

QUALITY MANAGEMENT APPROACH IN SUPPLY CHAIN LOGISTICS CASE OF SHIPPING MARITIME TRANSPORTATION

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Abstract: The importance of quality management practices in the achievement of operational results and customer satisfaction in logistics has been asserted in many studies. Satisfy the customer through the control of the triptych "Quality, Cost, Time." Therefore, the survival of enterprises must include control of all processes. Or, find the links existing between the logistics chain parts and requirements of the quality process is not easy, for this reason it is better to make mapping process to award the possible links so that we can adapt these two concepts together. This paper presents the results of an exploratory survey investigating the status of quality management practices in the logistics function in the logistics chain of shipping maritime transportation.

Keywords: Quality management, logistics performances, logistic chain, customer satisfaction, shipping maritime transportation.

Introduction

Quality management programs have been implemented globally, across manufacturing and service industries. Leadership and team building have been identified as key factors in quality management. From a quality management perspective, the emphasis of leadership is on the communication of values and the articulation of a vision [4]. These activities are similar to those prescribed by transformational leadership theory [2,6,11]. Thus, leadership is viewed as a behavior that modifies the motivation or competencies of other researches [3]. The use of teams has been the primary mechanism to implement the necessary work force changes to achieve organizational goals [7,8], such as the enhancement of customer service.

The importance of quality management practices in the achievement of operational results and customer satisfaction in logistics has been asserted by a number of scholars in the logistics academic journals [12,13,15,16]. There are some leading studies on logistics quality management that were published by the Council of supply chain management professionals. Each identified practices and processes that we will describe later; which are similar to those referred to above and suggest that they affect logistics performance and customer satisfaction.

The logistic and transport service providers have to tackle the challenge of the profit accession. At the same time, quality and customer orientated service getting widespread all over the world becomes a key factor of the market success and business survival. Therefore the logistic-transport providers have to establish and

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implement the quality strategy of their services rapidly. Establishment, maintenance and continual improvement of quality services have two primary preconditions: definition of the right quality of transport services, and establishment of quality system assuring the quality of services. The definition and implementation of a quality system in transport services are much more specific tasks, without any existing and appropriate standard.

The rest of the paper is structured as follows: following this introduction, a literature review and related research work are illustrated in Section 2; this is followed by Section 3 which provides a discussion of our research problem and the conceptual model; In the fourth section, the proposed model is formulated using the activity diagram of Unified Modeling Language (UML) standard. Section 5 concludes the paper and provides suggestions for future research.

Literature review

Robinson and Malhotra [17] conduct a case study of the leading supplier of American Honda. The two researchers set three goals. The first is to show the importance of ensuring the quality of supply chain management by identifying key elements of each. The second objective concerns the determination of the five research themes Supply Chain Quality Management (SCQM) namely: (1) communication and partnership activities (2) creating and process integration, (3) management and leadership, (4) strategy, and (5) best practices to be undertaken. The last goal focuses on identifying the scope of future research of SCQM -- stimulation of a process approach, and development of standards ensuring the performance of a chain of quality and impact of ISO 9001.

Batson and McGough [1] conduct a study while posing the problem of the quality planning of a logistics chain. They present the work of Juran [10] and his trilogy based on the quality and applies the logistic chain. These authors insist in the responsibility of the supplier and its contribution in improving quality. They argue that the trilogy of Juran quality can be applied to remove the requirements in terms of quality in production and delivery. They also state that this policy promotes communication between members, who elaborate the main idea of the relation between the quality and logistic.

Several researchers have used SCQM approach to explain the impact of quality practices which are related to supply chain on performance and customer satisfaction [14,9] these researchers are based, in this case, conceptual models and empirical methods. The model of Lin et al. [14] focuses on the supplier side, and specifically highlights the importance of participation and selection of suppliers. They also use quality practices to assess their impact on organizational performance. In addition, the model of Fynes et al. [9] highlights the partnership relations within the supply chain, these authors tend to consider the impact of such relations on the quality of design and the product in terms of quality and therefore their impact on the level of customer satisfaction. In the research work of Bott-

Genoulaz [5], the authors addressed the problematic issue on «coordination in the logistics chain," the objective of their action is:

- To identify the collaborative practices implemented by the players arising from the nature of information shared,
- To propose methods for evaluating their impact on the performance of actors, but also of the value chain
- Proposing models of development, dissemination, implementation practices.

The following table depicts the different studies that treat the quality as a main component in the supply chain logistic over the literature.

Table.1 Different research Quality/Supply chain

Authors	Objectives	planning Methods
Fynes & al. (2005)	Impact the quality of inter-organizational relationships within the supply chain (SCRQ: Supply Chain Relationship Quality) on improving the quality	The single-step analysis for measuring and evaluating the structural model simultaneously. - The confirmatory factor analysis (CFA) to assess the validity of each model variable
Lai & al. (2005)	Study the determinants of SCQM and their influence on organizational performance	Modeling determinants of SCQM
Batson & Mc Gough (2006)	1-The quality planning in the supply chain 2-The quality control throughout the supply chain	1-ISO 9001: Since this standard devotes an entire section to the "planning 2-production planning 3-planning supply chain namely supplier selection, choice of transport mode, etc..
Robinson & Malhotra (2005)	1-Show the importance of ensuring the quality of management of the supply chain 2 - Determination of the five research themes SCQM namely: (1) communication and partnership activities (2) mangement and process integration, (3) management and leadership, (4) strategy, and (5) best practices to be undertaken. 3 - Identification framework for future research of SCQM	SCOR : Supply Chain Operatinnel Referentiel

The proper functioning of the supply chain requires the presence of a quality capable of ensuring efficient transmission of information from upstream to downstream and vice versa. This may be done in the shortest possible time in order

to preserve the synchronization of physical flows with that of information. Thus enable the various actors in the chain. This requires the effective use of quality indicators and methods, since they are the heart of a good supply chain management. According to this work and in our literature search it is rare to find a holistic view of quality throughout the logistics chain. This has particular consequences in the transport chain.

Research problem and the conceptual model

This study develops quality management in the logistics chain of shipping maritime transportation. The functional perimeter of the monitoring pre and post delivery port platform is shown in Fig 1. We begin by modeling the different movement of containerized goods processes, then, following a quality process we will integrate the most significant logistics performance / quality indicators.



Figure 1. Functional perimeter of the monitoring pre and post delivery port platform

During the transportation process, there are several goals that must be mastered and performed adequately to meet the triptych (quality-cost-time). These objectives can be summarized in the following table.

Table 2. Goals of the pre and post delivery port platform

Goals	Indicator
1. Reduction of transportation costs on the delivery of goods	Lower transport costs
2. Lasting improvement of transport services between the different actors of functional ocean freight	Reduced operating cost of vehicles
3. Improve the efficiency of the transport system.	Increased volume of trade
4. Modernize, renovate and rehabilitate existing port infrastructure.	storage (kl). Average waiting time for ships (hours). Rest time of goods. Productivity of the handling of goods by main product
5. Provide, rehabilitate, renovate and modernize equipment and facilities for handling containers.	Traffic can be done by container (%). Waiting time for container ships (hours). Time of call for container ships (hours).
7. Install efficient port infrastructure and	Rate of container handling.

improve customer service. Reduce transport costs.	Costs of handling containers (/ item). Availability rate of container cranes (%)
8. Improve productivity of port facilities.	Increased capacity of ports. Reduction of unit costs of transport and passenger market. Reduced rates for freight and passengers for some sources / destinations. Average waiting time for ships (hours). Rest time of goods.
9. Improve and strengthen the operational capacity and port management.	Increased availability and reduced time of immobilization of the key elements of port facilities.
10. Land transport	Linear road network (primary, urban, rural roads and other classified areas) Average cost of transport..
11. Shipping	Number of containers transiting the port Average time of stay of containers in port Average waiting time in port Total port charges per container imported.

Following the platform for delivering goods shipping that we conducted, we distinguished 9 process such us: making shipment process, booking transport process, container positioning process, transport instructions process, transport course process, arrival of goods in a port process, goods boarding process, transport status process, transport execution process.

The pre and post delivery port platform is involved in a quality process in order that ensures the sustainability of the entire logistics chain through consolidation of customers. And thus satisfy our loyal customers. This is not altruistic. We have seized 14 goals in general manner to satisfy the customer requirements. According to our studied case, we can conclude some goals described in table 1.

- respect of the technical specifications of products delivered (Goal 1)
- the reliability of the products loaded (Goal 2)
- respect of the delivery period (Goal 3)
- reduction of transportation costs on the delivery of goods (Goal 4)
- lasting improvement of transport services between the different actors of functional maritime freight (Goal 5)
- improve the efficiency of the transport system (Goal 6)

- modernize, renovate and rehabilitate existing port infrastructure (Goal 7)
- provide, rehabilitate, renovate and modernize equipment and facilities for handling containers. (Goal 8)
- install the port infrastructures are efficient and improve customer service (Goal 9)
- reduce transport costs (Goal 10)
- improve productivity of port facilities (Goal 11)
- improve and strengthen the operational capacity and management of ports (Goal 12)
- improve the quality of service of road transport (Goal 13)
- improve service quality in maritime transport (Goal 14).

To define indicators logistics / quality we opted to build the matrix of indicators that is the result of both the intersection of quality indicators and logistics and quality of strategic objectives and processes identified.

The result of this study is summarized in the following table which are described in ordre in Fig.1.

Table 3. Matrix of Indicator Logistics /Quality

	Process 1	Process 2	Process 3	Process 4	Process 5	Process 6	Process 7	Process 8	Process 9
Goal 1	Rate of return (i1.1)			Reference Number (i1.2)		Deliver y provide r number (i1.3)			
Goal 2			Rate of loss due to damaged goods (i2)						
Goal 3					Lower transport costs (i3)				
Goal 4			Rest rate of goods (i4.1)						Reduce d operati ng cost of vehicle s (i4.2)
Goal 5					Overall logistic s costs (i5)				
Goal 6		Increas ed volume of trade (i6.1)				Fee total port contain er (i6.2)			

Goal 7							Average waiting time for vessels (i7.1)	Rest periods for goods (i7.2)	Productivité de la manutention des marchandises (i7.3)
Goal 8			Container traffic handled (i8.1)				Time of call for ships at berth (i8.2)		Number of container wharf (i8.3)
Goal 9			Rate of container handling (i9.1)				Costs of container handling (i9.2)		
Goal 10		Reduced rates for freight goods for goods (i10.1)					Increased capacity of ports (i10.2)	Unit costs of transport and passenger market (i10.3)	
Goal 11							Increased availability and reduced time (i11)		
Goal 12		Operating cost of vehicles (i12.1)	Container traffic handled (i12.2)						
Goal 13			Number of containers transiting the port (i13.1)				Average time of stay of containers in port (i13.2)	Average waiting time in port (i13.3)	
Goal 14	Unit transport cost (i14.1)					Volume of receipt (i14.2)			Average utilization rate of transport (i14.3)

After the construction of the matrix of indicators we will integrate these indicators in the modeling process. In the section for we present a mapping of the different process and we integrate the most indicators Logistics/Quality.

Mapping Process & Integration of Logistics/Quality indicator

We present the mapping process of the platform using the diagram of activity recommended by the standard Unified Modeling Language (UML) The Fig 2 shows the shipment preparation process.

Making shipment process

The goods shipper (shipper or transport operator) sends a request for transportation; the transport reviews the application to see if he can or not the service; If it is unable to provide the benefit, then it returns to the applicant an answer stating the reasons for its refusal. If it is able to meet demand, it will return a listing of freight

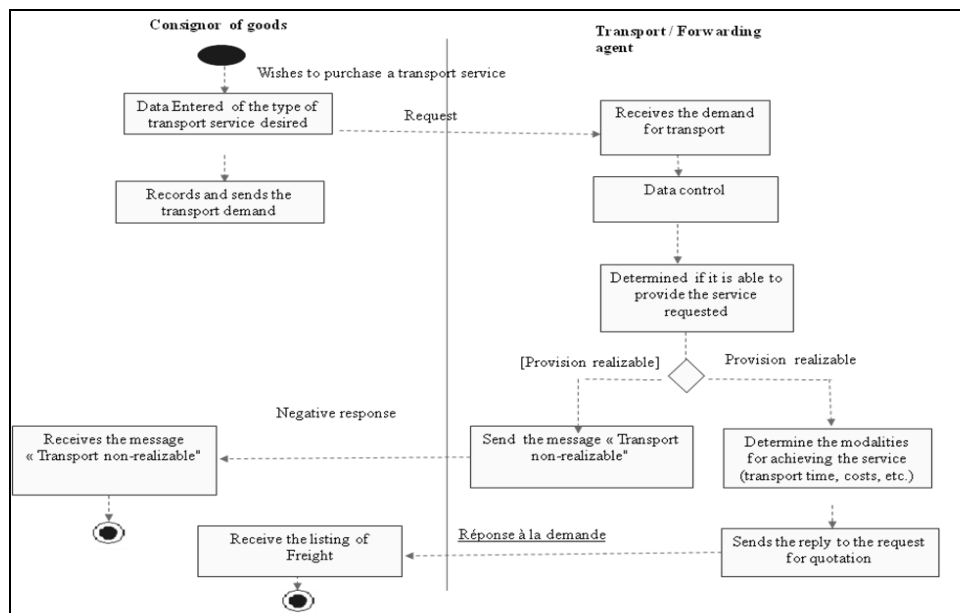


Figure 2. Mapping of the "making shipment" process

Making booking transport process

From the listing freight, the goods shipper addressed a booking freight for a date with a transporter or a freight forwarder (Fig .3).

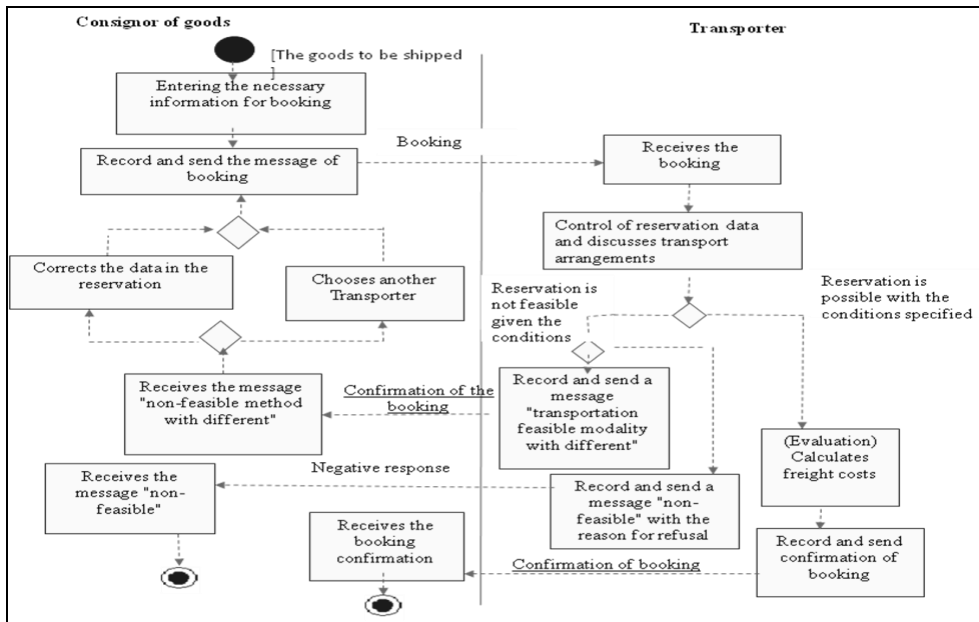


Figure 3. Mapping of the "booking of transport" process

Container positioning process

The consignor addressed a reservation request for empty container. Based on availability of container, the booking of a container is made (Fig. 4)

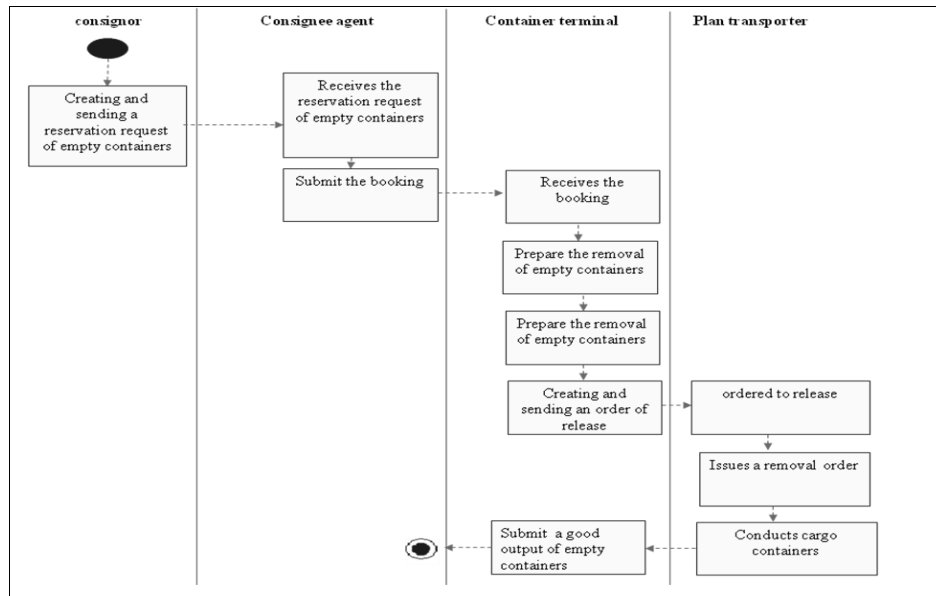


Figure 4. Mapping of the "Container positioning" process

Transport instruction process

The consignor performs the packing of goods and makes the labeling regulations. The transporter sets the contract of transport it transmits to the consignor and the recipient of any products.

The consignor sends instructions as well as information on goods to take charge. When taking over the products, the transporter checks the load, possibly complete the information transmitted by the cosignor (weight of the goods, scan labels, etc.). Loading, it is a confirmation of support to the consignor. It can also send a notice of shipment of goods to the consignee (Fig. 5).

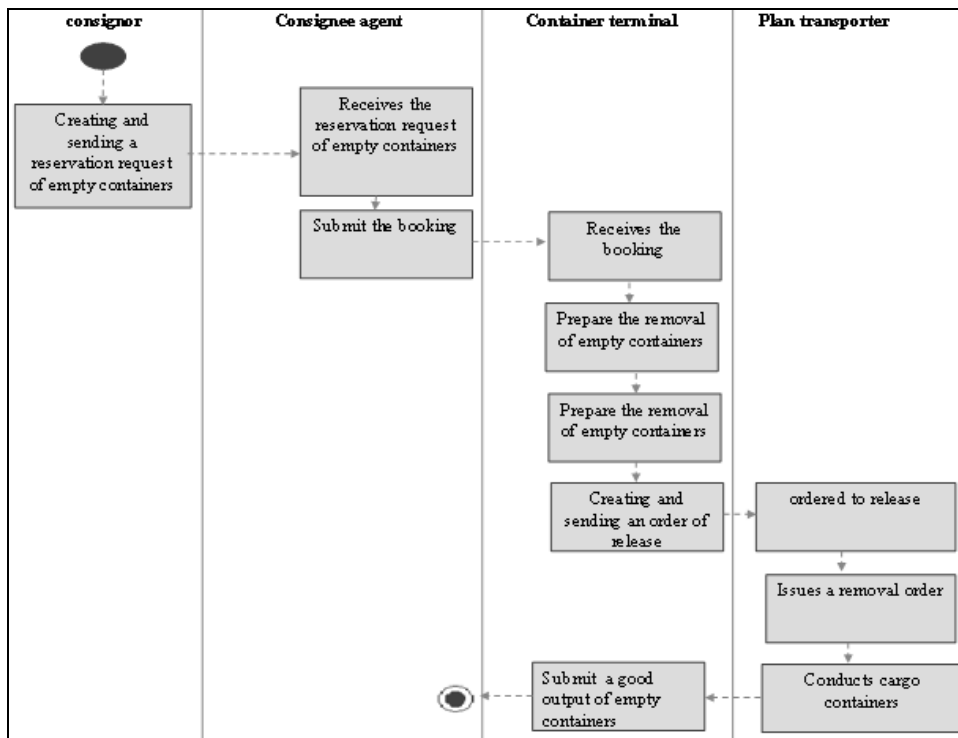


Figure 5. Mapping of the "Transport instruction" process

Transport course process

The goods are taken over by the land transporter. If a second transporter must take over from the first, the first transporter may send a notice of delivery to the second following the chain of transport. Upon receipt of products, the second transporter issues a confirmation of receipt / taking over and eventually a notice of delivery to the consignee of the goods. This step can be performed as many times as there are transporters involved in the transport chain (Fig. 6).

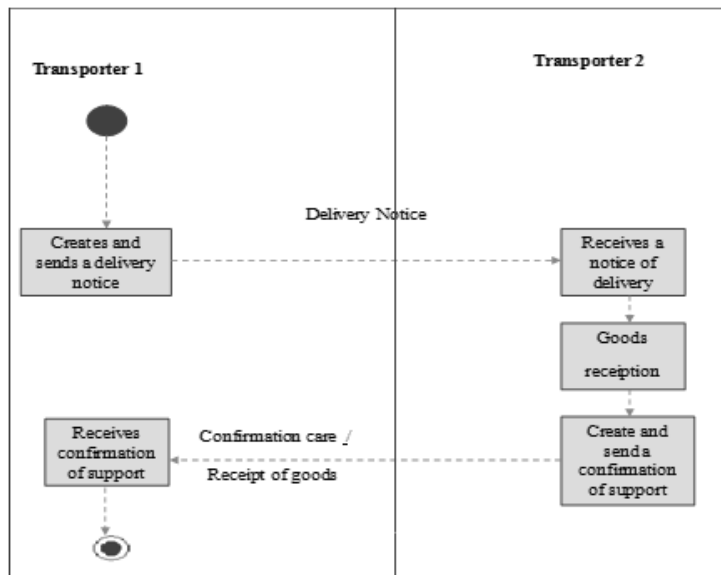


Figure 6. Mapping of the "Transport course" process

Arrival of goods in a port process

Before the arrival of the goods in the port, the head of transport (shipper, curator of transportation, freight forwarder) is sending a notice of arrival of goods to the harbor. The port authority, if it accepts the arrival of goods in the port, sends a confirmation to the declaring (Fig 7).

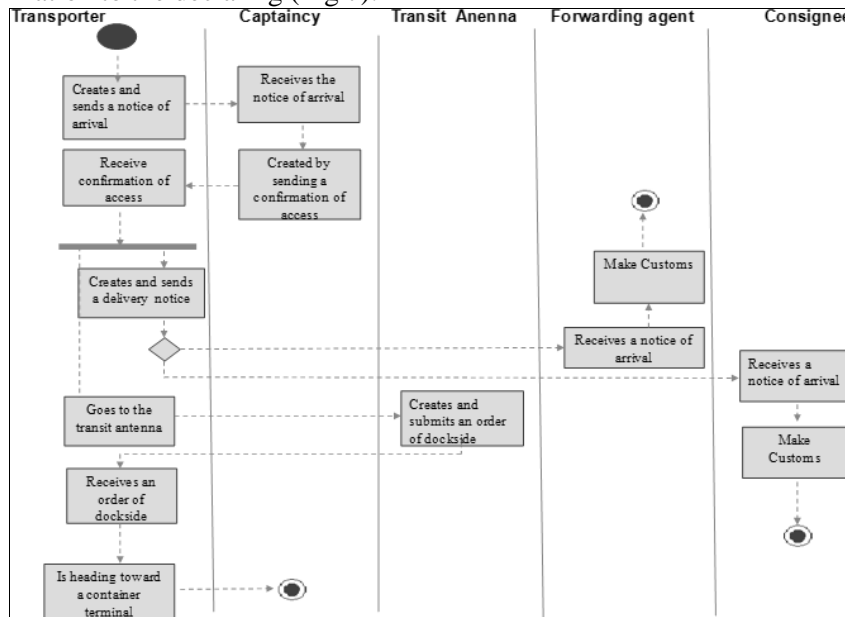


Figure 7. Mapping of the "Arrival of goods in a port" process

Goods boarding process

The owner collects the goods and arranges loading for the products. It sends a manifest to the agent receiving the products in the country of destination and a delivery notice. The recipient receives the official manifest, makes the unloading of the goods and sends a notice of discharge as well as an account of deviations if necessary for the agent to start. The agent establishes the Bay Plan depending on the container list and manifests and transmits it to the owner (Fig.8).

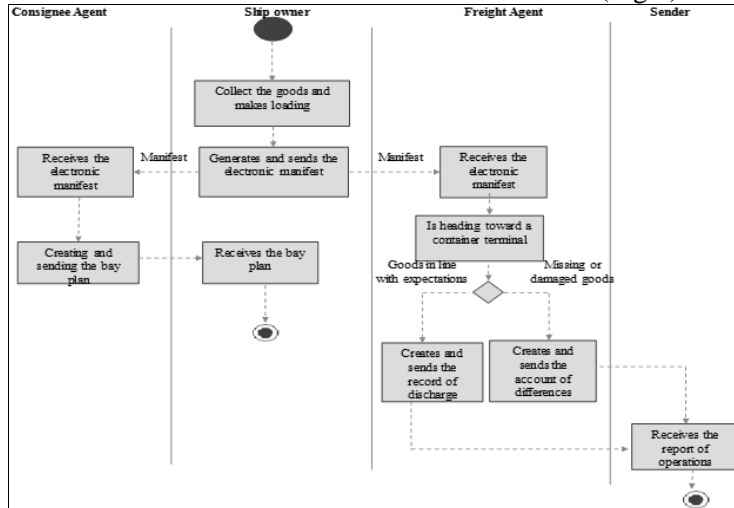


Figure 8. Mapping of the "goods boarding" process

Transport status process:

An event or a new state transport is identified on the platform. If these items meet the criteria for monitoring transport arrangements for transportation (the shipper, freight forwarder) a message transmission status is automatically sent to the latter.

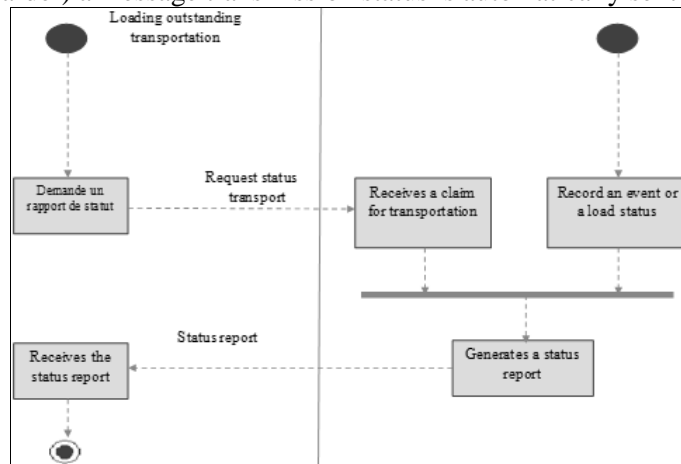


Figure 9. Mapping of the "transport status" process

Transport execution process:

The feeder container pots, filled packing certificate for the terminal arms, container, via the carrier and himself. It makes the packing list, it transmitted to the carrier.

The land carrier establishes the consignment road or rail, or bill of lading river for himself (and his driver in road transport), charger, at Goods / receiver (and broker if river transport by water).

The driver arrives at the port representative of the shipper or forwarder issuing the order wharfage, for the carrier, the terminal and customs. The it executes a notice of arrival for the carrier and the commission, which previously drawn the notice of arrival for access to dock.

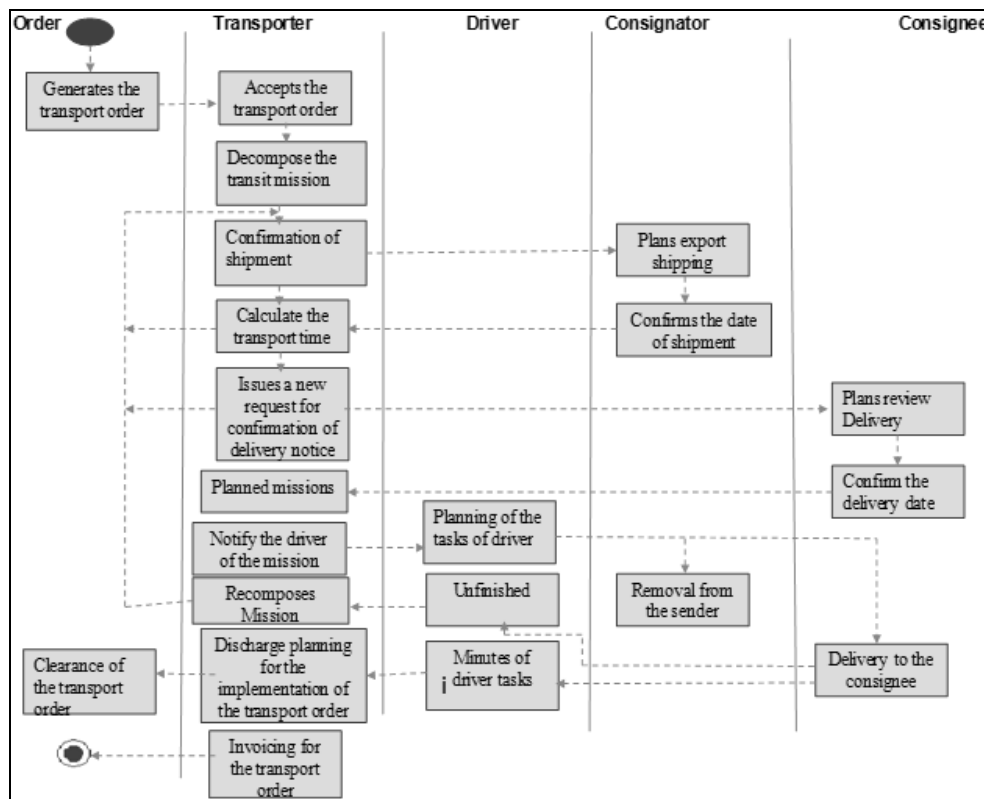


Figure 10. Mapping of the "execution of transport "process

In this platform quality improvement (reduction of non-quality and process improvement) requires combining reflection. All actors in the supply chain to define achievable objectives and agreed standards.

The mapping process is that to improve service quality and delivery of goods in the first process of preparing the shipment, we must introduce three indicators (the reduction in freight rates and passenger for certain goods (i10.1), and the unit cost

of transport (i14.1) at the extent of work required and the realization of transport since the relationship between them is inseparable. At this same process and specifically between the two messages of the "non-feasible", measure the rate of return (i1.1).

Moreover, this improvement requires the involvement in the transport booking (process 2) so that we draw the detected non-compliance and control of the smooth running of work. Indeed, after testing the control reservation data and ways of transport, it must increase the volume of trade (i6.1). After the process of calculating the costs of transport on integrated indicator of unit cost of transport (i14.1). At the end and after the registration and sends the reservation, the indicator (i12.1) and (i1.1) should be incorporated into the end of every task in the process. The third mapping, the container positioning and to ensure the proper transmission of the reservation, the time indicator rest of the goods (i4.1) must be included before the receipt by the third actor. To ensure proper loading of containers incorporating the indicator "i12.2" it is necessary to improve the quality of traffic. Furthermore, at the level of transport instructions (process 4) one must mention the number of references before the submission of information necessary for the expedition.

If we concentrate on the fifth process (transport course) the pursuit of quality requires the involvement in the receipt of goods by the indicator: cost of transport.

On the basis of the mapping process: arrived goods in port, we note that the indicators (i1.3) and (i14.2) should be highlighted among the following activities; responsibility for the transportation and the harbor. The indicator relates to the taxes by the total port container must be incorporated before establishing customs formalities. All this must be put in place to ensure that the merchandise arrives safely in port.

The process of boarding goods is that to improve the quality of service delivery, we have introduced two indicators: the average waiting time of vessels (i7.1) and time of call of Ships dock (i8.2) because the relationship between the owner and the agent consignee of the goods is inseparable.

For the transport status process, it is better to integrate three indicators (the time of receipt of the goods, the volume after receiving the loading of transport) and the indicator (i10.3) unit cost of transporting goods after synchronization to generate a status report. If we focus on the implementation process of transport, we find that the indicator (i7.3) productivity of the handling of goods shall be at the level of acceptance and the decomposition of the transport order mission to offer a high quality of transport.

Against the indicators by (i4.1) resting rate of goods and (i14.3) average usage rate of transport must be integrated in the activity that connects the working procedures between the transporter and the driver.

One can infer that the successful integration of quality indicators / logistics level process maps, is a step in the establishment of a quality approach.

Summary

The quality management is an integral part of any logistics system; it can describe the performance of logistics system, assess the strengths and weaknesses and provide accountability. The present paper describes several indicators which are useful tools for monitoring and evaluation of a logistics system. These indicators can be used to measure the availability of services in the process of maritime shipment forwarding and logistics system performance.

This study allowed us to identify the various processes of the pre and post delivery platform; to describe all processes and link them together in a mapping, to define data and the actors and the links between different processes, to model the mapping process to determine the objectives for each process, build the matrix of indicators and integrate quality/logistics in the mapping process..

Several research perspectives can be detected at this research for example to establish procedures for the measurement of performance indicators to detect any potential shortfall, to extend this work to the whole of the platform and port 'develop a repository that the mixed approach logistics and quality.

This work does not stop at the pre and post delivery, but must be extended to encompass the entire supply chain. Thus, it is best to apply the five principles the establishment of a quality that is leadership, customer focus, employee involvement and approach the process at all links in the chain, then in our case it was more interested in the application of the latter principle.

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PODEJŚCIE DO ZARZĄDZANIA JAKOŚCIĄ W LOGISTYCZNYM ŁAŃCUCHU DOSTAW NA PRZYKŁADZIE TRANSPORTU ŻEGLUGĄ MORSKĄ

Streszczenie: znaczenie praktyk zarządzania jakością w osiągnięciu wyników operacyjnych i zadowoleniu klienta w logistyce udowodnione było w wielu badaniach. Satysfakcjonowanie klienta poprzez kontrolę tryptyku „jakości, kosztów, czasu”. Dlatego też prawidłowe funkcjonowanie przedsiębiorstwa musi obejmować kontrolę nad wszystkimi procesami lub znaleźć powiązania istniejące między elementami łańcucha logistycznego i wymaganiami jakościowymi procesów, co w rezultacie nie jest łatwe. Z tego powodu korzystniejsze będzie stworzenie procesów mapowania dla przydzielania ewentualnych powiązań, tak abyśmy mogli dostosować te dwa zagadnienia razem. W artykule przedstawiono wyniki badania ankietowego oceniającego poziom praktycznego zarządzania jakością funkcji logistycznych w transporcie żeglugą morską.

物流供应链中的质量管理：海运案例

摘要：质量管理对于业务的成功有着重要的作用，客户对物流满意度在很多研究中已经被断言。我们通过三联控制来满足客户，即“质量，成本，时间”。本文阐明了一种关于质量管理在物流功能和海上物流链状态的调查结果。