Supply Chain Management Performance Of Bandungan Chrysanthemum

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ABSTRACT

Chrysanthemums are included in a group of flowers with relatively high economic value. The demand for chrysanthemums increases from year to year so that special concern in chrysanthemums is required in order to maintain their quality and availability. Bandungan, as one of the centers of chrysanthemum production in Indonesia has some problems in functioning as part of the chrysanthemum supply chain, such as, 1) difference in selling price based on time of day, 2) difference in selling price based on days of importance, and 3) long supply chain. The research aims to measure the performance of chrysanthemum supply chain management in Bandungan by using the SCOR analysis with five performance attributes, namely, 1) supply chain reliability, 2) supply chain responsiveness, 3) supply chain agility, 4) supply chain cost, and 5) supply chain asset management. The research was conducted in February 2019. The research was descriptive type with quantitative approach. The sample consisted of farmer, retailer, florist and consumer which numbered 30 respondents. The result shows that the perfomance in relation with supply chain reliability, supply chain responsiveness, and supply chain agility is satisfactory in category (with scores ranged from 31 to 40), while the performance in relation with supply chain cost and supply chain asset management is moderate in category (with scores within the 21-30 range). The performance of chrysanthemum supply chain management in Bandungan would be better if all the actors in the supply chain take special notice of any performance done. This result could be a reference in the making of strategies for development and improvement in the chrysanthemum business in Bandungan.

Keywords: chrysanthemum, performance, supply chain management

INTRODUCTION

Chrysanthemums are potential among cut-flower commodities to cultivate with high market demand. According to the Indonesian Central Bureau of Statistics (otherwise known as *Badan* *Pusat Statistik* or BPS, for short) in 2017, the chrysanthemum as cut flower ranks highest based on harvest area and production in Indonesia. Its harvest area is 11,635,498 m² and it produces 480,685,420 stalks of the cut flower.

Lately, the chrysanthemum plant has become one of the ornamental plants with a high economic value, and the flower is extremely popular in society. The demand for chrysanthemums as cut-flower has been increasing from year to year (Pratomo & Andri, 2013). The central production areas for decorative plants in Indonesia in 2017 were East Java, West Java, Banten, Central Java, North Sumatera, and Bali. Three of them, East Java, Central Java, and West Java contributed greatly to the production of chrysanthemums in Indonesia with contribution percentages were up to 32 percent, 31 percent, and 29 percent respectively (Qomariah, 2018).

In one of the center of decorative-plant production areas in Indonesia, Central Java, or, more precisely, in Semarang Regency, the chrysanthemum production areas are situated in Sumowono, Ambarawa, and Bandungan. According to the branch office of BPS in the Semarang Regency, Sumowono, with a harvest area of 270 m^2, produces 17,280 stalks, Ambarawa, with harvest area of 5.1 m^2, producing 346,500 stalks, and Bandungan, with harvest area of 1,608.1 m^2, producing 123,515 stalks.

The quality and availability of chrysanthemums should be maintained in order fulfill consumers' demand. The maintenance could be done by analyzing the supply chain of the chrysanthemum.

The supply chain is not only about the company and supplier but also the actors who involved in transportation activity, warehousing, retailer and consumers itself Azmiyati, S., & Hidayat, S. (2016). The implementation of supply chain management concept on a horticultural commodity has not yet frequently discussed since it is influenced by the condition and quality of the attributes possessed by the horticultural product concerned. Horticultural supply chain management represents the whole production management process of cultivating, distributing, and marketing activities until the demanded product reaches the customer concerned.

The research of Senendar, S et al., (2019) was also discuss about the horticultural commodity supply chain, it was melinjo. They used a transportation model using scientific management application to determine the optimal melinjo chip distribution in minimum cost. The result of that study illustrated that the cost of melinjo chips marketing can be minimzied, so the producers should allocate on to markets that mention in their transhipment model.

As for supply chain management, according to Heizer and Render (2011), it is the integration among the activities of material procurement and service, the process of transforming the materials into half-finished goods and final

products, and their delivery to the end consumers. The success of a supply chain is closely related to its management. The real measure of its success could be seen from how effective the activity in organizing the whole supply chain conducted in order to produce high value for the end consumers (Minarsih, 2012).

The factors influencing supply chain management performance of chrysanthemums (cut flowers) are consumers' demand and the buying price that they offer. Measuring the supply chain management performance is an important thing to do to see how far the implemented management performance attains effectiveness and efficiency. The performance is measured to reveal any weakness in the management and provide input to the actors of the supply chain to help them make adjustments in order that the expected effectiveness and efficiency could be attained (Deperiky, 2018).

One of the analyzing tools utilized to measure performance in a supply chain is called the Supply Chain Operation Reference (SCOR). The process of employing it consists of 1) modelling, which is a process that consists of five key processes referred to as *plan*, *source*, *make*, *deliver*, and *return* and, as an addition, *enable* (to refer to action) and 2) measuring supply chain performance through performance attributes covering supply chain reliability, responsiveness, agility, cost and asset management. Performance, according to SCOR, consists of two elements, namely, the performance itself and matrix attributes. The performance attribute is the grouping of matrixes utilized to determine the strategy, while the matrix attribute is a measurement of standard performance providing the basis of how the performance of processes in a supply chain is evaluated.

The measurement of supply chain performance by using the SCOR analyzing tool was conducted by Maulidiya et al. (2014) at PT Arthawenasakti Gemilang Malang. As a result of the research, the number 7.48 was obtained through the OMAX method, which means that, on the whole, the supply chain performance at PT Arthawenasakti Gemilang Malang does not yet come up to expectations, although it already approaches the target. Maulidiya et al., (2014) suggested that the deviation from the demand, the amount of planned production and the effectiveness of the periodical machine checking time should be fixed.

Wahyuniardi et al., (2018) also conducted a measurement of supply chain performance by using the SCOR approach at a company, namely, PT Brodo Ganesha. The result of the research shows that the lowest performance score was 11.00 which was gained by

the agility attribute and the highest one (19.74) was for the reliability attribute. It indicates that the performance value obtained for PT Brodo Ganesha was 59.21, which could be considered as being on the average for a company supply chain.

The focus of this research is to measure the value of each performance attributes supply chain consisted of supply chain reliability, responsiveness, agility, cost and asset management involving all actors such as farmer, retailer, florist and consumer. From those five performance attributes, we can see whether the performance of Bandungan chrysanthemum supply chain is satisfactory or not. In addition, the novelty of this research also lies in supply chain observations which are not only in Bandungan but also outside it, because the flower is sold outside this area as well.

Researcher found several problems related to the chrysanthemum flower is produced for commerce in Bandungan, such as, 1) the difference in selling price based on time of day, 2) the difference in selling price based on days of importance, and 3) the chrysanthemum supply chain which was categorized as long, involving farmers, retailers, florists, and, finally, consumers. Thus, the research about performance of Bandungan chrysantemum supply chain management is essential to be done.

METHODS

Descriptive approach was used in this study. The objective of descriptive research is to provide a detail and accurate description by using reliable data in the form of numbers and words to explain a series of stages or steps and a cause-and-effect mechanism (Neuman, 2013). And then, quantitative method was employed. Survey was conducted to obtain general description about research project. (Djalal & Lasabuda, 2012). The reason for choosing Bandungan as the research site is that the area is one of the biggest centers of chrysanthemum production in Indonesia. The respondents in the research were farmers, retailers, florists, and consumers. Triangulation technique consisting of observation, interviews, and field-notes was exerted to elicit the data.

This research was conducted in 6th February 2019. The sample of this research consisted of farmers, retailers, florists, and consumers of the chrysanthemums. The form of chrysanthemums product in this study was limited to cut flower. Purposive sampling technique was employed by considering certain criteria such as: 1) the farmers' domicile was Bandungan, 2) the retailers were those supplying the chrysanthemums from the farmers in Bandungan, 3) the florists were

those supplying the chrysanthemums from the retailers or directly from the farmers in Bandungan and sell them to consumers, and 4) the consumers were those situated in Yogyakarta. The number of farmers, retailers, florists and consumers taken as sample were 10, 5, 5, and 10 respectively. Therefore, the total sample in the research was 30 respondents.

Method of Data Analysis

The measurement of chrysanthemum supply chain management performance in Bandungan was aimed to analyze and understand how effective the performance in that supply chain management is, so that when the result of the performance revealed, it could be concluded whether the supply chain management performance in Bandungan is effective or not by considering the standard assessment.

For measurements of supply chain performance, each attribute of supply chain performance was transformed into a question form that is later called matrix of Level 1. It was being the indicator that

would function in the assessment of the supply chain performance attribute. Each indicator has weight and value that would be filled in accordance with what respondents perceived. The assessment of indicators was only done by farmers, retailers, and florists. Meanwhile, consumers were seen from how often they buy the chrysanthemum and their reasons for buying it. After indicators assessment, the collected data was analyzed to result the final value of chrysanthemum supply chain management performance.. The weight was obtained from the number of each attribute indicator divided by the total number of attribute that have been rated by each actor in this supply chain. The researcher's determination of the range of value and weight of chrysanthemum supply chain management in Bandungan was referred to the reference from Sugiyono (2014), which is shown in Table 1.

Furthermore, the total value and the average value were calculated. The average value would be the final

Table 1. Range of Weight And Initial Value of Chrysanthemum Flower Supply Chain Management in Bandungan

Rate	Information	Early value	Information
0-0,1	Very little satisfied	0-10	Very little satisfied
0,11-0,20	Not satisfied	11-20	Not satisfied
0,21-0,30	Moderately	21-30	Moderately
0,31-0,40	Satisfied	31-40	Satisfied
0,41-0,50	Very satisfied	41-50	Very satisfied

Source: (Sugiyono, 2014)

value for chrysanthemum supply chain management performance, which was referred to the criteria from Sugiyono (2014).

After obtaining the results of each item, the results were summed and averaged. The average value will be the performance value of chrysanthemum supply chain management performance in Bandungan that could be seen in Table 2.

As for the indicators of each performance of Bandungan chrysanthemum supply chain management attribute, they were presented as: supply chain reliability, supply chain responsiveness, supply chain agility, supply chain cost and supply chain asset management having some performance indicators.

Table 2. Assessment of chrysanthemum flower's supply chain management performance in Bandungan

Performance value	Information
0-10	Very little satisfied
11-20	Not satisfied
21-30	Moderately
31-40	Satisfied
41-50	Very satisfied

Source: (Sugiyono, 2014)

RESULTS AND DISCUSSION

Supply Chain Reliability

The result of the supply chain reliability performance calculation is shown in Table 3. The value of chrysanthemum supply chain reliability performance in Bandungan was 34.86 and it meets the criterion for being satisfactory. The lowest value was the matrix value of documentation as indicator of reliability gaining score of 2.53. It is in line with the observation in the field that only several respondents documented their chrysanthemum selling and buying activity. The majority of the documentation was only done by the florists. The highest value (9.86) was the matrix value of delivery based on other suppliers' demand as indicator of reliability. It is in line with the observation in the field that farmers, retailers, and florists always tried to sell or sent chrysanthemums based on other suppliers' demand. The result of this supply chain reliability was same as the result of Depariky's research (2018) that showed the lowest value was documentation because the farmers thought that it is not important, consequently they gave a low score. On the other hand, the highest value of this research was delivery based on other supplier's demand because the farmers were able to deliver the mangosteen on time and with the best quality as demanded by consumer. The total value of chrysanthemum supply chain reliability performance in Bandungan could be seen in Table 3.

Tabel 3. Chrysanthemum Supply Chain Reliability Performance in Bandungan

Reliablity Performance Indicator	Weight	Initial value	Matrix value	Matrix value of level 1
Delivering product of good quality	0.25	38.8	9.70	Perfect order fulfillment
Delivery in line with other suppliers' demand	0.25	39.43	9.86	
Delivering product of the right type	0.23	36.83	8.47	
Acceptance of returned product if it is damaged	0.16	26.87	4.30	34.86 (Satisfied)
Documentation	0.12	21.1	2.53	

Source: (Primary data, 2019

Supply Chain Responsiveness

The result of the supply chain responsiveness performance calculation is shown in Table 4. It can be seen that the value of supply chain responsiveness performance in Bandungan was considered as satisfactory with the score of 39.37. The lowest value was the matrix value of the speed of product provision in certain condition as supply chain responsiveness indicator with the score of 7.77. It is in line with the observation in the field that when demand suddenly increases, retailers have to look for and find chrysanthemums according to the florist's demand in a short time. The speed of product provision in certain condition could be fulfilled when all the actors in chrysanthemum supply chain management work hard.

The highest value was achieved by the matrix value of easy access in looking for chrysanthemums as supply chain responsiveness indicator gaining score of 12.53. It is in line with the condition of the research location which was in the centre or the biggest area of chrysanthemum production in Indonesia. This fact is supported by the research of Maghfira (2017) stating that Bandungan has the largest chrysanthemum harvest area that it made chrysanthemum become easy to find. From the farmers' perspective. It is easy to sell the flower because they cultivate such flowers themselves. Therefore, they do not have any significant problem to find chrysanthemums. From the retailers' perspective, there was no difficulty because several farmers have already been their regular suppliers. Therefore, when the retailers need chrysanthemums of certain types and numbers in a short time, it would be easy to obtain the flowers directly from the farmers. In addition, several retailers also already had stalls/shops in the Bandungan flower market which directly eased them in looking for the chrysanthemums on demand. From the florists' perspective, it would be easy

to find or look for the flower because they already have regular retailers to supply and have a good communication with them.

Supply Chain Agility

The result of supply chain agility performance calculation is shown in Table 5. In the table, it can be seen that the value of supply chain agility performance in Bandungan was 31.71 or satisfactory. The lowest score was 3.95, obtained by the matrix value of the ability to make an innovative product strategy as supply chain agility indicator.

Only florist planned innovative selling strategies by using social media and sell chrysanthemum in variative form, such as bunches, bouquets, vases, and wreaths. Andri (2013) also stated that farmers could not be able to implement advanced and suitable innovation because of the low motivation of farmer to adopt new technology. Consequently, no product added value was applied. Andri's research was matched to the lowest value of this supply chain agility's indicator.

The highest value was 8.32, gained by the matrix value of the ability to

Table 4. Chrysanthemum Supply Chain Responsiveness Performance in Bandungan

Responsiveness Performance Indicator	Weight	Initial value	Matrix value	Matrix value of level 1
The speed of product delivery	0.24	39.93	9.58	The speed in responding 39.37 (Satisfied)
The speed of chrysanthemum flower procurement	0.24	39.5	9.48	
Easy access in looking for chrysanthemums	0.29	43.2	12.53	
The speed of product provision in certain condition	0.23	33.8	7.77	

Source: (Primary data, 2019)

Table 5. Chrysanthemum Supply Chain Agility Performance in Bandungan

Performance indicator of agility	Weight	Initial value	Matrix value	Matrix value of level 1
The ability to fulfill an order made at an unexpected time	0.23	36.17	8.32	Dexterity of supply chain 31.71 (Satisfactory)
The ability to fulfill an order when a problem accurs	0.22	33.1	7.28	
The ability to calculate market needs with the stock	0.23	35.1	8.07	
The ability to plan a selling strategy	0.16	25.53	4.08	
The ability to make an inovative product strategy	0.15	26.33	3.95	

Source: (Primary data, 2019)

fulfill an order made at an unexpected time as supply chain agility indicator. It shows that every supply chain actor could fulfill an order from another actor in the supply chain though the order was made at an unexpected time because of an unpredictable event, for example, the florists were able to fulfill the consumers' orders when suddenly there are orders for flower wreaths or there was an increase of demand related to certain events like weddings, graduations, and others. The retailers could also fulfill the order from the florists when the increase of demand could not be predicted by looking for the chrysanthemums in several farmers' stock. The farmer as the first actor in a supply chain would provide the chrysanthemums based on the retailer's demand. When one farmer is not able to fulfill the order, the retailer would attempt to find the flower from another farmer.

Supply Chain Cost

Cost is an attribute whose focus is internal activity. The result of supply chain cost performance calculation is shown in Table 6. In the table, it could be seen that the value of chrysanthemum supply chain cost performance in Bandungan was 27.48 (moderate).

The matrix value of budgetting the expenditure cost for chrysanthemum delivery had the lowest value of 1.65. It is in line with the observation in the field that the farmers do not have to do any payment for cost of chrysanthemum delivery because they sell the chrysanthemums directly to buyers so they don't pay delivery cost so they gave lowest score for this indicator. The same thing happened to the retailers because delivery cost is borne by florist. The supply chain actors bearing the highest delivery cost are the florists since they would pay the cost of delivery from the retailers to their shops and from their

Table 6. Chrysanthemum Supply Chain Cost Performance in Bandungan

Cost Performance Indicator	Weight	Initial value	Matrix value	Matrix value of level 1
Budgetting of expenditure cost for treatment	0.19	27.63	5.25	
Budgetting of expenditure cost for harvesting/ purchasing	0.24	35.57	8.54	Supply chain cost
Budgetting of expenditure cost for packaging	0.17	25.53	4.34	
Budgetting of expenditure cost for delivery	0.09	18.33	1.65	27.48
Budgetting of expenditure cost for damage	0.17	25.97	4.41	
Budgetting of expenditure cost for technical problems	0,14	23,47	3,29	(Moderately)

Source: Primary data (2019)

Table 7. Chrysanthemum Supply Chain Asset Management Performance in Bandungan

Asset Management Performance Indicator	Weight	Initial value	Matrix value	Matrix value of level 1
The ability to achieve determined selling targets	0.24	35.33	8.48	Supply chain cost
Getting cash income	0.27	38.27	10.33	
Doing payment receivables	0.17	21.37	3.63	
Doing calculation of depreciation tool cost	0.13	17.1	2.22	29.20
Doing calculation of depreciation place cost	0.04	12.33	0.49	
Recording of expenditure in doing business	0.15	26.93	4.04	(Average)

Source: Primary data (2019)

shops to the end consumers ordering within the vicinity of the location.

The matrix value of budgeting the expenditure cost for chrysanthemum harvesting/ purchasing had the highest value of 8.54 as supply chain cost performance indicator. All suppliers in the supply chain, whether they are farmers, retailers, or florists, budget their expenditure cost related to chrysanthemum harvesting and purchasing.

Supply Chain Asset Management

Asset management conveys the ability to utilize the asset efficiently. The result of supply chain asset management performance calculation is shown in Table 7. It could be seen that the value of supply chain asset management in Bandungan was 29.20 considered as moderate (or average).

The lowest value was 0.49, occurred in the matrix value of calculating the place depreciation cost as supply chain

asset management indicator. It is in line with the observation in the field that the farmers do not calculate the place depreciation cost because they sell the chrysanthemum in the form of cut flower directly in the flower market in Bandungan without renting the place. It made the farmers give 0 score to the place depreciation cost indicator. The supply chain actor that calculates place depreciation cost is only the florists because they rent the place for selling chrysanthemum. So they think that place depreciation cost calculation becomes an important issue because it would affect their selling price and their income.

The highest value, namely, 10.33, is the matrix value of getting cash income as supply chain asset management performance indicator.

The suppliers in Bandungan chrysanthemum supply chain in the average get their income in cash although there are several of them who also agree to payment on credit. The cash income

really helps the farmers as actors in the Bandungan chrysanthemum supplier chain because when they are paid on credit, it would affect their business and the fulfillment of their daily living cost because the offered price is not high.

CONCLUSION

From five performances attributes of the SCOR analysis, three indicators are satisfactory (or good) in category, which are supply chain reliability, supply chain responsiveness, and supply chain agility. The two other attributes, namely, supply chain cost and supply chain asset management are moderate (or average) in category. In order to improve the performance of Bandungan chrysantemum supply chain management, there are several things that need to be improved, such as: documenting each transaction that actors done so that it becomes evidence in supply chain activities and for their business. Furthermore, farmers and retailers should be able to provide products faster and more innovative so that it can make consumers are more interested, increase sales and receive more profits than before. This innovative strategy can be done by online sell and chrysantemum's various forms. Farmers must also record the expenditure of their business related to the costs of what it used in the business so as to be able to manage expenses and save costs. The chrysanthemum supply chain management performance in Bandungan would be better if each actor in the chain take special notice of each performance attribute being done in the distribution of chrysanthemums to the end consumer.

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