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# A Study on the Potential of the Development of Software Applications and Digital Content Industrial Ecosystem in Indonesia

## *Studi Potensi Pengembangan Ekosistem Industri Aplikasi Perangkat Lunak dan Konten Digital di Indonesia*

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### *Abstract*

The phenomenon of digitalization has changed human civilization at a very massive level in various aspects of life. In line with the advancement of ICT, so have the development of innovation and the software and digital content industry. Competition in the software industry is starting to develop. The ability to increase companies' production is changing significantly. Industry competition in the globalization process requires existing companies to be able to develop industrial capabilities with all industrial models and policies. The role of the government remains an important factor in creating an environment in which the domestic telematics industry can gain a competitive advantage. This study aims to map the potential of the digital content and software application industry in Indonesia. This study is conducted qualitatively through literature studies. The study produces a mapping of the potential for the software and digital content industry in Indonesia. This study recommends increasing the capacity of human resources in the field of ICT and further regulatory support to support the growth of the software and digital content industry in Indonesia.

**Keywords:** *Potential Development, Industry, Software Applications, Digital Content.*

## INTRODUCTION

### Background

Along with the rapid development of information and communication technology, the phenomenon of digitalization has changed human civilization at a very massive level in various aspects of life. In this era, anyone who is not responsive to adopting technology will slowly be left behind by newer and more advanced technology. This, of course, affects business behavior and global economic conditions massively, leading to the birth of the digital economy.

The digital economy is a new resource that Indonesia has. The development of the digital economy era rests on the birth and growth of entrepreneurs whose bases are talents, ideas, and digital technology to produce innovations. These entrepreneurs are known as Digitalpreneurs. Developing innovations is very complex with not easy implementation, because no companies or innovators are experts in all fields. For this reason, collaboration is needed between several different skills and knowledge.

In the future, economic players must be able to employ the technology, especially digital technology. Factors that can support this development are the use of technology and improvement of the quality of Indonesia's human capital. In fact, according to PWC data in February 2017, Indonesia is predicted to be ranked 5th in the world's largest economy by 2030 (PWC, 2017).

Indonesia has an enormous market potential, supported by Presidential Instruction to promote Digital Transformation to accommodate the rapid development of ICT in Indonesia. In fact,

in 2001, a new Ministry was established to regulate the ICT sector through a Presidential Decree. Then, in 2008, a new Law on Internet application and content was promulgated, namely Law Number 11 of 2008 on Electronic Information and Transaction (ITE Law, 2008), which was later amended by Law Number 19 of 2016 (ITE Law, 2016). Based on data from the Industry Ministry's Directorate of Electronics and Telematics Industry, currently only 20% of software industry business players are local players, the rest are foreign players. However, the potential of local software developers continues to increase from year to year, proven by domestic software market opportunity which reaches 110 million dollars per year (Warsito, 2015). The weak competitiveness of the local software industry which has previously been mentioned occurred because there is no standard of a process model for the maturity of the domestic software industry in place. Seeing the above phenomena and the increasing potential for local software developers from year to year, the government is encouraged to immediately establish regulations and standards that can promote the local software and content industry growth and development. The policies and standards established must be based on tested methodologies and go through extensive best practices to be able to find a method most suitable to the conditions in the country (Wijaya, 2008).

The potential for the software market is enormous and can reach US\$ 600 million per year. Currently, many millennials develop software contents personally and sold them to Apple Store or Google Play Store (Ministry of Industry, 2017). With such potential, the Government is targeting investment in the telematics industry to reach a

minimum of US\$ 60 million per year. This target is enforced in accordance with the government's local content requirement (TKDN) of smart phones. If not managed properly, the nation's great potential will not be able to enter the industrial world in dire of engineering talents. What the nation has now is untapped potential waiting to be further exploited for the industry.

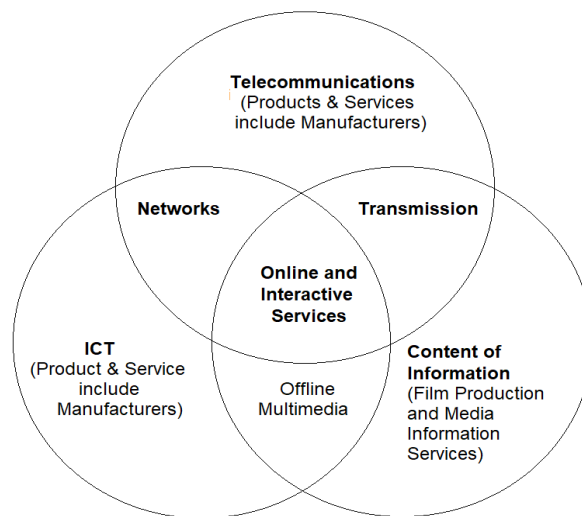
Based on the aforementioned problems, the formulation of the problem that becomes the question in this study is how to exploit the potential for the development of the content industry and ICT applications based on innovation and creative industries to increase their contribution to the national economy?

## Literature Review

Literature relevant to the object of the study is the policy and governance of software and content applications in order to design a strategy for developing domestic software and content industry as a driver of digital economy in Indonesia.

## Definitions and Industry Classifications of Software Applications and Digital Content

Based on the Annex "Guide to measuring the information society" (2005), the OECD has defined the ICT group and also emphasizes the intersection between information technology, telecommunications and information content activities within a company or organization.



**Figure 1.** Group of ICT Activities

The content industry is then referred to as something different, although it is complementary to the ICT sector. The definition of ICT is "those industries which facilitate, by electronic means, the processing, transmission, and display of information". This definition does not explicitly include industries that produce information or what

are then called the content industry. The content industry is divided into three types, namely:

1. Multimedia Creator, which is digital content creator that combines sound, data, and video-based materials with the majority of application functions in the entertainment, social, and friendship fields;

2. E-Commerce Creator, namely digital content creator that also combines voice, data, and video-based material with or stands alone from most application functions in the trading, commercial, and business fields; and
3. Publishing Creator, which is digital content creator which also combines sound, data and video-based material with or stands alone from the majority of application functions in the fields of information, news, and its derivatives.

Meanwhile, based on literature studies, the software industry means an industrial activity related to the development of information technology including computer services, data processing, database development, software development, system integration, system design and analysis, software architectural design, and infrastructure design, software and hardware, and portal design including maintenance.

### **ICT Sector Industries**

The development of standards is an important element of the mandate of the Working Party on Indicators for the Information Society (WPIIS). The first paragraph of the terms of reference reads: Industry will ensure continuous improvement in terms of data collection methodologies at the international level for measuring supply and demand, information and communication technology (ICT). This will include developing and maintaining standards for measuring the ICT sector, ICT goods and services, e-business including e-commerce, IT security,

digital content and ICT diffusion for organizations and individuals.

The first achievement of WPIIS in that role came in 1998 when delegates agreed on the definition of an ICT-based industrial sector. The combined sector of manufacturing and industrial services which covers the production, delivery, or display of data and information electronically. In order to promote international comparability of statistics and accelerate compilation of relevant data, the definition is based on current industry standards, namely the International Standard Industrial Classification, Revision 3.1 (ISIC Rev. 3.1) on all economic activities.

In 1998, it was recognized that an activity-based definition should be complemented by a classification of ICT products. Mapping products for activities will enable more precise quantification of production related to ICTs and value added and employment, both in the core ICT sector and in other sectors of the economy.

The sector definition is complemented by the definition of ICT goods in 2003 and the definition of ICT services in 2006. The first is based on the 2002 version of the harmonized system used for trade statistics and the latter on the latest version of the Product Classification Center - UN or United Nation Central Product Classification (UN CPC). Furthermore and related to this, the Organization for Economic Cooperation and Development (OECD) has provided a framework for the ICT sector and to support basic economic analysis. For example, some of the key indicators published in the OECD's Information Technology Outlook; Science, Technology and Industry Scoreboard; The measurement of the ICT sector industry and the

impact of ICTs on the economy is based on this definition. Such definitions have also been used for national data releases and analytical studies of interest to policy analysts.

The main objective of the ICT sector review is to maintain the classification standards in a contemporary (current) manner and seek to preserve them. This is a special challenge, where goods and services related to the latest/modern ICT will quickly emerge and develop. In more detail, the OECD proposes an ICT sector based on the general characteristics of industries that have ICT products. The following figure illustrates this proposal.

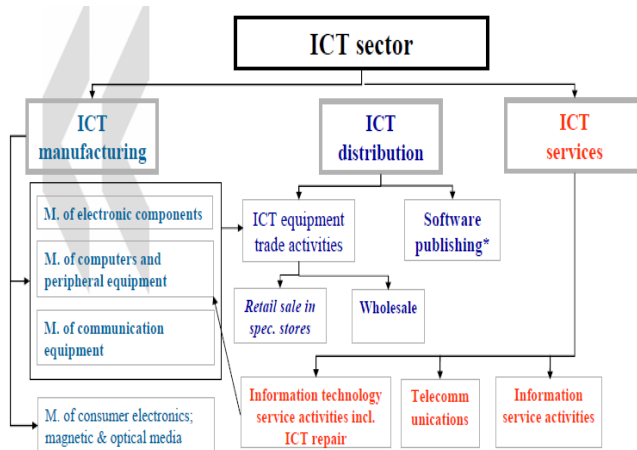


Figure 2. ICT Sector Industries

One important feature of the definition of the ICT sector proposed by the OECD is that it violates the traditional ISIC dichotomy between manufacturing and service activities. The activities of producing or distributing ICT products can be found in various aspects of the economy/industry. In addition, by identifying the key sectors whose main activity is the production or distribution of ICT products, this definition represents the first approach sequence of the ICT production sector.

With regards to digital content, the OECD defines that the sector is a group of economic activities/industry whose activities are mainly engaged in publishing and/or electronic distribution of content products. The value of these products to consumers does not lie in the quality/tangible form, but lies in the values of information, education, culture or entertainment content. A content product is published through mass communication media in accordance with the message presented for the community/consumers. The chart in the following figure explains the relationship between digital content and the ICT sector in the information economy.

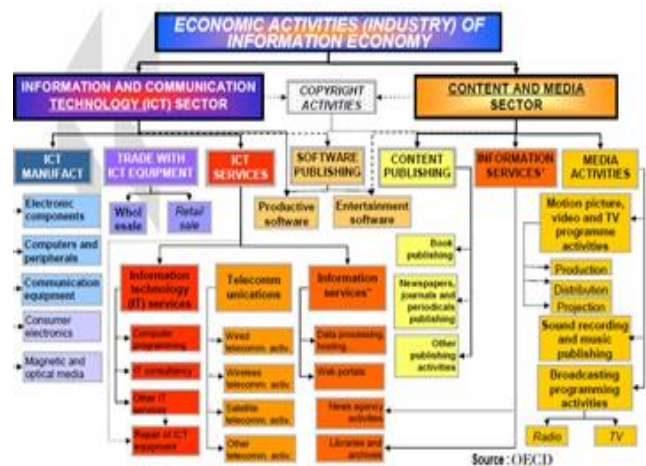


Figure 3. Industrial Activities in the Information Economy

Referring to the 2009 Indonesian Standard Industrial Classification (KBLI) issued by Statistics Indonesia (BPS), based on the Regulation of Head of the Statistics Indonesia No. 57 of 2009, the Software Industry and Digital Content Industry are included in the Information and Communication Group, where the Software and Digital Content industry is included in the classification of Programming, Computer Consulting, Information Technology and Other

Computer Services as well as the Production of Motion Picture, Video and Television Program Sub-categories.

Programming, Computer Consulting, Information Technology, and Other Computer Services Sub-Activities include writing, modification, testing, and supporting software activities to meet the needs of certain clients. Activities that are also included in this sub-category include; planning, designing, supplying and installing; computer system management and support services that integrate hardware, software and computer communication technology. Meanwhile, Moving Image, Video and Television Program Production Sub-category includes the production of moving images or animation including digital games, films, videos, television programs or television mobile advertisements.

## **METHODOLOGY**

The stages of this research include research background, problem formulation, research objectives and problems. In this stage, literature studies are carried out to study various theories that are relevant with the framework of research methodology in solving the problems. The literature study used is related to case studies of information technology infrastructure planning in the research object environment, the software industry and digital content. Information technology infrastructure planning theories are taken from library materials, lecture materials, the internet, scientific journals and regulations, procedures, and documents/references related to the industry.

## **Collection of Data and Information**

The collection of data needed is carried out in several methods, namely:

- Interview method conducted to several parties related to the research. interviews were conducted with five informants;
- Focus Group Discussion (FGD) involving experts in the software application industry, digital content industry, and representatives from the Directorate of Informatics Industry Empowerment as well as from the Ministry of Industry and the Ministry of Trade. A total of four FDG series were conducted to support this research.

Data collection through in-depth interviews and in several series of focus group discussions were then carried out by expert judgments. Furthermore, the collected data were further analyzed by the research team.

## **RESULTS AND DISCUSSION**

The development of communication and information technology in the last two decades has been very rapid, this is supported by the increasing spread and quality of telecommunications services, especially the Internet. The same thing also happens in Indonesia where telecommunication access has become a primary need that cannot be separated from everyday life.

Another challenge for a large country like Indonesia is the provision of infrastructure to support economic activities. The infrastructure itself has a very broad spectrum. One thing that must get the main attention is infrastructure that encourages connectivity between regions so that it

can accelerate and expand Indonesia's economic development. Deployment of infrastructure that encourages connectivity will reduce transportation and logistics costs so as to increase product competitiveness and accelerate economic movement. Included in this connectivity infrastructure is the development of transportation routes and information and communication technology (ICT), as well as all regulations and rules related to these matters.

The quality of human resources remains a challenge for Indonesia. Currently, about 50 percent of the workforce in Indonesia still has primary school education and only about 8 percent has a diploma/bachelor's degree. The quality of human resources is closely related to the quality of education, health facilities and access to basic infrastructure. In terms of Human Resources (HR), Indonesia is a country with the 4th largest population in the world. A large population with

increasing purchasing power is a potential market, meanwhile, a large population with continuously improving quality of Human Resources (HR) is a potential for extraordinary competitiveness.

Indonesia is in a transition period in the structure of the productive age population. In the period 2020-2030, the decline in Indonesia's dependency index (which has been going on since 1970) will reach its lowest figure. An important implication of this condition is the increasing importance of providing employment so that the economy can make maximum use of the large portion of the population of productive age. More importantly, if the level of education in general is assumed to continue to improve, the productivity of the country's economy is actually in a premium condition, which will be very beneficial for the purposes of accelerating and expanding economic development.

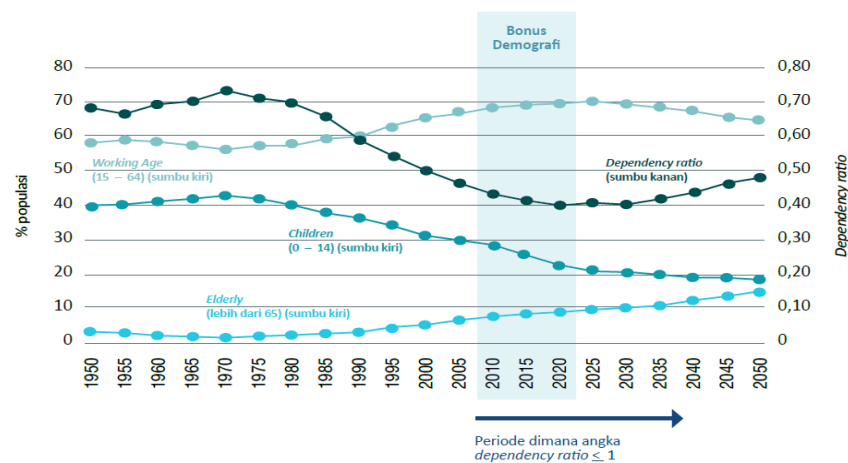


Figure 4. Age Demographics of the Indonesian Population

Indonesia is facing rapid urbanization. If in 2010, as much as 53 percent of Indonesia's population lived in urban areas, BPS predicts that by 2025 the population in urban areas will reach 65 percent. The direct implication that must be anticipated due to urbanization is an increase in movement

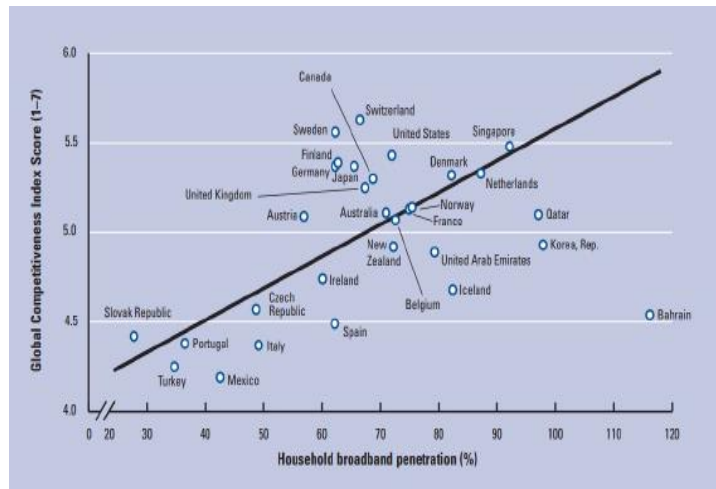
patterns, changes in consumption patterns and production structures that have an impact on the labor structure, increased land use conflicts, and an increase in the need for reliable infrastructure support to support the distribution of goods and services. With all the potentials and challenges

outlined above, Indonesia needs an acceleration of economic transformation so that the welfare of the entire community can be realized early.

**Indonesia’s ICT Industry Mapping**

The development of communication and information technology in the last two decades has been very rapid, this is supported by the increasing

spread and quality of telecommunications services, especially the Internet. The same thing also happens in Indonesia where telecommunication access has become a primary need that cannot be separated in everyday life. Broadband penetration as a major ICT technology currently has a strong correlation with the Global Competitiveness Index. This relationship can be seen in Figure 5 below



**Figure 5.** Broadband Penetration vs Global Competitiveness Index  
 (Source: World Economic Forum, 2010; ITU, 2010; Booz & Company analysis)

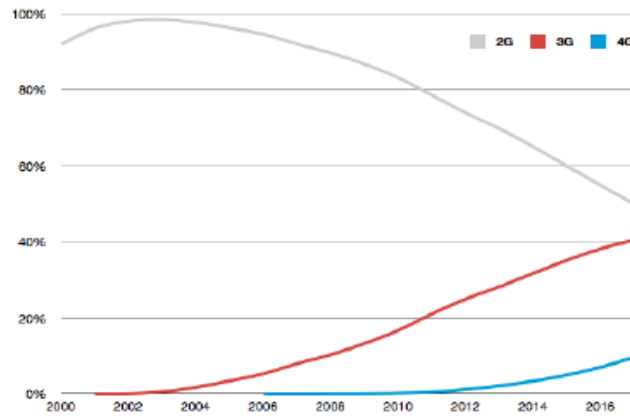
Its contribution to the country's economy also grew very significantly, in 2013 when our GDP only grew 5.78%, the telematics sector together with transportation could grow 10.19% and became the only sector that grew in double digits.

The level of telematics adoption in Indonesian society has also increased significantly. This is indicated by the number of cellphone users until October 2014, reaching more than 300 million numbers or penetration of 120% and exceeding the world average. The number of Indonesian internet users has reached 100 million

people and is ranked 8<sup>th</sup> in the world with an average growth of 58% in the last 5 years. Indonesians are also very active in using internet-based applications, with the country's social media ranked 4<sup>th</sup> in the world for Facebook users and 5<sup>th</sup> for Twitter.

The concept of competitiveness also relates to static and dynamic components. As previously stated, productivity also plays a central role in determining the rate of return on investment, which is actually a key factor in explaining a country's economic growth potential (Schwab, 2012).





**Figure 6.** Global connection based on connection technology generation.  
(Source: Wireless Intelligence, 2013)

The Global Competitiveness Index is a comprehensive tool for measuring the microeconomic and macroeconomic foundations of a country. The World Economic Forum defines competitiveness as a set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity itself determines the rate of return on investment which is currently seen as the main driver of the growth rate. In other words, the more competitive a country's economy is, the greater the country's ability to support the sustainability of its economic growth.

Given the close relationship between broadband penetration and competitiveness, the topic of broadband is very strategic in national development. As is well known, one of the pillars of the Master Plan for the Acceleration of Indonesian Economic Development (MP3EI) is connectivity, one of which is ICT. In each and between MP3EI economic corridors, good ICT connectivity in the form of broadband networks must be built. Within this framework, replacement of copper cables with fiber-optic cables has been programmed.

### **Potential of Software Application and Digital Content Industry in Indonesia**

From the available data sample, there are 33 companies or 31% of the total software industry companies located in West Java, followed by DKI Jakarta 26% (27 companies), and 12% in the Special Region of Yogyakarta (13 companies). Java Island still dominates the development of software companies, especially in DKI Jakarta. The existing software companies are located in capitals/big cities, where the economy is growing.

Meanwhile, there are 22 content industry companies, of which 42% of the total sample of companies are spread across DKI Jakarta, followed by West Java with 30% (15 companies) and 12% in East Java. A small number of others are in Yogyakarta, Central Java, and Banten. Uniquely, from the sample data obtained, almost all of them are in Java Island. Java Island still dominates the development of digital content companies, especially in DKI Jakarta. The existing digital content companies are located in capitals/big cities, where the economy is growing. When viewed from the content category, there are 29 companies

(58%) are games companies and 219 other companies (42%) are animation companies.

If classified according to the number of employees in the company, there are 89 software companies (35% of the total companies) which are classified as small companies with 0-20 employees, 10 companies are classified as medium-sized companies with 21-50 employees, and 4-6 companies. (4%) including large-scale companies. Meanwhile, the ratio of the number of IT employees to the total number of existing employees is around 32%.

Furthermore, software companies are noted to market their products the most domestically, namely 17% of the total sample of companies marketing their products at home and abroad. Only 2 companies that market overseas and the rest are not yet marketed (are startup companies). Some of these companies do business only through online media. The listed companies' marketing target countries are Singapore, Taiwan, China, and the Netherlands.

Meanwhile, from the data collected, 36% of the companies are classified as household or small companies with a total of 1-20 employees. Twenty percent of them are medium-scale companies with employees of 21-100 people, while the other 6% are large-scale companies with more than 100 employees. Nineteen other digital content companies did not respond because the existing contact number could no longer be contacted or the contact person did not have any contacts of the companies' employees.

### **Mapping of Software Application and Digital Content Industry in Indonesia**

The rapid development of information technology in Indonesia has been evident in the

last two decades. This can be seen from the many uses of IT products for both personal and corporate/business use. Some of the related IT products are gadgets, softwares/applications, games, animation, and others. In fact, now IT has entered into the lifestyle of the majority of the capital's residents where people cannot be separated from IT-related matters in their daily lives. This has resulted in the emergence of a market that is wide open for the IT industry in Indonesia.

There have been many startups/start-ups in the information technology industry in recent years, particularly in the fields of software, games and digital content. According to the DKI Digital Creative Industry Map documentation, there are more than 150 companies in Jakarta, consisting of 120 software companies, 20 game companies and 28 animation companies. Of course, there are more IT companies in Indonesia. With the increasing number of startups/new companies, the government needs to control the development of the IT industry in order to maximize the existing potentials to improve the quality of the Indonesian economy.

Software industry companies develop/produce superior products for their users. The manufacturing process of these products is divided into two methods, namely production on request and production from original ideas. The products produced by these companies can be grouped by types of industry. The following are categories that define the types of industrial products a listed company produces:

1. Banking
2. Manufacturing
3. Distribution/Retail
4. Insurance

5. Education
6. Mining
7. Plantation
8. Cross Industry
9. Travel
10. Government/Public Sector
11. Health
12. Entertainment
13. Outsourcing
14. Exercise
15. Aviation
16. Capital Intensive Industries
17. Investment Management
18. Creative Industries
19. Property Industries
20. Startup Industries
21. Trading

Each company can have one or more industry categories according to each product. However, companies in the digital content industry are generally engaged in the Entertainment/Media industry. Each company can have one or more industry categories according to their respective software products. From the sample of company data, it is obtained that softwares most developed by these companies are used for education (20%), entertainment (18%) and government (10%) sectors.

From the data sample collected, as many as 90% or 45 of the 50 companies are included in the Entertainment/Media industry category. The rest are only 1-3 companies engaged in other fields such as Education, Hospital, Retail, Engineering, and Manufacturing. Thus, based on existing data, 29 companies (58%) are games companies and 21 other companies (42%) are animation companies.

Data on marketing scope for 13 out of the 50 sample companies are unavailable due to unresponsive contacts and no other sources of information were available. Data is successfully collected from 37 companies. The number of

companies that market their products both domestically and abroad has almost the same ratio. There are 18 companies whose marketing scope is domestic and foreign, as well as 16 companies with domestic marketing scope.

## CONCLUSION

The digital content industry and software applications are a never-ending business because their main capital is creativity. Especially in today's era of mobile devices, more and more users are gaining the most out of their smart phones or tablets. Currently, telecommunications is only a basic business for the use of technology. The sectors that can be developed are software applications and digital content. The development of the digital content industry and software applications can also be a way out to determine the direction of the Indonesian technology industry.

## Recommendation

Based on the discussion that has been carried out in this study, suggestions that can be given from the results of this study include;

1. Increasing human resources' capacity by providing easy access to knowledge such as books, training, tutors, and others.
2. The government's support for digital content industry products and local local software applications is very important to be able to absorb the local content creators' products to trigger the high growth of content products
3. Providing guidelines in the distribution of content products, supporting the marketing

of Indonesian content products, and providing marketing distribution channels.

4. Providing education and facilitating the management of copyright and intellectual property rights, in order to protect the original works of local content creators.

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