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Supply Chain Integration and Technological Innovation for Business Performance of Aquaculture Contract Farming in Malaysia: A Conceptual Overview

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Abstract— This paper conceptualizes the supply chain integration and technological innovation for business performance of aquaculture contract farming landscape in Malaysia. Based upon the SCM philosophy, it highlights on the three related variables of supply chain integration, namely: external integration with suppliers, external integration with customers and supply chain risks, and technological innovation, and the relation amongst the variables in focus that perhaps could produce possible promising business performance. Hence, ability to conceptualize, observe and give due recognition to the possible relation amongst these variables in question by the prospective aquaculture contract farming participants, perhaps could bring about an insightful engagement for the betterment of the aquaculture business performance.

Keywords— *Supply Chain Integration, Aquaculture Contract Farming, Technological Innovation, Business Performance, Supply Chain Risk.*

1. Introduction

Since independence, the development of agricultural economics activities in Malaysia, have long gained focus. Malaysia drives how agriculture can best contribute to overall economic growth and modernization, premised on believed that robust agricultural growth and productivity increases are crucial to sustain in term of economic development. Despite this widely acknowledged role of agriculture in economic development, many policy makers, policy analysts and academics in developing countries, international agencies and donor communities appear to have lost interest in the sector, often relegating its role from engine of

growth to sunset status [1] and [2] or arguing for its continuing relevance and importance [3]. However, after almost two decades of relative neglected, interest in agriculture is returning in a big and passionate way, as manifested in the 11th Malaysia Plan, where it is heralded as the next (third) engine of nation growth.

Following the impact after 1997 world financial crisis Malaysia fast made a reviewed on its agricultural food production to ensure the sector's contribution to the national economy and its global competitiveness continuously remain resilient. As a testimony of the government's commitment, the Third National Agricultural Policy (NAP3) and its action plans was formulated and endorsed in the year 1998. Within, the potential and importance of fisheries as food security commodity and potential foreign exchange earning was highlighted and given a significant task to balance out food import bill which long time was shown a deficit. The increase in production and contribution was set to be from aquaculture sector which is currently is not fully utilized. Government will capitalize the vast production area which is still available and not the least to employ improves technology which enables high productivity yet with environmentally friendly approach. The target was set at 662,000 mt to be achieved by and beyond 2010. The main commodity singled out from aquaculture food production are marine shrimp (180,000 mt), marine fish (122,000 mt), fresh water fish (230,000 mt), cockle (130,000 mt) and sea weed (125,000). In a move to get closer to the production target and to boost the image as a producer of quality aquaculture products the government introduced best aquaculture practices management and food

safety programs. However, consider a few years more to go before the policy year end quantity and quality of the produce was far yet from satisfactory. The issue of production sustainability, employment of improved technology, concept of eco-friendly, food safety regulations and the likes are still challenges facing the industries. Among the crucial variables that are somewhat receiving less attention that ought to be given due consideration include the affairs of supply chain integration, namely: external integration with suppliers, external integration with customers, and supply chain risks, and technological innovation towards achieving significant business performance. All these variables may avail in the agriculture sector, perhaps also in aquaculture contract farming.

According to [4], in their FAO manual for contract farming, distinguish between five models. These models differ in the type of contractor, the type of product, the intensity of vertical coordination between farmer and contractor, and the number of key stakeholders involved. The models are centralized model, nucleus estate model, multipartite model, informal model and intermediary model. In this study, investigation will endow with a conceptual focus on supply chain integration and technological innovation for business performance of aquaculture contract farming in Malaysia.

Given the above new development, this paper aims to unveil some possible state of affairs that could lead to this rejuvenation of interest in agricultural economic activities, with specific focus on contract farming in aquaculture. Hence, this paper will address the above mentioned subject matters from the preceding paragraph, namely: supply chain risks, external integration, and technological innovation toward business performance, in the context of aquaculture contract farming landscape. The rest of the paper addresses on the background of contract farming in aquaculture, follows by the SCM philosophy and supply chain integration, and finally this paper ends up with concluding remarks on the subject matter of discussion.

2. Literature Review

2.1 Contract Farming in Aquaculture

Like many industries in the world, there is great competition in the agricultural sector. Demand for agricultural products, particularly those relating to food production, is high. In order to meet the demand various techniques, technologies and chemicals have been introduced to increase productivity. In Malaysia, within the Five year term Malaysian Plan, agriculture has been placed as the third-highest income generator for the country. The government has undertaken various strategies and measures to further increase food production. The strategies include the opening of new agriculture lands, and introduction of modern agricultural production techniques and other initiatives the like. Further, the agriculture ecosystem is flourished by the presence of the practice of contract farming in poultry, so as its presence in the aquaculture environment.

Contract farming is not a new industry in Malaysia, having been established since the early 1980s. The scheme was originally designed for poultry-based broiler farms, and was then broadened to other types of farming, including aquaculture. Contract farming can be defined as agricultural production based on an agreement between a buyer and farmers, which establishes conditions for the production and marketing of a farm product or products. Commonly, the farmer agrees to produce their products according to the quality and quantity determined by the purchaser. In turn, the buyer commits to buy the product and, in some cases, to support production through, for example, the supply of farm inputs, land preparation and the provision of technical advice. Hence, it is obvious that there exist the relationships based on collaboration between business partners, namely: the farmers and buyers. The said relationship based on such collaboration becomes a fundamental subject matter in the supply chain management (SCM) phenomenon. The following section provides the highlight of SCM philosophy, supply chain integration related concepts in relation with business performance of aquaculture.

2.2 The SCM Philosophy and Supply Chain Integration

To some people, SCM is a management philosophy, while to others it is a management process, and some view it as an integrated system. However, [5] succinctly expressed, in operational term, that SCM involves the movement of materials and products; while [6] defined that supply chain as a network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer. Thus, the supply chain can be described as the connecting process across supplier-user relationship, starting from the raw materials (such as agriculture inputs) and ending with the consumption of the finished products, in aquaculture environment are the fishes, shrimps, cockles and the like.

Generally, the supply chain comprises of all the internal and external functions of an industry which enable the value chain to produce items and supply services to ultimate customer or end user of an industry and in this context is the agriculture sector. Hence, the SCM essentially combines supply and demand management within and across business entities. This management philosophy concentrates on how businesses make use of their supply processes, technology, information, and skills to improve their business performance through the coordination of production, materials, logistics, and distribution and transportation functions within an organization SCM as an integrative strategic initiative to manage the overall movement of a distribution route from supplier to the end user. Having stated so, the subsequent sections provide specific highlight on the three related variables of supply chain integration, vis-a-vis, external integration with suppliers, external integration with customers, and supply chain risk. All these variables are anticipated having bearing on business performance. The innovation in agriculture in relation with business performance is discussed then.

3. Discussion

3.1 External integration with Supplier and Business Performance

Organization's integration with suppliers refer to that entity working closely with suppliers and viewing the latter as an important component of supply chain [7]. In this article, this variable also

encompasses the degree of involvement and influence suppliers have in the company's decision. It also measures how closely suppliers work with company to seal a deal [8]. The level of strategic partnership with suppliers has been used to refer to closer, longer-term relationships with suppliers [9].

Several previous studies have also examined the effects of supplier involvement effort on performance [10]. One of the earliest studies on the effect of supplier involvement effort is reported by [11]. The author found positive impacts on shorter project lead-time and fewer engineering hours from strong inter-firm communications, intensive joint engineering problem solving, and early involvement. [12] operationalized the buyer-supplier interface as timing of supplier involvement, and supplier's responsibility for policy. Overall, this body of research tends to emphasize the positive side of supplier involvement in business performance. Perhaps this scenario is anticipated to exist in the context of aquaculture contract farming landscape.

3.2 External integration with Customers and Business Performance

Company's integration with customers refers to company working closely with customers and viewing the latter as an important component of supply chain [13]. In this article, this variable also encompasses the degree of involvement and influence customers have in the company's decision. It also measures how closely customers work with company to seal a deal [8]. On the demand side of a supply chain, through customer integration, firms will penetrate deep into the customer organization to understand its products, culture, market and requirements. With increased visibility, customer integration will further enable collaboration in demand planning [14] otherwise, due to the lack of information sharing from one and end of the supply chain to the other, there will be tremendous inefficiencies in customer service [15], consequently affected business performance on the whole.

3.3 Supply Chain Management Risk and Business Performance

A supply chain is a network that includes vendors of raw materials, plants that transform those materials into useful products, and distribution

centres to get those products to customers. Known also as the value chain, it is the sequence, which involves producing and delivering of a product or service. The simultaneous integration of customer requirements, internal processes and upstream supplier performance, however, is not commonly free from risk, vis-a-vis, supply chain management risk. Perhaps, the potential occurrence of possible or anything that may disrupt or impede the information, material or product flows from original suppliers to ultimate user, may affect the business performance.

3.4 Innovation in Agriculture Sector

Currently, more than ever before, global food and agricultural systems are undergoing a process of rapid change. Growing consumer demand and changing consumer preferences have emerged as key drivers of agricultural prices, technology, and trade. Global integration of agricultural markets, and supply chains have created new opportunities for sharing of goods, services, and ideas among suppliers, consumers, producers, researchers, and entrepreneurs. These changes have been accompanied by new technology and other fields that have the potential to change the quantity and quality of food and agriculture produced and consumed worldwide. These rapid changes and emerging conflicts strongly suggest that developing countries will need to develop more responsive, dynamic, and competitive agricultural sectors in the short to medium term to benefit from the changing global system. Agricultural innovation will be the order of the day, and developing countries will need innovative policies, programs, and investments just to keep up.

4. Conclusion

In this paper, three variables of supply chain integration, namely: external integration with suppliers, external integration with customers, and supply chain risk; as they may have different effects on business performance. It is also possible that the effects technological innovation on each of these three elements of supply chain integration differ from one to another. These concepts are discussed above in turn. In the scope of this paper, external integration in the supply chain perspective involves the processes of collaboration with suppliers and customers to achieve mutually acceptable results. Linkage with suppliers and with

customers helps to reduce lead-time which undoubtedly reduce the adverse effects, such as bullwhip effects, and contribute to enhanced business performance. Perhaps the outcome of supplier integration could act as a competitive competence, meriting management consideration and resources. Hence, when companies are integrated and acted as a single entity, performance is shared throughout the chain. Similarly, collaborations and combined experience of both parties can help reduce errors, defects or flaws in routine, which leads to improved operational performance. This scenario perhaps could emerge in the context of aquaculture contract farming in Malaysia. Hence, these milieus ought to be observed, giving due recognition and consideration by the prospective aquaculture contract farming intervenants in light of reaping the fruitful engagement for business performance.

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