsistent with the initial statement but more likely to achieve beneficial results under changed circumstances (Ward, Gore, Hutton, Conway, & Hoffman, 2018).

Employer requires adaptive skills from every new employee. Therefore, to widen present skills is it important to obtain adaptive skills; and it is an opportunity to solve facing issues (Ericsson, Krampe, & Tesch-Römer, 1993). This skill, habit gives opportunity to use and manage knowledge, skills obtained in appropriate circumstances (Fadde & Klein, 2010). It can be seen from the conclusion and the research work that researchers always include how these types of skills can be learned in the study.

3.4.5 Professional and Technical skills

The special skill feature of Information and communication technology industry is the professional and technical skill. With the increase of new technology, matters of employee's technological skill also rise. Therefore, the examination of the employers' perspective on technological skill and the research conducted in other industries are follows.

Marx (1976&1981) stated, "technology discloses man's mode of dealing with Nature, the process of production by which he sustains his life" (p. 372). This definition shows that today world technology became part of our life. Therefore, technology

skills are very important matter for employers, especially employers in the field of information and communications technology.

Whether people are ready to the technology or not; technology has rapidly connected to the society(Martinez, 2008). People make shopping on internet, make appointments by phone, communicate via emails, make online trainings; and only attend schools and universities physically. This shows that technology need and skills related to this have been growing and increasing day by day. This is just a simple list of human's daily technology need which people use in normative form. Therefore, workplace requires to have further, much higher skills in professional level; and it comes obvious that there will be forecast of employer requiring this skill from the employee.

Needs of information technology grow and increase day by day, in this regards skill requirements related to this grow as well. Researcher Hesselbein (Hesselbein, 1998) has noted it as: "Information technology is the single biggest shaper of contemporary society, and it will no doubt abide as a powerful catalyst of change in the future" (p. 264).

Technology education has important significance to every person of the world (Martinez, 2008). Useem (1986) has noted in his work the idea that depending on future prospect of world people's needs information foundation should be shared and used by public, not just solely by scientists, founders. Furthermore, users will require professional technology knowledge, writing skills.

Generally, it is considered that only manpower, users, citizens should have skills to use the technology(Martinez, 2008). However, most of businessmen says that technology is more important and needful than to make a choice (Glynn, 2003). But researchers consider that employees value technology skills more than any experience of employer (Hartman, Bentley, Richards, & Krebs, 2005). Also, future employees should have very high technology skills and pedagogues have admitted it, and they consider that they should prepare students with high-level technological skills (Hartman et al., 2005).

Researchers (Tsitskari, Goudas, Tsalouchou, & Michalopoulou, 2017) and (Singh, Thambusamy, Ramly, Abdullah, & Mahmud, 2013) viewed that employability skills are normal and convertible skill and technical and knowledge skill can be used in workplace. Furthermore, researchers concluded technical skill is the most important skill in all industries and at all levels.

It is stated researches have significant margin in the researches on necessary technical skills in workplace (Shelly, Cashman, Gunter, & Gunter, 2004) and (Martinez, 2008). Several researchers conducted a detailed study on technical skills necessary for workplace, however, these type of research studies have not conducted.

Additionally, employers are paying more attention to the newly graduates' skills in order to provide necessary technical skills in the workplace to match the modern day (Martinez, 2008). Furthermore, researcher categorized skills as computer literacy, information literacy, and integration literacy. However, It was established the theory required in workplace for the employer and employee in 1971

(Toffler, 1971). The idea of this theory is to provide technological knowledge in order to meet the labor market need and demand. It can be seen from here that in order to study the employer's satisfaction in modern day, the examination of employee technical skills is an important factor.

3.5 Employers' satisfaction

Researchers explain the understanding of employer's satisfaction and how to understand it by their own perspectives. Therefore, the examination of studies regarding that matter is explored.

It has noted in his own researching work, information and communications technology graduates will be hired only by ICT employer (Chin & Chang, 2011). ICT employer will be defining what kind of knowledge; skills are needed at each Information and Communications Technology workplace. However, to hire a proper new employee with proper knowledge and skills at appropriate workplace employer requires to know about ICT training content. Employer must answer correctly especially to the following questions:

Which ICT course products the right graduate for this job?

What skills and knowledge does a graduate of a specific ICT course possess?

Researchers assume that answers to these questions will identify the satisfaction of employer. However researchers Harvey and Green (1994) have studied the satisfaction of graduates and highlighted that students are no satisfied with the fact that employers hiring high skilled graduates directly (Anthony J Hesketh, 2000). Thereof, we can see that there is a possibility that employer's satisfaction may be

high if they hire high-level skills graduates with higher education. Despite it, Tate and Thompson (Tate & Thompson, 1994) researchers concluded that employers have high level of satisfaction when employees get skills at workplace and use their learnt skills well. As we can see from different researches, we may understand that employers' satisfaction can't be defined from a single point, each employer has different satisfaction.

Is it right to make analysis of investigations made by researchers from the different point of views in regards with employers' satisfaction? As we can see from above mentioned researcher's conclusions, some employers' satisfaction is fulfilled by hiring an employee with higher education or graduates with good marks; however, in another hand some employers' are satisfied when employee uses professional skills well at the workplace. However, researchers had doubts in the authenticity of their works and explained it by three points (Lee Harvey & Green, 1994). Firstly: because parties participated in the research, in other words employer and employee have no direct relations. Secondly: Data may be not reliable. Thirdly: Institution of different sectors assume that employer's satisfaction may vary depending on current field or sector. It catches the eye the level of researching work of ICT employer's satisfaction. To evaluate the quality of higher education it is identified how to research the level of employer's satisfaction (Lee Harvey & Knight, 1996).

When employers say that they are satisfied it means that they are satisfied with the standard of graduates (even if the criteria for this are not always clearly specified) or that graduates fulfil the requirements expressed by employers or that

employers get a return for the money they invest in graduate recruitment and employment or that graduates assist the organization to adapt to the rapidly changing situation of the 1990s and beyond. (Harvey & Knight, 1996, pp. 58–59, emphases in the original)

Employers' satisfaction research was performed in Silicon Valley (Stevens, 2005). As we can see from the results of research employers weren't satisfied with communication skill and writing skills of newly hired employees. It was noted that they need greater skills to express themselves to others, use technology which require more advanced skills such as using electronic media, emails and power point. From this point we can assume that employee's basic skills have significant impact to employers' satisfaction.

As per employers' requirement, estimation of graduates' advanced skills level was made by "performance" and "importance" (Hodges & Burchell, 2003). Hodges and Burchell have determined 10 best qualities expected by employers from new employee, which include following: "ability and willingness to learn; energy and passion; teamwork and cooperation; interpersonal communication; customer service orientation; order, quality, and accuracy; flexibility; problem solving; achievement orientation; and initiative".

Recently numerous employers have confirmed that they are not satisfied, even disappointed with newly graduates; and these employees haven't obtained technology skills, they showed they can't execute their work by emails (Glynn, 2003; Hartman, Bentley, Richards, & Krebs, 2005; Handel, 2003; Stevens, 2005). However,

if to see from the results of investigations, it is required for employers to improve personal skills of every employee depending on the changes of employee's appointed duties (Hartman et al., 2005) (p. 351). Results of some researchers came out similar to the research results of above mentioned researchers.

Concluding the all above, researchers have studied employers' satisfaction from various different perspectives. As the result of study, it has noted that one of the important factors that affects the employer's satisfaction is the employee's skill matters, and depending on the skill, the result can affect the entity of the employers directly and indirectly.

Chapter 4. Research Method and Data

The research on the development of human resources in Mongolia's information and communication technology industry will be conducted through the satisfaction of employers. It showed that new students and employers differ in each other's expectations, based on similar research results from other countries (Anthony John Hesketh, 1995; Anthony J Hesketh, 2000). For example, employers look for more abilities and skills from job seekers, and job seekers also have different expectations from their future employers. The main purpose of the study is to develop educational policy recommendations that improve understanding of current inconsistencies between employers and employees in the labor market in the ICT sector and highlight the importance of the ICT sector.

The study is based on the previous study to help getting a comprehensive review of the literature and investigation of the Mongolian labor market on relevant statistical data in the previous chapters. This chapter discusses research proposals, research philosophy, research model, and specific research method of this study. It shows how sample study respondents are selected and how data are collected. It also displays the measurements of the variables used in the model and how they are reflected in the questionnaire. It also describes the mixed methods used in the main analytics of the thesis. First, it defines the advantages of using the mixing method instead of using only one of them and adds the following procedures, including measurements of variables and data collection methods.

4.1 Proposal

The purpose of this research is to identify the level of human resource development of the entities and organizations operating in Information and communication technology sector of Mongolia through the employers' satisfaction and make potential suggestions of policies. The research involves graduates from Mongolian universities or institutes with information technology major hired into new job and newly hired employees in last 5 years to examine the employers' satisfaction towards the skills of these employees.

The result of the study conducted in the sphere of demand and supply of Mongolian labor market (Labor barometer - 2017), there is an increase of 3.6% new workplaces in Information and Communications Technology sector in 2017; however, there are still unemployed graduates existing in the same sector. The survey participant entities were asked about the problems they face during the labor relations process, it was pointed that the most common problem is job seeker's insufficient job experience and it takes long period of time to train and discipline the employees.

Particularly, 31.5 percent of the employers answered job seeker's job experience was insufficient, 23.5 percent answered that the education and professional level does not meet the job position requirements.

It is considered that it is required to make investigation of the current circumstances occurred to the Mongolian Information and Communications Technology employers. Among the research of this circumstances, we will make

selection from the most important five skills, identified by (Anthony J Hesketh, 2000), (Shah & Nair, 2011) the research work of 372 employers of United Kingdom, and study them modelling according to the conditions in Mongolia. Briefly mentioning these skills as follows:

Verbal communication, learning, written communication, problem solving. Researchers have considered above mentioned highly evaluated five skills (L Harvey, 1993) and concluded that for hiring new employee, the employers highlight interpersonal skills, communication skills, intelligence and personally as the most important skills. The same research work has been conducted by Graduate Careers Australia (GCA) (2007)⁴ of Australia (Shah & Nair, 2011). As we can see from the conclusion of this research, interpersonal and communication skills(written/oral); critical reasoning and analytic skills; problem solving; technical skills; passion and knowledge of industry; drive; commitment; attitude; cultural alignment; values fit and academic qualification are the most important.

Thus, based on the above researchers' conclusion, through measurement of employers' satisfaction level regarding the skills of current employees who had graduated in last 5 years with the major of information and communication technology industry of Mongolia, the human resource development level of information technology industry of Mongolia will be determined.

⁴ Graduate Career Australia (GCA) (2007). Snapshot: Graduate outlook 2007. A summary of the graduate outlook survey. Melbourne, Victoria: Graduate Careers Australia

Based on the results and outcome of the research work, policies proposals to use for implementation in the human resources of Information and Communications Technology sector will be developed. Wherefore, we will be getting highly skilled graduate students whose skills will be cohered with the world's future development; and this will become the basic core of implementing new technologies and creating innovations in Mongolia.

Research question was developed basing on the Researcher's (Anthony J Hesketh, 2000) questions to explore the necessary skills needed to meet employers' satisfaction and suggest possible solutions to the problem.

Research question 1: What skills are important in ICT sector to meet employers' expectation?

Research question 2: What kind of education policy are required to develop qualified Human resource in university?

4.2 Research methodology

This section discusses the basic philosophy and study design of research. As Byrne (2001) pointed out, research methodologies link specific philosophies to appropriate research methods and relate these concepts to actual study strategies. There are two views on social phenomena. In one respect, it is assumed that a positive research philosophy can be characterized by a regular pattern and can be studied in a similar way to the natural phenomena. On the other hand, the Phenomenological Research Philosophy (Scutz, 1967) studies human experience from an individual point of view.

The emphasis of a phenomenological study on exploring social events from the agent's personal perspective means that this approach is based on qualitative methods. The advantage of qualitative research is the ability to provide complex text descriptions of how a given research problem is encountered. It provides information about the "man" of the problem. They often provide information about contradictory behavior, beliefs, opinions, feelings, and personal relationships. In contrast, positive research methodologies are more relevant to quantitative studies because they relate to the characterization of a population using quantitative data, forecasting cause and effect relationships. Another key between quantitative and qualitative methods is flexibility. Generally, quantitative methods are quite inflexible. Using quantitative methods such as surveys and surveys, for example, researchers ask all participants questions in the same order. The response categories available to choose from are "closed" or "formal." The advantage of this flexibility is that it provides a significant comparison between participants and lab responses. However, a thorough understanding of how to ask important questions, how to ask the most questions, and the range of possible answers is required. Because of the advantages and disadvantages of both methods, it is common to use mixed methods in research. Mixed - method studies allow a better understanding and interpretation of the complex realities of a given situation and the meaning of quantitative data.

4.2.1 The research philosophy

The choice of study design for this study was determined by research question of the study and the type of data needed to answer them. By providing complete

information using the qualitative and quantitative methods both, this paper helps to add to the overall knowledge of the field and helps to improve the efficiency of the study. This study can be argued to have both empirical(quantitative) and phenomenological(qualitative) factors in basic philosophy. The method of study was chosen to provide numerical data on the views of employers and the suggestion of education policies by Mongolian university professors. Thus, the identification of the overall pattern or relationship between the both sides are the major issue in this paper. The main study is based on a mixed method design that combines quantitative and qualitative methods. The main concrete methods used in the research are as follows.

1. A semi-structured questionnaire survey of CEOs and managers in various industries in Mongolia.
2. In-depth interviews with a selection of education experts- deans of departments of IT in Mongolian major universities

The following sections discuss the advantages of the research methodology and how these methods can be usefully combined in a mixed-methods approach.

4.2.2 Advantages of the mixed-method

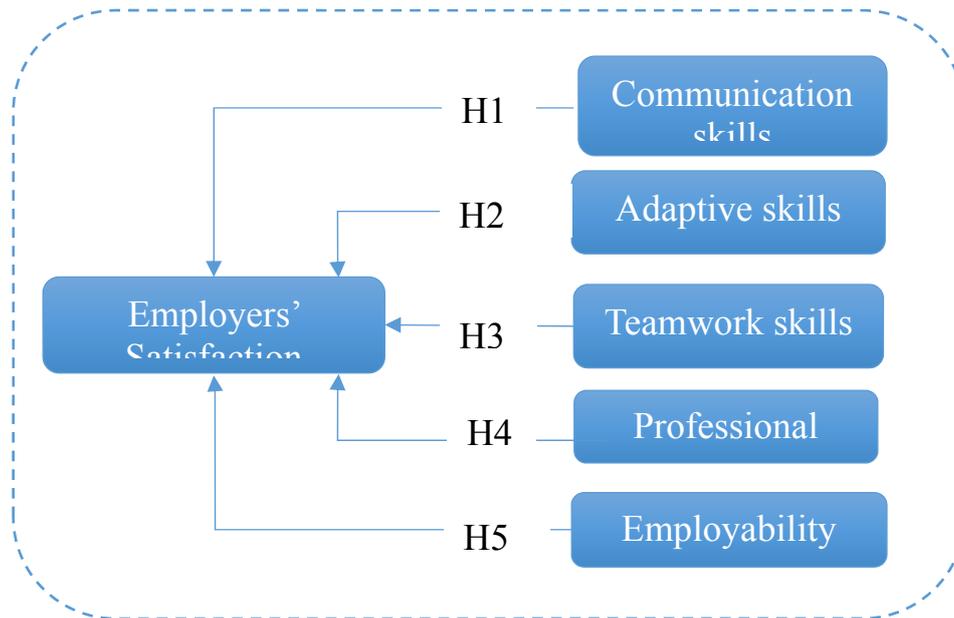
The mixed methods have been widely used recently in the social science literature due to its main advantages over the quantitative and qualitative methods. The main advantage of the method is an ability to explore and explain phenomena fully with dual coordinates which are qualitative and quantitative methods (Cohen, 1986). The use of mixed method study designs has become common due to its

advantages. The reason is that it is possible to use qualitative studies in the early stages of a study to identify primary direction of the research before performing the results of a quantitative survey. Another advantage of using the mixed methodology in a research studies is the ability to verify results by comparing data collected using different methods on same topic. Here, the mixed method matches with the goal of the thesis so that the main method will be the mixed method.

The quantitative method is first used in the survey to identify the phenomena and to elicit responses to survey questions and then qualitative method, the semi-structured interviews in the study, explores phenomena and use more flexible and repetitive approaches to interview questions to get deeper insight of the phenomena.

4.2.3 Research Model

The model consists of five types of skills: communication skills, adaptive skills, teamwork skills, professional skills and employability skills. The model of employers' satisfaction survey was developed based on the conclusion of The Employer Satisfaction Survey (ESS), funded by the Australian Government Department of Education and Training. The research model of employers' satisfaction, which was concluded based on the investigations performed by researchers, has been developed on the base of previous literature review.



Source: (Freeman), (Damian Oliver et al., 2014) The Employer Satisfaction Survey (ESS), funded by the Australian Government Department of Education and Training

Soft and Communication skills

Employers of all the industries mainly requires job seekers to have soft skills (Robles, 2012). Interpersonal skills can be named as soft skills as well and in includes communication, listening, team problem solving, cross-cultural relations and customer services (DuBrin, 2014). Employers of the Information and communication technology (ICT) industry used to prefer more technical skills when hiring an employee, however, in recent years, industry employers increased their qualification requirement and demands more complex skills.

One of the skills that impacts the satisfaction of the employers the most is communication (written and verbal) skills (Nurita, 2004).

Research conducted among the Australian graduates showed the graduates of computer science major received higher evaluation in time management, comprehension of business practice, academic learning skills, however, both written and verbal communication, leadership, self-expression skills received relatively lower evaluations (Australia 2000). The study conduct by Malaysian government in 2005 among the graduates showed one of the main reasons approximately 60,000 graduates failed to get job is weak communication skills (Malaysian Today, 2005).

Analytical and Problem-solving skills

According to Klaus (Klaus, 2010), 75% of the individual's long term success depends from the personal skills, the rest of the 25% depends from the professional skills. In this society, one of the most important skills that one must possess is the ability to examine, evaluate a situation and solving a problem. This skill is almost every employer in every industry seeks from the employee. In particular, most of the job positions in the ICT industry requires analytical and problem solving skills and it required more in the system analysis position compared to the other positions (Ahmed, 2012). Researcher Faheem Ahmed (Ahmed, 2012) noted, analytical and problem solving skills are the ability to identify and understand the problem as complex structure, and make a decision based on the available information.

Adaptive skills

Information and communication technology industry is a rapidly developing and hourly renewing industry based on a technological advancement and modern science. This industry composes the corresponding integration between the other sectors and plays important role in the other sectors' development (Eriksson, Niitamo, & Kulkki, 2005). Along with this the employees in the ICT industry required to be innovative, seek for new idea, have creative mind, able to learn new technologies and to have the ability to adaptive in new environment and conditions by the employers.

Employers have high satisfaction towards the employees that are productive and innovative, and more likely to give promotion.

Technical skills

Preferring an individual with interpersonal soft skills over an individual with technical hard skills are gradually increasing among the employers (Wilhelm et al., 2004). However, technical skills are still one of the major factors that impacts the employers' satisfaction (Robles, 2012).

Teamwork and Interpersonal skills

Organization is a union of people who has different views and different work style. Under any circumstances people who work together in order to achieve the team success or purpose, the individual's ability to work in a team has significant importance (Carnevale, 1990). Team working skill is one of the soft skills and the

most important factor that increases the productivity in the workplace. It is also important indicator that impacts the employers' satisfaction.

4.3 Survey Participants

In the case of the quantitative method, the size of the sample is decided by as follows. Total of 3056 (Mongolian statistical information service) registered entities are actively operating in Information technology sector nationwide in Mongolia and if the confidence interval is 5%, confidence 95%, and then the sample size is 150-180 employers. By participating the 150 -180 employers of the actively operating entities in information and communication technology industry in the research study, the standard error should be determined. The targeted respondents in the research are going to be the board of directors, chief executive officer, deputy director, head of department, head of agency, and supervising managers of the employing entities. The selection of these targeted participant employers is based on their professional or information technology industry direction, the duration in the administrative position, the number of employees, the reputation of the organization, successfully implemented projects, and the number of new employees hired in last 5 years. The selected organization information has been selected from the information distributed from Mongolian Software Association (MoSA) and employment research studies of the Information technology universities and institutions graduates.

The qualitative interview sample is selected with the goal to get the deep insight of the problems of the ICT educational process in Mongolia. Based on their

position, the professional experience length and reputation, four experts who are educating human resource in the ICT sector for long time were selected. `

Table 11. The Characteristic of Interview

	Name	Position	Department	University
1	Lodoiravsal Choimaa	Head of Machine Intelligence Laboratory, Associate Professor	Department of Electronics & Communication Engineering	School of Engineering & Applied Sciences National University of Mongolia
2	Sukhbat.B	Vice-President		Mongolian University of Science Technology
3	Turbat.R	Ph.D Associate Professor	Virtual Technology Department	Mongolian University of Science Technology
4	Byambajargal.B	Director of IT University	-	Mongolian National University

4.4 Measurements of Variables

1. Dependent variables / Employers' Satisfaction/

In order to measure the dependent variable which is the satisfaction level of the employers, the question in the Section G of the survey “What is your overall satisfaction with the recent graduates whom you had hired within past five years?” has measured. The respondents have answered with the five point Likert’s system. (1 being “Very Dissatisfied” and 5 being “Very Satisfied”)

2. Independent variables /Skills/

In order to show the research analysis, it has categorized into ... groups, the satisfaction of the employer has analyzed. Herein: Section A: General Information,

Section B: Communication skills, Section C: Adaptive skills, Section D: Teamwork and interpersonal skills, Section E: Technical and Professional skills, Section F: Employability skills. Section A control variables include the employers' areas of activity, job position, duration of employment in the administrative position, gender, age, number of employees in organization under the employer, number of employees hired in last 5 years from the domestic universities and institutions, and preferential of which domestic university or institution graduates.

- 1) Section B, the communication skills include total of 4 skills. These four skills are categorized in the communications skills and included in one batch. Herein: Oral communication skills, written communication skills, numerical skills, analysis and problem solving skills.
- 2) Section C, the adaptive skills include 3 types of skills. These 3 skills are the basic skills of the adaptive skills. Herein: Ability to develop innovative ideas or identify new opportunities, understanding different viewpoints, and working autonomously.
- 3) Section D, the Teamwork and Interpersonal skills include 2 types of skills. Herein: Getting on well with their co-workers, and effective collaboration with colleagues to complete tasks.
- 4) Section E, the Technical and Professional skills include 3 types of skills. These 3 skills are the important representative of the technical skills measurement. Herein: Effective use of technology, applying technical skills in a workplace context, and observing professional and ethical character.

- 5) Section F, the Employability skills include 3 types of skills and these skills are important measurements for these types of skills. Herein: An ability to cope with work pressure and stress, Flexibility and adaptability, and ability to meet.

4.5 Data collection

According to the objective of the research, the respondents are employers and investors in the case of survey participants. The employers are categorized into deputy director, director, supervising manager, head of department. It has been shown from the results and models of numerous researches, most of the researchers conduct these type of research focusing more on the employees not the employers.

Initially, the survey was planned to be conducted in 14 days of period; however, it has continued for 21 days. In order to conduct an efficient survey, total of 15 people were hired to take the survey and has collected data by sending the survey link via Facebook private message and email address after each and every one of the surveyors has explained the context of the survey to the respondents in 5 minutes.

In some cases, participants did not have the appropriate devices or tools to take the survey, therefore, pre-prepared tabs were used to take the survey.

Survey was developed by using www.surveymonkey.com website. Selection of the survey responding employers have completed from the employers of Mongolian Software Association member. This organization is a non-governmental organization that has been actively operating last 10 years in Mongolia and all the entities in the information technology industry are its members. Therefore, this organization has chosen based on their experience and availability.

Total of 200 employers initially planned to get interviewed, however, during the intended period total of 153 employers of entities are covered.

Survey was conducted in 2 phases and first 20 respondents selected to be in the pilot study. Based on the results of the pilot study of the participants', the survey questionnaire re-developed and first survey with 27 questions are changed into 29 questions.

During the result measurement of the survey, it took average of 6 minutes to complete the online survey after the survey context introduction to the respondent. In order to take the survey of this duration, there were few problems such as trying to schedule an appointment with each respondent, waiting for the respondent's at the workplace, and not being able to meet on the scheduled time. If to make a conclusion from this situation, question of why other researchers conduct the survey from the employees not the employers have raised.

The chances of organizing these types of study for numerous time is very slim, and if to organize again, it could preferably with the employees or the supervisors as the Australian Government study example.

The analysis of the research has been conducted using the SPSS software and based on the characteristics of the research question and content, the appropriate method has been selected to develop the conclusion and the policy.

In the case of qualitative interview, the four experts were interviewed online due to my absence in Mongolia. They were asked to suggest education policies related to their field based on their experience and need from the market.

Chapter 5: Results and policy discussion

This chapter presents the results of the study that has been conducted in order to gain the main goals of the thesis such as conducting large-scale quantitative surveys of employers in Mongolian ICT sector to provide background information on the extent to which skills are more demanded from employers in the terms of the perspectives of employers. Moreover, performing in-depth interviews with educational experts such as deans of IT departments and directors of major universities in Mongolia to explore their views on what education policy for the sector are needed to implement.

The research findings are intended to answer our research questions defined in the previous chapter, as follows:

- What skills are important in ICT sector to meet employers' expectation?
- What kinds of education policy are required to develop qualified Human resource in universities?

5.1 Employers survey results

5.1.1 Characteristics of Respondents

We surveyed a total of chief executive officers, senior engineers and managers of 154 different companies in Mongolia. Table 12 shows the characteristics of survey respondents. Of these, 39 (25.3%) were directors, 27 (17.5%) were engineers and others were branch managers, CEOs, chairmen of the

board or team leaders. The majority (60.3%) were aged 30 to 39, 9.6% were aged 29 or under, and 28.8% were aged over 40. Based on their experience, most of them (66.7%) were experienced less than 6 years and others were experienced more than 6 years.

Table 12. Characteristics of respondents

Measure	Items	Frequency	Percent (%)	Measure	Items	Frequency	Percent (%)
Position of Respondents	Branch	18	11.7	Number of years work	Less than 1 year	17	10.9
	CEO	9	5.8		1 – 3 year	44	28.2
	Chairman of the Board	6	3.9		4 – 6 year	39	25.0
	Director	39	25.3		More than 6 year	52	33.3
	Executive Director	23	14.9				
	Senior Engineer	27	17.5	Age	18 – 29	15	9.6
	Team Leader	22	14.3		30 – 39	94	60.3
	Vice Director	10	6.5		40 - 45	39	25.0
					More than 55	6	3.8

Table 12 shows the characteristics of respondents' affiliations. We found that 5.2% were affiliated to governmental organizations, a large proportion of 65.2 % were associated to ICT related companies and the rest in other organizations. When asked about number of their total employees, 30.8 % of companies had between 1 to

20 employees, 26.3% had between 21 to 50 employees, 9.6 % had between 51 to 100 employees and the rest 32.1 % had more than 100 employees. It shows that the respondents' affiliations were actively operating in the market as the number of employees are relatively higher than start-ups.

In order to understand the educational background of the employees (see Table 12), we categorized the companies with employees with ratio of employees graduated from domestic to foreign universities. We found that most of the companies (39.7 %) had most number (80 – 100 %) of employees from domestic universities followed by 33.3 % with 60 – 80 %, 11.5 with 1 – 20 %, 10.3 % with 40 – 60 % and 2.6 % with 20 – 40 %. Moreover, we classified the companies based on the number of ICT employees and found that most (66.7 %) of them are small with 1 – 10 employees whereas only 4.7 % of total ICT companies have more than 100 employees.

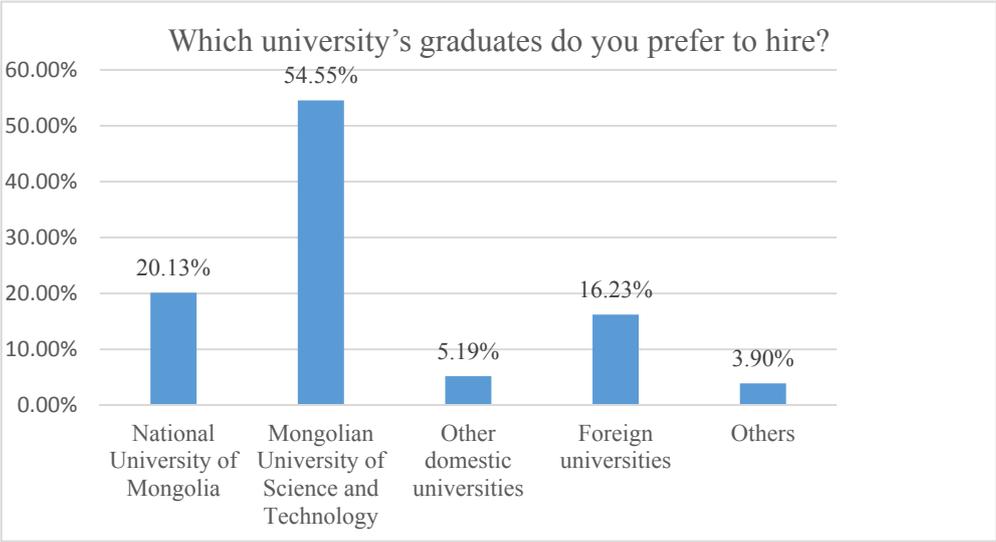
Table 13. Characteristics of respondents' affiliations

Measure	Items	Frequency	Percent (%)	Measure	Items	Frequency	Percent (%)
Types of the entities	Government	8	5.2	Percentage of employees graduation from domestic universities	1%-20%	18	11.5
	ICT	101	65.2		20% - 40%	4	2.6
	Other	46	29.7		40% - 60%	16	10.3
Number of total					60% - 80%	52	33.3
	1 – 20	48	30.8		80% - 100%	62	39.7

employees	21 – 50	41	26.3	Number of ICT employees			
					1-10	100	66.7
	51 – 100	15	9.6		10-20	25	16.7
					20-50	12	8.0
	More than 100	50	32.1		50-80	6	4.0
					More than 100	7	4.7

Respondents were also asked to specify their preference of universities to hire new employees (Figure 7). The majority (54.6%) preferred Mongolian University of Science and Technology and 20.1% preferred National University of Mongolia. If we consider the fact that only 5.2% of the respondents replied that they prefer other domestic universities, the top two public universities are dominantly preferred by employers. While 74.8% preferred the top two universities in Mongolia, only 16.23% of the respondents only stated their preference for graduates of foreign universities. The phenomenon is related to the companies' working ability. As most of the companies do simple manual duties such as web designing or supplying hard wares, they are not able to afford highly educated graduates from foreign universities. In other words, they prefer those who are able to do their works at low salary. Moreover, it indicates that the companies are not eager to work on research and development using the highly educated human force.

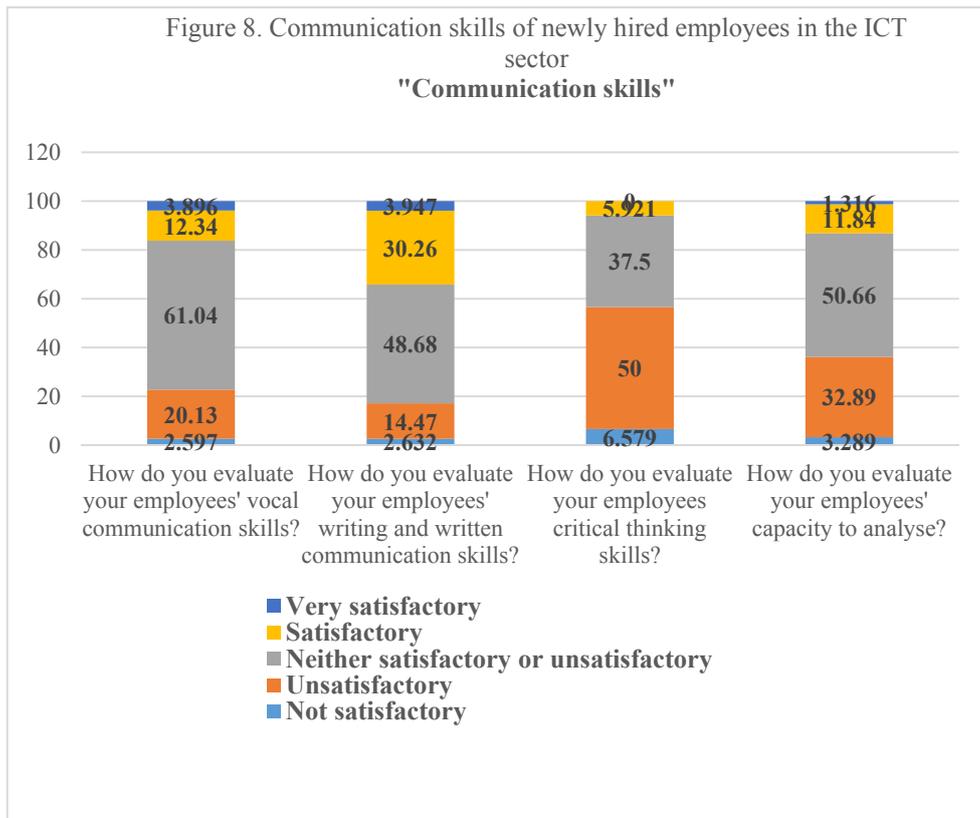
Figure 7. Preferred universities by employees



5.1.2 Quantitative survey – The current situation of employees’ skills in the ICT sector

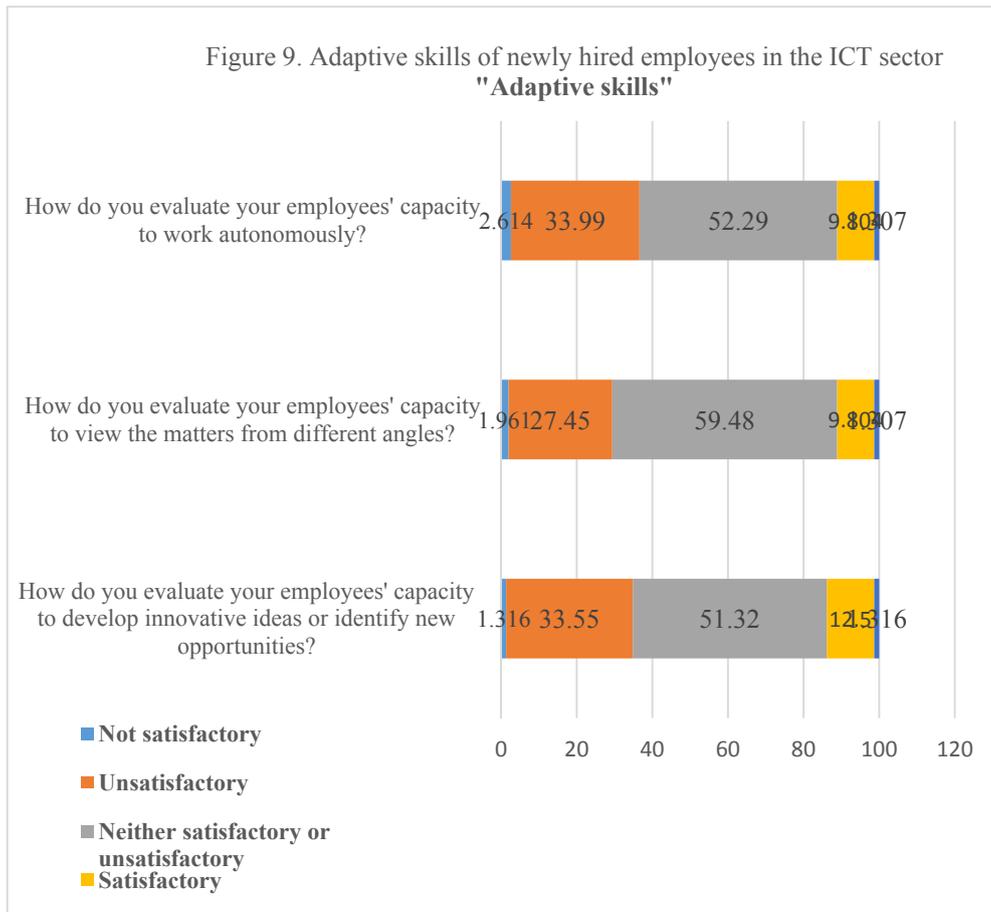
Firstly, the respondents were asked to indicate what they think about employees’ communication skills, and the results for the whole sample of the employers are shown in

Figure 8. Communication skill was defined asked by four questions, including vocal communication skills, writing skills, critical thinking skills and analyzing skills. Only around less than 3 percent of the respondents said that they are satisfied with their employees’ vocal, writing and analyzing skills (2.6%, 2.6% and 3.3% respectively). Moreover, most of them indicated that they are neither satisfied nor dissatisfied with the employees’ vocal communication, writing, critical



thinking and analyzing skills. The thing we have to focus is that 30.26% of the all respondents replied that writing skills are not satisfactory and around 12% are not satisfied with vocal communication. Here, it indicates that the skills that are usually acquired in secondary schools and universities are not satisfactorily learned and it reversely affects the satisfaction level of employers.

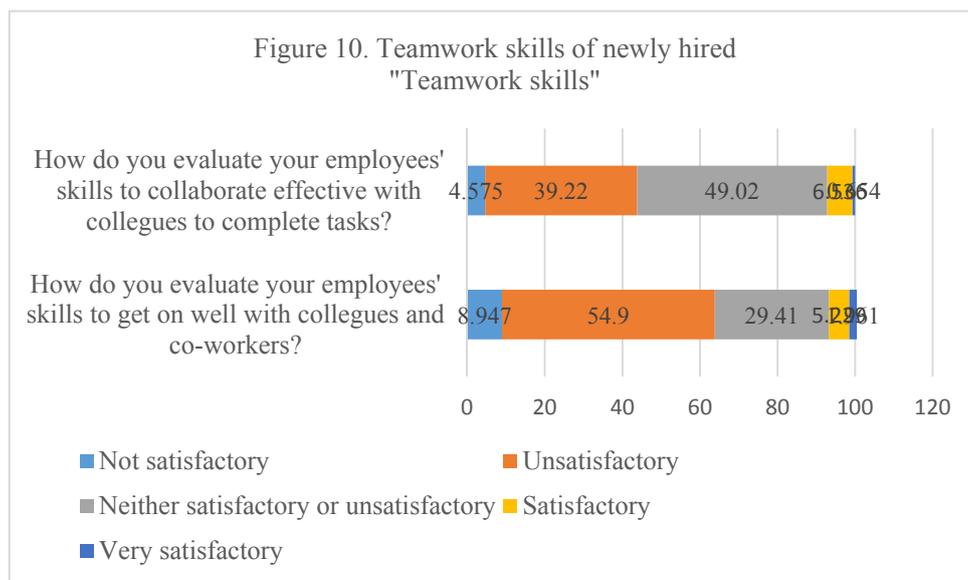
Second, respondents were asked about the adaptive skills defined with three questions; the ability to develop innovative ideas, the ability to see from the different angle, and ability to work autonomously. They were considerably more likely to indicate that they were neither satisfactory nor unsatisfactory in every question by showing the result of 50% of the whole is dominant (Figure 9). However, the portion



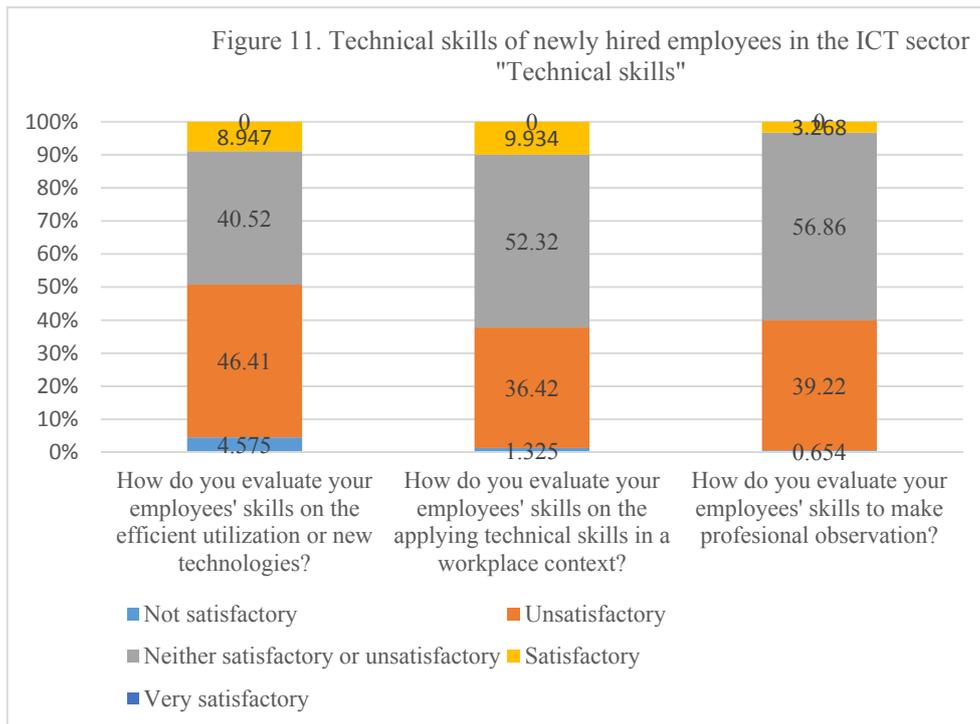
of those who replied unsatisfactory to the total respondents is relatively small compared to satisfied ones. For example, respondents who said not satisfactory at all in capacity to develop new ideas is only around 1% and same for other two questions

as well. Moreover, as same as communication skills, we can recognize that more than the half of the employers indicated that their employees' adaptability skill is neither satisfactory nor unsatisfactory. But, around ten percent of the all respondents were not satisfied with adaptive skills of their employees.

Next, team work skills of the employees were evaluated with two questions that are intended to define the ability to get on well with colleagues and the skill of effective collaboration on tasks (Figure 10). The results did not make much difference with other questions; the group found to be satisfied with the ability to get on well with colleagues (54.9%) and 39.22% of employers effectively collaborative on completing tasks. Both questions showed the overall satisfaction and very less

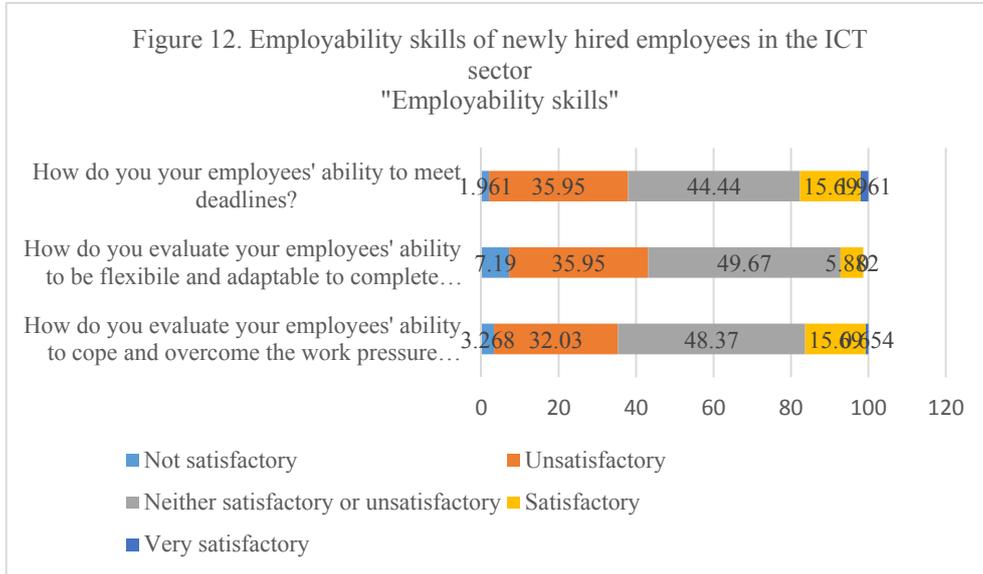


dissatisfaction. Despite of the overall satisfaction, those who replied no distinct satisfaction level are relatively high in the both questions.



Also, when asked whether satisfied with employees' technical skills with three questions that are focused on efficient utilization of new technology, the ability to apply technical skills in workplaces and the skill to make professional observation, 40.5% said neither satisfactory nor unsatisfactory in the first question, 52.3% in the second and 56.6% in the third question (Figure 11). Again, some notable differences did not emerge between satisfaction level; the majority of respondents (46%) said that they are satisfied with employees' skill on efficient utilization of new technology and 36.4% and 39.33% of those stated their satisfaction with employees' technical skills and professional observation respectively. Nevertheless, the sufficient skills required to make innovation is lacked from the fact the majority of the respondents expressed their indifference between satisfaction and dissatisfaction. To make

employees more satisfied, the relevant solutions directed to improve the technical skills are necessary.

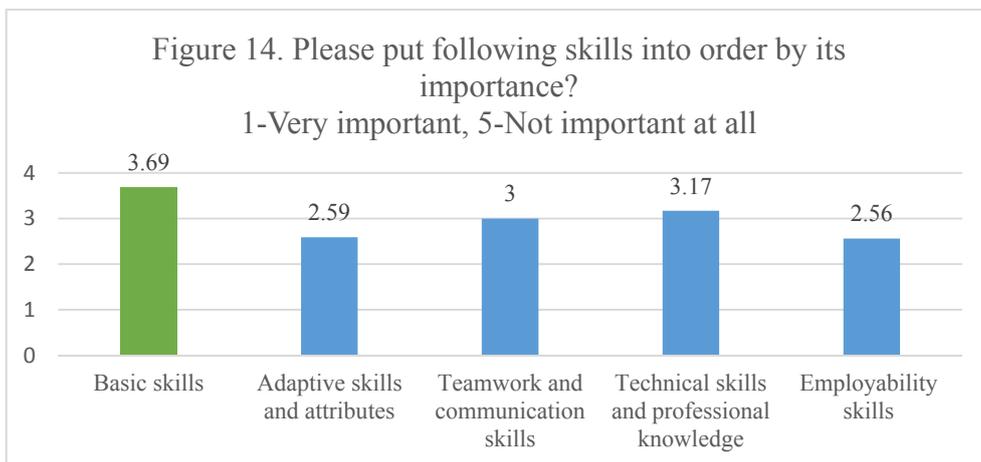


Next, the employability skills were evaluated based on three questions: the ability to overcome the work pressure and stress, the ability to be flexible to complete a given task and the ability to meet deadlines (Figure 12). Similar to other four skills, the majority of the respondents were generally satisfied or not sure about their



employees' employability skills. The 40% to 50% of them were neither satisfied nor dissatisfied; however, those who stated satisfactory are much higher than those replied unsatisfactory. But, it cannot be ignored that around 15% of the respondents expressed their dissatisfaction with their employees' inability to overcome the work pressure and meet deadlines.

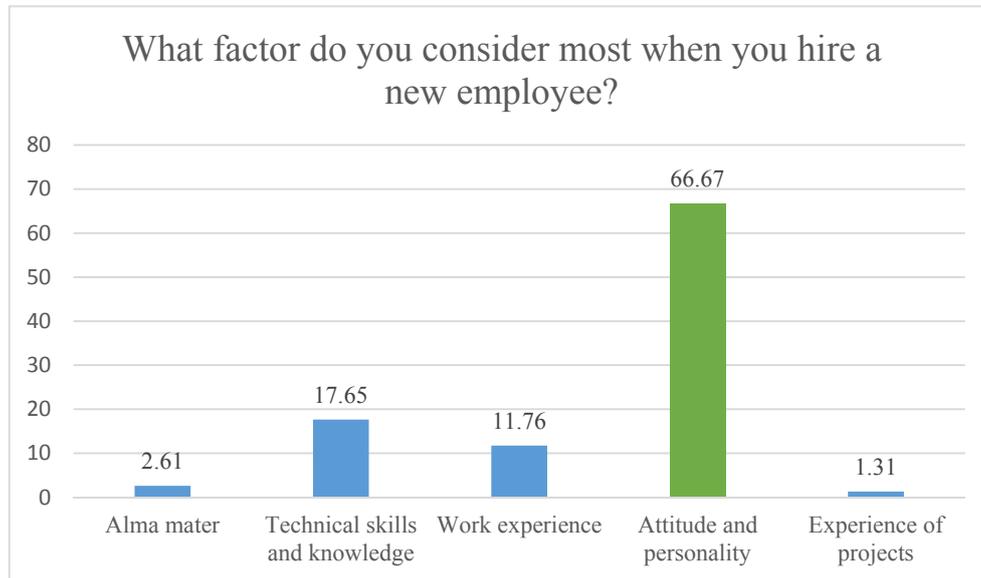
Lastly, the respondents were asked to indicate how well prepared their new employees are to satisfy their professional requirements in terms of professional skills. For each source listed, they were required to indicate whether they would be "Well prepared", "Somewhat prepared" "Not so prepared" or "Not prepared at all" to use this. The overall distribution of findings is shown in Figure 16. Asked about their satisfaction on detailed skills, they replied about their overall satisfaction about the newly employed employees in their organizations. Only 37% of them stated that employees are somewhat prepared and almost 40% declared about their dissatisfaction with their employees' overall skill. Moreover, 10% of the respondents replied that the newly hired employees are not prepared at all to perform the duties



in the workplace. We have to focus on the result that only 13% of the employers are satisfied with them and declared that those employees are prepared enough to work in their organizations. As we can conclude from the answers of the questionnaire, the majority of the employers are not much satisfied with their employees' several skills and overall satisfaction level is always medium. Here, we have to explore what actions are needed to be implemented for improving the situation.

Overall, the respondents in this survey were asked to put the skills into order by their importance when considering their employees' skills (Figure 14). The findings matched with the results of previous research and literature in some level. For example, they were most likely to evaluate factors such as basic skills, technical skills and professional skill and teamwork and communication skills as fairly important when evaluating employees' skills. However, some contradicted with the literature such as adaptive skills and attributed and employability skills were rated lower compared to others; however, views were somewhat mixed as the difference between the importance level was not significantly high. As the basic skill is taught in high school and the base of the other skills, policies suggested must be intended to improve the basic skills of graduates.

Figure 15. Most important factor considered in hiring new employees in the ICT sector

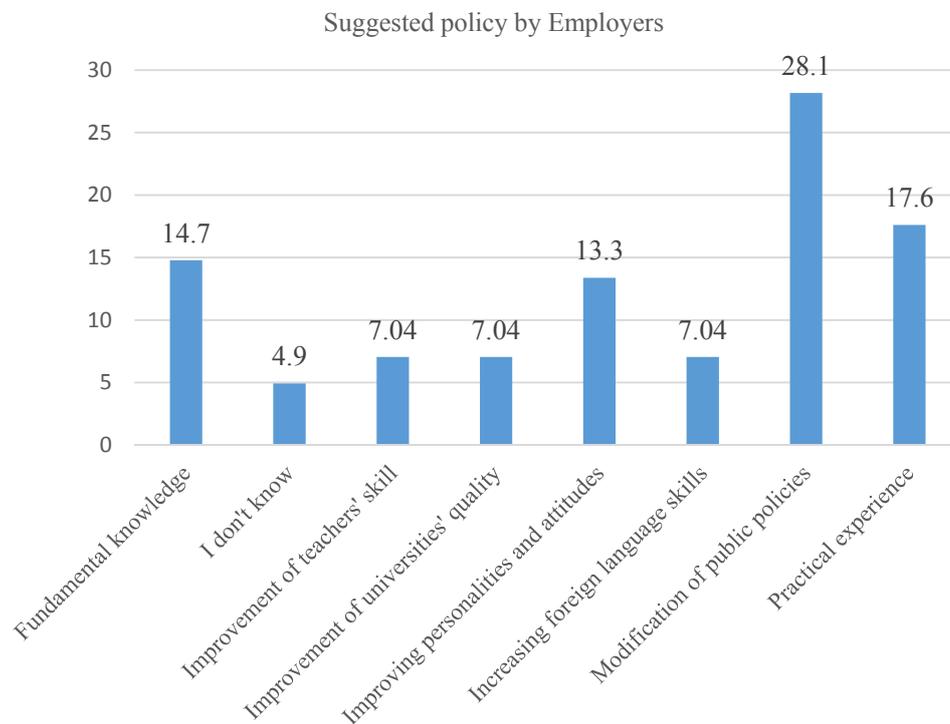


Moreover, asked which factor the respondents consider most when they hire a new employee, 66.7 percent of the respondents agreed that the attitude and personality are the most important; 17.6% of them agreed that they consider technical skills and knowledge the second most (Figure 15). Interestingly, alma mater, experience of projects and work experience were relatively considered less important by employers. We can also deduce that the employers are not satisfied with their employees' communication, adaptability, technical, employability and teamwork skills because they consider only the personality when hiring employees. It can directly result in employees' poor professional performance since they are extremely concentrated on personal attitudes and characteristics.

To explore potential solutions to improve employees' skills and further employers' satisfaction, the two potential solutions are improving Basic skills and Promoting employers' attitudes and personalities. Here, we can see common characteristics between these two ways; both are taught or acquired by students in their school time or early ages.

Finally, the employers were asked about the potential policies to improve the human resource development in Mongolian ICT sector (Figure 16), 28 percent of them suggested the modification of public policies and improving practical experience of graduates were the second most suggested one (17%). Moreover, respondents who suggested increasing fundamental knowledge, improving the personal attitudes and promoting foreign language skills were next most suggested solutions. However, increasing teacher's skills and universities' quality were least suggested. But, we should not the exclude these two solutions.

Figure 16. Suggested policies by employers in the ICT sector



5.2 Qualitative interview results

Four ICT experts in Mongolian educational institutions were selected for the interview in order to get the insight of the reality and information to answer Research Question II: “What kinds of education policy are required to develop qualified Human resource in universities?”.

The respondents who were selected are the ICT professionals worked in the educational sector for more than 20 years and are currently active in educating the industry’s human resource development. Interviews were conducted online. The

Qualitative interview is conducted to give an answer to the Research question II which aims at suggesting proper educational policies. The educational policies must be able to improve skills of graduates of universities so that it can help reduce companies' cost of training and increase their owner's satisfaction as well.

Since the required policies by employers were all the skills that are acquired in early time especially in university times, education experts' opinion in the sector is very important. Thus, they were asked what policies are needed to prepare fully trained ICT graduates in universities.

All of the research participants stressed the importance of ICT to the economy and society of Mongolia and suggested the policies that are needed to strengthen the ICT sector and to boost the competitiveness of Mongolia amongst other economies by using the sector as a strategical industry. Mongolia still needs to hurry up to go along with many other developing economies since the growth of the ICT sector is the important way to help for it.

When asked about the possible policies to achieve the goal, the respondents suggested their opinion based on their long-time experience in educating students in the sector. If we cite the interviewee's reply, the Interviewee 1 suggested of *Increasing the requirements and aptitude test score of enrolling a university, increasing tuition fee and increasing professors' salary to improve skills of them and subsidizing R&D centers and other technological equipment by government.* The interviewee II also indicated that *making a plan to make Mongolian educational system standardized to International standard, building R&D centers, simulation*

labs and providing software, training professors in international seminars and workshops and following International educational standards are required most in this level of the human resource development. Interviewee III added his opinion that *Teaching programming and information technology in depth to high school students, increasing enrolled students' knowledge and skills, Making ICT close to the public so that ICT demand in every sector will increase and Financing exchange programs with foreign institutes and universities* are needed in this field. Lastly, the last interviewee stated his opinion that *Increasing the quality of education in secondary schools, making hours of information technology class more in high schools and Promoting start-ups based on IT* are the crucial policies to be implemented in the sector because the sector has to focus on the professional's knowledge and skills not on public education of IT. To prove the significance of the policies suggested, the previous research such as Uyanga (2014) can be cited. She has attempted to explain the current situation of Mongolian ICT sector. She mentioned that Mongolian ICT sector is underdeveloped because it has been focusing on public computer knowledge and building up an infra for the sector. However, it is the time to move on to the next stage which is to promote the sector by government policies and modifying the educational system of the sector.

Here, we can deduct some common keywords among their interview. These are building R&D centers, training educators professionally, organizing exchange and training programs and promoting IT start-ups. The overall concluded policies to prepare qualified human resource in the ICT sector, we have to focus on four subjects

which are increasing quality of schools and universities, training of teacher and professors in the sector, building more research and development center and increasing compensation of graduates.

5.3 Policy discussion

5.3.1 Government policy in the ICT sector

Before discussing the policy implication of the research, we have to look back on the current policies being implemented in the ICT sector of Mongolia. The State Policy on Development of Information and Communication Technology, 2017-2025 is the biggest policy in the sector prepared in 2017 and approved by the Parliament. Within the framework of drafting this policy, Communication and Information Technology Authority of Mongolia (CITA) conducted the study in all fields of ICTs, organized numerous discussions among government bodies and state-owned organizations, academic, researchers, senior communications experts and private enterprises since 2011, and received open suggestions online. Finally, the policy contains 8 goals aimed at enabling universal accessibility of ICT advancements, developing knowledge-absorbed, high tech and export-oriented national industry, supporting human development and increasing competitiveness within the framework of the main objective to accelerate the development of Mongolia as follows (Source: White book-2017):

- *Goal 1 to create favorable environment for the sectorial development by optimizing the legal system and organization of ICT sector;*

- *Goal 2 to set up the national backbone network and infrastructure of ICT which will meet increasing needs and demands of universal ICT services with state support and private partnership;*
- *Goal 3 to increase ICT service types, accessibilities and quality of services (QoS) based on advanced technology;*
- *Goal 4 to create an integrated innovation and research-development system in Mongolia by accelerating ICT research-development activities and undertaking measures to set up a scientific technology park;*
- *Goal 5 to increase competitiveness in the global markets by developing production of ICT products, supporting national digital content and software industry, and introducing ICT in industry automation, control and monitoring;*
- *Goal 6 to support for investment based on public-private partnership aimed at building a pilot plant to manufacture final products and installing high cost and efficient equipment;*
- *Goal 7 to protect information security by ensuring national interests and availability, safety, authenticity and wholeness of information of state, citizens and organizations;*
- *Goal 8 to develop e-governance by increasing productivity and efficiency of operations of public organizations, enhancing democratic, non-bureaucratic, transparent and accountable status of governance, supporting innovation and improving development of e-government.*

Even it was made after getting the full insight of the sector, only Goal 4 is directed into developing the research and development in the sector and building the information park. However, the statistics mentioned in previous chapters indicate that Mongolian infrastructure of the sector is fully enhanced; however, the government is still focusing on the infrastructure and did not give attention to the development of human resource.

The second project by the government by the way of supporting the knowledge-based economic development is the "Silicon house" project implemented at the National IT Park in 2014. This project has become a comprehensive creation of a mini version of "Silicon Valley", the epicenter of global leading IT companies. Within the framework of the project, an information center with more than 3,000 specialized books and textbooks on IT, a training center, a laboratory for developing embedded system and a content producing computer vision laboratory were newly established, and the opportunities to develop real products from new ideas and experimenting to print blueprints in 3D were created. Even though there are laboratories and libraries are built, educational training programs for students or engineers in the sector have not been held. Instead of building the libraries and other infrastructure, the government has to use them to train and educate the people in the sector. In that case, the human resource development of the sector will be fully enhanced.

The third government policy in the sector is running incubators for start-ups in the sector. With the aim to develop ecosystems for the start-up business, the

National IT Park has implemented multi-faceted activities to support establishment of many start-up businesses in Mongolia, intensifying ICT development, enhancing skills of sectorial human resources and disseminating innovation culture, and as a result, nearly 80% of companies operating in ICT sector has been supported and incubated through these activities. The business incubator of the National IT Park provides working spaces for start-up companies to develop their innovative and advanced IT ideas into economically efficient products and services, renders comprehensive management support and assistance, aims to help them to become sustainable in both financially and operationally, competitive in foreign and domestic markets as well as highly profitable. The business incubator has organized 30 enrollments, provided incubation services to 113 start-up businesses, and 62 companies have successfully graduated up to now. However, the contribution of the start-ups to Mongolian economic development is still too little and the products of them are not revolutionary enough to be called innovation.

If we compare the new policies suggested in the research with current policies already being implemented by the government, there can be many advantages over the current ones. There are many policies aimed at developing the ICT sector in Mongolia such as The State Policy on Development of Information and Communication Technology, 2017-2025, “Silicon house” project and the development of ecosystems for the start-up business.

It is now widely known that the current ones have had limited effectiveness for the achieving its goals due to the lack of authority, financial supply and other situation.

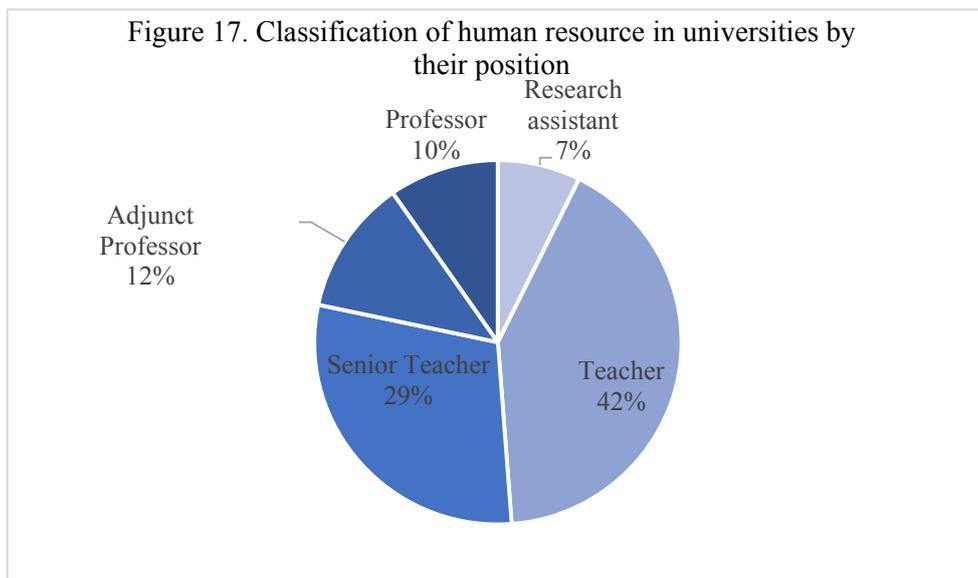
5.3.2 Current situation of the Educational part of the ICT sector

The plan for the development of science and technology of Mongolia by Ministry of Education, Culture and Science selected 18 sciences and technologies as the core technologies to be carefully developed and extensively invested. The ICT sector and electronics are selected as one of the core sectors in the plan; however, there is no solid project operating on the education part of the ICT sector except selecting an exemplary project or a creative product according to the plan and giving around fifty thousand dollars for the award. Even though the plan specifies that the investment in the core technologies will be increased, the recognizable improvement has not been done, yet.

Since any big projects are not run by the government, the educational institutions of the ICT have to implement plans for increasing the quality of R&D, the human resource employed and graduates they are preparing. To my knowledge, there is no R&D development centers or projects in the ICT universities in Mongolia except organizing some events and seminars based on the Silicon house established in 2014 by the IT park of Mongolia.

In the case of the development of human resource in the universities, the universities are not doing enough. Even though there is the center for the development of teachers established by the ministry, the main operation is directed

for teachers of secondary schools so that universities such as Mongolian University of Science and Technology (MUST), which is the biggest science university in Mongolia, organize some training for the self-development of professors through their website. Furthermore, the only option for professors is to participate in seminars and workshops individually by themselves. Moreover, the selection process of professor employment is not standardized and applies differently to every selection. Hence, the education requirement for positions are different. As a result, 54% (6917) of total professors in Mongolian universities are full-time while the remaining are part-time lecturers. 2034 professors, 29.4% of the total full-time professors in Mongolia holds PhD degree and 65.9% (4560 professors and lecturers) have master's degree even though the number of doctorate professors has been increasing year by year. Thus, the situation that only 10% of the full-time lecturers have the position of professors and the majority of them are teachers means that they do not have required degree for the position of professors (Figure 17).



Additionally, students in the IT universities are not potential enough to get higher education. As mentioned in the result of the experts' interview, increasing the requirement for enrollment of universities is necessary; the minimum score of the General Entrance Exam for the MUST is 480 for Mathematics and 400 for Physics out of 800, the maximum score. As the General Entrance exam is based on the relative evaluation system, 400s is not high score to achieve. Moreover, universities' score requirement is not only low but also they do not require high school students to submit essay or statement of purpose to prove their interest in their field through essay or interview. It makes students go to a university where their score matches despite of their future goal, interest and abilities. These factors are crucial barriers in the human resource development of ICT in Mongolia.

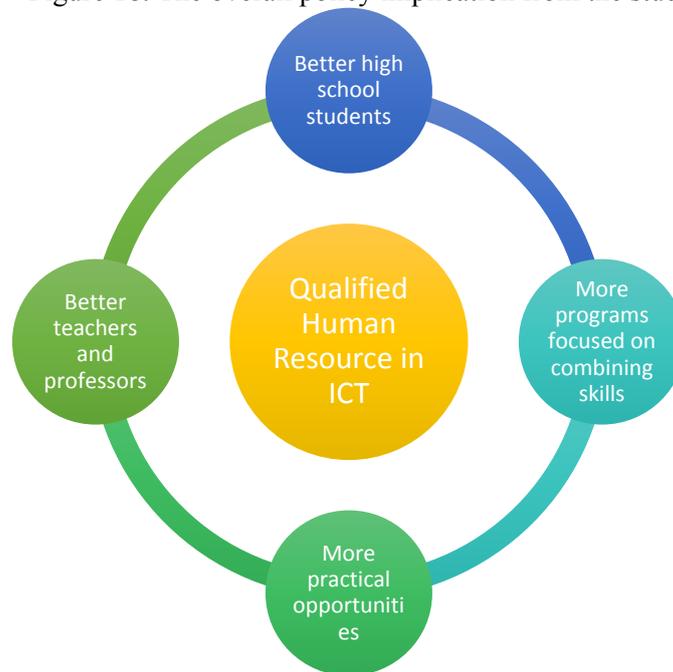
5.3.3 Policy implication of the study

As we can see from the current policies, the policies are country-level ones. However, the real required policies suggested by the employers and the education experts in the human resource of ICT are focused on university-level ones. The employers in the survey suggested policies such as modifying the public policies, improving the fundamental knowledge, foreign language skills and practical experience of students, increasing the skills of teachers and making effort to increase the quality of universities. Meanwhile, the experts in the sector implied the policies such as increasing the enrollment requirements to universities, subsidizing research centers, training professors and increasing the opportunities of exchange programs for both professors and students. Comparing the results of both interview and survey, the common opinions are related to the skills of students and professors, especially skills related to the fundamental skills and personalities. However, the difference between the two methods is that the experts suggested more detailed ones compared to the employers such as mentioning the necessity of research centers based on educational institutions. Moreover, the employers emphasized the importance of foreign language skill while the experts in the sector did not mention it at all. Also, the experts in the educational institutions highlighted the necessity of the improvement in the university enrollment requirements.

I suggest following policies for the human resource development of the ICT sectors based on the results of survey and interview by considering more practical situations based on statistical data. Improving the ICT knowledge and interest of

high school students, promoting the training programs for teachers and changing their educational requirements for them and implementing programs for the development of their students by cooperating with the industry are needed to improve graduates' basic skills and personal attitudes. Additionally, the necessity to prepare technology managers and policy makers is crucial because the sector has been focused on only preparing engineers (Figure 18).

Figure 18. The overall policy implication from the study



As concluded in the result of survey of employers in the sector, the most demanded skills are basic skills and personal attitudes. It implies that the graduates of universities must have acquired them rather than learning by practice at the workplace. Thus, the role of educational institutions not only universities but also secondary education schools become crucial to improve the human resource

development of the ICT sector. As the basic skills and personal attitude are one of the life-long learning skills, high schools have to build core ICT competencies in secondary education curricula, enhance ICT skills among teachers and promote ICT skills by increasing students' exposure to new technologies. By doing so, their interest to ICT will lead them to their future instead of their score in the General Entrance Exam.

As derived from the qualitative interview in my study, experts in IT higher education institutions in Mongolia demonstrated that the lack of good potential students, the low quality of teaching and facilities and inadequateness of practical experience of students are the main problems for causing unprepared students to graduate and work in the sector. As mentioned above, increasing the score requirement for basic sciences and considering students' interest in the field are the main solutions to make enroll highly qualified and potential students in universities.

Moreover, the increasing the requirement for hiring teachers is also one of the necessary actions. According to the statistical data, only around 30 percent of currently employed teachers in universities hold PhD that it influences the quality of their lecture and research proportionally. Furthermore, universities need to strengthen their human resource development by hiring more full-time professors so that sustainable investment for professors are going to be maintained. As I interviewed with the experts, it was easily recognized that graduates are discouraged to pursue academic careers due to the salary differentials. Thus, universities have to attract qualified teaching staff by offering higher salaries than industry.

New graduates of the sector are facing a challenge to find a job in Mongolia because the employers' expectation from them differs with their real ability. Thus, universities have to i) ensure that graduates have acquired the right balance of theoretical and more applied skills; and ii) incorporate the teaching of business / management skills and “soft” skills into technical degrees.

To address the first goal, educational institutions must promote students' exposure to real-life situations and problems by cooperating with the industry and providing more opportunities for internships. It is not new practice. In many other countries, the importance of apprenticeships where students gain on-the-job experience has been growing through partnerships with local business. New forms of industry and academic institutions collaborations should also be encouraged because it benefits both sides; attracting qualified human force before graduation and training students with on-the-job experience.

Secondly, revising IT curricula is necessary due to its total absence in the curriculum of ICT universities in Mongolia. As OECD (2002) denotes, educational institutions have to respond to concerns suggested by industry groups and employers that many IT-related occupations require a broad range of often non-technical skills such as personal attitude, teamwork skill and adaptive skills. Thus, education institutions in Mongolia have to begin to introduce programs that combine technical and business skills such as IT police program in Seoul National University. They have to consider to focus not only engineers but also IT managers who make relevant

policy in the sector. It is important that they recognize the growing role of the management of technology.

To conclude, the study implies several modification ways of educational institutes in the ICT sector of Mongolia in various dimensions. First, it suggests improving the requirements of high school students to enroll to universities, focuses on strengthening the education and ability of educators in universities and adds some programs universities can run to improve their students' professional and personal skills.

Chapter 6. Conclusion

As the growth and benefits are often attributed to good use of human capital and information and communication technology, the human capital are very important components in the ICT sector and furtherly the country. Especially, the ICT sector plays an important role by contributing to rapid technological development and productivity growth in a country. Information technology integrated into science and innovation is an important factor in the development of a country. The use of information and communication technology will also help the people living in Mongolia. Because it is used to improve the living standards of the Mongolian people and the jobs of their friends and relatives. Mongolia will be able to have a culture of innovation, which will play an important role in developing the national economy and making economic development sustainable if the ICT sector is developed to the level where it can compete with other countries.

Mongolia's ICT development barriers include the need to further reform its education system. Another key factor is the lack of people with appropriate skills in the ICT sector. The ICT sector is not self-operated; thus, it requires technical management and application by human resources. Therefore, in order to operate a technical system, the population must have appropriate technical skills and experience. More than half of the respondents said human resource of the sector were not prepared to work professionally at work, according to the employer survey. Respondents were most likely to value basic skills and employability skills when evaluating their employees' abilities. Most employers thought attitude and character

were the most important when hiring new employees. In addition, most respondents felt that the revision of education policies and improvements in working experience were the most potential policies that could be implemented for the development of human resources in Mongolia's ICT field.

The expert interview findings results confirm the findings of employers' satisfaction survey, about the high necessity to modify the educational system of Mongolia ICT sector. Concerning the result of the qualitative interview, the most commonly cited response given by nearly half of all respondents was promoting the exchange and training program, for the development of the quality of students' education quality. In addition, the majority of respondents indicated that it is crucial to increase the requirements of enrolling into universities and train teacher and professors in accordance with international educational standards.

This research is unique because there is no such previous research on the topic of the human resource development of the ICT sector in Mongolia. Moreover, it is the first attempt to use various theoretical approaches to the labor market coupled with investigation of the practical problems faced on the ground by employers and experts in the sector. It has attempted in particular to explore the current gap between the supply of and demand for labor, in other words between the educational system and industry in Mongolia, and to identify solutions.

Having the research be based on existing theories and knowledge of how the labor market operates can easily infer the importance of research results in a wide range of knowledge areas of the labor market. In addition, composite method studies

using both quantitative and qualitative data collection provide large-scale up-to-date data, empirical evidence base for human resource development, and other relevant information needed to develop future Mongolian policies. It also contributes more directly to policy development by formalizing a set of recommendations derived from the reality instead of the policies developed on theories.

The themes of ICT, human capital and labor markets are all critical to Mongolia's policymakers, businesses and students in the fourth industrial revolution era, which is led by big data, artificial intelligence and cloud computing that are all related to the ICT sector. Taking a closer look at the information service landscape, further research into the field of ICT in Mongolia's private sector is one of the key areas of scientific research for policy and information. On the demand side, the Mongolian education system meets the needs of the economy through human resource development by collecting more detailed representative data on technical requirements for jobs in the private sector in various fields.

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APPENDIX
Employer satisfaction survey of
Information technology and communications industry
(The Case of Mongolia)

This survey is dedicated for Information technology, and communication industry and public and private entities, executives of the organizations, current head of the departments, officials and supervising employees of the organizations that utilize information technology, introducing and implementing new technology and innovation projects. The objective of this survey is to determine the employers' satisfaction of their information technology specialists that were trained in Mongolia las five years. As the result of the survey, the policy needs and requirements in Information technology industry in the future will be identified. The confidentiality of your survey answer will be kept accordance to the "Personal confidentiality law" of Mongolia without disclosing to others. Also, the survey result will not be used except for the intended objectives of the survey and your opinion will contribute to the Mongolian information technology industry development. A Study of Employers' Satisfaction in ICT field

Section A: General information

1. Name of your employer and the sector in which it operates:
.....
2. Position of the person answering:
.....
(*Source: Generic competence questionnaires*)
3. How many years have you been working as an executive within your company or organization?
 1. Less than a year
 2. 1-3 years
 3. 4-6 years
 4. More than six years
4. What is your gender?
 1. Male
 2. Female
5. What is your age?
 1. 18-29
 2. 30-39
 3. 40-55
 4. 55 + years
6. Number of employees? (*Source: Generic competence questionnaires*)
 1. 1-20
 2. 20-50
 3. 50-100
 4. More than 100

7. What percentage of your employees graduated from local universities?
(Source: ESS, June 2014)
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8. Which university graduates do you prefer to hire for your company or organization?
1. National University of Mongolia
 2. Mongolian University of Science and Technology
 3. Local private institutes
 4. Foreign universities

Section B: Communication skills

9. How do you evaluate your employees' vocal communication skills? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
10. How do you evaluate your employees' writing and written communication skills? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
11. How do you evaluate your employees' critical thinking skills? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
12. How do you evaluate your employees' capacity to analyse? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent

Section C: Adaptive Skills and Attributes

13. How do you evaluate your employees' capacity to develop innovative ideas or identify new opportunities? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
14. How do you evaluate your employees' capacity to view the matters from different angles? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
15. How do you evaluate your employees' capacity to work autonomously? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent

Section D: Teamwork and interpersonal skills

16. How do you evaluate your employees' skills to get on well with colleagues and co-workers? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
17. How do you evaluate your employees' skills to collaborate effectively with colleagues to complete tasks? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent

Section E: Technical skills and Professional Skill

- 18.** How do you evaluate your employees' skills on the efficient utilization of new technologies? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
- 19.** How do you evaluate your employees' skills on applying technical skills in a workplace context? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
- 20.** How do you evaluate your employees' skills to make professional observation? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent

Section F: Employability skills

- 21.** How do you evaluate your employees' ability to cope and overcome the work pressure and stress to complete the given task? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent
- 22.** How do you evaluate your employees' ability to be flexible and adaptable to complete the given task? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent

23. How do you evaluate your employees' ability to meet deadlines? (please evaluate the specialist graduated from the local university or institution in last 5 years)
1. Very Poor
 2. Poor
 3. Average
 4. Good
 5. Excellent

Section G: Overall satisfaction

24. How is your overall satisfaction of your employees?
1. Not prepared at all
 2. Not so prepared
 3. Somewhat prepared
 4. Well prepared
25. Do you classify the following skills by the number 1-5 as important? (1 being most important, 5 being least important)
- Basic skills
 - Adaptive Skills and attributes
 - Teamwork and communication skills
 - Technical skills and professional knowledge
 - Employability skills
26. What factors do you prefer when you hire information technology employee?
- Alma mater
 - Technical skills and knowledge
 - Work experience
 - Attitude and personality
 - Experience of projects
27. Based on your experience, which skills of the newly hired graduates' fulfils your organizations' needs and requirements and also satisfies your expectations?
28. Based on your experience, what policy do you think that is required in order to improve the human resource of information technology industry?
29. Thank you very much for taking part in this survey. If you would like to receive the result of this survey, please write your email address.

초 록

몽골 ICT 분야의 HRD 에 관한 연구 :

고용주의 만족도와 관련하여

자담바

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몽골 노동수요 및 공급 조사(Labor Barometer-2017)의 결과를 따르면 정보 통신 기술(ICT) 산업 신규 일자리가 지난해와 비교하면 3.6% 증가하였으며 이는 신규 졸업생 수보다 높은 숫자다. 그러나 관련 기관의 보고에 따르면 실업자들이 여전히 증가하고 있는 가운데 새로 창출된 일자리에 대한 수요도 여전히 높다. 조사에 참여한 기관들이 직면한 노사 관계의 어려움을 파악할 때, 가장 흔한 문제는 구직자 경험부족이므로 직원들을 훈련하기 위한 시간과 재정적 자원의 필요성을 줄이는 것을 강조하였다. 설문 조사에 참여한 고용주의 31.5%는 구직자들의 기술과 경험이 부족하다고 답하였고, 23.5%는 구직자들이 교육 수준 및 직업 요구 사항을 충족시키지 못한다고 응답하였다. 그러나, 몽골의 전문 정부 기관 및 유관 정부 기관들은 이 분야에서 어떠한 조사도 시행하지 않고 있다. 따라서 본 논문은 몽골 정보 기술(IT)산업의 노동 문제를 파악하기 위해 고용주들이 직원들에게 어떤 기술을 원하는지, 또한 이를 위하여 어떤 정책이 필요한지를 조사하였다.

본 연구의 목적은 몽골에서 사업을 운영하는 기업이나 고용주를 통해 정보 기술의 인적 자원 개발을 연구하기 위한 것이다. 이 조사는 최근 5년간 몽골의 대학교를 졸업한 신입 사원들의 직업과 기타 능력에 대한 고용주들의 만족도와 성과를 연구하였다.

이 논문은 양적, 질적 방법이 둘 다 사용되는 혼합방법을 사용하였다.

몽골 ICT 산업의 인적 자원 기술의 현실을 명확히 하고 정책적 의미를 제시하기 위해 초기 단계에서 설문조사 자료를 기반으로 한 실증적 분석을 하였다. 이후에는 정량적인 부분에서 이미 제시된 요인을 확인하기 위해 심층 면접을 시행하였다. 이 접근법은 같은 주제에 다른 방법을 사용하여 비교함으로써 결과를 확증하는 데 도움이 된다. 직원들의 기술에 대한 고용주의 만족도가 만족스럽지 않다는 결과가 나왔다. 기술 및 만족도 향상을 위하여, 고등학교 입학 요건 변경, 대학교의 인적 자원의 개선, 기술을 이용한 실질적인 경험을 개선하기 위해 업계와의 협력을 통한 인턴십 기회제공 등 정책이 연구 결과에서 제시되었다.

몽골의 정책기관은 이러한 개선 가능성을 이해함으로써 ICT 산업의 인적 자원을 개선하고 효율성을 더욱 높일 수 있는 정책을 수립할 수 있다.

주요어: 몽골 ICT 인적 자원 개발, ICT 기술, Employers' Satisfaction Survey (ESS)

학 번: 2016 28722

Талархал

Сөүлийн Үндэсний их сургууль (SNU)-д тэнцлээ гэдэг хариугаа хүлээн авсан тэр өдрийг би яг өчигдөр мэт санаж байна. Өнгөрсөн хоёр жилийн хугацаанд Дэлхийн өнцөг булан бүрээс ирсэн аавын шилдэг охид, хөвгүүдтэй өнгөрүүлсэн дурсамжтай, хөгжилтэй, хааяа хүндхэн тэр сайхан өдрүүд миний амьдралд насан туршид үл мартагдах хамгийн сайхан дурсамж минь болон үлдэж байна.

Дэлхий хаашаа эргэдэг вэ? гэдгийг хүн бүр мэддэг. Харин Дэлхийн ИТ-н салбар хэрхэн хөгжиж ирсэн, хэрхэн хөгжиж байна вэ? ирээдүйд хэрхэн хөгжих вэ? гэдэг хариултыг хуульч мэргэжилтэй миний бие энэ сургуулиас хайж ирсэн. Хайсан асуултын хариултаа ч олж, өөрийгөө шинээр нээж, хоёр дах мэргэжлээ эзэмшлээ. Далай мэт их эрдэмээсээ зааж сургасан эрхэм хүндэт эрдэмтэн багш нартаа туйлын ихээр талархаж байна. Онцгойлон миний судалгааны ажлын удирдагч профессор Junseok Hwang танд чин сэтгэлээсээ талархлаа. Таны шавь нараа гэсэн тэрхүү хичээл зүтгэлийг тань, надад өгсөн их итгэлийг тань алдахгүйн төлөө хичээн суралцлаа. Таны зааж сургасан их эрдэмийг тань ашиглан эх орондоо их зүйлийг хийж бүтээх болно.

Миний судалгааны ажлын үе шат бүрт оролцож, хоёргүй сэтгэлээр зөвлөн ажилласан профессор Hyeong Yoon танд чин сэтгэлээсээ талархлаа. Таны цаглашгүй их эрдэмийг миний бие ихэд биширч танаар үргэлжид бахархан дурсаж байх болно. Бидний өдөр тутмын хөтөлбөрийг менежмент хийж, өөрийн ах, дүү мэт сэтгэлээр хандан ажилладаг Kwi-Yeong танд талархлаа. Өөрийн хүү мэт дэмжиж, зөвлөж байсан Dr. Shim танд баярлалаа.

Хүний нутагт суралцахад ар тал минь байж, нэг өдөр, нэг цаг ч ар гэртээ санаа зовохгүйгээр суралцах боломжийг олгосон хайрт хань Т. Ариунжаргалдаа баярлалаа. Чиний минь ухаалаг, холч ухаанаар хань нь бахархаад ч барахгүй ээ. Баярлалаа хайраа. Чи минь мундаг байсан шүү. Аавынхаа жинхэнэ найз байж, аавын эзгүйд гэртээ томоо эр хүн нь байсан миний ухаалаг хүү Ж.Одбилэг, энхрий ялдамхан миний хайртай охин Ж. Одхүслэн, гэгээ цацруулан инээмсэглэн мэндэлж, хайрын бурхан болсон бага охин Ж.Оджаргалмаа нартаа баярлалаа. Аав нь та нартаа хязгааргүй их хайртай шүү. Мөн гэр бүлийг минь асран хамгаалж, дэмжиж байсан ээж Ц.Гансүх, ээж Ц. Молонжав болон түүний хань, хадам аав З. Төмөрбаатар болон дүү Ч.Дамдинбазар болон түүний гэргий, дүү Ч.Хулангаа болон түүний хань, дүү Т.Ариунчимэг болон түүний хань, эгч Б.Ариунтуяа болон түүний хань нарт талархлаа. МУ-ын манлай уяач, найз Т. Ихбаяр, ирээдүйн тод манлай уяач хайртай дүү Г.Даваадалайдаа баярлалаа.

Андын халуун сэтгэлээр туг барихад ч, тугал хариулахад ч хамтдаа өнөөдрийг хүртэл зүтгэж, хүнд хэцүү үед ч бүхий л талаар туслаж, дэмжиж ирсэн найзууддаа талархлаа. Миний дотны нөхөд болох “Жудо бөх сонирхогчдын групп”-ийн багш нартаа, гэр бүлийн найз нарын “Бригад” группийн гишүүд, “Хүй мандал гал”-ын уяачид, Солонгос улсад төгсөгчдийн “SKMGKo”-н хамт олондоо талархлаа. Та нарын минь намайг дэмжиж, хурцалж, хүч нэмж байсан их хүчээр би энэхүү судалгааны ажлыг сайн хийж чадлаа.

Эцэст нь энэ сургуульд анх ирэхэд “А” үсгийг минь зааж өгч, хоёргүй сэтгэлээр туслаж байсан сонбэ Оки, зовлон, жаргалаа хуваалцан найз минь байж чадсан Борко, Оби, Эби нартаа, дүүгийн ёсоор “ах” гэж намайг хүндлэн дэмжиж байсан Сүлдээ, Болдбаяр, Урандөлгөөн, Номуна, Цацаа, Алдараа, Номио, Заяа, Эрдак нартаа баярлалаа. Онцгойлон миний судалгааны ажлын хүнд үед үнэтэй зөвлөгөө өгч, том эрсдэлээс гарахад тусалсан дүү Оюука, Гантулга, үргэлж сэтгэлээрээ дэмжиж байдаг сайхан сэтгэлт дүү М. Батзаяа, бүх талаар туслаж, дэмжиж байсан найз Наабаа, Өлзий, Тоогий, Уугнаа, Энхбат нартаа чин сэтгэлээсээ талархлаа. Хуучнаар “Мэдээллийн технологи, шуудан, харилцаа холбооны газар”-ын хамт олондоо талархлаа. Онцгойлон Н.Цэвээндарь танд талархлаа. Та нар минь мундаг байсан шүү. Та бүхнээрээ үргэлж бахархаж, өөрөөс хамаарах бүхнээр цаашид та бүхнийгээ дэмжиж, үргэлж хамтдаа хөгжих болно.

Итгэл өгсөн та бүхний сэтгэлийг тань хариулж, сурсан бүхнээ эх орондоо зориулъя!

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