



Enhancing Operational Performance of Indonesia Pine Chemical Industry Through Delivery Improvement

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ABSTRACT

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Pine chemical products, namely gum rosin and turpentine oil have become one of the main exported non-timber forest products (NTFPs) from Indonesia. As the biggest pine chemical producer in Indonesia, a State Owned Enterprise named Perum Perhutani is required to operate at its optimum capability. Hence, this study aims to identify and measure some dimensions of operational capability that have the most influence on increasing the export performance of Perhutani. The data are collected through online survey from 207 Perhutani employees who work in pine chemical production lines. Four-point Likert Scale questionnaires are employed to collect the data regarding respondent's perception on seven dimensions of operational capability, namely Cost, Quality, Delivery, Flexibility, Service, Innovation, and Sustainability. R statistics software is selected to run the tests. By adopting Tukey HSD, a multiple pairwise-comparison technique, Delivery is rated as the most important dimension to enhance export performance. It is significantly proven to have the highest mean score. Another finding indicates that Delivery is found to have fair to moderate correlation to other dimension which directly involved in supply chain activities, i.e. Cost, Quality, Flexibility, and Service. Therefore, this study demonstrates a need for Perhutani top management to set minimum and expected targets of some key indicators of Delivery performance such as on-time delivery, delivery accuracy, length of lead-time, and safe inventory level. The higher the rate of on-time and in-full (OTIF) delivery fulfilled, the higher the opportunity to achieve a better export performance of pine chemical products.

1. INTRODUCTION

Indonesia is a country that is rich in natural resources, one of which comes from the forestry sector. Indonesian tropical rain forests provide high organism biodiversity, both of flora and fauna. Tropical rainforest also provides crucial ecosystem services such as raw materials, soil protection, timber source, medicinal plants, carbon sequestration, and watershed protection [1-3]. Indonesia forest products are important to fulfill domestic and international demands. Based on the Minister of Environment and Forestry Regulation Number 8 of 2021 concerning Forest Management and Preparation of Forest Management Plans, as well as Forest Utilization in Protection Forests and Production Forests, forest products are classified into timber (TFP) and non-timber (NTFP). Both have important roles in increasing Indonesia's export value [4]. In 2019, the TFP (timber forest products sector), such as engineered wood & wooden furniture, contributed an export value of US\$ 5,038.89 million, while non-timber forest products (NTFP) amounted to US\$ 248.20 million. This particular NTFP export value denoted an increase of 16.81% in 2019 compared to the acquisition in 2018 of US\$ 212.49 million. Following the export commodity group classification released by Statistics Indonesia [5], NTFP is classified into agricultural commodities, which is separate from the TFP

group. Within the NTFP subsector there are several sub-categories, i.e. rubber gum, woven materials not made of bamboo and rattan, and other types of NTFP. The NTFP export value in 2018 and 2019 can be seen in Table 1 [5].

Table 1. NTFP export volume & value in 2018 & 2019

NTFP Commodity	2018		2019	
	Volume (Million Ton)	Value (Million US\$)	Volume (Million Ton)	Value (Million US\$)
Woven materials	0.70	1.33	0.84	1.18
Rubber gum	53.23	56.64	50.24	50.22
Other types of NTFP	2,037.28	154.52	2,902.24	196.81
Total	2,091.20	212.49	2,953.21	248.20

The export value of NTFP contributed 6.87% (US\$ 248.20 million) to the agriculture sector (US\$ 3,612.37 million), and 0.16% of the non-oil and gas total export value (US\$ 155.893.74 million). Although the contribution of NTFP is small compared to TFP products (3.23% of the non-oil and gas total export value or US\$ 5,038.89 million), the value of NTFP exports is increasing from year to year. Some important issues appear related to the contradictory of both products'

ecological, social, economic, and biological impacts. Timber production requires intensive capital investments, resulting in environmental damages, as well as disturbances to the remaining forest ecosystem. On the other hand, the impacts on the forest ecosystem of harvesting NTFP are much less than TFP [6]. Current regional authority to manage forest production and protection by the provincial government gives important roles in changing the administrative procedures and improving forest business practices in order to reduce deforestation, increase financial benefits, and enhance the community welfare [7].

Pinus merkusii is one of the tree species with great utilizations, either for its timber (TFP) or non-timber forest products (NTFP). As a source of NTFP, *Pinus merkusii* excretes oleum pine resin as the raw material to produce gum rosin and turpentine oil. Average yield of pine chemical product is about 70-80% for gum rosin and 15-25% for turpentine oil [8]. Both pine chemical products are widely used in the manufacture of soap, paints, waxes, adhesives, and various pharmaceutical products. Apart from Indonesia, *Pinus merkusii* also grows naturally in Vietnam, Cambodia, Thailand, Burma, India, and the Philippines [9]. Indonesia ranked third among the largest producers of gum rosin in the world after China and Brazil [10]. Gum rosin production volume by country is shown in Table 2.

Table 2. Global gum rosin production by country

Country	Volume (Tons)	Percentage
China	420,000	48.3%
Brazil	180,000	20.7%
Indonesia	80,000	9.2%
Vietnam	45,000	5.2%
Others	145,000	16.7%
Gum Rosin Total	870,000	100.0%

Perum Perhutani is a state-owned forestry enterprise, acts as a producer of most gum rosin in Indonesia with an average volume of 65,000 tons per year. Meanwhile, the turpentine volume production is about 14,000 tons per year (Perhutani Statistics Book, 2020). Perhutani's production is predicted around 81% of the total national gum rosin volume, remaining 19% ($\pm 15,000$ tons/year) produced by the private sector. In 2019, the total sales value of NTFP (export and local market) contributed around 40% to Perhutani's total revenue, of which 33% revenue was generated from export trading of gum rosin and turpentine oil and 7% from domestic market. From the other product lines, TFP contributed around 44% to the Perhutani's total revenue, while around 16% revenue was generated from ecotourism and agribusiness [11].

In relation to the large contribution of NTFP to Perhutani's total revenue, all pine chemical factories need to work with optimum operational capabilities in order to increase the company's profitability. According to the resource-based view-based approach [12], capabilities are defined as the company's ability to use its resources to improve organizational performance [13] and achieve organizational goals [14]. These resources can also be in the form of talent, skills, and technology that perform better than competitors, which are difficult to imitate and provide an advantage in the marketplace [15]. Based on some literature, there are four basic dimensions of operational capability, namely cost, quality, delivery and flexibility [16-20]. However, as markets, technology and social factors continue to change, three

additional dimensions emerged in the early 2000s, namely innovation, service, and sustainability [21-25].

This study aims to measure the influence of operational capability dimensions to increase export performance of Perhutani's gum rosin and turpentine oil. The results section will be preceded by a national study of gum rosin & turpentine oil based on export destination countries, followed by a brief study of Perhutani's GR & TO exports in 2017-2019 using secondary data from Indonesia Foreign Trade Statistics [5], Annual Report 2019 [11], and Statistics Book 2014-2018 [26]. The next result section will display the results of descriptive and inferential quantitative measurements of operational capability dimensions, which are considered to have the most influence on GR & TO export performance based on priority. Data was collected using a questionnaire which was distributed to 207 employees of Perhutani. Most of them work in 9 pine chemical factories and several employees work at the head office specifically in the marketing department of NTFP. Thus, this research is expected to contribute to increasing the export performance of NTFP, especially gum rosin and turpentine oil so that it can bring more benefits, especially to increase export value for the country and the company.

2. METHODOLOGY

The object of this study is Perum Perhutani, a State-Owned Forestry Enterprise of the Republic of Indonesia. Scope of this research is limited only in gum rosin and turpentine oil or pine products business line in general. Both, primary and secondary data collection techniques are employed. Primary data collection is conducted through online survey. Questionnaires are constructed using and distributed through Google Forms application to attain respondents' perception about the most influential dimension of operational capabilities. The main reason to choose Google Forms because that application has many add-ons for integration with other survey tools as well as its features to create a more complex form by using yes/no options, radio buttons, drop-down menus, and opinion polls [27]. Another case study of google form conducted by Raju and Harinarayana [28] resulted that online surveys or web based surveys have become important because it spend less cost and able to reach out more respondents from different population. This study adopted a cross-sectional survey design with the target population are those who work on pine products business line, either in manufacturing (mostly) in factory or commercial function in Perhutani Head Office. A total of 207 respondents completed the self-administered questionnaires through simple random sampling technique. Refer to Yamane's formula to determine sample size, 202 respondents are required at minimum, deducted from 409 workers in total. The secondary data was collected from several official reports, i.e. Annual Report, Statistics Book, and Trade Statistics. Data was analyzed through descriptive and inferential statistics and presented in the form of graphs and tables.

The questionnaire consisted of seven sections comprising closed-ended Likert scale-type questions (1=strongly disagree to 4=strongly agree), one for each dimension of operational capability, i.e. Cost, Quality, Delivery, Flexibility, Service, Innovation, and Sustainability. Dimension of Cost consists of 4 questions to represent 3 indicators, i.e. Cost Efficiency, Process Efficiency, and Flow Efficiency. Dimension of Quality consists of 3 questions to represent 3 indicators, i.e. Product Quality, Process Quality, and Product Durability.

Dimension of Delivery consists of 2 questions to describe 2 indicators, i.e. Delivery Dependability and Delivery Speed. Dimension of Flexibility consists of 6 questions to describe 5 indicators i.e. Delivery Flexibility, Volume Flexibility, Product Mix Flexibility, Product Line Flexibility, and Employee Flexibility. Dimension of Service consists of 4 questions to describe 4 indicators, i.e. Customer Service, After Sale Service, Advertising, and Distribution. Dimension of Innovation consists of 8 questions to describe 4 indicators, i.e. Product Innovation, Process Innovation, Technology Innovation, and Market Innovation. Dimension of Sustainability consists of 3 questions to describe 2 indicators, i.e. Product Sustainability and Process Sustainability.

All data obtained from reports that were issued by particular institution were captured in Microsoft Excel. The primary one collected from survey was analyzed using R statistics software for statistical computing. The data analysis consisted of some phases. In the first phase, data analysis of the descriptive results revealed the demographics profile of the respondents (e.g. age, gender, home language and place of residence) as well as the descriptive statistics to determine maximum and minimum score, mean, and standard deviation of each dimension of operational capabilities. In the second phase, pilot test which consisted of 100 respondents was employed to conduct validity and reliability test. Valid instruments, following Item-Total Correlation approach [28], should have correlation coefficient (r) greater than 0.3. Meanwhile, reliable instruments should have Cronbach's Alpha coefficient (α) greater than 0.7. Those are considered to have a high internal consistency [15]. The next phases will employ inferential statistics, i.e. Kolmogorov-Smirnov normality test, Spearman's rank correlation coefficient, ANOVA, and Tukey HSD (Honestly Significant Difference) test. Through application of inferential statistics, data conclusions are enabled to be drawn to explain population's phenomenon from which the samples are taken. Inferential statistics can be applied to compare each other two or more samples to investigate potential differences and reveal the relationship between them [29, 30].

3. RESULT

This section consists of three parts. First, business performance and outlook of gum rosin and turpentine oil in Indonesia. Second, profile of the respondents, and third, descriptive and inferential statistics result of indicators measurement of operational capability dimensions inquired on the questionnaire using four-point Likert-scale.

Refer to the data issued by Indonesia Central Bureau of Statistics (acronym: BPS) in 2019 and 2020, foreign trading-volume and value of Gum Rosin (HS Code: 38061000) and Turpentine Oil (HS Code: 38051000) can be estimated. Since all pine chemical products manufacturers in Indonesia only use oleoresin from tree tapping, there is no end-product yielded from kraft pulping process, e.g. crude sulfate turpentine or tall-oil rosin [8]. Trading volume for each commodity from national export activities in 2017 to 2019 are shown below in Table 3.

Both commodities of pine chemical products are traded worldwide and become the mainstays of non-timber forest product (NTFP) originated from Indonesia [25]. Graphs that depict top countries of export destination or act as importers of Indonesia gum rosin and turpentine oil are shown below in

Figure 1 and Figure 2. Whereas, list of countries are sorted based on biggest to smallest average trading volume from 2017 to 2019 [5] are recapitulated in Table 4 and Table 5.

Table 3. Indonesia export trading-volume of pine chemical products 2017 to 2019

Export Commodity	Volume (Ton)		
	2017	2018	2019
Gum Rosin	74,116	84,020	87,796
Turpentine Oil (Gum Turpentine)	16,428	17,356	17,080

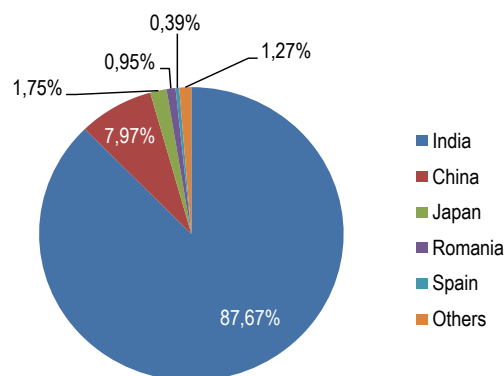


Figure 1. Exported turpentine oil by country of destination

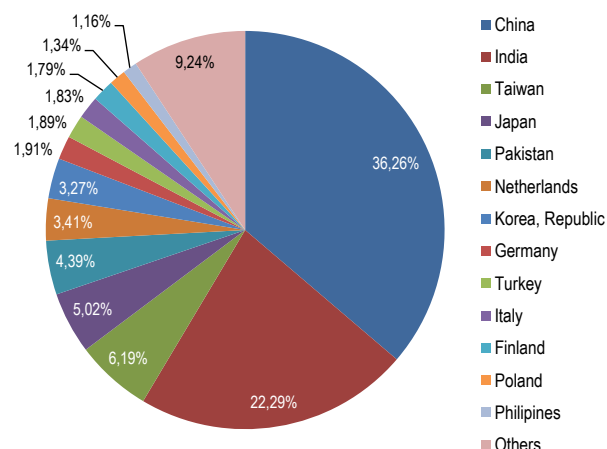


Figure 2. Exported gum rosin by country of destination

Table 4. Average export trading volume of turpentine oil

Rank	Countries	Average Volume (Ton)	Percentage
1	India	14,866,154	87.67%
2	China	1,352,303	7.97%
3	Japan	296,000	1.75%
4	Romania	160,847	0.95%
5	Spain	66,667	0.39%
6	Others	215,893	1.27%

Perhutani, as a State-Owned Forestry Enterprise, has several businesses in the production and commerce of timber (TFP) and non-timber forest products (NTFP), ecotourism, and agriculture products. Revenue contribution of each commodity to total company's revenue is shown in Table 6 and Table 8 below. The revenue generation from NTFP is greater than 40% annually. Revenue obtained from gum rosin and turpentine oil export activities itself contributed to 29.88% to the company's total revenue in 2019.

Table 5. Average export trading volume of gum rosin

Rank	Countries	Average Volume (Ton)	Percentage
1	China	29,721,585	36.26%
2	India	18,274,789	22.29%
3	Taiwan	5,075,903	6.19%
4	Japan	4,115,441	5.02%
5	Pakistan	3,596,720	4.39%
6	Netherlands	2,796,800	3.41%
7	Korea, Republic	2,684,145	3.27%
8	Germany	1,567,200	1.91%
9	Turkey	1,549,025	1.89%
10	Italy	1,497,600	1.83%
11	Finland	1,466,952	1.79%
12	Poland	1,100,800	1.34%
13	Philippines	952,333	1.16%
14	Others	7,578,001	9.24%

Table 6. Contribution of each type of forest product to Perhutani'S total revenue 2017 to 2019

Type of Forest Product	Contribution to Total Revenue (USD Million)					
	2017		2018		2019	
Timber (Log & Engineered)	126.96	47.5%	136.22	45%	131.24	44.1%
Non-timber (gum rosin, turpentine oil, cajuput oil & copal)	127.66	47.8%	147.97	48.9%	120.12	40.4%
Others (Ecotourism & Agriculture)	12.52	4.7%	18.48	6.1%	46.31	15.6%
Total Revenue	267.13	100%	302.67	100%	4.14	100%

Table 7. Descriptive statistics of operational capability dimension

Dimension	Min Score	Max Score	Range	Mean	Standard Deviation	Rank
Cost	1	4	3	3.18	0.55	5
Quality	1	4	3	3.23	0.55	2
Delivery	1	4	3	3.39	0.62	1
Flexibility	1	4	3	3.00	0.52	7
Service	1	4	3	3.02	0.67	6
Innovation	1	4	3	3.22	0.53	3
Sustainability	1	4	3	3.20	0.55	4

Table 8. Result of one-way ANOVA

Parameter	Df	Sum Sq	Mean Sq	F value	p-value
Dimension	6	21.9	3.650	14.88	2e-16 ***
Residuals	1,442	353.8	0.245	N/A	N/A

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

In this research, One-Way ANOVA was employed to test the difference in the mean scores of more than two groups of data. Term of One-Way indicates that each measurement has only one independent variable. The results are shown in Table 8.

Obtained from the ANOVA test results, p-value <0.05 indicates the null hypothesis (H0) is rejected. Thus, at least one significant mean-score difference is detected between operational capability dimensions. To find out different mean score between dimensions, Tukey HSD (honestly significant difference) was performed. This test is known as multiple pairwise-comparisons between the means of groups. The null hypothesis (H0) is rejected if the p-value <0.05, which indicates that there is a difference in the mean score between dimensions. One dimension has a significantly higher or lower mean score than the others. The results of the Tukey HSD test are shown in Table 9.

Perhutani produces around 65,000 ton of gum rosin and 14,000 ton turpentine oil in average per year. This gum rosin volume is estimated to have reached 81% of total national production [10]. In average, 92.94% of gum rosin total production volume as well as 84.44% of turpentine oil total production volume is addressed for export purposes. The rest is addressed for local trades.

The next sub-section denotes results of descriptive and inferential statistics using the data obtained from completely-administered questionnaire of operational capability.

The descriptive statistics are employed to describe behavior of the sample data using some types of measurements, namely central tendency (mean, median, and mode), dispersion or variability (range between max and min score, variance, and standard deviation), frequency, and position (lower, middle, and upper quartile) [31]. The results of descriptive statistics calculation for each dimension of operational capabilities are shown below in Table 7.

Table 9. Results of muti pairwise-comparison Tukey HSD

Dimension Symbol	Mean Score Dimension 1	Mean Score Dimension 2	p-value	Remark
B-A	3.23	3.18	0.9670	Equal
C-A	3.39	3.18	0.0000	Not-equal
D-A	3.00	3.18	0.0040	Not-equal
E-A	3.02	3.18	0.0120	Not-equal
F-A	3.22	3.18	0.9950	Equal
G-A	3.20	3.18	1.0000	Equal
C-B	3.39	3.23	0.0170	Not-equal
D-B	3.00	3.23	0.0000	Not-equal
E-B	3.02	3.23	0.0000	Not-equal
F-B	3.22	3.23	1.0000	Equal
G-B	3.20	3.23	0.9930	Equal
D-C	3.00	3.39	0.0000	Not-equal
E-C	3.02	3.39	0.0000	Not-equal
F-C	3.22	3.39	0.0060	Not-equal
G-C	3.20	3.39	0.0010	Not-equal
E-D	3.02	3.00	1.0000	Equal
F-D	3.22	3.00	0.0000	Not-equal
G-D	3.20	3.00	0.0010	Not-equal
F-E	3.22	3.02	0.0010	Not-equal
G-E	3.20	3.02	0.0050	Not-equal
G-F	3.20	3.22	1.0000	Equal

Based on mathematical logic, the order of operational capability dimensions from the highest to the lowest mean score is C>B=F=G=A>E=D. Dimension C (Delivery) has the highest score or was significantly higher than the other dimensions (A, B, D, E, F, G). Mean score of Dimension B (Quality) is not significantly different from Dimension F (Innovation), Dimension G (Sustainability), and Dimension A (Cost). Those dimensions (C, B, F, G, A) are significantly higher than Dimension E (Service) and Dimension D (Flexibility). Mean score of Dimension E (Service) is not significantly different from Dimension D (Flexibility). In this

research, dimension D has the lowest mean score among other dimensions.

4. DISCUSSION

During 2017 to 2019, Perhutani's gum rosin and turpentine oil (GRTO) revenue experienced a significant change, which increased significantly in 2018 against 2017 (+19.6%) but declined sharply in 2019 (-25.3%). GRTO revenue in 2018 was the highest, while the lowest value occurred in 2019. Fachrozi et al. [32] stated that high price fluctuations in the international market become the main cause of instability in revenue generation from year to year. This is triggered by the supply of GRTO from China, as the largest producer, which continues to change every year. China's tax policy and the unpredictable producers and traders' business plans have made other countries, such as Brazil and Indonesia, unable to suggest gum rosin and turpentine oil selling price in the following years. In these uncertain conditions, Perhutani should operate with optimal capabilities by considering that there are lots of uncontrollable external variables.

Pine resin as raw material to produce GRTO is tapped from Perhutani's own pine forests. Pine chemical factory will continue its production despite the absence of buyer's order. The status of GRTO stored in the warehouse is declared as inventory. Therefore, the Delivery dimension becomes a top priority for Perhutani's GRTO export activities. The length of shipping time and the temperature of the container affect the quality of the product. Perhutani as producer must guarantee that product specifications are still in accordance with the quality statement on the Certificate of Analysis (COA) when received by the buyer at the destination country. Thus, Quality also becomes an important operational capability dimension. On the opposite, flexibility dimension ranks the last. Perhutani does not provide a product mix or products with different features. The smallest unit that can be served by PGT is one full container load (1 FCL), both for gum rosin (1 FCL=19.2 tons) and turpentine oil (1 FCL=13.6 tons).

One of the key performance indicators (KPI) to measure the success of the Delivery dimension is shipper's ability to fulfill agreed delivery time and in appropriate quantity as well as its quality [33]. Donderwinkel [34] describes several OTIF failures, including the absence of ready-to-ship stock in the warehouse; problems with tools and production equipment; outspec quality of the final product; delay in the delivery or quality issues of raw materials; unavailability of vessel space; changes in delivery; miscommunication with the buyers regarding goods availability and delivery schedule; and the late prepayments (payment in advance before the realization of shipment). By considering the high demand of GRTO and shipments are carried out from several different warehouses, an Informatics Technology application called Enterprise Resource Planning (ERP) equipped with an inventory control system based on the Material Requirement Planning (MRP) approach is suggested to be used by Perhutani as a company with complex organizational structures [35]. Monthly safety stock or safe inventory can be predicted using sales history data combined with future demand forecasts. To ensure that safety stock is met, Perhutani must apply and run Sales Inventory & Operation Planning (SIOP) properly. This process contains three main plans on the supply-side (manufacturing, sourcing, inventory plans), financial

(budgeting, investment, cash flow plans), and demand-side (sales, marketing, life cycle plans) [36].

In achieving its highest performance, focusing only on Delivery indicators is not enough. Other correlated dimensions should also operate at maximum capability. Perhutani must control the entire production phases, started from ensuring the quality of raw material is accepted, overseeing manufacturing process, until finished product are completely drummed and sealed. Supply chain manager is required to run a flexible business process, for example to adjust inventory level or production plan when demanded. A financial or investment plan is required to manage continuous improvement of delivery performance which is totally interconnected with performance of other operational dimensions [33]. Successful delivery determines high customer satisfaction as part of the service indicators [37]. On the other hand, Pragmatek [38] stated that dimension of innovation and sustainability cannot be measured directly but are attached to each of other direct-measurable operational dimensions. In order to improve profitability, Perhutani must conduct continuous product innovation in a sustainable manner with regard to the regulation of Forest Sustainability Management [39].

5. CONCLUSIONS

Pine chemical products, well known as gum rosin and turpentine oil, are traded worldwide and become the mainstays of non-timber forest product (NTFP) originated from Indonesia [32]. Three main export destinations of Indonesian pine chemical products are China, India, and Japan [5, 11]. Therefore, this study finds that Delivery becomes the most important operational capability dimension to enhance. Implementation of IT (informatics technology) software such as ERP (Enterprise Resource Planning) can facilitate to monitor performance of delivery as well as other dimensions throughout entire production phases. Perhutani is suggested to review existing delivery performance indicators. Those indicators are used to measure fulfilment of OTIF (on-time delivery and in-full).

In achieving the highest delivery performance, other correlated operational dimensions must work with optimum capability as well. A control of the entire production phases, started from raw material acceptance until finished product shipment, must be appropriately executed. A flexible business process and investment plan are required to support continuous improvement of delivery performance. High successful delivery rate will also result high customer satisfaction which contributes to enhance company's profitability [33, 37].

This research still has many opportunities to be developed. It can be related to number and type of dimensions tested. In the future, a more complex analysis can be carried out to determine the relationship between variables through equation modeling. The development of operational capabilities is very important to create a sustainable competitive advantage in a dynamic market environment to meet the demands and needs of an ever-changing market [17, 24, 40]. Some findings of this research are expected to contribute to the development of science and operation management. Combination with qualitative research to find out detailed operational issues is also suggested to result a holistic and more meaningful study.

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APPENDIX

Likert-scale questionnaire with 4 (four) answer options, i.e. Strongly Disagree, Disagree, Agree, and Strongly Agree.

No & Dimension	Question: The company or industry you work for should have the ability to:
1 A	Produce Products with Low Cost
2 A	Distribute Products at Low Cost
3 A	Maximizing Resource and Process Utilization
4 A	Maximizing the Output or Result of the Process
5 B	Producing Products with High Utilization (High Performance)
6 B	Producing Consistent Quality Products
7 B	Producing Durable Products
8 C	Delivering Products on Time / According to the Delivery Schedule (On Time)
9 C	Sending Products As Soon As Possible (Short Time)
10 D	Fulfilling Changes in Delivery Time Requests
11 D	Fulfilling Changes in Product Quantity or Volume Demand
12 D	Manage Product Mix Changes
13 D	Customize Products Based on Customer Needs
14 D	Providing Various Products with Different Features
15 D	Having Employees Who Can Carry Out Various Types of Tasks
16 E	Providing Services to Customers Regarding Product Information Before Transactions Occur
17 E	Providing Service to Customers After Product Delivery (After Sales Service)
18 E	Advertise/Promote Products
19 E	Widely Distribute Products
20 F	Developing New Products
21 F	Introducing New Products
22 F	Developing New Technology
23 F	Implementing New Technology
24 F	Developing New Services
25 F	Introducing New Services
26 F	Finding New Markets and Opportunities
27 F	Leveraging New Markets And Opportunities
28 G	Producing Products with Sustainability Principles
29 G	Producing Products Sustainably
30 G	Distribute Products Sustainably

Notes of dimension symbols:

A=Cost, B=Quality, C=Delivery, D=Flexibility, E=Service, F=Innovation, G= Sustainability.