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A Study on the Third-party Logistics Industry in Mexico

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ABSTRACT

The global growth of the Third-party Logistics (3PL) industry increases opportunities for providers but also increases the challenges in the business as the market becomes more complex and difficult to achieve integration of logistics. The present document is qualitative research. It is based on documentary research with secondary sources of information about the 3PL logistics industry in Mexico. The purpose of this document is to show the performance of the 3PL industry and the perceptions of Mexican companies with research from 2006 to 2017 through the study of four elements: the most frequently outsourced services, reasons and benefits for outsourcing logistics services, services to be outsourced in the future, and information systems and communication. This study reveals the value of the 3PL industry in Mexico, as well as the challenges in expanding the business according to the needs of the market. In order to achieve the competitiveness of logistics services required by the supply chain, a commitment from 3PL providers and firms is necessary; otherwise, the services of the Mexican 3PL industry will be fully covered by multinational providers. In addition, a change in mentality of Mexican firms could help logistics providers achieve better performance.

Keywords: logistics, outsourcing, providers, service providers, 3PL (Third-party logistics)
JEL Classifications: L81, L87, L91, M11

I. Introduction

In the last twenty years, the logistics services industry has faced increasingly complex challenges, derived from pressures to meet the needs of its customers. In addition, the integration of supply chains has become a factor that requires greater precision in logistics systems. In this sense, the role of logistics providers seems to be a link that allows adaptation to the requirements of demand to achieve efficiency in logistics.

According to Yang (2014), in the beginning, the Third-party Logistics (3PL) industry focused on providing single and short-term logistics services, such as warehousing and transportation. In recent years, 3PLs are placing more attention on building long-term contractual relationships with their customers by providing multiple logistics services.

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Due to the many definitions of 3PL, there is no uniform expression to define this concept. However, 3PL services can be simplified through specialization in the areas of transportation, inventory control, and warehousing.

Third-party or outsourcing refers to a series of services performed by an external provider, which manages a significant portion of the logistics and supply chain requirements of an organization. These services include transportation, consolidation, warehouse management, purchase and handling of materials, customs agency, consulting services, orders, and order processing (Selva, Molina, & Amador, 2009). Since the year 2000, there has been clear awareness of making a transformation in the administration to successfully face logistics management in the supply chain (Antun, 2002).

3PL services have contributed to overall logistics cost reductions, improvements in customer service, and new and innovative ways to improve logistics effectiveness, according to those who use logistics services and 3PL providers perceptions (Langley, Allen, & Capgemini, 2016).

According to the World Bank (2016), Mexico is situated in the 54th position, from a total of 164 countries regarding the Logistics Performance Index (LPI) with a score of 3.114, on a scale from 1 (worst) to 5 (best). The LPI encompasses freight transportation, warehousing, border clearance, payment systems, and many other functions. It makes Mexico an interesting country to study in terms of logistics, with respect to other Latin American countries.

This paper aims to review comprehensive literature and construct a framework on the roles and challenges of 3PL industry in Mexico.

The remainder of this paper is organized as follows. In section 2 we will introduce theoretical backgrounds of the 3PL. In section 3, the performance of 3PL companies in Mexico will be analyzed based on previous studies. For section 4, the challenges of the 3PL industry in Mexico are detailed. Finally, in section 5 are the conclusions.

II. Theoretical Backgrounds of the 3PL

2.1. Outsourcing

During the 60's, logistics began to integrate services, transforming them into a new resource called outsourcing. Outsourcing is the process by which a company identifies a deficiency in some part of its processes and finds that this deficiency can be optimized by an external provider by contracting its services. In this way, the first party can focus on the core areas of its business while the second develops the deficient part of the first company.

According to Lei and Hitt (1995), outsourcing involves the use of external sources that add value to the manufacture of components, and it involves the use of external skills and capabilities. In other words, outsourcing is the contracting of specialized external services to reduce costs and facilitate processes in a company.

2.2. Third-party Logistic

In the 80's, due to the interest in logistics operations, companies began to look for new schemes to improve their processes, specifically in the area of quality. In order to obtain better performance, it was increasingly necessary to optimize the entire supply chain. This fact, together with a more flexible international transport industry, put logistics operators into a key and an important role in the supply chain. In this way, services began to spread, combiningwith storage services.

Thus, we can mention the changes in inventory strategies such as just-in-time, a concept originally implemented in manufacturing processes, but due to its success, it was implemented in other production sectors, such as the automotive sector. In addition, the development of strategic alliances intensified the relationship between suppliers and the production market.

During the 90's, with the rise of globalization and technological platforms, a greater demand began in the service sector. Derived from this practice, a new concept called 3PL arose. This concept is more specialized with the arrival of strategic alliances in logistics. For a 3PL provider, activities involve logistics, distribution, transportation, warehousing, and inventory control.

2.3. Third-party Logistics Relationships

According to a study by Hertz and Alfredsson (2003) on how the relationship development of the 3PL providers influences strategic development in terms of customer coordination and how it shifts over time, it was found that networks are important for the 3PL, and internationalization seems to be closely tied to this as well.

Unlike traditional providers, in the case of 3PL providers, customer relationships are based on strategic alliances, which involve long-term commitments.

In a highly competitive sector, information technologies play an important role when it comes to customer satisfaction because it becomes an element allowing decisions to be made when choosing a 3PL provider.

Yang (2014) explains that today, 3PL providers can provide traditional services such as transportation and storage, but they can also offer more complete activities, services, and processes, such as cross-docking and export operations. A list of outsourced logistics functions are shown in Table 1.

Table 1. Outsourced Logistics Functions

Carrier Selection	Consulting Services	Cross Docking
Customer brokerage	Customer clearance	Export operations
Development of distribution strategy/system	Fleet operations	Fulfillment
Freight bill payments and auditing	Help desk	Import operations
Freight consolidation	Freight distribution	Freight forwarding
Information systems	Intermodal services	International communications
Letter of credit review and compliance	Rate negotiation	Replenish inventory
Management and performance reports	Product returns	Inventory management
Order entry and processing	Order management	Overseas distribution
Overseas sourcing	Pickup and delivery	Product assembly/installation
Product marking, labeling and packaging	Product modification	Product repair
Route and network optimization	Traffic management	Shipment planning
Selected manufacturing activities	EDI capability	Warehousing
Transportation (inbound and outbound)	Expedited delivery	Export licensing assistance

Source: Yang (2014).

Improvements in supply chains through the use of 3PL providers show a clearly visible economic benefit. This is the result of adequate logistics planning. Table 2 summarizes the various performances of 3PL providers in North America, Western Europe, Asia-Pacific, and Latin America.

Table 2. Quantifiable Measures of 3PL Success

Cost / Benefit	North America	Western Europe	Asia-Pacific	Latin America
Logistics Cost Reduction	15%	11%	15%	17%
Fixed Logistic Asset Reduction	16%	17%	25%	41%
Average Order-Cycle Length Change (days)	From 12,2 to 6,8 Days	From 7,1 to 4,8 Days	From 38,7 to 19,4 Days	From 20,7 to 15,3 Days
Overall Inventory Reduction	7%	11%	10%	16%
Cash-to-Cash Cycle Reduction (days)	From 22,2 to 19,8 Days	From 23,5 to 19,6 Days	From 49 to 19,4 Days	From 36,2 to 26,6 Days
Service Level Improvement (percent "yes")	58%	69%	71%	72%

Source: Langley, Allen, & Capgemini (2004).

Nowadays, domestic transportation, warehousing, and international transportation are the most frequently outsourced activities around the world, while customer service, lead logistics provider/4PL services, and service logistics are the less frequently outsourced activities, among others, as shown in Table 3.

Table 3. Diversity of Logistics Services Outsourced

Outsourced Logistics Services	Percentages of 3PL Users
Domestic Transportation	86%
Warehousing	66%
International Transportation	60%
Freight Forwarding	44%
Customs Brokerage	42%
Transportation Management and Planning	36%
Cross-Docking	34%
Freight Bill Auditing and Payment	32%
Inventory Management	24%
Order Management and Fulfillment	24%
Reverse Logistics (defective, repair, return)	23%
Product Labeling, Packaging, Assembly, Kitting	22%
Supply Chain Consultancy Services Provided by 3PLs	19%
Information Technology (IT) Services	17%
Fleet Management	15%
Service Parts Logistics	12%
Lead Logistics Provider/4PL Services	10%
Customer Service	9%

Source: Capgemini and Langley (2016).

2.4. 3PLs in Latin America

In an exploratory study conducted in Central America by Selva, Molina, and Amador (2009), it was found that the predominant factor in the 3PL industry was the pressure to reduce costs incurred by companies over providers, followed by pressure to improve quality from service.

Kirby and Brosa (2011) stated that Latin American and Caribbean countries have structural problems such as limited multimodal connectivity, limited availability of concentration centers for logistics activities, and inefficiencies in port activity.

In Colombia, the outsourcing process represented large mergers, acquisitions, and strategic alliances between companies that provided few logistics services, in order to group a broader portfolio of services and offer integrated logistics solutions throughout the supply chains of their customers. The strategy of cooperation between national companies took place as a protection and competition scheme against the multinational companies that arrived after economic opening. This trend was evident in 2012, with the ratification of the FTA with the USA (Gonzales, 2015).

In Peru, there are important barriers to overcome, such as the development of specialized talent in the supply chain, infrastructure, achieving greater participation and confidence in the logistics operations of organizations, and achieving investment in technology in an environment of economic slowdown (Champi, Coloma, Funegra, & Vertiz, 2016).

Table 4 below shows logistics costs and 3PL revenue contributions to GDP for Latin American countries. In terms of 3PL revenues, Brazil and Mexico are the leading countries.

Table 4. Global Logistics Costs and Third-Party Revenues

(Unit : US$ Billions)

Country/Region	2016 GDP	Logistics (GDP%)	2016 Logistics Cost	3PL Revenue %	2016 3PL Revenue
Mexico	1,046.00	12.0%	125.5	10.4%	13.1
Argentina	545.10	12.0%	65.4	8.9%	5.8
Brazil	1,798.60	11.6%	208.6	9.0%	18.8
Chile	247.00	11.5%	28.4	9.5%	2.7
Colombia	282.40	12.5%	35.3	8.2%	2.9
Peru	195.10	12.5%	24.4	8.2%	2.0
Venezuela	287.30	11.9%	34.2	7.0%	2.4
South America-Others	221.90	15.6%	34.5	7.5%	2.6

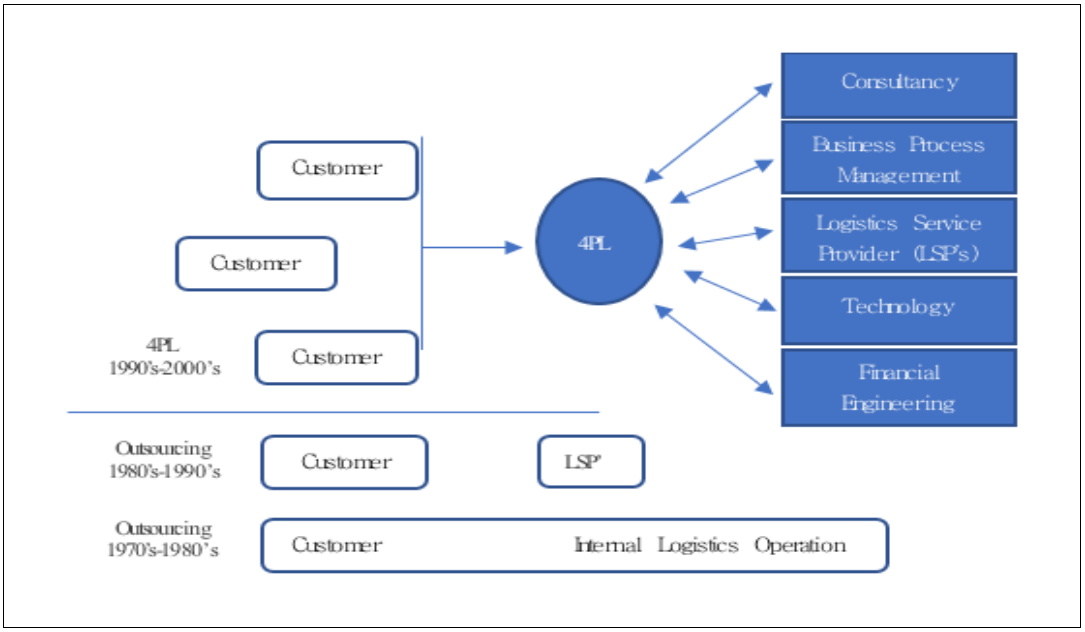
Source: Armstrong & Associates (2017).

2.5. 4PLs

Unlike a traditional provider that offers services in a specific part of management, a 4PL provider is responsible for the entirety of the supply chain. That is, a 4PL provider has complete control, supervision, and planning with the support of information technologies. In fact, one 4PL provider feature is advising in software techniques for logistics activities.

It is possible to see a 4PL provider with a single client executing part or all of the supply chain (Hernández-Apam, Durán-Encalada, Vega-Lebrún, and Olivares-Benítez, 2014). Fig. 5 shows the evolution of internal logistics into different contracting models.

Fig. 1. Evolution Internal Logistics



Source: Hernández-Apam, Durán-Encalada, Vega-Lebrún, & Olivares-Benítez (2014).

III. Performance of the 3PL Industry in Mexico

3.1. The 3PL Industry in Mexico

The efficiency of a country or a region is directly conditioned by the level of its infrastructure development, the regulatory framework, and the quality and accessibility of its logistics services (Kirby & Brosa, 2011).

The government of Mexico is still working to improve road and communications infrastructure; in fact, some structural reforms, such as energy, have been carried out in the last five years. This should have a positive impact in terms of logistics costs; however, the benefits that this reform implies are long-term. Meanwhile, the transport sector must absorb and leverage costs due to the increase in fuel that affects both the supply chain and product profitability.

Because research on the 3PL industry in Mexico are very limited, two studies related to the performance of the Mexican 3PL industry were found at the time this study was performed. The first was performed by Arroyo, Gaytan, and De Boer (2006) as an academic study at the Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM) campus in Toluca, Mexico. The second was performed by Miebach Consulting (2012).

3.2. Most Frequently Outsourced Services

According to the academic study performed by Arroyo, Gaytan, and De Boer (2006) the most frequently outsourced services in Mexico were customs brokering, product delivery, fleet management and operations, supplier payment, auditing, shipment planning, and consolidation. However, the more recent study, Miebach Consulting (2012), suggests a slight evolution of the 3PL user's needs since the most outsourced services were

those related to transport, warehousing, manufacturing services, and customs brokerage.

Parallel to these studies and more recently, Langley (2015) conducted a survey on the most outsourced services in Mexico, where the predominant factor remains national and international transportation, warehousing, and customs brokerage, as seen in Table 5. It seems that the geographic area and the advantages of NAFTA play an important role, especially for those firms related to the manufacturing sector.

Table 5. Trends in Logistics Service Offerings in Mexico

Services	Currently Buying or Providing	Need Improvement	Planned Investment (12-18MOS)
Domestic Transportation	68%	61%	12%
International Transportation	68%	33%	12%
Customs Brokerage	47%	25%	6%
Information Technology (IT) Services	27%	22%	14%
Order Management and Fulfillment	32%	21%	6%
Customer Service	32%	21%	6%
Warehousing	68%	20%	12%
Transportation Planning and Management	33%	19%	7%
Freight Bill Auditing and Payment	19%	14%	4%
Inventory Management	29%	13%	5%
Freight Forwarding	41%	10%	5%
Reverse Logistics (defective, repair, return)	32%	10%	3%
Service Parts Logistics	20%	10%	2%
Cross-Docking	38%	10%	4%
Sustainability/Green Supply Chain Related Services	13%	9%	2%
Fleet Management	7%	8%	3%
Product Labeling, Packaging, Assembly, Kitting	36%	7%	4%
LLP (Lead Logistics Provider) / 4PL Services	21%	7%	4%
Supply Chain Consultancy Services Provided by 3PLs	20%	7%	4%

Source: Langley (2015).

3.3. Reasons and Benefits for Outsourcing

In Mexico, one of the reasons for outsourcing services was more related to reducing costs and improving the level of service (Miebach Consulting, 2012). Firms expect lower costs than those internal, but with the same or higher quality; further, trying to find qualified personnel seems to be a hard task for firms (Selva, Molina, & Amador, 2009). However, a decade ago, cost savings were not among the principal benefits mentioned by Mexican firms.

In addition, Arroyo, Gaytan, and Boer (2006) found that within the benefits perceived by Mexican firms was the mention of flexible logistical operations, possibility to concentrate on the firm's core activities and customer improvements.

3.4. Services to be Outsourced in the future

In regards to logistics services to be outsourced in the future by Mexican firms, inventory management, dry warehousing, and transportation and distribution for dry and reverse logistics are among them (Miebach Consulting, 2012). Interestingly, in 2006, logistics inventory management and reverse logistics were among the least frequently outsourced (Arroyo, Gaytan, & De Boer, 2006) (Table 6). This result is striking since those services are precisely one of the main functions of 3PL logistics. However, it suggests a potential area for the 3PL industry that has not yet been exploited, and providers should be focus on this as an opportunity to expand the business. In other words, it seems that firms are beginning to demand more integrated services that fit the needs of the supply chain.

Table 6. Outsourced Logistics Functions

Logistics Function	**Percent of firms in Gooley (1997) that outsource this function (Europe)**	**Is the function mentioned as "commonly outsourced" in Van Laarhoven et al. (2000) (Europe)**	**Per cent of firms in Lieb and Randall (1996) that outsource this function (USA)**	**Per cent of firms in Boyson et al. (1999) that outsource this function (USA)**	**Per cent of firms in this survey that outsource this function (Mexico)**
Customs and Freight Brokering		No			45
Product Delivery		No			39
Fleet Management and Operations	52	Yes	22	17	30
Carrier Selection	43	No	33	24	29
Suppliers Payment and Auditing		Yes			25
Shipment Planning and Consolidation	60	No	36		22
Reverse Logistics	44	No	11	15	14
Logistics Information Systems	30	Yes	29	20	11
Order Processing	13	No	6	10	9
Warehousing Management	52	Yes	36	29	8
Inventory Management	15	Yes	6	8	5
Number of Respondents	157	53	92	463	92

Source: Arroyo, Gaytan, and De Boer (2006).

3.5. Information Systems and Communication

Despite the fact that information systems services seem to be an important element in most companies that outsource on their supply chain, in Mexico it is not precisely a predominant factor for outsourcing. In fact, it seems that it is just beginning to have importance in logistics. This suggests that the supply chain in Mexico is quite traditional.

From the point of view of communication, Cheong (2003) states that 3PL providers usually share order tracking information over the Internet with the purpose of allowing their clients to have information on products within the supply chain. Furthermore, Cheong (2003) emphasizes the importance of focusing on how 3PL companies can participate more actively in information sharing, what other types of information can be shared, types of technology, and the subsequent impacts, as well as assessing the value the 3PL company achieves through information sharing.

Efficient communication between providers and customers allows optimization of the processes of the chain by improving the ability to respond to unexpected changes.

IV. Problems and Challenges of the 9PL Industry in Mexico

4.1. Problems of the 3PL industry

Research of 3PL industry in Mexico shows specific needs for each part. This section shows some problems found in several studies that suggest challenges for both firms and providers in Mexico.

Grupo Logistics (2017) stated that between 1960 and 1980, the introduction of new technologies and improvements in control systems meant a 30% cost reduction in the logistics industry. However, reductions since then have been much lower since the impact of costs has reached a point where it requires more investment and comprehensive effort to achieve reductions of 2-3% (Grupo Logistics, 2017). In addition to the above, previously the rapidity in the movement of goods was achieved in days, whereas today, the reductions can be seen in hours. This shows the difficult situation currently faced by 3PL operators.

In Mexico, the mentality of managers seems to be a problem facing by the 3PL industry, since the way of doing business of some Mexican firms is a bit traditional, and this does not allow providers greater penetration in the supply chain. In addition, Mexican firms seem to concentrate less on outsourcing tactical and integrated functions (Arroyo, Gaytan, & De Boer, 2006).

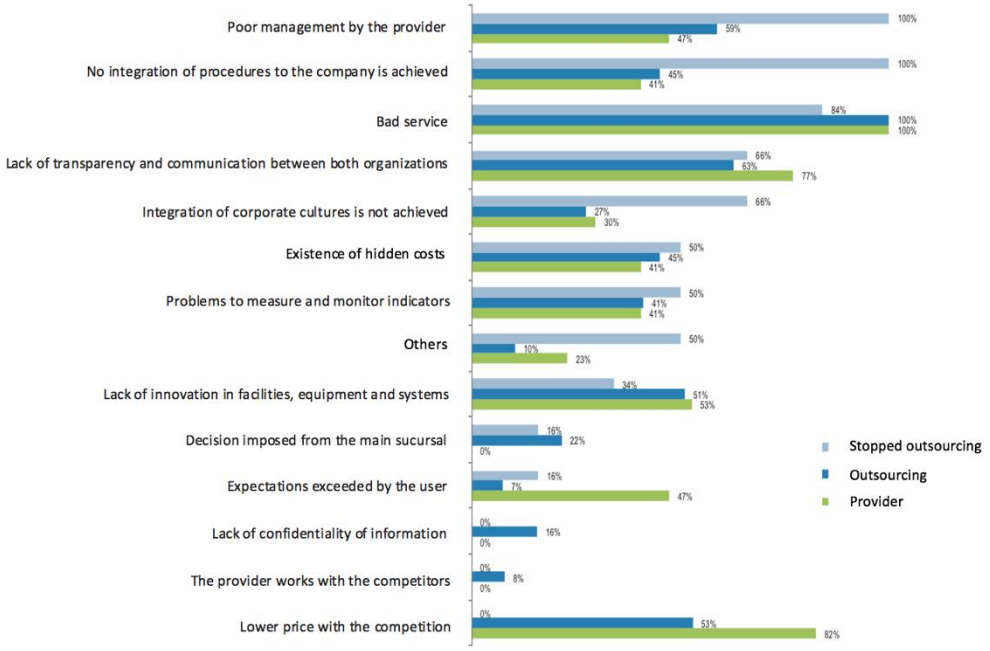
On the contrary, according to research carried out by Miebach Consulting (2012), it was revealed that in Mexico, 3PL service providers are not identified as true strategic partners by firms. This situation may involve a lack of commitment and reliability from providers in the supply chain. For an international 3PL provider that understands the importance of a strategic partner, it could be easy to access the Mexican market, as long as it adjusts its processes to local needs.

Furthermore, the lack of continuous improvement by 3PL providers is another problem mentioned by the firms, either because providers do little to improve the operation once the account is obtained, or because the improvements they make rarely have a positive impact on the firm (Miebach Consulting, 2012). Some researchers attribute this situation due to the fact that the existing demand is large and the degree of commitment between providers and firms is short-term.

In the same study, (Miebach Consulting, 2012), 3PL providers and firms that currently outsource services recognize poor service as one of the main reasons for not renewing a contract. In addition, firms that stopped outsourcing pointed to bad management and a lack of integration for the procedures of their companies as the main reason, as shown in Fig. 2.

In general, Fig. 2 fits the problems previously encountered by the 3PL industry in Mexico. Apparently, most problems are related more to internal factors than to external factors. In this case, an appropriate management strategy seems to help improve performance.

Fig. 2. Reasons for Not Renewing a Contract



Source: Miebach Consulting (2012).

Supply chains by nature are complex and vulnerable, hence the need for more preparation. Bad management and lack of integration for logistical procedures may be due to several causes, but we believe that they are the result of a the logistic provider lacking the vision to understand the requirements of firms.

4.2. Challenges for the 3PL Industry

O'Reilly (2014) stated that the real challenge for 3PLs was the changing perception of logistics service providers. Many firms do not want to invest in capital in fixed costs, regardless of whether it is infrastructure or technology. The challenges of the 3PL industry also imply the need for better positioning as the true managers of the supply chain, adding technological solutions that impact the business market, and a more competitive vision regarding the services they offer. 3PL service providers require significant progress to meet the growing demands of their customers (Revistas Enfasis, 2012).

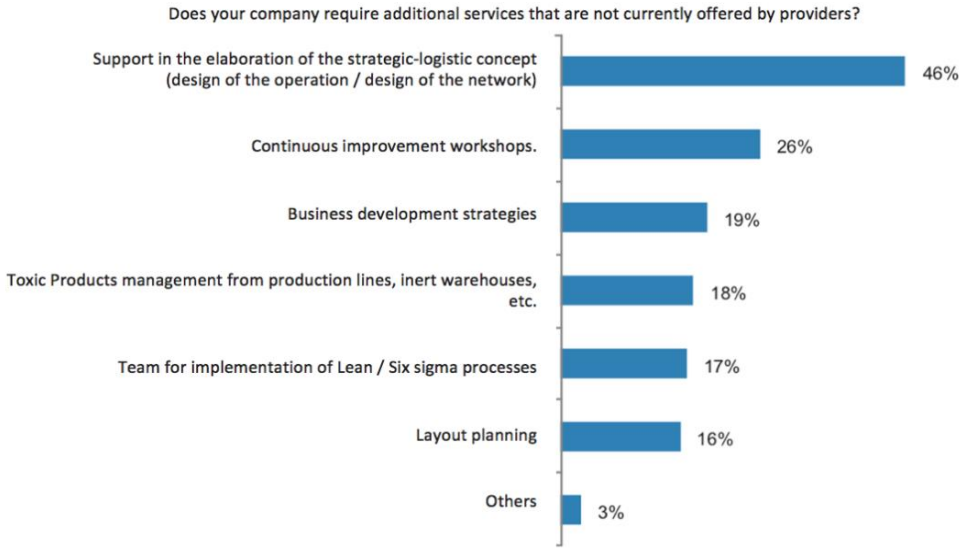
According to Revistas Enfasis (2017), compared to Latin America, Mexico has had good development in its value chains; however, in order to achieve a world-class competitiveness levels, it is necessary to invest in technology aimed at connecting its network with providers and customers.

Seeing 3PL providers as collaborative partners is a task that has not been possible to achieve. It requires commitment from both parties. Achieving this challenge also implies an effort on the part of firms, since it is necessary for them to externalize their needs and expectations in such a way that providers can improve services and the confidence that allows long-term relationships.

On the other hand, and as mentioned in the previous chapter, the 3PL industry is known for concentrating on routine activities rather than more integrated tactical functions (Arroyo, Gaytan, & De Boer, 2016). Perhaps this is due to market demand; however, it seems that at present, some firms have started to build more integrated processes in the supply chain that support greater accuracy in communication within a short time. These

processes are what Mexican providers must be prepared for, and if they do not have the necessary tools and technology, it is very likely that they will be less competitive in the global market place. In Fig. 3, respondents have identified those services that are required and not offered by 3PL providers. This, again, confirms that to be more competitive, 3PL providers must focus on activities such as the development of the strategic-logistic concept and support for continuous improvement.

Fig. 3. Additional Services Required That Are Not Currently Offered by 3PL Providers



Source: Miebach Consulting (2012).

Finally, the manufacturing industry plays an important role for 3PL service providers as it is an important source of both opportunities and growth. Therefore, it is necessary that providers develop strategies to face the challenges that the manufacturing sector requires, as well as seeking a greater level of specialization to meet their needs.

V. Conclusion

For the past two decades the third-party logistics industry around the world has experienced an evolution in demand, from simple processes like transportation to the more complex activities of the supply chain. In Mexico, it is not an exception that companies are also hit by the wave of globalization, and the modernization in their processes is a must if they want to survive the competition. Thus, it is necessary to adjust the integration patterns to each region because although there seems to be similarities between countries, demand reacts differently in each case, and providers need to be able to take full advantage of market opportunities.

On the other hand, both firms and suppliers must be aware and understand that logistics, in its simplest form, is a process that requires the precision of all links that are part of the supply chain and, for them to embody this perfectly, it requires a strategy that is being improved constantly. It seems that the 3PL logistics services industry has a fairly large market to which to offer its services; however, the challenges that must be overcome are still greater. 3PL logistics services should be aware of geographic and economic advantages to understand the

needs of Mexican firms and be prepared to offer alternatives that meet theserequirements, since an important amount of users belong to the manufacturing sector.

The most outsourced services by companies are those related to national and international transport, warehousing, and brokerage services, instead of activities that require a more complete level of integration. In our opinion, this is due to the significant demand of companies dedicated to export, such as the automotive sector and manufacturing, among others, and their markets are located around the border region.

In relation to the use of information systems, despite the fact that in other countries' information systems are a very important characteristic for firms, the information collected in Mexico suggests that it does not seem to be an important factor for firms. It makes us think that processes in the supply chain are still a bit traditional, but we can see that they are just beginning to be interested in more integrated logistics services. This means, based on several studies, inventory management, dry warehousing, and transport and distribution for dry and reverse logistics will be profitable activities for the 3PL industry in the future. This study also confirms that one of the biggest challenges for the 3PL industry is to combine the activities offered by providers into operational strategies by concentrating on activities generating strategic value in the supply chain.

Cost reductions and improvements in the level of service are the main reasons to outsource to 3PL logistics services for Mexican firms. Nevertheless, this is not an exclusive quality of the industry in Mexico since, according to the information gathered, in general, in Latin America it is the main factor for deciding to outsource a logistic service.

In spite of all the above, research suggests that Mexico has competitive 3PL logistics performance with regards to other Latin American countries.

Finally, we would like to add that even though the 3PL industry has an extensive background, in Mexico it is still a field that can be exploited by academics since much of the data collected has not been updated. On the contrary, we found that there is great interest by international companies in this field. In addition, the logistics industry in Mexico represents a potential market, and that makes it attractive for international companies.

References

Antún, J. (2002, February). Supply chain administration. *Segment, Marketing Magazine of the Business School*. Retrieved from http://segmento.itam.mx/Administrador/Uploader/material/Administracion%20de%20la%20Cadena%20de%20Suministros.PDF

Armstrong & Associates. (2017). *Global 3PL market size estimates* (Webpage). Retrieved from http://www.3plogistics.com/3pl-market-info-resources/3pl-market-information/global-3pl-market-size-estimates/

Arroyo, P., Gaytan, J., & De Boer, L. (2006). A survey of third party logistics in Mexico and a comparison with reports on Europe and USA. *International Journal of Operations & Production Management, 26*(6), 639-667.

Camino, J. & Aragonez, S. (2017, April 25). Value chains in Mexico: How to achieve global competitiveness?. *Enfasis Magazine*. Retrieved from http://www.logisticamx.enfasis.com/articulos/77666-cadenas-valor-mexico-como-alcanzar-competitividad-nivel-mundial

Capgemini Consulting & Langley, J., Jr. (2016). 2017 Third-party logistics study: The state of logistics outsourcing. *Industry Week*. Retrieved from https://jda.com/-/media/jda/knowledge-center/thought-leadership/2017 stateoflogisticsreport_new.ashx

Champi Quispe, E., Coloma, V. P. A., Funegra, Q. F., Tavera, V., & Carlos, J. (2016). Strategic plan for logistics operators in Peru (Webpage).. Retrieved from http://tesis.pucp.edu.pe/repositorio/handle/123456789/7526

Cheong, M. L. (2003). Logistics outsourcing and 3PL challenges (Webpage). Retrieved from https://www.researchgate.net/publication/37595239_Logistics_Outsourcing_and_3PL_Challenges

González, C. J. A. (2015). Logistics operation hiring process in Colombia: The implementation of a crosscutting logistics operator. *Semestre Económico, 18*(38), 215-237.

Grupo Logistics. (2017, August), The challenges of the 3PL: Changing the offer of integral services to business solutions. *Inbound Logistics Latam, 11*, 26-28. Retrieved from http://www.il-latam.com/images/articulos/el-reto-de-los-3pl.pdf

Hernández-Apam, M. A., Durán-Encalada, J. A., Vega-Lebrún, C. A., & Olivares-Benítez, E. (2014). The role of the 4 PL's (fourth party logistics) of the companies located in the central-Gulf region of Mexico. *Nova scientia, 6*(11), 198-227. Retrieved from: http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-07052014000100012

Hertz, S. & Alfredsson, M. (2003). Strategic development of third party logistics providers. *Industrial Marketing Management, 32*(2), 139-149.

Kirby, C. & Brosa, N. (2011). Logistics as a competitiveness factor for small and medium enterprises in Latin America and the Caribbean. *Inter-American Development Bank*. Retrieved from https://publications.iadb.org/bitstream/handle/11319/5089/La%20log%C3%ADstica%20como%20factor%20de%20competitividad%20de%20las%20Pymes%20en%20las%20Am%C3%A9ricas.pdf?sequence=1&isAllowei=y

Capgemini Consulting & Langley, J., Jr. (2015). The state of logistics outsourcing: Results and findings of the 19th annual study. *Industry Week*. Retrieved from http://www.cold.org.gr/library/downloads/Docs/2015%20Third%20party%20logistics%20study%20A.pdf

Langley, C. J., Jr., Allen, G. R., & Dale, T. A. (2004). *Third-party logistics study results and findings of the 2004 ninth annual study* (Lab report). Retrieved from https://www.coursehero.com/file/12301624/3pl-2004-report

Lei, D. & Hitt, M. (1995). Strategic restructuring and outsourcing: The effect of mergers and acquisitions and LBOs on building firm skills and capabilities. *Journal of Management, 21*(5), 835-859. https://doi.org/10.1016/0149-2063(95)90043-8

Miebach Consulting. (2012). *Study on outsourcing 2012 results and conclusions.* Frankfurt, Germany: Author. Retrieved from http://www.elogistica.economia.gob.mx/swb/work/models/elogistica/Resource/3/1/images/tercerizacion2012.pdf

O'Reilly, J. (2014). Market research: 3PL perspectives 2014. *Inbound Logistics Latam, 8*, 50-54.

Revistas Enfasis (2012, December 3). Benchmark 3PL: Diagnosis of Mexico and the world. *Logistica*. Retrieved from http://www.logisticamx.enfasis.com/articulos/65703-benchmark-3pl-diagnostico-mexico-y-el-mundo

Selva, G., Molina, P., & Amador, J. (2009). The 3PL industry in central America. *INCAE Business Review, 1(*8), 34-39.

World Bank. (2016). *Logistics Performance Index* [World Bank Datafile]. Retrieved from https://lpi.worldbank.org/international/global/2016

Yang, X. (2014). Status of third party logistics: A comprehensive review. *Journal of Logistics Management, 3*(1), 17-20.

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Financial Analysis of Adapting Artificial Insemination (AI) Technology in Selected Dairy Cattle Farms in Lipa City, Batangas, Philippines

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ABSTRACT

The Application of Artificial Insemination (AI) technology in cattle breeding has been a promising method in developing dairy cattle production. The aim of the study was to analyze the financial aspect of selected farms in Lipa City, Batangas, by adapting AI with the assistance of Philippine Asian Biotechnology Research and Development (PABRD). Three models of payment scheme were used to project the herd inventory, namely (1) purchasing the straws at Php1, 200 each, (2) returning one calf to PABRD for every five calves born, and (3) returning one calf for every six calves conceived. The financial statement analysis showed that the selected farms have weak to stable financial statuses with respect to the financial standard available for dairy cattle industry. Both farms were operating below the breakeven point based on breakeven analysis. The sensitivity analysis suggests that applying AI technology will be a good investment for the farmers, especially when the first model of payment scheme is observed.

Keywords: artificial insemination, breakeven analysis, dairy cattle, financial statement analysis, projection of herd inventory, sensitivity analysis

JEL Classifications: F30, N50, N95

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I. Introduction

The Philippine dairy industry was once threatened with complete operational stoppage, and the dairy needs of the country would rely solely on importation (Bulatao, n.d.). In the late 1980s to early 1990s, successful experimental programs saved the then dying industry. As of 2017, local milk production increased while both importation and exportation of milk and other dairy products decreased by 5 and 24 percent, respectively (NDA, 2017). Local production accounted for one glass out of four of the liquid milk supply. According to the Philippine Statistics Authority (PSA), the increase in milk production was most noted in the areas of Luzon and Mindanao. There is a registered number of 25,494 cattle out of the 57,515 heads of dairy animal inventory.

As the Philippine dairy sector is gaining momentum, this is further enhanced by adapting technologies to better improve production. The use of AI technology is seen as one of the ways to help boost this industry. In 2017, some dairy cattle farms in Lipa, Batangas, started importing semen of Aussie red cattle and began applying the technology. PABRD, a private corporation which distributes imported semen, has developed an arrangement with the local farmers. It will provide the semen to the breeders in exchange for one of every 5 calves.

The general objective of the study was to analyze the financial aspect of selected dairy cattle farms in Lipa City, Batangas, Philippines, using AI technology with the assistance of PABRD. Specifically, the study described the current marketing, production, and organization of the selected farms; the herd inventory of the farms was projected by applying three different payment scheme models (purchase at Php1,200 per straw, 1/5 model, and 1/6 model). The financial aspect of the selected farms was assessed using financial statement analysis, which included the following tools: liquidity, solvency, profitability, financial efficiency ratio analyses, breakeven analysis, and sensitivity analysis.

The financial analysis of adapting this technology allowed the farmers to foresee the potential economic gain or loss by venturing different models of payment scheme. This research will also be a basis for further studies since no studies in the Philippines were yet conducted analyzing the economic value of adapting AI technology in cattle breeding, as well as exploring the financial aspect when dealing with arrangements such as the semen distribution exercised in this study.

Since there were no existing financial statements from the farms, the raw data of their 2017 business transactions were utilized to prepare financial statements in compliance with the Philippine Financial Reporting Standard (PFRS). These statements are not audited, hence their accuracies are not verified by an external auditor. Since the implementation of AI in the said farms started in 2017, there are no actual data yet for the program's success rate. Only estimates will be projected based on existing herd inventory and production cycle of each farm.

II. Literature Review

2.1. Dairy Cattle in the Philippines

With the near-death failure of the Medium-Team Development Plan for Dairy around 1986, wherein the Department of Agriculture (DA) decided to solely rely on importation of dairy products, some promise started to show between 1989 and 1993. Through the efforts of the former DA Secretary Carlos G. Dominguez, they began to initiate a new dairy plan wherein the Zero-base approach was practiced. This strategy addressed the problems that were brought about by the poor selections of participating farmers, which often lead to selection of overly dispersed dairy production sites, few existing facilities that were either too old or an inappropriate size for production volumes, and non-enterprise functioning cooperatives. In the early 1990s, they established three zones, 2 of which, Davao and Cebu, did not have prior dairy activities.

The support and development of the Philippine dairy industry continued to grow as the Philippine Carabao Center (PCC) was created in 1992 to pursue the promotion of water buffalo as a source for products like milk and meat. In 1993, the first national organization of smallholder dairy farmers, the Dairy Confederation of the Philippines (Dairycon), was organized. Eventually, the members met annually to convene and be updated of the latest products and technology in the industry.

Few experiments were tried to research how to improve the dairy industry in country. In the mid-1990s, the government dealt with big commercial farms as a venture into the industry. None of the efforts succeeded. It was learned that the small producers maintained a competitive edge because investment was low, and they incurred only low overhead per farm (Bulatao, n.d.).

2.2. AI Technology Overview and Its Importance to the Dairy Industry

Artificial Insemination (AI), among other reproductive technologies, is very important for the effective passing of genetic material for breed improvement. It can start a huge production of offspring from an elite cattle, thus disseminating genetic material that is premium. (Van Arendonk, 2011). AI provides the producers means for effective increases in the genes within their herd (Muth-Spurlock, Poole, & Whisnant, 2016). It also enables easier access to these genetic materials, even abroad (Van Arendonk, 2011). AI allows accurate estimates of breeding values, hence optimizing schemes from a genetic and economic perspective. It is seen to improve farm assets by increasing the chance of efficient reproduction (Barrientos-Blanco, Thompson, Widmar, Wolf, & Unruh Snyder, 2018). The use of this technology has addressed some issues of conventional cattle breeding, such as fertility problems in herds (Spengler, Neff, & Ivemeyer, 2016). Some technology for AI has become even more advanced through the use fluorescence, through which farmers are able to sort male- and female-bearing sperm cells (Barrientos-Blanco et al., 2018). During the past few decades, the focus of farmers throughout the world are the inclusion of longevity of cattle's lactating period and the passing of functional traits, such as fertility and health (Clasen, Norberg, Madsen, Pedersen, & Kargo, 2017). As genetics are improved in AI, it seen as one of the ways to improve herd management as it addresses deteriorating functional traits and longevity (Clasen et al., 2017).

In the Philippines, some cattle breeders have already imported semen to develop breeds that can easily adapt to the changes in the country's temperature. The importation, however, requires extensive research and testing to ensure that there is compatibility with the adaptive and production traits of the genes (Van Arendonk, 2011).

III. Methods

3.1. Data Collection

Interviews with the owners of the selected dairy farms were done to collect information about their marketing, organizations, and operations. Financial documents, which include sales, expenses, production, selling prices, assets, liabilities, equity, terms with clients and suppliers, and credit terms with the National Dairy Authority (NDA) and other creditors were gathered.

3.2. Financial Analysis

3.2.1. Financial Statement Analysis

This was done through an integrated analysis of all financial statements. Farms' raw financial data were used to produce financial statement in compliance with the PFRS. The liquidity analysis, solvency analysis, profitability analysis, and financial efficiency of the data were compared to the financial standards available for the dairy farm industry. There is, however, no financial ratio standard for the dairy industry in the Philippines. The benchmark, as shown in Table 1, was used as a reference.

Table 1. Farm Financial Rations and Benchmark Calculations and Implications

Liquidity Analysis	Calculation	Strong	Stable	Weak
Current Ratio	Total Current Farm Assets ÷ Total Current Farm Liabilities	>1.50	1.00 - 1.50	<1.00
Working Capital Rule	Working Capital ÷ Total Expenses	>50%	20 - 50%	<20%
Solvency Analysis	**Calculation**	**Strong**	**Stable**	**Weak**
Debt Ratio	Total Farm Liabilities ÷ Total Farm Assets	<30%	30-70%	>70%
Equity Ratio	Total Farm Equity ÷ Total Farm Assets	<70%	30-70%	<30%
Debt/ Equity Ratio	Total Farm Liabilities ÷ Total Farm Equity	<42%	42-230%	>230%
Profitability Analysis	**Calculation**	**Strong**	**Stable**	**Weak**
Rate of Return on Farm Assets (ROA)	Net Surplus ÷ Average Total Farm Assets	>5%	1-5%	<1%
Operating Profit Margin	Net Surplus ÷ Gross Revenue	>25%	10-25%	<10%
Financial Efficiency	**Calculation**	**Strong**	**Stable**	**Weak**
Asset Turnover Ratio	Gross Revenue ÷ Average Total Farm Assets	<40%	40-60%	>60%

Source : Wolf, Stephenson, Knoblauch, & Novakovic (2016).

3.2.1.1 Liquidity Analysis

Liquidity refers to the ease of converting assets to cash. This is the ability of the farm to pay current obligations and keeps the business operational in the short run. The ratios involve current assets. Current liabilities are also considered. These must be settled or converted to other liabilities within one year of the operating cycle. To test the liquidity of the farms, current ratio and the working capital rule were used. The current ratio measures the adequacy of the working capital as it used to meet current obligations from current assets. A possible solvency problem can be indicated by a low current ratio, while a high ratio can suggest that a management may not be productively investing idle assets. The working capital rule measures the adequacy of working capital to meet operating expenses, which are the selling and administrative expenses in an accounting period.

3.2.1.2 Solvency Analysis

This is a firm's ability to pay its noncurrent obligations, and keeps it in business in the long run. The key factors of solvency are the firm's capital structure and degree of leverage. To complete a solvency analysis, debt ratio, equity ratio, and debt-equity ratio were considered. Debt ratio refers to the proportion of total assets provided by the creditors. The higher the ratio is, the higher the risk taken by the creditors. The proportion of the total assets provided by the owners is referred as the equity ratio. The higher the equity ratio, the higher the risk taken by members of the cooperative. The proportion of assets provided by creditors relative to what has been provided by the owners is the debt-equity ratio. A low ratio means a lower relative debt burden, thus creating better chances of repayment of creditors.

3.2.1.3 Profitability Analysis

This measures the firm's profit in relation to its total revenue. The analysis was done through consideration of the rate of return on farm assets (ROA) and operating profit margin (PM). ROA is the efficiency with which assets are used to operate the business while PM measures the profit generated after the consideration of operating costs.

3.2.1.4 Financial Efficiency

This measures the utilization of resources. This was determined through the use of the asset turnover ratio, which is the generated revenue from farm resources.

3.2.2 Breakeven Analysis

This is used to determine the point wherein the revenue is equal to the total cost. This is a tool to aid decision makers to plan not only budgeting but also identifying the amount of output and sales level at which there would neither be profit nor loss. The data needed for the computation are the selling price per unit, variable cost per unit, contribution margin per unit, contribution margin percentage, and total fixed cost.

To get the breakeven output (BEP) of a single product, the formula used was:

$$BEP = TFC \div CM$$

where TFC is the total fixed cost and CM is the contribution margin per unit.

The breakeven sale (BES) is computed using the formula:

$$BES = TFC \div CM\%$$

where TFC is the total fixed cost and CM% is the contribution margin percentage.

BEP_A, which is the breakeven point of animal inventory, determines the minimum average milking cattle that the farms should maintain to have neither profit nor loss. This can be computed using the formula:

$$BEP_A = (BEP \div ADP) \div 365\ days$$

where BEP is the breakeven output, and ADP is the average daily production for each farm. The operating days are 365 days per annum.

The BEP, BES, and BEP_A will vary depending on the farm's operation. The results will be the basis in providing recommendations for the farms' future operations.

3.2.3 Sensitivity Analysis

This analysis addresses the impacts of assumptions or changes in a business scenario. The results from animal inventory projections based on the farms' operations were utilized. The financial statements prepared from the farms' 2017 raw financial data were used. A 6 percent discount rate was applied for computing the net present value (NPV), and the cash flow stream was used for computing the internal rate of return (IRR). The payback period was also considered to assess when the recovery of the investment. The projection was set to 10 years to cover the life expectancy of the cattle from birth until culling.

To compute the NPV, the formula used was:

$$NPV = Present\ value\ of\ Cash\ flow - Cash\ Overflow$$

The equation was used to get IRR:

$$IRR = \sum_{t-1}^{t} \frac{C_t}{(1+r)^t} - C_0$$

where t is the number of time periods, C_t is net cash inflow during the period t, r is the discount rate, and C_0 is the total initial investment cost.

The payback period is computed using the formula:

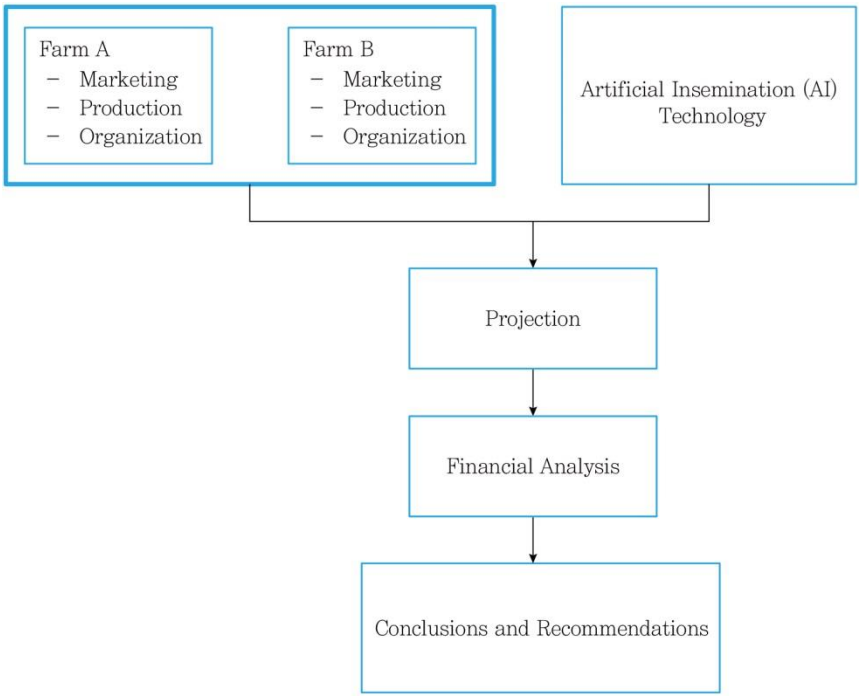
$$Payback\ period = Years\ before\ full\ recovery + \frac{Unrecovered\ cost\ at\ start\ of\ the\ year}{Cash\ flow\ during\ the\ year}$$

3.3. Animal Inventory Projection

The estimation of herd inventory was determined using the integrated data for breeding cycle and the semen provided by PABRD. The breeding cycle includes the AI process, life cycle of cattle, and the life cycle of cattle before it produces milk.

Three models of payment schemes were used in this study. In the first model, the farmers will immediately purchase straws at Php1,200 each. In the second model, for every 5 calves born, the farm will return one calf aged 6 months to PABRD. In the third model, 1 calf for every 6 calves born will be returned, aged no older than 6 months.

Fig. 1. Analytical Framework of the Study



The analytical framework of the study, as shown in Fig. 1, started with data collection of the farms' marketing, production, and organization. AI technology practices was gathered with an AI technician as the basis for estimation. The projection of herd inventory will be based on the collected secondary data, the estimates of using AI technology, the production cycle of each farm, and the data from each farm. A financial analysis will be drawn through the projection output. Finally, conclusions and recommendations will be presented.

IV. Results and Discussion

4.1. Farm Business Functions

Farm A was registered in the city of Lipa at the Department of Trade and Industry (DTI) as a sole proprietorship engaged in dairy farming. The sole proprietor oversees the daily operation and handles all the administrative work. Farm A was initially dedicated to cattle livestock fattening before it decided to solely focus on dairy cattle farm. It started with 74 dairy cattle, loaned from NDA. For every cattle loaned, it will pay back the loan in the form of giving back lactating cattle with ages of 2.5 to 3 years old. The farm also has the option to pay in cash. With the shift in product line, Farm A mainly sells raw milk with a base price of Php29.00 per liter, and a premium price of Php33.00 per liter. It sells its products exclusively to a milk processor in Laguna, who picks up the raw milk twice a day. Given this, it does not have a regular promotional strategy. Its other products also include male calves, bulls, cattle subject for culling, and excess feeds and silage. With a 10-hectare location, itoperates throughout the year. It has 208 cattle, 7 sets of farm equipment, and farm facilities such as land, pastures, fences, cow pens, calf houses, and other farm structures. It produced and sold 208,811.64 liters, or Php6,890,784.02 in 2017. Currently, the farm has 7 in-house laborers.

Farm B was registered in the city of Lipa with the DTI as a sole proprietorship engaged in dairy farming.

The owner facilitates daily operation and solely handles all administrative work on the farm. Farm B was a sugarcane farm before the shift to dairy cattle farming. The farm started with 118 dairy cattle loaned from the NDA, and it observes the same scheme as Farm A in terms of loan repayment. Its main product is raw milk with a base price of Php28.00 per liter and a premium price of P34 per liter. Its product is delivered to several clients, such as the Samahang Magbabaka ng Batangas Cooperative (SAMBACO), to which they deliver products twice a day. Its other products include male calves, bulls, cattle for culling, and excess feeds and silage. Having a 7-hectare farm facility, the farm operates daily throughout the year. It has farm equipment and farm facilities such as land, pastures, fences, cow pens, calf houses, and other farm structures. It produced and sold 236,848 liters, or Php7,374,907 in 2017. Animal inventory during 2017 was 136 cattle. As of 2017, the farm has 10 in-house employees.

4.2. Artificial Insemination

Table 2. Artificial Insemination Process

	Activities	Duration (Days)
1	Farm assessment	30
2	Selection of cattle to be inseminated	16
3	Scheduling of insemination and selection of compatible semen for breeding	2
4	Actual artificial insemination by technician	2
5	Weekly monitoring by AI technician and veterinarian	
6	Drying of pregnant cattle on its 7 months from conception	
7	Actual delivery of calf	280
	Total	330

The process of artificial insemination, as shown in Table 2, begins with farm assessment which may take 30 days. This is when the breeds, farm facilities, and capabilities of the farmers are checked to determine readiness to adapt the technology. The selection of cattle to be inseminated comes next, which can take as long as 16 days. The cattle have to first be in heat before administering the semen. It will take about two days for the scheduling of insemination and selection of compatible semen for breeding. Another two days is allotted for the technician's actual artificial insemination administration. There is weekly monitoring of AI technicians and veterinarians to ensure the safety of the cattle. Pregnant cattle are subject for drying in their 7th month of conception. The period starting from conception to delivery may take around 280 days.

Table 3. Life Cycle and Feeding Requirements of Cattle

	Classification and Feeding	Age
1	Calf - Exclusively feed by cow's milk	0-3 Months
2	Calf - Feed by grower and water	>3 months to 1 year
3	Heifer - Feed by grower and water	1 year - 2 years
4	Heifer - Feed by corn silage and premix feeds	2 years and above
5	Pregnant Heifer - Feeds, spent grain, and corn silage, medication	2 years and above
6	Pregnant Cattle - Feeds, spent grain, and corn silage, medication	3 years and above
7	Milking Dam - Feeds, spent grain, and corn silage, medication	3 years and above

From birth to 3 months, the calves are exclusively feeding on cow milk. From their 4th month to 1 year, they are starting to be fed with grower and water. From 1 to 2 years, the heifers rely on grower and water. For non-pregnant heifers, which are 2 years old and above, they are fed corn silage and premixed feeds. while pregnant heifers of the same age are fed with feeds, spent grain, and corn silage, plus some medical attention. This is also the same list of requirements for pregnant cattle aged 3 years and older and for milking dams of 3 years and above.

Table 4. Schedule of Cattle Before It Produces Milk

Activities	Duration (Years)
Growing stage	2
Artificial insemination and pregnancy	1
Milking (seven lactation)	7
Total	**10**

Table 4 shows the period of years the cattle grow and begin lactating. From birth to heifer, growing time may take up to 2 years. The artificial insemination and pregnancy can altogether be around one year, while the lactation period can last 7 years.

Considering the data from tables 2, 3, and 4, the following assumptions were followed: (1) cattle should be three years old before it produces raw milk in consideration of the cattle's life cycle; (2) milk production was 300 days based on the average days of each cattle's production for each farm; (3) the actual production rate of the Aussie red was 25 liters per day at its highest and 14 liters per day at its lowest, and the average production was 19.5 liters per day; (4) the estimated conception rate was 60 percent based on PABRD research; and (5) at least 10 heifer/dam will be inseminated each year for each farm.

Table 5. Semen Provided by PABRD with Expected Number of Calves with Corresponding Cost

	No. of Straw (Provided by PABRD)	Conception Rate	Expected Herd		To be Given to PABRD (6-month Old Calf)	
			Number	Cost (Php)	Number	Cost (Php)
Farm A						
Aussie Red	25	60%	15	540,000	3	108,000
Farm B						
Aussie Red Arbobama	23	60%	14	496,800	3	108,000
Aussie Red Hilly	24	60%	14	518,400	3	108,000
Aussie Gold	50	60%	30	1,080,000	6	216,000

Farm A has received 25 straws of Aussie red. With the assumption that the conception rate is 60 percent, the expected additional herd is 15 calves, which is equivalent to a Php540,000 increase in biological assets. As per the contract agreed upon by the PABRD and Farm A, the farm is set to give three six-month old calves, which will cost Php108,000.

A total of 97 straws of Aussie Red Arbobama,

Aussie Red Hilly, and Aussie Gold were received by Farm B. Still, with the assumption of a 60 percent fertility rate, it is expected that their herd will have an additional 14 calves of Aussie Red Arbobama, 14 Aussie Red Hilly, and 30 Aussie Gold calves, a total of a Php2,095,200.00 increase in biological assets. The farm is set to give 12 calves aged 6 months old to PABRD, and will cost a total of Php432,000.00.

Table 6. Cost of Expected Number of Calves to be Given by Each Farm to PABRD

	No. of Expected Herd	If Purchased by Farmers @Php1,200	If 1/5 Model		If 1/6 Model	
			Number	Cost (in Php)	Number	Cost (in Php)
Farm A						
Aussie Red	15	30,000	3	108,000	2	72,000
Farm B						
Aussie Red Arbobama	14	27,600	3	108,000	2	72,000
Aussie Red Hilly	14	28,800	3	108,000	3	108,000
Aussie Gold	30	60,000	6	216,000	5	180,000

Three models of payments scheme were prepared to determine the most viable arrangement for the farmers. If Farm A uses the first model, the added operating expense will be Php30,000 for 25 straws. If it follows the second model, the opportunity cost will be Php150,000, while if it follows the 1/6 model, the opportunity cost will be Php100,000. A 6-month old calf costs Php36,000 with a selling price of Php50,000 based on the data gathered from each farm.

If Farm B buys all 97 straws, the added operating expense will be Php116,000, while if it applies the second and third models, the opportunity cost will be Php600,000 and Php500,000, respectively.

Table 7. Expected Additional Animal Inventory from AI Applying the of Payment Scheme Models

	Added per year	Purchase at Php 1,200 Remaining			To PABRD	1/5 Remaining			To PABRD	1/6 Remaining		
		Male	Female	Total		Male	Female	Total		Male	Female	Total
Farm A												
2018	6	3	3	6	0	3	3	6	0	3	3	6
2019	6	6	6	12	1	5	6	11	1	5	6	11
2020	3	7	8	15	1	6	7	13	1	6	7	13
2021		7	8	15	1	5	7	12		5	7	12
Farm B												
2018	9	4	5	9	0	4	5	9	0	4	5	9
2019	9	9	9	18	1	8	9	17	1	8	9	17
2020	9	13	14	27	1	12	13	25	1	12	13	25
2021	9	18	18	36	1	17	18	33	1	19	18	33
2022	9	22	23	45	3	18	21	39	3	18	21	39
2023	13	29	29	58	3	21	28	49	3	21	28	49
2024		29	29	58	3	18	28	46	1	19	29	48

4.2. Projection of Herd Inventory

In Table 7, the expected additional cattle from the application of AI technology under the three models of payment schemes are shown. It is assumed that Farm A will inseminate 10 cattle for 2018 and 2019, and five cattle in 2020. Farm B will inseminate 15 cattle from 2018 to 2022, and 22 cattle in 2023. They will stabilize in 2021 and 2024 for Farm A and Farm B, respectively. If Farm A follows the first model to purchase the straws, a total of 15 cattle will be added to its herd by 2021. If it follows the 1/5 and 1/6 models, a total of 12 cattle will be added. For Farm B, if it follows the first model, 58 new cattle will be added by the end of 2024. It will become 46 and 48 cattle if the farm uses the 1/5 and 1/6 models, respectively.

Table 8. Estimated Raw Milk Production with Different Payment Schemes

(Unit: in Liters Per Year)

Year	Farm A			Farm B		
	Purchase	1/5	1/6	Purchase	1/5	1/6
2017	208,812	208,812	208,812	236,848	236,848	236,848
2018	208,812	208,812	208,812	236,848	236,848	236,848
2019	208,812	208,812	208,812	236,848	236,848	236,848
2020	208,812	208,812	208,812	236,848	236,848	236,848
2021	226,362	226,362	226,362	266,098	266,098	266,098
2022	243,912	243,912	243,912	289,498	289,498	289,498
2023	255,612	249,762	249,762	318,748	312,898	312,898
2024	242,687	249,762	249,762	342,148	342,148	342,148
2025	252,687	249,762	249,762	371,398	359,698	359,698
2026	252,687	249,762	249,762	406,498	400,648	400,648
2027	252,687	249,762	249,762	406,498	400,648	406,498

Table 8 shows the estimated volume of raw milk production. For Farm A, the average production per year starting in 2017 to 2027 is 1.80 percent, or 233,807.09 liters per year for the first model, with 1.69 percent, or 232,211.64 liters per year, for second and third models. It is notable that the increase in production will begin in 2021 and stabilize in 2024. The average estimated volume of raw milk produced by Farm B is 5.14 percent, or 304,388.91 liters per year for the first model, with 5.01 percent, or 301,729.82 liters per year, for the second model. Using the third model, the average percent added volume production is the same as the first, with a volume average of 302,261.64 liters per year. The increase in production will also commence in 2021, but it will begin to stabilize by the year 2026. Farm B has a higher increase in production than Farm A because of the greater straws provided.

Tables 7 and 8 were generated following the assumptions that: (1) the average production per day of the new breed is 19 liters per day; (2) the yearly lactation period for every cattle is 300 days; and (3) the gender ratio is 1 male to 1 female calf.

4.3. Financial Analysis

4.3.1. Financial Statement Analysis

Table 9. Financial Statement Analysis

Financial Ratio	Standard	Farm A		Farm B	
		Ratio	Remarks	Ratio	Remarks
Liquidity Ratio					
Current Ratio	1-5	1.41	Stable	69.34	Strong
Working Capital Rule	20-50%	10.30%	Weak	11.49%	Weak
Solvency Analysis					
Debt Ratio	30-70%	26.90	Strong	46.98%	Stable
Equity Ratio	30-70%	73.10%	Stable	53.02%	Stable
Debt-Equity Ratio	42-230%	36.79%	Stable	88.61%	Stable
Profitability Analysis					
Rate of Return on Farm Assets (ROA)	1-5%	(0.01%)	Weak	(0.54%)	Weak
Operating Profit Margin	10-25%	(0.05%)	Weak	(2.75%)	Weak
Financial Efficiency					
Asset Turnover Ratio	40-60%	11.73%	Weak	19.59%	Weak

Results for the liquidity analysis, as shown in Table 9, indicate that the current ratio for Farm A was stable, while farm B was strong. This implies that both farms have enough current assets to pay currently maturing debts. Farm B may have a low investment in fixed assets, resulting in a higher current ratio. The working capital rules for both farms are, however, weak. It shows that their working capital cannot cover at least 20 percent of the total farm expenses. This means there is not enough working capital to cover expenses which may result in farmers using their own personal money or looking for creditors.

In terms of solvency, results show that there is a strong debt ratio for Farm A. This implies that since its debts are low, it is also incurring low interest expenses and has a low risk for creditors. The equity and debt-equity ratios for both farms are considered stable. It shows that the combination of debt and equity were balanced in terms of financing the business. This suggests that for both farms, the business risks are lowered in terms of financial leverage.

Since both the rate of return on farm assets and the operating profit margins for both farms were weak, this suggests that they were operating below the standard. Optimization of operations should be reviewed to maximize revenue and minimize costs.

The financial efficiency for both farms is considered weak at 11.73 percent and 19.59 percent, respectively. This suggests that both farms are not maximizing the utilization of their resources. Assessment of all properties should be done to identify idle assets.

4.3.2. Breakeven Analysis

Table 10 shows the details to be used for the computation of the breakeven point for the selected farms. The average selling prices were Php33.00 and Php30.96 per liter for Farm A and Farm B, respectively. The variable costs, which include raw materials, direct labor, farm variable overhead, and variable operating expenses were Php26.85 per liter for Farm A and Php25.40 per liter for Farm B. Their contribution margins are Php6.15 and Php5.56 per liter, respectively. The amounts for fixed cost, farm fixed overhead excluding depreciation, depreciation expense, and fixed operating expenses were also computed.

Table 10. Breakeven Point Input Data for Each Farm

Particulars	Farm A		Farm B	
	Total (Php)	Per Liter (Php)	Total (Php)	Per Liter (Php)
Average Selling Price		33.00		30.96
Variable Cost		26.85		25.40
Raw Materials		22.57		20.28
Direct Labor		2.77		1.31
Farm Variable Overhead		0.79		1.38
Variable Operating Expense		0.72		2.43
Contribution Margin		6.15		5.56
Fixed Cost	1,287,545.71		1,562,675.87	
Farm Fixed Overhead, excluding Depreciation	65,638.50		60,000.00	
Depreciation Expense	981,907.21		1,322,675.87	
Fixed Operating Expense	240,000.00		180,000.00	

Table 11. Comparative Breakeven Analysis with AI after 10 Years

Particulars	Unit of Measurement	Farm A		Farm B	
		Value	Difference	Value	Difference
Break-even point (Ave 13L/d)					
Unit Sales	Liters	209,340.74	-	280,849.92	-
Peso Sales	Philippine Peso	6,908,244.58	-	8,695,113.55	-
Cattle	Milking Dam	44.12		54.96	
Current Operation (Ave 13L/d)					
Unit Sales	Liters	208,811.64	(529.11)	236,848.00	(44,001.92)
Peso Sales	Philippine Peso	6,890,784.02	(17,460.56)	7,332,814.08	(1,362,299.47)
Cattle	Milking Dam	44.01		49.92	
With AI Technology after 10 years					
Purchase (Average of 14L/d)					
Unit Sales	Liters	252,686.64	43,345.89	406,498.00	125,648.08
Peso Sales	Philippine Peso	8,338,659.02	1,430,414.44	12,585,178.08	3,890,064.53
Cattle	Milking Dam	49.45		79.55	
1/5 Model (Average of 13.65L/d)					
Unit Sales	Liters	249,761.64	40,950.00	400,648.00	163,800.00
Peso Sales	Philippine Peso	8,242,134.02	1,351,350.00	12,404,062.08	5,071,248.00
Cattle	Milking Dam	50.13		80.42	
1/6 Model (Average of 13.65L/d)					
Unit Sales	Liters	249,761.64	249,761.64	406,498.00	406,498.00
Peso Sales	Philippine Peso	8,242,134.02	7,989,447.38	12,585,178.08	12,178,680.08
Cattle	Milking Dam	50.13		81.59	

Table 11 shows the results of the comparative breakeven analysis of current operations and operations with AI after 10 years. Farm A should produce 209,340.74 liters of raw milk per year, or Php 6,908,244.58 of sales, to reach the breakeven point. The farm should maintain 45 milking dams per year to breakeven. Farm B should produce 280,849.92 liters per year, or have Php8,695,113.55 in sales, to reach a level where there is no profit or loss. 55 milking dams must be maintained per year for this farm to breakeven.

The current operation of Farm A is at 208,811.64 liters, or P6,890,784.02 in sales, for 2017, while Farm B has 236,848.00 liters, or Php7,332,814.08 in sales. Both farms have values below the breakeven point, which implies that both are operating at a loss. As of 2017, Farm A has an average of 44 milking dams, and Farm B has 50.

As both farms adapted AI technology, PABRD has provided Farm A with 25 straws of the Aussie Red breed with the assumption of a 60 percent conception rate, or 15 calves born, while Farm B has received 97 straws, assuming that 58 calves will be conceived.

Observing the first payment scheme model, Farm A will increase its output to 252,686.64 liters per year, or Php8,338,659.02. Farm B will increase to 406,498 liters per year, or Php12,585,178.08. Using the second model, Farm A will increase to 249,761.64 liters per year, or Php8,242,134.02, while Farm B will have 400,468 liters per year, or Php12,404,062.08. With the third model, it is expected that Farm A will increase its production to 249,761.64 liters per year, or Php8,242,134.02, and Farm B will have 406,048 liters per year, or Php12,585,178.08.

4.3.3. Sensitivity Analysis

To complete the sensitivity analysis, the following assumptions were made: (1) female calves will be replacements and will start producing milk in the 3rd year, 2021; (2) male calves will be given to PABRD for the 1/5 and 1/6 models; (3) all remaining male calves will be sold six months after they are born; (4) the selling price of male calves will be Php50,000 per calf based on the average selling price from the data provided by the farms; (5) the male calves given to PABRD will be treated as an opportunity cost; and (6) the discount rate used for computing Net Present Value (NPV) and Internal Rate of Return (IRR) will be 6 percent, based on the prevailing inflation rate and business risk. Each farm will incur costs only for three years, or until 2020, and start earning in 2021. The payback period will be above three years for all payment schemes.

Table 12. Ten-Year Sensitivity Analysis for the Selected Farms

	Purchase	**1/5 Model**	**1/6 Model**
Farm A			
NPV	₱4,619,658.31	₱4,388,847.27	₱4,465,814.86
IRR	84.03%	77%	80%
Payback Period	3.83 years	4.25 years	4.14 years
Farm B			
NPV	₱8,550,647.36	₱7,551,304.13	₱7,736,372.83
IRR	58.07%	63%	65%
Payback Period	4.67 years	4.99 years	4.86 years

Based on Table 12, for Farm A, all payment scheme models are profitable because both the NPV and IRR are positive. The most viable option is the first. It will have the highest computation for NPV at Php4,619,658.31 with the IRR at 84.03 percent. The shortest payback period is 3.83 years.

In the case of Farm B, all models are still profitable as NPV and IRR are both positive as well. The best

model to apply is still the first model. Although this has recorded the highest projected NPV at Php8,550,647.36, this model has the lowest IRR at 58.07 percent. Given this, it is advisable to focus on NPV because it shows the monetary value of the discounted cash flow. The shortest payback period is 4.67 years.

V. Conclusion and Recommendations

Based on the interviews with the sole proprietors of both farms, their main production dwells in raw dairy milk. They cater to regular clients, and they are hands-on in performing administrative functions. According to the projection of animal inventory for Farm A, the model wherein the farm will purchase the straws, it will have the most cattle by 2021. The second and third models will only lead to 12 cattle. For Farm B, the first model still produces the most cattle at 58 individuals by 2024, as opposed to 46 cattle in the second model and 48 in the third model. The first model also provides the farmers the greatest revenue as it produces the greatest increase in raw milk production. The current financial status of both farms based on the financial statement analysis are weak to stable in terms of overall financial health. Although both farms are already close to the breakeven point according to the results of the breakeven analysis, they still come up short, which means they are operating at a loss. Lastly, it is concluded that the adoption of AI technology for the farms will cause a positive effect on future business operations since the sensitivity analysis shows that the NPV and IRR are positive and the payback period is below five years, or half the economic life expectancy of a dairy cattle.

To increase the chances of producing female offspring, the farms can adapt the AI technology used abroad wherein, through the use of fluorescence, they can select the female-bearing sperm with 90 percent accuracy. The study on working capital management should be conducted to know when to acquire current assets and when to pay currently maturing debts. The financial leverage is stable; hence, they should maintain their respective capital structures. Because Farm A has a weak ROA and both are weak in terms of PM**,** they should review the current operation to assess where to optimize, and they can consider seeking assistance from government organizations such as the DA and NDA, or from the private sector to increase their yield. The asset turnover ratios for the selected farms are also weak, indicating that they are not efficiently utilizing their farm resources; hence, they can consider putting up processing plants to increase the value of their products. By adding new products such as fresh milk, the shelf life of their products will increase. For succeeding in AI operations, it is best that the farmers follow the first model, wherein they will purchase the straws directly, especially if their objective is to develop the cattle industry. PABRD can also propose a new payment scheme wherein the farmers and PABRD itself can benefit equally.

The results of the study can also be used for comparative analysis with the DA's plan to import the Girolando breed in Bohol, Philippines.

References

Bulatao, S. (n.d.). Philippines: Promoting dairy entrepreneurship through enterprise zones (Webpage). Retrieved from http://www.fao.org/docrep/011/i0588e/I0588E09.htm.

Clasen, J. B., Norberg, E., Madsen, P., Pedersen, J., & Kargo, M. (2017). Estimation of genetic parameters and heterosis for longevity in crossbred Danish dairy cattle. *Journal of Dairy Science*, *100*(8), 6337–6342. https://doi.org/10.3168/jds.2017-12627

Muth-Spurlock, A. M., Poole, D. H., & Whisnant, C. S. (2016). Comparison of pregnancy rates in beef cattle after a fixed-time AI with once- or twice-used controlled internal drug release devices. *Theriogenology*, *85*(3), 447–451. https://doi.org/10.1016/j.theriogenology.2015.09.019

Spengler Neff, A., & Ivemeyer, S. (2016). Differences between dairy cows descending from artificial insemination bulls vs. dairy cows descending from natural service bulls on organic farms in Switzerland. *Livestock Science*, *185*, 30–33. https://doi.org/10.1016/j.livsci.2016.01.007

Van Arendonk, J. A. M. (2011). The role of reproductive technologies in breeding schemes for livestock populations in developing countries. *Livestock Science*, *136*(1), 29–37. https://doi.org/10.1016/j.livsci.2010.09.004

Wolf, C. A , Barrientos-Blanco, J. A., Thompson, N. M., Widmar, N. J. O, & Unruh Snyder, L. (2018). Expected value of crossbred dairy cattle artificial insemination breeding strategies in virgin heifers and lactating cows. *Livestock Science*, *211*(March), 66–74. https://doi.org/10.1016/j.livsci.2018.03.005

Wolf, C. A., Stephenson, M. W., Knoblauch, W. A., & Novakovic, A. M. (2016). Dairy farm financial performance: firm, year, and size effects. *Agricultural Finance Review*, *76*(4), 532–543. https://doi.org/10.1108/AFR-02-2016-0009

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Financial Literacy: A Case Study on a Senior High School in Calabarzon

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ABSTRACT

This paper assessed the financial literacy of senior high school students in CALABARZON as well as some factors that can affect financial literacy. The Enhanced K to 12 basic educational program aims to produce graduates that are prepared for tertiary education, employment, and entrepreneurship. Thus, there is a need to ensure that senior high school students will get adequate education on financial literacy before finishing secondary education. Three out of the four fundamental financial concepts investigated to assess financial literacy were already taught in the Enhanced K to 12 curriculum. However, a majority of senior high school students were still found to have low financial literacy. Although most of the respondents had a good understanding of numeracy, several students were found to have a poor understanding of inflation and compound interest. Contrary to previous studies done outside the Philippines, the majority of the respondents were found to have a good understanding of risk diversification. The results of the study showed similar trends found with other previous financial literacy studies done in the country and internationally. The findings of this study may be found useful for curricular reforms for the secondary level of basic education.

Keywords: financial education, financial literacy, gender gap, K to 12 basic education, secondary education, senior high school
JEL Classifications: A21, D14, G11

I. Introduction

In the Philippines, the year 2018 marks the full implementation of the Republic Act No. 10533, otherwise known as the Enhanced K to 12 Basic Education Act of 2013, which includes the addition of two years of Senior High School (SHS) in secondary education. One of the main reasons for the implementtation of the Enhanced K to 12 Program was to provide students sufficient time for mastery of concepts and skills, and prepare graduates not just for tertiary education but also for employment and entrepreneurship (Department of Education, 2017). This calls for the need for ensuring the incorporation of the knowledge and practice of financial literacy in curriculum to produce graduates bound for financial success.

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The Organization for Economic Co-operation and Development (OECD) defines financial literacy as "a combination of awareness, knowledge, skill, attitude, and behavior necessary to make sound financial decisions and ultimately achieve individual financial well-being" (OECD, 2015). SHS students are usually approaching the legal age of 18 years old. At this age, people may already be able to start entering into contracts and making bigger financial decisions. Thus, the need for ensuring that students are equipped with financial literacy becomes a matter that is of increasing importance.

In the first few years of the full implementation of the Enhanced K to 12 Program, many government and private institutions were seen to be looking into possible curricular reforms and improvements to ensure the achievement of the objectives of the educational transition, which includes producing well-equipped graduates for tertiary education, employment, and entrepreneurship. In preparation for this event, this paper aimed to assess the level of Financial Literacy of the SHS students in a selected senior high school in the CALABARZON region and provide insights for the education sector, especially during this time of undergoing systemic reforms due to the newly implemented Enhanced K to 12 Program.

II. Review of Literature

2.1. Financial Literacy

Financial Literacy is defined by the OECD (2015) as "a combination of awareness, knowledge, skill, attitude and behavior necessary to make sound financial decisions and ultimately achieve individual financial well-being". Similarly, Huston, as cited by Manalo (2017), described financial literacy as the measurement of an individual's personal finance knowledge and personal finance application. He described the former as a stock of knowledge on essential financial concepts which can be acquired either through education and/or experience, while the latter is the ability and confidence to effectively apply knowledge related to personal finance. The importance of financial literacy is further emphasized by Lusardi (2016) who pointed out that financial literacy is an essential skill needed to participate in society.

To measure financial literacy, the Standard and Poor's Ratings Services Global Financial Literacy Survey (S&P Global FinLit Survey), the world's largest and most comprehensive survey of financial literacy, will be used. S&P Global FinLit Survey investigates an individual's knowledge on the four fundamental financial literacy concepts, namely numeracy, inflation, compound interest, and risk diversification. The respondents able to obtain a score of at least three out of four were considered financially literate. According to Klapper, Lusardi, and van Oudheuden (2015), of all these financial literacy concepts, their results showed that numeracy and inflation are the most understood. The OECD, an organization promoting policies aimed at improving the economic and social well-being of people around the world, uses a similar methodology. However, on top of the four fundamental financial literacy questions, the OECD also asks questions about the financial behavior of the respondents, including questions about budgeting.

Assessment of Financial Literacy is important. According to Klapper, Lusardi, and Van Oudheusden (2015), "Financial knowledge is especially important in times where increasingly complex financial products are easily available to a wide range of the population." In support of this statement, Lusardi and Tufano, as cited by Klapper et al. (2015), mentioned that financial ignorance causes people to spend more due to transaction fees and higher interest rates on loans. Moreover, low levels of financial literacy have been linked to financial losses, less wealth accumulation, and so on (Lusardi, 2016). There are a number of variables which are seen to have a relationship with a person's financial literacy. Some of these are age, gender, and education. For emerging countries, financial literacy declines with age (Klapper et al., 2015). In the report by Hasler and Lusardi (2017) entitled the *"Gender Gap in Financial Literacy: A Global Perspective"*, it was also found that there was a

gender gap in terms of financial knowledge, where the financial literacy of men was higher compared to that of women. Interestingly, one of their findings was that financial literacy is strongly associated with math skills (Klapper et al., 2015).

Considering the results of the study conducted by Hasler et al. (2017) and Klapper et al. (2015), the following hypotheses were formed: (1) male respondents have a higher rate of financial literacy compared to female respondents; and (2) students in Science, Technology, Engineering and Mathematics programs are more financially literate than those in the General Academic Strand.

2.2. Financial Literacy in the Philippines

The World Bank Group (2015, p. 16) conducted a study about financial capability and inclusion in the Philippines. One of their findings showed that adults scored an average of 3.2 out of 7 on financial literacy-related questions. Among all the financial literacy questions, the concept of compound interest had the fewest correct answers at a rate of only 29 percent. For the financial application aspect, the results of the study showed that respondents scored low in behaviors related to saving and budgeting, but showed strengths in other aspects such as planning for unexpected expenses, achievement orientation, and far sightedness. Moreover, the results of the study showed that the overall financial behavior scores in the Philippines tended to improve with age. At the end of their study, the World Bank Group (2015) recommended the development of a National Financial Education Strategy. On top of this, the study recommended a consideration of developing a curriculum that integrates financial education as a core subject for school-based financial education programs (World Bank Group, 2015).

Dr. Johnny Noe Ravalo, the Managing Director of the Bangko Sentral ng Pilipinas, in one of his presentations entitled, *"The Case and Challenges for Financial Inclusion and Literacy in the Philippines"*, discussed the steps that the Philippine Government, through the initiatives of the Banko Sentral ng Pilipinas, has been taking to improve financial literacy in the country (Ravalo, 2016). According to his presentation, in the year 2008, the Economic and Financial Learning Center (EFLC) was established. This center aims to spread awareness and skills of financial literacy through methods such as the conducting of the Financial Learning Campaign in the country. The EFLC conducts various learning sessions targeted to specific audiences, which include those at the secondary education level (Llanto, 2015).

To measure the effectivness of financial literacy programs, the study will check the validity of the hypothesis (3) "Financial literacy Education/Training/ Seminars improve the financial literacy of students in terms of knowledge and practice."

2.3. Financial Literacy and the Enhanced K to 12 Educational Program

The Philippine educational system is in the early stages of implementation of the Republic Act No. 10533, otherwise known as the Enhanced K to 12 Basic Education Act of 2013. In a press release from the Department Education (2017), Education Secretary Leonor Briones explained that the implementation will equip learners with appropriate skills, creativity, and intelligence to cope with the changing world. Moreover, according to Padre (2010), this reform was passed to allow students adequate time for the mastery of basic competencies, which can be reflected on the National Achievement Test (NAT). In academic year 2009-2010, the NAT passing rate of high school was only 46.38 percent.

The financial literacy survey of the S&P Global FinLit focuses on financial literacy topics, namely numeracy, inflation, compound interest, and risk diversification. In the K-12 Basic Education Curriculum released by the Department of Education, three out of four of these topics are included in the secondary education curriculum. The skill in numeracy is taught in Algebra; the concept of inflation in Economics; and compound interest in General Mathematics. This led the study to the hypothesis that the respondents will achieve correct answers for these topics.

III. Research Design and Method

The respondents of the study were SHS students taking up the General Academic Strand, (GAS) and the Science, Technology, Engineering and Mathematics Strand (STEM). The study utilized samples from a senior high school located in the CALABARZON region. The researcher used non-probability sampling to allow the comparison of two different sections of students taking up different strands in SHS. All the members of the two different sections selected were asked to answer the survey questionnaire.

The survey questionnaire was composed of three sections. In the first section, the respondents were asked three questions about their profile; their SHS Track, and if they have acquired any financial education/training/ seminars. The second section included questions about the basic financial practices of the respondents, specifically in terms of budgeting. This was based on and modified from the OECD financial literacy questionnaire, which included questions capturing the financial practices of the respondents. The questions were selected and modified based on the context of the basic financial decisions made by SHS students. They were asked questions about how they save money, and if they prepare a budget for their expenses. The section also included a Likert scale for those who prepare a budget to find how strictly they follow their budget. The third section included four word problems to measure financial literacy. This was based on and modified from the S&P Global FinLit Survey and the OECD survey, which asked questions aiming to measure four fundamental financial decision concepts, which include basic numeracy, inflation, interest compounding, and risk diversification. For this section, a person is considered financially literate when he or she correctly answers at least three out of the four financial concept questions.

A Z-test on two population proportions was used to test if the proportions of financially literate respondents in the two programs, GAS and STEM, are significantly different at α=0.05. A Z-test on two population proportions was also done to compare the proportions of financially literate males with the proportion of financially literate females. The same method was also done for the variable 'exposure to Financial Education/ Training/Seminar'. Aside from the Z-test, the researcher also used descriptive statistics in further analysis of the data collected.

IV. Results

4.1. Analysis of the Financial Literacy Scores of SHS Students

The Financial Literacy of the SHS Students, in terms of their knowledge on the fundamental financial concepts, was determined using a questionnaire which included four questions about the fundamental financial concepts of numeracy, inflation, compound interest, and risk diversification. Respondents who were able to score at least three points were considered financially literate. The data showed that for both sections, less than half of the students were able to get at least three points. Also, it can be noted that the STEM Strand is up by three points as compared to GAS.

Table 1. Financial Literacy of Students in STEM and GAS

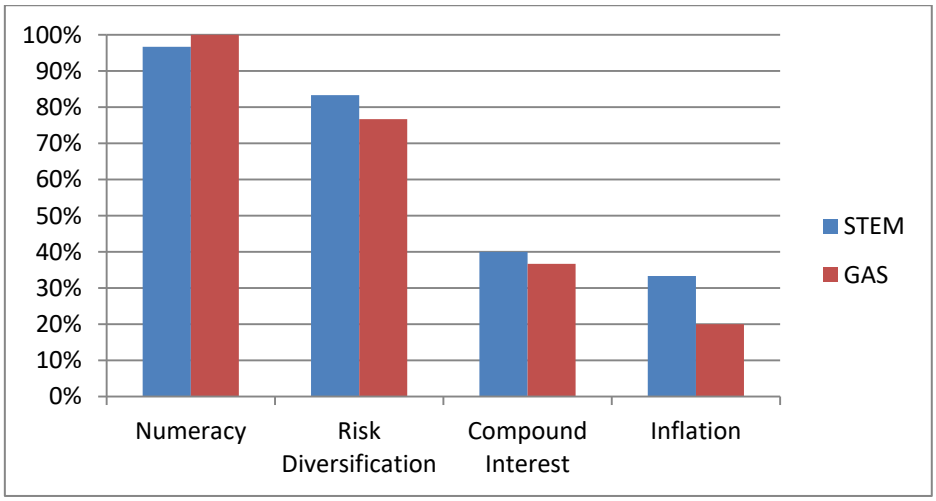
Programs	**Financial Literacy**	
	Literate	**Not Literate**
STEM	14	16
GAS	11	19

The data gathered showed that there were more financially literate students in the Science, Technology, Engineering, and Mathematics (STEM) program as compared to the General Academic Strand (GAS). This is similar to one of the highlights of the report by Klapper et al. (2015) stating that Financial Literacy is strongly associated with math skills. However, using a Z-test on two population proportions, it was found that at α=0.05,

the percentage of financially literate students of STEM (47 percent) and GAS (37 percent) are not significantly different. One possible reason for this result was because there were no significant differences in the financial literacy-related courses in the curriculum of both programs. The curricula for both programs were able to touch on the topics of numeracy, inflation, and compound interest. However, there was no formal course tackling the topic of risk diversification. Moreover, the respondents were exposed to the same subjects and similar methods of teaching during their four years at the junior high school level.

A per-item analysis was administered for the four fundamental financial literacy questions. The difficulty of the topics based on the percentage of correct answers follows the same trend for both the GAS and STEM sections. Both sections scored highest in numeracy, followed by risk diversification, then compound interest, and lastly, inflation. It can also be noted that for the numeracy and risk diversification questions, more than half of the population were able to answer correctly, unlike those for inflation and compound interest. The high score for numeracy may be attributed to the long period of the respondents' exposure to numbers since the early levels of basic education. This is partly similar to the report by Klapper et al. (2015) which stated that numeracy is one of the most understood concepts. Interestingly, risk diversification obtained a high percentage of correct responses even though is not included in the basic education curriculum, and it is next to numeracy in terms of the number of correct answers. This result may be supported by Huston (2010) when he described personal finance knowledge as something that cannot only be acquired through education but also through experience. The students' ability to decide correctly in financial decisions involving risk may have been developed through practical personal finance experiences. The results of the study also showed that the respondents had low scores on compound interest and inflation, even though these topics are included in their curriculum. This suggests that the students may have a weak understanding of the concept. One possible reason for this implication is that the students may have less exposure as well as fewer opportunities to apply this aspect. One interesting fact about the result is that in the research done by the World Bank Group (2015), which was also done in the Philippines, the respondents of the study also had difficulty with the concept of compound interest. This finding suggests that the difficulty in understanding the concept of compound interest may be experienced by Filipinos in different parts of the country. This may also imply curricular flaws followed throughout the country, especially in subjects related to compound interest.

Fig. 1. Financial Literacy Scores on Fundamental Financial Decision Questions of STEM and GAS Students



4.2. Comparison of the Financial Literacy of Male and Female Respondents

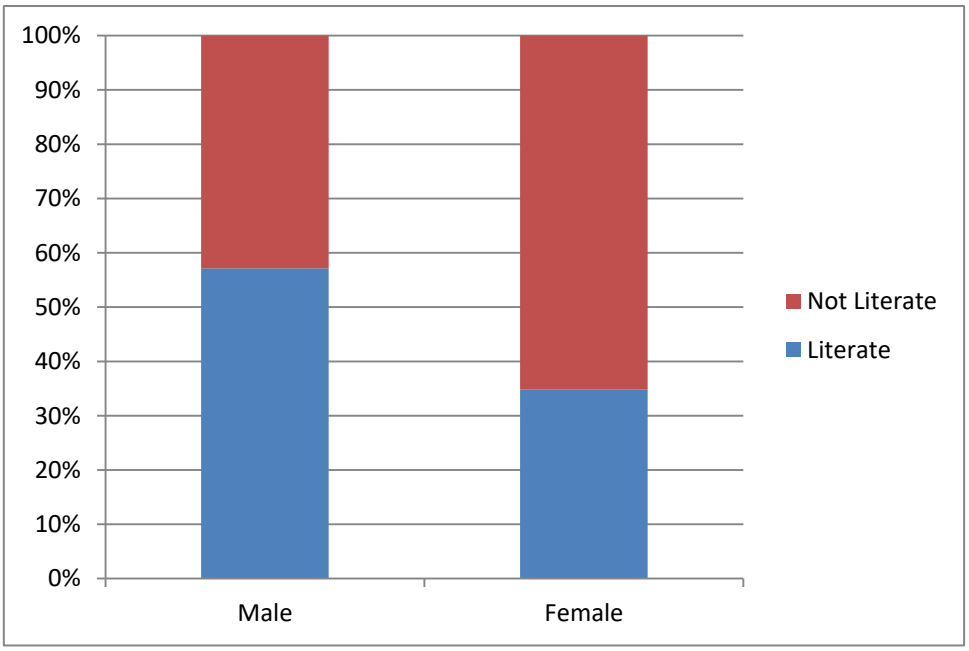
Previous studies conducted by S&P Global FinLit showed that there was lower financial literacy among women. The financial literacy of the male and female students was analyzed to check for similar findings with those of the S&P Global FinLit.

Table 2. Comparison of the Financial Literacy of Male and Female Students

Sex	Literacy	
	Literate	Not Literate
Male	8	6
Female	16	30

Table 2 shows the comparison of the financial literacy of male and female students. It should be noted that there were more female respondents than male. More than half of the male respondents (57 percent) were found to be financially literate, as compared to the 35 percent literacy rate in female respondents. This can also be seen by looking at Fig. 2. However, using a Z-test on two population proportions, it was found that at α=0.05, the percentage of financially literate male students (57 percent) and financially literate female students (35 percent) are not significantly different. Although there was about a 22 percent difference between the proportion of literate male and female respondents, the Z-test showed that the two proportions are not significantly different because of a large disparity in the number of male and female respondents.

Fig. 2. Proportion of Students that are Financially Literate by Sex



4.3. Budget Preparation Practices of SHS students

A majority (80 percent) of the respondents attempt to prepare budget for their expenses. However, of the 48 respondents who indicated that they prepare a budget, only 13 respondents prepare actually follow a budget most of the time. For the respondents of both sections who prepare budgets, a majority indicated a rating of three, which means that they only follow the budget sometimes.

Table 3. Budget Preparation Ratings of Senior High School Students

Program	Budget Preparation		Following Budget				
	Prepares Budget	Percentage	Never	Rarely	Sometimes	Usually	Always
Gas (30)	23	76.7	0	4	12	7	0
Stem (30)	25	83.3	0	5	14	6	0
Total (60)	48	80.0	0	9	26	13	0

One possible implication from this data is that although the majority understands the importance of budgeting, it is possible that only a few of them actually have the discipline to follow the budget they set.

4.4. Impact of Financial Education/ Training/Seminar on the Financial Literacy of SHS Students

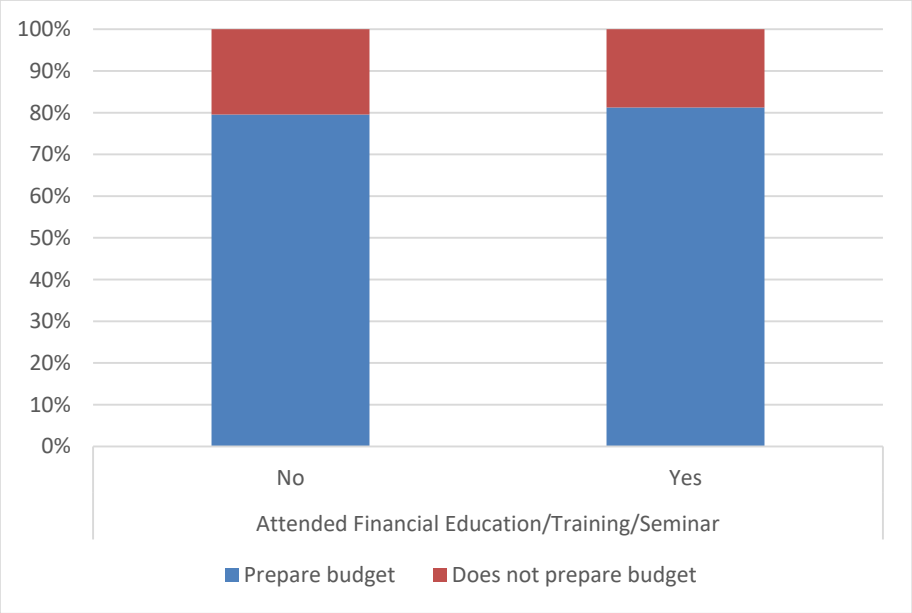
Several institutions, including the government, through the efforts of the Bangko Sentral ng Pilipinas, conduct campaign programs for the improvement of financial literacy in the country. The study attempted to measure its impact on the financial literacy of the SHS student respondents. One of the dimensions of financial literacy is its application to personal finance. Table 3 shows the impact of financial education/training/ seminars on the budget preparation practices of SHS students.

Table 4. Impact of Financial Education/Training/Seminars on Budget Preparation Practices

Budget Preparation	Attended Financial Education/Training/Seminar	
	Yes	No
Prepare Budget	13	35
Does Not Prepare Budget	3	9

Overall, more than half of the respondents practice budget preparation. 13 out of 16 students attended a financial education/training/seminar practice budget preparation. However, using a Z-test on two population proportions, it was found that the proportion of students who practiced budget preparation and have attended a financial education/training/seminar is not significantly different from students who practiced budget preparation but have not attended financial education/training/seminar opportunities.

Fig. 3. Proportion of Budget Preparation Practicing of Students by Exposure to Financial Education/Training/Seminar



4.5. Impact of Financial Education/Training/Seminar on the Financial Knowledge of SHS Students

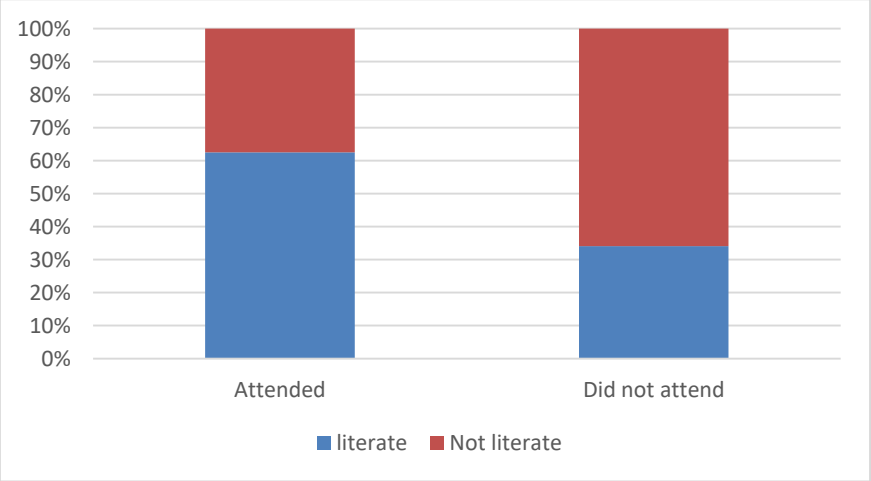
Another dimension of Financial Literacy is the measurement of an individual's knowledge of personal finance. The study analyzed the impacts of attending financial education/ training/seminars on the financial literacy of SHS Students.

Table 5. Literacy of Students with Exposure to Financial Education/Training/Seminar, and Those Without

Exposure to Financial Education/Training/Seminar	Literate	Not Literate
Attended	10	6
Did Not Attend	15	29

More than half (62.5 percent) of those who were exposed to financial education/training/seminars are financially literate, while only about 34 percent of those without exposure to financial education/training/seminars are financially literate. However, using a Z-test on the two population proportions, it was found that at α=0.05, the percentage of the financially literate students with exposure to financial education/training/seminars (62.5 percent) and financially literate students without exposure to financial education/training/seminars (34 percent) were not significantly different. Despite the difference of about 28.4 percent, the low level of significance in the results may attributed to the large difference in number of respondents with exposure to financial education/training/seminars and those without. However, the data suggests that exposure to financial education/training/seminars may help in the development of an individual's knowledge on financial literacy.

Fig. 4. Proportion of Financially Literate Students by Exposure to Financial Education/Training/Seminar



V. Conclusion and Recommendations

The results of the study showed that there were no significant differences in the proportion of financially literate students in the STEM and GAS programs. This may be attributed to the fact that there were no significant financial-literacy related differences in the curriculum of both programs. However, it should be noted that more than half of the population for both programs were found to be financially illiterate in terms of knowledge on fundamental financial concepts. Analyzing the per-item scores of the students on the test on the respondents' knowledge on fundamental financial concepts, the results showed that students obtained high scores for items where they have practical exposure: numeracy and risk diversification. The high score in numeracy confirms the study by Klapper et al. (2015), that, similar to the other parts of the world, numeracy had the highest rate of correct answers.

Despite being included in the basic education curriculum, inflation and compound interest still revealed a low score, signifying that many students lack knowledge on these concepts. However, the result for the compound interest confirms the study of the World Bank Group (2015), where the Filipino respondents also scored poorly on the topic. This may imply that other Filipinos in the country may also have difficulty with compound interest. This also implies that there may be ineffectiveness all throughout the country in teaching compound interest. It is therefore suggested to review how these topics are taught and find ways on how to improve students understanding, and the retention of the knowledge of the specific topics.

It is difficult to come to a conclusion on the results of the comparison of the proportions of financially literate males and females because there is a huge difference in the total number of male and female respondents. However, the results of the study suggest a similarity to the results of a previous report conducted by Hasler et al. (2017) that men tend to have higher financial literacy as compared to women. It is again therefore suggested for schools to incorporate and further strengthen financial literacy education in their curriculum across genders, preparing them to achieve financial success.

Although the study showed that the proportion of financially literate respondents with exposure to financial education/training/seminar was 28.4 percent higher compared to those without exposure, it is difficult to conclude that exposure to financial education/training/seminar contributed to the financial scores of the respondents because of the large difference in the number of respondents able to attend a financial education/training/seminar and those unable to attend.

The conducting of more studies for further research is suggested to validate the results.

The Enhanced K-12 Program is still in its early stages of implementation, and still more is must be done. This basic education program was designed to prepare graduates not just for tertiary education but also for employment and entrepreneurship (Department of Education, 2017, p. 1). To achieve this, students need preparing on financial literacy to achieve financial success. The fundamental financial concepts are currently embedded in the curriculum of the Enhanced K to 12 basic education program. However, there is a need to reflect on how these subjects are taught as well as how to strengthen the financial literacy of the students. While knowledge on the fundamental financial concepts can be developed through the financial literacy-related courses in the Enhanced K-12 basic education program, schools should also look for ways to develop the behaviors and attitudes of students toward personal finance, especially through saving and budgeting.

Since the study can only show results that can only speak for the case of the selected senior high school in CALABARZON, a nation-wide study is suggested to determine if the same results are true nationwide. With the findings of a future study, policy makers should take actions to improve curriculum for the country to produce more financially literate graduates equipped to cope with the changing world.

References

Department of Education, (2017, January 13). *DepEd: K to 12 is for the triumph of Filipino Learners* [Press release]. Retrieved from http://www.deped.gov.ph/press-releases/deped-k-12-triumph-filipino-learners

Hasler, A., & Lusardi, A. (2017). *The gender gap in financial literacy: A global perspective* (Policy brief). Washington, DC: Global Financial Literacy Excellence Center.

Klapper, L., Lusardi, A., & Van Oudheusden, P. (2015). *Financial literacy around the world. insights from the standard & poor's satings services global financial literacy survey* (World bank report). New York, NY: World Bank. Retrieved from http://gflec.org/wp-content/uploads/2015/11/3313-Finlit_Report_FINAL-5.11.16.pdf?x28148

Lusardi, A. (2016). *Gender differences in financial literacy around the world* [Power point slides]. Retrieved from http://gflec.org/wp-content/uploads/2016/09/Gender-gap-IFFM-Lusardi-1.pdf?x87657

Llanto, G. (2015). *Financial inclusion, education, and regulation in the Philippines* (Working Paper no. 541). Manila: Asian Development Bank. Retrieved from https://www.adb.org/sites/default/files/publication/171786/adbi-wp541.pdf

Manalo, R. (2017). *Financial literacy in the MSME sector: The case of food-based enterprises in Davao city, Philippines* (Unpublished undergraduate thesis). University of the Philippines Mindanao, Davao City, Philippines.

Organization for Economic Co-operation and Development. (2015). 2015 OECD/INFE tool kit for measuring financial literacy and financial inclusion (Webpage). Retrieved from http://www.oecd.org/daf/fin/financial-education/2015_OECD_INFE_Toolkit_Measuring_Financial_Literacy.pdf

Ravalo, J. (2016). The case and challenges for financial inclusion and literacy in the Philippines. organization for economic co-operation and development [Power point slides]. Retrieved from http://www.oecd.org/finance/financial-education/48303431.pdf

World Bank Group. (2015). *Enhancing financial capability and inclusion in the Philippines: A demand-side assessment*. Washington, DC: Author.

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Third Party Certification: Benefits, Problems, and Effects on the Business Operations of Selected Certified Organic Operators in the National Capital Region (NCR) and Region IV – A (CALABARZON), Philippines

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ABSTRACT

The demand for organic products has been increasing since people are becoming more health and eco-conscious. Although many claim their produce as organic even without the seals provided by third party certifying bodies, there are only a few certified organic operators in the country. Third party certification is the sole certification recognized by the Philippine national government, as stated in Republic Act 10068 for produce to be called "organic". This study aimed to determine the benefits, problems, and effects of third party certification on the business operations of selected fruit and vegetable organic operators in the National Capital Region (NCR) and Region 4-A (CALABARZON). Four organic operators were personally interviewed, and data content analysis was done. The results showed that the benefits, problems, and effects of third party certification varied depending on the situation and history of the organic operators. The main benefits identified were access to new markets and increase in sales and profit. However, all of the companies experienced difficulties in complying with the standards set and found recording and heavy documentation tedious. Moreover, there was 'no policing' when it came to organic products, even if there is a law stating that produce cannot be called organic if it is not certified by a third party certifying body. The effects were mostly on the areas of marketing and finance, as seen in the benefits of third party certification. Minimal effects were observed on production, with the standardization of the processes and raw material used.

Only two respondents perceived an improvement in the recording skills of their farmers. Recommendations were directed to farmers or businessmen who would want to apply for third party certifications like financial stability, their purposes, and the preparedness of the applicants.

Keywords: fruits and vegetables, organic operators, Philippines, Republic Act 10068, third party certification
JEL Classifications: L26, N5, Q12

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I. Introduction

Organic agriculture is a production system that enhances the sustainability of soil fertility, ecosystems, and people. It mainly depends on ecological processes, biodiversity, and cycles suited to existing local conditions, instead of the utilization of inputs that may have adverse effects. Organic agriculture integrates tradition, innovation, and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved (IFAOM, 2005).

Nowadays, the demand for organic products has increased since people are becoming more health and eco-conscious. In turn, farmers are shifting from conventional farming to organic farming. As of 2015, based on a survey report by Willer and Lernoud, the Philippines ranked 5th with the most number of organic producers, and 29th in terms of organic land area in the world.

Aside from the increasing demand for organic products, another factor that contributes to the increasing number of organic farmers is the high perceived value for organic products. Consumers are willing to pay a premium price for organic produce (FAO, 2001). However, there are only a few certified organic operators in the country. One of the major constraints for this is the high cost of certification. Most organic products available in the market are not certified, and some are just claiming that their products are purely organic.

In the Philippines, only third party certification is being recognized by the national government for farmers to claim that their products are purely organic, as stated in Section 17 of the Republic Act (RA) 10068, also known as the "Organic Agriculture Act of 2010". Third party certification as defined in RA 10068 is, "when firm requires that its suppliers meet a certain standard and requests an independent organization that is not involved in the business relationship to control the compliance of the suppliers" (Official Gazette, 2010). There are two third party certification bodies accredited by the Department of Agriculture (DA), namely the Organic Certification Center of the Philippines (OCCP) and Negros Island Certification Services (NICERT). OCCP is based in Cubao, Quezon City, Metro Manila, while NICERT is in Bacolod City, Negros Occidental.

This research aimed to determine the effects of third party certification on the business operations of selected fruit and vegetable organic operators in the National Capital Region (NCR) and Region 4-A (CALABARZON) as well as the benefits and the problems that were encountered during the certify-cation process. This study can provide insights as to whether third party certification is beneficial for fruit and vegetable operators and can be used as an advantage by organic operators here in the Philippines. Furthermore, this study could serve as a guide for non-certified organic operators to decide whether or not they should consider applying for third party certification.

II. Literature Review

2.1. Worldwide Statistics

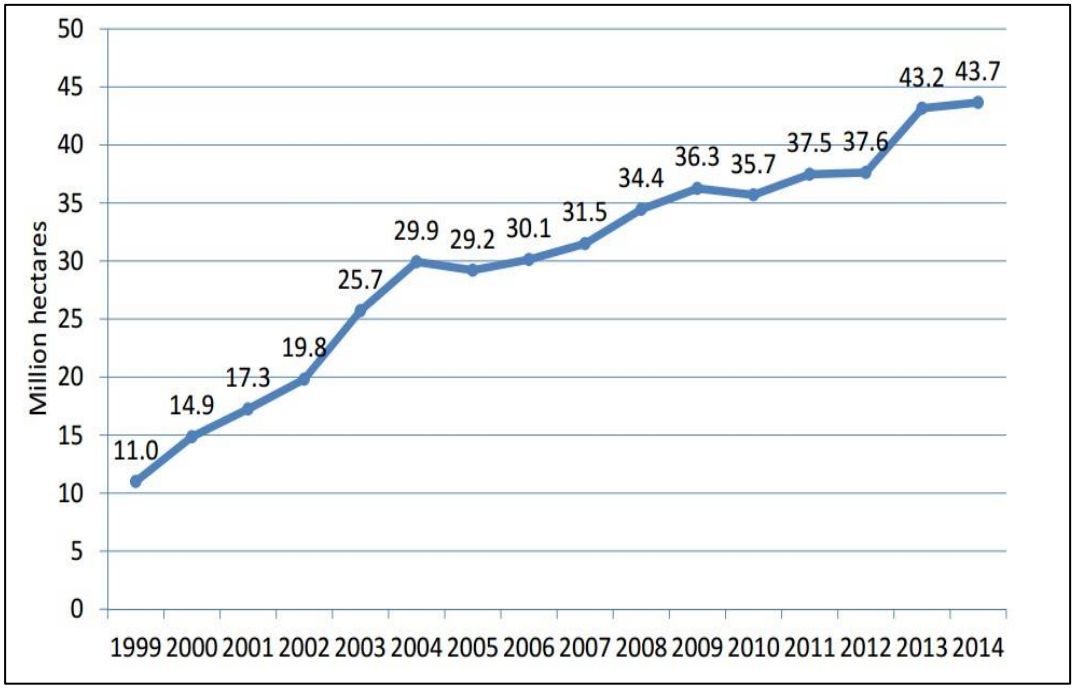
The Research Institute of Organic Agriculture conducted a worldwide survey with 179 participating countries/territories (Willer & Lernoud, 2017). In the survey report entitled, "The World of Organic Agriculture Statistics and Emerging Trends 2017", current figures with regard to the number of hectares allotted of agricultural land and growth from 1999 to 2015, top organic producers, and other relevant information about organic farming were presented. Oceania had the largest area of organic agricultural land at 45%. It was then followed by Europe (25%), Latin America (13%), Asia (8%), and North America (6%). The region with the smallest organic agricultural land area was Africa with only 3%. It can be observed that regions with relatively small land area/size were those that have higher organic agricultural land.

In terms of the top 10 countries with the largest areas of organic agricultural land in 2015, Australia had the largest area of organic agricultural land with 22.69 million hectares. It was followed by Argentina

with 3.07 million hectares, and in third place was the United States of America with 2.03 million hectares. Four out of the ten countries included in the top ten, namely Spain, Italy, France, and Germany, are in Europe, with a total of 5.93 million hectares. China and India, both in Asia, have a combined organic agricultural land area of 2.79 million hectares. Uganda, the only country from Africa, had a total of 1.31 million hectares.

In another report by Willer and Lernoud (2016) entitled, "Organic Agriculture Worldwide 2016: Current Statistics", the authors presented the growth and development of organic agricultural land from 1999 to 2014. Figure 1 shows that the area allotted for agricultural land had continued to grow from 1999 to 2014, though at some points it went down a little. The highest leap was from 2012 to 2013, with an increase of 5.2 million hectares.

Fig. 1. Growth of the organic agricultural land worldwide (1999-2014)



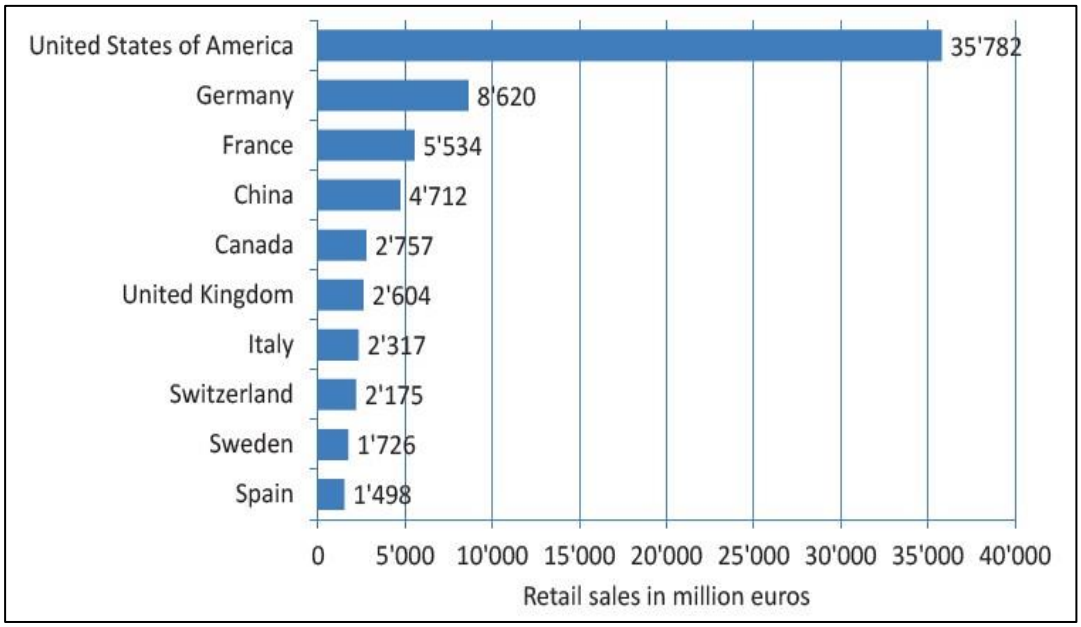
Source: Willer and Lernoud (2016).

Despite the relatively lower growth in organic land in Asia compared to Oceana, Europe, and Latin America, Asia was the top region with greatest number of organic producers in 2015. In the same year, India had the highest number of organic producers (585,000 producers), followed by Ethiopia, Mexico, Uganda, and the Philippines (166,000 producers), respectively.

Fig. 2 presents the top ten countries with the largest market for organic food in 2015. Ninety percent of the countries with the largest market of organic food were in Europe and America. China was the only Asian country included in the list. Of the 90%, only two came from the American region, while the rest were from Europe. It can be noted that the market for organic food is mostly in developed countries such as Canada and the USA, while the producers are in the developing countries such as India and the Philippines. Setboonsarng and Markandya (2015) reported that the reason why most organic producers were located in developing countries was that the supply for organic products in these countries was not enough to meet the increasing demands of the consumers, and it was

looked upon as an opportunity. Furthermore, these countries looked at the other side of organic farming, which also provides benefits apart from financial benefits, such as improved household health, food security, and environmental conservation, and encouraged their people to venture into organic farming.

Fig. 2. Top Ten Countries with the Largest Market for Organic Food in 2015



Source: Willer and Lernoud (2017).

Together with the increasing area of organic agricultural land and organic producers worldwide is the positive growth and development of organic food market values. Furthermore, Setboonsarng and Markandya (2015) reported that the market will continue to increase due to the changing lifestyle of many consumers, which is moving towards a healthier and more environmentally friendly lifestyle.

2.2. Philippine Organic Farming

Based on the statistics presented by Willer and Lernoud (2017), the Philippines had 234,642 hectares of land allotted for organic agriculture and ranked 4th in Asia with the largest organic area in 2015, and 29th in the world. In terms of the number of organic producers, the Philippines ranked 5th with the most number of organic producers in the world at 165,958 producers, and 2nd in Asia. When it comes to the volume of production, a huge increase in production has been recorded over four years from 12,899 metric tons to 442,510, based on data from the DA's National Organic Agriculture Program (Official Gazette, 2016).

There has been a sudden increase in the number of organic farmers in the country since some conventional farmers are shifting to organic farming due to the following reasons:

healthier consumer lifestyles (Cardinoza, 2013; Nicavera, 2016), health (Jaucian, 2016; Landicho et al., 2014), environment, lower input costs, and increasing demand for organic produce (Landicho et al., 2014).

In 2010, under the administration of former President Gloria Macapagal Arroyo, Republic Act 10068 (RA 10068), also known as the "Organic Agriculture Act of 2010", which deals with the promotion and improvement of organic agriculture in

the Philippines, was approved and passed. It tackles pertinent information regarding organic agriculture, policies, standards, and governing bodies together with their responsibilities as well as research, development, extension, and other information related to organic agriculture. Under Section 24 of RA 10068, incentives that will be received by certified organic operators are listed. These include: (a) exemption from the payment of duties on the importation of agricultural equipment, machinery, and implements; (b) identification by LGUs of local taxes that may be offered as incentives to organic input production and utilization; (c) provision of preferential rates and a special window for organic input producers and users by the LBP; (d) subsidies for certification fees and other support services to facilitate organic certification; (e) zero-rated value-added tax (VAT) on transactions involving the sale/purchase of bio-organic products, whether organic inputs or organic produce; and (f) income tax holiday and exemption for seven (7) years, starting from the date of registration of organic food and organic input producers on all income taxes levied by the National Government (Official Gazette, 2010). There have been several projects proposed and implemented in various regions in the country. Furthermore, there have been different learning sites established to provide information to individuals regarding organic farming. As of December 5, 2016, there were 40 learning sites located in CAR, Regions IV – B, VI, X, XI, and XIII.

2.3. Certification in Organic Farming

Organic certification is a process wherein an "independent third party" determines if a certain farm's operations and practices are able to meet the standards and regulations imposed by the certifying bodies. A certificate or "written assurance" is given to the farms once they pass the inspection and certification process. This is done to make sure that organic products available in the market are truly organic, and not just claims. This also enables farms to put "premium prices" on their products and distribute in "markets for organic products" (OCCP, 2012). The certification process is done on the farm which applied for certification.

Organic farms can be certified or non-certified. For a farm to be certified, one must apply for certification, and then comply with the standards set by the certifying bodies. In the Philippines, there are only two certifying bodies accredited by the Department of Agriculture (DA): the Organic Certification Center of the Philippines (OCCP) and the Negros Island Certification Services (NICERT). Certificates for organic farms only last up to 18 months (Philippine Organic Agriculture Information Network). Based on the list of Third-Party Certified Organic Operators in the Philippines as of January 23, 2017, there were 86 certified operators throughout the country; most are located in the National Capital Region (NCR), Region IV – A (CALABARZON), and the Cordillera Administrative Region (CAR).

Certification in the Philippines does not necessarily mean that the certified operator is also considered certified in other countries where it is going to export products (United Nations, 2003). The certification that the operator has should be at par with the certification recognized in other countries (United Nations, 2003). For instance, in Europe and the United States, the regulations and standards should be equal to that of the EU regulations and the USDA National Organic Program, respectively (United Nations, 2003).

Organic certification serves as a guarantee for consumers that the labeled organic products are produced in accordance with organic practices and standards (Limpin, n.d.; United Nations, 2003). Likewise, it serves as a guarantee that the products are truly organic and "not chemically grown" (Setboonsarng & Markandya, 2015).

The certification processes and requirements of an individual farm or processor applying are different from those of a smallholder group. There are less requirements that an individual firm needs to comply with in order to be certified. The process of being certified normally takes three to six months. The minimum cost is Php 15,000 (Philippine Organic Agriculture Information Network, n.d.).

2.4. Certifying Bodies

2.4.1. Organic Certification Center of the Philippines (OCCP)

Organic Certification of the Philippines (OCCP) is located in Cubao, Quezon City. It is "an independent, private, membership-based organic standard setting and organic certification body duly accredited by the Philippine Government, under the Department of Agriculture-Bureau of Agriculture and Fisheries Product Standards (DA-BAFPS). OCCP is a lead advocate and promoter of sustainable agriculture-organic farming in the Philippines". The OCCP provides both local and international services. The company is also affiliated and a member of different international institutions, such as the International Federation of Organic Agriculture Movements (IFOAM), Certification of Environmental Health Standards GmbH (CERES), Certification Alliance, and the Philippine Fair Trade Forum. The company has three different seals: certified organic, made with organic ingredients, and organic in transition. Figure 3 shows the three different seals of the company. The information on the OCCP was taken from the company's website.

Fig. 3. Seals of OCCP

Source: OCCP (n.d.).

2.4.2. Negros Island Certification Services, Inc. (NICERT)

Negros Island Certification Services, Inc. (NICERT) is a private company based in Bacolod City, Negros Occidental. It is a third party certifying body which conducts inspections and certification of various organic production methods, handling, and retailing. It started operations in 2008 since there was a need for certification bodies for organic agriculture at that time. The company provides their services to producers, traders, processors, handlers, and retailers who want to be certified. The information mentioned above is taken from the official website of NICERT.

2.5. Philippine National Standards in Organic Agriculture (PNS OA)

The Philippine National Standards in Organic Agriculture (PNS OA) is used by certifying bodies as the regulations to be followed by applicants to be certified. The first version of the PNS was released in

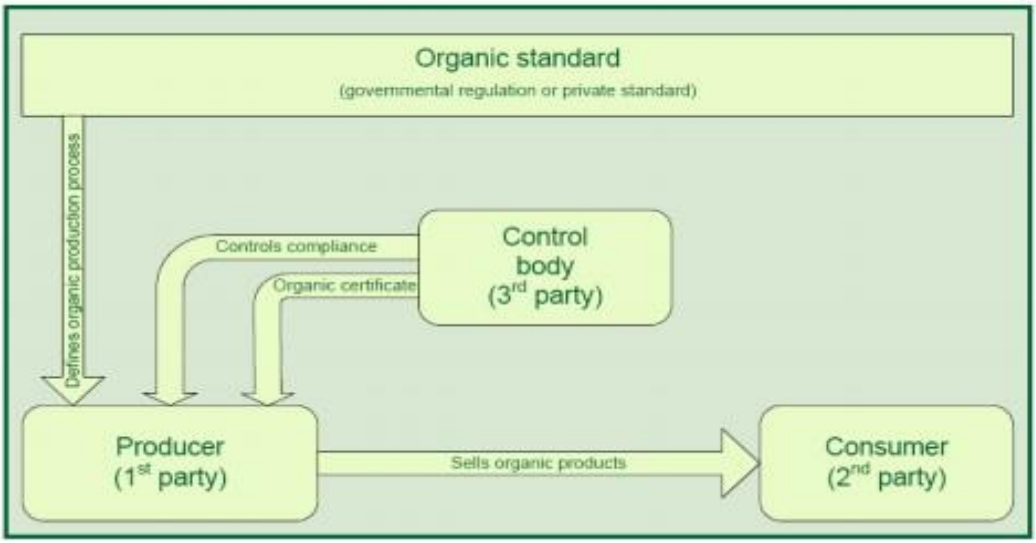
2003 and was made by the OCCP. It was then used by the Department of Agriculture (DA) through the Bureau of Agriculture and Fisheries Product Standards (BAFPS), which changed its name to Bureau of Agriculture and Fisheries Standards (BAFS). The 2003 PNS version had six parts: (1) Conversion to Organic Agriculture; (2) Crop Production; (3) Livestock; (4) Processing; (5) Special Products; and (6) Labeling and Consumer Information (DTI-BPS, 2003).

In 2016, a revised version was released as a response to the global improvements in the organic industry, and to be in line with the ASEAN Standard for Organic Agriculture. The six parts before were increased to nine, and there were some which were removed. The nine parts are as follows: (1) conversion; (2) crop production; (3) animal production; (4) beekeeping; (5) special products; (6) processing; (7) labeling and consumer information; (8) traceability; and (9) requirements for the inclusion of substances for organic production (DA-BAFS, 2016).

2.6. Third Party Certification

Third Party Certification is defined in RA 10068 as "when the firm requires that its supplies meet a certain standard and requests an independent organization that is not involved in the business relationship to control the compliance of the suppliers." According to Dittrich (2012), third party certification comes with accreditation by public or private institutions, making it more acceptable and dependable than first and second party certification.

Fig. 4. Third Party Certification Scheme



Source: Dittrich (2012).

As seen in Fig. 4, the producer serves as the first party, and it sells produce to consumers, making them the second party. Involvement of a control body comes when the producer applies for certification. It is the control body (3rd party) that provides the certificate and conducts inspections, controls, and other certification processes. The standards used for certifying may either be governmental regulation or standards set by private institutions.

Dittrich (2012) described the common processes undertaken during third party certification as follows:

An operator (e.g. producer, importer, and supplier) applies to a particular third party certifier body for certification.

The third-party certification body conducts a pre-assessment and a documentation review of the operator's facilities and production operations.

The control body conducts field audits (inspection) and the inspector fills out the inspection report.

When conformity is verified, the certifier issues a certificate and allows the supplier to label its products as certified.

2.7. Benefits and Problems Associated with Organic Certification

Blackmore et al. (2012) conducted a study regarding the costs and benefits of various certification schemes, namely organic, Fairtrade, Rainforest Alliance, Utz Certified, and CAFÉ Practices in Asia. The study was initiated due to insufficient information with regards to the costs and benefits of various certification schemes to farmers in Asia as well as the "potential of geographic labelling strategies to deliver benefits to poor and marginalized farmers". Blackmore et al. (2012) concluded that "certification is not a development panacea". Certification can be beneficial in terms of farmers' production through improved productivity, financial aspects in terms of lower cost of raw materials, and improvement in quality, which eventually leads to profit and markets by adding new markets and building relationships with trading partners. However, results also showed that there are other factors that "marginalized farmers" should have to fully realize for the benefits of certification. Those factors include "links to markets, quality or well branded produce, group organization, and internal control and management systems". In addition, Blackmore et al. (2012) mentioned that even with certification, there is no assurance when it comes to sales and access to markets.

Dankers (2004) discussed in Chapter 1 a report about the "FAO Meeting on Voluntary Standards and Certification for Environmentally and Socially Responsible Agricultural Production and Trade", the summary of case studies of organic operators certified by Fairtrade Labelling Organizations International (FLO) in various countries with growing economies. Results showed that "price premium" is only a portion of the benefits that can be attained from certification. This is because only a fraction of produce is "sold via the fair- trade market". There are other factors which appeared to be more essential, which are "organizational progress, better bargaining positions, credit worthiness, and economies of scale".

Zorn et al. (2009), in a report on the "Economic Concepts of Organic Certification", identified the benefits that operators get from EU organic certification. One of the benefits mentioned in the report is the "assurance of the organic market and the access to it". Furthermore, consumers are ready to spend money on organic products. Kontogeorgos and Semos (2008), as cited by Zorn et al. (2009), said that "the documentation requirements of organic certification may have advantages in relation to the daily management". As discussed in the study, this benefit allows the farms to have proper and well-structured documentation.

According to the USDA (United States of America Department of Agriculture) (2013), the department claims that having certification provides benefits to organic producers and handlers, though there are no supporting studies for its claims as posted on its website. Those benefits listed on the USDA's website are as follows: (a) receive premium prices for products; (b) access fast-growing local, regional, and international markets; (c) support local economies; (d) access additional funding and technical assistance; and (e) market products to consumers.

In a study by Lantican (2008) entitled, "Adding Value to Fresh and Processed Produce through Product Certification: The Philippine Case", the author discussed the positive and negative points of certification in the country with only the OCCP as the certifying body. One of the negative points is the certification cost, which includes the direct fee and other fees incorporated during the whole process. Another is that production is reduced and the quality of the products is different due to the "transition period for conversion". These, in turn, resulted in lower

income. However, there are also benefits from certification. One is, with certification, it is easier to win and gain control of the market; hence, prices increase and do not always change. Other benefits reported by Lantican (2008) were the betterment of the "condition of the farm, quality of the produce, and welfare of the farmers". Farm productivity is also enhanced due to the standards followed with regards to the use of fertilizers, pesticides, and other inputs at the farm.

Piadozo et al. (2016) conducted a study on why there were only few farmers certified in the Philippines and why they were reluctant in applying for third party certification. Based on the outcome of the study, the "small volume of production and low farm prices" hinder farmers in securing and receiving third party certification. Furthermore, certification is not "viable" for those who are still in the process of shifting to organic farming, and to those who have volume of production which is not substantially high.

In RA 10068, only those certified by third parties are accepted as organic in the Philippines. Organic farmers are entitled to numerous incentives once they apply and secure third party certification. Most of the incentives are certification subsidies, support, and tax incentives.

News articles (Conserva & Padillo, 2015; Perez, 2017) on third party certification in organic farming in the Philippines mentioned that the certification cost is expensive, making it difficult for farmers to apply and be certified. Ms. Chedy V. Ansale, head of the DA10 Agribusiness and Marketing Assistance Division, admitted that certification is costly; however, it is worthwhile. Also, in a presentation prepared by Dr. Orville L. Bondoc, one of the hindrances in the production of organic livestock in the Philippines is the "high cost of certification."

Studies showed inconsistency in the benefits as well as the problems encountered with regards to certification. In the Philippines, an article by Lantican (2008) was written with only OCCP as the third certifying body. This study provides new information regarding third party certification in the country particularly with organic vegetables and fruits.

III. Methodology

A list of Third Party Certified Organic Farms and Establishments in the Country was obtained from the Bureau of Agriculture and Fisheries Standards. Purposive sampling was used in determining the organic operators to be used as subjects. A total of 10 certified organic operators were identified as respondents; however, only five agreed to be interviewed. Only four were used for the results and discussion since the other does not sell their organic produce but instead focuses more on the production of certified seeds and distribution to partner farmers. Three of the four respondents interviewed were the owners and presidents of the certified organic farms and businesses. The other was the certification officer of the certified organic farm.

The benefits and problems of each company were identified and analyzed to see the effects on the business operations of the four respondents. Data gathered for each company were compared to determine the similarities and differences of the effects of third party certification on the four respondents.

For the marketing, pricing before and after certification were determined in order to see the effect of being certified in the price of the organic products. Promotional strategies implemented by the farms were also determined to see how the farms reach out to their consumers. The place where the farm is located is also important. It is to see whether the farm is situated near the communities, consumers or source of their raw materials. Lastly, in the marketing part, are the products produced by the farms - the reason why they have chosen that product.

Another business function is the production/ operation wherein the raw materials used and their sources were identified. Information regarding the suppliers was also determined. The methods and

practices that the organic farms are implementing were also examined to see if those practices comply with the standards by the certification bodies.

For the human resources aspect, the main discussion focused on the farmers; their skills and knowledge regarding organic farming. It also includes the skills learned and knowledge acquired by the farmers after getting certified.

For the financial aspect, the sources of capital and other related information using financial statements if available were noted and assessed depending on whether there was an increase or decrease in sales, operational expenses, and profits.

After evaluating the operations of the farms, the benefits and problems encountered by the organic operators were identified and assessed. The benefits were identified by comparing the changes before and after getting third party certification. The implications of these benefits and problems were then analyzed to determine their overall effect on the farms. Lastly, recommendations were formulated based on the benefits and problems of third party certification, which can serve as a guideline for farmers or entrepreneurs who would want to venture in organic farming and apply for third party certification.

IV. Results and Discussion

4.1. Comparison Between the OCCP and NICERT Certification Processes

In summarizing the certification process of the two certifying bodies, it can be seen in Figure 5 that their processes are the almost the same. Also, during the interviews, the process that the OCCP certified operators went through was almost the same with that of those NICERT certified. It starts with application and then is followed by inspection. Documents are checked, and if there is any non-compliance, applicants are given time to address these and submit them to the certifying bodies. When the requirements are complete, a decision is made and a certificate is handed to the applicants. If denied, the applicant may appeal to the certifying bodies.

OCCP was established earlier than NICERT. They have been in the industry for quite some time already, and operators were first certified by OCCP. With this, it is possible that they will renew their certificates with OCCP unless there is a miscommunication or disagreement that makes them decide to shift to NICERT, or not apply for renewal. They also worked on the PNS OA, which is the same standard adopted by the national government. They were also affiliated with international institutions. If the organic operators applying for certification are targeting the export market, they could apply for a foreign certifying body with OCCP as the facilitator.

However, there could be instances when operators might prefer NICERT over OCCP. One is by considering the area where the applicants are located. Since the process was almost the same based on the findings, it would be better if the applicant applies for NICERT if they are based in Visayas. Through this, they could easily contact and communicate with NICERT.

Fig. 5. Summary of OCCP and NICERT's Certification Process

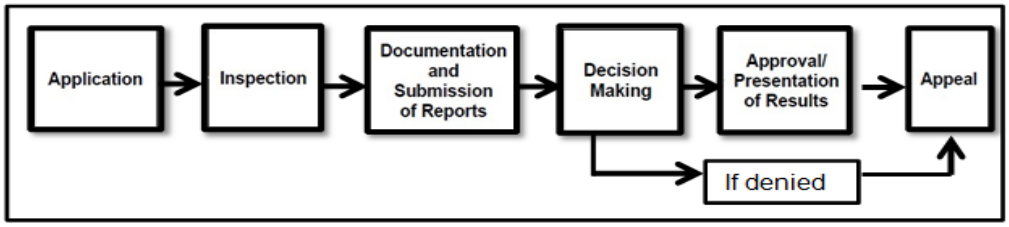


Table 1 presents the profile of selected organic farms in the NCR and Calabarzon, Philippines. Basic Necessity Inc. was the first to be established among the four and has been in the business for 20 years. It also had the largest land area devoted to organic farming. The farms were either OCCP or NICERT certified. It took quite a while for Basic Necessity Inc. to receive certification from the time it was first established, and it also incurred the longest time in the process of certification. During the conducting of this study, Amazing Foods Corporation and Px Community Foods and Marketing, Inc. were currently certified. All complied with the PNS standards.

Table 1. Profile of Selected Organic Farms in NCR and Calabarzon, Philippines.

Items	Amazing Foods Corporation	Basic Necessity Inc.	Costales Nature Farms	Px Community Foods and Marketing Inc.
Year Established	2005	1997	2005	2014
Land Area	15.8 ha	16 ha	8 ha	1334 sq. m.
Location of the Farm	Sta. Maria, Laguna and Quezon	Benguet and Cavite	Majayjay, Laguna	Benguet
Certifying Body	OCCP/CERES/ Control Union	OCCP	NICERT	OCCP
First Year to Be Certified	2009	2013	2012	2016
Length of Certification Process	3 months, faster in the succeeding years	more than a year, faster in the succeeding years	3 months, faster in the succeeding years	less than two months
Currently Certified	YES	NO – Expired last February 25, 2017	NO – Under renewal	YES

4.2. Benefits, Problems, and Effects on Third Party Certification

Third party certification was beneficial for three out of the four respondents interviewed. Amazing Foods Corporation, Px Community Foods and Marketing Inc., and Costales Nature Farms all received benefits from third party certification, while for Basic Necessity Inc., the certification has been not beneficial.

For Amazing Foods Corporations, the major benefits of third party certification were:

(1) being able to export their product; (2) reach out to local customers in Luzon and Visayas; (3) command higher prices; (4) increase in sales; and (5) profits. Other benefits were for the consumers, with the certification serving as a "seal of high quality" and assurance that the product is organic.

In the case of Px Community Foods and Marketing Incorporated, they were able to increase their market in terms of customers through recommendations and referrals. The quality of their farmers' product improved as well. They also look at third party certification as a "seal of good housekeeping".

Costales Nature Farms, on the other hand, also increased their market connections through the referrals and recommendations of their customers as well. The proportions of raw materials used and other processes in the farms also became more standardized, which led to efficiency. They also noticed an improvement in the recording skills of the farmers.

In terms of problems, all of the companies experienced difficulties in complying with the standards set, especially in where to outsource the inputs to be used in

the farms, except for Amazing Foods Corporation, who only made a few adjustments. According to Mr. Buenconsejo of Px Community Foods and Marketing Inc., the standards are ideal if the applicant has a large farm. However, at a farmer's level, small farmers may not be able to meet the requirements and standards since they have limited resources.

Moreover, the four respondents found the recording and heavy documentation tedious, with some of their farmers complaining about recording everything. In line with this, there are also many requirements needed to pass the certifying body in order to be approved.

For the case of Basic Necessity Incorporated, their main issue is the depreciation in the quality of their products after shifting to organic farming, and applying for third party certification, which caused a decrease in sales, profits, and company customers.

There is one main concern that the three respondents, except for Amazing Foods Corporation, thought that the government should look into, which is in some ways related to third party certification. They noticed that there is "no policing' when it comes to organic products. Even if there is a law stating that produce cannot be called organic if it is not certified by a third party certifying body, at trade fairs and weekend markets, vendors can easily claim their products organic, even though they did not follow the standards set by the certifying bodies. These vendors can impose a lower price on their products, which the foundation cannot do since their expenses for growing organic produce are high.

Looking into the effects of third party certification, they have been negative for Basic Necessity Incorporated, most especially in marketing and finance. For the remaining three, most of the effects of third party certification are positive on the marketing, finance, and production aspects of the company. Further, there are also instances where third party certification had no effect in terms of the operation's expenses and farming practices employed.

In terms of effects, there were also instances where third party certification had no or minimal effect on the companies. For the four companies, operational expenses of the companies remained the same throughout the whole process. Another stems from the farming practices employed by the companies on their farms. Third party certification did not contribute nor introduce new farming practices to the four companies; it was only the raw materials used that changed. In addition, customers of the four respondents, mostly distributors, do not necessarily look for certification. For most distributors, it was enough to know that the companies were producing organic products. For the four respondents, their customers trusted that their products were truly organic. It seems that certification has been a major requirement only by the government and not by the customers.

It was evident in the responses from the respondents that vendors are able to sell their products as organic even if just claiming that they are organic. This implies that the consumers were not that strict in looking for certificates, and claims are enough for them. This can also be attributed to the current mindset of customers that organic produce is expensive, so when someone sells produce at a high price and puts an organic label on it, Filipinos easily believe that these are really organic without looking for certification.

V. Conclusion and Implications

In receiving third party certification, the first thing to be considered by applicants is the cost associated with the certification process. It is important that owners of farms or businesses who wish to apply for certification are financially stable. It is important to have enough resources and sources for funding for certification fees. If possible, it is also important to have support from an organization to lessen the burden of the certification expenses. It is also favorable for them if they already have a market to serve, or even prospective buyers, that they are sure that they will be able to sell their produce and use the gains to recover from their expenses. It would also be better if they have at least started organic farming before applying for third party certification to allow them to cope with the adjustments of shifting from conventional to organic farming. It is evident in the case of Basic Necessity Incorporated, wherein their operations

were negatively affected, and they had to wait quite some time to remove the chemicals present on the soil they were using. In relation to those who started organic farming, if the organic farm plans to expand its market and reach other customers, certification is a good marketing tool to tap into new customers and serve new markets since it is the main benefit of certification for certified organic operators.

The purpose of receiving certification is also a factor that the applicants have to take into consideration as well. With the current status of the organic industry in the Philippines and the support from the government, applying solely for the reason to put an organic label on produce is not enough. It would be difficult. Based on the information obtained during interviews, it was noted that distributors did not really look for proof of certification or the certificate, and many vendors claimed that their produce was organic, even if it was not. Also, it was noted that the effect of certification was mostly on the marketing aspect of the business, with the increase in sales and profits only following once they were able to serve new markets and fill demand gaps for organic produce. One reasonable purpose for getting third party certification is to engage in exporting since, based on the literature, the markets for organic products are not here in Asia, but in Europe and North America. Through this, they may be able to access these markets and maximize the benefits of third party certification.

Though most respondents have their own niche markets, the lack of "policing" in the organic market is still something that the government has to work on. Lack of policing in the organic industry enables non-certified organic producers to claim their products organic and take advantage of the situation. The effect of this was seen by the respondents as not only limiting to them but to the consumers as well. It was also one of the reasons why it became difficult for them to compete in the market where so-called "organic" products proliferate. With a lack of support from the government, even with the presence of RA 10068, the number of certified organic producers in the country is still low. Based on the literature cited, the Philippines is one of the top producers of organic products. However, without the seal required by the government, only a small percentage of those producers can be recognized as truly organic producers. Furthermore, the market for organic produce is not actually here in the Philippines, but in the foreign market. They can only reach and serve those markets if they are certified organic. However, if they are not recognized as organic here in the first place, it may be difficult for them to cater to foreign markets.

References

Blackmore, E., Keeley, J., Pyburn R., Mangus, E., Chen, L. & Yuhui, Q. (2012). *Pro-poor certification: Assessing the benefits of sustainability certification for small-scale farmers in Asia*. London: International Institute for Environment and Development. Retrieved from http://www.european-fair-trade-association.org/efta/Doc/Propoorcert-IIED.pdf

Bondoc, O. L. (n.d.). *Organic livestock farming and breeding towards food security of smallholder farmers in the tropics* [PDF document]. Retrieved from http://searca.org/phocadownload/ADSS_2015/

Cardinoza, G. (2013, September 28). More Pangasinan farmers going organic. *Philippine Daily Inquirer*. Retrieved from https://business.inquirer.net/145049/more-pangasinan-farmers-going-organic

Conserva, L., & Padillo, M. M. (2015, November 19). Amid clampdown, small organic farmers struggle with certification. *Business World Online*. Retrieved from http://www.bworldonline.com/content.php?section=Agribusiness&title=amid-clampdown-small-organic-farmers-struggle-withcertification&id=118834

Dankers (2004). Chapter I - Benefits of certification: Does certification benefit farmers and society as a whole? In Lui, P., Andersen, M., & Pazderka, C. (Eds.), *Volntary standads and certification for environmentally and socially responsible agricultural production and trade* (pp. 5-19). Retrieved from http://www.fao.org/tempref/docrep/fao/007/y5763e/y5763e01.pdf

Dittrich, P. (2012, June). *Organic agriculture information note*. Brussel: European Commision. Retrieved from https://ec.europa.eu/europeaid/sites/devco/files/study-organic-agriculture-201206_en_5.pdf

Galvez, J. (2015, November 13). Organic farming gains ground. *The Manila Times*. Retrieved April 16, 2017, from http://www.manilatimes.net/organic-farming-gainsground/228928

Jaucian, M. B. (2016, August 24). Farmers enjoy good health, more income via organic farming. *Philippine Daily Inquirer*. Retrieved from http://business.inquirer.net/213967/farmers-enjoy-good-health-more-income-viaorganic-farming

Landicho, L. D., Paelmo, R. F., Cabahug, R. D., Visco, R. G., & Abadillos, M. G. (2014). Prospects and challenges in promoting organic agriculture in the upland communities in the Philippines: Implications to food security and nutrition. *International Proceedings of Chemical, Biological and Environmental Engineering, 67,* 12, 60-65. doi: 10.7763/IPCBEE

Lantican, J. M. (2008, December). Adding value to fresh and processed produce through product certification: The Philippine case. *Palawija News*. Retrieved from http://www.uncapsa.org/?q=palawija-articles/adding-value-fresh-andprocessed-produce-through-product-certification-0

Limpin, L. (n.d.). *Organic certification* [PDF document]. Retrieved from http://www.pca.da.gov.ph/coconutrde/images/sugarpdfs/LLimpin_OCCP1.pdf

Nicavera, E. (2016, September 6). DA steps up support for organic farmers. *Sun Star Bacolod*. Retrieved from http://www.sunstar.com.ph/bacolod/local-news/2016/09/06/da-steps-support- organic-farmers-495984

Negros Island Certification Services (NICERT). (n.d.). Getting certified (Webpage). Retrieved from http://nicert.org/getting-certified/

Official Gazette. (2016 January 14). Local organic farming achieves exponential growth (Webpage). Retrieved from http://www.officialgazette.gov.ph/2016/01/14/growth-organic-farming/

Organic Certification Center of the Philippines.(2012) *Organic certification* [PDF document]. Retrieved from http://occpphils.org/certification.htm

Piadozo, M. E. S., Lantican, F. A., Pabuayon, I. M., & Nocon-Shimoguchi, N. (2016). Cost of organic certification in the Philippines: Boon or bane to organic farmers?. *Journal of the International Society for Southeast Asian Agricultural Sciences, 22*(2), 107-118. Retrieved from http://www.issaas.org/journal/issues.html

Perez, P. L. (2017, January 5). Pinoy farmers move to save seeds for prosperity. *GMA News Online*. Retrieved from http://www.gmanetwork.com/news/scitech/science/594779/pinoy-farmers-move-to-save-seeds-for-posterity/story

Philippines. (2010). *Republic Act No. 10068*. Retrieved from http://www.officialgazette.gov.ph/2010/04/06/republic-act-no-10068/

Philippine Agricultural Information Network (n.d.). Organic certification process in the Philippines (Webpage). Retrieved from http://www.pcaarrd.dost.gov.ph/home/momentum/philorgagri/index.php?option=com_content&view=article&id=25%3Aorganic-certification-process-in-the-philippines&catid=4&Itemid=4

Setboonsarng, S. & Markandya, A. (2015). Organic agriculture and post-2015 development goals building on the comparative advantage of poor farmers (Webpage). Retrieved from https://www.adb.org/publications/organic-agriculture-and-post-2015-development-goals

United States Department of Agriculture (2013). Benefits of organic certification (Webpage). Retrieved from http://www.usda.gov/wps/portal/usda/usdahome?contentid only=true&contentid=benefits-organic.xml

Willer, H. & Lernoud, J. (2016). Organic agriculture worldwide 2016: Current statistics [Powerpoint slides]. Retrieved from http://orgprints.org/29790/13/willer-lernoud-2016-global-data-biofach.pdf

Willer, H., & Lernoud, J. (2017, February). *The world of organic agriculture statistics and emerging trends 2017*. Frick, Switzerland: Technology Innovation Platform of IFOAM. Retrieved from https://shop.fibl.org/CHen/mwdownloads/download/link/id/785/?ref=1

Zorn, A., Lippert, C., & Dabbert, S. (2009, July 29). *Economic concepts of organic certification deliverable 5* (CERTCOST project agreement no. 207727). Retrieved from http://orgprints.org/16041/1/D11_D5_EconomicConcepts.pd

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Determinants of Philippine Prawn and Coconut Oil Exports

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ABSTRACT

Prawn and coconut oil are traditional export commodities of the Philippines. They are mainly exported to Japan, the United States, and the Netherlands. This study assessed the effects of domestic production and income, domestic and export prices, foreign exchange rate, and trade agreements on the volume of Philippine exports of these two commodities to the top destination countries . The trade agreements focused on the Japan-Philippines Economic Partnership Agreement in the case of prawn, and the country's accession to the General Agreement on Tariffs and Trade, now the World Trade Organization, for coconut oil. Multiple regression analysis was employed to determine the factors affecting export volume. Problems and challenges in the local industries and export markets were identified, and recommendations to improve the export demand of Philippine prawn and coconut oil were also provided.

Keywords: coconut oil, export demand, prawn, trade agreements
JEL Codes: F13, Q17

I. Introduction

Prawn and coconuts are two of the most important export commodities for the Philippines. Coconut, as a major dollar earner, has 70 percent of its products sold as exports, and only 30 percent in the local markets. On the other hand, the fishery sector, which includes prawn, is one of the last few remaining sectors in the Philippine economy that has a trade balance surplus.

The Philippines is the 5th greatest producer of prawn in the world after Vietnam, Indonesia, Bangladesh and Malaysia. Prawn resources are widely distributed throughout the country's water territory, and even on in-land prawn farms. The major production regions in the

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Philippines are Central Luzon, Northern Mindanao, Zamboanga Peninsula, Western Visayas, and Central Visayas. Among the number of commodities exported from the fishing industry, prawn has been constantly in the top three, contributing 9 percent to the total volume of fishery exports and 10 percent to total revenue in 2013. It is often exported in various forms, such as fresh, frozen, preserved, dried, or smoked. Among the three, frozen/chilled forms of prawn comprised the bulk of the prawn trade. Japan is considered one of the top destinations of Philippine exports of both non-agricultural and agricultural products, including prawn. For decades it has been the country's second largest trading partner. In 2016, Japan accounted for 15.2 percent of the Philippines' total trade (PSA, 2016).

In an effort to further improve trade, the Japan-Philippines Economic Partnership Agreement (JPEPA) was implemented. JPEPA is a comprehensive economic partnership which includes not only the removal of tariff and non-tariff barriers but also involves cooperation in a wide range of economic activities. It was formally signed on September 9, 2006, in Helsinki, ratified by the Japanese Diet in December 2006, and by the Philippine Senate on October 8, 2008. Finally, it was signed and took effect on December 11, 2008 (Medalla, 2010). Under the Agreement, tariffs on exports of the Philippines to Japan will be removed to further facilitate the movement of goods, which include prawn.

Indeed, international trading has become the norm, and the General Agreement on Tariffs and Trade-World Trade Organization (GATT-WTO) Agreement on SPS Measures has been one of its forerunners. Its ratification promoted harmonization of the sanitary and phytosanitary (SPS) standards adopted by member countries for internationally traded commodities. Aragon (2003) found that the Philippine coconut oil industry processors and exporters had been complying with the international and importing countries' standards from 1980 to 2000. However, Bautista (2012) reported that the country's exports of coconut oil are still being affected by trade barriers, such as the regulations on maximum allowable levels for contaminants and labelling requirements. These trade barriers may have affected the country's exports, especially to the United States and the Netherlands, which are major destinations for Philippine coconut oil, accounting for about 70 percent of total exports. For instance, the European Union, where the Netherlands is a member country, implements SPS measures relative to the standards set by the Codex. On the other hand, the United States has strict labelling requirements on saturated fats. In the midst of all this, Aragon (2003) revealed that while the country's coconut oil was found to be highly competitive in the world vegetable oil market during the period 1980-2000, the level of competitiveness has been declining by 1.76 percent per year. Alarmingly, that of Indonesia has been increasing at 242.09 percent per year based on their estimated revealed comparative advantage (RCA). Indonesia is the main competitor of the country when it comes to coconut oil production and exportation in the world market (Bautista, 2012).

Meanwhile, coconut, also known as the tree of life owing to its various uses, is being produced in 68 provinces in the Philippines, particularly in Davao Oriental, Quezon, and Davao del Sur. The country exports 40 types of coconut products (PSA-BAS, 2013), accounting for 60 percent of the total world coconut exports (Bautista, 2012). The main coconut exports of the country are fresh coconut, copra, desiccated coconut, and coconut oil. Coconut oil is a type of oil extracted from the dried meat of mature coconut, and it is used as food, medicine, and biofuel, and in processing soap, cosmetics, and massage oils. It has been exported by the Philippines since 1970. According to the Food and Agriculture Organization of the United Nations (FAO-UNCTAD, 2014), the top export destinations of Philippine coconut oil are the United States (45%), the Netherlands (31%), Japan (4%), People's Republic of China (4%), and Malaysia (3%).

Beyond the expectations of improved export volume and value, the opening of trade among nations has brought to the fore sad realities on the way policy adoption for agricultural business is being done in the Philippines, and this has some implications, especially on the top export commodities like coconut oil and prawn. Export commodities are crucial foreign exchange earners

that the country cannot afford to lose, and while there have been some advantages enjoyed by the country in the past, this might not be true anymore due to the current state of affairs in many competitor nations. With the vast number of people and other industries dependent on these exportable commodities, the Philippines cannot simply pack up; rather, it must gear up. The what, how and why require clearer understanding.

This study therefore was conducted with the end-view of determining the factors affecting the country's volume of exports of prawns and coconut oil, and came up with recommendations and policy implications that could help put these two important industries back on their original footing.

II. Research Methodology

2.1. Types and Sources of Data

The Philippines' entry into a bilateral trade agreement with Japan, the Japan-Philippines Economic Partnership Agreement, more popularly known as JPEPA, made it imperative that the analysis for prawn be focused on trade with the latter. Thus, time series data on export volume of Philippine prawn in metric tons, export price in US dollar per kilogram exported to Japan, domestic production of prawn in metric tons, wholesale price in Philippine Peso per kilogram, and foreign exchange rate in Philippine Peso per Japanese Yen covering the period 1990-2014 were collected from the Department of Agriculture (DA) – Bureau of Fisheries and Aquatic Resources (BFAR) and Bangko Sentral ng Pilipinas (Central Bank of the Philippines). The volume of prawn imports by Japan from 2000 to 2014 was also collected from the Trade Ministry of Japan.

Similarly, the large market shares of the United States and the Netherlands for Philippine coconut oil exports were considered in the decision to select them as the country's trade partners in the analysis. Time series data on the export volume of coconut oil (being the major coconut export) in metric tons, export price in US dollar per kilogram exported to the United States and Netherlands, export price of Indonesian coconut oil exported to the United States and the Netherlands (being the country's major competitor in the international coconut oil export market), Gross Domestic Product per capita in US dollar per person, and domestic production of coconut oil in metric tons (1990-2013) were used. They were collected from the Food and Agriculture Organization and United Nations Conference on Trade and Development (FAO-UNCTAD) and the Philippine Statistics Authority-Bureau of Agricultural Statistics (PSA-BAS).

2.2. Methods of Data Analysis

Multiple regression analysis was used to determine the factors affecting the export volume of Philippine prawn and coconut oil. Linear, logarithmic-linear, linear-logarithmic, and double logarithmic forms of the model were estimated for the assumption of linearity. To check for multicollinearity, heteroscedasticity, autocorrelation, and variance inflation factors, the Breusch-Pagan/Cook-Weisberg and Durbin-Watson tests were employed. For both commodities, the final models used were in double-logarithmic form specified as follows:

$$\ln X = \beta_0 + \beta_1 \ln PROD + \beta_2 \ln WP + \beta_3 \ln EP + \beta_4 \ln FOREX + \beta_5 JPEPA + \varepsilon$$

$$\ln Y = \beta_0 + \beta_1 \ln PROD + \beta_2 \ln GDP + \beta_3 \ln PR + \beta_4 GATT + \varepsilon$$

where:

X = volume of Philippine prawn exported to Japan (mt)
Y = total volume of Philippine coconut oil exported to the United States and the Netherlands (mt)
PROD = domestic production of Philippine prawn or coconut oil (mt)
WP = wholesale price of Philippine prawn (Philippine Peso per kilogram)
EP = export price of Philippine prawn exported to Japan (US Dollar per kilogram)

FOREX = foreign exchange rate (Philippine Peso per Japanese Yen)
JPEPA = dummy variable for Japan-Philippine Economic Partnership Agreement
(1 = 2009 to 2014, 0 = otherwise)
GDP = Gross Domestic Product per capita (US$/person) as a measure of income
PR = average price ratio of coconut oil of the Philippines and Indonesia exported to the United States and the Netherlands
GATT = dummy variable for General Agreement on Tariffs and Trade – World Trade Organization (1 = 1995 to 2013, 0 = otherwise)

III. Results and Discussion

3.1. Determinants of Export Volume

As shown in Table 1, the regression model for prawn exports is significant at the 1 percent level of probability, with around 89 percent of the variation in volume of Philippine prawn exports to Japan being explained by the independent variables in the model. The significant variables that affect the volume of Philippine prawn exports to Japan were domestic wholesale price, foreign exchange rate, and the Japan-Philippines Economic Partnership Agreement dummy variable. The coefficients suggest that a one percent increase in the domestic wholesale price of prawn would result in a 1.77 percent decrease in the export volume of Philippine prawn to Japan. This is expected since an increase in domestic prices would encourage sellers to sell in the domestic market, leaving less for the export market. It is worthy of note that exporting to Japan requires meeting the stringent sanitary and phytosanitary measures being imposed on Japan-bound products. Evidence comes from some countries like India, Indonesia, Vietnam, Thailand, and China with quality problems that resulted in Japan's rejection of their prawn exports. The main reasons for these rejections were antibiotic residue and contamination. For instance, in 2012, a Vietnamese prawn shipment to Japan was rejected due to residues of Ethoxyquin, Trifluralin, and Enrofloxacin (Collado, 2013). For its part, the Philippines has been consistently able to meet such sanitary requirements. However, an exporter of prawns faced with an improved domestic price would rather sell domestically than export to Japan and undergo such a complex process of testing and shouldering additional cost.

Regression results also revealed that a 1 percent increase in the foreign exchange rate would result in a 0.97 percent increase in the volume of Philippine prawn exports. This is consistent with economic theory wherein an increase in foreign exchange rate would make a country's export more competitive in the export market. Lastly, JPEPA had a negative effect on the volume of Philippine prawn exports to Japan. Although the agreement resulted in a decrease in tariffs, instead of the expected increase in the volume of prawn exports, the opposite case was observed. One explanation for this was the decline in total volume of prawn imported by Japan from all sources (Figure 1). Although there was an increase in the share of Japanese prawn imports from the Philippines from 1.58 to 2.22 percent between the pre- (2000-2008) and post- (2009-2014) JPEPA period (Trade Ministry of Japan, 2015), it was not sufficient to counteract the negative effect of the reduced total prawn imports of Japan.

Similarly, it can be seen in Table 1 that the regression model for Philippine coconut oil exports is significant at the 1 percent level of probability, and 58 percent of the variation in the volume of coconut oil exports to the United States and the Netherlands is explained by the included independent variables. In terms of factors affecting the volume of Philippine coconut oil exports, domestic production and export price ratio between the Philippines and Indonesia were found to be statistically significant.

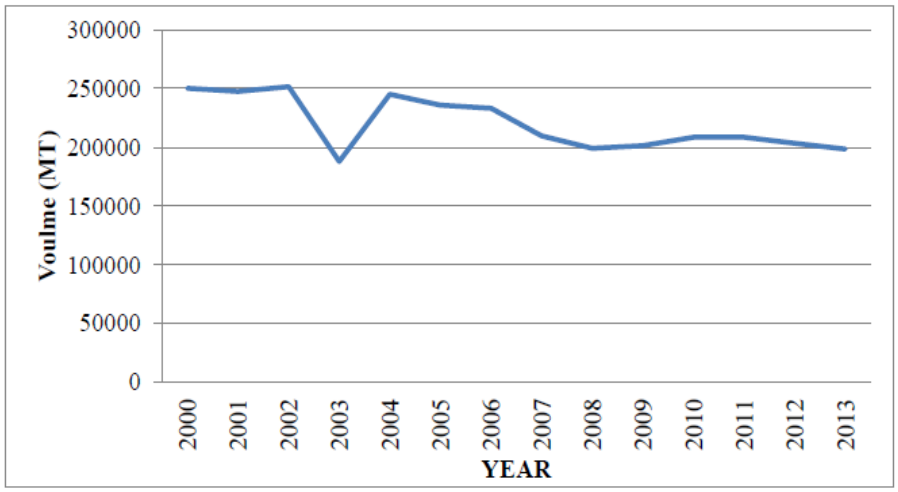
The coefficient implies that a 1 percent increase in the domestic production of Philippine coconut oil would result in a 1.19 percent increase in the volume of Philippine coconut oil exported to the United States and the Netherlands (Table 1). Figure 2 shows the generally increasing but highly fluctuating trend in Philippine coconut oil production with an average annual growth rate of 2.83 percent in the period 1990-2013.

Table 1. Results of the Multiple Regression Analysis on Prawn and Coconut Oil Exports 1990-2014

Item	Coefficient	Standard Error
Prawns		
Intercept	9.4600***	2.08
Regression Coefficient		
PROD	0.1200^{ns}	0.27
WP	-1.7700***	0.45
EP	-0.0300^{ns}	0.26
FOREX	0.9700**	0.44
JPEPA	-0.2300***	0.06
R^2	0.8929	
Adjusted R^2	0.8647	
F-value	31.6900***	
Coconut		
Intercept	-4.6200*	2.66
Regression Coefficient		
PROD	1.1900***	0.16
GDP	0.1100^{ns}	0.15
PR	-0.1800*	0.09
SPS	0.0400^{ns}	0.09
R^2	0.5800	
Adjusted R^2	0.5400	
F-value	14.8000***	

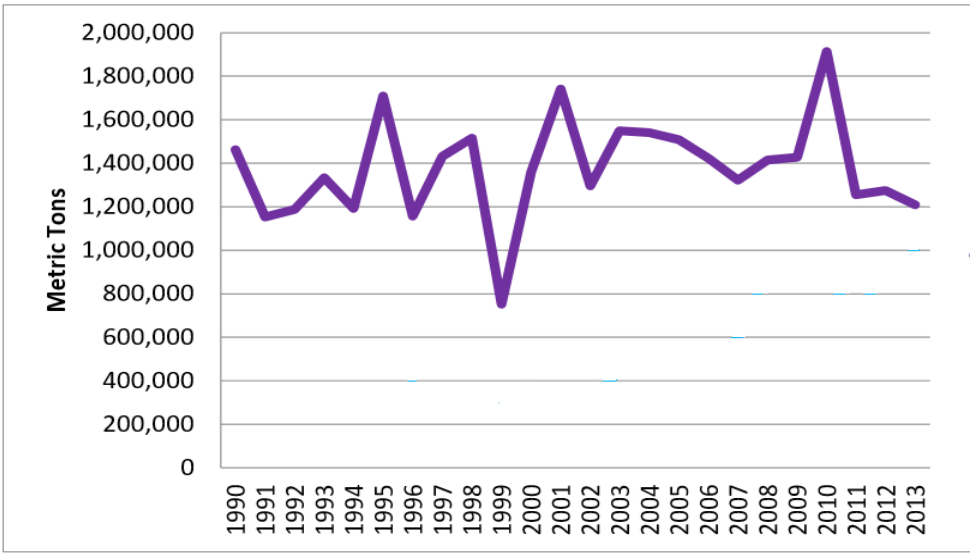
Notes: 1. ***, **, * - significant at 1%, 5%, and 10% level of probability, respectively.
2. ns – not significant at 10% level of probability.

Fig. 1. Trends in Import Volume of Prawn by Japan, 2000-2014



Source: Trade Ministry of Japan (2015).

Fig. 2. Domestic Production of Philippine Coconut Oil, 1990-2013



Source: FAO-UNCTAD (2014).

Table 2 shows the computed ratios between the export prices of the Philippines and Indonesia to the United States and the Netherlands. It can be seen that the price ratios in the United States (1.58%) are growing much faster than those of the Netherlands (1.28%), suggesting that the Philippines' coconut oil export prices to the United States are increasing much faster than the export prices of Indonesia to the same country. While the Netherlands has a much lower price ratio, Philippine export prices are still higher than the prices offered by Indonesia, making the former less competitive in these two markets.

Table 2. Price Ratios of Philippines and Indonesian Coconut Oil Exports to the United States and the Netherlands, 1990-2013

Year	Price Ratio	
	United States	Netherlands
1990	0.93	0.91
1991	1.11	0.90
1992	1.08	1.00
1993	0.94	1.00
1994	0.97	1.00
1995	1.02	0.96
1996	1.05	1.00
1997	1.02	0.95
1998	1.17	1.10
1999	1.03	1.12
2000	0.89	0.95
2001	0.65	0.92
2002	0.93	1.12
2003	1.01	1.09

2004	1.00	1.00
2005	1.02	1.03
2006	1.05	1.03
2007	1.03	1.17
2008	1.08	0.95
2009	1.05	1.05
2010	0.95	0.87
2011	1.00	1.05
2012	0.96	0.94
2013	1.10	1.06
Average	1.00	1.01
Average Annual Growth Rate (%)	1.58	1.28

Source: FAO-UNCTAD (2014).

Looking at the factors affecting the volume of exports, a 1 percent increase in the coconut oil export price ratio between the Philippines and Indonesia would result in a 0.18 percent decrease in the volume of Philippine coconut oil exported to the United States and the Netherlands (Table 1). This is to be expected because a more expensive product will be less demanded in the market. As shown in Table 2, the price ratios follow a generally increasing trend and these negatively affected the volume of Philippine coconut oil exported to the aforementioned destinations. This has been verified by a negative but weak correlation (-0.1821) between the coconut oil exports of the Philippines and those of Indonesia (Table 3), suggesting that Indonesia has been slowly captuing the coconut oil export market share of the Philippines.

Table 3. Prawn Imports of Japan by Major Exporting Countries, 2000-2014

Year	**Philippines**	**Australia**	**Canada**	**China**
2000	2.93	23.32	-	18.39
2001	3.15	28.41	15.47	10.07
2002	2.66	23.73	16.86	13.93
2003	1.88	23.37	20.04	19.09
2004	1.46	21.80	17.30	21.74
2005	0.04	14.04	20.13	22.17
2006	0.03	16.96	19.95	-
2007	0.05	19.65	14.04	20.13
2008	2.00	15.59	18.83	25.27
2009	1.94	10.16	9.20	38.14
2010	2.83	6.49	17.46	41.91
2011	2.18	5.13	16.90	42.26
2012	2.64	8.83	41.46	-
2013	0.48	0.67	30.56	-
2014	3.24	0.03	18.14	28.12
r^2		0.0190	-0.0161	0.0563

Source: Trade Ministry of Japan (2015).

Unlike the JPEPA for prawn, the Philippines' accession to the General Agreement on Tariffs and Trade did not have a significant effect on the volume of Philippine coconut oil exported to the United States and the Netherlands as signified by the non-significant GATT dummy variable (Table 1). This is already an improvement in the competitiveness of Philippine coconut oil exports under the GATT regime since in the study of Aragon (2003), the effect of GATT on export volume of coconut oil covering the period 1980-2000 was negative.

Correlation analyses between the prawn exports of the Philippines to Japan and those of other exporting countries showed a very weak negative relationship between the Philippines and Canada, and positive but very weak relationship with China and Australia (Table 3). It cannot therefore be said that these countries were able to capture what the Philippines has lost in the Japanese prawn market ,suggestive of the fact that there could have been reasons other than Japan's imports from other countries.

On the other hand, a higher negative correlation (-0.1821) was noted between the coconut oil exports of Indonesia and the Philippines (Table 4). While the relationship has also been weak, this might be indicative of the fact that Indonesia has been able to enter the international coconut oil market at the expense of Philippine coconut oil.

Table 4. Coconut Oil Exports of the Philippines and Indonesia, 2000-2014

Year	**Indonesia**	**Philippines**
1990	198	1073
1991	351	789
1992	258	1122
1993	393	773
1994	148	1331
1995	360	899
1996	452	1020
1997	471	1386
1998	317	595
1999	670	1145
2000	450	1204
2001	515	1070
2002	365	1070
2003	447	1063
2004	782	996
2005	602	1200
2006	666	832
2007	718	957
2008	518	741
2009	556	1285
2010	572	989
2011	831	800
2012	591	1117
2013	777	870
r^2		-0.1821

Source: indexmundi (n.d.).

3.2. Problems and Challenges in the Philippine Prawn and Coconut Oil Export Industries

The numbers are clear through the years, and the Philippines' top export earners have not been performing well relative to other countries. A bilateral trade agreement such as the JPEPA has not been effective in increasing the Philippines' prawn exports to Japan, while traditional export coconut oil has also not been spared. A review of available literature and studies point to the fact that the domestic situation, particularly production, has encountered several problems.

Based on news from different national online websites, studies, and the interview of an industry specialist, some of the issues which affected the prawn exports of the Philippines are: unstable production of prawn due to disease outbreaks; high input costs (e.g. feeds); continuous increase in the production of other exporting countries, increasing competition (Caipang, Muegue1, & Geduspan, 2015); and relatively higher domestic price than export price.

According to Caipang, Muegue1, and Geduspan (2015), a disease outbreak that happened in the late 1990s still has an effect up to the present, leaving the volume of production still unstable and very far from its level in the late 1980s and early 1990s. Low productivity decreased the supply for export, and eventually became a reason to decrease exports to Japan. Furthermore, high input costs, especially for prawn feeds, are a major concern. This is another reason why producers of prawn cannot easily cope with the disease outbreak. Continuous increases in the input prices pull down potential increases in production. Lastly, high prawn producing countries like China, Thailand, and Vietnam adding much to the volume of prawn to the world market, specifically in Japan, eventually decreasing the export price and lessening the incentive for local prawn producers to export their prawn.

In addition, while the Philippines has been producing less, the increasing per capita consumption of prawn by Filipinos pulled up the domestic price relative to the export price, giving producers an incentive to sell locally to gain higher profit. Of equal importance is the issue that if other prawn exporting countries can produce more than 200 percent of what the Philippines can produce volume-wise, then, through economies of scale, they can offer a much lower price, from which importing countries like Japan will benefit.

Similarly, fresh coconut production in the Philippines has been declining by 0.98 percent annually in the period 2011-2015 (PSA-BAS, 2017). This is explained by the decrease in area devoted to coconut production by 0.32 percent per year (PSA-BAS, 2017). In a study by Reyes and Bathan (2017), the occurrences of Super Typhoons Zebs (*Iliang)* and Babs (*Loleng)* in 1998 and Megi (*Juan*) in 2010 have resulted in a decrease in the domestic supply of fresh coconut in the period 1990-2014. Since coconut oil production is largely dependent on the production of fresh coconut, it is important to address these production-related concerns in order for local coconut oil production not to be negatively affected. There are also challenges faced by the Philippines in the world coconut oil export market, particularly the regulations on maximum allowable levels for contaminants and labeling requirements of the United States and the Netherlands (Bautista, 2012) as well as the cheaper export price of Indonesian crude coconut oil in the Netherlands (Djoni, Atmaja, & Fauzi, 2013).

IV. Conclusions and Policy Recommendations

Continuous decreases in Japan's importation of prawn were a significant factor in the Philippines' decreased volume of prawn exports to Japan. Even the Philippines' increased price competitiveness from the JPEPA's tariff elimination was not able to offset the effect of Japan's general decrease in its import of prawns from the Philippines. Furthermore, the high domestic price of prawn in the Philippines relative to export price resulted in lesser exports from the Philippines because domestic production was not able to recover from disease outbreaks and the negative effects of environmental degradation. There was also increased domestic consumption of prawn. These factors effectively hindered the potential benefits that the Philippines could

receive from the bilateral agreement. It can therefore be concluded that while JPEPA ratification was able to produce its intended effect of improving price competitiveness of Philippine prawn, the long-standing problems in the Philippine prawn industry which remain unaddressed are an indication that the country might have entered into another agreement for which its industry players are not yet prepared for. In the case of coconut oil, the seemingly lackluster performance of the local industry has also reverberated into the international market, indicating the need for more aggressive and innovative strategies for improved local conditions.

In recognition of the above, it is suggested that domestic production of prawn be given a closer look. While domestic wholesale price significantly decreased Philippine prawn exports to Japan, increases in domestic supply will lower the domestic price and give incentives to prawn producers to export. Increases in domestic supply, however, can only be realized if government support in addressing disease outbreaks and other prawn management practices can be provided. Of critical concern here is the deliberate maintenance of the Philippines' prawn exports being regarded as good quality because they have always been free from antibiotics and other chemical residue. Since prawn is one of the country's top exports, the government should be on top of the terms for providing logistical support that private providers are not willing to undertake.

For Philippine coconut oil exports to the United States and the Netherlands, there is also a need to increase the domestic production of coconut oil in order to increase the volume of exports, and to become more competitive than Indonesia, particularly, in the Netherlands market. To increase the country's production of coconut oil, coconut production must be improved by using high-yielding varieties and applying salt, which serves as a fertilizer. With the occurrences of super typhoons in the Philippines, it is recommended that the dwarf varieties such as the Tacunan green dwarf be grown in typhoon- or cyclone-prone areas. The government, through the Philippine Coconut Authority, should also exert more effort in promoting investments in the domestic coconut industry, particularly in the establishment of copra processing plants and oil mills to further increase the domestic production of coconut oil. It will be useless to increase production of nuts when the number and quality of these facilities are not improved.

References

Aragon, C. T. (2003). *Determinants of global competitiveness of the philippine coconut oil industry* (Unpublished undergraduate thesis). University of the Philippines Los Baños, Laguna, Philippines.

Bautista, K. A. (2012). *Trade impact of sanitary and phytosanitary measures of Philippine coconut oil exports, 1986-2009* (Unpublished undergraduate thesis). University of the Philippines Los Baños, Laguna, Philippines.

Caipang, C. M., Muegue1, M. F., & Geduspan, J. S. (2015). Current status of shrimp aquaculture in the Philippines. In Caipang, C. M., Bacano-Maningas, M. B. I., Fagutao, F. F. (Eds.), *Biotechnological advances in shrimp health management in the Philippines* (pp. 1-18). Kerala, India: Research Signpost.

IDE-JETRO and UNIDO. (2013). *Meeting standards, winning markets: Regional trade standards compliance report-East Asia 2013*. Chiba, Japan: IDE-JETRO. Retrieved from https://www.unido.org/sites/default/files/2013-12/UNIDO-IDE-JETRO_Regional_TSC_Report-East_Asia_2013_final_ebook_0.pdf

Djoni, D. D., Atmaja, U., & Fauzi, A. (2013). Determinants of Indonesia's crude coconut oil export demand. *Journal of Economics and Sustainable Development, 4*(14), 98-105.

Food and Agriculture Organization of the United Nations Conference on Trade and Development (FAO-UNCTAD). (2014). *International trade in goods and services: Trade structure by partner, product or service-category* [Data file]. Retrieved from http://unctadstat.unctad.org

Indexmundi (n.d.). *Philippine coconut oil exports by year* [Data file]. Retrieved from https://www.indexmundi.com/agriculture/?country=ph&commodity=coconut-oil&graph=exports

Japan Ministry of Finance. (2015). *Trade statistics of Japan* [Data file]. Retrieved from customs.go.jp

Medalla, E. (2010). *Japan-Philippines economic partnership agreement (JPEPA): Toward a framework for regional economic integration* (Discussion paper series no. 2010-19). Retrieved from http://dirp3.pids.gov.ph/ris/dps/pidsdps1019.pdf

Moreto, J. D. C. (2016). *Economic impact of Japan-Philippines economic partnership agreement on Philippine prawn exports to Japan, 1990-2014* (Unpublished undergraduate thesis), University of the Philippines Los Baños, Laguna, Philippines.

Philippine Statistics Authority. (2016). *Foreign trade statistics of the Philippines* (Data file). Retrieved from http://psa.da.gov.ph

Philippine Statistics Authority – Bureau of Agricultural Statistics (PSA-BAS). (2017). *Foreign trade statistics of the Philippines* [Data file]. Retrieved from http://psa.da.gov.ph

Reyes, J. S., & Bathan, B. M. (2017). Analysis of the export competitiveness of Philippine coconut oil. Paper presented at International Conference on Food and Agriculture, SEARCA, Philippines Los Baños, Laguna.