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Editorial

There is a likely link between the number of studies and the economic development in a country. How big is the number of logistics-and-supply-chain studies in Indonesia? In the world, the topic area has been researched rigorously for about twenty years. During this period, the level of analysis has evolved from a dyadic level of supplier–manufacturer, to a chain of supplier-manufacturer-distributor, then to a network of multi physical-and-virtual parties across geographical boundaries supported by the information technology and systems. The study of logistic and supply chain management is actually a meta-discipline in that almost every business function affects and is affected by the flow of products, services, information, and finances throughout a large number of interconnected firms. This nature calls a collaborative research involving researchers from various disciplines.

The number of logistic and supply chain studies in the Indonesian context is still small. This could be linked to the actual development level of logistic and supply chain in Indonesia. The JLSCM is aimed to foster interdisciplinary researchers and practitioners to study and disseminate their results to improve the logistic and supply chain development in this country.

This issue presents five selected papers. Three papers address the supply chain for perishable products. Poppy Arsil, Ropiudin, Agus Margiwiyatno, and Tetsuya Araki determined the shortest route and minimum spanning tree for the strawberry distribution from the fruit farm to the market. The second paper, Eureke Charmela, Joniarto Parung, dan Evy Herowati developed and then tested a model based on Multiple Attribute Group Decision Making to select the best supplier. Furthermore, Ika Sartika developed a model of a fish supply chain using a dynamic simulation modeling. Moreover, Lisa Mardiono and her collagues addressed the importance of logistic performance in the overall firm's performance, and then proposed a new performance measurement model by combining Oregon Productivity Matrix and Logistic Performance. The last but not the least, the fifth paper by Novita Utari Atmoko, Dina Natalia Prayogo, and Jerry Agus Arlianto proposed a model of supplier selection with a case study in a prawn processing industry.

We hope the readers, whether from academia or industry, find the articles valuable and encouraging for further inquiry into the respective topics in the Indonesian context. We, the editors, extend our gratitude to the reviewers and publication team for this issue.

Joniarto Parung
Editor-in-chief

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The shortest route for strawberry distribution from Serang Village, Karangreja District, Purbalingga Regency

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The Shortest Route For Strawberry Distribution From Serang Village, Karangreja District, Purbalingga Regency

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Abstract

The selected route of strawberry distribution by traders based on their habit and custom is not a good standard procedure for strawberry distribution due to its perishable characteristics. The shortest route is an appropriate way to shorten transportation time as one way to keep the strawberry quality especially its freshness. The determination of the shortest route and minimum spanning tree for strawberry distribution was applied in strawberry distribution from Serang village, Purbalingga Regency. The shortest route from central strawberry production to some marketing areas such as Purwokerto, Purbalingga (Bojong district), Cilacap , Pekalongan and Tegal had been done. Besides the shortest route, minimizing spanning tree had been determined for two bowl areas of marketing which are Purwokerto, Purbalingga, Cilacap area and another Tegal and Pekalongan marketing area. The shortest distribution route towards Purbalingga (Bojong) marketing area is 19.8 km, Purwokerto 27.7 km and Cilacap 81.1 km. While the shortest route to Pekalongan marketing area is 89.5 km and Tegal 78.4 km. The minimizing spanning tree of network marketing area to Purbalingga, Purwokerto, and Cilacap area is 169.8 km and Pekalongan and Tegal network marketing area is 169.2 km.

Keywords : the shortest route, distribution system, strawberry.

1. Introduction

Serang village in Karangreja district is well known as the centre of strawberry production in Purbalingga regency, which lies 800-1200 meter above sea level. The total area of strawberry farming in Serang village was 43.6 ha in 2007 (primary data). It is supported by good climate for strawberry cultivation, such as air temperature (between 16-30°C) and soil type is andosol with crumb structure until friable and sandy loam texture [1].

Strawberry is a key horticultural farming in that area due to high economic value and market demand. A kilo of A grade strawberry in trader level cost Rp 60,000. On the daily base, a trader can sell 1-2 tons of strawberry for supplying some cities such as Tegal, Purwokerto, Purbalingga, Pekalongan, Cilacap and Batam (private communication with Mr. Mughirin, big strawberry trader in Serang village). Despite its high value, strawberry has weakness as it is easily to be spoiled. Yet, trader needs to shorten the time to keep strawberry in a fresh condition in form into plastic bag. So, effective and efficient distribution system, such as the shortest route and minimum spanning tree are needed to keep the quality, beside other treatments such as cooling, modified atmosphere packaging and others. So far, literature about distribution system of strawberry from Serang village is not available. The aims of this research are; to determine the shortest route and minimum spanning tree for strawberry distribution system from trader to market. The results of this research are expected to give benefit for farmers and traders related with strawberry distribution route.

2. Literature Review

The method used for finding the shortest route between two points in an interconnected network is by investigating a selection of routes from both the starting point and the terminal point. The selection of routes is decided dynamically by extending the routes which have currently covered the least distance one by one. Once a complete through route has been found, it has to be determined that it is the shortest [2]. Mills [3] stated that a large network needs to decompose the network into parts, apply one of the shortest methods to each part separately, and then to reunite the parts.

2.1 The Shortest Route Analysis

Distribution is related to commodity delivery from the source to the destination. The shortest route analysis is applied to look for the shortest route from the source to the destination by giving minimum distance of distribution. The Djikstra algorithm is used to determine the shortest route which consists of 3 steps:

Step 1: Source node value as d(s)=0, while other d(s,j). The d(s,j) is the upper boundary of shortest route from source node to destination node. If direct bowl (s,j) is not available so d(s,j) = ~. Please select the d(s,j) minimum and mark at that node.

Step 2: For all unmarked d(s,j) , find d(s,j)=min{(d(s,j1)+d(j1,j), d(s,j). While d(s,j)= ~ for all unmarked node j, so algorithm finish because no route from s1 node to j. If not, mark j node that having the least d(s1,j).

Step 3: Please redo step 1 to 3 until the destination node is marked [4].

2.2 Minimizing Spanning Tree Analysis

Minimizing spanning tree analysis is a various shortest route problem. Minimizing spanning tree analysis is determined to minimize connecting node of the network. Bronson [5] explains that the steps of minimizing spanning tree are:

1. Select a node and connect it into another closest node.
2. Connect another node to the closest distance to the node that had been connected in step 1. Do it until all nodes are connected.

3. Methods

3.1 Place and Time

Research had been done in Serang village, Karangreja district, Purbalingga Regency and the route of strawberry distribution network. This research had been done in January until April 2008.

3.2 Material and Method

Material required in this research consisted of primary and secondary data. Primary data was strawberry distribution network and the distance measurement of strawberry route. Secondary data was taken from BPS or related department.

3.3 Research Procedure

1. Figure out strawberry distribution route from Serang village using descriptive analysis.
2. Measurement of the distance between two nodes using tachnometer.
3. Data analysis for the shortest route
4. Data analysis for minimizing spanning tree.

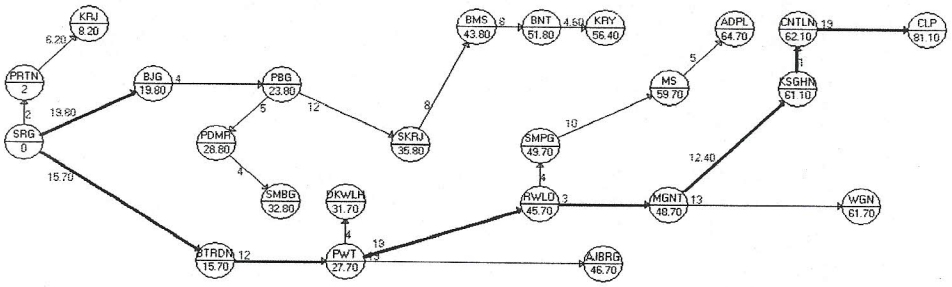
3.4 *Assumption Used in This Research*

The election route of distribution based on road condition which can be passed by vehicle (motorcycle and car) with road width is approximately ± 3 m and paved.

4. Result

4.1 *The Shortest Route of Strawberry Distribution*

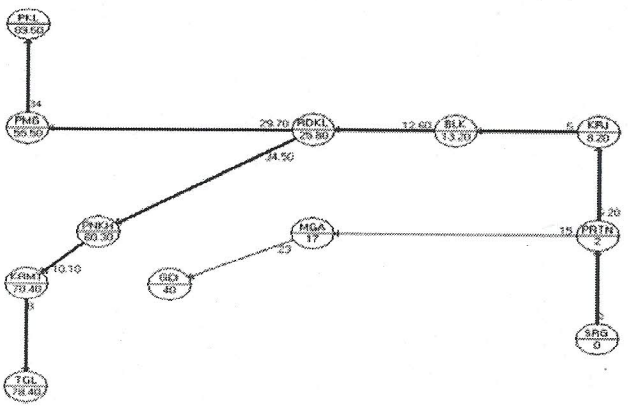
The Strawberry from Serang village is distributed to some marketing areas such as Purbalingga, Pekalongan, Purwokerto, Cilacap, and Tegal. The route of marketing to Purbalingga, Purwokerto, and Cilacap completed with the distance to each village/city can be seen at Figure 1. The marketing area of Purbalingga is located in Bojong district. Based on the shortest route analysis, the shortest route from Serang toward Bojong sub district is 19.8 km. The distribution route of strawberry from Serang village toward marketing Purwokerto is 27.7 km with route Serang-Baturaden-Purwokerto. While distribution route to Cilacap is 81.1 km with route Serang-Baturaden-Purwokerto-Rawalo-Menganti-Kesugihan-Cantelan-Cilacap. The shortest route to Purbalingga, Purwokerto and Cilacap can be shown in Figure 1.



= the shortest route

Figure 1. The distribution network and the shortest distribution route to Purbalingga, Purwokerto, and Cilacap

Based on the shortest route analysis, it shows that the distribution route to Pekalongan is 89.5 km with route Serang-Pratin-Karangreja-Belik-Randudongkal-Pemalang-Pekalongan. While the shortest route to Tegal is 78.4 km with route Serang-Pratin-Karangreja-Belik-Randudongkal-Pangkah-Kramat-Tegal. The route of marketing to Pekalongan and Tegal can be seen in Figure 2.



= the shortest route

Figure 2. The distribution network and the shortest route to Pekalongan and Tegal

Description:

ADPL	=	Adipala	MS	=	Maos
AJBRG	=	Ajibarang	PBG	=	Purbalingga
BJG	=	Bojong	PDMR	=	Padamara
BLK	=	Belik	PKL	=	Pekalongan
BNT	=	Buntu	PMG	=	Pemalang
BMS	=	Banyumas	PNKH	=	Pangkah
BTRDN	=	Baturaden	PRTN	=	Pratin
CLP	=	Cilacap	PWT	=	Purwokerto
CNTLN	=	Cantelan	RDKL	=	Randudongkal
DKWLH	=	Dukuh waluh	RWLO	=	Rawalo
GCI	=	Guci	SKRJ	=	Sokaraja
KRJ	=	Karangreja	SMBG	=	Sumbang
KRMT	=	Kramat	SMPG	=	Sampang
KSGHN	=	Kesugihan	SRG	=	Serang
MGA	=	Moga	TGL	=	Tegal
MGNT	=	Menganti	WGN	=	Wangon

The complete shortest route analysis can been seen in Table 1 to 5.

Table 1. The solution of shortest route for Serang-Bojong (Purbalingga Regency)

No	From	To	Distance (km)	Cumulative Distance (km)
1	SRG	BJG	19,80	19,80
From SRG To BJG Distance = 19,80 km				

Table 2. The solution of shortest route for Serang-Purwokerto

No	From	To	Distance (km)	Cumulative Distance (km)
1	SRG	BTRDN	15,70	15,70
2	BTRDN	PWT	12	27,70
From SRG To PWT Distance = 27,70 km				

Table 3. The solution of shortest route for Serang-Cilacap

No	From	To	Distance (km)	Cumulative Distance (km)
1	SRG	BTRDN	15,70	15,70
2	BTRDN	PWT	12	27,70
3	PWT	RWLO	18	45,70
4	RWLO	MGNT	3	48,70
5	MGNT	KSGHN	12,40	61,10
6	KSGHN	CNTLN	1	62,10
7	CNTLN	CLP	19	81,10
From SRG To CLP Distance = 81,10 km				

Table 4. The solution of shortest route for Serang-Pekalongan

No	From	To	Distance (km)	Cumulative Distance (km)
1	SRG	PRTN	2	2
2	PRTN	KRJ	6,20	8,20
3	KRJ	BLK	5	13,20
4	BLK	RDKL	12,60	25,80
5	RDKL	PMG	29,70	55,50
6	PMG	PKL	34	89,50
From SRG To PKL Distance = 89,50 km				

Table 5. The solution of shortest route for Serang-Tegal

No	From	To	Distance (km)	Cumulative Distance (km)
1	SRG	PRTN	2	2
2	PRTN	KRJ	6,20	8,20
3	KRJ	BLK	5	13,20
4	BLK	RDKL	12,60	25,80
5	RDKL	PNKH	34,50	60,30
6	PNKH	KRMT	10,10	70,40
7	KRMT	TGL	8	78,40
	From SRG To TGL Distance = 78,40 km			

4.2 The Minimizing Spanning Tree of Strawberry Distribution from Serang Village

The minimum spanning tree analysis had been done and it explained that a minimum total length of strawberry distribution network to Purbalingga (Bojong), Purwokerto, and Cilacap is 169.8 km. While total length of minimum spanning tree of marketing area to Pekalongan and Tegal is 169.2 km. The minimum spanning tree of Purwokerto, Purbalingga and Cilacap areas can be seen in Figure 3 while to Pekalongan and Tegal in Figure 4.

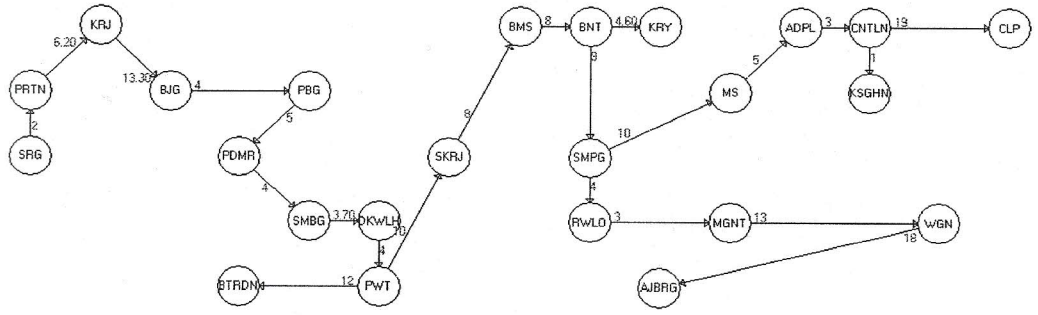


Figure 3. The total minimum bow of Purbalingga, Purwokerto, and Cilacap marketing areas

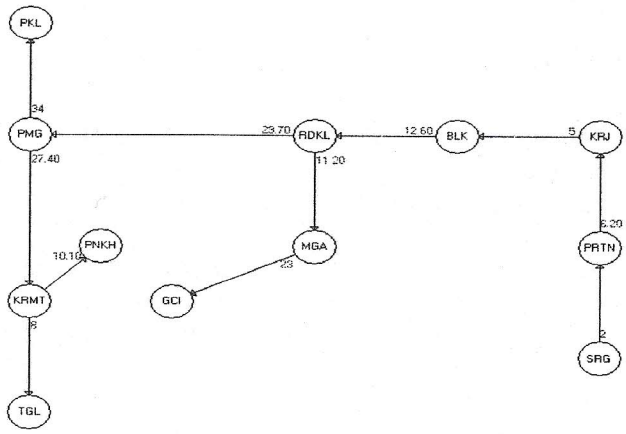


Figure 4. The total minimum bowl of Pekalongan and Tegal marketing areas

The result of minimizing spanning tree analysis can be seen in Table 6 to 7.

Table 6. The solution of minimum spanning tree for Serang-Purwokerto-Cilacap

No	From Node	Connect To	Distance (km)
1	PWT	BTRDN	12
2	KRJ	BJG	13,3

Table 6. The solution of minimum spanning tree for Serang-Purwokerto-Cilacap (continue)

No	From Node	Connect To	Distance (km)
3	BJG	PBG	4
4	PBG	PDMR	5
5	PDMR	SMBG	4
6	SMBG	DKWLH	3,7
7	DKWLH	PWT	4
8	PWT	SKRJ	10
9	SKRJ	BMS	8
10	SMPG	RWLO	4
11	WGN	AJBRG	18
12	BMS	BNT	8
13	BNT	SMPG	9
14	RWLO	MGNT	3
15	BNT	KRY	4,6
16	SMPG	MS	10
17	MGNT	WGN	13
18	MS	ADPL	5
19	CNTLN	KSGHN	1
20	ADPL	CNTLN	3
21	CNTLN	CLP	19
22	SRG	PRTN	2
23	PRTN	KRJ	6,2
Total Minimum Connected Distance =169,80 km			

Table 7. The solution of minimum spanning tree for Serang-Pekalongan-Tegal

No	From Node	Connect To	Distance (km)
1	SRG	PRTN	2
2	PRTN	KRJ	6.2
3	RDKL	MGA	11.2
4	KRJ	BLK	5
5	BLK	RDKL	12.6
6	RDKL	PMG	29.7
7	PMG	PKL	34
8	KRMT	PNKH	10.1
9	MGA	GCI	23
10	PMG	KRMT	27.4
11	KRMT	TGL	8
Total Minimum Connected Distance =169,20 km			

Minimizing spanning tree is the total minimum of bow length that connects to every node in the network. If traders want to build storehouse or temporary transit, they can build it in Purwokerto for Purwokerto, Cilacap and Purbalingga marketing areas. It is the strategic point, beside the shortest line to Cilacap. The strategic point for storehouse for Pekalongan and Tegal marketing area is Randudongkal, because it is the shortest line to Pekalongan and Tegal.

5. Conclusion

1. The shortest distribution route to Purbalingga (Bojong) is19,8 km, Purwokerto 27,7 km, Cilacap 81,1 km, Pekalongan 89,5 km, and Tegal 78,4 km.
2. The minimum spanning tree to Purbalingga, Purwokerto, and Cilacap marketing area is 169.8 km and center in Purwokerto. While minimum spanning tree to Pekalongan and Tegal marketing area is 169.2 km, and centre in Randudongkal.

Further research for appropriate transportation type and the cost of strawberry distribution are necessary.

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