

# Adopting Supply Chain Management Model to Measure Fishermen Cooperative Performance

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## ABSTRACT

A uniqueness of cooperative enterprise is distinguished principles; user-owner, user-controlled, and user-benefited. In terms of supply chain, this uniqueness should have impact on the business performance as there is almost no asymmetric information among the entities in the supply chain system. This study aims to assess the implementation of the supply chain and proposes a supply chain management model in a fishermen cooperative (the coop). Based on data collected mainly by observation, interview, and focus group discussion with board of the coop, it is revealed that it has no clear pattern of supply chain management as well as performance measurement. The coop is no more than a little auction organizer in fish trading. There are two groups of actor in coop supply chain system; in-system entities and outer-layer entities. In the model, the coop acts as the core of the system while the members represent both the supplier and customer. As supplier, members provide fish, while as customer, members need the fishing equipment, ice, diesel, daily needs, and other necessities. A set of scenarios is discussed to measure the performance of the coop using the supply chain management. Further research needs to be conducted to assess the implementation of the model.

**Keywords:** *supply chain management, fishermen cooperative, performance*

## 1. INTRODUCTION

Measuring supply chain (SC) performance in the context of cooperative enterprises is rarely discussed. SC performance measurement mostly applied on investor-owned firm (IOF) and small-medium enterprises (SMEs). Cooperative (coop) is a unique enterprise. It is owned by those who use them, not by investors or partners whose interest is to make a profit from them [1]. It may be the only one form of enterprise where the members are both the recipients of the benefits of the collective business and also the owner. It implies that the members have to use the products and services of the coop business which depend on the nature of the coop [2]. As a social enterprise, the coop can create substantial social value while also creating economic value [3].

The position of fisherman individually in fishery supply chain system is commonly weak. Fishermen's coop is expected to increase fishermen bargaining power in the system, and ultimately improve their lives. Through the coops, fishermen can collectively have a greater resource that increase its position and bargaining power as an entity in the fishery supply chain system. Study on the improvement of fisheries coop performance has been conducted by [4]. The difference is that this study emphasizes supply chain issues, while [4] emphasizes the management of common pool resource (CPRs).

The fishery supply chain is a complex system because of its perishable commodities, long range of supply, and a large number of entities in the system and asymmetric position of

fishermen. The coop plays a critical role in the system, like original equipment manufacturer (OEM) in the supply chain system of manufacturing.

Unlike IOF and SMEs, SC performance measurement of the coops is rarely discussed. In the IOF and SMEs, SC performance measurement mostly focus on customer and operational perspectives. On the other hand, performance measurement of the coops generally concern on the role of the coop in maximizing benefit to its member both in term of economic value and other kind of benefit.

Because of its distinctive characteristics, SC performance measurement of the coop should consider other aspects that are not taken into account in those of IOF and SMEs. This paper presents an overview and evaluation of the performance measurement of the coop. The aims of this study are to assess the implementation of the supply chain of the coop and propose a model of coop performance measurement using Supply Chain Management (SCM) framework.

## 2. LITERATURE REVIEW

### 2.1. Supply Chain Management

The concept of SCM has been widely discussed by experts and researchers. Reference [5] define SC as a collection of three or more entities that are directly involved in the activity of the flows of products, services, finances, and/or information either towards the upstream or downstream from a source to a customer.

According to [6], the supply chain is a network of interdependent organizations and cooperates to control, regulate and improve material flow and information from

suppliers to end users. Much like [6], [7] suggests a strictly emphasizing that SCM is a network of multiple businesses and relationships. SCM offers the opportunity to capture the synergy of intra and intercompany integration and management the supply chain is also a corporate network [7].

Reference [8] define the supply chain as a logistics network consisting of suppliers, manufacturers, warehouses, distribution centers, and retail outlets, where raw materials, semi-finished goods, and finished goods are flowing between the facilities. Supply chain also defined as a network of all organizations (from suppliers to end users) and activities related to the flow and transformation of goods, information and money [9]. Based on the experts' opinions, it can be concluded that SCM deals with the management of material flows involving many entities through many stages from the upstream supplier start to end customers, and the services and information accompanying.

## **2.2. SC Performance Measurement**

Similar to SCM, the discussion of SCM performance spread as the emergence of SCM concepts and practices. Reference [10] emphasizes three types of SC performance of manufacturing; resource, output, and flexibility. Subsequently, [10] categorizes all three types of measurements into their respective goals and purposes.

SC activity/process is used as basis of SC performance measurement. Reference [11] summarize SC performance metrics based on SC activity/process then address it into three categories respectively; strategic, tactical, and operational.

The Balance Score Card (BSC) model of [12] is also applied in measuring supply chain performance. The four dimensions of SCM Framework developed by [13] for example, refers to BSCs' [12] with adjustment, SCM goals, SCM customer benefits, financial benefits, end customer benefits, and SCM improvement. Adopting BSC model, [14] elaborate four dimension of BSC in the metrics addressed to operational SC like fill rate and conformance to specification for customers perspective, work-in-process and resource utilization for internal processes, best improve and new information technology investment for innovation, and value added, increasing profit, market share and other financial metrics for finance perspective.

Similar to [14], [15] propose a SCM performance model using BSCs' [12] four terms dimensions that are translated into more operationally corresponding metrics. These metrics and measures reflect strategic goals and objectives of SCM [15].

## **2.3. Coop Enterprise**

Coop is defined as an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise [16]. Characterized by its principles, the coop is a unique enterprise compared to IOF and SMEs. According to [16], the coop principles reflect two type of principles: business

principles reflecting how relationship between the coop and the member should be designed, and society principles reflecting the reduction of transaction costs for members in their interaction.

From a partnership perspective, the uniqueness of cooperatives is reflected in the position of members who have a dual interest, that of patronage (as customer or supplier), and that of investor (owner/shareholder) [3]. According to [2], one of the main features of a cooperative is that it is one of the few forms of enterprise, if not the only one, where the members are both the recipients of the benefits of the collective business and also the owners.

From the perspective of information use, [18] pointed that the coops have the potential to exploit information more efficiently than other forms of vertically integrated firms. Both member and coop face a greater incentive to gather and transmit information. The coops also represent a way of obtaining the benefits of scale economies while at the same time retaining knowledge of the products.

## **2.4. Measuring Coop Performance**

In accordance with its uniqueness, measuring coop performance should cover not only economic and organization aspects, but also social perspective, albeit many scholars emphasize on economic factors for performance measures.

The study by [19] conclude that financial performance of cooperatives are classified into two categories, the study based on the economic theory of the firm and the study emphasizes on accounting techniques. In terms of economic, [20] measure the performance of coop using efficiency measures. Efficiency is deployed into technical efficiency consists of input-oriented technical, scale and allocative efficiency.

Research on coop performance generally involves non-economic aspects. Reference [21] develop a multidimensional controlling model to cover aspects should be assessed in measuring coop performance. There are three dimensions to be measured: economic and financial performance, social effectiveness and institutional legitimacy. Each dimension is further deployed into technical indicators according to their respective measures. In matching these three dimensions, [21] further integrate measures as follows:

- For the economic-financial and social effectiveness fields: productivity of inputs
- For the economic-financial and institutional legitimacy fields: compliance with the non-distribution constraint
- For the social effectiveness and institutional legitimacy fields: correspondent between achieved results (revenue, outcomes, impact) and the stated mission, and involvement of workers and users/beneficiaries in decision making.

According to [22], non-financial performance indicators can be categorized into four groups: staff profile, community investment, members and environment. These categories are applicable to all type of coop.

Solidarity, mutuality, participation and coop principles are used as social dimension measures by [23]. They develop dual dimensions matrix to figure the performance of a coop

both in terms of economic dimension and social dimension. Each dimension is ranged between -100 and 100, where the smaller the score the less effective and efficient the coops' performance.

Measuring coop performance that addresses the nature of the coop organizational form is performed by [24]. They promote a framework of performance assessment of the coop, where there are two categories (reflecting the dual nature of the coop: business nature and social membership nature), to be assessed. The business nature is further divided into three sub categories: business financial appraisal (BFA), business efficiency appraisal (BEA), and subjective business appraisal (SBA), and then takes the organization (the coop) as unit of analysis. Meanwhile, the social membership nature is divided into two sub categories: objective membership appraisal (OMA) and subjective membership appraisal (SMA), and then takes the member(s) as unit of analysis.

### **3. METHOD**

This research is conducted through a case study on a fishermen coop in a fishermen village in Mayangan Sub District, Subang Regency, and West Java Province, Indonesia. Supply chain management practice is observed, and internal assessment on the coop performance is undertaken.

Primary data are collected mainly by observation, interview, and Focus Group Discussion (FGD). Five boards and a manager take part in the FGD, while two official staffs and three members of the coop are interviewed. Secondary data are gained from references that are strongly related to SCM, SCM performance, cooperative, and also cooperative performance. As the so-called "social enterprise", there are many stakeholders involved for the coaching and supervision over coop performance as source of secondary data.

Coop performance is assessed by comparing the extent of its achievement with the standards of performance stipulated by the provisions that apply both in the financial measures and institutional aspects. Financial and supply chain measures are applied in assessing financial and operational performance whereas, social and institutional measures are applied in assessing non-economic performance.

## **4. RESULTS AND DISCUSSION**

### ***4.1. The Coop Profile***

The coop was established in 1998 and currently has a total of 246 members, that all are fishermen. Consisting of 246 fishermen member, the coop is led by 5 official boards: chairman, vice chairman, secretary and vice secretary, and treasury.

Currently, the main business of the coop is organizing fish auctions of fishermen members. The coop also serves credit union (CU) to facilitate members who need money to fulfill

their daily needs. The loans are refunded as soon as they sell their catches.

Production activities are carried out through fishing in seasons where weather conditions allow members of fishermen to sea. Due to the weather conditions, they can only effectively go to sea for 8 months. Consequently, there is virtually no economic activity that can be undertaken during the famine season where they are not at sea. This conditions affects the decline in their welfare levels. Therefore, the coop are expected to be an alternative source of income for the welfare of fishermen.

### ***4.2. The Coop Performance***

For the present situation, where the coop only manages the fish auction and credit union, the complete measurement of performance is hard to do. This is due to the lack of data to measure. The coop performance can be assessed using five dimension performance measures: institutional, business, financial, benefits for members, and benefits for society. The dimensions then deployed into indicators that reflect the performance of the coop. Refers to [21], the dimensions cover all the triangle dimensions of the performance. Economic and financial value added are included in business and financial dimensions, social effectiveness in benefits to members and benefits to society dimensions, and institutional legitimacy in institutional dimension.

Assessment on all the five dimensions reveals that almost all indicators show that the performances of the coop are poor. This conclusion emerges in the FGD and empirically, the documents available for performance measurements are also very slight. There is inadequate data to be measured to describe how coop performance is, especially from economic aspects and social effectiveness. Therefore, performance measurement will be developed using illustrative model where the coop serves as socio-economy entity that improves welfare for members and society.

### ***4.3. Supply Chain Model of Fishermen Coop***

The main activity of the coop members is catching fish. In the model, the fish flows from the fishermen through an auction process or broker that further sells it to industrial customers or end-users. Hence, the fishermen are positioned as suppliers and the coop as distributor. As a unique enterprise, the coop must be able to play a critical role, not only as a broker and serving CU, but also as socio-economic entity that gives maximum benefit to its stakeholders.

As an entity whose primary purpose is not only to create profit but also the welfare of its stakeholders and socio-economic inclusion, as emphasized by [25], the coop must be able to create value added both economically and socially. Hence, the coop is advised to scale-up its business that has a close connection with the key activities of the members, such as retail stores, payments gateway, and agency. With the retail store, the coop can provide tools needed by members to go to sea, daily necessities for members as well as their families while they are at sea, and other necessities of life.

Payment gateway is third-party service that facilitate members to pay their bills to third parties. In addition to convenience, members can pay bills at a lower cost than they do through another payment partners.

As a line of business, the agency can be one of the revenue streams for the coop. The agency is a third-party products or services fee-based selling such as ticket, fuel, etc.

The business model whereby coops exist with diverse business lines involves many entities that make up the supply chain system. The position of members, the coop, and other entities in the system can be illustrated in Fig. 1. The figure shows that the coop is the core of the system,

while members are the entities that act as suppliers and customers as well. As a member, fishermen supply fish to the coop for auction. The coop, therefore, acts as customer. Meanwhile, as a customer, fishermen buy means for fishing and other needs during fishing. To provide goods for sale, such as fishing equipment, fuel, groceries, and daily necessities, the coop are not adequately supplied by members. The coop requires partners outside the members as suppliers. The coop are keen to engage suppliers outside of members who have the capacity to provide goods at competitive prices so as to economically benefit members.

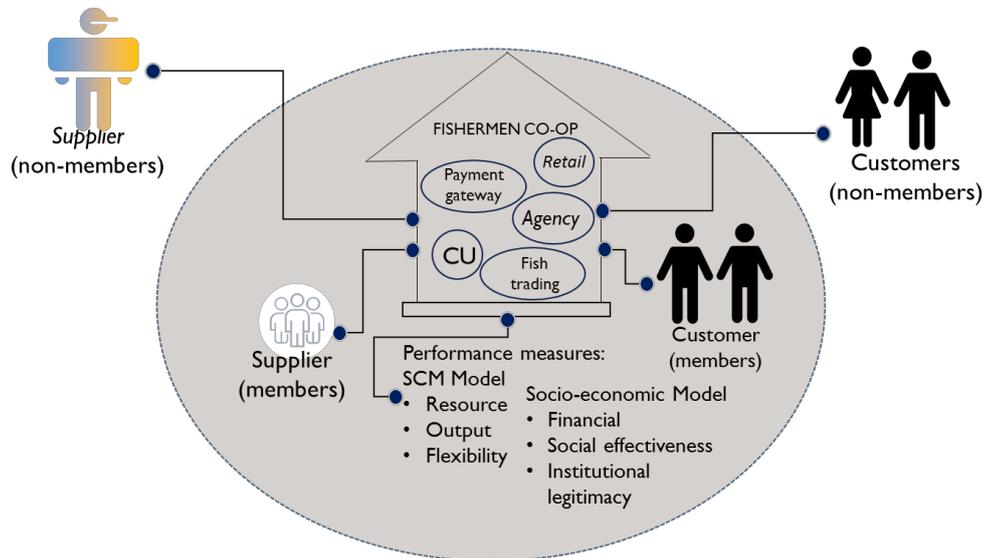


Figure 1 Supply chain system typical of fishermen coop

#### 4.4. Measuring Coop Performance Using SCM Framework

Scholars typically measure the coop performance based on economic and financial, and social aspects. Economic and financial performance measurement is used to check their financial accountability [21]. Comprehensive assessment on the coop performance covers social and institutional aspects other than financial.

Cooperative performance can also be reviewed from the SCM framework, refers to the concept of [10], where the measures consist of resource, the output, and flexibility, that is, cooperative capability responds to environmental changes both internally and externally. As seen in Fig.1, performance of the coop can be assessed with two models: SCM model and socio-economic. SCM model assess the coop performance based on three aspects of SC; resource, output and flexibility.

From the resource perspective, the coop performance is measured by the efficiency of resources utilization. Efficiency can be measured by cost of labor, cost of inventory its hold, and total cost the coop expend to operate its business. The ultimate measure of the efficiency is the return the coop gain from the member capital its use.

From the perspective of output, the coop performance can be assessed on how effective it satisfies the members requirements is. The more capable the coop meet the member needs, the better the coop performance. The capabilities of the coop in satisfying the member are measured by the time of fulfilling, the availability of goods the member need. The faster the coop fulfill member requirement, the better the performance. In the perspective of availability, the more available the goods, the higher the capability of the coop. The ultimate indicator of the effectiveness is the profit the coop gain from its operation. The flexibility is indicated by the coop capability to respond the change of member as well as non-member relation requirement. As revealed in observation, the member sometime change their requirement of fishing tools or fuel immediately. So the non-member partners do, especially industry customer. They sometime change the specification of fish they asked immediately. The coop should be able to respond these change so that they are not dissatisfied. The similarity of SCM model with socio-economic model is as of the economic perspective. In the socio-economic model, financial indicators are applied in the economic and financial perspective. For these measures, Soboh [21] elaborate the indicators comprehensively. The difference between SCM model and socio-economic model is the point of view, where the SCM model emphasizes on the relation between supplier and customer whereas, the socio-

economic emphasizes on the relation between the coop and the member.

Measuring the social effectiveness of the coop concerns on the benefits the member and society gain from the coop. Member benefits can be in terms of shared/distributed profit they get, lower cost for getting fishing tools and other necessity, quicker time to get goods they need. Society benefits can be employee absorption, economic activity the society can take part in, availability of goods they need, etc. The institutional aspects can be assessed by how the coop comply the regulation, formal as well as norms. The indicators of compliance are the legal requirements fulfillment (valid act of establishment, documented and formalized governance like standard operations management/SOM, standard operating procedures/SOP, and other procedures). For this aspect, there is a little document the coop has due to their narrow scope of business.

## 5. CONCLUSION

Coop is a unique enterprise compared to IOF or SMEs. It characterized by socio-economic type of business where the owners are both the supplier and customer. Measuring SC performance can be based on the combination of SCM model and socio-economic model. From the resource perspective, the coop performance is measured by the efficiency of resources utilization. From the perspective of output, the coop performance can be assessed on how effective it satisfies the members requirements is. The flexibility is indicated by the coop capability to respond the change of member as well as non-member relation requirement. All three aspects of the SC performance assessment are the essence of the model developed to assess the fishermen coop performance. Currently, there is inadequate data to assess the coop performance. To maximize its role as socio-economic enterprise, it is advised the coop to scale-up its business like retail, agency, and payment gateway. The limitation of this research is the small unit of analysis. Further research should involve more coop to get real condition of the performance of it and the reflection of SC system of the coop.

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