VGM Amendment reveals port community as a business network

Competitive Paper

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Abstract

Port is a business interface between actors of the multimodal cycle of activities and as such, it represents an interesting field of investigation for business-to-business research (Harrison & Håkansson, 2006; Mandják & Lavissière, 2017). Moreover, port marketing seems to be a field of research to develop considering recent studies (Parola et al, 2017). Traditional studies on port business are developed through the lens of Supply Chain Management (SCM) theories in which the chain can and needs to be drawn tight in order to optimize factors. Reality seems more complex and one optimized supply chain is probably only part of a coat of mail.

In 2014, the International Maritime Organization (IMO), the UN body in charge of safety and environmental protection in the shipping industry, adopted the Resolution MSC.380(94) on the Verified Gross Mass (VGM) of packed containers in order to enhance maritime and port safety operations. Since 1 July 2016, shippers have been henceforth obliged to provide the weight of packed containers prior to loading operations. This new activity that had to be performed along the supply chain showed how intertwined port actors are on several layers.

This paper aims at identifying the characteristics and links of what is known as port community but is hardly defined in the literature. IMP Approach of business networks is used to provide a new perspective from traditional SCM literature.

The methodology relies the case of VGM Implementation in French ports. This case study is based on recollection of secondary data as well as a set of interviews within both ports of Le Havre and Marseille. A content analysis and a linguistic analysis of the verbatim provides strong data to understand the structure of port community as a network.

Results show that port community is not organized as a linear chain, but rather as a network of actors, called “port community”, that can be considered as client of the port, supplier of the port, stakeholder of the port, and member of the port depending on the perspective of the network picture.

Key Words: Supply Chain, Port, Security, Network, VGM

1. INTRODUCTION

Scholars and experts have considered seaports as pure logistic nodal element for a long time encouraging an abundant research related to transport geography (Rodrigue and Notteboom, 2009), economics (Tovar and Wall, 2015), governance (Verhoeven, 2010; Brooks and Pallis, 2013; ESPO, 2016) and more widely as regards supply chain management (Robinson, 2002). Recent studies have highlighted new strategic perspectives for port managers in the light of marketing (Parola et al, 2013; Parola et al, 2017) and business (Dooms et al, 2013; Mandják and Lavissière, 2017).

The aim of the paper is twofold. It firstly aims to identify the characteristics, links and limits of what is known as "port community:" Secondly, it fills a research gap related to the notion of "port community" which is hardly defined in the existing literature. IMP Approach of business networks is used to provide a new perspective from traditional SCM literature.

The methodology used in this research is grounded on the case of VGM Implementation in two leading French ports, port of Le Havre and Marseille, and completed by a recollection of secondary data based on interviews performed in both ports. VGM is the Resolution MSC.380(94) on the Verified Gross Mass (VGM) of containers with the purpose to enhance port safety operations (IMO, 2014a). A content analysis and a linguistic analysis of the verbatim provides strong data to understand the structure of port community as a network.

After this introduction, the paper is structured as follows: Section 2 explores extant literature with respect to port marketing. It also underlines research gaps regarding organizational relationships in the port network. Section 3 explains our methodology based on expert interviews through questionnaires administered in two leading French seaports and completed by an exploratory analysis performed by IRaMuTeQ software. Our main results are proposed in Section 4. Final remarks concerning implications and future research opportunities are given in Section 5.

2. LITERATURE REVIEW

Chopra and Meindl (2009) define supply chain management as the management of flows between and among supply chain stages to maximize total supply chain profitability. They have a sequential approach to supply chain stages. Typically, a supply chain includes the linear relationships between the row material suppliers, the component suppliers, the manufacturers, the wholesalers (distributors), the retailers and the customers. The main question is the profitability of the supply chain; which is "the difference between the revenue generated from the customer and the overall cost across the supply chain" (Chopra and Meindl, 2009:6).
In contrast, heterogeneity of resources (Olsen, 2013) and activities, and their connectedness by interaction are the main ontological basis of IMP business network theory. IMP describes the business world where each interdependent company is embedded in a network structure where resource combinations and activity structures are developed and related to each other over time and space. In this perspective, "business is something that takes place uniquely between identifiable actors" (Håkansson et al 2009) and the business is the result of the interaction process between the two actors. In the IMP approach, interaction is not a simple mutual communication process but it is a substantive one: "Substantive interaction is the process

through which activities, resources and actors are confronted, sometimes brutally, sometimes destructively and sometimes creatively" (Håkansson et al 2009:263).

As networks are sets of connected exchange relationships, the positions of different actors are more or less interrelated. Network positions are a consequence of the cumulative nature of the use of resources to establish, maintain and develop business relationships. A network position depends on that with whom the focal actor has exchange relationships. In a broader view, the network position involves the role of the actors in the network. "The role comprises the function accorded by the industrial logic and the relative importance of the actor" (Johanson and Mattsson 1992:213). From this point of view, there are two main types of actors. Those who have strong network positions and play a central role in a focal network. The other type of actors has a weak network position, and they have a peripheral role (Todeva, 2006). However, business networks are dynamic, and the network positions may change, sometimes rapidly and drastically (Håkansson et al. 2009; Easton 1992).

Actors make their relational decisions with reference to their network pictures (Ford and Ramos 2006). These decisions are supported and constrained by the other network actors' decisions and networking activities. These network pictures influence their networking actions, which arise in relationships. The results are network outcomes (Ford et al. 2011). However, network outcomes may be also an unexpected consequences of actors' purposive actions (Portes 2010). Ford et al (2011) draw the conclusion that network pictures, networking, and network outcomes also simultaneously cause changes in each other, which provide the essentials of business relationship management.

In sum, business interaction process between both business and non-business actors is always embedded in its network. The partners have their own network picture of the situation. These network pictures influence the actors' networking activities what in turn create the network outcomes. These network outcomes have different meaning for the actors and for the whole network.

In this paper, we focus on another layer of the A-R-A model (Håkansson and Snehota 1995). We study the appearance of a new institution on activity links. A new institution (VGM in our case) may also influence the actors' network pictures and consequently their decisions concerning their networking activity (Ford et al 2011). The results of the different network actors' networking activities are the network outcomes which influence the network structure. In turn, the network structure itself, and most importantly its dynamics, influences all the three layers of the network (Håkansson et al 2009). Consequently, studying how the amendment of the Verified Gross Mass system influences the different network actors' activities and their network pictures may help to understand the structure of the port communities more deeply.

3. METHODOLOGY

In order to investigate the organization of relationships in the port network, data was collected from stakeholders of the ports of Marseille and Le Havre in France in the form of open-question surveys. The participants and the questionnaire procedure is described in this section; the questions are provided in Annex I. Two analyzes of the data were then completed. First, an automated content analysis was completed using the software program IRaMuTeQ. Second, a linguistic analysis using Guillaumean linguistics was carried out on specific examples to understand the nature of the network pictures provided by the different interviewees.

1. The actors and relationships among the actors

France was chosen as a field of study for understanding network pictures because it is one of the major actors in the maritime world with the second coastal line in the world, deep-sea port infrastructures and major shipping lines such as CMA CGM, the third largest maritime company. For this study, we chose the following port communities: Le Havre and Marseille. In France, these ports are the two main ports and they have both similar (container, coal…) and different (oil, sugar, cruise…) activities.

Questionnaires were sent to 80 targeted managers, based on their position (decision level management), their companies (related to container management), and their involvement with the new VGM regulation. Out of these 80 managers, 23 provided an answer that was consistent enough for the study (more than a single sentence per open question). These stakeholders manage activities all along the so-called "supply chain," including port authorities, port terminal operators, shipping lines, freight forwarders, shippers, and institutions.

2. Analysis methods

Following the administration and the collection of the questionnaire data, two analyses were carried out. First, a lexicometric content analysis of the potential relationship between the actors of the port community was carried out using the software IRaMuTeQ. Secondly, a qualitative linguistic analysis was performed using Guillaumean linguistics. The details of analyses are provided here below.

a. Lexicometric Content Analysis

Content analysis is one of the accepted methods for analyzing texts in social sciences and for making valid inferences from oral or written texts (Silverman, 2001; Weber, 1990). This method, which is at the crossroads of linguistics and hermeneutics, seeks to understand the meaning of a text through its units and the frequency with which they appear (Mucchielli, 2006). We summarize the traditional process of content analysis including six steps (Weber, 1990; Mucchielli, 2006). First, the researcher establishes a corpus for his study. Second, he defines the "meaningful unit" in his corpus, depending on the data and the research objectives of the study. For textual data, the meaningful unit can be words, phrases, sentences, or paragraphs. Third, a coding scheme is created and tested for validity and reliability (Weber, 1990). Fourth, if this scheme is found to be valid and reliable, units are categorized through the coding process (Weber, 1990). Fifth, a statistical analysis can be performed on the coded data after the coding process is finished to see which units of meaning are the most frequent or appear most frequently with others. Sixth, the researcher makes inferences about the information contained in the data itself, about author of the message or about receiver of the message (Weber, 1990).

In recent years, new technology has facilitated content analysis. Following the research of Reinert (1990), the software IRaMuTeq divides a text into segments according to the researcher's definition of segments, identifies the active lexical forms (excluding grammatical forms such as "a," "and," etc.), and lemmatizes the text. The more often two words are found in the same segment, the more the two concepts are linked in the corpus. Therefore, the software

creates categories according to these statistical links. One advantage of the software is that the categories created are based on the statistical information about the proximity of words, generally corresponding to the existence of two words in a standard sentence, that emerge from the data itself, rather than on predetermined categories imposed on the data by the researcher.

A linguistic principle underlies the algorithms of the software: words that are often found in the same segment (and here we should interpret segment as sentence in the sense of a subject and a predicate) form a contextual field. A contextual field, it must be explained, is in opposition to the lexical field, which is a group of words that are intrinsically linked. The originality of the approach used in this article is to select a lexical field within the corpus – the actors – and to run a contextual field study. We made this choice in order to map the relationship between the actors. The relationship is measured according to the co-occurrences in the corpus and repetition of these co-occurrences. Results of the mapping are shown in the Figure 1 in the Results section below.

b. Guillaumean Linguistics Analysis:

While the lexicometric analysis allows us to see the words that are linked in the corpus, we also wanted to understand the nature of the link between words specifically referring to the port community and the representation of the different roles of the actors in the port community. We therefore carried out a linguistic analysis of the verbatim. In the following paragraphs, we first present the linguistic theory and model used. Second, we specify which words were analyzed.

First, this analysis employs Guillaumean linguistic theory, a theory, which even before Cognitive linguistics, proposed a link between cognitive processing and linguistic representation (Hewson, 1995). Given that the focus of this study is actors, we focus on syntactical roles associated with the verb and its arguments in the verbatim. The verbs' arguments involves the role of agent and patient, and is specifically adapted to understanding how the actors of the port community represent their roles and the roles of other members.

For this analysis, we adopt the analytic tool proposed by Chevalier (Chevalier, 1978), the "chreode." This model of the verb includes two arguments and an action, the gene – the generator of the action (historically called the "agent") – and the site – the argument that receives the action (sometimes called the "patient"). Every verb includes these two arguments, and the transitivity of the verb is determined by whether the verb accepts that the arguments be filled by the same noun (intransitive use) or are necessarily filled by two distinct nouns (transitive use). In the creation of a sentence, the speaker chooses one of these arguments as the subject of his sentence.

Second, for this analysis, we began with a concept that is central to VGM issues and which, in a certain sense, unites the actors of the port community: the "container." After this analysis, we moved to the analysis of words that can represent the port community: "community," "port," and "stakeholder."

4. RESULTS

The lexicometric analysis of the questionnaire provides two major results: the representation of network actors and the representation of network pictures according to the descriptions of the participants. These results are detailed in the paragraphs here below.

1. Lexicometric Analysis: Network Actors and Network Pictures

a. Network actors

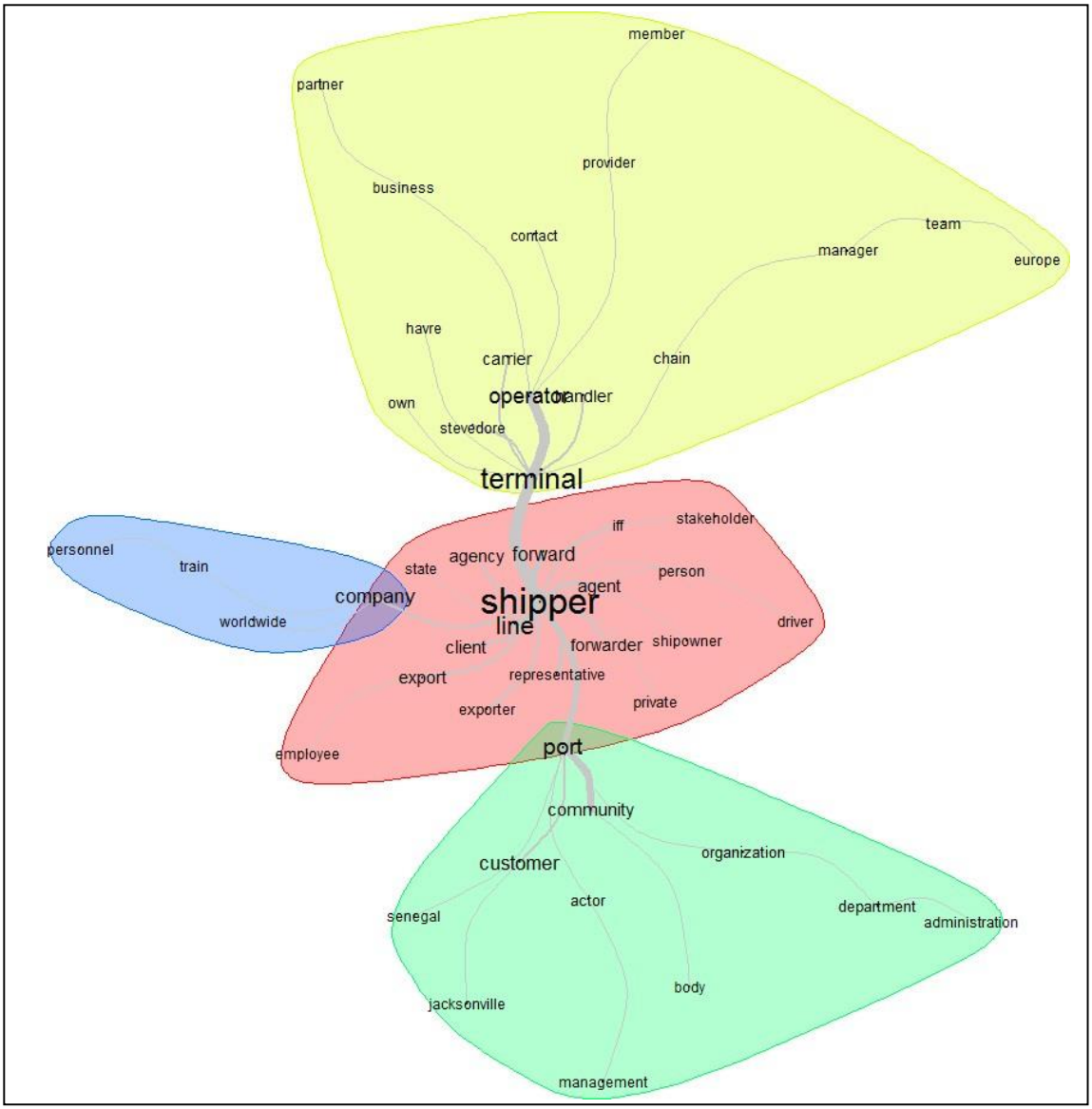

Figure 1: Results of mapping (Source: Authors' elaboration based on IRaMuteQ, 2018)

First of all, from our interpretation of the lexicometric analysis shown in Figure 1, the actors that are cited in the corpus of 23 open questionnaires are of three different levels in the organization. There are the individuals such as employees, managers and drivers; the companies such as the shippers, the port, the handler, the operator; and the organizations such as community, State, administration, France, Marseille, Le Havre.

Then, the software regroups the actors in four groups. We interpret that the central group with the strongest relationships is composed of the main actors of the container supply chain. This can be interpreted as the core of the port community with the shipper, the freight forwarder, the agent, the client, the stakeholder, the state, etc. From this core port community, three groups emerge. The first one (in blue) seems to be the company and its employees, the second one (in green) that emerges from the port and regroups several administrative actors, sometimes

overseas. This second groups seems related to international trade. The third one (in yellow) regroups actors of the inland physical logistics, through the operator of terminal, stevedores and carriers.

Such a representation is quite interesting with a central group of the local port community and on its side the local companies' individuals, and above the hinterland actors, and under, the international trade actors.

This representation, however, is an aggregated representation of the network of actors from all the respondents. When we group the respondents depending on their activities, five main groups emerge that are significant enough to run a subcorpus analysis. These groups are made up with the Port Authorities and the Unions of port actors who constitute the regulating and political bodies of the port, the freight forwarders, the shippers, the shipping lines and the logisticians represented by the terminal handlers and the carriers.

Table 1. The five main groups

Respondent	Nbr of Texts	Nbr of Occurrences	Nbr offorms	Occurrences of Port	Occurrences of Shipper
Port Authority & Union	3	1 555	510	22	19
Freight Forwarder	5	2 640	681	16	34
Shippers	5	2 715	797	6	21
Shipping Lines	6	3 077	688	14	47
Terminal & Carrier	4	2 553	689	4	24

Source: Authors' elaboration, 2018

These five groups are consistent in terms of numbers of questionnaires (i.e.Texts), as well as occurrences and forms. The two main occurrences of actors from our corpus, shipper (in terms of number of occurrences) and port (in terms of concept) have different distributions among the groups of respondents. All groups except the Port Authority & Union give more importance to the shipper compared to the port.

b. Network pictures

When one looks at the contextual fields of actors at the level of the groups, there are major differences of perception of the network of actors. The main differences come from the mapping of the discourse of Port Authorities and Unions and the Shippers. As represented in Figure 2, the former group represents a sequence of actors in the manner of supply chain, from the stakeholder of the shipper, to the member of the port community system and through terminal and port. In comparison, Shippers consider themselves at the center of a network of relationship with three main groups: logistics and physical operations (operators, terminal, handler and carrier); administrative management (destination, port, administration, department, manager); and supply chain management (freight forwarder, agent, company, customer).

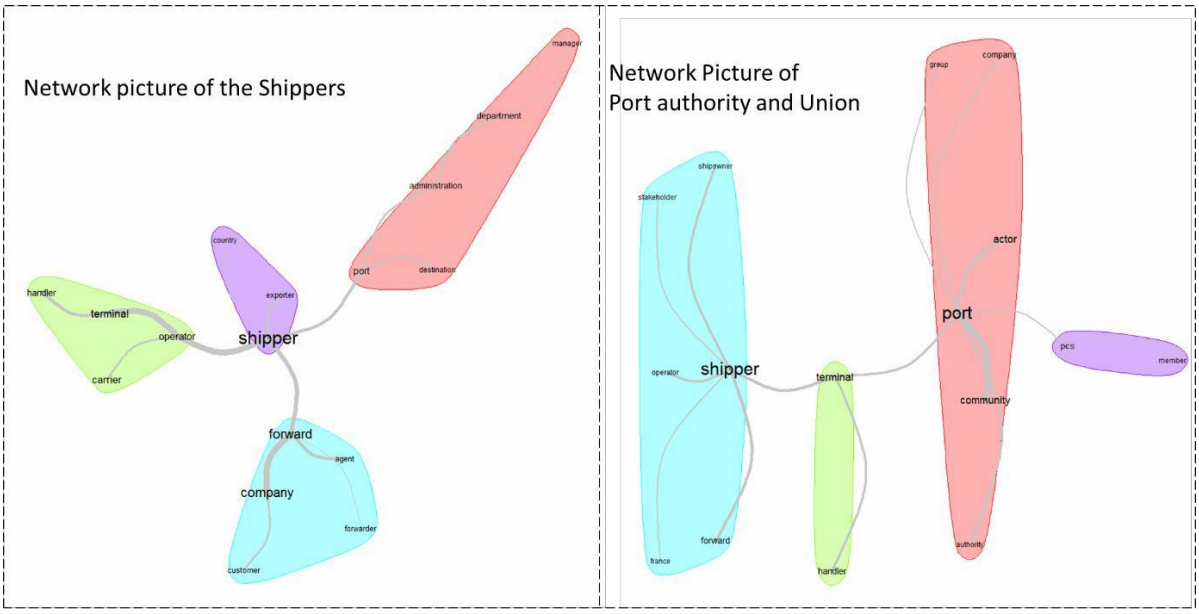

Figure 2. Network pictures of shippers, Port Authority and Union

Source: Authors' elaboration based on IRaMuteQ, 2018

When focusing on the three other groups, we observe perceptions of the network centered around Shippers, but from different perspectives. Both freight forwarders and shipping lines see the shipper in between of the port and the terminal. They however have a complimentary perception since freight forwarder have more networked perception of port and linear sequential perception of terminal while Shipping Lines have a networked perception of terminal related actors and a sequential representation of port related actors. This tends to show that supply chain is complex and one can conceptualize the part he knows better as a complex network while the parts that are less known are rationalized as a logical sequence. Terminal Operators and Carriers are not directly linked to shippers and it appears in the mapping since there are three related concepts being port, operator (terminal one) and shipper, each of them has two branches but then is very sequential.

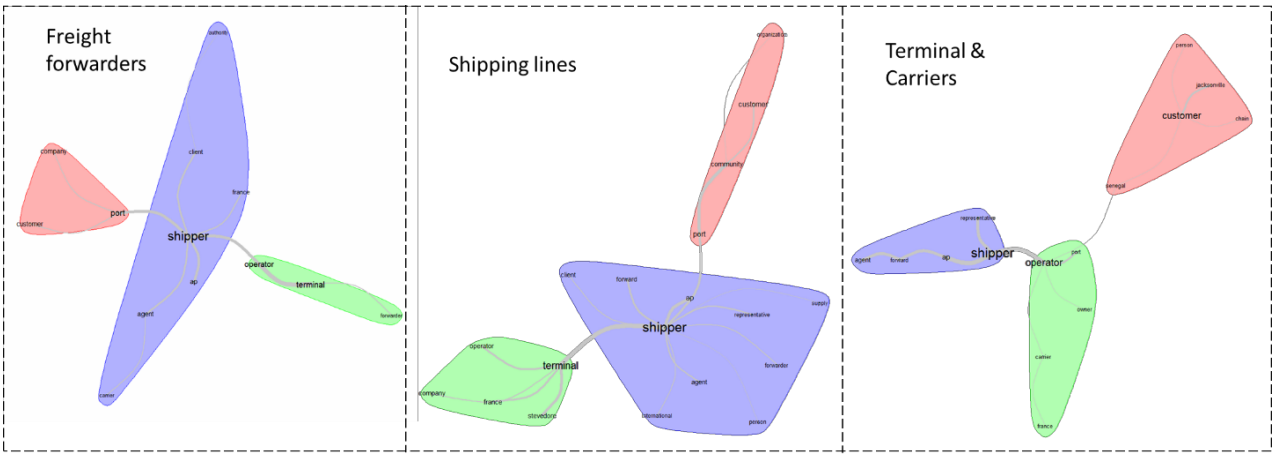

Figure 3. Network pictures of Freight forwarders, Shipping lines, Terminals and Carriers

Source: Authors' elaboration based on IRaMuteQ, 2018

What we can conclude from this analysis is that the actors of the port community do not have a common verbal representation of this community. Moreover, the closer the actors are to the actual port operations, the more complex is their representation of the port community network. In addition, the farther actors are from operations, the more they represent actor network as a sequential one. Complexity is rationalized with a representation of a sequence of processes we usually name "supply chain."

2. Guillaumean linguistic analysis: words describing actors' relationships

Now that we seem to observe representations of a consistent link between the actors of the port community, representations which are not as linear as the models proposed by supply chain theories (Chopra and Meindl, 2009), it is interesting to look at the way these actors are related.

We began our analysis with "container." "Container" appeared often as the site of transitive verbs in the role of the direct object.

In the verbatim, as expected, the container appears to be the object that links the actors together, as they weigh it, put it on hold, etc. However, while the container is the key linking element in these examples of discourse, the exact roles of the actors around it are not always specified. Many examples of containers that are "acted upon" without the responsible actor being identified as the gene.

In these verbatim, the actor focuses on his role concerning the containers and does not focus on whose role or responsibility it was to pack or stuff the container, or present it to the terminal. It is as if the identity of the actor who acts on the container before or after the actor who is speaking is not a key element. In this silence, we can ask whether it is not the "port community" or network that is responsible but unidentified by the speaking actor.

As the port community was not specifically mentionned in these examples, we decided to analyze three words which could be used to refer to the port community: "community," "port," and "stakeholders." In the following paragraphs, we analyze the use of these words according to the speaking actor.

The word "community" is used in two ways. First, when used by the Port Authority, it seems to refer to a network of actors. The second use, and the one that is used in the grand majority of cases, is the group "port community system":

In addition to being part of the group "port community system," the word "port" is used in two other major ways, which counterbalance the uses of the word "community." First, when it is the Port Authority who is speaking, "port" seems to be used to refer to the Port Authority itself, at times in the syntagme "port authority," which is represented as an actor and for this reason can take the role of gene of the verb and subject of the sentence:

In contrast, when the other actors used the term "port," the actor referred to the port community as a whole and not only the Port Authority.

Another observation concerning these examples is "port" is not the subject of verbs. It qualifies a noun as a part of the community, without identifying the specific actor for which the "employees" or "workers" work or which specific actor is responsible for the weighing process.

The final term analyzed is “stakeholder.” This term appears in only three verbatim and for this reason, is rather marginal. However, in these example “stakeholder” seems to be a vague term, which identifies an actor as interested, but does not specify the role of the actor in the community.

5. CONCLUSION

We carried out expert interviews completed by a content and lingusitic analysis of open questions questionnaires. Our results allowed us to identify the main stakeholders involved in the VGM process, their belonging to specific groups, and to understand their respective role. Additionally, this method highlighted the key features and underlying links of a port community.

Finally, we have demonstrated that port community is not organized as a liner chain but rather as a network of actors, called “port community” that can be considered as client of the port, supplier of the port, stakeholder of the port, and member of the port depending on the perspective of the network picture.

Moreover the results show that traditional main stream supply chain perspective fails to represent this community, delimit it and represent it in the mind of involved actors. There is no consensus toward the terms to use, nor clear verbal representation of what port community is. The results also show that port community is a complex network with fuzzy borders and actors can only bear this complexity in their close network. Further in the network, their representation is more sequential and this is probably where supply chain representation helps rationalize.

Another finding is the focus on movements within the representation of surveyed actors. Container is seen as a link in the supply chain, while actors and their activities are not mentioned clearly. Linguistics analysis emphasizes the passive representation around container’s supply chain. This lead the authors toward new perspectives of research on ARA model in order to map networks of resources and networks of activities to measure the match with the representation of the network of actors and also with the traditional representation of supply chain.

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ANNEX I : QUESTIONNAIRE

1. How is VGM implemented in your organization?
2. What has changed in your organization since VGM took effect? People changes? Process changes? Technology changes?
3. What do you see as the impact of VGM on shippers? Governments? Seaports? Shipping lines? Handlers? (possibly create a cognitive map – compare the perception of each of these groups)
    - **a.** Cost:
    - **b.** Process:
    - **c.** Timeliness:
    - **d.** Responsibility:
    - **e.** Tolerance for error accepted:
    - **f.** Sanctions for non-compliance:
4. What have you observed in terms of delayed shipments, non-loading operations due to non-compliance and other implementation struggles?
5. What is the chain of communication among the shippers, shipping lines and terminal operators?
6. What will be required for VGM to have an impact on safety?
    - **a.** Level of adoption?
    - **b.** Legal requirement and penalties in place?
7. What is the cost of VGM and who pays the price?
8. Who is responsible for monitoring the implementation of VGM?