An Integrated Artificial Intelligence and Resource Base View Model for Creating Competitive Advantage

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ABSTRACT

Objective – The performance of MSMEs (Micro, Small, and Medium Enterprises) is one of the main indicators to increase Indonesia's economic growth. The contribution of Indonesia's MSMEs is low in the global market and the lowest in ASEAN. One of the ways to increase the contribution is to create the value of competitiveness product. Management of resources is needed to provide high-quality products and competitive advantage of the company. This study aims to examine the combination of resources of the company through the Resource Base-View (RBV) approach.

Methodology/Technique – A mix research method was employed, utilizing multiple criteria decision making as the analysis method and the Analytical Hierarchy process (AHP) as the instrument tool of the analysis. The respondents were 100 MSMEs in Pontianak.

Findings – The criteria were determined by RBV Concept and the characteristic of company resources. The combination was the sequence level of the weight of the resources. The study also formulated the integration of the Artificial Intelligence and RBV model. The results of the study indicated that human resource is as the highest priority of company attention and the following sequences are marketing and distribution, finance and funding, operational and production, and the internet usage and technology.

Novelty – The study also resulted in the creation of the RBV-AI Framework model to obtain strategic resources maintaining the competitive advantage of the company.

Type of Paper: Empirical.

Keywords: Artificial Intelligence (AI), Resource Base-View (RBV), MSMEs.

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JEL Classification: M15, O32

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1. Introduction

Development is a process of the amendment that includes various fundamental changes in social structure, attitudes of citizens, national institutions, economic growth, and all aspects of state life (Todaro & Smith, 2017). Poverty is still the biggest obstacle to the development process because of the inability of the population to obtain sufficient income to meet their daily needs.

One way the government can address this problem is to implement sustainable development (United Nations (UN) Sustainable Development Goals (SDGs) program, which has 17 goals and 169 targets (Suresh & Johnson, 2015)). At SDGs, all objectives were interconnected, so success at one goal will solve problems at another (UNDP, 2016). The performance of MSMEs (Micro, Small, and Medium Enterprises) is one of the main indicators to increase Indonesia's economic growth. The MSMEs have to contribute to the economic growth especially in export trade. Export performance has been concerned by the Indonesian government to aim for economic development. This statement can be seen from the steps issued by the Financial Services Authority (OJK) Policy Package in boosting exports and accelerating economic growth (Fauzia, 2018). Another step was carried out by creating a policy package XVI from the Government of Indonesia related to the export-import trade system that functions to facilitate business licensing and import of industrial raw materials. The government had also taken steps to create a volume XVI economic policy package related to the export-import trading system that serves to facilitate business licensing and the import of industrial raw materials.

The policy package was taken to increase the value of the trade balance which is still relatively small so that it has an impact on the condition of Indonesia's economic growth (Kontan, 2018). Based on data from BPS (Central Statistics Agency), the value of Gross Domestic Product (GDP) in 2011-2015 fallen sharply from its original value which ranged from 6.2% to 4.8% (BPS, 2018). Then in 2016 and 2017, GDP showed a slight increase of 5% and 5.1%. Historical data on economic growth in the past 7 years are displayed in the Figure 1.
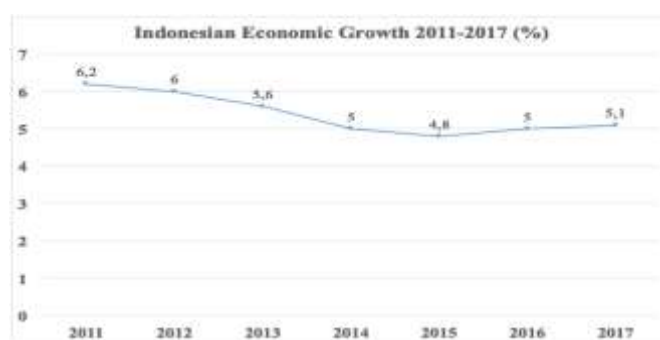

Figure 1. Indonesian Economic Development

Source: Kontan, 2018

Indonesia's macroeconomic environment in recent years had been quite supportive of increasing economic growth. Figure 1is Indonesia's macroeconomic condition in the last 8 (eight) years below (Indonesian Ministry of Domestic Affairs, 2018):

Table 1. Indonesia's Macroeconomic Environment

Year	Balance of Trade (BoT)	Inflation Rate (%)	Exchange Rate Rp to $ US
2011	US$ 26.061	5.4	8.773
2012	US$ -1.669	4.3	9.419
2013	US$ -4.077	8.4	11.563
2014	US$ -1.886	8.4	11.800
2015	US$ 7.672	3.4	13.389
2016	US$ 9.553	3.0	13.309
2017	US$ 11.843	3.6	13.381
2018	US$ -8.699	3.2	14.500

29

J. Bus. Econ. Review 5 (1) 28 – 37 (2020)

The focus of the research is MSMEs in Pontianak City because of the miscellaneous export products that are essential and quite diverse. In general, it can be said that the more types of goods production provided by a country can encourage more exports. Based on data from the Department of Industry and Trade (Disperindag) of West Kalimantan, the number of MSMEs in Pontianak City is quite large with a total of 5414 MSMEs spread in six districts. Pontianak City is a district that has the highest number of MSMEs with 43.92%. The following figure is a diagram of the percentage of MSMEs in Pontianak below:
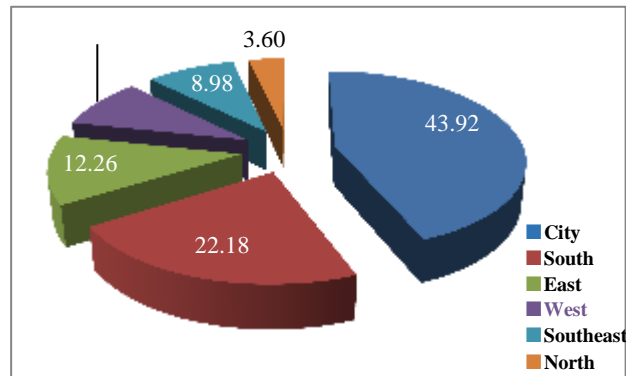

Figure 2. Percentage of MSMEs in Pontianak City (6 districts)

Source: West Kalimantan Industry and Trade Agency (Disperindag), 2019

Based on the background, the formulation of the problem can be taken as follows: what strategic resources are owned by MSMEs to encourage competitive advantage, the order of strategic resources owned by MSMEs and Artificial Intelligence Design (AI) in the MSMEs RBV strategy with a focus on the sample of Pontianak City MSMEs. The purpose of this study was to find and assess the strategic resources needed by MSMEs and develop AI designs to collaborate with the RBV concept for MSMEs.

The study findings can be useful to help MSMEsin making business decisions by managing strategic resources. The owners of MSMEs can use the RBV concept to determine which resources that must be highlighted and developed properly. The other contribution of the study is an integrated RBV-AI model can determine which the company resources will be development priority. The RBV concept for MSMEs will be collaborated with AI to foster the businessin dynamic economic and business environment.

1. Literature Review

2.1. MSMEs Growth and Competitive Advantage

The scope of MSMEs in Indonesia was limited to domestic consumption, while the focus of Indonesian export-oriented MSMEs was very minimal (Akbar, 2018). The cause of the lack of export orientation of MSMEs was the limited information and market promotion and the lack of technical ability to produce good quality products (Wibowo, 2017). As a result, the contribution of MSMEs to GDP in Indonesia has only been around 60.34% in the last five years and has caused a slowdown in the country's economic development. The following conditions were inversely proportional to the number of internet users in Indonesia, which reached 143.26 million (AAPJI,2017). According to data from the Indonesian Ministry of Cooperatives and MSMEs, 3.79 million MSMEs in Indonesia have been online and are expected to increase annually (Ministry of Cooperatives and MSMEs,2017).

One way to create export competitiveness is the need to empower strategic resources within companies to create products with competitive advantages and international standards. Porter (1985) in Hao (2000) stated that competitive advantage grows fundamentally from the value that can be created by companies for buyers

30

that exceeds the cost of the company in creating it. There are two basic types of competitive advantage, namely: cost advantage (cost leadership) and differentiation. Sigalas, Economou, & Georgopoulos (2013) stated that a company has a competitive advantage if it can create more economic value than marginal competitors (break-even points) in its product market. Ahmad (2015) explained knowledge and related approaches to utilize intelligence from that knowledge to rely on unique resources such as skilled people and quality data found in organizations.

2.2. Resource Base-View Concept with AHP

The considered effective approach in producing the product is the Resource Base-View (RBV). Barney (1991) in Shannassy (2008) developed insights on resource base-view (RBV) and connected RBV more closely to the concept of competitive advantage and criticizes Porter's competitive advantage. Barney developed the RBV concept with a Value Resources framework, Rare, Imperfect Imittable, and Organizationally Embedded. The framework is abbreviated VRIO. Barney also proposed the RBV framework, namely: Value, Rare, Imitability, and Non-Substitutability.

Based on empirical reviews, both of these uses can create competitive advantages effectively and efficiently to be applied by MSMEs. Shannassy (2008) found certain business environment elements such as strong competition, regulatory changes, and technological improvements. These elements can act as a catalyst to stimulate the development of strategic resources in the company, helping the company achieve and maintain a competitive advantage with implications for future organizational performance. Clulow et al. (2007) in Panda & Reddy (2016) found that RBV is related to customers where customer value greatly contributes to real and unreal company resources and competencies.

The embedded AHP in RBV aims to analyze the company resources which will be set as the strategic resources. AHP is the multiple-criteria decision making concept to determine many criteria of terms. (Rasli et al., 2016) conveyed that AHP is one of the multi criteria evaluation techniques that have been widely accepted by industries for solving support decision systems. AHP enables the calculation of relative weight or importance of each of the parameters considered in the analysis by comparing the parameters to each other (Saaty, 1990). Both qualitative and quantitative measures can be considered in the process of selecting the best alternative from a number of choices of multiple criteria

2.3. Artificial Intelligence in RBV

Companies can exploit resources that cannot be replicated by companies because they do not have unique historical paths so they cannot obtain the resources needed to implement their strategies (Darcy, Hill, McCabe, & McGoven, 2014). Rockwell (2019) stated that RBV has limitations related to company heterogeneity and resource immobility. Through these two export product criteria, RBV and technology collaboration are needed. One such potential technology is Artificial Intelligence. Brynjolfsson and McAfee (2017) in Hirsch (2018) stated that machine learning in all contexts of Artificial Intelligence (AI) changes the relationship between humans and machines in a more integrated way.

The use of the RBV's point of view enables MSMEs to identify the growth and operation of areas that are currently considered to be inappropriate and timely for their interventions. Stone et al (2016) in Hirsch (2018) in the book "One Hundred Year Study on Artificial Intelligence" found a good answer to describe the role of AI. Stone tries to model the potential contribution of machines by human-driven and internet of things that produces sensor description data from every device we use. Haddoud, Jones, & Newbery (2018) found two groups of resource combinations from 103 samples of exporters.

31

J. Bus. Econ. Review 5 (1) 28 – 37 (2020)

3. Research Methodology

3.1. Research Design

This research uses a mix-method to explain MSMEs' export performance by using analytical tools in the form of the Analytical Hierarchy Process (AHP) and making the initial design of RBV-based AI. The research sites were six (6) sub-districts in Pontianak City. The object of the study is particularly MSMEs that have an export orientation. The number of samples in this study was 100 MSMEs. The research sample criteria in this study were as follows: 1) MSMEs producing commodities and finished goods, and 2) MSMEs considered to have the potential to export within the next five years.

3.2. Data and Analysis

The MSMEs data were collected through questionnaires. The next steps were analyzing the MSME strategic resources, crafting an export strategy as a result of the questionnaire assessment, and creating an RBV-based AI model. The respondents were 100 MSMEs in Pontianak. The variables of research were adopted from the Barney framework, namely the RBV component. It consists of value, rare, imitability, and non-substitutability. The following is a brief explanation of 4 points of view based on Barney (1986) in Sanchez (2015):

1. Value - the resource that can produce a product that is of value to consumers.
2. Rare - the resources with limited supply.
3. Imitability - the resources that are difficult for other companies to replicate.
4. Non-Substitutability - irreplaceable resources.

In analyzing the data, the development of the RBV model to search for the company's strategic resources was utilized, and the data were then analyzed by AHP analysis tools. The next step was to describe the steps of MSMEs to create competitive export value and create a model of developing Artificial Intelligence (AI). RBV values (Value, Rare, Imitability, and Non-Substitutability) was assisted by AHP analysis. The analysis technique is possible in creating an analysis of decision making. The working principle of AHP is to simplify a complex problem that is not structured, strategic, and dynamic into its parts, and arrange in a hierarchy (Saaty, 2003). The steps in qualitative analysis in this study consisted of 4 steps, as follows:

1. Assessing company resources using a questionnaire based on differential semantic scale (1-5).
2. Finding the company's strategic resources using the AHP analysis tool which is the development of the RBV model
3. Describing the steps of MSMEs related to creating value of export competitive advantage
4. Creating an Artificial Intelligence (AI) development model.

4. Results

4.1 Data Tabulation

The first data obtained from the survey is to discuss the export will of MSMEs. Of the 100 samples studied, 77 MSMEs wanted to export and 23 MSMEs did not carry out export activities. Based on these results, it was discovered that the export interest of MSMEs in Pontianak City is quite high.

The results of the tabulation of data from respondents can be seen in Table 2. The table shows the choices of MSMEs in Pontianak related to the selected resources. Based on these results, the first resource choice refers to human resources with a total of 28 answers. Then, the second resource choice leads to marketing

32

J. Bus. Econ. Review 5 (1) 28 – 37 (2020)

and distribution with a total of 24 answers. Furthermore, the third resource choice leads to finance and funding with a total of 21 answers. The fourth resource choice refers to the operational and production section with a total of 20 answers. And the fifth resource choice leads to internet usage and technology with a total of 19 answers. The tabulation results with the highest number of entries were analyzed by using the AHP technique. Selected resources were human resources (as the resource 1), marketing and distribution (as the resource 2), finance and funding (as the resource 3), operational and production department (as the resource 4), and internet usage and technology (as the resource 5).

The five selected resources are critical indicators of MSMEs to develop their businesses to achieve export-oriented competitiveness. Human resources become the most strategic resources because these resources are chosen by most MSMEs

Table 2. The Resources Choice Priority of MSMEs

Resources	1st Choice	2nd Choice	3rd Choice	4th Choice	5th Choice
Operational and Production	15	16	16	20	14
Innovation	6	11	7	11	10
Network Coverage	3	5	5	13	15
Finance and Funding	16	10	17	17	10
Marketing and Distribution	23	24	21	13	8
Internet Usage And Technology	9	8	7	6	19
Human Resources	28	23	14	7	6
Reputation	0	3	13	13	18

The Table 3 illustrates the accumulated number of questionnaire scores based on value, rarity, imitability, and non-substitutability. From the final results, it is clearly seen that resource 1 has a greater total score rather than other resources.

Table 3. The RBV's Score

Resources	Value	Rare	Imitability	Non-Substitutability
Resource 1 (Human Resource)	330	214	275	319
Resource 2 (Marketing and Distribution	283	206	243	263
Resource 3 (Finance and Funding)	175	143	148	167
Resource 4 (Operational and Production)	218	174	193	205
Resource 5 (Internet Usage and Technology)	199	152	185	195

4.2 The Weighting Score of Resources

The resources choices were measured based on criteria. Resources have a weighting score based on four research variables (value, rare, imitability, and non-substitutability). The measurement results for determining strategic resources are in Table 4. And the next steps, the hierarchy of resources was determined by the sequence of the total score of resources.

33

J. Bus. Econ. Review 5 (1) 28 – 37 (2020)

Based on the results in Table 4, human resource is the strategic resource that has to be prioritized to develop by MSMEs in Pontianak City. Finance and funding which have the smallest score are the last strategic resources needed to be developed by MSMEs. Marketing and distribution become the second priority of strategic resources to be developed. The sequence of strategic resources is based on the results of the AHP analysis, as follows: 1) Human Resources, 2) Marketing and Distribution, 3) Operational and Production, 4) Internet use and technology, and 5) Finance and Funding

Table 3. The AHP's Results

Resources	Weight				Total Score	Rank
	Value	Rare	Imitability	Non-Substitutability		
	0.54	0.04	0.13	0.29		
Resource 1 (Human Resource)	177.96	9.37	35.31	92.04	314.68	I
Resource 2 (Marketing and Distribution	152.61	9.02	31.20	75.88	268.72	II
Resource 3 (Finance and Funding)	94.37	6.26	19.00	48.19	167.82	V
Resource 4 (Operational and Production)	117.56	7.62	24.78	59.15	209.11	III
Resource 5 (Internet Usage and Technology)	107.32	6.65	23.76	56.26	193.99	IV

Operations and production are considered more strategic to develop compared to the use of the internet and technology and finance and funding. There are three strategic resources that become development priorities, namely human resources, marketing and distribution, and the operational and production department. The weighting score for AHP analysis is dynamic. Therefore, a change in score will be possible if there is a change in the business environment. Changes in company resource data encourage MSMEs to adjust business strategies at any time.

4.2 The Integration Model of RBV and Artificial Intelligence

Based on the results of data processing, it is obtained that the company's resources have to be the priority of company management. The data for each MSMEs will change every time, therefore the company decision making will also vary to deal with changes in the business environment. Data company resources that are collected every time will form big data called Big Data. Information on business decision making is obtained from Big Data. To support this process, AI is required to produce business information for companies.

AI model is a design to use AI to support corporate data processing that aims to produce business information. AI is used to identify company resources that are strategically developed going forward. The development phase of the design into a prototype will be carried out in further research. The AI Model design in collaboration with the RBV concept can be seen in the Figure 4.

Management of MSMEs' resources have become a necessity to create competitiveness. The role of AI helps MSMEs in making business decisions quickly and accurately. MSMEs are unnecessary to wait for data

34

to be collected and then processed to produce business information. MSMEs can obtain business information on which decisions can be taken quickly. Research Bottani et al. (2019) found the application of ANN (Artificial Neural Networks) has the potential to reduce economic losses due to out of stock up to 56 percent for wholesale distribution companies. AI's contributions to business activities are reducing losses, cost efficiency and accuracy of business decisions.
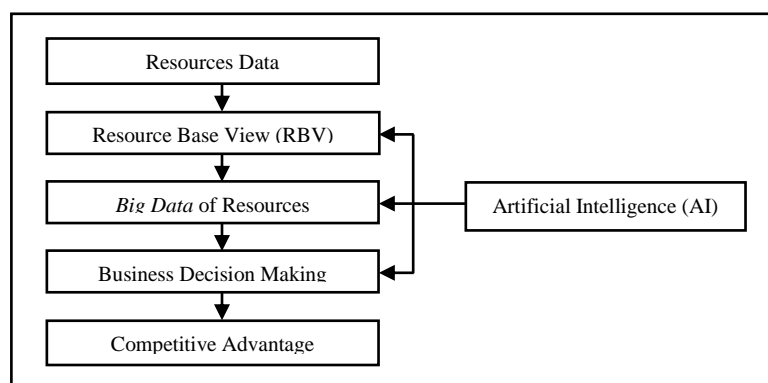

Figure 4. The Integration Model of RBV and AI

5. Discussion

MSME's strategic resources in Pontianak City which are the main priority in development are human resources. These results support the statement of the definition of human resources that is someone who is ready, willing and able to contribute to the achievement of organizational goals (Rivai, 2004). Human resources are the drivers of the organization in the activities of product input and output, both at various levels of management such as top-level management, middle-level management, and first-level management. This essential factor is supported by the results of AHP analysis scores placing human resources as the first resource choice. The view of the role of crucial human resources becomes the main reference for Pontianak City SMEs in carrying out business activities, so the AI model that contains the main strategic resources must be based on the condition of its human resources first.

AI is considered as a solution to helping the process of MSME export activities. Empirical studies prove that AI plays an important role in the development of strategic resources. Buckner (1993) stated that Japanese managers increasingly place a high priority on synergizing both human resource development and information technology using Artificial Intelligence techniques. But in a condition, AI requires the role of big data to make decisions even though it returns to managers in formulating new strategies (Rialti, Marzi, Ciappei, & Busso, 2019).

6. Conclusion

Based on the analysis and discussion it can be concluded that the interest of MSMEs in Pontianak to export is relatively large based on survey data. Marketing and distribution resource is the resources with the highest number of questionnaires compared to other resources. However, human resource is the top priority of MSMEs which must be managed well to achieve competitive advantage. Marketing and distribution are the second resources of concern for MSMEs. The operational and production part is the third priority; the use of the internet and technology is the fourth priority; and finance and funding are the fifth priority.AI

35

J. Bus. Econ. Review 5 (1) 28 – 37 (2020)

collaboration in the RBV concept is indispensable for generating business decisions using big data resource companies. Design AI models with RBV are designed to produce prototypes for further research. The collaboration of the RBV-AI Framework model to obtain strategic resources maintaining the competitive advantage of the company. The model will be improved for the next study to foster MSMEs in dynamic economy and business environment.

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37

J. Bus. Econ. Review 5 (1) 28 – 37 (2020)