

How to Cite:

Saeng-on, P., Pranee, S., Pulphon, S., & Piyamputra, P. (2022). Factors affecting quality development and certification of local fishery products in Ranong Province, Thailand. *International Journal of Health Sciences*, 6(S5), 42–53. <https://doi.org/10.53730/ijhs.v6nS5.5195>

Factors Affecting Quality Development and Certification of Local Fishery Products in Ranong Province, Thailand

Poramet Saeng-on

Suan Sunandha Rajabhat University, Thailand

Email: poramet.sa@ssru.ac.th

Supattra Pranee

Suan Sunandha Rajabhat University, Thailand

Email: supatta.pr@ssru.ac.th

Sodsri Pulphon

Suan Sunandha Rajabhat University, Thailand

Email: sodsri.pul@mahidol.ac.th

Panvipa Piyamputra

Suan Sunandha Rajabhat University, Thailand

Email: jumpoons@yahoo.com

Abstract--The purpose of this study was to determine the factors affecting the quality development and certification of local fishery products in Thailand. The study was cross-sectional and survey method was used to collect the data. We distributed 325 questionnaires to processors of fishery products working in Ranong province. PLS-SEM was used to test the proposed hypotheses. The findings of the study indicate that supply chain had a significant relationship with product quality and certification. The findings also indicate that government regulations moderate the relationship between supply chain and product quality and certification. The current study will discuss the Thai government's policies and efforts to ensure the quality and safety of aquaculture products from "Pond to Plate" through an efficient management strategy.

Keywords--local fishery products, quality certification, Ranong Province, supply chain.

Introduction

Food security is critical on a global scale due to the astounding increase in consumption and population, while climate, water, and land are all deteriorating (Hanning, O'Bryan, Crandall, & Ricke, 2012). The fishery industry, which includes both aquaculture and wild catch, is important for local and international food security. It is a vital component of shellfish and wholesome fish, which contain high levels of animal protein, vitamins, and micronutrients (Beveridge et al., 2013; Thilsted et al., 2016). In addition, numerous "Sustainable Development Goals" (SDGs) from the United Nations' 2030 Agenda for Sustainable Development, including SDG 14 (Life Below Water), SDG 2 (Zero Hunger), and SDG 1 (No Poverty), emphasize the critical role of fishery products in developing economic benefits, achieving sustainable food processes, and providing nutrition to ensure food security at the global level (Desa, 2016; Griffin, Wang, & de Souza, 2019; Thilsted et al., 2016). The sustainable development goals and the fisheries sector interact in a variety of ways (Blanchard et al., 2017). Massive population expansion and rising seafood demand have put the fisheries sector under pressure, as have increased expectations for environmental wellbeing and sustainability. In 2016, the fisheries production in the world was approximately 1701 million tons, with 91 million tons (54 percent of total production) coming from capture fisheries and 81 million tons (48 percent from aquaculture) (FAO, 2018). However, in 2016, Thailand was among the top twenty-five countries in the world in term of capture fishery production (FAO, 2018), with expected output of 2.5 million tons, with 36 percent from aquaculture production and 64 percent coming from capture production (DoF, 2018). Along with ensuring food security, fishery is a critical economic activity of a country and an important source of micronutrients for the people of Thailand (Panjarat, 2008). For this, the government is playing an important role in the industry's development. There has been research and development on new product development, product safety and quality. Thailand has an internationally known fish inspection system in terms of quality management. The "Department of Fisheries" (DOF) "Hazard Analysis and Critical Control Point" (HACCP) based inspection programs are critical to market development success, as are the collaborative efforts of several government agencies to help the sector through information services, inspection services, and research findings on trade issues, standards, and marketing (Suwanrangsi, 1997).

To help preserve Thailand's food sector, particularly the fishery sector, and to reassure consumers about product safety, the year 2004 has been deemed "Food Safety Year." The main objective was to standardize methods across the value chain, from basic production to the market, and to implement a standardized method to all products, regardless of whether they were destined for domestic or international marketplaces Suwannarak (2005). Even though the "Food Safety Year" has completed, the notion has been approved as state policy, and initiatives have been continued. To preserve its position as the world's largest producer and exporter of fishery products, the Thai government recognized the significance of safety, quality, and sustainability. These objectives can be accomplished by implementing management system that are sector-specific, spanning from farms to processing operators. Since 1999, the DOF, which is administered by the Ministry of Cooperatives and Agriculture, has introduced and established

guidelines on a Code of Conduct (CoC) and Good Aquaculture Practices (GAPs) for ethical fish farming. In addition, “Good manufacturing Practices” (GMPs) and HACCP are compulsory for fishery products production plants that are registered and licensed by the Department of Agriculture (DOF) for supply. However, the “Farm-to-Table” concept may not be implemented without the support of various other department-led programs (Yamprayoon & Sukhumparnich, 2010). The “National Residue Control Program” (NRCP), monitoring for production, the usage of the “Movement Document” (MD) for tracking, and the computer application for providing health-related licenses are all examples of supporting operations. This article highlights the factors affecting the development of products and certification of local fishery products in Ranong Province of Thailand.

Literature Review

Supply chain associations and product development and certification schemes

Mighell and Jones (1963) and Arnold (1999) define food supply chain as a vertically interconnected processes and define vertical integration as “all the ways in which these stages are directed and fitted together.” These connections between different stages in food supply chain need qualitative and quantitative harmonization: qualitative collaboration refers to the design and implication of specific products and processes and has grown increasingly significant; quantitative collaboration, on the other hand, refers to the balance of inputs and outputs (Malorgio, Camanzi, & Grazia, 2012). Department of fisheries establishes standard operating protocols and procedures for laboratory work and inspections in the form of an operational and policy manuals. These procedures and policies are intended to deliver adequate confidence that relevant statutes and pertinent requirement are met by the local producers. Inspections at the process plant are carried out in compliance with GMP standards, which include basic guidelines of hygiene standards as a preliminary procedure. Additionally, all producers approved by the DOF are expected to follow HACCP standards. Rather than depending exclusively on product sample analysis, the program stresses continual solutions of problems and protection from sea to marketing. Various important producers, including the United States and the European Union, have imposed traceability to make sure food safety. DOF introduced the “Use of MD” for culturing fishery products with the goal of facilitating the traceability of completed products back to the feed supplier, hatchery, and farms. Basically, two different types of “MDs”: Farm Movement Document (FMD) and Fry Movement Document (FMD). However, MDs will be delivered by responsible parties along the food supply chain from hatcheries, farms, and processing units. Apart from routine plant’s inspections, the department of fisheries also oversees final products from certified producers. The program’s purpose is to audit their system of food safety management (Yamprayoon & Sukhumparnich, 2010).

Apart from routine plant inspections, the Department of Fisheries also oversees final products from certified processors. The program’s purpose is to audit their management system for food safety. In addition, the security system verifies the product’s safety, quality, and conformance to DOF criterion or criterion agreed upon with the quality standards. The sample frequency is determined by the

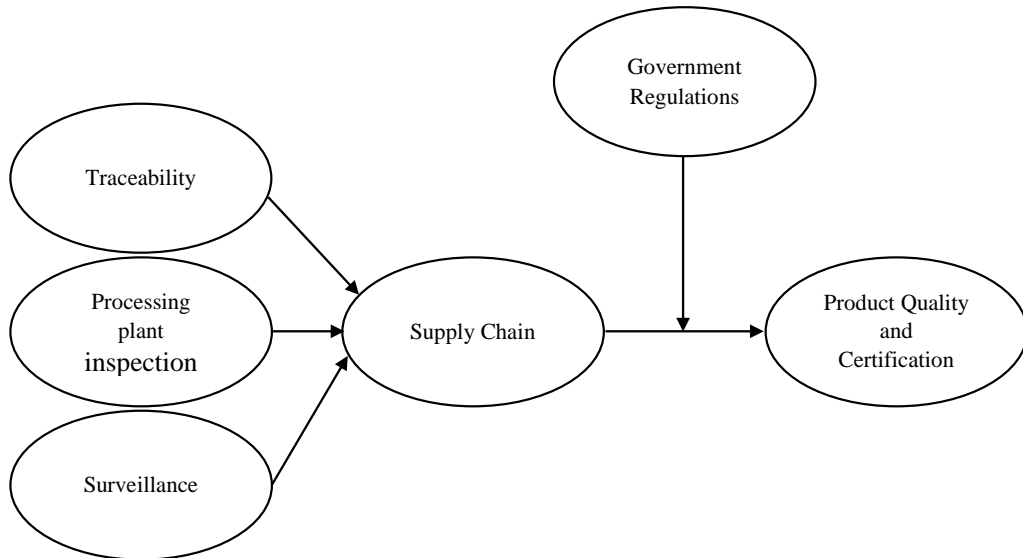
processor's performance history and product's risk category. At the plant, samples are gathered by well-trained officers of the fishery department who follow a pre-established sampling methodology on the basis of the 'ISO 2859-1' sampling procedure for monitoring by characteristics (Yamprayoon & Sukhumparnich, 2010). Chemical, microbiological, and sensory analysis will be performed on samples held at the appropriate temperature for the product type. Department of fisheries laboratories are endowed with cutting-edge technology such as LC-MS-MS, GC, and HPLC. Employees has received training programs to meet the standards. If the results of the products monitoring indicate that products are out of conformity with department of fisheries standards, department of fisheries can suspend certification, based on the risk level of the danger. The operator should provide department of fisheries with a plan for mitigating the risks.

Government Policies as a Moderator

Regarding government policies, all aquaculture farms and hatcheries have been needed to register with the department of Fisheries and Wildlife. According to statistics, the DOF certified roughly 488,167 fishery farms and hatcheries for CoC or GAP compliance (Yamprayoon & Sukhumparnich, 2010). This accounted for approximately 85 percent of the aquaculture farming in Thailand. The numbers of certified farms have been expanding as the Thai government strives to certify all fishery farms as quickly as feasible. Under the jurisdiction of the Fishery Act B. E. 2490 which was established in 1947, farms registration is necessary. Department of fisheries promotes the certification program by mandating all DOF approved and registered fishing operators for supplies to source raw material exclusively from CoC or GAP registered farms (Dewalt, Vergne, & Hardin, 1996). However, if processing units are discovered to be purchasing fish from unregistered farming stations, they will be cautioned and subject to appropriate sanctions, which may include temporary removal from the suspension from certificate issuing or privileged monitoring program. In addition, if the offence includes food safety concerns that are damaging to the health of human beings, or if the violation is committed repeatedly, the production plant will be removed permanently from the approved list of DOF. This is a useful instrument for promoting CoC and GAP among aquaculture farmers, notably in fish farming, where the production is distributed locally and exported (Yamprayoon & Sukhumparnich, 2010). Department of fisheries has tried to include sustainability and social responsibility concept into the current GAP standards. The new amended guidelines of GAP or GAP Plus, which was started in 2009, is practical while still providing guidelines of safety, quality, and sustainability of Thailand's aquaculture sector. From the above discussion, we can propose the following hypothesis as shown in Figure 1.

H1: Supply chain has a significant impact on product development and certification of local fishery products in Ranong, Thailand.

H2: Government regulations moderates the relationship between supply chain and product development and certification of local fishery products in Ranong, Thailand.



Theoretical Framework

Methods

Sampling and Procedure

The sample of the study were processors of fishery products operating in Ranong, Thailand. A questionnaire was used to collect data from the respondents using non-random sampling technique. With the help of the language center, the questionnaire was translated from English into Thai. The study was cross-sectional because the data was collected at a single point in time. Prior to undertaking the investigation, the HACCP and human research committees received ethical permission. After getting permission, we explained the study's goal to processors of fisheries products, who provided the consent in written form for the research to proceed. Prior to completing the questionnaire, participants were briefed about research purpose and the requirements for completing this questionnaire. Respondents of the study were assured that their information gathered during the research will be kept private and confidential. To minimize the bias sources, questionnaire was distributed randomly among respondents. We distributed 325 questionnaires to respondents and received 219 responses with a 67.38 percent response rate. The questionnaires with missing or incomplete data were discarded, and a total of 207 questionnaires were used for the analysis.

Measurement Scales

This section summarizes the study's items and analyzes the development of the measurement scales used in the questionnaire. Nevertheless, the items of the measurement scales were adjusted to fit the study's objectives. The entire scale is based on a five-point Likert type scale ranging from 1 to 5. The measurement scale of supply chain was adapted from different sources. It has three dimensions: traceability, processing plant inspection, and surveillance.

Traceability scale has five items and was adapted from Cousins, Lawson, Petersen, and Fugate (2019). The four items of inspection were adapted from Kvenberg, Stolfa, Stringfellow, and Garrett (2000). The four items of surveillance were adapted from Kanjanarach, Jaisa-Ard, and Poonaovarat (2014). The scale of government policies and regulations were adapted from Pryor (2002). The scale of quality certification was adapted from Tran and Goto (2019).

Data Analysis

Partial least squares (PLS) structural equation modelling (SEM) and the techniques utilized in it are now the most commonly accepted and newest methodologies (Ali Qalati, Li, Iqbal, Yassir Hussain, & Ali, 2019; Gozali et al., 2018). This study's findings are based on PLS 3.0 software for testing the proposed hypotheses. This research analyzed data using PLS path modeling due to its frequent use in academic studies (Hair, Sarstedt, Ringle, & Mena, 2012). Prior to assessing the items and their internal consistency, convergent validity, reliability, discriminant validity, and paths, several notions of multicollinearity and normality were tested, as well as common method bias (CMB) (Podsakoff & Organ, 1986). We used Harman's single factor analysis to address the issue of CMB, and the results show that the first factor value was 26.17 percent, which was less than 50 percent, indicating that CMB was not an issue in our study. The normality of the data was assessed using skewness and kurtosis, and the results show that both skewness and kurtosis were within a ± 2 range, as shown in Table 1. This research evaluated and reported PLS-SEM results in two steps: measurement (outer) model and structural (inner) model assessments (Hair, Black, Babin, Anderson, & Tatham, 2006; Sarstedt, Ringle, Smith, Reams, & Hair Jr, 2014). Moreover, an evaluation of the inner model as testified by coefficient of determination (R^2) and predictive relevance (Q^2).

Table 1
Descriptive Analyses

Construct	Mean	S.D	SC	GR	PD&C	Skewness	Kurtosis
SC	4.84	0.538	1			0.878	1.421
GR	3.61	0.604	0.462	1		0.628	1.817
PD&C	3.65	0.549	0.448	0.617	1	1.732	1.624

Note: ** Correlation significant at 0.05 level (2-tailed); GR = Government Regulations, SC = Supply Chain, PQC = Product Quality Certification.

Results

Measurement Model Assessment

According to Henseler, Ringle, and Sinkovics (2009), researchers are required to analyze internal consistency, individual item's reliability, convergent validity, and discriminant validity to assess the model of study. According to the study's findings, all item loadings were between 0.694 and 0.792, which were greater than 0.5 (Chin, 1998). The composite reliability (CR) value should be greater than 0.70, and the results show that all constructs' CR values were between 0.814 and 0.862, indicating sufficient construct reliability. Furthermore, for convergent validity, the extracted average variance (AVE) values ranged between 0.588 and

0.678, which was greater than the 0.50 threshold (Henseler, Ringle, & Sarstedt, 2015). (see Table 1).

Table 2
Measurement Model Results

Higher order constructs	LOC	Items	Loadings	CR	AVE	VIF
Supply Chain	Traceability	T1	0.778	0.841	0.678	1.763
		T2	0.707			1.542
		T3	0.736			1.028
		T4	0.701			2.281
		T5	0.741			1.273
	Processing plant inspection	PPI1	0.725	0.814	0.588	1.600
		PPI2	0.694			1.438
		PPI3	0.739			1.736
		PPI4	0.729			2.175
	Surveillance	S1	0.792	0.835	0.632	2.172
		S2	0.734			1.624
		S3	0.722			1.428
		S4	0.710			1.146
	Government Regulations	GR1	0.715	0.862	0.607	1.410
		GR2	0.699			1.298
		GR3	0.715			2.456
GR4		0.688	2.157			
GR5		0.725	1.085			
Product Quality and Certification	PQC1	0.758	0.847	0.649	1.428	
	PQC2	0.741			1.258	
	PQC3	0.733			1.557	
	PQC4	0.715			1.491	

Note: T = Traceability, PPI = Processing plant inspection, S = Surveillance, GR = Government Regulations, PQC = Product Quality and Certification.

Discriminant Validity

Usually, two techniques were employed to determine the variables' discriminant validity (e.g., cross-loadings and HTMT ratio). Cross loadings refer to the loadings of cross indicators with respect to another latent variable (e.g., their correlations), which should be lower than the indicators' loadings with their related variable (Hair et al., 2012; Sarstedt, Hair Jr, Cheah, Becker, & Ringle, 2019). According to

the HTMT criteria, the HTMT inference scores should be less than 0.85 to identify those two latent variables are different from one another (Henseler et al., 2015). The discriminant validity of the constructs was assessed using the HTMT criterion in this study. The study's findings suggest that the research variables were within the specified range, confirming the achievement of discriminant validity.

Table 3
Discriminant Validity (Hetrotrait-Monotrait Ratio)

Variable	1	2	3
GR			
SC	0.655		
PQC	0.528	0.354	

Note: GR = Government Regulations, SC = Supply Chain, PQC = Product Quality Certification.

Structural Model Assessment

The inner model analyzes the path coefficients (β -value) and their significance level (p-value) to determine the link between constructs (Sarstedt et al., 2019). The beta value ranges between +1 and -1, indicating the direction and magnitude of the interaction between variables. A score close to -1 or +1 indicates a strong negative or positive link between the variables. Nevertheless, if the value is near to zero, it indicates a weak link between the variables (Garson, 2016). To determine the level of significance, bootstrapping is used to obtain the value of standard errors. The values of standard errors are used to calculate the t-values (standard error/path coefficient), which indicates the level of significance for beta. Moreover, the bootstrapping technique with 5,000 subsamples was used to assess the values of path coefficients (Hayes, 2009). PLS-SEM recommends examining the R^2 to determine the variance of the constructs (Hair et al., 2012). The values of 0.25, 0.5, and 0.75 were considered as weak, moderate, and large effect sizes (Henseler et al., 2009). The findings show that the value of R^2 was 0.301 (Chin, 1998), indicating that the obtained value of R^2 appears to be weak. Moreover, considering the reflective nature of the constructs, the current study used Q^2 to evaluate the model's predictive relevance as suggested by (Marcoulides, Chin, & Saunders, 2009). It serves as a measurement of the model's Q^2 value indicates predictive relevance or out of the sample predictive power (Geisser, 1974). The value of Q^2 greater than zero for a certain dependent construct indicates the predictive relevance of the path model for a specific endogenous latent variable in the structural equation model. The study's findings indicate that the model is predictive in nature, with a predictive value of 0.318.

Hypothesis Testing

Using the bootstrapping tool in PLS, the path coefficient values were used to determine the significance of the proposed direct and moderation relationships. The path coefficients had t-values greater than 1.96 and p-values less than 0.05 that were statistically significant at 95 percent confidence level. The findings indicate that supply chain has a statistically significant relationship with product quality certification ($\beta = 0.437$, p-value < 0.05). Thus, supporting H1. The findings

of the study also demonstrates that government regulations moderate the relationship between supply chain and quality certification ($\beta = 0.348$, $p\text{-value} = 0.05$) of local fishery products. Therefore, H2 is supported as proposed. The result shows that government regulations has a buffering effect on the supply chain and product quality and certification relationship, which is shown in Figure 2.

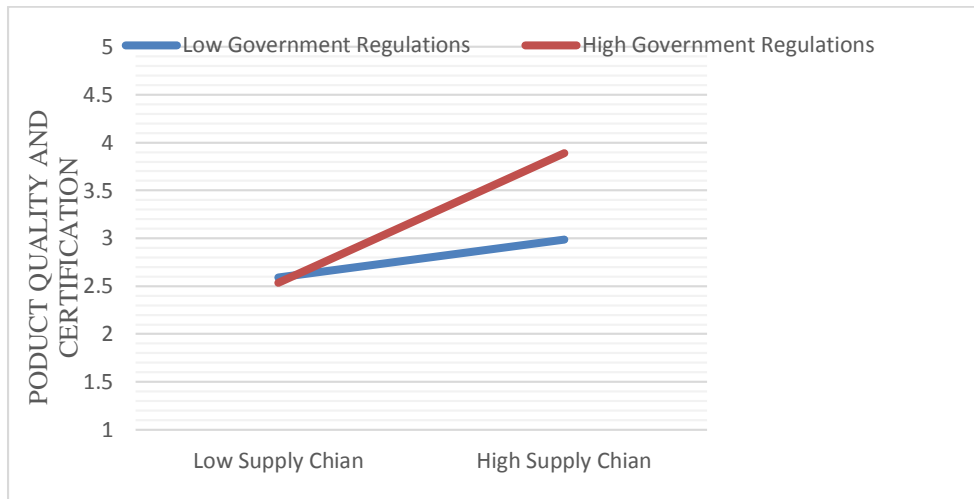


Figure 2. Interaction Plot

Discussion and Implications

Following the presentation of the primary findings of the direct survey, several observations about the likely effects on supply chain organisation and structure may be addressed. The current study adds to the body of knowledge by investigating the critical role of supply chain processes and government regulations in promoting product quality development and certification. The purpose of this study is to build a concept for examining the supply chain's involvement in delivering enhanced product development services (traceability, processing plant inspection, and surveillance). Moreover, it investigates the moderating effect of government rules on processors of fishing products. Therefore, the findings of this research indicate that improving supply chain attributes is critical for enhancing product quality and certification. However, government policies are important in fostering the growth of fishing products. Numerous factors contribute to the development of safe and high-quality fishery products. To ensure the fishery products industry's sustainability, fish farmers and processors must promote, practice, and maintain CoC and GAP. Department of fisheries may focus on strengthening its quality criteria in aquaculture. Close cooperation among the relevant agencies is needed, however, to make sure that illegal veterinarian chemicals and drugs are not disseminated or made available to processors. Furthermore, there is a need to raise awareness of fishery producers' responsibilities to the well-being of consumers and the environment. An effective monitoring system must begin with farms, shipping and handling and expand all the way to final products processing. The private sector and government must work cooperatively to instill consumer trust. In addition, supporting efforts, like the implementation of traceability systems, can have a

beneficial psychological impact on the consumers by assuring them of the product's safety and quality. Government should enforce strict standards for the safety and quality of fishery products. Nonetheless, countries producing culture fishery products should seize this chance to improve the entire production supply chain from "Pond-to-Plate."

Thailand's government wants it to be a regional food processing hub. As a result, the sector envisions the agency assisting the sector in trying to maintain output, technology development, market development and human resource development to improve the quality of fishery products. The government function in research should be to develop products and technologies for domestic use as a protein source, as well as to enhance handling to minimize spoilage and waste, and to develop new products from aquatic species. Given the sector's demonstrated capability in developing product technology, the departments can continue to work on products development and quality certification to help the sector to grow locally and internationally. Additionally, the departments may collaborate with universities and other government agencies to carry out research programs on quality control, processing, and fish handling and they must provide equipment, budget, and information to help the agencies in carrying out research programs related to the department's interests. Quality and risk assessment research must continue. Similarly, the department's research centers and laboratories should be upgraded to fulfill local and global accreditation standards. However, training programs for quality controllers and inspectors should be planned; quality control, handling, and processing training institutions should be established; and industry-specific training on critical areas should be conducted on a regular basis.

Furthermore, the departments should be actively involved in quality control and inspection processes. This is to comply with the need of several nations that recognize solely the role of government institutions in quality control and inspection. For this, the departments must support the convergence of regulations for fishery products, as well as the establishment of system equivalence. The departments should continue to work with international groups to address the health and safety concerns associated with fishery products. Moreover, guidance to processors in need of establishing or improving their inspection system should also be incorporated in the goal of developing of fish handling, quality control, and processing.

References

- Ali Qalati, S., Li, W., Iqbal, S., Yassir Hussain, R., & Ali, S. (2019). Impact Of Price On Customer Satisfaction; Mediating Role Of Consumer Buying Behaviour In Telecom Secto. *International Journal of Research*, 6(4), 150-165.
- Arnold, B. (1999). Capabilities, transaction costs, and vertical coordination in the food system. In *vertical relationships and coordination in the food system* (pp. 21-37): Springer.
- Beveridge, M. C., Thilsted, S., Phillips, M., Metian, M., Troell, M., & Hall, S. (2013). Meeting the food and nutrition needs of the poor: the role of fish and the opportunities and challenges emerging from the rise of aquaculture. In (Vol. 83, pp. 1067-1084): Wiley Online Library.

- Blanchard, J. L., Watson, R. A., Fulton, E. A., Cottrell, R. S., Nash, K. L., Bryndum-Buchholz, A., . . . Elliott, J. (2017). Linked sustainability challenges and trade-offs among fisheries, aquaculture and agriculture. *Nature ecology & evolution*, 1(9), 1240-1249.
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods For Business Research*, 295(2), 295-336.
- Cousins, P. D., Lawson, B., Petersen, K. J., & Fugate, B. (2019). Investigating green supply chain management practices and performance: The moderating roles of supply chain ecocentricity and traceability. *International Journal of Operations & Production Management*, 39(5), 767-786.
- Desa, U. (2016). Transforming our world: The 2030 agenda for sustainable development.
- Dewalt, B. R., Vergne, P., & Hardin, M. (1996). Shrimp aquaculture development and the environment: people, mangroves and fisheries on the Gulf of Fonseca, Honduras. *World development*, 24(7), 1193-1208.
- DoF. (2018). Fisheries statistics of Thailand 2016; Department of Fisheries: Bangkok, Thailand.
- FAO, F. (2018). *The state of world fisheries and aquaculture*. Retrieved from
- Garson, K. (2016). Reframing internationalization. *Canadian Journal of Higher Education*, 46(2), 19-39.
- Geisser, S. (1974). A predictive approach to the random effect model. *Biometrika*, 61(1), 101-107.
- Gozali, L., Masrom, M., Sagloel, Y. M., Norehan Haron, H., Dahlan, D., Jusuf Daywin, F., . . . Susanto, E. H. (2018). Critical Success and Moderating Factors Effect in Indonesia Public Universities' Business Incubators. *International Journal of Technology*, 5(9), 1049-1060.
- Griffin, W., Wang, W., & de Souza, M. C. (2019). The sustainable development goals and the economic contribution of fisheries and aquaculture. *FAO Aquaculture Newsletter*, 1(60), 51-52.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Multivariate data analysis 6th Edition. *Pearson Prentice Hall. New Jersey. Humans: Critique and Reformulation. Journal of Abnormal Psychology*, 87(1), 49-74.
- Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the academy of marketing science*, 40(3), 414-433.
- Hanning, I., O'Bryan, C., Crandall, P., & Ricke, S. (2012). Food Safety and Food Security. *Nature Education Knowledge*, 3(10), 9.
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76(4), 408-420.
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of The Academy of Marketing Science*, 43(1), 115-135.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *New Challenges to International Marketing* (pp. 277-319): Emerald Group Publishing Limited.
- Kanjanarach, T., Jaisa-Ard, R., & Poonavarat, N. (2014). Performance of health product risk management and surveillance conducted by health personnel at sub-district health promotion hospitals in the northeast region of Thailand. *Risk Management and Healthcare Policy*, 7(1), 189.

- Kvenberg, J., Stolfa, P., Stringfellow, D., & Garrett, E. S. (2000). HACCP development and regulatory assessment in the United States of America. *Food Control*, 11(5), 387-401.
- Malorgio, G., Camanzi, L., & Grazia, C. (2012). *Supply chain relationships and quality certification schemes: A case study in fisheries*. Retrieved from
- Marcoulides, G. A., Chin, W. W., & Saunders, C. (2009). A critical look at partial least squares modeling. *MIS Quarterly*, 33(1), 171-175.
- Mighell, R. L., & Jones, L. A. (1963). *Vertical coordination in agriculture*: Farm Economics Division, Economic Research Service, US Department of Agriculture.
- Panjarat, S. (2008). Sustainable Fisheries in the Andaman Sea Coast of Thailand. Division for Ocean Affairs and the Law of the Sea Office of Legal Affairs. In: The United Nations: New York.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12(4), 531-544.
- Pryor, F. L. (2002). Quantitative notes on the extent of governmental regulations in various OECD nations. *International Journal of Industrial Organization*, 20(5), 693-714.
- Sarstedt, M., Hair Jr, J. F., Cheah, J.-H., Becker, J.-M., & Ringle, C. M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal (AMJ)*, 27(3), 197-211.
- Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair Jr, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, 5(1), 105-115.
- Suwannarak, W. (2005). Food safety controls from farm to table with emphasis on aquaculture shrimp in Thailand. *Ryder and L. Ababouch, editors. Fifth World Fish Inspection and Quality Control Congress. Proceedings of the Fifth World Fish Inspection and Quality Control Congress, the Hague, Netherlands, 20-22 October 2003. Food and Agriculture Organization (FAO), Rome, Italy.*, 61-64.
- Suwanrangsi, S. (1997). Advances in fish processing technology in Thailand in relation to quality management.
- Thilsted, S. H., Thorne-Lyman, A., Webb, P., Bogard, J. R., Subasinghe, R., Phillips, M. J., & Allison, E. H. (2016). Sustaining healthy diets: The role of capture fisheries and aquaculture for improving nutrition in the post-2015 era. *Food Policy*, 61(1), 126-131.
- Tran, D., & Goto, D. (2019). Impacts of sustainability certification on farm income: Evidence from small-scale specialty green tea farmers in Vietnam. *Food Policy*, 83(1), 70-82.
- Yamprayoon, J., & Sukhumpanich, K. (2010). Thai aquaculture: Achieving quality and safety through management and sustainability. *Journal of the World Aquaculture Society*, 41(2), 274-280.