Available at www.ictom.info

ICTOM

Conference Proceedings © 2012 – ISBN: 978-979-15458-4-6

www.sbm.itb.ac.id

www.cob.uum.edu.my

The 3rd International Conference on Technology and Operations Management

"*Sustaining Competitiveness through Green Technology Management*"

Bandung – Indonesia, July 4-6, 2012

The relationships between supplier and customer involvements towards broiler business performance: An empirical investigation on Malaysian poultry industry

Ahmad Shabudin Ariffin[1,*], Hendrik Lamsali[1,*], Shahimi Mohtar[1,*]

[1]School of Technology Management and Logistics (STML) - College of Business (CoB) - Universiti Utara Malaysia (UUM), Sintok 06010, Kedah Darul Aman, Malaysia

Abstract. Agriculture is one of the key sectors for international trade that supply foods to the world population. The major contribution of broiler consumption in improving per capita nutrients level is well documented. In the meantime, the importance of supplier and customer involvement within supply chain operations are also well acknowledged. Nonetheless, empirical evidence linking broiler business performance and the aforementioned involvements remains elusive. Hence, this study proposes an investigation over potential relationships between supplier and customer involvements towards broiler business performance. The potential moderating effect of managerial skill levels on the abovementioned relationships is also proposed. A research framework and six hypotheses are then forwarded to further gauge the issues. Plugging the information gap in Malaysian poultry industry and examining the inclusion of customer involvement and managerial skill levels into the model are the focal contribution of this study. Upon completion, the study is expected to be beneficial to relevant authorities, practitioners and interested parties alike.

Keywords: Broiler industry, supplier involvements, customer involvements, skill levels, producers, integrators, business performance

1. Introduction

At the moment poultry industry in Malaysia has three types of producers. It comprises commercial farms and conventional farms. Commercial farms that run business on contract farming basis with integrator and conventional farms that are belong to independent entrepreneurs. The contracting scheme is therefore more likely to be sustained by its ability to support entrepreneurs than it is by its ability to produce highly competitive. In 2009 there were 3,300 farms in operation carrying a standing population of nearly 186 million broiler chickens. Of these, 4,300 farms 22.9% are large farms with more than 50,000 broilers per cycle while 26.2% are medium scale farms carrying 20,000-50,000 broilers per cycle, and the rest are small farms with 20,000 broilers per cycle. Malaysia is 121.8% self-sufficient in the supply of poultry meat. Most were consumed fresh. It is the main meat type consumed in the country accounting for 70% of the total meat consumed. Only 9% of local

* Corresponding authors.
E-mail address: ashabudin@uum.edu.my ; hendrik@uum.edu.my ; shahimi@uum.edu.my

production was used for further processing. However, processers were increasingly getting supplies from cheaper imported poultry meat for value added processing. In fact, most of poultry supplied for processing were from imports. The main challenge facing the industry is its competiveness, where prior to WTO and AFTA, the broiler industry was highly protected through import bans and quantitative restrictions. Currently some products are under tariff rate quotas. In this respect, transforming the small scale farms to a more capital intensive medium and large scale farms is the major initiative that is needed by the industry to enhance productivity and competitiveness to sustain the industry in a more liberalized market. Another challenge for the industry is to cope with the environmental and pollution issues associated with its production system. In this respect, the government has provided incentives for producers to upgrade their production system from the open to the more efficient and environmentally friendly closed house system of production. Within a relatively short period of time the poultry industry has been able to transform itself from backyard subsistence levels to highly modern, commercial and efficient production systems.

In the meantime, empirical information on broiler business performance in Malaysia is still in infancy stage. The potential impact of supplier and customer involvement towards local broiler business performance also remains debatable due to lack of relevant empirical evidence. Hence, the aim of this study is to propose an investigation over the potential relationships between supplier and customer involvement towards local broiler business performance. The remaining part of this paper is organized as follows: Section 2 reveals relevant literature review, section 3 depicts the conceptualization of research hypotheses and section 4 briefly addresses proposed research methodology and relevant constructs measurements. Expected contribution from the research is stated in section 5 and finally conclusion of the research is presented in section 6.

2. Literature Review

2.1. The Supply Chain Management (SCM) Perspective

Supply chain management (SCM) recently has become popular within practitioners and academician (Burgess, 2006). Supply chain management practices are chartered to deliver the right product, place, time, quantity, quality and condition to the customers at the lowest possible cost (Coyle, *et al.*, 2003; Lumnus, 2003; Li, 2006). Recent business environment has been driven by constant changes, market unpredictability (Swafford *et al.*, 2006; Yusuf, Gunasekaran, Adeleye and Sivayoganathan, 2004; Kim, 2005), rapid technology changes (Lau, 1996) and shorter product life cycle (Hyun and Ann, 1992). This has resulted in diversification of product varieties (Fischer, 1997) and inconsistent global demand (Porter, 1991; Lee, 2004; Ketchen et.al., 2008). Successful organizations remained competitive through various supply chain channel collaborations (Porter, 1990; Speakmanet. Al., 1998; Van Hoek, 2001) while adapting to change market place condition (Reichhart&Holweg, 2000; Kumar et. al., 2006).

2.2. Supply Chain in Poultry Industry

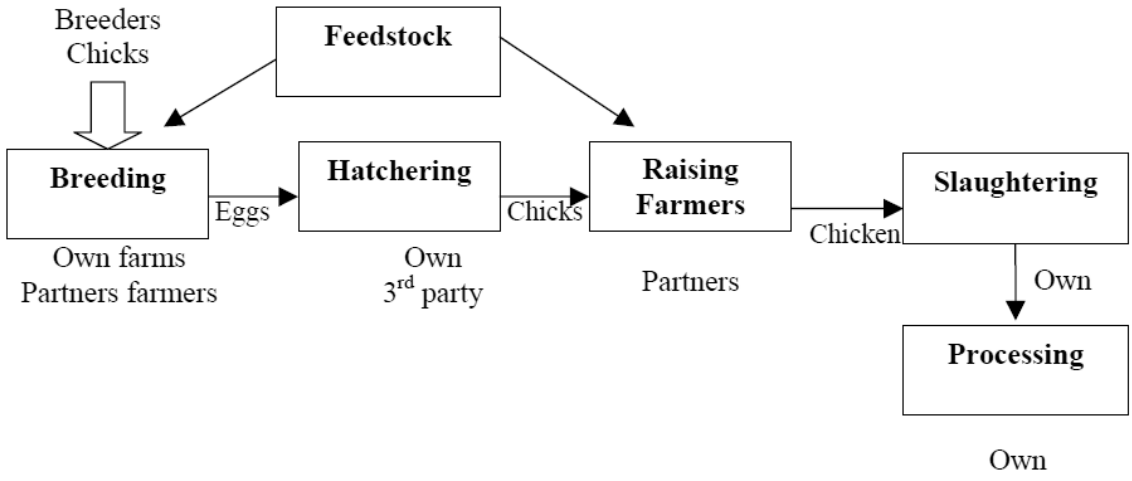

Figure 1. The vertically integrated Poultry Production Supply Chain

The main company has a vertically integrated supply chain, it operates as an integrated producer, owning the majority of all breeding, feed, slaughtering and processing facilities (see figure 1). It uses state of the art technology and a strict hygiene control in all its processes. The company operation counts with rural producers

as integrator and direct collaborators. It operates with a wide variety of distribution channels, ranging from supermarkets to distributors and groceries. It also delivers its products directly to restaurants. The company believes its favorable position in the national and foreign markets is the result of a long-term work that the whole team has been developing along with the strategy of the company in granting service and personalized products.

2.3. Contract Farming

The term "contract farming" generally refers to situations in which a farmer raises or grows an agricultural product for a vertically integrated corporation. For example, thousands of farmers nationwide are growing broilers under contract farming arrangements for major poultry-producing companies. Contract farming arrangements are also becoming common in other kinds of poultry production. There are two parties in a typical contract farming arrangement: the grower and the company (Integrator). Generally, the grower provides the land, the buildings, the equipment, and the labour. The company provides the broiler, the feed, the medicine, and management directions and services. Broiler contracts consist of contracting out the growing stage. Integrators (i.e. the firm that controls or contracts out each stage of production) recruit large farms (growers) to rear broiler chickens for meat according to contractual guidelines. From the growers' perspective, contracts with integrators provide them access to many facets of production that may otherwise be unavailable including credit, production technology, and the world market. Farming contracts can also help growers mitigate risks posed by fluctuations of input prices and provide a secure market outlet for their product. The latter is especially important because of the limited facilities that process chickens raised by independent farmers. While current trends are moving producers toward vertical integration, there remain many farms currently under contract or with unused infrastructure from past contracts. These contracts cover four main elements; price, quality, quantity, and time. The first type, procurement contracts, only specifies the conditions of input purchases and the conditions of output sale. Most integrators in Malaysia participated contract farming with growers for broiler production. Consequently, the integrators are always involved in every stage of production. Growers receive chicks from the firm hatcheries, feed from the firm feed company, veterinary services from the company veterinarians, etc. Therefore, while there are key differences between contract farming and complete vertical integration (e.g. who supervises over important growth stages), most aspects of the supply chain are the same. Total contract arrangements dictate that the growers retain ownership of the broilers during the growing stage because the growers receive all inputs (including chicks) free of charge. Similar to completely integrated production systems, all scheduling in contract production systems is controlled by the integrator. The integrator thereby gathers the benefits of efficient scheduling and decreased transaction costs.

3. Conceptualization of Research Hypotheses

3.1. Product Modularity (PM)

According to (Schilling, 2000) PM as a continuum of describing separateness, specificity (Ulrich, 1995) and transferability of product components in a product system (Lau, Yam, & Tang, 2010). A product is transferrable if the product components in a product system can be reused by another system (Starr, 1965). It can be separated as it can be disassembled and recombined into new product configurations without loss of functionality (Schilling, 2000), and specified as the product component has a clear, unique and definite product function with its interfaces in the product system Ulrich (1995). If a product has high PM (i.e. modular product design), the product system has separate modules with well-specified interfaces across the modules, such as those found in personal computers. The product modules can be transferred to different product lines and progressive development projects. On the contrary, if a product has low PM (i.e. integrated product design), the product components are highly interlinked without well-specified interfaces across the components, like those found in fine art. It is very difficult for these components to be transferred to other product lines. Product modularity is a multi-faceted construct and little consensus of definition has emerged (Gershenson, Prasad, & Zhang, 2003). The literature relates modularity and standardization through commonality and product architecture. In this research, we define product modularity as the use of standardized and interchangeable parts or components that enable the configuration of a wide variety of end products. This definition pre-supposes the concepts of loose combination, ease of disaggregation, dissimilar outputs, and a one-to-one matching of function to module.

Hence, the abovementioned issue is hypothesized as follow:

H1. PM has positive significant relationship with BP

Conference Proceedings © 2012 – ISBN: 978-979-15458-4-6

3.2. Internal Coordination (IC)

Recent literature have stated that successful product development can only be achieved if the organization can effectively integrate internal functional units, including marketing, manufacturing, R&D, and purchasing (Gerwin & Barrowman, 2002); (Clark & Fujimoto, 1991). Diverse internal integration mechanisms (e.g. cross-functional teams, overlapping, employee involvement, concurrent engineering, connections, dedicated teams, empowered teams) have been recommended in different phases of NPD (Griffin, 2002); (Hargadon & Eisenhardt, 2000); (Zirger & Hartley, 1994). Thus, this study defines IC as the degree of the coordination among sales and marketing, research and development, and production to inventory management throughout the product development process.

H2. IC has positive significant relationship with BP

3.3. Product Innovativeness (PI)

An important part of the research within the new product literature focuses on the effect of PI on product performance (Cooper, 1979); (Zirger & Maidique, 1990); (Kleinschmidt & Cooper, 1991); (Cooper & Brentani, 1991); (M. X. Song & M.E. Parry, 1997); (M. X. Song & Montoya-Weiss, 1998). Even with the widely varying conceptualizations and operationalization of the PI construct (Danneels & Kleinschmidt, 2001), there are prevailing views arguing that both higher and lower PI increases product performance while the opposite holds true for moderate PI. In particular, more innovative products require greater efforts and resource commitments from the firm but are likely to have positive performance effects because they gain significant comparative advantages that secure adoption by customers. Likewise, less innovative products reduce the efforts required, because of their familiarity with the core products of the firm. Since they benefit from firm-specific experiences, competencies and resources, they are likely to become more successful, thus leading to higher performance. Based on the above, this study seeks to provide new evidence concerning PI as a phenomenon and extend the empirical literature to the relation between PI and performance. In particular, it classifies firms according to three dimensions of PI and looks for differences in product- and firm-based performance, while directs the attention to the context of industry. Indeed, there is still a major question as to whether smaller as compared to larger firms are more active and successful in product innovation. Despite the persistent, ongoing controversy on this issue (Fritz, 1989), smaller firms are thought to be more innovative than larger firms for many reasons (e.g. respond faster to market shifts and needs, accept and implement change easier). Following this reasoning, many studies refer to attempts of categorising small firms' innovative behaviour (e.g. (Hadjimanolis & Dickson, 2000); (Raymond, Julien, Carriere, & Lachance, 1996); (Rizzoni, 1991). The proposed alternative typology schemes usually contrast two polarised innovation strategies (i.e. strategies behind innovation), such as proactive innovators vs non-innovators or considering intermediate situations, such as reactive innovators. However, the literature as regards typologies according to PI and their relation to business performance within a small firm context lacks evidence. So, in the absence of such evidence it is useful to resort to qualitative evidence from the Malaysia context. Given the above considerations, the research questions that this empirical study raises, attempt to identify differences, if any, in performance measures at both the product level.

H3. PI has positive significant relationship with BP

3.4. Supplier Involvement (SI)

According to (X. M. Song & Benedetto, 2008); (van-Echtelt, Wynstra, Weele, & Duysters, 2008)SI is recognized as an important way for new product success. In this study, SI is defined as the direct participation of the supplier during the product development processes (Ragatz, Handfield, & Scannell, 1997). Suggested by (Fliess & Becker, 2006); (Takeishi, 2001) it involves joint product design, process engineering and production operations with key suppliers. SI helps secure resources and capabilities, which the manufacturers do not have but essential for product innovation(Grant, 1996). It helps the supplier learn new technology applications while the buyer can actively shape product performance (Athaide & Klink, 2009).

H4. SI has positive significant relationship with BP

3.5. Customer Involvement (CI)

Suggested by (Feng, L. Sun, & Zhang, 2010); (Brown & Eisenhardt, 1995)CI is defined as the direct participation of the customer in the design and development stages of New Product Development (NPD), in which the customer engages in problem solving activities and co-develop the final forms of the product with the manufacturers. It involves joint product design, process engineering, and production operations with key customer. According to (Brown and Eisenhardt, 1995; (Clark & Fujimoto, 1991) the early involvement of customers or early customer inputs is essential to develop new products. It facilitates the project teams to

recognize new ideas and opportunities while avoiding development delays due to a mismatch of the ideas and the customer needs(Ittner & Larcker, 1997).

H5. CI has positive significant relationship with BP

3.6. Business Performance

If organizations cannot measure performance, they cannot manage their business (Kaplan & Norton, 1992). If organizations are to survive and prosper in information age competition, they must use measurement and management systems derived from their strategies and capabilities. This statement summarizes the necessity of performance to measure, and asdirect consequence, and to evaluate their performance (O'Raily, Wathey, & Gelber, 2000). Summarizing the ideas of many authors, it can be said that the roles of business performance evaluation are to ensure compliance with crucial minimum standards, to check how well organization are doing, to test strategic assumptions, and to provide a reliable basis for communicating with interested parties (Coelho, Yivisaker, & Turkstra, 2005). The business performance extends the eras of measurements to the three perspectives (Maluenda, 2006).There are innovation, rate of new product development, customer satisfaction, customer retention and operating costs (Zack, McKeen, & Singh, 2009). Business performance is defined as measurable result of the level of attainment of organizations goals (Daft & Marcic, 2001) or measurable result of the organization's management of its aspects (ISO 1999), or mechanism for improving the likelihood of the organization successfully implementing a strategy. Business performance evaluation is the process to help management decisions regarding an organization's performance by selecting indicators, collecting and analyzing data, assessing information against performance criteria, reporting and communicating and periodically reviewing and improving this process (Coelho et al., 2005).

H6. All variable has significantly influence with BP

3.7. Skill Level

Economic theory recognizes several processes by means of which skill is created and contributes to business performance. Despite skill significance in economic theory (Loasby, 1999), it seems that insufficient attention has been paid so far to skill creation in the division of labour in the Agri-Food sector. It recognises that characteriseAgri-Food systems, at the level of both whole chains and groups of agents(Fritz & Schiefer, 2008); (Sporleder & Wu, 2006), and maintains that organisationalskill is a effective source of competitive advantage(Teece, G.Pisano, & Shuen, 1997); (Schroeder, Bates, & Junttila, 2002). It seems that a specific characteristic of the Agri-Food sector, which offers important examples on how organisational choices positively influence skill level, is related to the peculiar distribution of the sources of codified and tacit knowledge (Nonaka and Takeuchi, 1995), with farms mainly involved in the tacit knowledge creation. Researchers are paying increasing attention to food supply systems(Lindgreen, Hingley, & Trienekens, 2008); (Omta, Trienekens, & Beers, 2001); (Menard & Clein, 2004); (Sonnino & Marsden, 2006), and this reflects both the complexity of the sector’s organizational arrangements and the growth of analytical interest in Networks Analysis (Borgatti, Mehra, Brass, & Labianca, 2009). Today, this industry is against the severe economic practices of governments and the most difficulties from governments are certain attention to management preparations in poultry production in order to increase the efficiency(Oknkow & Akubuo, 2001). In addition to three factors of labour force, capital and land, management is introduced as the fourth factor of production which have important role in the three first factors. What is important theoretically is that in each production, due to being quality of management, it must turn to quantity for using some indexes until it can use in production function (Hamidi, 2005). Hence, the managers of agriculture production and producers are considered as the most efficient agent to control efficiency and productivity of business. So, assessment of their performance and efficiency and also their role in realizing farm management goals play important role, So that, (Amini & Ramezani, 2007) had been introduced managers capacity and proficiency as one of the important inter organizational component in success of poultry cooperation's. These managerial skills help them to perform correct selection due to financial levels, workforce, land resources and risk escaping. These skills help the producers for access to income possible levels about what thing must be product, in which part of farm, by what method, when and how much, take informed decision (A.Sh. Al-Rimawi, Karablieh, Al-Qadi, & Al-Qudah, 2006) and (A.S. Al-Rimawi, Emad, & Abdullah, 2004). In this study, the potential role of managers’ skill levels as moderating variable between the aforementioned independent and the dependant variables will be discussed and depicted by the following hypothesis.

H7: SL has significantly moderate relationship between IV and D

Conference Proceedings © 2012 – ISBN: 978-979-15458-4-6

4. Proposed Research Methodology

This study will involve all broiler producers in Malaysia. General approach of this research is quantitative. With regard to the research problem which is try to study the relationship between Supplier Customer Involvement towards Business Performance and moderating of managerial skills in broiler production, it performed based on survey strategy and it is enjoying of descriptive-analytical method. Statistical population of this research consisted of whole industrial boiler production (producers) that registered at Department Veterinary Services (DVS) of Malaysia. The main instrument for data collection was a questionnaire including background of the company, supplier and customer involvement specification and managerial questions about broiler production and individual/professional characteristic.

4.1. Research Design

The objective of the research is to determine the relationship of supplier involvement, customer involvement, product modularity, product innovativeness, internal coordination and business performance. Skill level is a moderating variable between independent variables and dependent variable. Suggested by (Pinsonneault & Kreamer, 1993) that survey research is best to answer questions on what, how much, how many and lesser extent to answer how and why. Literature review also showed survey is appropriate to examine the all variables and the need of higher number sample size to cover the field in different location in Malaysia. Survey method is the best option as it is cost efficient. It does not involved significant amount of time and also need have statistically tested validation to close previous research gaps identified from other researchers. Finally, based on the preliminary interview with experienced industry practitioners, the probability of obtaining commitment from firms to participate in case study are relatively low making this option not advantageous. This research considers case study to triangulate areas of research questions which need more contextual confirmation on how and the level of supplier-customer involvement towards business performance. Based on the literature reviews and problem statement illustrated, there are not many research instrument to measure relationship Supplier-customer involvement towards business performance in agriculture product such as broiler. Hence, specially crafted test instruments through structured questionnaire are used to study the research framework.

4.2. Instrument Development

Independent Variables		
Variables	**Dimension**	**Sources**
Supplier Involvement (SI)	Product Modularity (PM) Product Innovativeness (PI) Internal Coordination (IC)	A.K.W Lau (2011) Wynstra & Ten Pierick(2000) Vonderembse & Tracey (1999) van-Echtelt et al.(2008) Takeishi (2001) Salavou (2005) Stjenstrom & Bengtsson (2004) X. M. Song & Benedetto (2008) Salavou (2004) Ryu, Min, & Zushi (2008) Peter (1996) Avlonitis & Salavou (2007) Danneels & Kleinschmidt (2001)
Customer Involvement in Product Development (CPD)	Customer Involvement in Product Development (CPD)	M.F.Svendsen, et. al. (2011) Ragatz et al (1997) Peterson, Handfield, & Ragatz (2005) Athaide & Klink (2009) Brown & Eisenhardt (1995) Chen, Damanpour, & Reilly (2010) Feng et al (2010)
Moderating Variables		
Managerial Skill Level (ML)	Planning and Goal Setting (PGS) Accounting and Financial Skills (AFMS) Marketing Management Skills (MMS)	M.S.Allahyari et. al (2011) G.Martino & P. Polinori (2011)
Dependent Variables		
Business Performance (BP)	Business Performance (BP)	S. Roll (2010) R.Bhagwat & M.K.Sharma (2007) A.Agus (2010) A.Agus (2011) (Sanchez & Perez (2005) Zelbst, Green, & Sower (2009)

Conference Proceedings © 2012 – ISBN: 978-979-15458-4-6

		Zailani & Rajagopal (2005) Zack et al (2009) Yaaghubi, Chizari, Pezshkirad, & Foeli (2009) Worren, Moore, & Cardona (2002) Webster (2002) Threranuphattana & Tang (2008) Tan, Kannan, & Handfield (1998) Sezen(2008) Saad & Patel (2006) Rosenzweig, Roth, & Jr-Dean (2003)

4.3. Population and Sampling Frame

Malaysia's agriculture sector accounted for 14 percent of GDP in 1995, down from 38 percent in 1960 (Asian Development Bank. Asian Development Outlook 1996 and 1997, 1996). During the past three decades, the Malaysian poultry industry has evolved from small back-yard operations into relatively modern, large-scale commercial operations. One of the factors contributing to the growth of the poultry sector is the replacement of local breeds with high-quality poultry breeds from the United States, Europe, Canada, and Australia. A second factor is the growth of highly efficient integrated production systems. Six of the largest broiler operations are now fully integrated with breeder farms, feed mills, processing plants, and in some cases, retail outlets. The integrated firms account for two-thirds of broiler production in Malaysia and are steadily increasing their market share (Fuglie, 1996). Hence, this sector is logical consideration as the population used for the research. The Malaysia Department of Veterinary Services (DVS) has been commonly used by various researchers as a data base to select population and sampling frame. Based on literature reviews, quality of respondents is an important factor and is expected to have best knowledge about the operation and management of supply chain in their organization. Hence the survey targets managers in operation, materials planning, marketing, general managers or directors. Based on these past experiences, it has been decided to include the entire listed contract broiler producers. The objective is to involve all the producers and to ensure sufficient data collected to meet the criteria of good sampling frame and sufficient data to run the statistical analysis (Bryman & Bell, 2003).

5. Discussion and Expected Result

The contact farming literature reminds us that these arrangements often fail because of opportunistic behavior. The poultry example shows that contracting is a useful institution when processor interests are closely aligned to that of the grower. This paper describes the situations under which this orientation is obtained. First, it enhances to the small and growing body of work that explained the performance contract growers. Second this paper also addresses benefits from contract scheme between suppliers and growers. The potential moderating effect of managerial skill levels on the abovementioned relationships is also proposed. Plugging the information gap in Malaysian poultry industry and examining the inclusion of customer involvement and managerial skill levels into the model are the focal contribution of this study.

6. Conclusion

Almost everyone knows that agriculture seems to have a certain element of poultry farming. This research is expected to identify the factors that involved integrators and growers towards business performance. The information gathered from farm operation management and supply chain system will compile during this study hopefully will give us some indicator and suggestions on how to improve the existing system. The suggestion generated hopefully will become a new innovation initiative to be further germinated and deliberated among the broilers producers suited according to the market requirement. Hence, this study proposes an investigation over potential relationships between supplier and customer involvements towards broiler business performance. Upon completion, the study is expected to be beneficial to relevant authorities, practitioners and interested parties alike.

References

[1] Agus, A. (2010). The importance of new technology and innovation in SCM in enhancing production performance and product quality performance: an investigation on mediating effect. *Global Review of Business and Economic Research, 6*(2), 19-38.

[2] Agus, A. (2011). Supply chain management, supply chain flexibility and business performance. *Journal of Global Strategic Management, 5*(1), 134-145.

[3] Allahyari, M. S., Saburi, M. S., & Keshavarz, F. (2011). Analyzing Farm Management Skills in Poultry Production Enterprises in Iran. *Life Science Journal, 8*(1).
[4] Al-Rimawi, A. S., Emad, K. K., & Abdullah, S. A. (2004). An Investigation into the perceived farm management and marketing educational needs of farm operators in Jordan. *Journal of Agriculture Education, 45*(3), 34-43.
[5] Al-Rimawi, A. S., Karablieh, E. K., Al-Qadi, A. S., & Al-Qudah, H. F. (2006). Farmers' Attitudes and Skills of Farm Business Management in Jordan. *Journal of Education and Extension, 12*(3), 165-177.
[6] Amini, A., & Ramezani, M. (2007). Asessment of most important internal component in the success of poultry production cooperatives Tehran province. *Science and Technologies in Agriculture and Natural Resources, 12*(43), 285-295.
[7] *Asian Development Bank. Asian Development Outlook 1996 and 1997*. (1996). New York:: Oxford University Press.
[8] Athaide, G. A., & Klink, R. R. (2009). Managing seller-buyer relationships during new product development. *Journal of Product Innovation Management, 26*, 566-577.
[9] Avlonitis, G. J., & Salavou, H. (2007). Entrepreneurial orientation of SMEs, product innovativeness, and performance. *Journal of Business Research, 60*(5), 566-575.
[10] Bhagwat, R., & Sharma, M. K. (2007). Performance measurement of supply chain management: A balanced scorecard approach. *Computers in Industrial Engineering, 53*, 43-62.
[11] Borgatti, S. P., Mehra, A., Brass, D. J., & Labianca, G. (2009). Network analysis in the social sciences. *Science, 323*(5916), 892-895.
[12] Brown, S. L., & Eisenhardt, K. M. (1995). Product development: past research, present findings,and future directions. *Academy of Management Review, 20*(2), 343-378.
[13] Bryman, A., & Bell, E. (2003). *Business Research Methods*. New York: Oxford University Press.
[14] Chen, J., Damanpour, F., & Reilly, R. P. (2010). Understanding antecedents of new product development speed: a meta-analysis. *Journal of Operations Management, 28*, 17-33.
[15] Clark, K. B., & Fujimoto, T. (1991). *Product Development Performance*. Boston, MA: Harvard University Press.
[16] Coelho, C., Yivisaker, M., & Turkstra, L. (2005). *Nonstandardized assessment approaches for individuals with traumatic brain injuries.* Paper presented at the Seminars in Speech & Language.
[17] Cooper, R. G. (1979). The dimensions of industrial new product success and failure. *Journal of Marketing, 43*, 93-103.
[18] Cooper, R. G., & Brentani, U. D. (1991). New industrial financial services: what distinguishes the winners. *Journal of Product Innovation Management, 8*(1), 75-90.
[19] Daft, R. I., & Marcic, D. (2001). *Understanding management* (3rd ed.). Fort worth, USA: Harcourt College Publishers.
[20] Danneels, E., & Kleinschmidt, E. J. (2001). Product innovativeness from the firm's perspective: its dimensions and their relation with project selection and performance. *Journal of Product Innovation Management, 18*, 357-373.
[21] Feng, T., L. Sun, & Zhang, Y. (2010). The effects of customer and supplier involvement on competitive advantage: an empirical study in China. *Industrial Marketing Management, 39*(8), 1384-1394.
[22] Fliess, S., & Becker, U. (2006). Supplier integration - controlling of co-development processes. *ndustrial Marketing Management, 35*, 28-44.
[23] Fritz, M., & Schiefer, M. (2008). Food chain management for sustainable food system development: a European research agenda. *Agribusiness, 24*(4), 440-452.
[24] Fuglie, K. O. (1996). Private Investment in Agricultural Research / AER-805. *Economic Research Service/USDA* (International Potato Center Bogor, Indonesia), 114-121.
[25] Gershenson, J. K., Prasad, G. J., & Zhang, Y. (2003). Product modularity: definitions and benefits. *Journal of Engineering Design, 14*(3), 295-313.
[26] Gerwin, D., & Barrowman, N. J. (2002). An evaluation of research on integrated product development. *Management Science, 48*(7), 938-953.
[27] Grant, R. M. (1996). Prospering in dynamically-competitive environments: organizational capability as knowledge integration. *Organization Science, 7*(4), 375-387.
[28] Griffin, A. (2002). Product development cycle time for business-to-business products. *Industrial Marketing Management, 31*, 291-304.
[29] Hadjimanolis, A., & Dickson, K. (2000). Innovation strategies of SMEs in Cyprus, a small developing country. *International Small Business Journal, 18*(4), 62-79.
[30] Hamidi, M. S. (2005). *Management and economic of ostrich culture in Iran.* Tehran, Iran (In Persian): Sepehr Publisher.
[31] Hargadon, A. B., & Eisenhardt, K. M. (2000). *Speed and quality in new product development, in Cole, R.E. and Scot, W.R. (Eds),The Quality Movement Organization Theoy*. Sage, New York, NY.
[32] Ittner, C. D., & Larcker, D. F. (1997). Product development cycle time and organizational performance. *Journal of Marketing Research, 34*(1), 13-23.

[33] Kaplan, R. S., & Norton, D. P. (1992). The Balanced Scorecard-Measures that Drive Performance. *Harvard Business Review*, 71-79.
[34] Kleinschmidt, E. J., & Cooper, R. G. (1991). The impact of product innovativeness on performance. *Journal of Product Innovation Management, 8*, 240-251.
[35] Lau, A. K. W. (2011). Supplier and customer involvement on new product performance: Contextual factors and an empirical test from manufacturer perspective. *Industrial Management & Data Systems, 111*(6), 910-942.
[36] Lau, A. K. W., Yam, R. C. M., & Tang, E. P. Y. (2010). Supply chain integration and product modularity: an empirical study of product performance for selected Hong Kong manufacturing industries. *International Journal of Operations and Production Management, 30*(1), 20-56.
[37] Lindgreen, A., Hingley, M., & Trienekens, J. H. (2008). Relationships, networks and interactions in food and agriculture business-to-business marketing and purchasing. *British Food Journal, 110*(No 4/5), 1-4.
[38] Loasby, B. J. (1999). *Knowledge, Institutions and Evolution in Economics*. London: Routledge.
[39] Maluenda, J. U. (2006). Support effectiveness. Unpublished master's thesis. Malardalen University.
[40] Martino, G., & Polinori, P. (2011). Networks and organisational learning: evidence from broiler production. *British Food Journal, 113*(7), 871-885.
[41] Menard, C., & Clein, B. (2004). Organizational issues in the agrifood sector: toward a comparative approach. *American Journal of Agriculture Economics, 86*(3), 750-755.
[42] Oknkow, W., & Akubuo, C. (2001). Thermal analysis and evaluation of heat requirement of a passive solar energy poultry chick broader in Nigeria. *Journal of Renewal Energy, 9*(1).
[43] Omta, S. W., Trienekens, J. H., & Beers, G. (2001). Chain and network science: a reseach framework. *Journal of Chain and Network Science, 1*(No 1), 1-6.
[44] O'Raily, M., Wathey, D., & Gelber, M. (2000). ISO 14031: Effective mechanism to environmental performance evaluation: Corporate Environmental Strategy. *1*(3), 267-275.
[45] Peter, M. (1996). *Early Supplier Involvement in Product Development, Disssertation.* St. Gallen der University, St. Gallen.
[46] Peterson, K. J., Handfield, R. B., & Ragatz, G. I. (2005). Supplier integration into new product development: Coordinating product, process, and supply chain design. *Journal of Operation Management, 23*, 371-388.
[47] Pinsonneault, A., & Kreamer, K. L. (1993). Survey research methodology in management information system: An assessment. *Journal of Management Information System, 10*(2), 75-105.
[48] Ragatz, G. L., Handfield, R. B., & Scannell, T. V. (1997). Success factors for integrating suppliers into new product development. *Journal of Product Innovation Management, 14*, 190-202.
[49] Raymond, L., Julien, P. A., Carriere, J. B., & Lachance, R. (1996). Managing technological change in manufacturing SMEs: a multiple case analysis. *International Journal of Technology Management, 11*(3/4).
[50] Rizzoni, A. (1991). Technological innovation and small firms: A Taxonomy. *International Small Business Journal, 9*(3), 31-42.
[51] Roll, S. (2010). *An empirical study of the supply chain relationships among strategy, flexibility and performance.* Open University of the Netherlands, Amsterdam.
[52] Rosenzweig, E. D., Roth, A. V., & Jr-Dean, J. W. (2003). The influence of an integration strategy on competitive capabilities and business performance: an exploratory study of consumer products manufacturers. *Journal of Operations Management, 21*(4), 437-456.
[53] Ryu, S., Min, S., & Zushi, N. (2008). The moderating role of trust in manufacturer-supplier relationship. *Journal of Business & Industrial Marketing, 23*(1), 48-58.
[54] Saad, M., & Patel, B. (2006). An investigation of supply chain performance measurement in the Indian automotive sector. *Bechmarking: an International Journal, 13*(1/2), 36-53.
[55] Salavou, H. (2004). The concept of innovativeness: should we need to focus. *European Journal of Innovation Management, 7*(1), 33-43.
[56] Salavou, H. (2005). Do customer and technology orientations influence product innovativeness in SMEs? Some new evidence from Greece. *Journal of Marketing Management, 21*, 307-338.
[57] Sanchez, A. M., & Perez, M. P. (2005). Supply Chain Flexibility and Firm Performance: A conceptual model and empirical study in automotive industry. *Journal of Operation Management, 17*, 97-113.
[58] Schilling, M. A. (2000). Towards a general modular systm theory and its application to interfirm product modularity. *Academy of Management Review, 25*(2), 312-334.
[59] Schroeder, R. G., Bates, K. A. V., & Junttila, M. A. (2002). Resources-based view of manufacturing strategy and the relation with manufacturing performance. *Strategic Management Journal, 23*(2), 105-117.
[60] Sezen, B. (2008). Relative effects of design, integration and information sharing on supply chain performance. *International Journal of Supply Chain Management, 13*(3), 233-240.

[61] Song, M. X., & M.E. Parry, M. E. (1997). A cross-national comparative study of new product development processes: Japan and the United States. *Journal of Marketing, 61*, 1-18.
[62] Song, M. X., & Montoya-Weiss, M. M. (1998). Critical development activities for really new versus incremental products. *Journal of Product Innovation Management, 15*(4), 124-135.
[63] Song, X. M., & Benedetto, A. D. (2008). Supplier's involvement and success of radical new product development in new ventures. *Journal of Operations Management, 26*(1), 1-22.
[64] Sonnino, R., & Marsden, T. (2006). Beyond the divide: rethinking relationship between alternative and conventional food networks in Europe. *Journal of Economics Geography, 6*(2), 181-199.
[65] Sporleder, T. I., & Wu, S. Y. (2006). Social capital and vertical ties in agrifood supply chain. *Journal of Chain and Network Science, 6*(1), 1-7.
[66] Starr, M. K. (1965). Modular production - a new concept. *Harvard Business Review* (November-December), 131-142.
[67] Stjenstrom, S., & Bengtsson, L. (2004). Supplier perspective on business relationship: Experiences from six small suppliers. *Journal of Purchasing and Supply Management, 10*, 137-146.
[68] Svendsen, M. F. (2011). Marketing strategy and customer involvement in product development. *European Journal of Marketing, 45*(4), 513-530.
[69] Takeishi, A. (2001). Bridging inter- and intra-firm boundaries: management of supplier involvement in automobile product development. *StrategicManagement Journal, 22*(5), 41-53.
[70] Tan, K. C., Kannan, V. R., & Handfield, R. B. (1998). Supply chain management: supplier performance and firm performance. *International Journal of Purchasing and Materials Management, 34*(3), 2-9.
[71] Teece, D. J., G.Pisano, & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*(7), 509-533.
[72] Threranuphattana, A., & Tang, C. S. (2008). A conceptual model of performance measurement for supply chains: Altrnate considerations. *Journal of manufacturing technology Management, 19*(1), 125-148.
[73] Ulrich, K. (1995). The role of product architecture in manufacturing firm. *Research Policy, 24*(3), 419-440.
[74] van Echtelt, F. E. A., Wynstra, F., Weele, V. A. J., & Duysters, G. (2008). Managing supplier involvement in new product development: a multiple-case study. *Journal of Product Innovation Management, 25*, 180-201.
[75] Vonderembse, M. A., & Tracey, M. (1999). The impact of supplier selection criteria and supplier involvement on manufacturing performance. *Journal of Supply Chain Management, 35*(3), 33-39.
[76] Webster, M. (2002). Supply system structure, management and performance: a conceptual model. *International Journal of Management Reviews, 4*(4), 353-369.
[77] Worren, N., Moore, K., & Cardona, P. (2002). Modularity, strategic flexibility, and firm performance: a study of the home appliance industry. *Strategic Management Journal, 23*(12), 1123-1140.
[78] Wynstra, F., & Ten-Pierick, E. (2000). Managing supplier involvement in new product development: a portfolio approach. *Europen Journal of Purchasing and Supply Management, 6*, 49-57.
[79] Yaaghubi, A., Chizari, M., Pezshkirad, G., & Foeli, S. (2009). Importance of farm management skill from the viewpoint of Wheat farmers in Tafresh Township. *Journal of Agricultural Economic and Development, 17*(66), 99-114.
[80] Zack, M., McKeen, J., & Singh, S. (2009). Knowledge management and organizational performance: an exploratory analysis. *Journal of Knowledge Management, 13*(6), 392-400.
[81] Zailani, S., & Rajagopal, P. (2005). Supply Chain Integration and Performance: US versus East Asian companies. *International Journal of Supply Chain Management, 10*(5), 379-393.
[82] Zelbst, P. J., Green, K. W., & Sower, V. E. (2009). Impact of supply chain linkages on supply chain performance. *Industrial Management and Data Systems, 109*(5), 665-682.
[83] Zirger, B. J., & Hartley, J. L. (1994). A conceptual model of product development cycle time. *Journal of Engineering & Technology Management, 11*, 229-251.
[84] Zirger, B. J., & Maidique, M. A. (1990). A model of new product development: an empirical test. *Management Science, 36*(7), 867-883.

Cite this paper

Ariffin, A.S., Lamsali, H., and Mohtar, S. (2012). "The relationships between supplier and customer involvements towards broiler business performance: An empirical investigation on Malaysian poultry industry," *Proceedings of The 3rd International Conference on Technology and Operations Management: Sustaining Competitiveness through Green Technology Management*, Bandung–Indonesia (July 4-6), pp. 249-258. ISBN: 978-979-15458-4-6.