JURNAL RISET DAN APLIKASI: AKUNTANSI DAN MANAJEMEN

Human Capital Development of Information and Communication Technology Industry in Indonesia

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Abstract

Industri teknologi informasi dan komunikasi (TIK) memainkan peran utama dalam transisi pengetahuan berbasis ekonomi, dan berpeluang untuk pembangunan sosial-ekonomi, terutama bagi negara-negara berkembang. Human capital memainkan peran penting dalam sektor berbasis pengetahuan seperti industri TIK. Di negara berkembang khususnya Indonesia, human capital merupakan faktor pendorong penting pertumbuhan industri TIK. Sehingga, perusahaan harus menginvestasikan sumber daya yang diperlukan dalam mengembangkan sumber daya manusia yang cenderung memiliki dampak yang besar pada kinerja. Artikel ini menjelaskan dan menganalisis peran modal manusia dalam pengembangan industri TIK di Indonesia serta mengembangkan model berdasarkan rangkuman teori yang telah ada yang menjelaskan hubungan antara pengembangan modal manusia dan kinerja perusahaan ICT. Model yang dikembangkan diharapkan dapat menjadi acuan dalam pengembangan human capital di industri lainnya, khususnya di negara berkembang.

Kata kunci:

ICT
Human Capital
Economic-Based Knowledge
Developing Countries

Abstrak

The industry of information and communication technology (ICT) has an important role in the transition of economic-based knowledge, and has a chance in the social-economic development, particularly for the developing countries. Human capital is indeed important in the knowledge-based sector like IT industry. In developing countries, particularly Indonesia, human capital was the strongest factor to stimulate the growth of IT industry. Human capital is intangible asset which is very important to be developed. Therefore, companies must invest their capital to develop their human capital which tends to give a high impact on companies' performance. This paper explained and analyzed the role of human capital in term of ICT industry development in Indonesia, then developed the model by summarizing existing theories that explained the relationship between development of human capital and the performance of ICT companies. The model that developed was expected to be the benchmark for human capital development in the other industries, particularly in developing country.

1. Introduction

Information and Communication Technology (ICT) is an important aspect that can boost the national development. Not only it works as the production

and economic factor, ICT also works as the enabler in cultural-social changes of the society in many aspects. The development of ICT leads to the emergence of free-way communication and information traffic among countries and regions. In the other words, the existence of ICT can vanish various geographical terms, which creates a transformation in people's platform of life within various sectors towards the knowledge-based society.

Information and communication technology in this era can be used as an indicator in determining the economic condition of a country. High demand and penetration of digital equipment in many aspects of people's life give a direct impact in creating a gigantic industry in technological sector involving almost all great nations of the world, with the business value that increase day to day (Indrajit, 2004). ICT has become a new resource for the growth of economy. This is shown by the impact of ICT usage, widely, which make it possible to apply the methods that more efficient for production, distribution, and product & service consumption.

The development of ICT in Indonesia grows rapidly. Several phenomenon shows the development of ICT in Indonesia, based on the information gathered from The Central Bureau of Statistic (BPS, 2014) as follows: (i) the number of internet users on 2013 increased to 32.2%, or around 82.2 million people; (ii) annual increase in terms of computer usage were 15.26% on 2013, (iii) the internet penetration in Indonesia increases annually as well, by 32.2% on 2013. These phenomenon also followed by the number of mobile phone users in Indonesia which increases annually, to 86.09%. It means that more than 200 million people in Indonesia are mobile-phone users and they use it for their daily routines. From those two phenomenon, it could means that Indonesia has a large market size for ICT products. Based on the data from (BPS, 2014), the economic growth in Indonesia was 5.78% in 2013. The growth occurred in all economic sectors. The highest number of growth was 10.19% in transportation and communication sectors; whereas in particular the telecommunication sector gave a 10% contribution. Based on a survey, the 10% of broadband penetration in a country can increases Gross National Product (GNP) up to 1.38%. Therefore, the ICT sector is the fastest element that build national economic. The higher information technology in a country, it will lead to the higher its economic growth. There is a tendency that the country with a fast growth in ICT has a fast economic growth as well.

The competitiveness of Indonesia in ICT sectors shows by IDI (ICT Development Index), which is an indicator of ICT development issued by International Telecommunication Union (ITU). IDI works in scope of ICT infrastructure development and improvement, ICT usage, and skill of human resources in ICT. In 2012, Indonesia was in the 97^{th} rank of 157 countries (ITU, Measuring the Information Society 2013). It means that Indonesia's rank is still below the neighborhood countries like Singapore, Malaysia, Vietnam, or Thailand. In global term, South Korea is still on the top of IDI's rank on 2012. Overall, the rank of ASEAN countries' IDI rank decreased, in average. Except Cambodia which jump up one step to (120) above India (121).

On its development, ICT in Indonesia has several advantages which support the development of ICT industry in the country. The advantages are high number of workers, skilled and experienced, many ICT industries that already invest in Indonesia (IBM, Oracle, Microsoft, SUN Microsytems, INTEL, *etc*). The challenge of development in ICT industry from the human resource sector is lack of skill to produce IT human resources, proven by the IT human resources that not distributed evenly in the whole parts of Indonesia, but only focused in several areas. The existence of skilled and professional human resources in the IT industry is admitted as the most important aspect for the successful ICT industry.

In this global market era, it is important for a company to improve its competitive advantages by using their employees as the competitive advantage. Therefore, formulating strategies to improve employees' productivity to boost a higher value for the company are required. The company could tries to optimize their employees through comprehensive human resource development program, not only to achieve the purpose of their business, but above all, for the continuous and long term life. To achieve this purpose, the company needs to invest their resources to ensure that their employees have the knowledge, skills and competency that they need to work effectively in a complex and rapid change of environment.

ICT investment and ICT capital are expected to push the productivity growth. The aim of this research is to explain and analyze the development of human capital in building and developing the industry of information technology in national level. This paper started by defining the concept of human capital in company's performance, followed by proposing improvement the conceptual model and conclude the

importance of human capital as a pillar in analyzing the future of company's performance.

2. Literature Review

2.1 Human Capital

Originally, the term human capital was conceived by Schultz (1961), an economist who prove that the results of the top human capital investment through education and training in the United States greater than development through capital investment. Human capital is one of the principal component of intellectual capital (intangible asset) required to support the company development. Human capital is an important factor in the organization, which include; joint intelligence, skill and expertise giving the characters peculiar to the organization (Bontis,1999) and considers to an essential factor in supporting organization (Colombo and Grilli, 2005). Furthermore, characteristics that relevant for human capital is education, experience, and knowledge (Wright et al., 1995**)**. Human capital is more than just knowledge ability and experience, but also a desire to share an attribute in a central organization to create value (Baron, 2011). Accordant to Elias and Scarborough (2004), the concept of human capital is very useful and regarded as a bridging the concept, that defines the relationship between resources and business performance.

In attempt to improve innovation, the potential of human resources who are qualified and competent in their field should respond to market competition, not only in term of technological information, but also personnel encouragement and commitment to the whole organization (Anggadwita and Dhewanto, 2013). The need to identify the skills of employees as the best resources should be the company's priority, thus, some employee development program can be done to improve the performance of the organization including formal training, on-the-job training, benchmarking, and communication sessions to educate staff about the organization (Anggadwita and Dhewanto, 2013). Furthermore, human capital is an effort to manage and develop the ability of humans to achieve a significant degree higher in performance (Chatzkel, 2004). According to Mayo (2000) human capital consisted of five components, namely individual capability, individual motivation, leadership, the organizational climate and workgroup's effectiveness. Each component had different role to shape the company's human capital, which in turn determined the value of the company.

2.2 Components of Human Capital

Human capital is consist of five components below:

1. Individual Capability has five criteria as follows (Mayo, 2000):
   a. Personal capabilities was the ability of the individual within him/herself, included appearance, thoughts, actions and feelings.
   b. Professional and technical know-how was the ability to be professional in every situation and condition as well as their willingness to transfer knowledge from senior to junior.
   c. An expert is someone who is competent and has sufficient experiences in his fields and will to share his experience.
   d. The network and range of personal contacts was competent person when someone is said have extensive networks and connections, especially with people who are associated with the profession.
   e. The values and attitudes that influence the actions were values and attitudes that will influence the actions in the work environment.
2. Individual Motivation has four criteria: aspirations, ambitions and drive, work motivations, productivity (Mayo, 2000).
3. Leadership was clarity of the vision set by the top management and the ability to communicate and behave consistently with what has been created.
4. The Organizational Climate relates to how did the culture of the organization, especially in terms of freedom to innovate, openness, flexibility and individual awards.
5. Effectiveness Workgroup consisted of three criteria, namely supportiveness, mutual respect, sharing in the common goals and values.

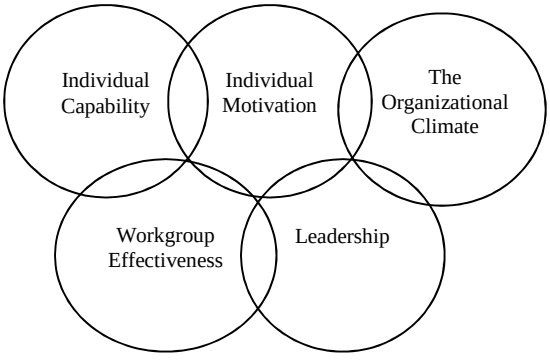

Figure 1. Human Capital Component (Mayo, 2000)

Based on IT Industry Competitiveness Index 2011, Indonesia was ranked 57 out of 66 countries.

Among the five proposed assessment of the business environment to support for IT industry development, as shown in the Table 1 below, the highest weighted was on Research& Development (R & D). Besides, Indonesia had the disadvantage of two aspects, namely R & D environment and IT infrastructure. R&D environment only was worth 0.1 which means that Indonesia was very weak in IT development research. While Malaysia had soared 11 ratings for the development of R & D owned environment. However, Indonesia was superior in the field of human capital compared to Malaysia. This had become one of the strengths of Indonesia in achieving the development of IT (The Soft-ware Alliance (BSA), 2014).

Table 1. IT Industry Competitiveness Index 2011

Rank	- / +	Country A-Z	Overall Index Score	Business Environment	IT Infrastructure	Human Capital	R&D Environment	Legal Environment	Support for IT Industry Development
53	▲ +3	Vietnam	**27.1**	60.8	23.5	23.5	0.2	50.0	43.5
54	▼ -1	Egypt	**26.3**	66.5	10.9	29.9	0.6	42.0	47.9
55	◀ /	Peru	**25.5**	61.5	13.2	21.9	0.2	52.0	47.0
56	▲ +2	Sri Lanka	**25.0**	64.5	8.6	20.9	0.1	53.5	48.0
57	▲ +2	Indonesia	**24.8**	52.7	7.2	30.1	0.1	48.0	48.0
58	▼ -1	Venezuela	**24.5**	46.6	18.0	36.8	0.5	37.0	33.9
59	▲ +1	Ecuador	**23.1**	49.9	12.9	22.8	0.3	53.0	37.0

Source : The Software Alliance (BSA)

2.3 Role of IT in a Company

Five fundamental role of information technology in a firm are as follows (Perdana, 2004):

1. Operational Functions
   In its role as an operational function, this unit is associated with the management of information technology as a supporting agency, where information technology is considered as an infrastructure of firm.
2. Monitoring and Control Functions
   This function implies that the existence of information technology would become an integral part with the activity at managerial level.
3. Planning and Decision Function
   This function raised the level of information technology to have more strategic role because its existence as an enabler of the company's business plan and was a generator of knowledge for corporate leaders that are faced with the reality to take some important decisions daily. Not many firm that ultimately choose to place units of information technology as part of the planning function and/or corporate development as a strategic function mentioned above.
4. Communication Function
   In principle, this function is included in firm infrastructure in the modern era where information technology organization placed its position as a means or medium of individual of firm to communicate, collaborate, cooperate, and interact.
5. Function Inter-organizational
   Function Inter-organizational was a role that quite unique because it was triggered by the spirit of globalization that forced of firm to collaborate or to build partnership with a number of other companies. The concept of strategic partnership or partnerships was based on information technology such as the implementation of Supply Chain Management or Enterprise Resource Planning made the company conduct a number of important break through in the design of the organizational structure of its information technology unit. It is unusual that companies tend to perform a number of business process outsourcing activities related to the management of information technology to other parties for smooth business. This types and functions of information technology's role was directly relate to companies performance.

3. Metodology

Research design applied in this study is exploratory method as an effort to reveal various factors that influence the importance of human capital development in ICT industry in Indonesia. Research method used in this study is descriptive approach by building relationship between two or more variables.

This paper built a conceptual model to develop

human capital in ICT industry and conclude the importance of human capital as a pillar for future research about the performance of ICT companies.

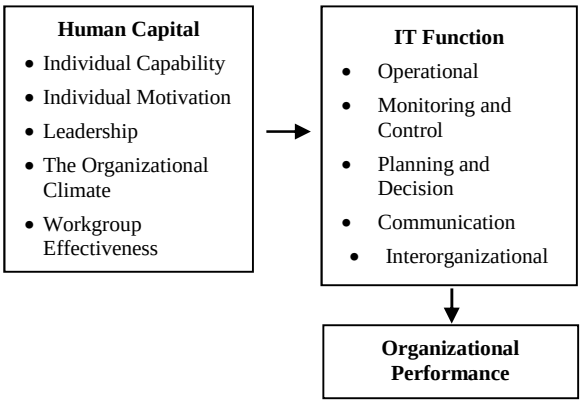

Figure 2. Human Capital and IT Function (Author)

4. Discussion

4.1 Conceptual Model: Human Capital Development

Based on ICT index, it is known that Indonesia has competitiveness in human capital, but it has not optimal yet. To develop human capital in ICT industry, there are differences with other industries. Human capital development in the ICT industry can be done by applying the appropriate compensation management, performance management, career planning, and learning management so that it can increase company's performance entirely.

4.2 Compentency-Based Pay

In ICT industry, employees are required to have knowledge and skills. The compensation management application that can be done is competency-based pay or payment system which is based on individual competencies level individually. The company creates clarifications of each job and standard of competence that required for each job. This system is related to trainings system that should be provided by the company in order to support the needs of employees.

A number of organizations are paying employees for competencies they demonstrate rather than just for specific task performed. Competency plan focuses on the growth and development of employee competencies, employee who continue to develop their competencies also benefit by receiving pay raises (Malthis, 2011).

Table 2. Competency-Based Systems Outcomes

Organization-Related Outcomes	Employee-Related Outcomes
Greater workforce flexibility	Enhance employee understanding of organizational "big picture"
Increased effectiveness of work teams	Grater employee self-management capabilities
Fewer bottlenecks in workflow	Improved employee satisfaction
Increased worker ouput per hour	Greater employee commitment
More career-enhancement opportunitues	

Source: Malthis (2011)

The expected outcomes of organization and employees related to competence application. There are several positive impacts for organizations such as the organization become more flexible, improve the effectiveness of teamwork, avoid bottlenecks, increase labors' output per hour, and increase employment opportunities. While the employees outcomes are employees can understand the organizational framework, the ability to manage their own self, improve employees' satisfaction, and increase employees' commitment.

4.3 Career Planning

Career path at each company will be vary according to the characteristic of the company. Generally exist in the ICT industry, the workers are mostly technical workers or professionals such as engineers, scientist, or IT experts. Career path's system that may be applied is the dual-career ladder.

The dual career path is commonly used in the pharmaceutical, computers and electronics, and telecommunications industries. Besides the career path management, someone who works in ICT industry is also undergoing a career path as technician.

4.4 Performance Management

Besides the compensation system and career, performance assessment system also provides important things for employees. Not only related to compensation system, performance can also motivate employees, fair performance assessment also can increase employee satisfaction. In this case in the ICT industry can be applied a Multisource Rating system or assessment that conducted by all components that supports

individuals' work such as superiors, subordinates, peers, theirselves, and client. This assessment is more objective because it involves the working environment.

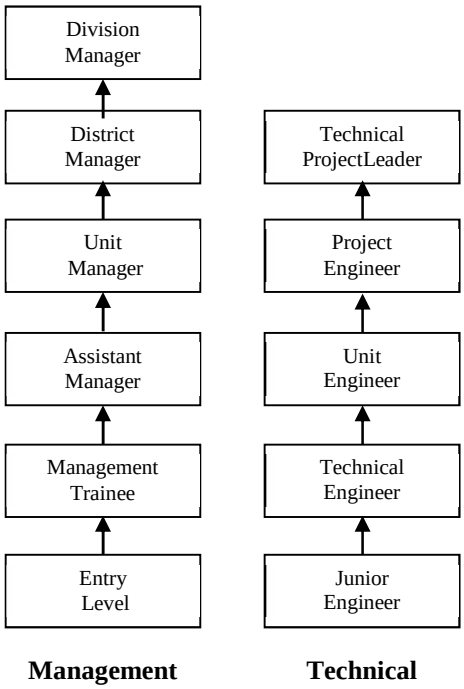

Figure 3. The Dual-Career Ladder (Malthis, 2011)

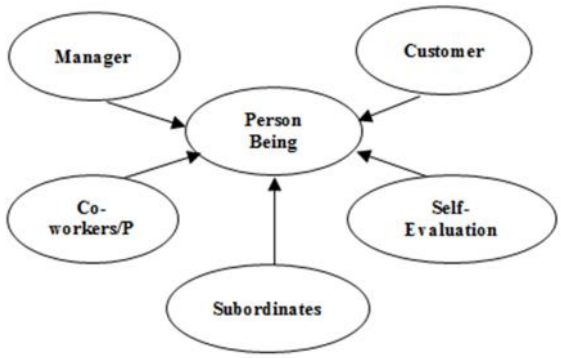

Figure 4. Mulsource Rating (Malthis, 2011)

4.5 Developing E-Learning

In connection with competence-based compensation system, it can be used as a reference in determining training needs and appropriate training for employees. To get the mapping needs can be done in advance Training Need Analysis (TNA). The TNA carried out to all employees in order to become the basis for determining training needs and training.

The Training Process conducted prior to delivery of training is the assessment process of identifying the determination of the criteria and objectives to be achieved from training. Then the design process with regard to the selection of the right trainer and the appropriate fields, making of interesting material in terms of content and appropriateness of the contents, the determination method of training will be conducted. Then, the next process is the delivery, respect of the schedule of training, presentation training and support equipment training course. The last process is the evaluation phase that aims to measure the results of training and training.

Application of the ICT industry can be done by developing E-Learning in training systems and training. To conduct meetings and discussions can be done with virtual class and web-chat procedures that facilitate the access of each employee. The company can make share-to-share services, as access to exchange information and experience between each employee in terms of the implementation of work. Utilization of ICT can provide advantages and disadvantages of the implementation of E-Learning, namely:

Table 2. Advantages and Disadvantages E-Learning

Advantages	Disadvantages
• Self-paced; trainees can proceed on their own time.	• May cause trainee anxiety.
• Is interactive, tapping multiple trainee sense.	• Not all trainee may be ready for e-learning.
• Allow consistency in delivery of training.	• Not all trainees may have easy and unterrupted access to computers.
• Enables scoring of exercise/assessments and the appropriate feedback.	• Not appropriate for all training content.
• Incorporates built-in guidance and help for trainees to use when needed.	• Requires significant upfront cost and investment.
• Is relatively easy for trainers to update content.	• No significantly greater learning evidenced in research studies.
• Can be used to enhance instructor led training.	• Requires significant top management support to be succesful.

Source: Malthis (2011)

Based on the above theories, the following Figure 5 is summarized the path of human capital, IT function, human capital development towards organizational performance.

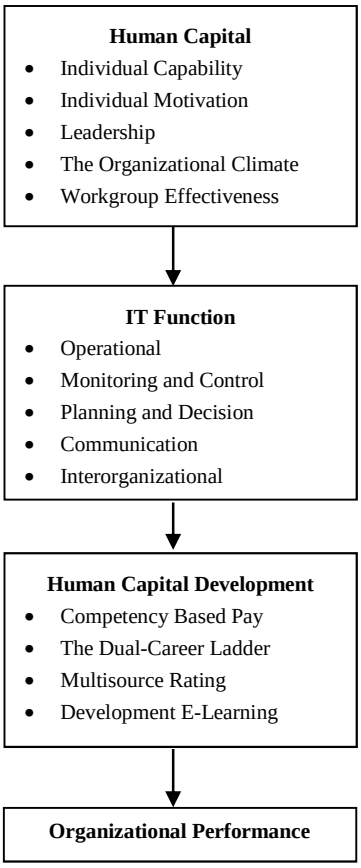

Figure 5. Conceptual Model (Author)

5. Conclusion And Recommendation

This study explores the development of human capital and its impact on the company performance, especially in ICT industry. A review of literature shows that there is strong evidence to indicate that human capital encourage innovation and had an impact on the organisational performance.

The development of human capital in the ICT industry should not only focus on skill development but also should be developed in all aspects that can push the performance of each individual in order to optimize performance. Companies in the ICT industry really need skilled manpower to develop industry to be able to compete in global industry. Moreover, the company also required to develop human capital management in order to satistfy individual in terms of salary and remuneration, mapping career, the promotion, fair performance assessment systems, and offering training for improving skills and knowledge of employees .

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