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Challenges in the operation of multimodal transport system: The case of Ethiopian shipping and logistics services enterprise

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Abstract

This article investigates the key challenges in the operation of Multimodal Transport System. The 'Multimodal Transport' concept can be defined as the combination of various types of transport modes used in a national or international transport operation, which provides door-to-door services, under the responsibility of one single transport operator. The Multimodal Transport System is a concept aimed at improving trading efficiency. Following the introduction of Multimodal Transport System in Ethiopia since 2012, there have been symptoms which have stimulated substantial public debate and inefficiencies as studies shows. The study identifies the key challenges of Multimodal Transport System in the trade and investments during importation of goods and it is expected to help beneficiaries to know the gap for using Multimodal Transport System. Simple descriptive statistics and inferential statistical measures were used to analyze the data. The key identified challenges are network connectivity, lack of ICT usage at each level, lack of railway infrastructure, and lack of clear laws and regulations that support the involvement of privately owned service providers. The study suggests that in order to improve the services of Multimodal Transport System these key challenges should be solved. In order to encourage competition between private operators and the Ethiopian Shipping and Logistics Services Enterprise, the government or Ethiopian Maritime Affairs Authority is recommended to produce the possible new law or/and proclamation which requires private potential Multimodal Transport Operators to be established at the national level for developing and maintaining competitive advantage.

Keywords: Multimodal transportation system, services, transit, transport

1. Introduction

1.1 Background of the Study

The transportation system is one of the key drivers in trade logistics. In developed nations, businesses enjoy the best logistics and transportation professionals, systems, and infrastructure in the world. Transportation costs are higher when dealing with shipping materials over long distances in international trade. Wood, Donald F., Barone, Anthony P., Murphy, Paul R. and *Wardlow*, Daniel L., (2002) ^[23]

Although several authors defined the International Multimodal Transport differently, the most authoritative definition of the term is defined by UNCTAD (United Nations Conference on Trade And Development), (2001) ^[19] which reads as follows: "the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country..."

The multimodal transport operator is any person who on his own behalf or through another person acting on his behalf concludes a multimodal transport contract and who acts as a principal, not as an agent or on behalf of the consignor or of the carriers participating in the multimodal transport operations, and who assumes responsibility for the performance of the contract UNCTAD, (2001) ^[19].

As stated in the Growth and Transformation Plan (2010/11–2014/15), Ethiopia is undertaking several development and investment initiatives of Government and cooperative sectors toward reducing poverty and to realize country's transformation strategy. These plans not only require the availability of financial resources, but also the availability of adequately integrated service providers and strong implementation capacities too. Accordingly, one of

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the objectives of Millennium Developmental Goal (MDG) is to expand competent marine and dry port and dry land transit services with an expected output of improved in export–import trade and quality of marine, dry land and multimodal transport service system at the end of Growth and Transformation plan.

The government of Ethiopia has been implementing a Multimodal Transport System since January, 2012 to realize the MDG related to Multimodal Transport system. In this system, Ethiopian Shipping and Logistics Services Enterprise (ESLSE), a public enterprise, has taken this national responsibility to manage the Multimodal Transport system in transporting cargo from abroad which was explained on the profile of ESLSE. The Multimodal Transport System is a concept aimed at improving trading efficiency and to transform the relationship between trading partners and international carriers under a single liability system, leading to better command, control and co-ordinated transport system.

1.2 Statement of the Problem

On contrary to the above national objectives, there are symptoms of Multimodal Transport System inefficiencies as studies and media shown. It has become open for complaining. According to Fekadu (2013) [8], from the assessment made about Logistics practice in Ethiopia, he summarized in his study that Ethiopian logistics system is characterized by poor logistics management system and lack of coordination of goods transport, low level of development of logistics infrastructure and inadequate fleets of freight vehicles in number and age, damage and quality deterioration of goods while handling, transporting and in storage. Following from the analysis made during the assessment, he recommended that there is an urgent need for research on the logistics gaps identified, and human resource needs in freight transport and logistics needs of the country.

According to World Bank report, 2013, [24] Ethiopia's relative ranking in the World Bank Logistics Performance Index dropped from 123 in 2010 to 141 in 2012 (out of 155 countries surveyed). The recent introduction of the multimodal system, in particular, has stimulated substantial public debate. The sole MTSO (Multimodal Transport System Operator), ESLSE, is currently overwhelmed with the task at hand. There is a serious congestion problem in the dry ports which has, in turn, resulted in substantial operating costs for ESLSE.

1.3 Objective of the Study

Multimodal Transport System is introduced by Ethiopian Shipping and Logistics Services Enterprise. This study identified challenges in using Multimodal Transport System in the trade and investments during importation of goods.

1.4 Researchable Questions

What are the key challenges related to the implementation of Multimodal Transport System in importing of goods in Ethiopia?

1.5 Significance of the study

The outputs of this study will have paramount importance because of the inefficiency of trade logistics of the country and it is expected to help the ESLSE to identify the key challenges in the operation of the services. The policy

makers, academicians, researchers, and potential service users who directly or indirectly involve in the trade logistics would be benefited from this study if they make use of the outcome.

1.6 Limitation of the study

This research aims at assessing the key challenges of Multimodal Transport System in Ethiopian Shipping & Logistics Services Enterprise. The research was limited to identify the key challenges in the operation of the Multimodal Transport System rather than identifying the service reliability in the country and comparison with other an international context.

2. Literature Review

2.1 The concept of multimodal transport

The introduction of containers had enabled global reach through an increase in trade volume with increase of operational efficiency, which ultimately enables Multimodal Transport to be applied in most international transport operations (Cullinane, *et al*, 2005) [7]. Thus, according to Van Schijndel and Dinwoodie (2000) [9], developments of standardized units, including containers, with the characteristic of ease of transfer, favor Multimodal Transport. For the past fifty years, these terminologies have been widely practiced and applied in the identification of specific operating systems used in a particular operation. Prior to United Nation's formalization of Multimodal Transport in 1980, the terminology has gone through several stages of changes before it obtained its official status by the UNCTAD / ICC in 1992.

The enormous growth of freight shipments and the associated transport needs have caused a wide range of problems and conflicts that are primarily visible in metropolitan and urban regions. These problems are due both to capacity and acceptability constraints of the current distribution system, of which the former is generally accepted as a serious challenge for policy and planning. In contrast, sustainability of freight transportation is (still) subject to minor consideration, because economic interests are often ranked much higher than social or environmental goals. Yet air pollution, noise emissions and the degradation of infrastructure (roads, bridges), mainly caused by heavy-duty vehicles, happen at a certain cost to the environment and society – not to mention the extraordinary demand for space at major gateway locations for warehousing, vehicle operations, trans-shipment, or the storage of empty containers (WATERS, D., 2010) [22].

The 'Multimodal Transport' concept can be defined as the combination of various types of transport modes used in a national or international transport operation, which provides door-to-door services, under the responsibility of one single transport operator (UNCTAD, 2001) [21]. The 'Multimodal Transport' terminology was first coined by the United Nations Convention on Trade and Development (UNCTAD) on International Multimodal Transport of Goods in 1981, which authoritatively defines the term as:

"... the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country (UNCTAD, 1981) [17]."

2.2 Multimodal Transport in the Context of Services

Due to market competition in the transport industry, these services are often insufficient. The increase of service coverage such as: the use of information and communication technology (ICT) and infrastructural capability, security and safety, facilitation, legal aspects and market access has become a rising phenomenon in the competitiveness of Multimodal Transport (UNCTAD, 2003) [20].

2.3 Technology and Innovation in Transit Transport Systems

Information and communication technologies in logistics, trade facilitation and supply chain security have helped improve transport operations. While various information systems have been developed to meet specific needs in their respective sectors, such systems could in many cases add additional efficiency, if interconnected where possible. They are categorized according to three main purposes: cargo operation, customs transit monitoring and supply chain security goals. UNCTAD, (2013) [21]

Innovative information technology solutions in ports have focused mainly on cargo handling and storage operations, in particular container terminal and vessel bay plan management. While the first type of computer systems allows for the monitoring of containers in the yards, the latter allows for the planned allocation of the boxes within a vessel to level the load and ensure efficient loading and unloading in the sequence of ports of call. Both systems, one on shore and the other on the ship, benefit from being interconnected, as they are crucial to expedite ship-to-shore operations making optimal use of cargo handling. UNCTAD, (2013) [21]

2.4 Prevalence of hard copy documents for information exchange

Overall, there is no legal framework in place to recognize documents exchanged electronically in relation to e-commerce, e-signatures, and e-payments. In fact, current Ethiopian laws require paper receipts to be issued for all transactions, although the Government is reviewing legislation and assessing, among other things, the recognition of electronic format. Most stakeholders in the trade transaction process also lack automation systems, and where they exist (Customs, ESLSE) their implementation levels could be further improved. Documents, forms, laws, and regulations are not always available online while data sharing electronically is completely lacking between agencies. Modernization efforts are underway, as ERCA plans to upgrade its customs processing system and implement an Electronic Single Window (ESW). UNCTAD, (2013) [21]

2.5 The overall logistics performance is low in Ethiopia compared to relevant peers

As per the reports of World Bank Report, 2013, [24] the World Bank Logistics Performance Index (LPI) provides a comprehensive measure of the state of trade logistics in a country facilitates comparisons with other countries. Ethiopia ranks at the lower end of the surveyed countries (141 out of 155 countries in 2012). It is not only below the average for sub-Saharan Africa in all the six key dimensions of logistics performance measured, but also lags behind in the direct comparison with neighbouring Kenya and Tanzania; yet it is only slightly lower performing as

landlocked Rwanda. Ethiopia is generally considered “logistics unfriendly.” The difference from individual countries in East Asia such as China, Korea, and Vietnam, as well as the grouping of East Asia and Pacific, is even starker.

2.6 The logistics system in Ethiopia is not improving over time

According to the LPI, the ranking of Ethiopia shows a relative deterioration between 2007 and 2012. In the first LPI of 2007, Ethiopia still ranked 104 out of 150 economies; in 2010, it ranked 123 out of 155 economies; and in the most recent version in 2012, Ethiopia reached only 141 out of 155. The situation gets even more worrisome if one includes in the consideration Djibouti, Ethiopia’s only gateway to the world in terms of land transportation. Djibouti ranked 145, 126, and 154, respectively for 2007, 2010, and 2012. (World Bank Report, 2013) [24]

2.7 Infrastructure development in Ethiopia

In the 2012/13 World Economic Forum (WEF) World Competitiveness Report, Ethiopia’s infrastructure development is ranked 119 out of 144, far behind Vietnam and China (95 and 48, respectively), but relatively better than Tanzania and Uganda (132 and 133, respectively). (World Bank Report, 2013) [24]

2.8 The inadequate quantity, capacity, and quality of trucks

The structure of Ethiopian imports has changed over time, from finished and light weight products to a combination of light finished products and project-bound bulky cargo. This structural change has not been accommodated by a change in the design of the logistics system, however. The upgrading of the road network needs to go hand in hand with the acquisition of trucks of the right length and quality. There are much fewer trucks, both private and state-owned, than the required weight of goods to be lifted. The available number of trucks range from 800 to 1,500, significantly below the total required number of vehicles (i.e., 13,055) for transporting the existing and expected bulky cargo. (World Bank Report, 2013) [24]

However, the existing trucks that are old and light in weight do not match the heavy and bulky cargo. As a consequence the existing trucks are overloaded, which leads to the destruction of roads and bridges. The solution is, in addition to strengthening enforcement of axle load limits, to upgrade the capacity of the road system and bridges; but more importantly to facilitate the expansion and construction of a functioning railway system, to provide an alternative to road transport. In the meantime, the government could introduce initiatives to increase the number of trucks with the appropriate specifications required for both the cargo and the roads. (World Bank Report, 2013) [24]

2.9 Coordination issues and ad-hoc implementation of regulations to solve the current challenges

One recent example of such a coordination issue is the case of the Ethiopian Maritime Affairs Authority (EMAA), which prepared a directive, for the approval by the Ministry of Trade, to penalize traders that do not collect their items within 45 days. However, the recent offer by ESLSE for traders to collect their goods for free does not tally with this

tendency. Hence, no one knows which directive is valid at a given point in time. This creates confusion among traders and their relationship with the various logistics agencies. It also indicates the potential arbitrariness of handling the trade logistics problem and coordination failure among ESLSE, EMAA, and Ministry of Trade. (World Bank Report, 2013) [24]

3. Research Methodology

A descriptive research design was used to identify the key challenges in operation of Multimodal Transport System in Ethiopia. The sources of relevant and appropriate primary data were staff of Ethiopian Maritime Affairs Authority (EMAA) and ESLSE (Ethiopian Shipping & Logistics Service Enterprise). Sixty five respondents were purposively selected from ESLSE staffs of head office. In addition, seven respondents were selected from EMAA staff based on their involvement in Multimodal Transport System as a regulatory body. They were recruited from various departments such as Multimodal Transport Operation system Team, Import good's transit transport team, and export goods transit transport team. The data were collected through self-administrated questionnaire and interview. Of the 65 questionnaires distributed to respondents 56(86.15%)

were properly filled and returned. Likewise, of the expected (i.e. seven respondents) EMAA staff, 5 people were interviewed.

To supplement the primary data, secondary data such as organization profile, annual reports, working guidelines and manuals were used. Descriptive statistics were used to analyze and present the results and exploratory factor analysis was used to assess whether the items used to assess the challenges measured a single underlying concept. The data were analyzed using Statistical Package for Social Sciences (SPSS V.20). The results were presented using narrative text, tables and graphs.

The study was approved by Jimma University ethics review committee. Respondents were provided with detail information about the study and informed written consent obtained from all respondents.

4. Results & Discussion

4.1 Demographic characteristics of the respondents

Table 1 presents the background information of respondents. Consequently, 53 (94.6%) of the respondents were first degree holders and in term of year of experience, 25 (44.6%) were served for 3-4 years. This implies that respondents are well educated in their area of expertise.

Table 1: Background information of the respondents

Items	Respondents Type	Frequency	Percent	Valid Percent	Cumulative Percent
Educational Background	Third degree (PhD)	0			
	Second degree	3	5.4	5.4	5.4
	First degree	53	94.6	94.6	100
	College Diploma	0			
	Certificate	0			
	Others	0			
Position /Current Job	Division Manager in MTS	1	1.8	1.8	1.8
	Information & Customer Service Division Manager	1	1.8	1.8	3.6
	Multimodal Officer	5	8.9	8.9	12.5
	Trade Route Coordinator	4	7.1	7.1	19.6
	Container follow up Officer	3	5.4	5.4	25.0
	Logistics Officer	5	8.9	8.9	33.9
	Freight Payment Officer	3	5.4	5.4	39.3
	Documentation Officer	7	12.5	12.5	51.8
	Customer service Officer	16	28.6	28.6	80.4
	Transport Officer	7	12.5	12.5	92.9
Transport Payment Officer	4	7.1	7.1	100.0	
Service years	Less than 1 year	0			
	1 – 2 year	16	28.6	28.6	28.6
	3 – 4 year	25	44.6	44.6	73.2
	5 and above	15	26.8	26.8	100.0

Source: Based on the survey questionnaire for this study (2015).

With respect to the position of the respondents' customer service officer are 28.6%, transport officer are 12.5%, and documentation officers are constituted 12.5%. These positions may show that respondents were in appropriate positions in their organization which enable them to have a direct relation with the operation of a Multimodal Transport

System.

4.2 The challenges of Multimodal Transport System

The key challenges of Multimodal Transport System are rated based on its degree of seriousness by using a five point likert scale ranging from 1 to 5 as follows:

Table 2: The key challenges of Multimodal Transport System based on the mean score from the respondents' data

Rated Variables	N	Min	Max	Mean	Std. Deviation
The Network connectivity	56	3	5	4.3	0.711
The Problem of ICT usage at each level	56	2	5	4.25	0.815
Challenges of railways physical infrastructure	56	2	5	4.18	0.855
Lack of competition in the MTS	56	1	5	3.98	1.12
The distance between origin or source materials and customers to get on time.	56	1	5	3.96	0.953
Coordination challenges in the MTS	56	2	5	3.93	0.806

Lack of integrity with Stakeholder relationship	56	1	5	3.84	0.949
Challenges of roads physical infrastructure	56	1	5	3.82	1.046
Lack of strategic planning & follow up	56	1	5	3.79	0.909
Lack of integrity with Customer relationship	56	1	5	3.77	1.009
The shortage of Trucks by ESLSE	56	1	5	3.73	1.104
The length of procedures, the involvement of different stakeholders	56	1	5	3.62	0.964
The shortage of skilled manpower	56	1	5	3.18	1.114
Valid N (list wise)	56				

Source: Based on the survey questionnaire for this study (2015).

As summarized in table 2 above, respondents were asked to rate the key challenges of Multimodal Transport System based on its degree of seriousness by using a five point Likert scale ranging from 1 to 5. According to the responses given by the sample respondents shown in the summary table above, the ranks of the variables are identified from its very serious problem to serious problem in decreasing order. From the variables identified above, the top three variables were rated as the key challenges of Multimodal Transport System. These are the challenges of network connectivity (with the mean value 4.3 and Std. Deviation 0.711), the problem of ICT usage at each level (with the mean value 4.25 & Std. Deviation 0.815) and challenges of railways physical infrastructure (with the mean value 4.18 & Std. Deviation 0.855) are ranked first, second and third respectively. These identified key challenges of a Multimodal Transport System as per the respondents rated a very serious problem in providing the services of the multimodal transport system. This can signal that there is a top three priorities of key challenges in the operation of Multimodal Transport System.

Accordingly, the remaining identified variables based on their degree of seriousness are ranked by the respondents as follows: lack of competition in the Multimodal Transport System (with the mean value 3.98 & Std. Deviation 1.12), the distance between origin or source materials and customers to get on time (mean value 3.96 & Std. Deviation 0.953), coordination challenges in the Multimodal Transport System (the mean value 3.93 & Std. Deviation 0.806), lack of integrity with Stakeholder relationship (the mean value 3.84 & Std. Deviation 0.949), the shortage of Trucks by ESLSE (the mean value 3.73 & Std. Deviation 1.104), the length of procedures and the involvement of different stakeholders in the process (the mean value 3.62 & Std. Deviation 0.964) and the shortage of skilled manpower (the mean value 3.18 & Std. Deviation 1.114).

4.3 Factor analysis of the key challenges in the operation of MTS

For the key challenges in the operation of Multimodal Transport System's purpose, factor solution with Eigenvalue greater than one was considered for analysis after Varimax Rotation method. Consequently, the analysis produced only one factor which indicates the key challenges in the operation of Multimodal Transport Systems is only measured as a single concept.

This factor analysis, confirmed that the key challenges scale measured single dimension which explained 88.6% of variance in the key challenges. All items are strongly loaded to this factor with lowest factor loading of 0.86. Factor-loadings are those values which explain how closely the variables are related to each one of the factors discovered. Kothari, (2004) [5]

For instance, the variable “lack of integrity with Customers relationship” is more important and key challenge to

ESLSE. It is followed by the variable “challenges of roads (physical infrastructure)” (Table 3). The composite measure of this key challenge scale was computed by summing up all responses (range of possible 13 - 65) to each item. The mean key challenge score was 50.36 (SD = 11.63) and the median score was 52. Figure 1 shows the kernel density estimate for the key challenge score.

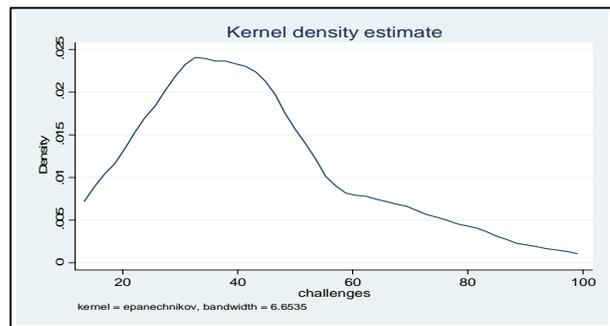


Fig 1: The kernel density estimate for key challenge score.

Table 3: The Key challenges of in the operation of MTS

Component Matrix ^a	
Items (Variables)	Key challenges
	Factor loading
Lack of integrity with Customer relationship	0.967
Challenges of roads physical infrastructure	0.966
Lack of competition in the multimodal transport system	0.961
Lack of integrity with Stakeholder relationship	0.958
The shortage of Trucks by ESLSE	0.952
Challenges of railways physical infrastructure	0.947
The length of procedures, the involvement of different stakeholders in the process	0.946
The distance between origin or source materials and customers to get on time.	0.946
Coordination challenges in the Multimodal Transport System	0.946
The Problem of ICT usage at each level	0.942
Lack of strategic planning & follow up	0.926
The Challenges of network connectivity	0.913
The shortage of skilled manpower	0.860

5. Conclusion and Recommendations

5.1 Conclusion

This study aimed to investigate the challenges of Multimodal Transport System at Ethiopian Shipping & Logistics Services Enterprise. The related theoretical literatures and empirical studies issues were incorporated in this study to provide a theoretical basis for the development of the research. The key challenges related to the operations of Multimodal Transportation System are identified. Accordingly, poor network connectivity, the problem of ICT usage at each level, the lack of railway infrastructure, lack of competition in the multimodal transport system, the

distance between origin or source materials and customers to get on time, poor coordination, lack of integrity with Stakeholder relationship, shortage of trucks by ESLSE, length of procedures and the involvement of different stakeholders, shortage of skilled human power, resistance from the Djibouti, and employment issues, were identified as serious challenges. On the other hand, bureaucratic nature of clearance procedures at Ethiopian customs and inadequate knowledge or wrong perception about Multimodal Transport System was reported by respondents.

5.2 Recommendations

- Currently, there is only one sole operator of Multimodal Transport System for Ethiopia (ESLSE). However, in order to encourage spirit of competition between private operators and the government owned one (i.e. ESLSE), it is crucial to consider a new law or/and proclamation that can encourage participation of private sectors in Multimodal Transport operation at the national level for developing and maintaining competitive advantage.
- The ESLSE is recommended to provide a timely and fundamental capacity building program like develop integrity with customer, training and upgrading of the employees professional qualification. In general, the concerned bodies should work to minimize the aforementioned challenges as per their seriousness order.

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