The Power of Innovation, Distribution and Supervision Factor in Improving Performance of Supply Chain Management of Subsidized Fertilizer in Indonesia

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***Abstract*— Supply chain (SC) is increasingly recognized as an important factor for improving business performance. Because of that, the SC activities need to be optimized and this can be done through the supply chain management (SCM). This study has three key objectives: to reveal the influence of government policy in terms of supervision, to check the reliability of distribution and innovation factors on the execution of the SCM of subsidized fertilizer in Indonesia. A sum of 800 questionnaire have been spread to the test site and a number of 587 or 73% successfully returned. Furthermore, the data from 513 respondents, or 64% of the spread, was analyzed by statistical software Structural Equation Modeling (SEM). The findings from this study shows that the government policy in terms of supervision and the reliability of the appropriation has immediate and critical impact on execution SCM of subsidized fertilizer. However although there is no immediate impact on the execution of SCM, factor of innovation plays a significant role because it determines the success of supervision and reliability of the distribution. Moreover, this supervision factor and the reliability of the distribution act as a mediator between the factors of innovation with the full performance of SCM. To improve the performance of SCM of subsidized fertilizer in Indonesia, this research suggests that the government pays attention to supervision, the reliability of the distribution as well as innovation factors. Due to that, the distribution of fertilizer will be more suited to its purpose at the right time with the appropriate location, type, quantity and the right quality, and at an appropriate price. In future research, the same study could be utilized for other subsidized commodities.**

International Journal of Supply Chain Management
IJSCM, ISSN: 2050-7399 (Online), 2051-3771 (Print)

Keywords*— *SCM performance, supervision, distribution, innovation factors, structural equation modelling (SEM).

1. Introduction

Supply chain (SC) increasingly recognized as a key factor for improving business performance. Companies that implement efficient and effective SC will be a success. Because of that, the activities of the SC needs to be optimized with the process of supply chain management (SCM) [1]. According to [2] SCM is the management of some companies from upstream to downstream; suppliers, manufacturers, distributors, retailers, logistics, transportation, warehousing, information and others involved in supplying goods to the end customer (user). The basic aim of SCM is to associate all of chain of the supply to cooperate to expanding the efficiency, including esteem, decreasing the cost, expanding consumer loyalty, along these lines expanding the intensity of undertakings.

Measurement of performance of SCM is needed to survey whether the SCM is already running at its ideal or not. By measuring the SCM, it can be seen the achievement that has been accomplished, client needs are met, a superior comprehension of the procedure, discover the mistakes and pointless things, comprehend the issues and open doors for development, give choice truthful to get advance, encourage the work equivalent and open correspondence and better [3]. This research will conduct an assessment and performance measurement of SCM in subsidized fertilizer, because fertilizer is one of the creation offices to expand the generation and efficiency of agricultural

land. So fertilizer got an enormous consideration from the legislature for accomplishing national sustenance security.

As a strategic production facility, the government has made two (2) fundamental strategies on fertilizer. To start with, give compost subsidy to ranchers, and second assign SCM of fertilizer. The distribution of compost from the production line to the farmers was completed by the Government through the State Owned Enterprises, which is PT. Pupuk Indonesia (Holding) alongside distributor and trader through the SCM framework oversight products. With fertilizer is relied upon to be accessible to farmers in 6 right; right amount, sort, time, area, cost and quality. Moreover, land profitability and production of rice is required to be enhanced and increment farmers' payment and the accessibility of rice across the nation.

Some phenomena happen in the performance of SCM subsidized fertilizer : 1) Data from [4] states that there is no increase in rice production significantly in the last five years, because the productivity of rice plants is still low and even decreased in the year 2011. 2) Statistical data of PT. Pupuk Indonesia, shows a gap between the allocation of subsidized fertilizer set by the Ministry of Agriculture to the market needs. Additionally there is a broad refinement between the distributions of subsidized chemical fertilizer to the acknowledgment of the distribution. Furthermore, 3) According to [5] if the companies do not innovate they will die. And if they innovate - then they do not succeed, they will die too, but it's better than just silence. Government innovation in SCM subsidized muck. Study [6] stated that there had been several improvements in subsidized fertilizer's regulations. However, the phenomenon is often the case up until now is a scarcity of fertilizers, especially during the harvest season.

From the above issues may happen due to the things that are less great at innovation factors, supervision and management factor in the distribution of subsidized fertilizer SC.

1.1 Research Objectives

In respect of issues raised, the primary purpose of this study is to empirically proving the power of innovation, supervision and distribution of impact on the performance of SCM in subsidized fertilizer.

The more specific targets of this exploration are:

a) To determine whether the distribution has a significant influence on the performance of SCM.
b) To investigate whether the supervision factor has a significant impact on the performance of SCM
c) To determine whether the innovation factors have a significant influence on supervision factor.
d) To see the extent of innovation factors have a significant impact on the distribution.
e) To examine the effect of mediation supervision factor on the relationship between the factors of innovation with the performance of SCM.
f) To empirically test the mediating effect of the distribution on the relationship between the factors of innovation with the performance of SCM.

2. Literature Review

2.1 The Performance of SCM

SCM involves managing demand, supply, source of raw materials, manufacture and assembly, warehouse and stock control, order management and distribution over channels, as well as delivery to customers.

2.2 Relationship between Supervision and Performance of SCM

The feedback is an important part to improve any process. Measuring systems for efficient management of the SC that enables the monitoring of compliance with business processes. Similarly [7] stated that the process of SCM depends on supervision over what happens in each chain. Thus, it is hypothesized that:

H1: Supervision positively affects on performance of SCM.

2.3 Relationship Between Distribution and Performance of SCM

Execution is controlled by the management of SC distribution exercises to give merchandise and enterprises, including request administration, transportation administration, and stockroom administration to take care of demand. This is in line with research findings [8] Hence, it is hypothesized that:

H2: Distribution positively affects on performance of SCM

2.4 Relationship Inovation`Factor and Distribution

[9] using innovation factor for evaluating the performance of the distribution, the view that

innovation must be seen as part of a business that enable the implementation of new processes and service products for the customer's needs. Similarly, [10] states that innovation is the model of the commerce realizing new value for customers, and directly affect the unwavering quality of the circulation. Henceforth, it is hypothesized that:

H3: Inovation factor has a direct effect on distribution factor

2.5 Relationship Between Inovation and Supervision

[6] states that the innovation process needs to be managed carefully as a set of business process analysis. Hence, it is hypothesized that:

H4: Inovation factor has a positive effect on supervision factor

2.6 Mediation Effects of Supervision and Distribution on the Relationship between Inovation factor and Performance of SCM.

Supervision and distribution activity may mediate the success of innovation in improving SCM performance. Thus, it is hypothesized that:

H5: Distribution as mediator the linkage between inovation factor and performance of SCM

H6: Supervision as mediator the linkage between inovation factor and performance of SCM.

2.7 The Conceptual Model

A structural equation model is used in this study to analyze the influence of the factor structure of supervision, distribution and innovation factors on the performance of SCM.

Therefore, this flowchart provides causality variables testing. In accordance with the theory, the the performance of SCM is the dependent variable, while the reliability of the supervision (K), the reability of the distribution (KP) and innovation factor (I) are independent variable. Besides, K and KP are mediator variables between I and the performance of SCM.

For the measurement the performance of SCM, it uses two indicators: conformity of recording data with fertilizer needs of farmers (SCMP1) and conformity of allocation with the fertilizer needs of farmers (SCMP2). Flow distribution of fertilizer from the factory to the area (KP3) and flow transportation of fertilizers (KP4) is an indicator of distribution factor, likewise, innovation for rules and regulation (I3) and innovation for service of officer (I4) are indicators of innovation factor. Supervision of the allocation distribution (K1) and supervision for distribution by location (K2) are indicators of Supervision.

Based on the above discussion, the conceptual framework is presented in Figure 1.

CONCEPTUAL FRAMEWORK

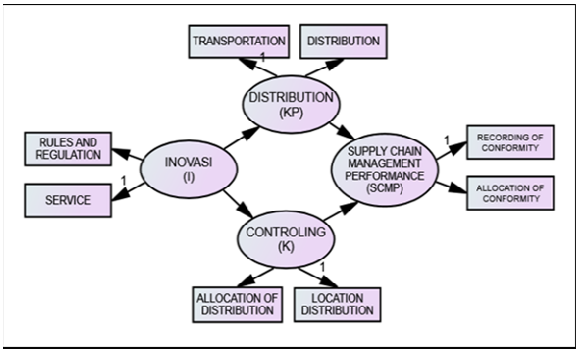

Figure 1: Proposed Conceptual Framework

3. Research Methodology

3.1 Sample Design

To get an item questionnaire that is valid and reliable, there is two (2) field trials and each trial using 40 respondents. Once the questionnaire items are reliable and valid, eight hundred (800) questionnaires, which twice the sample size required (450), were distributed to the respondents. This is in accordance [11] which states that the number of samples using SEM to be effective on a sample size of 150 -. 450. Of 73% of the questionnaires, which five hundred and eighty to be precise, were returned. After filtering, then as many as 513, or 64% of data can be used for analysis.

Sampling of the population occurred in two stages. The first stage is the selection of provincial samples with stratified random sampling method. From 33 provinces in Indonesia, it obtained five (5) provinces. However, according to the writer's observation sufficiently representative for the area generally granary with different infrastructure. In the second stage, the selection of samples number in each province hold with a random sample table and systematic review of 450 of the total plan [20].

3.2 Measurement and Analysis Method

Data analysis is done by statistical analysis of SEM (Structural Equation Model) using software Amos 22, consists of three stages; model identification,

the test measurement model and structural model of the test.

Measurement of the dependent variable and independent variables using a Likert scale (1 = strongly disagree and 7 = strongly agree).

4. Data Analysis

4.1 Demographic Profile of the Respondents

Respondents in this study is the manager authorized distributor and retailer of subsidized fertilizer, the majority of men (78.2%), average aged 31-50 years (59.3%). Being a distributor and retailer of between 5-10 years (47.8), with education background of the respondents generally graduated from high school (60.1%). Only 72 (14%) had some training as a distributor and retailer of fertilizer, and 38 people received awards (7.4%). Total sales of subsidized fertilizer generally below 1.000 tons (85%) for each growing season. Having a fertilizer warehouse with the capacity of being, which is 500 tons (91.2%), and approximately 149 people (32.9%) had a fleet of trucks. In general, respondents in work assignments generally have three employees, and the airport is less than 10 retailers or farmers.

4.2 Generated Structural Model (GM)

By utilizing an adjusted file, which gives the covariance relationship between E 40 and E46 research produces Structural Model Generated better and more appropriate, because the p-value of 0.104 (p-value> 0.05). Therefore, the explanation will be based on the results of the hypothesis Generated by Structural Model Revision Model (Figure 2).

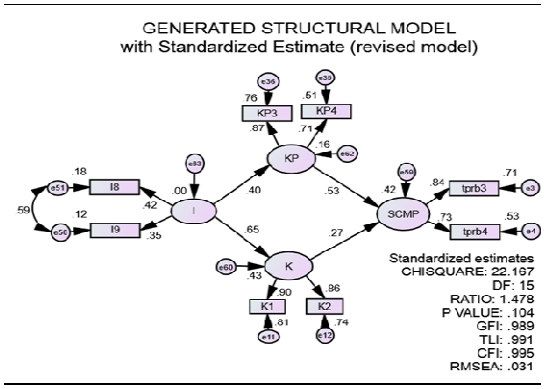

Figure 2. Generated Structural Model

4.3 The Regression Estimates

The generated structural model produces regression standardized beta estimates as in Table 1.

Table 1. Direct Effects Regression Estimates (Beta)

Hypo	End o		Exo	Beta	S.E	C.R	P	Status
H1	SCMP	<---	K	.271	.009	5.271	***	Sig
H2	SCMP	<---	KP	.525	.024	8.990	***	Sig
H3	K	<---	I	.652	.432	3.012	.003	Sig
H4	KP	<---	I	.396	.097	3.521	***	Sig

From the data shown in Table 1, it depicts supervision has a positive significant effect on SCM performance (Beta =0.271; CR = 5.271; p <0.001), or **H1 accepted.**

Secondly, distribution has a positive considerable effect on the performance of SCM (Beta=0.525; CR=8.990; p<0.05) or **H2 accepted**. Thirdly, innovation factor has a positive major effect on supervision factor (Beta=0.652; CR=3.02; p<0.05) or **H3 accepted**. Lastly, innovation factor has a major direct effect on distribution factor (Beta=0.369; CR=3.521; p<0.05) or **H4 accepted**.

4.4 Supervision Mediation on Inovation and the performance of SCM

Furthermore, to examine the role of mediating factors between the supervision and distribution of innovation and the performance of SCM, test results will be compared to the direct and indirect relationships, once inserted Innovation factor. Model and standard regression coefficient of the estimate, such as figure 3 and table 2 below.

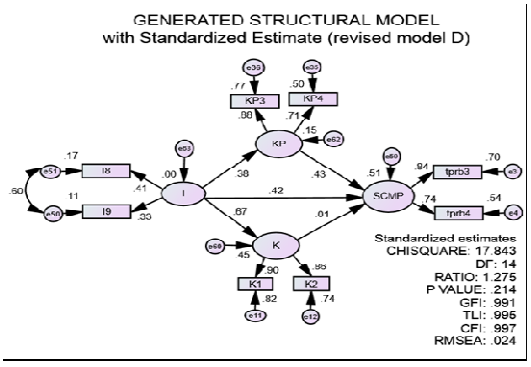

Figure 3. Generated Structural Revised Model

Table 2. Direct Effects Regression Estimates (Beta) after I direct to the performance of SCM (SCMP)

Hypo	Endo		Exo	Beta	S. E	C. R	P	Status
H1	SCMP	<---	K	.010	.037	.049	.961	No.Sig
H2	SCMP	<--	KP	.430	.032	5.546	***	Sig
H3	K	<---	I	.671	.492	2.868	.004	Sig
H4	KP	<---	I	.383	.099	3.500	***	Sig
	SCMP	<--	I	.420	.122	1.269	.204	No.Sig

From the correlation of test outcomes immediate and relationships, once it inserted Innovation factors, the model does not support a finding that the supervision factor (K) mediate significant in the relationship between the I and the performance of SCM (Table 2). It can be concluded that **H5 could not accepted.**

Table 2. Supervision Mediation on Innovation and SCMP

Model Element	Test Mediation in SCMP	Revised model with Direct Effect
Model Fit		
Chi-square	22.167	17.843
Df	.15	.14
P-value	.104	.214
RMSEA	.031	.024
CFI	.996	.997
Std Estimates		
I→K	.652***	.671**
K→SCMP	.271***	.010ns
I→SCMP		
-Indirect	.176	.067
-Direct	0	.420
-Total Effect	.176	.487

4.5 Distribution Mediation on Inovation and the performance of SCM.

From the correlation of test results on the relationship of immediate and circuitous impact, having entered the Inovation (I) figure, the model bolster the finding that KP is a critical go between on the relationship amongst inovation and the performance of SCM (Table 3). It can be reasoned that the **H6 is accepted.**

Table 3. Distribution Mediation on Innovation and the performance of SCM

Model Element	Test Mediation in SCMP	Revised model with Direct Effect
Model Fit		
Chi-square	22.167	17.843
Df	.15	.14
P-value	.104	.214
RMSEA	.031	.024
CFI	.996	.997
Std Estimates		
I→KP	.396***	.383***
KP→SCMP	.525***	.430***
I→SCMP		
-Indirect	.207	.164
-Direct	0	.420
-Total Effect	.207	.584

5. Conclusion and Discussion

The conclusion of this study is the policy of the government in terms of supervision and distribution has an immediate and critical impact on the performance of the SCM of subsidized fertilizer in Indonesia.

It turns out that the distribution factor assumes a more vital part for the accomplishment of the performance of SCM. The success element will determine the distribution of the fertilizer distribution which can provide according to farmer needs in the proper amount, type, time, exact location, prices are set and appropriate quality. This is in line with the findings of the [12] that the shortages of fertilizer to farmers in Indonesia are not caused by a lack of production, but due to the weakness of the system of distribution.

According to the analysis, the issue is quite often a lack of fertilizer, particularly in the growing season, since farmers need fertilizer simultaneously and required in large quantities. If there are issues in the appropriation distribution, farmers will experience difficulty in getting fertilizer, or well known as the phenomenon "the scarcity of fertilizers". Likewise, problems in terms of capacity storage and marketing are generally derived from the system of distribution that has not been adequately planned.

According to the research, there are two issues that need to be under the spotlight on the distribution. The first is the distribution of the subsidized fertilizer from the factory to the farmers (KP3), and second is to transport the fertilizer distribution from the factory to the farmers (KP5). This will improve the performance of the distribution of subsidized fertilizer from factories to wholesalers and then to retailers and to the end user, ie farmers.

The study further showed that the supervision (K) directly affects the performance of SCM subsidized fertilizer. To factor this oversight, there are two things to note for improvement, namely oversight of the allocation distribution (K1) and the monitoring of the distribution of fertilizer in a field to the desired location (K2).

According to the authors, the deviation of the distribution of subsidized fertilizer can occur due to differences in fertilizer prices in the country that are quite large which is the price of subsidized and non-subsidized. Therefore, without the necessary

supervision and strict application of sanctions, there will be a permeation of fertilizer subsidized and non-subsidized in the market. This is consistent with previous studies of [13] that the Indonesian government must strictly implement the supervision over the SC, which means that the strict sanctions should be applied against irregularities, so as a shock therapy for other actors.

Factors innovation has an important role despite the fact that it has no immediate impact on the performance of SCM, because it determines the success factors such as supervision and distribution. In other words, the performance of SCM starting from the innovation factor, due to the achievement of the distribution and the direct supervision influenced by component of innovation. The development of constructive MSC requires innovation. Improvements in innovation could be done, especially against regulations the distribution of subsidized fertilizer (I8) and administrative redemption subsidized fertilizer (I9). With a good factor of innovation, it can affect the success and reliability of distribution and supervision, which in turn will determine the success of the performance of SCM of subsidized fertilizer in the future.

5.1 Conclusion

Factors supervision and distribution factors have a huge influence on the performance of the performance of SCM of subsidized fertilizer.

In spite of the fact that the innovation factor does not directly affect the performance of the SCM of subsidized fertilizer, but its part is vital because innovation factor significantly influencing factor supervision and distribution factors.

Distribution factor being the mediator of the relationship between the factor of innovation and performance of SCM, while the supervision factor is most certainly not.

5.2 Managerial Implication

This paper expresses the importance of monitoring factors, distribution and innovation factor in the performance of SCM subsidized fertilizer, so that relevant organizations can specify the pace and state of mind in settling on choices for development later on.

The study found that some important aspects of the performance of SCM subsidized fertilizer in Indonesia should be tended to in the future, so that policies can be adapted to the conditions of these factors.

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