

Development of Supply Chain Quality Management in Peruvian Blueberry Companies: A Case Study in Cañete, Peru

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Abstract- The keen research objective is to develop a quality system in the Supply Chain Management geared to the agribusiness sector. The Supply Chain Quality Management (SCQM) proposed for blueberry companies must improve their operational performance. This study includes micro and small agricultural enterprises located in the Cañete region of Peru, where thanks to the interviews and questionnaires were possible to determine the critical practices, which will be applied in the agribusiness sector. The literature review found to enrich the methodical procedures that are essential practices of the innovative SCQM model. The research shows that the critical practices to develop quality management in this sector are Customer Relationship Management, Supplier Relationship Management, Process Management, and Human Resources Management. This research turns out to be utterly innovative because the use of the recently proposed technique of Quality Management into the Supply Chain combined with the best practices will lead to operational improvement and other qualitative advantages. Finally, the knowledge embedded in SCQM applied to small blueberry companies in an emerging country can provide added value to management to increase the competitiveness of the agribusiness sector.

Keywords- Blueberries, Food Supply Chain, Quality Management, Supply Chain Quality Management, Supply Chain Management, Supply Chain, Peru.

1. Introduction

The export of blueberries from Peru in 2016 grew 140% compared to 2015. This research will carry out an in-depth study on the main problems that minimize the growth of small businesses within a specific sector by proposing several improvements that will help to increase competitiveness and

contribute to the economic growth in Peru. The objective of proposing these improvements is to generate the greatest possible impact in some economic indicators, improvement in the social aspect, and poverty reduction due to new employment opportunities.

Therefore, it is important to seek advice from the experts of the academia and practitioners on the best current management tools that may help to fulfill the proposed objective.

2. Literature Review

The main objective of the literature review is to determine the theoretical model of Supply Chain Quality Management (SCQM) to be implemented in the food industry of blueberries in the province of Cañete, Peru.

Below is the research procedure carried out by the authors. As shown in Figure 1, the order is ascending from basic quality concepts up to the integration of quality management practices in the supply chain management.



Figure 1: Summary of Literature Review, Source: own study

2.1 Quality Concepts

The main concepts of quality are explained by the increase of knowledge in the industry [72]. The stages are: focusing on the product, the process, and the system. First, the focus based in quality control of the product (QC). The focus in the process contains quality control (QC) and quality assurance (QA). Finally, in the last time, the industry's awareness of quality has led to the creation of a new paradigm known as Focus on the System, where Quality Management (QM) and Total Quality Management (TQM) are within this new focus. This stage of quality wants to create an environment where all the workers are involved in the success of the business, therefore, the culture of the companies must be oriented to continuous improvement.

2.2 Main Strategies of Quality Management

There are many methodologies used for the efficient and effective way to establish a quality system within companies. The top three quality management strategies are Lean Manufacturing, Six Sigma, and Total Quality Management [4].

a) Lean Manufacturing

Just-In-Time (JIT) practices are very useful for improving operational performance. These practices represent the core of the Lean management methodology; they were developed for the first time in Toyota, where production is highly repetitive [14]. Also, JIT improves the key points of the organization: organizational culture, the improvement of communication between areas, the improvement of teamwork and the relationship management with suppliers [51]. The main objective of the system is to minimize all types of inventories to reduce operational costs and to generate value in the production cycle through continuous improvement [2].

b) Six Sigma

Six Sigma is a methodology for continuous process improvement in businesses that identifies and removes existing opportunities for defects by reducing process variability [60]. Six Sigma presents a project-based approach. In addition, the focus is on the client and their needs, thanks to its structured and systematic methodology known as DMAIC (Define, Measure, Analyze, Improve and Control) [43]. Six Sigma also provides a step-by-step approach to identify the cause of problems that

affect critical characteristics related to quality [62].

Other benefits are the increase of productivity, a reduction of the rework rates or defective products and greater satisfaction of the client [30]. The profitability of companies is improved by reducing costs, cycle times and inventory [5]. The main tools used by the Indian companies were: supplier-input-process-exit-client (SIPOC), cause and effect analysis, Pareto analysis, process flow diagrams, point diagrams, box diagrams and the statistical control of the process (SPC). The Six Sigma methodology is improved and could be achieved more efficient and better results when integrating with Design of Experiments (DOE) [52]. In the same way, a new Six Sigma quality control (SSQC) was developed, and nowadays is more focusing in reducing the process shift and process variation [31].

c) Total Quality Management

TQM is a business management philosophy that involves all the organization's activities to achieve operational excellence [1]. TQM also considers external factors to the company, such as customers and suppliers. The supplier integration could be necessary when supplier of Supply Quality Risk are considered to be a significant threat, because a potential quality issues associated with a supplied component [75]. It generates cost reduction, improves flexibility, and increases the quality of the product or service, and, ultimately increases customer satisfaction [70].

Additional benefits of TQM include the improvement of the working environment, as well as the increase in morale of the workers, which leads to greater job satisfaction [7]. Some authors affirm that the most important factor of TQM is the client's approach and the superior management of leadership, which are crucial to achieving the objectives and the success of the system [6]. Although other authors argue that the most important practice for excellence is leadership since the leader is not only the manager of the company but also responsible for the success of the entire administration [48]. Therefore, the personality of the leader is a key factor in the solution of internal and external problems, which will subsequently lead to the success of the organization [35].

d) Choice of the best strategies

Based on the analysis of these three tools, the methodology that will be used in this research will be TQM. TQM creates an organizational culture that is characterized by meeting the needs of customers through the continuous improvement of processes and the participation of all staff [34]. The sector of study selected for this research is comprised of micro and small agricultural enterprises. They are not familiar with the tools or philosophies of quality systems. Therefore, the goal is to create a system to adopt continuous improvement. These agribusiness companies seek to increase their competitiveness through the application of world-class techniques.

2.3 TQM practices

Since its development in the 80s, by Deming, Total Quality Management is a methodology used in the industry to increase competitiveness. This situation is generated due to the successful adoption of their practices that create competitive advantages, difficult to imitate by competition [22]. Competitive advantage in increasing customer satisfaction through the delivery of high-quality products and services at a controlled cost [44].

A clear example of the success of good management practices is the case of the manufacturing industry in Japan, which has made it a leader and a world benchmark regarding quality [24].

Also, in order to obtain success on total quality management this study identifies and describes the best practices in TQM.

Academic experts classify best practices in TQM into three groups: "Management Practices," "Infrastructure Practices" and "Core Practices."

a) Management Practices (MP)

This practice corresponds to the management function of the principal leaders in the organizations. It is important to note that the correct application and proper functioning of quality management depend on the degree of participation of the leaders or senior managers. Within this group, the following practices are considered: Top Leadership Management (TLM), Strategic Planning (SP), Benchmarking (B) and Business Result Focus (BRF).

b) Infrastructure Practices (IP)

Infrastructure practices are the soft part of business management. That is, to take into account the behavior, the attitudes of the staff; as well as the internal and external relations of the employees of the organization. Among the main practices carried out in this category are: The practice of Human Resources Management (HRM) that covers other practices, such as the continuous training of personnel, promoting teamwork and the participation of all staff in the management, as well as generating communication at all levels of the organization; on the other hand, achieve the creation of a culture towards quality (QC), the management of relations with suppliers (SR) and the management of relations with customers (CR).

c) Core Practices (CP)

These core practices contrast with the infrastructure practices, with a technical design oriented to issues and improved processes. In addition, the study of the statistical tools necessary to achieve this objective, such as the control of the statistical process and the methodology of continuous improvement (Plan-Do-Check-Act). Among the main techniques of the core type, the following are included: Process Management (PM), The Continuous Improvement (CI), Information and Report Management (IRM), Innovation (R), Quality Management Certifications (QMC) and Product Design (PD).

d) Choice of best practices in TQM

The selection of the best practices of Total Quality Management was carried out based on an analysis of academic articles. Table 1 shows a total of fourteen articles were reviewed and each article presents the most important TQM practices. Then, depending on the number of times these practices are cited by academic experts, and these practices have received the most attention by academics who study TQM.

	Literature Review	HRM	TLM	CM	PM	SM	IRM	CI	SP	QC	C	PD	BRF	QMC	B	I
[24]	Young (2012)	X	X	X	X	X	X	X	X	X		X		X	X	X
[23]	Fallah (2013)	X	X	X	X	X	X					X				
[41]	Maher (2015)	X		X	X	X	X		X							
[88]	Talib (2013)	X	X	X	X			X	X			X				
[89]	Wu (2016)	X	X	X	X	X	X			X						
[21]	Elnaer (2016)	X	X	X	X	X	X									
[22]	Ericksson (2016)	X	X	X	X		X	X			X		X			
[44]	Mehra (2016)	X	X	X		X			X	X	X					
[73]	Yaadani (2016)	X	X	X	X		X	X								
[27]	Honarpour (2017)	X	X		X	X		X		X		X		X	X	
[47]	Nawwaf (2017)	X	X						X	X	X					
[71]	Palyal (2017)	X	X	X	X	X	X					X				
[87]	Yogesh (2017)	X	X	X				X						X		
[78]	Zwain (2017)	X	X	X	X			X	X					X		
	Total	14	13	12	11	9	9	9	9	9	4	4	3	2	2	1

Table 1: Qualitative Study Results on Best practices in TQM, Source: own study based on[24].

According to the analysis of the literature, the most important best practices in TQM are shown in Table 2.

Best TQM Practices	%	Category
Human Resource Management	100%	IP
Top leadership Management	93%	MP
Customer Management	86%	IP
Process Management	79%	CP
Supplier Management	57%	IP
Information and Resport Management	57%	CP
Continuous Imporvement	57%	CP

Table 2: Selection of best practices in Total Quality Management, Source: Own study based on[24]

2.4 Integreation of Quality Management within the Supply Chain

a) Supply Chain Management (SCM)

The supply chain is a network consisting of nodes and links, where nodes are organizations, which are agents with the ability to make decisions freely [24]. The links represent exchanges between two nodes [13]. It is important to mention that there are three types of exchanges or flows between the nodes: material flow, information flow, and money flow [18]. In addition, the proper management of the supply chain generates a series of competitive advantages because it covers several approaches, a critical part of the business, the management of suppliers, the management of customers, the management of inventories, etc., [20]. In recent

times, the SCM has had to evolve due to the regulations of the states. The new approach is to create sustainability throughout the supply chain to preserve the environment. This new approach is known as Green Supply Chain Management (GSCM) [55]. Therefore, this view indicates that not only direct clients influence changing paradigms, but also regulations.

In conclusion, the best definition of Supply Chain Management is achieved by integrating in two directions: forward and backward with suppliers [68].

b) Supply Chain Quality Management (SCQM)

This is a new theoretical model that consists of the integration of the practices of Supply Chain Management and Quality Management, where they mainly have leadership practices, Customer Focus, relationship with suppliers, Continuous Improvement and Management of the Information [29]. These practices can be divided into two dimensions: intra-organizational and inter-organizational. Practices that take multiple nodes of the supply chain and others that are only used within the organization itself [61]. According to the theory of SCQM, the internal dimension comes from the side of Quality Management; while the external aspect comes from the context of supply chain management [57]. This is generated because the focus of each strategy is different.

On the one hand, SCM provides integration and collaboration through continuous and uninterrupted flow. On the other hand, QM seeks to continually develop its processes to satisfy the client [25]. Furthermore, from a point of view like the one mentioned, the SCQM can be defined using the equation (SCQM = SC + Q + M), where "SC" is where the production and distribution network is: "Q" fulfills the requirements that seek its satisfaction and, finally, "M" means to perfectly comply with the conditions for the functions of the system [40], [3].

c) Best practices in SCQM

The SCQM is a two-dimensional tool that integrates the collaborative approach, the distribution of the SCM and the approach to the continuous

improvement of the internal processes of QM. Therefore, we align the best practices of TQM and provide the integration and collaboration approach. That is, adapt quality practices to meet the requirements of the SCM. For example, the practices that obtain backward and forward integrations are the client's approach and the relationship with the provider. Although from the perspective of quality only seek to relate to these to improve internal processes; adapting it to the perspective of the chain, this relationship becomes a mutual benefit, seeking to improve on both sides continuously.

As shown Table 3, some practices of TQM have considered in the analysis, and with the help of articles for each specific practice, we will increase our knowledge and develop the quality systems for the practices that are critical for the selected sector.

Practices	Authors	Description
Top Leadership Management	[12] Burris (2017) [26] Hibbert (2017) [63] Steward (2017)	This practice involve the activity that must realize by the top managers of the companies to assure the success of the complete management.
Customer Relationship Management	[11] Brown (2005) [45] Mithas (2005) [50] Payne (2005) [59] Seiders (2005)	Integration with customers is important for the success of the management. For one side, it helps for knowing perfectly their needs and satisfice them completely
Supplier Relationship Management	[19] Durach (2017) [32] Joshi (2017) [37] Lambert (2002) [53] Li (2017) [49] Park (2010)	This is upstream integration and the purpose here is to collaborate with them to get mutual benefits. Suppliers are critical to satisfice correctly the customer need.
Process Management	[39] Lehner (2017) [46] Nadarajah (2016) [54] Rahimi (2016)	This practices focus on control the mistakes and failures in all the keys processes.
Human Resource Management	[38] Lee (2017) [15] Cooke (2013) [10] Bretos (2017) [8] Bates (2014) [64] Suder (2017)	The best practices according to the experts are training for workers, job satisfaction, personal commitment.
Information & Report Management	[16] Cui (2017) [56] Rezvani (2017) [65] Sun (2017)	This practices focus on create the process necessary to obtain good quality information for measuring and controlling the company performance.

Table 3: Summary of Best Practices in SCQM, Source: own study based on[29]

3. Case Study

3.1 Current Situation

The study was developed in the Canete region, and during the site visits general managers, operations managers and engineers were contacted in each organization, and the most relevant information for the region studied conformed by 16 small blueberry companies were the area cultivated on average of 9 hectares. All farmers are located in the coast area in the Canete region, and the variety of berry products are Biloxi, Misty and Legacy. These types of berries are well adapted in Peru.

Production: The studied coastal region where the berries were recently introduced has good weather, wind, winter period, terrestrial acidity, etc. The average area harvested increased from 2012 to 2016 is more than 50% and production increases by more than 60%.

According to recent study from Agriculture Ministry (MINAGRI) of Peru in 2016, only in Canete region showed 141 hectareas, and exist other more bigger areas in the coastal, andean and amazonian regions with current production and potential areas for cultivating berries.

Quality certifications: The principal certifications for agribusiness sector are ISO 9001 or 22000, Hazard Analysis and Critical Control Points(HACCP), The British Retail Consortium (BRC) and in some cases TQM.

However, for exportation or access to new international markets, the farmers or small-scale producers must obtain the Global Good Agricultural Practices (GAP) certification.

In the blueberry sector, only 36% of small producers present some of these certification, in the same time all interviewed had technical degree or high level education.

International clients According to the interview and the export reports, we found that the main international markets of Cañete are the United States and the European Union. These two markets accounted for almost 70% of sales in 2016. In addition, Singapore and Canada are also positioning themselves as important destination countries, where 75% of export companies send products to these countries.

3.2 Scope of the Research

The scope of the research should integrate the main processes of the supply chain. According to several models of supply chain mapping, the scope ranges from the suppliers of the suppliers to the company or farmer and the end customer of our customers, as shown in Figure 2. However, due to the limit of the information obtained in the interviews with the leaders of the companies and also the size and small administrative capacity of these, have showed us the inefficiency in the operations or processes with significance wastes in the berry supply chain.

Therefore, to adapt the research to a real model that can be applied, it was decided to reduce the reach of the chain only to the first level. This level includes direct interaction with primary suppliers and their direct customers, as well as large wholesale distribution. With this scope, it is expected to meet the objective of integrating quality management

practices throughout the sector of the blueberry producer supply chain in Cañete region.

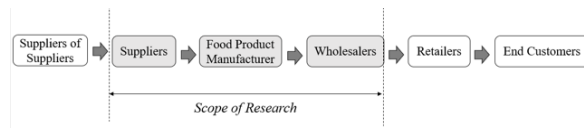


Figure 2: Delimitation of the scope of the research, Source: own study, based [37]

3.3 Supply Chain Mapping

As shown in Figure 3, the principal entities in the supply chain are:

Suppliers: The suppliers of agricultural inputs are responsible for providing the key inputs necessary for the production of blueberries. Among the most important inputs are water, fertilizers, agrochemicals, peat and rice straw, bags. These are the critical inputs in the production of blueberries, which are obtained in large volumes each year from several suppliers in the Cañete region. In general, these products are supplied by local retailers for the agribusiness sector, who represent to Peruvian company or international company.

Blueberry Manufacturers: According to our research, the Cañete in Lima sector has a total of 324 hectares installed in the current year, 2017. This number is increasing year after year. The production of blueberries involves a series of processes that must be carried out with extreme care due to the fragility of the blueberry plant.

The main processes are: planting, growing, pruning, and harvesting blueberries. In addition, after the harvest, in reason to perishable condition, the production is sent to a packing plant, and sort the right products and poor quality products. The best quality products are destined to international market, and others products are derived to local market, but at the end, all products must arrive in good conditions to end consumers. Only, minimum quantities sometime 2-3% of production due poor quality condition are re-use in other type of food industry.

Distributors: The distributors are the clients of the companies in the Cañete region. These are large

wholesalers that group the production of several blueberry producers. The scope of the present investigation it will only take the wholesale distributors. In addition, it must be taken into account that these customers are present in the main export destinations, including those in North America, Europe, Asia.

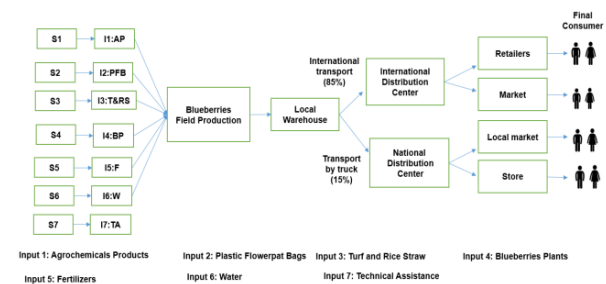


Figure 3: Blueberries Supply Chain of Cañete, Source: own study

3.4 Theoretical Model of SCQM

According to the literature review the theoretical model of SCQM represents the integration of the quality of practices and the management of the supply chain. SCQM manages all the supply chain network and companies with all process integrated, where the effective SCQM demand extensive quality integration among different supply chain partners [28].

Carry out quality practices to an inter-institutional that integrates all the actors in the chain. The integration of the supply chain is carried out in two directions back to the suppliers and sent to the customers, as shown in figure 4. In addition, it includes the internal process, that is to consider the intra-organizational factor.

Therefore, the practices necessary to achieve this objective are: First, the management of the supplier relationship (upstream integration) and the management of the relationship with the customer (downstream integration). Second the best practices that will be implemented in the internal factors of the companies will be determined by a previous analysis of root cause analysis to show us which are the best practices that have a greater impact on the productivity from blueberries in the region.

According the FAOSTAT in 2016, Peru showed the yield of 2,5 kg/H against 9,8 kg/Ha from Mexico, one

of the best in america. It's very important to consider that only few research studies have considered the quality problem in the global supply chain environment [69].

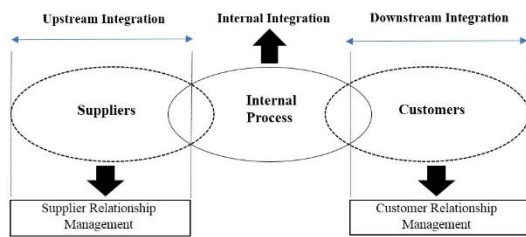


Figure 4: Proposed Model of SCQM, Source: own study based on [69][28]

3.5 Internal Integration

Our studies and site visits identified six main causes of the most recurrent losses in the sector. In general, these causes are related to methods and human factors. For example, do not burying the roots of blueberry plants at the proper depth, do not performing post process healing treatment, and an ineffective preventive controls for pruning, have a poor result in the canete region. According, the Commerce Chamber of Lima in 2016, only 3,816 kg/ha was obtained in Cañete region against 12,328 kg/ha in the north coast from Peru, in term of sales it mean two or three time minus.

These critical factors are related to the internal processes integration, process quality practices and human resource management respectively. Thus, the process system will be developed for the following four practices: SRM, CRM, PM and HR.

a) Supplier Relationship Management System

As shown the Figure 5, The Supplier Relationship Management System aims to join forces with suppliers to improve the quality of the product delivered to the customer. In addition, obtain other benefits that will lead to greater profitability of the business. Therefore, collaboration and the long-term relationships with suppliers are fundamental in this proposal system [33].

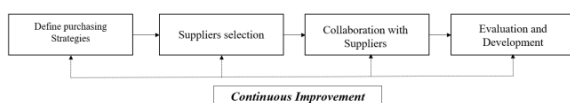


Figure 5: Supplier Relationship Management System for Blueberries Peruvian Companies, Source: own study based on [49][37][32]

Purchasing Strategies: According to the classification of the product, processes resources will be allocated, goals or policies will be established. In the same way, the negotiation method with strategic suppliers or local dealers.

For example, all small companies in the region Canete must try to negotiate directly with plagicides laboratories, or pesticides companies the annually quantity requested and time scheduled according an integrated and shared plan of production.

In the same direction, technicians and specialized works could be planned and agreed. These purchasing strategies will be minimizing the risky situations with provider of critical item for the blueberries production.

Supplier Selection: The selection of suppliers must be carried out objectively based on selection criteria that adapt to local companies' requirements, which will allow manager to generate the greatest value for the company.

Collaboration: The process integrates supply chain management practices since it provides upward integration and collaboration, strategic alliances are developed with strategic suppliers to obtain a mutual benefit for several years. In addition, suppliers can help us improve the current process, increase the quality of products, reduce the cost of inventories and reduce delivery times.

Evaluation and development of suppliers: The results obtained from supplier relationship management will be very useful in making decisions and will serve to reinforce or improve the course of established processes in order to create great value to the supply chain.

b) Customer Relationship Management System

As shown the Figure 6, customer relationship management system is important because by obtaining valuable information from the client for the continuous improvement of the quality of the product delivered and thus increases the level of customer satisfaction [17].

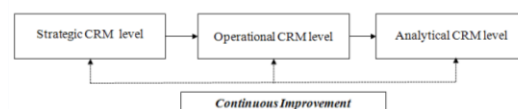


Figure 6: Customer Relationship Management System for Blueberries Peruvian Companies, Source: own study based on[50][45]

Strategic CRM: The process value delivered to the customers, is defined according to their importance to the company. Customer prioritization can be done based on sales volume and how the impact on the profitability. The value strategy aims to define the follow-up processes and contact level for clients to provide the highest possible satisfaction. Also, the operating processes, in harvest and distribution, must fully meet the needs of customers.

Operational CRM: This process corresponds to the completion of monitoring and evaluation processes defined in the strategic part. This process is used to collect customer information that allows us to fully understand the requirements and continuously improve the berries delivered.

Analytical CRM: This process corresponds to the processing of the information obtained from the customer's follow-up phase. Based on these results, we will evaluate the changes in the strategy that seek to align the capabilities of the berries company with the requirements of the client.

c) Internal Processes Integration

Internal integration of the process is related to quality management for its focus within the organization. This integration is based on three best practices selected from literature review: Process Management, Information Management, and Human Resources Management. These practices are integrated into a system to create a solid quality system in organizations.

Figure 7 shows the quality system proposed for the companies located in Cañete area, and how the practices interweave with each other, this system is oriented to satisfy the needs of the client and to improve continuously [74].

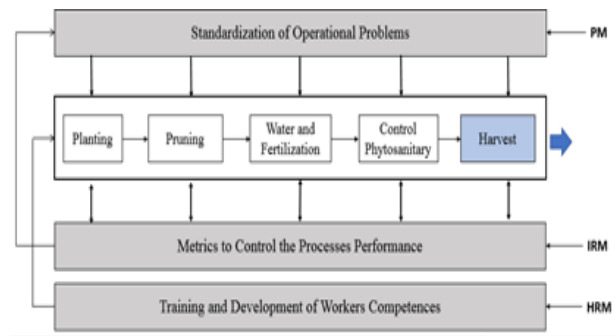


Figure 7: Quality System for Blueberries Agribusinesses in Cañete, Source: own study based on[21]

c.1) Process and Information Management

Process management aims to keep the variation of key processes under control. In this case study, it would be production. The production process has a total of five sub-processes, and it is necessary to guarantee the fulfillment of the quality requirements to generate a product that complies with the client's specifications to maintain the means of variation generating the defects or defective products in the least amount possible. For this, managers can use several tools.

In the case of the blueberry producing sector of the Cañete region, it is proposed to document and control the losses incurred in each of the most important sub-processes by standardizing the production processes based on good practices and continuous improvement.

Best Practices in Agriculture: The proposal is to standardize sub-processes based on GAP (Good Agricultural Practices) that are carried out by other companies belonging to the blueberry sector inside and outside of Peru. On the one hand, companies producing blueberries in the Cañete region, through synergies the managers can establish a single method that generates the best results.

During 2016 the productivity were 3.8 kg/Ha and the leaders at the north of Peru have obtained in average 13.41 kg/Ha. Thus, another source that will increase our managers' knowledge about good practices are the leaders of the blueberry industry in Peru. These are the producers of blueberries, located in La Libertad region of Peru, which cover 90% of the total production and export in Peru.

We benchmark with the top four leaders in Peru for berries, with information available on the web and other methods and techniques for the cultivation of blueberries from the main exporting countries of the fruit such as Chile, Argentina, Spain, and Mexico.

Operations Standardization: The Process standardization develops procedures and control of metrics, as shown in figure 8, these procedures will be used as an input in the staff training process, and the procedure will be adapted in a way that operators can understand perfectly.

The form is the adaptation of procedures in guides, manuals or instructions for production; this will ensure that the training process generates a greater impact on the learning of workers.

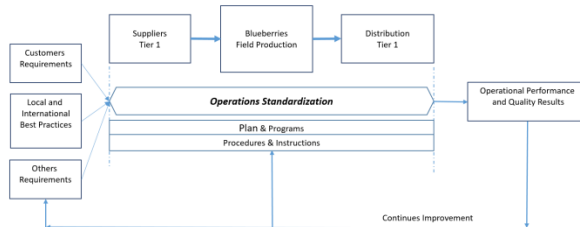


Figure 8: Empirical Proposal for Operations Standardization, Source: own study based on [66]

c.2) Human Resource Management System

As shown in Figure 9, human resources management seeks to implement three proposals that include the best practices of Quality Management. The proposals are: establishment of training plans for operators and supervisors, creation of Quality Circles, and establishment of incentives for productivity and efficiency.

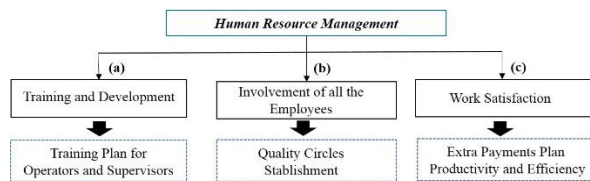


Figure 9: Implementation of the best Quality Practices for Human Resources Management, Source: Own study based on[66]

The training plan is one of the critical activities in quality management; this training must be based on best practices. This plan covers two levels: operators and supervisors. The establishment of quality circles or a team focused in continuous improvement is designed to create a culture of quality in organizations, ensure the participation of all staff in

the new management and improve the level of communication between all levels of the company. The productivity bonus plans; these are monetary incentives the operators will receive when reaching the highest levels of efficiency in their work. The proposal is that efficiency should be measured during harvest since operator failure at this stage of the production process has the greatest impact on determining the volume of exportable fruit[42].

4. Managerial Implications

The supply chain is managed by relationships and the supply chain is managed link by link [36]. As shown in Figure 10, supply chain quality management is an integrated system. In this way, the main benefits that can be obtained by correctly implementing the proposed systems will be analyzed. These benefits are obtained mainly from two sources. On the one hand, we have the main source that comes from the direct information of the companies in the sector; this information was useful to estimate an economic benefit when operations are improved.

There are other types of benefits; these benefits are translated into the qualitative impact, which cannot be estimated economically. In this case we use the articles and select the main advantages of the implementation.

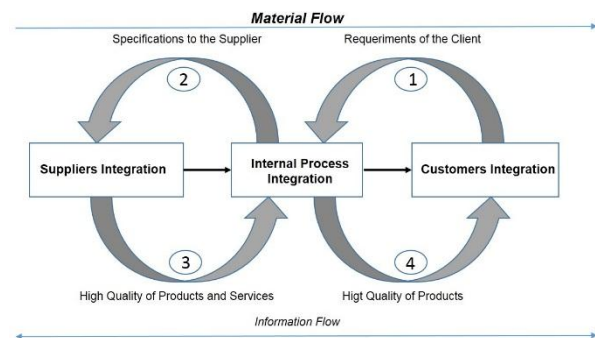


Figure 10: Model proposed of SCQM for Blueberries Companies, Source: own study base on[36]

a) Quantitative Aspects

The quantitative impact focuses on the improvement of internal processes. That is, in the intra-organizational field of the companies in the sector. Specifically, the implementation of PM and HRM practices would generate this benefit. This is

produced by the reduction of losses of blueberry plants and exportable fruit in the production process.

This improvement was achieved thanks to the research carried out within the sector and comparisons with the leaders of the industry at a national and international level, as detailed in the proposed system for process standardization.

The losses of the products are classified as losses in blueberry plants and losses in fresh fruit. With the improvement of the products, a loss of 12% in the plants and a loss of 5% in the fresh fruit are avoided.

b) Qualitative Aspects

Figure 11 presents the qualitative aspects to implement with Internal Processes Integration, CRM and SRM. These practices are intra company and inter-organizational with focus on improving relationships with customers and suppliers.

Due to the difficulty of estimating the improvements in these points economically, we could recognized the rol of achieve international competitiveness by implementing SCQM allowing obtain some certifications requested by the global market, for example the GlobalGAP certification.

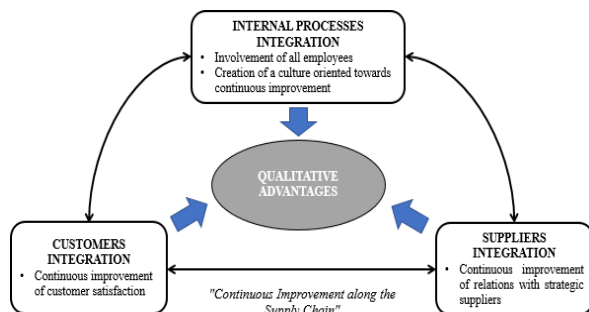


Figure 11: Qualitative Advantages of the SCQM developed, Source: own study based on[61]

5. Conclusions

This research yielded to the following results: The four practices that developed the theoretical foundation for the SCQM in the blueberry producing sector in the province of Cañete were Supplier Relationship Management, Process Management, Human Resource Management, and Customer Relationship Management are proved to be applicable in a remote area such as Cañete, Peru. These systems, if correctly implemented, would generate a series of benefits that helped to increase the business competitiveness of the mentioned

sector. These benefits were analyzed quantitatively and qualitatively. The quantitative benefits were measured by reducing the total cost while enhancing the production processes efficiency.

On the other hand, the qualitative benefits showed an improvement in the companies integration with their peers throughout the supply chain, as well as the organizational and cultural advantages. In the case of the SCQM, three essential areas were enhanced: supplier integration, internal process integration, and customer integration.

6. Future Research

Our study shows a positive impact on the increase of the competitiveness of the companies of the sector studied, showed in the Figure 12. However, the present research was limited to only the first level of the supply chain (suppliers and customers).

Therefore, for future research, it is recommended to increase the scope and take it to the total supply chain. This would increase the benefits, such as profitability and sustainability of the companies involved in the supply chain of berries.

More important in food supply chain could be the quality and traceability of fresh products. The quality of the product deteriorates continuously upon harvesting, so in this case, many considerations need to discuss in SCQM for blueberries [9].

Then, the applications of the model present in Peru should be developed for a total increase in the competitiveness of the blueberry industry in Peru or in emerging countries and thus have an impact on economic growth.

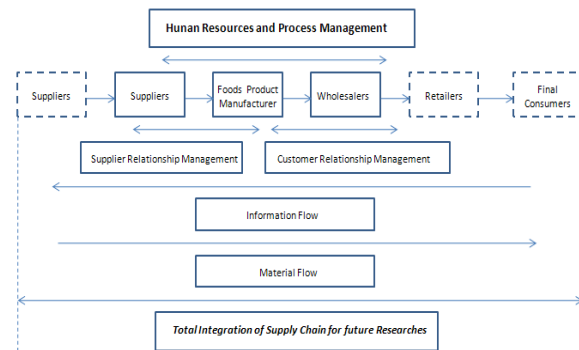


Figure 12: Outcome and Recommendations for future research, Source: own study based on[9]

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