JPPI Vol 9 No 1 (2019) 37 - 52

Jurnal Penelitian Pos dan Informatika

32a/E/KPT/2017

e-ISSN 2476-9266
p-ISSN: 2088-9402

Doi:10.17933/jppi.2019.090104

DEVELOPMENT STRATEGY FOR TELEMATICS SMALL AND MEDIUM INDUSTRIES IN INDONESIA

STRATEGI PENGEMBANGAN INDUSTRI KECIL MENENGAH TELEMATIKA DI INDONESIA

Eneng Tita Tosida[1], Hermawan[2], Fredi Andria[3], Irfan Wahyudin[4], Taufik Djatna[5]

[1,2,4]Computer Science Department, Faculty of Math and Natural Science, Universitas Pakuan, Jl. Pakuan Bogor
[3]Management Department, Economic Faculty, Universitas Pakuan, Jl. Pakuan Bogor
[5] Agricultural Industrial Technology Study Program, Faculty of Agricultural Technology, Kampus IPB Dramaga Bogor
[1]*enengtitatosida@unpak.ac.id*

Naskah Diterima: 07 November 2018; Direvisi : 15 Agustus 2019; Disetujui : 20 Agustus 2019

Abstract

The telematics industry is included in the national industry development policy. Electronic and Telematic Industries are projected to grow twofold by 2025. The telematics industry is also included in the Nine Priority SMEs for development. The telematics industry is even part of the creative industry that absorbs about 13,000 workers. The national telematics industry is grouped into five groups, namely the office equipment industry, software, animation, games, and embedded. The strategy for developing Telematics SMEs is based on the position of the industry in its strength map. The five industry groups have been mapped into 4 developing quadrants. The office equipment industry is included in quadrant 1, with an expansive strategy such as increasing production and market share. The game and embedded industries map into quadrant 2, the strategy developed is proactive such as strengthening promotion and innovation. The software industry enters quadrant 3, the strategy developed is consolidation, such as strengthening human resources, infrastructure, and business institutions. While the animation industry entered quadrant 4, the strategy developed was to defensive, namely managing production cost efficiency, strengthening the domestic market, and increasing the competency of human resources. Human resource development has received special attention in the development of telematics SMEs. The skills of human resources in the telematics business may not be doubted, but recognition of competencies is a distinguishing factor in efforts to provide quality assurance to customers.

Keywords : Developing Strategy, Telematics SMEs, Industry Mapping, Classified MSQA

INTRODUCTION

The electronics and telematics industry is projected to grow twofold from 2015 to 2025, with exports predicted to reach US$25 million (Ministry of Industry, 2013). The Telematics Industry Grows with Investment reaching Rp7 Trillion and 13 Thousand workers. One of Indonesia's visions in the field of telematics is to realize independent, competitive and dignified human resources with good ethics in the field Information and Communication Technology (ICT) with functions as an efficient meta-infrastructure, and ICT that provides equitable opportunities and resources in achieving prosperity (Ministry of Communications and Informatics, 2016).

In line with the points of the Jokowi-JK administration's nine key development programs, known as Nawacita, among others realizing economic independence, increasing people's productivity and competitiveness in international markets, as well as developing regions and villages, the development of the telematics industry continues to be developed through Small and Medium Industries (SMIs) or Small and Medium Enterprises (SMEs). Telematics is included in the nine focus of SMEs commodities developed by the Ministry of Industry together with processed seafood, coffee, furniture, weaving, essential oils, jewelry, non-mechanical agricultural equipment and appropriate technology, components of transport equipment, and electronic products.

According to 2016 Susenas data, the number of SMEs/SMIs in Indonesia reached 26.2 million and 10% of them were engaged in telematics. Telematics entrepreneurs continue to strive to increase the growth of SMEs/SMIs through Indonesia's Chamber of Commerce and Industry,Kadin, encouraging the government to approve the use of a portion of funds from Universal Service Obligation (USO) drawn from operators for the ICT Fund (Setiaji & Maulani, 2011). ICT Fund aims to provide funding for micro and small entrepreneurs in the field of telematics, which has been experiencing difficulties in the business development process.

The Indonesian Ministry of Cooperatives and SMEs has an empowerment program in the form of capital assistance grants for SMEs. This program is based on the actual condition of business operators in Indonesia which are dominated by micro businesses reaching 98.77% (Ministry of Cooperatives and SMEs 2014). The realization of this business assistance program in 2013 was only absorbed by 3,860 MSMEs actors (out of a total of 57.18 million MSMEs). From that figure only 4.7 % of the MSMEs actors were engaged in telematics. This data shows that the absorption capacity of assistance for Indonesian telematics MSMEs is still low.

The low rate of absorption of assistance can be caused the absence of support form incomprehensible business analytics system, so that the decision making process is not on target (Albright, Winston 2015). However, in the case of telematics SMEs/SMIs, the low absorption

capacity of national assistance may also be caused by the relatively small number of business entities. The Ministry of Industry in 2017, will focus on improving the Small and Medium Industries database in Indonesia.

The Government, through **Presidential Regulation No. 74 of 2017** considers that an electronic-based economy has high economic potential for Indonesia, and is one of the backbones of the national economy. In order to optimize the use of electronic-based economic potential, the government considers it necessary to accelerate and develop an electronic-based national trade system (e-Commerce), start-up business, business development, and logistical acceleration by establishing an integrated National Road Trading System (e-Commerce) Road Map.

The national telematics industry road map has been compiled since 2011, although it does not specifically describe the role of telematics SMEs/SMIs, but a series of studies have been conducted concerning the roadmap. Rapid changes in the digital world leaves various problems when telematics MSMEs/Small and Medium Industries entered the creative market, echoing the issue of "Disruption Era", so that surveys of business actors were carried out to update the data. A strategy is needed for the development of telematics SMEs/SMIs that are now mixed with creative industries and startups. Even in some countries, this problem has been sought a solution through the empowerment of SMEs especially with the creation of a technology-based start-up conducive environment or known as technopreuneur start-up (Sohn and Kim 2012). The concept of efforts to empower Micro Small and Medium Enterprises (MSMEs) telematics services is reviewed by Tosida et al. (2017) and Tosida et al. (2018a) through the concept of data mining. The results of the study produce the main factors that influence the process of providing assistance for empowering MSME telematics services. The approach to the data mining process is done through clustering and classification. This concept is continued by optimizing the MSME telematics service empowerment model (Tosida et al., 2018b).

This research was conducted to develop a strategy for the development of telematics SMEs/SMIs that is tailored to the latest developments in the industry. The aim is to assist the government in formulating policies related to the development of telematics SMEs/SMIs in Indonesia.

Development Of Telematics Industries In Indonesia

The telematics business is grouped into: 1) hardware industry; 2) the software industry; and 3) industrial and non-telematics service industries. These fields are divided into sub-fields and are detailly classified systematically in the Indonesian Standard of Industrial Classification (KBLI) numbering system. (Ministry of Industry, 2010). More explicitly, the Regulation of the Minister of Industry of the

Republic of Indonesia Number 64 M-IND/PER/7/2011 stipulates that Telematics is divided into 5 (five) groups, namely: 1) Office Equipment (cellphone, computer, printer, scanner, networking, etc.) -other); 2) Software (Internet application, WEB, WAP, Business, Art, Science, and Simulation); 3) Animation (TV, DVD, VCD, Radio cassette, Set top Box. Speaker, Digital Camera, Camcoder); 4) Games (Arcade, Education, etc.); and 5) Embedded (e-book, Gadget Software).

Data shows that in the country, the telecommunications and informatics Industries (telematics) have grown significantly, despite the fluctuating performance as depicted in Figure 1. Up to 2016, there are 23 *Electronics Manufacturing service*, 42 brands, and 37 owners of both global and national brands with total investment value of RP7 trillion and absorb workforce of 13 thousand people.

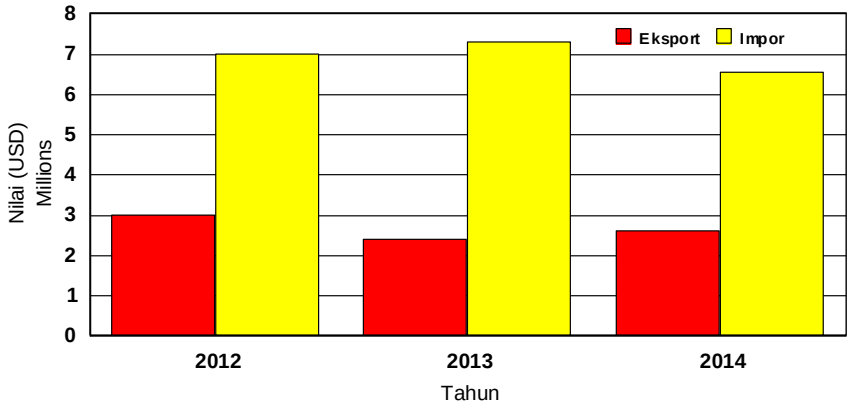

Figure 1. Development of Export-import Telematics products Indonesia (Ministry of Industry 2016, processed)

On the other hand, based on *e-Marketer*'s report, smartphone users in Indonesia will grow from 55 million people at 2015 to 92 million people at 2019. Then, with the reference data from *Gesellschaft fr Konsumforschung*, in 2015 smart phone sales in Indonesia reached 32.14 million units and increased by 2.9% or 33.07 million units in 2016.

The effort to boost the performance of telematics industry, another important factor is the development of human resources competence. Since 2002, Industry Ministry has facilitated the development *Regional development OF IT Center of Excellence* (RICE) or Incubator Business Center (IBC) in 14 regions in Indonesia. In its current development, five RICEs or IBCs were chosen to be the special Technopark for the software industry, content and animation that is located in several regions, namely Bandung (Bandung Techno Park), Denpasar (Tohpati Center), Semarang (Semarang Incubator for Creative Business and Telematics

Innovation/IKITAS), Makassar (Makassar Techno Park–Home Software Indonesia), and Batam (Phone Design center). Meanwhile, research and development centers for Daihatsu and Apple are planned be established in BSD city, Tangerang. It is targetted that within the next three years, Apple's innovation center will absorb local workforce by 1,300 people, where they would be able to operate iOS technology.

The software industry in Indonesia has been able to produce application products that can support the operations of other industries. The software application products produced include those of financial management, geographical information systems, inventory, office animation, multimedia presentations, executive information systems, and intranets. Start-up companies valued at billions of dollars in the country are fintech verticals. Existing unicorns are from the e-commerce vertical and vehicle sharing, the growth rate of fintech transactions has experienced very rapid growth in the past year. The domestic software industry has grown naturally, but if it is associated with world realities, Indonesia's position still needs to be improved.

In order to be able to develop software on an industrial scale, systems systems and strategies are needed to be prepared for technology transfer and appropriate technological innovations, including increased research and development funding, as well as synergies between government, entrepreneurs and academics. Efforts to develop the MSME telematics services group in Indonesia has been conducted through the telematics SIM MSMEs services prototype (Tosida et al 2015) and its clustering model (Tosida et al. 2016).

The Telematics industries as part of the creative industry is included in 4 groups that experienced rapid growth until 2015, namely: 1) television and radio; 2) publishing; 3) application and game developer; and 4) advertising, as presented in Figure 2. The Creative Economy Agency (Bekraf) recorded that the growth of visual communication design reached 10.28% and Animation 6.68%. Nevertheless, its contribution to Gross Regional Domestic Revenue is still below 10%.

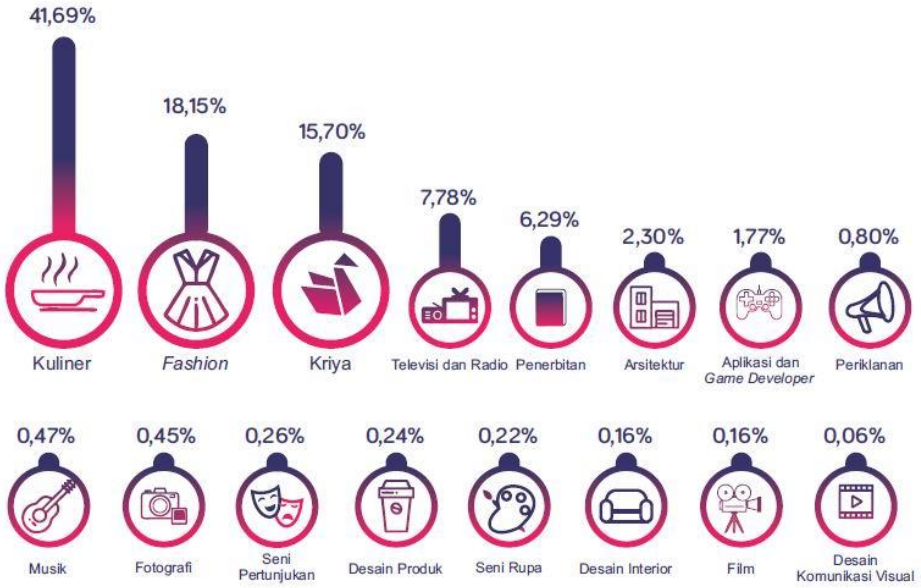

Figure 2. The contribution of several creative industry sectors to gross Regional domestic income (PDRB) (Bekraf RI, 2016)

According to data from the Creative Economy Agency, approximately 15,959,590 people worked in the creative industries in Indonesia in 2015 and 21.59% were entry level workers. As much as 48.94% creative companies only have 1-4 employees, putting them in the MSME category. In fact, 83.32% of which were not incorporated and 93.27% used their own capital. However, 64.24% of businesses use computer equipment, 30.39% have websites, and 68.83% utilize internet networks.

The government of Indonesia has established a Roadmap for the development of the Telematics industry in 2010, as shown in Figure 3. 2010-2015 was a period in which manufacturing and supporting components of telematics devices were developed,

the development of the communications industry, wireless, and the start of animation, content and application industries, especially for the domestic market. The 2016-2020 period is the period development of telematics, animation, content and application infrastructure devices to enter the regional market. While the period 2021-2025 is projected that Indonesian telematics products can compete in the Global market.

Figure 3. Roadmap for Telematics Industry Development (Deprin, 2010)

METHODOLOGY

1. Formulation of business condition factors of telematics

The first step of the research methode was in-depth study and analysis related to condition factors that include potential, problems and challenges faced by the business group of telematics, through the optimization of research results Tosida *et al*. (2015) and Tosida *et al.*(2016). The very important condition factor was studied as the first step in drafting the competency model. The achievement of competing excellence needs to identify the potential and conditions faced in detail and measurable, so that the potential differentiator from the others.

Business mapping of telematics will be conducted through data management and the preparation of *Master data Management* (MDM) and optimization of telematics business metadata. It is expected to identify the core business actors, supporting business, supporting institutions and related businesses followed by the analysis of human research needs.

2. Positioning of Telematics Business Group

The position of Telematics Business Group is required as the second step of determining development strategy. The General principle is maps to the role of the forward, leverage (upward), and weight (downward) of the driving factor. The analyzed factors are taken from *Multi Sector Qualitative Analysis* (*MSQA*), as with table 1. Babiak and Thibault (2009) states

that by using the Cross MSQA is able to test the challenges of *Partnership* between groups of organizations in Canada through the level of partnership in the public, non-profit and commercial sectors.

Table 1. Criteria Group and Sub-Criteria for Establishing Telematics Services Business Groups

Number	Kelompok Kriteria	Sub- characteristics
1	Domestic economic power	(1) Sectoral performance of telematics, (2) Contributions to economic activity/dynamics of economic activity, (3) value-Added activity/multiplier effect.
2	Trade orientation	(1) Domestic market, (2) export market, (3) trade barriers, (4) Competition efforts.
3	Technology and development	(1) Research and development support , (2) industrial centers, both telematics and other industries, (3) the ability to adopt telematics technology
4	Human resource development	(1) Training of telematics Field Support, (2) Local skills, (3) Labour availability
5	Management	(1) Association/Institutional Networks, (2) marketing capabilities, (3) Entrepreneurship, (4) Information systems,
6	Financial	(1) Source of financing, (2) Investment opportunity
7	Government	(1) Climate of Business (regulation), (2) Business support schemes, (3) coaching.
8	Infrastructure	(1) Transportation facilities and infrastructure, (2) product distribution, (3) Communications, (4) energy, (5) utilities, (6) Waste and environmental management.

Given the large number of telematics businesses, especially for SMEs telematics which reaches 2.6 million businesses, observations are made through sampling techniques. The sampling technique chosen was Purposive Sampling which were adjusted to the results of observations and in depth interviews with business associations in the field of telematics, with the number of respondents determined at 104 samples. At this step, the field survey was conducted to telematics SMEs/SMIs through observation and in depth interviews to telematics associations in Jabodetabek.

To facilitate the assessment, the factors in MSQA are grouped into four positioning factors which then produced Classified MSQA as Table 2. The next assessment uses Beyesian weighting criteria to determine the positioning of each group of telematics SMEs/SMIs. The MSQA collection method uses the principle of Expert Acquisition with questionnaire guidance.

Table 2. *Classified* MSQA to determine the positioning factor of telematics industry group in Indonesia

DRIVING FACTORS (FORWARD FACTORS)	1. Domestic economic power (contribution to GRDP) 2. Human resource development (support skill) 3. Technology and development (the existence of the people center) 4. Trade Orientation (Market Availability) 5. Infrastructure (support Infrastructure)	1. Financial (Capital limitation) 2. Technology and development (Mastery and technological proficiency) 3. Trade Orientation (limited Market access) 1. Infrastructure (No infrastructure) 2. Management (less Institutional support) 3. Human resources Development (Human resource constraints)	BACKWARD FACTORS
LEVERAGE FACTOR (UPWARD FACTORS)	1. Domestic economic power (potential added value increase, providing multiflier Effect) 2. Human resource development (Labor absorption) 1. Trade Orientation (has export prospects) 2. Government (open expansion opportunity business) 3. Technology and Development (National Research Institute Support)	1. Trade orientation (increased competition and substitution products) 2. Government (regional/National Policy change) 3. Technology and Development (Innovation Pace)	DOWNWARD FACTORS

The four-factor assessment will place each group of telematics Small and Medium Industries/MSMEs into a converted quadrant of 4 (four), where each quadrant requires a distinctive development strategy:

1. Quadrant 1, the driving factor and dominant lever, then the Expansive strategy is chosen
2. Quadrant 2, The dominant driving factor, selected Proactive strategy
3. Quadrant 3, The dominant lever factor, chosen Consolidative strategy
4. Quadrant 4, Dominant inhibiting and ballast factors, chosen defensive strategy.

3. Development Strategies of Telematics SMEs/SMIs

Strategic management as an art and knowledge for formulating, implementing, and evaluating cross-functional decisions that enable organizations to achieve their goals. The strategy management process consists of the following three stages: 1) Formulating a strategy (strategy formulation), 2) Strategy implementation, 3) Strategy evaluation. Strategy can be defined as a set of arrangements designed to ensure the long term. The business strategy is based on "House of Orientation". Reference to compile long-term road map is vision, mission, values, and core competencies (Parbalene, 2012).

The characteristics of business groups can be explored in various ways including through the formulation of clustering-based strategies (Hadighi, 2013). According to Lee (2011) because the field of telematics is laden with the development of innovation, then the determination of strategic decisions in this field can be done through a clustering approach to a variety of existing technologies based on their growth patterns and the interrelations between these technological innovations (Tsui, 2010). This is expected to help stakeholders understand

the characteristics of existing industries or business groups, and analyze the prevailing innovation process.

RESULTS AND DISCUSSION

The assessment of the four groups of factors, criteria and sub-criteria was carried out by involving a number of experts as resource persons. Weighting is conducted by the Beiyes principle per criterion, so as to produce an accumulation of calculation results on all four factors (driving, blocking, levering, and ballast). The results of these calculations are presented in Table 3.

Telematics SMEs/SMIs Group as stipulated in the Regulation of the Ministry of Industry No. 64 M-IND/PER/7/2011 is mapped into four quadrants. The results of the mapping are shown in Figure 4.

Table 3. Accumulated results of the assessment of the position of telematics SMEs/SMIs in Indonesia

Numbers	The group of telematics Small and Medium Industries / MSMEs	Horizontal Factors		Vertical Factos	
		Forward	Backward	Upward	Downward
1	Office equipment	2,853	2,603	3,440	3,358
2	Software	2,624	2,793	2,711	2,567
3	Animation	2,235	2,254	1,903	3,500
4	Games	2,558	2,410	2,348	3,475

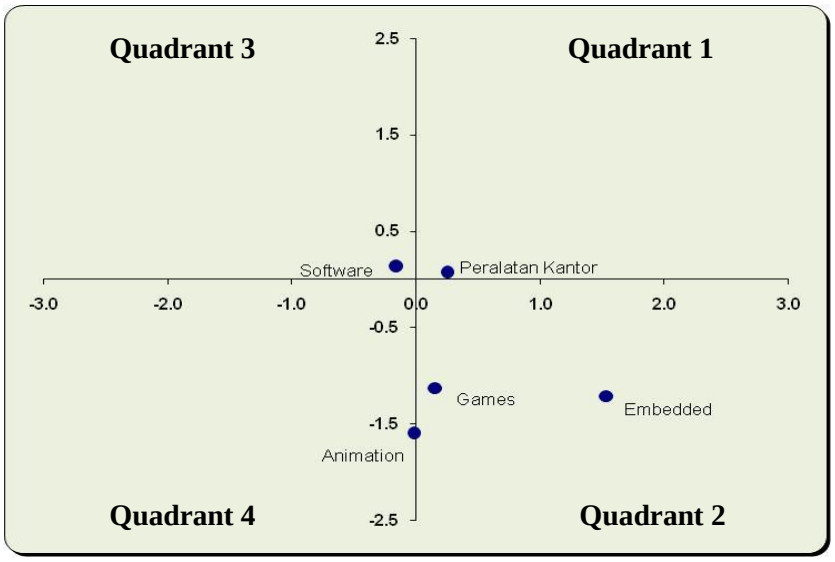

Fig. 4. Map of Group of Indonesia's telematics SMEs/SMIs

The SMEs/SMIs of Telematics Office Equipment fall into quadrant 1, so an expansionary strategy is chosen. The development of SMEs/SMIs Telematics Office Equipment actually follows the development of its large industry, becoming part of the supply

chain. A number of office equipment industry parts and components can be managed by SMEs/SMIs.

The SMEs/SMIs Games and Embedded groups fall into quadrant 2, where the vertical factor is weak. The strategy that must be chosen is a proactive strategy, especially to increase promotion and increase product competitiveness. Players in the Games and Embedded industry groups are pretty much attempted by Small and Medium Industries/MSMEs.

The SMEs/SMIs Software Group fall into in quadrant 3, meaning that the horizontal factor is weak. The chosen strategy is Consolidative, which is to reform the driving factors. Players of the Sofware industry group are large companies and Small and Medium Industries / MSMEs.

The SMEs/SMIs Animation Group is included in quadrant 4, where both vertical and horizontal factors are weak. The strategy that needs to be developed is defensive, which is to stay in competition. The Small and Medium Industries / MSMEs Animation group is closely related to large industries, as the results of the study of Tosida et al. (2012). Some draft strategies that can be developed for the four quadrants are summarized in Table 4.

Table 4. Collection of strategies for developing Indonesian Small and Medium Industry / MSMEs Telematics

Quadrant 1 (Expansive Strategy)	1. Increased Production 2. Market Control 3. Strengthening the supply chain 4. Development of Industrial Clusters	1. Kebijakan Penanaman Modal 2. Membangun Sinergi dalam rantai pasok 3. Promosi intensif 5. Inovasi dan diversifikasi produk 6. Program Standardisasi/Sertifikasi	Quadrant 2 (Proactive Strategy)
Quadrant 3 (Consolidative Strategy)	1. Enhancing human resources skills 2. Increased infrastructure support 3. Improving the business climate through government policy 4. Improvement of education, training and professional certification facilities 5. Research institute support	1. Enhancing professional education, training and certification facilities 2. Research institute support 3. Strengthening the domestic market 4. Control of production costs	Quadrant 4 (Strategy Defensive)

Indonesia's Ministry of Industry (2011) Generally designed a development strategy consisting of four steps :

1. Harmonization of government policies and programs to encourage the development of the telematics industry;
2. Expansion of domestic market access as a foundation for development
3. Development of telematics industry in potential areas
4. Strengthening the competitiveness of the national telematics industry.

The strategy is presented in Figure 5, but it is not specific to the Small and Medium Industry/MSME Telematics.

Figure 5. Strategy for developing the telematics industry in general (Ministry of Industry, 2010)

The Ministry of Industry has empowered the Small and Medium Industry Centers through institutional strengthening, facilitation of the use of the latest technology, facilitation to increase the Technical Service Unit (UPT), assistance of Field Extension Workers (TPL) as well as development and revitalization through the Special Allocation Fund (DAK) to 1,852 Small and Medium Industry Centers it fostered in 2016. For the development of Small and Medium Industry products, in 2017, mentoring and facilitation programs were held for the application of standardization and certification, IPR registration and improvement of packaging and brand design to 3,865 SMIs. Meanwhile, the realization of small business softloans (KUR) for Small and Medium Industries in 2017 reached Rp4.14 trillion for 187,871 business units. In fact, in enhancing the competitiveness of the Small and Medium Industries, the Ministry of Industry is implementing a restructuring program for Small and Medium Industry machinery and equipment in the form of investment financing schemes for the purchase of machinery and equipment to 67 Small and Medium Industries. Furthermore, facilitating market expansion through product promotion and marketing for 486 Small and Medium Industries.

Specific strategies to increase human resources in the national telematics industry are not elaborated, yet it constitutes an important strategy in developing small industries. According to the research of Tosida et al (2014), education in telecommunications and information technology has become one of the focuses of the development of the telematics services business sector in Indonesia. The portrait taken by Bekraf RI (2016) shows that

57.2% had a senior high school degree and around 6.7% had a diploma and above. The competency of human resources working at SMEs/SMIs Telematics needs to be increased so as for them to gain recognized certification.

The National Economic and Industrial Committee (KEIN) is preparing a road map for the industrialization of 2045 in the field of creative and digital economy. The road map will be divided into three stages, namely focus on industrial development (2017-2025), expansion stage (2026-2035), and acceleration stage (2036-2045).

CONCLUSIONS

The telematics industry is one of the mainstay in the national industry development policy. The telematics industry is also included in the nine development priority SMEs/SMIs. The telematics industry has even become part of the creative industry which absorbs no less than 13,000 workers.

The national telematics industry is grouped into five groups namely the office equipment, software, animation, games and embedded industries. The industry that has developed rapidly in Indonesia is office equipment. The development strategy of telematics SMEs/SMIs is arranged based on the industry's position in its strength map. The five industries have been mapped into 4 quadrants.

The office equipment industry is included in quadrant 1, including the sturdy industry, with an expansive strategy of increasing production and market share. The game and embedded industry entered quadrant 2, the strategy developed was proactive, strengthening promotion and innovation. Software industry is in quadrant 3, the strategy developed is consolidative, such as strengthening human resources, infrastructure, and business institutions. While the animation industry enters quadrant 4, the strategy developed is to survive, namely managing the efficiency of production costs, strengthening the domestic market, and increasing the competence of human resources.

Human resource development receives special attention in the development of telematics Small and Medium Industries/MSMEs. Human resource skills in the telematics business may not be doubted, but the recognition of competence is a differentiating factor in efforts to provide quality assurance for customers. Human resource development strategies need to be further developed for telematics SMEs/SMIs, including strengthening vocational programs in telematics and competency certification.

ACKNOLEDGEMENTS

1. **DRPM Ministry of Research, Technology and Higher Education of the Republic of Indonesia,** as the PKPT Grant that has been given for the main funding of this research
2. **Computer Science Department, Faculty of Mathematics and Natural Sciences, Universitas Pakuan,** as the

support of the overall research process and the provision of laboratories for data processing and analysis

3. **Agricultural Industry Technology Study Program (TIN) IPB & Computer Science IPB,** as a Supporting Research Team (TPM) on this PKPT.
4. **Research and Community Services Institute, Universitas Pakuan,** for its coordination and facilitation support for obtaining research funding grants
5. **The Ministry of communication and informatics, the Ministry of Industry, the Ministry of Cooperatives and SMEs, the Central Statistics Agency, 200 Vocational Schools in Jakarta greater area** and the resource persons for their cooperation in the process of data and knowledge acquisition for this research.

REFERENCES

Albright SC, Winston W. 2015. Business Analytics : Data Analysis and Decision Making. Cangage Learning, Stanford, USA.

Arvanitis S, E. Loukis, V. Diamantopoulou.2013. The effect of soft ICT capital on innovation performance of Greek firms.*Journal of Enterprise Information Management, Vol. 26 Iss: 6, pp.679 – 701*. Emerald Group Publishing Limited. 10.1108/JEIM-07-2013-0048 (Permanent URL).

Babiak, K & L. Thibault. 2009. Challenges in Multiple Cross-Sector Parterships. Journal of Nonprofit and Voluntary Sector Quarterly, Vol. 38, No. 1, p. 117-143.

Bekraf. 2016. Data Statistik dan Hasil Survai Ekonomi Kreatif, Kerjsama Badan Ekonomi Kreatif dan Badan Pusat Statistik RI. Laporan Bekraf, Jakarta.

Departemen Perindustrian RI. 2010. Roadmap Industri Telematika. Laporan Kegiatan. Pusdatin Deprin, Jakarta

Jones, P. 2011. ICT impact within the SME sector.*Journal of Systems and Information Technology*, Vol. 13 Iss: 2. http://www.emeraldinsight.com/journals.htm?issn=1328-7265&volume=13&issue=2&articleid=1923974&show=html. Wednesday March 26th,2014.

Kemenkominfo RI. 2016. Penyusunan Roadmap Pembangungan Sektor TIK yang Mengikat Secara Jangka Panjang s.d. 2045 Menuju 100 Tahun Indonesia Merdeka. Puslitbang Sumber Daya, Perangkat dan Penyelenggaraan Pos dan Informatika, Balitbang SDM, Kemenkominfo. Jakarta.

Kemenkop UKM. 2014. Deputi Bidang Pembiayaan. 2014. Pengembangan kebijakan dan program pemberdayaan UMK di bidang pembiayaan : Laporan tahunan Deputi Bidang Pembiayaan. Kementerian Koperasi dan UKM Republik Indonesia. Jakarta (ID).

Kemenperin RI. 2016. Kebijakan Pengembangan Industri Eletronika dan Telematika. *Laporan*. Direktorat Industri Elektronika dan Telematika, Direktorat Jenderal Industri Unggulan Berbasis Teknologi Tinggi.

Kim M. dan I. Han. 2013. The discovery of experts' decision rules from qualitative bankruptcy data using genetic algorithms. Expert Systems with Applications 25 (2013) 637–646.

Kowalkowski, C., D. Kindström, H. Gebauer, 2013. ICT as a catalyst for service business orientation.*Journal of Business & Industrial*

Marketing, Vol. 28 Iss: 6, pp.506 – 513. Emerald Group Publishing Limited.

Lee Hyoung-joo, Lee Sungjoo, Byungun Yoon. 2011. Technology clustering based on evolutionary patterns : the case of information and communications technologies.J. Technological Forecasting & Social Change, Vol. 78. (2011) 953-967. Elsevier.

Porter, M.E. 2007. Strategi Bersaing, Teknik menganalisis industri dan pesaing (Edisi Indonesia). Karisma Publishing Group, Tangerang.

Perkusich M, G Soares, H Almeida, A Perkusich. 2015. A procedure to detect problems of processes in software development projects using Bayesian networks. Expert Systems with Applications 42 (2015) 437-450.

Parlabene L. 2012. A business model analysis of Robert Bosch.Strategic International Management.Munich, GRIN Publ.

Tosida, ET., P. Harsani, Hermawan, dan S. Setyaningsih. 2012. Classification Models of Information Technology Services Business in Indonesia. *Proceed.* International Seminar on Science & Technology Innovation 2012. Jakarta 2-4 Oktober 2012.

Tosida, ET. S. Maryana, dan Hermawan T. 2014. *Proceed.* Seminar nasional Teknologi Informasi, Komunikasi dan Manajemen. Palembang 23 Agustus 2014.

Tosida ET, S Maryana, H Thaheer, F Arrahman. 2015. Visualization Model of Small and Medium Enterprises (SMEs) Telematics Services Potentiality Map in Indonesia. Proceedings of 2015 International Conference on Information & Communication Technology and Systems (ICTS), ITS, September 16th 2015.

Tosida ET, S Maryana, H Thaheer, . 2016. Implementation of Self Organizing Map (SOM) as Decision Support : Indonesian Telematics Services MSMEs Empowerment. IORA International Conference Operation Research, Bogor, August 27, 2016. IOP Series (http://iopscience.iop.org/issue/1757-899X/166/1)

Tosida ET, Maryana S, Thaheer H. 2017. Implementation of Self Organizing Map (SOM) as decision support : Indonesian telematics services MSMEs empowerment. IOP Conference Series : Materials Science and Engineering 166 (1), 012017. IOP Publishing. http://iopscience.iop.org/article/10.1088/1757-899X/166/1/012017/meta.

Tosida ET, Hairlangga O, Amirudin F, Ridwanah M. 2018a. Appication of Decision Rules for Empowering of Indonesian Telematics Services SMEs. IOP Conference Series : Materials Science and Engineering 332 (1), 012018. IOP Publishing. http://iopscience.iop.org/article/10.1088/1757-899X/332/1/012018/pdf.

Tosida ET, FD Wihartiko, I Lumessa. 2018b. Learning Vector Quantization Implementation to Predict The Provision of Assisstance for Indonesian Telematics Services SMEs. International Journal of Engineering & Technology, Vol. 7 No 3. 20 (2018) : Special Issue 20. https://www.sciencepubco.com/index.php/ijet/article/view/20576/9659.