

A study of developing Colombo Port as a major multi country consolidation(MCC) hub in South East Asia region with the help of improving the effectiveness of the MCC activities

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Abstract— Sri Lanka is involving in handling transshipment and Multi Country Consolidation (MCC) practices at Colombo port during last two decades of time. This research was carried out base on the question of how could be Sri Lanka improve effectiveness of MCC activities while taking the advantage of geographical location of Colombo Port of Sri Lanka. The study was carried out with objectives of to find factors affecting to the MCC operations and to find out geographical advantage for the MCC operations. The Questionnaire was developed according to a theoretical framework which was identified after having several interviews with industry professionals and also according to a thorough review of literature. The complete factor analysis and a network analysis were carried out from the data which were collected through the questionnaires and the ship distance calculators. Through the Factor analysis, six factors were identified as respectively Costs Related to Consolidation, Effectiveness of Ship Operation, and Value added Services, Freight & other related costs to Freight Forwarders & Shipping Lines, Effectiveness of the Custom Operation, Effectiveness of Indirect operations. After comparing and concerning all the above analyses, a conclusion can be made that developing Colombo Port as a major MCC hub will be cost effective and a competitive advantage that can easily gain through the geographical location and by optimizing all the above factors which came through the factor analysis.

Key Words: Multi Country Consolidation, Transshipment, Logistics Hub

I. INTRODUCTION

Singapore, Dubai and Aden are the main MCC transshipment hubs in the South East Asia region. And also everyone knows that Singapore is the most developed country in Asian region. Even though Singapore doesn't have any natural resources they have achieved this position successfully. How can they achieve a strategic position like this? There is a main reason behind this victory. The reason is that Singapore has developed their hub status more strategically by achieving that becoming the major logistics hub in the

region. When we consider about the present context, today Singapore has become the world's busiest port in terms of total shipping tonnage and considered as the world's busiest container and the busiest transshipment port. This indicates how important is the development of the hub status and the logistics capabilities towards the prosperity of a country. There for Sri Lanka is also having that strategic opportunity to develop as a hub in every aspects to develop as a nation.

East-West shipping route is the major shipping route which is transporting the largest portion of shipping tonnage all around the world. Sri Lanka is also located strategically and competitively closer to this East-West shipping route and having the potentiality to develop as the main logistics hub in the South Asia region. And also we are located in the middle of the Indian Subcontinent and in UNCTAD (2013) they figured out that the percentage change of the estimated containerized cargo in East-West Shipping route, from Asia to North America it is 7.2% and from North America to Asia it is 5.4% which are the highest changing rates. This further predicts that economies should continue to grow in coming years and there will be a higher demand in the respective industries in the future in this region.

Currently Sri Lankan Government is more concerned about developing the port sector of Sri Lanka by operating large projects like Colombo South Expansion project which increases the container handling capacity from 3.3 million TEU (in 2006) to 8.1 million TEU at the end of the project in 2015. And also Sri Lankan government expects to increase the container handling capacity to 10.5 million TEUs in 2024. Currently the first stage of the project has been completed which is well known as the Colombo International Container Terminal. So there is a high capability and a potentiality to develop Colombo as a major logistics hub in the South Asia region.

In the present context with the help of these competitive advantages Sri Lanka is involved in handling transshipment and MCC practices at Colombo port during

last two decades of time. MCC can be simply defined as the process of consolidating single or multiple Less than Container Load (LCL) transshipments to several destinations which are having different origins or vice versa. Compared to other countries like Singapore, Dubai, Salalah, Colombo port in Sri Lanka is in a primary stage of MCC activities and can be improve by using the best practices with the help of the competitive advantages. And also when we consider about the current scenario only Sri Lanka Ports Authority (SLPA) is involved in MCC operation activities and no private sector companies like D.H.L, Aitken Spence and Freight Links who were operated sometimes back. Aitken Spence was the only private company who had maintained a private bonded warehouse for MCC activities as an operator before two years back. Due to several issues Aitken Spence is also not practicing the MCC operations now. Likewise due to several political issues and high capital cost some MCC operators have shifted their operations in to several locations nearby. In Colombo port MCC operation are done at the bonded warehouses situated in Bandaranayke Quay (BQ) 1 and BQ-3 at Jaya Container Terminal (JCT). Due to not having much capacity at the SLPA premises involvement of some private companies as MCC operators would be a great opportunity to Sri Lankan logistics sector when improving Colombo as a major hub. Therefore a country like Sri Lanka which is located in a strategic location can be develop as a major MCC transshipment hub in the South Asia region by eliminating those barriers with the help of its competitive advantages and increasing the effectiveness of its activities. But before investing money in an industry which is having a huge capital and a sunk cost, some research should be done. Therefore the researcher thought that it will be very useful to conduct a research on MCC in order to investigate whether Colombo is an ideal place to develop as a Multi Country Consolidation hub in South East Asia region with the help of its geographical location.

This research is mainly focused on improving MCC practices in Colombo port as well as improving the hub status also with the help of the competitive advantage in Colombo Port's geographical location. Due to lack of literature and references several magazines, articles and newspaper publications were used to gather the information to conduct this particular research. And this literature review has discussed mainly about MCC operations, Logistics Hubs, Geographical Location of Colombo Port, Transshipments, Value added services in ports and some other important facts which are engaged in parallel to the MCC operations. As a whole there were no any article which was directly related to the matter which this particular research is going to discuss. But

some of the articles were more similar to this concept. Due to that the factors which were mentioned and asked in the questionnaire were taken as a result of those similar articles which were related to these operations. Cost factors like terminal handling charges, custom charges, documentation charges, freight charges, land transport charges etc. were taken according to the previous articles as well as some of the factors and questions were designed after having some discussions with the industry professionals. Most of the previous researches were conducted either only to find the factors which improves the hub status, to find the geographical advantages or to select a third party logistics provider for MCC operations. But in this particular research all the above aspects are going to covered. Questions regarding Geographical location advantage, distance advantage, value added services which increase the economy levels of the ports, out sourcing operations, main line and feeder line availability, convenient custom services were designed after analyzing all the literary articles. As well as some of the questions were designed due to lack of resources by the author himself after a thorough observation about the operations by taking consideration about the knowledge which was gained through several interviews which were conducted with industry professionals. Finally as a whole some research must be done to find the answers to the above research problems with the aim of completing the research successfully.

II. METHODOLOGY

This research is more a quantitative research that relies on quantitative data. For this research study, data was collected through questionnaire survey. For the purpose of collecting data the questionnaires were circulated among all the Freight Forwarders and Logistics providers who are currently engaged in MCC operations in Sri Lanka. Mainly two types of statistical analyzing methods were used for this particular research. Those were Factor Analysis and Network Analysis. Factor analysis was done to identify the factors which are affecting for the effectiveness of the MCC operations and the Network Analysis was done to prove the hub advantage of Colombo port when compared to other major hub ports in South East Asia region.

III. RESULTS

A. *Applicability of Factor Analysis*

The Kaiser – Meyer – Olkin measure of sampling adequacy represents the sample size of the data. According to the above table the value of Kaiser – Meyer – Olkin is 0.603 and this value is exceeding the recommended value of 0.6.

Table 1. KMO and Bartlett's test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.603
Bartlett's Test of Sphericity	Approx. Chi-Square	663.437
	df	253
	Sig.	.000
Cronbach's Alpha		.877

B. Bartlett's Test of Sphericity

Ho: correlation Matrix is an identity matrix

H1: correlation Matrix is not an identity matrix

According to the above table 4.08 the value of the Bartlett's test significance is 0.000 and this value is less than 0.05. That indicate correlation matrix confirming correlation are significantly different from zero. (The correlation matrix is not an identity matrix)

By mapping above results, it can be concluded that the sample data of this research is sufficient for represent the population and appropriate for the implementation of factor analysis.

Cronbach's Alpha value measures the reliability level of this particular research and according to the table 4.08 the Cronbach Alpha value is 0.877 which is greater than the recommended value of 0.70.

C. Determine Number of Factors

In order to develop a model, the data first analyzed using Principal Component Analysis to determine the number of factors or components for classification of items (Miller *et al*, 2002; Pallant, 2005) Eigenvalue rule and scree plot test were used to determine the appropriate number of components of research data.

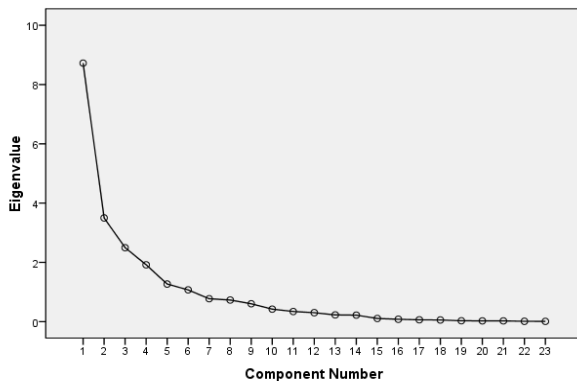


Figure 1. Scree Plot.

It can be seen a sharp turn (elbow) after 6th Eigen value Therefore it can be confirmed that 6 factors are small enough to account total variation. It further confirmed under the Extraction Sums of Squared Loadings.

The SPSS analysis has identified 23 factors within the data set. The extraction sums of squared loading part shows factors which met the criterions. The SPSS extracts all factors with eigenvalue greater than 1. According to the above table there are 6 factors with eigenvalues greater than 1. The '% of variance' column of the extraction sums of squared loadingspart tells how much of the total variability can be accounted for by each of these factors. According to the above table, factor 1 accounts for 37.924% of total variance, factor 2 accounts for 53.139% , factor 3 accounts for 63.989%, factor 4 accounts for 72.327%, factor 5 accounts for 77.841% and the last or the 6th factor accounts for 82.499% of the total variance. Altogether these six components are explaining 82.3499% variation of total variation.

Factor 1 = f (Fuel & Maintenance cost for equipment & Machineries, Labor Cost, Documentation Charges, Bonded Warehouse Charges & Maintenance Cost, Utility Cost, Land Transport Charges, Stuffing/Consolidation Charges, Value added service charges, NAVIS system renewal Charges and Competitive low port charges...) Factor one was named as **Costs Related to Consolidation.**

Factor two was named as **Effectiveness of Ship Operation.**

Factor 3 = f (Value added logistics services will attract more MCC operators and customers) Factor three was named as **Value added Services.**

Factor 4 = f (Freight Charges, Other Charges, Low distance between hub ports and feeder ports will reduce the cost of MCC operations) Factor four was named as **Freight & other related costs to Freight Forwarders and Shipping Lines**

Factor 5 = f (Custom Charges, Convenience of custom clearance procedures will increase the effectiveness of MCC operations) Factor five was named as **Effectiveness of the Custom Operation**

Factor 6 = f (Current port development and expanding activities will highly affect for the development of MCC operations, Performance and efficiency of Logistics Providers will increase the efficiency of MCC operations)

Factor six was named as **Effectiveness of Indirect operations.**

It was decided to proceed the study by keeping these six components by considering Extraction Sums of Squared Loadings.

According to the above table 4.12 factors can be defined further as follows.

Factor 1(Cost related to Consolidation) = $0.164F+0.144G+0.149H+0.157I+0.264J+0.025K+0.113L+0.032M+0.158N+0.104U$

Factor 2(Effectiveness of Ship Operation) = $0.265B+0.202C+0.297P+0.290V+0.292X$

Factor 3(Value Added Services) = $0.148M$

Factor 4(Freight & other related costs to Freight Forwarders & Shipping Lines) = $0.401A+0.177E+0.357Z$

Factor 5(Effectiveness of the Custom Operation) = $0.576D-0.021E$

Factor 6(Effectiveness of Indirect operations) = $0.063R+0.495S$

Where,

- Freight Charges (A)
- Terminal Handling Charges at destination ports (B)
- High THC when high local LCL volumes than MCC volumes (C)
- Custom Charges (D)
- Other Charges (E)
- Fuel & Maintenance cost for equipment & Machineries (F)
- Labor Cost (G)
- Documentation Charges (H)
- Bonded Warehouse Charges & Maintenance Cost (I)
- Utility Cost (J)
- Land Transport Charges (K)
- Stuffing/Consolidation Charges (L)
- Value added service charges (M)
- NAVIS system renewal Charges (N)
- Low distance between hub ports and feeder ports will reduce the cost of MCC operations (Z)
- Strong Main line service availability will increase the effectiveness of MCC operations (P)
- Convenience of custom clearance procedures will increase the effectiveness of MCC operations (Q)
- Current port development and expanding activities will highly affect for the development of MCC operations (R)
- Performance and efficiency of Logistics Providers will increase the efficiency of MCC operations (S)
- Value added logistics services will attract more MCC operators and customers (T)

Competitive low port charges will affect to increase the effectiveness of MCC operations (U)

• Lesser deviation time from main shipping routes will increase the MCC volumes (V)

Convenient feeder line availability will increase the effectiveness of MCC operations (X)

According to the Network Analysis among all the competitive ports in the South East Asia region Colombo port has the lowest mean distance to any regional port which is 1116.19Nm. So that it clearly indicates that Colombo Port can be developed as a major MCC hub in this region which is obviously having the competitive hub advantage.

IV. DISCUSSION AND CONCLUSION

After comparing and concerning all the above analyses, a conclusion can be made that developing Colombo Port as a major Multi Country Consolidation hub will be very cost effective and a competitive advantage that can easily gain through the geographical location and by optimizing all the above factors which came through the factor analysis. There are many more organizations who are willing to invest in this field and also who are expecting to expand their operations. Those findings of the research will be a great advantage to take their future decisions about their businesses and for their new investments.

For the MCC operators it can be suggested that if all the Charges related to consolidation will be reduced it will be a main reason to increase the effectiveness and the capacity of the MCC operations. And also secondly for the shipping lines and SLPA it can be suggested that the Effectiveness of the ship operations must be improved to increase the whole effectiveness of the MCC operations. Then For the Freight Forwarders and Shipping Lines it can be suggested that Freight & other related charges can be reduced for the improvement and the attraction of the operations. Sri Lanka Customs it can be suggested that by reducing the Custom Charges and also by improving the convenience of the custom procedures will be increase the effectiveness of the MCC operations. Logistics Providers must increase their efficiency to attract more customers. Also government must pay more attention on the expansions and the developments of the port of Colombo.

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