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The Influence of Lean and Agile Strategy on Implementation of Supply Chain Management

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ABSTRACT : *Determination of lean and agile strategies aims to improve efficiency, flexibility and provide a quick response to business processes from planning, manufacturing, marketing, and distribution. Implementation of Supply Chain Management (SCM) that has been carried out by the company includes supplier's partnership, customer relationships, information sharing, integration intensity, and trust and commitment. This study aims to determine and analyze the effect of lean and agile strategies on the implementation of supply chain management. As the object of the study were 294 respondents from the Apotek Kimia Farma network employees involved in SCM. This research is a causal associative type through a questionnaire that is measured by a semantic differential scale where the lowest points are 1 to the highest point 10. Data analysis uses Structural Equation Modeling (SEM) AMOS 24. The results show that lean strategies have a positive effect on SCM implementation with parameter values 0,153 significant level 0,048 and agile strategy have a positive effect on the implementation of SCM with a parameter value of 0,618 with a significant level of 0,001. The effect of agile strategies on the implementation of SCM is more dominant than the lean strategy.*

KEYWORDS: *Lean, Agile, SCM, SEM, AMOS*

I. INTRODUCTION

In the last ten years, Apotek Kimia Farma has carried out market development by opening a pharmacy network from 350 to 1000 pharmacies. This expansion aims to be closer to customers and can provide fast service according to consumer needs. A pharmacy network that is wide and spread throughout the territory of Indonesia, is absolutely necessary to handle operations more optimally, especially in terms of supply and distribution. To win the market competition, companies must be able to provide cheap, quality products, timely and varied services. This goal can be achieved if it is able to operate efficiently, produce quality, fast, flexible and innovative products (Punjawan, 2017). Therefore, the company establishes a Supply Chain Strategy so that business processes that include the flow of goods, finance, and information from all networks are managed optimally. With this strategy, the implementation is expected to be aligned and directed according to the set targets. Supply Chain (SC) Strategy is a conceptual formulation to determine the best goals and configurations from the supply chain according to the objectives set. This strategy is needed to ensure the business process works efficiently with the ultimate goal of achieving customer satisfaction. So that the overall flow of goods, information, finished products, services from suppliers, manufacturers, warehouses and finally to consumers can be managed in an effective and efficient work system. There are two types of supply chains namely lean and agile (Cetinkaya et al, 2011). Lean emphasizes the importance of managing costs and efficiency, while agile emphasizes the importance of responsiveness, speed and, service focus.

According to Punjawan (2017), the supply chain is a network of companies that jointly work to create and deliver a product to the end user. The company includes suppliers, factories, distributors, stores or retail and supporting companies such as logistics services. While SCM is a method, tool or supply chain management approach. According to The Council of Supply Chain Management Professionals (CSCMP), SCM is defined as "The planning and management of all activities involved in the procurement and conversion, conversion and all logistics management activities. Importantly, it also includes coordination and collaboration with partner channels, which can be suppliers, intermediaries, third-party service providers and, customers " (Wisner, Tan & Leong, 2012). Or in other words SCM is the integration, coordination and collaboration of various functions consisting of purchasing, needs management, distribution planning, quality management, production planning and, raw material management through the entire supply chain network for the purpose of moving raw material components, finished products and services until final submission to consumers (Heizer and Render, 2015). Sujono et al. (2013) in his research on SCM proved that supply chain management strategies have a positive and significant effect on supply chain management practices.
In this study, the SCM strategy was measured by the dimensions of lean, agile and hybrid. While SCM practices are measured by SC integration dimensions, sc characteristics, information sharing, strategic location, customer

relationship management and, JIT capabilities. Based on the phenomenon, theory and, previous research, the authors are interested in conducting research on the Effect of lean and agile strategies on the Implementation of Supply Chain Management in the Kimia Farma Pharmacy network.

II. LITERATURE REVIEW

Supply Chain Strategy. The SCM strategy is conceptual formulation to determine the best objectives and configurations of the supply chain to achieve the stated goals (Cetinkaya, et al, 2011). According to Azfar et al, (2014) the SCM strategy consists of 1. Lean (Just in Time, Relationship with the supplier, time reduction), 2. Agile (Speed in responsiveness, change in batch size), 3. Resilient (Developing visibility, Lead time reduction, Demand Based management), 4. Green (Reduce variety of materials, Reduce environmental impact). Referring to the research of Ambe & Weiss, (2011); Sukati et al. (2012) that supply chain strategy variables consist of Lean & Agile.

The lean strategy emphasizes cost reduction, flexibility, focus on reducing waste and improving non-value-added processes. The lean supply chain is a paradigm that is based on cost reduction & flexibility and focuses on the improvement process. The goal of lean is to reduce waste, fulfill consumer needs and achieve company profits. Lean implementation includes: minimizing inventory, optimizing resources, disseminating information to the network, just in time and lead time (Li, 2011). Based on the theoretical foundation, the writer measures the variable lean strategy with 5 indicators summarized in Table 1 below.

Table 1. Lean Strategy Variable Indicators

Variable	Indicator	Code
Lean Strategy	Reduces damage / defects / not according to specifications	SCL1
	Effective production /service/ delivery time in accordance with planning	SCL2
	Selection of locations that are close to the market/consumers	SCL3
	Do production/service/delivery according to the needs of consumers	SCL4
	Carry out checks in accordance with the frequency set by the company	SCL5

Agile strategies emphasize the overall ability to respond quickly and effectively to changes in unexpected costs in the market and increase the level of environmental changes in both volume and variation (Li., 2011). The purpose of Agile is the achievement of the right product, the right amount, the right conditions, the right place, on time and at the right cost. Agile implementation includes and inventory management for responses to needs, buffer capacity, rapid response to consumer needs, product visibility in markets, dynamic aliases, suppliers of speed, flexibility, quality and shorter lead times (Li, 2011). Based on the theoretical foundation, the writer measures the agile strategy variables with 5 indicators summarized in Table 2 below.

Table 2. Agile Strategy Variable Indicators

Variable	Indicator	Code
Agile Strategy	Agile Strategy Rapid response to changes in costs	SCA1
	Rapid response to changes in volume/market needs	SCA2
	Quick response to changes in delivery time	SCA3
	Quick response to changes in design	SCA4
	Rapid response to changes in quality standards	SCA5

Implementation of Supply Chain Management. The implementation of SCM is a set of activities carried out by an organization in order to achieve the effectiveness of its supply chain management (Li et al, 2006 in Sujono, 2016). The variable dimensions of SCM implementation in previous studies are as follows: Strategic supplier partnerships, customer relationships, level of information sharing, quality of information sharing, response (Li et al, 2011); Strategic Supplier Partnership, Information Sharing, Information Quality, Integration Intensity (Hamister, 2012); Strategic Supplier Partnership, Customer relationship, Information sharing (Sukati et al, 2012); Supply chain integration, sc characteristics, information sharing, strategic
location, customer relationship management, just in time capabilities (Sujono et al, 2013); Strategic Partnership with suppliers, Customer relationships, Level of information sharing and quality (Ince et al, 2013); Strategic relationships with suppliers, customer relationship management, information sharing quality (Handoko et al,

2015); Trust and Commitment, Customer relationship, Information sharing (Khanal and Tamang, 2017). Based on the theoretical basis above, the writer measures the variables of SCM implementation with 4 dimensions, namely partnership, customer relationship, information sharing, quality of information sharing, integration intensity, trust and, commitment. Furthermore, each dimension is measured by the indicators summarized in Table 3 below.

Table 3. Dimensions and Indicators of Variables for SCM Implementation

Variable	Dimensions	Indicator	Code
Implementation of SCM	Supplier Partnership	Partnership Selection of suppliers	ISP1
		Resolving problems	ISP2
		Give input	ISP3
		Continuous improvement	ISP4
		Strategic planning	ISP5
	Customer Relationship	Interaction with customers	ICR1
		Customer satisfaction	ICR2
		Finding out the wishes of the market	ICR3
		Facilitating customer complaints	ICR4
	Information Sharing	Information Sharing	IIS1
		Business planning	IIS2
		Collaborating on information updates	IIS3
	Quality of Information Sharing	On time	IQI1
		Accurate	IQI2
		Adequacy of information	IQI3
		Reliable	IQI4
	Integration Intensity	Internal integration between functions	III1
		Supplier involvement	III2
		Consumer involvement	III3
	Trust and Commitment	Trust	ITC1
		Understanding	ITC2
		Commitment	ITC3

Research Framework. On the basis of the theoretical foundation and previous studies, the authors compiled a research framework summarized in Figure 1 below.

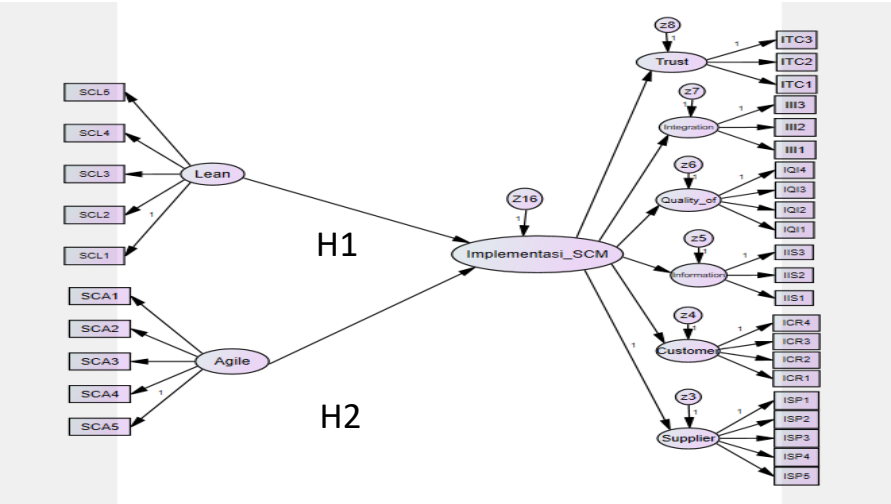

Figure 1. Research Framework

Figure 1 explains that in the framework of thinking consists of 3 variables, namely lean strategy, agile strategy and, SCM implementation. Lean strategies are measured by 4 indicators, namely SCL1, SCL2, SCL3, SCL4 and, SCL5. Agile strategies are measured by 5 indicators, namely SCA1, SCA2, SCA3, SCA4 and, SCA5. In the

implementation of SCM measured by 6 dimensions, namely Trust and Commitment, Integration intensity, Quality of Information sharing, Information sharing, Customer relations and, Supplier partnership. Trust and Commtement is measured by 3 indicators namely ITC1, ITC2 and ITC3, Intensity integration is measured by 3 indicators namely III1, III2 and III3, Quality of Information sharing is measured by 4 indicators namely IQI1, IQI2, IQI3 and IQI4, Information sharing is measured by 3 indicators namely IIS1, IIS2 and IIS3, Customer relationship is measured by 4 indicators, ICR1, ICR2, ICR3 and ICR4, and Supplier partnerships are measured by 4 indicators, namely ISP1, ISP2, ISP3 and, ISP4. Based on the above framework, the author composes the research hypothesis as follows:

H1: Lean strategies have a positive effect on SCM implementation
H2: Agile strategies have a positive effect on SCM implementation

III. METHODOLOGY

This research is a kind of causal associative research from primary data through a questionnaire. Questionnaires are measured by a semantic differential scale where this scale measures the attitudes of respondents composed of a continuum line from the lowest point 1 to the highest point 10 (Ferdinand, 2014). The research population includes employees of the Kimia Farma pharmacy network whose positions are at the level of supervisors, assistant managers, managers and, directors. Sampling using the purposive sampling method, where respondents are sampled based on predetermined criteria, namely understanding and being involved in supply chain management. The data analysis technique used in this study is Structural Equation Modeling (SEM) with AMOS 24 application. The stages of analysis are through Validity and Reliability Test (Confirmatory Factor Analysis, Average Variance Extracted, Construct Reliability), Normality Test, Goodness of Fit Test and Hypothesis Test.

IV. RESULTS AND DISCUSSION

The questionnaire was distributed by 294 respondents. All questionnaires were filled in completely and validly so that data was obtained with a respondent level of 100%. Data on the characteristics of respondents based on gender, age and position as stated in Table 4 below.

Table 4. Characteristic Data of Respondents

Characteristics of Respondents	Frequency	Percentage
Gender		
Men	168	57,14%
Women	126	42,86%
Age		
< 20 years	1	0,34%
20 up to < 25 years	28	9,52%
25 up to < 30 years	84	28,57%
30 up to < 35 yeasr	52	17,69%
≥ 35 years	129	43,88%
Position		
Supervisor	56	19,05%
Asistant Manager	176	59,86%
Manager	56	19,05%
General Manager	3	1,02%
Director	3	1,02%

Source: Results of data processing (2018)

Validity and Reliability Test. The results of the Confirmatory Factor Analysis (CFA) test show that all indicators of the dimensions and dimensions of the construct obtained a probability value at the level of 0.001 and the loading estimate value above 0,5. Except for the SCL3 (0,540) indicator, it is deleted because it produces a low loading value < 0,5 (Haryono, 2017; Ghozali, 2017). The loading indicator value is SCL1 (0.652), (SCL2 (0.769), SCL4 (0.815), SCL5 (0.669) means that the indicator can explain the lean strategy variable Value of leading indicators SCA1 (0.718), SCA2 (0.892), SCA3 (0.897) , SCA4 (0,730), SCA5 (0,656) means that the indicator can explain the agile strategy variable.In the SCM implementation variable shows that the ISP1 loading indicator value (0,617), ISP2 (0,827), ISP3 (0,814), ISP4 (0,827), ISP5 (0,715) can explain the Supplier partnership dimension, ICR1 indicator (0,740), ICR2 (0,835), ICR3 (0,846), ICR4 (0,790) can explain customer relationship dimensions, IIS1

indicator (0,782), IIS2 (0,861), IIS3 (0,871) can explain the dimensions of information sharing, IQI1 indicator (0.854), IQI2 (0.903), IQI3 (0.879), IQI4 (0.901) can explain the dimensions of quality of information sharing, indicator III1 (0.715), III2 (0.770), III3 (0.774) can explain the dimensions of integration intensity, indicator ITC1 (0,820), ITC2 (0,767), ITC3 (0,667) can explain the dimensions of trust and commitment. The partnership supplier dimension (0.830), customer relationship (0.695), information sharing (0.842), quality of information sharing (0.822), integration intensity (0.939), tran and commitment (0.835) can explain the SCM implementation variable.

Contruct Reliability (CR) and Average Variance Extracted (VE) Test results show that the values of all CR ≥ 0,7 and CE ≥ 0,5. Lean strategies (CR = 0,7; VE = 0,6); agile strategies (CR = 0,7; VE = 0,6), partnership supplier dimensions (CR = 0,7; VE = 0,7), dimensions customer relationship (CR = 0,7; VE 0,7), information sharing dimension (CR = 0,7; VE = 0,7), quality of information sharing dimension (CR = 0,8; VE 0,8), dimension integration intensity (CR = 0,7; VE 0,6), trust and commitment dimensions (CR = 0,6; VE 0,5), SCM implementation variables (CR = 0,7; VE = 0,7). Test Results Contruct Reliability and Average Variance Extracted indicate that the value of all CR ≥ 0,7 and CE ≥ 0,5 means that the questionnaire is reliable and valid.

Normality Test. Analysis of multivariate normality in AMOS 24 was performed using the criterion critical ratio (c.r.) from multivariate on kurtosis. If the value of cr is in the range between ± 2,58, it means that data is normally distributed multivariate (Haryono, 2017). The results of the normality test show that the value of c.r for multivariate is 96,617 > 2,58. This means that the overall (multivariate) data distribution is not normal. To fulfill the normality assumption, an outlier test needs to be done by deleting outlier data. The outlier data was obtained by comparing the Mahala Nobis distance values with the Chi-square table at a significant 0,001. In this research, the Chi-square value of the table is 61,098. So the Mahalanobis d-square value of more than 61,098 is stated as outlier data. There are 33 data outliers that must be deleted. After the outlier is removed the normality test is returned. The normality test output still shows multivariate remains abnormal. Because the value of cr multivariate of 34,648 is still above 2,58. To overcome the abnormal data multivariate, the influence test can be analyzed by the bootstrapping technique (Ghozali, 2017).

A Goodness of Fit Test. The complete model structure test results and model modifications obtained Goodness of Fit data as shown in Table 5 below.

Table 5. Goodness of Fit

Goodness of Fit	Acceptance Limits Required *	Results after modification of the	Decision
CMIN/DF	≤ 2,00	1,755	Good Fit
GFI	≥ 0,90	0,849	Marginal
IFI	≥ 0,90	0,952	Good Fit
TLI	≥ 0,90	0,945	Good Fit
CFI	≥ 0,90	0,952	Good Fit
RMSEA	≤ 0,08	0,045	Good Fit

* Source: Ferdinand, 2014; Widarjono, 2015; Haryono, 2017; Santoso, 2018

Based on Table 5 above, it shows that CMIN / DF, IFI, TLI, CFI and RMSEA Good Fit. While GFI gives results that are close to 1 (Marginal Fit). If one of the criteria for Goodness of Fit has been fulfilled, the model can be considered feasible (Widarjono, 2015). Overall, the Goodness of Fit can be assessed based on a minimum of 5 (five) criteria met (Ghozali, 2017). According to Latan, 2012 citing Hair et al., 2010, the use of 4-5 GOF criteria is considered sufficient to assess the feasibility of a model, with the requirements of each criterion of GOF namely Absolute Fit Indices, Incremental Fit Indices and Parsimony Fit Indices represented (Haryono , 2017). So it can be concluded that the overall model can be considered feasible and can continue to test hypotheses to find out how much influence between variables in the model.

Hypothesis Test. Hypothesis test results on complete structure models that have been declared fit, with bootstrapping techniques obtained data loading as in Figure 2. below. Bootstrap is a resampling procedure where the original sample is treated as a population. Multiple sub-samples with the same sample size as the original sample then taken randomly with replacement from the population. With this method, the researcher can create multiple samples from the original database. (Ghozali, 2017).

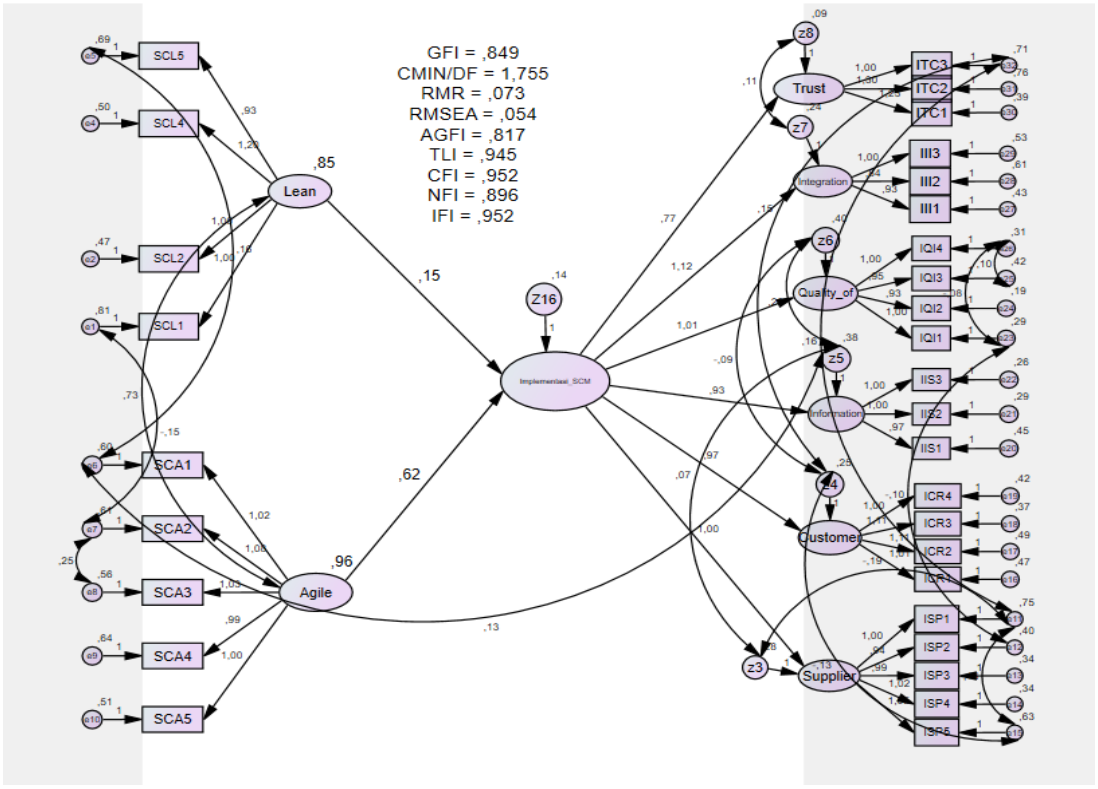

Figure 2. The Result of Hypothesis Test

Figure 2 shows that the output of the hypothesis test results is as follows, in hypothesis H1, The lean strategy has a positive effect on the implementation of SCM with a significant level of 0.048, the estimated parameter value is 0.152, that each increase in one lean strategy unit can increase SCM implementation by 0.153. In the H2 hypothesis, the agile strategy has a positive effect on the implementation of SCM with a significant level of 0.001, the estimated parameter value is 0.618, that each increase in one unit of agile strategy can increase competitive advantage by 0.618. The results of previous similar studies are Sujono et al (2013) which prove that the SCM strategy has a positive and significant effect on SCM practice. The results of this study are in line with Cetinkaya, et al (2011) about the importance of strategies to direct the implementation of SCM.

Table 6. The Results of Hypothesis Test

			Estimat	**S.E.**	**C.R**	**P**
Implementasi_SCM	<---	Lean	,153	,077	1,97	,048
Implementasi_SCM	<---	Agile	,618	,085	7,25	***
SCL1	<---	Lean	1,000			
SCL2	<---	Lean	1,005	,083	12,0	***
SCL4	<---	Lean	1,197	,095	12,5	***
SCL5	<---	Lean	,930	,086	10,8	***
SCA5	<---	Agile	1,000			
SCA4	<---	Agile	,992	,072	13,7	***
SCA3	<---	Agile	1,026	,071	14,4	***
SCA2	<---	Agile	1,079	,074	14,5	***
SCA1	<---	Agile	1,017	,071	14,2	***
Trust	<---	Implementasi_SC	,770	,076	10,1	***

			Estimat	S.E.	C.R	P
Integration	<---	Implementasi_SC	1,121	,099	11,3	***
Quality of	<---	Implementasi_SC	1,011	,092	11,0	***
Information	<---	Implementasi_SC	,934	,081	11,4	***
Customer	<---	Implementasi_SC	,965	,088	10,9	***
Supplier	<---	Implementasi_SC	1,000			
ISP1	<---	Supplier	1,000			
ISP2	<---	Supplier	,943	,078	12,0	***
ISP3	<---	Supplier	,988	,080	12,4	***
ISP4	<---	Supplier	1,015	,081	12,5	***
ISP5	<---	Supplier	1,048	,098	10,6	***
ICR4	<---	Customer	1,000			
ICR3	<---	Customer	1,109	,068	16,4	***
ICR2	<---	Customer	1,110	,072	15,5	***
ICR1	<---	Customer	1,006	,067	14,9	***
IIS3	<---	Information	1,000			
IIS2	<---	Information	1,002	,051	19,5	***
IIS1	<---	Information	,966	,056	17,1	***
IQI4	<---	Quality_of	1,000			
IQI3	<---	Quality_of	,950	,045	20,9	***
IQI2	<---	Quality_of	,931	,045	20,6	***
IQI1	<---	Quality_of	1,000	,055	18,1	***
III3	<---	Integration	1,000			
III2	<---	Integration	,838	,064	13,0	***
III1	<---	Integration	,930	,062	15,0	***
ITC3	<---	Trust	1,000			
ITC2	<---	Trust	1,305	,134	9,75	***
ITC1	<---	Trust	1,235	,117	10,5	***

Table 6 shows that the results of the hypothesis test output indicate that agile strategies have the most dominant influence on the implementation of SCM. This is indicated by the loading value of 0,618 greater than the lean strategy of 0,153. These results have implications for managerial policies, namely as a reference for management in determining the priority scale of policies that must take precedence. Companies must respond quickly to products needed by consumers which include improving quality standards, encouraging design innovation activities and adding product variations, guaranteeing the right lead time and economical product costs that can be reached by the market. In line with the agile strategy, companies must maintain their inventory capacity and turnover that is able to anticipate unpredictable market needs. Furthermore, simultaneously the lean strategy continues to run on a scale that does not inhibit agile strategy movements. In the lean strategy, the company still has to optimally reduce non-value-added activities, optimize inventory and shorten lead times as long as it does not increase costs (Hadiguna and Jonrinaldi, 2015).

In SCM implementation the strongest relationship is explained by the integrity intensity indicator with a loading value of 1,121 and the lowest is explained by the trust and commitment indicators with a loading value of 0,770. This shows that in order for the implementation of SCM the intensity of integration is high. Integration between entities, departments and between units must always be carried out. Integration here is not only in the work system but also includes the collaboration of human resources, communicating and sharing information with quality data. Information sharing with quality data is reflected in the loading quality of information sharing value of 1,011, and

information sharing of 0,934. The partnership supplier value of 1,000 illustrates that cooperation and the role of suppliers in distributing products to the Kimia Farma pharmacy are urgently needed. Collaborative relationships that need to be improved include making strategic planning with suppliers by giving input and improvement to each other and solving common problems. In order for the implementation of SCM to run optimally, it requires full company support for all employees and revives the corporate culture that trust and commitment are the main capital to consumers. With the existence of consumer trust and the commitment of employees and both parties, other supporting activities such as supplier partnerships, customer relationships, information sharing and integration of intensities are made easier. Customer trust including suppliers is reflected in the customer relationship loading value of 0,965 in accordance with the final goal of scm, namely the achievement of continuous customer satisfaction.

V. CONCLUSION

Based on data processing, analysis and discussion of research, conclusions can be drawn as follows: The lean strategy has a positive effect on supply chain management implementation. An increase in one lean strategy unit can increase the SCM implementation by 0,153. The agile strategy has a positive effect on supply chain management implementation. An increase in one agile strategy unit can increase the scm implementation by 0,618. The effect of agile strategies on supply chain management implementation is more dominant than lean strategies.

Suggestions. Further research is needed by using a larger number of samples and research needs to be done on different types of industries.

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