

Conceptual Analysis for the Strategic and Operational Knowledge Management of a Port Community

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Ports working in a network-community that is composed of a group of associative enterprises and logistic chains require managing their strategic and operational knowledge for achieving the efficiency of their activities at both levels. A conceptual model is presented that allows the development of a strategy for a port community through a strategic planning approach using operational knowledge. The different actors that participate in the community, their roles, and the main processes in which they participate are characterized. Then the vision and the mission of the community, and the strategic objectives in the four perspectives of the Balanced Scorecard: financial, clients, processes, and learning and growth, are defined. Finally, a set of indicators oriented toward the knowledge management of the main actors participating in the community is designed.

Keywords: Strategy; Knowledge Management; Communities, Business Plan, Balanced Scorecard

1 Introduction

Organizations, whether companies or communities, are faced with the imperative need to establish long-term competitive advantages that can be adapted, in their nature, to the changes required by their action environment. The knowledge of an organization is a high value intangible asset which, although not recorded in the accounting or financial statements, contributes substantially to its results [2]. Knowledge must be managed in a strategic manner and must be aligned with the strategy of the organization, and allows it to learn at all times [9], [15], [19].

Ports working in the modality of network-communities are composed of associative companies and logistic chains that have a multiplicity of actors (with physical and informational flows), among them port companies, outer ports, port terminals, cities, and public and private organizations that support export and import activities [5].

Future ports can be seen as “producer - transport - port communities”, “port - port communities” and “port - transport - client communities,” and “city-port communities” that must share a common vision and strategy, in an effort to satisfy their different stakeholders and society as a whole [7], [1],

and [11].

The value creation process by means of knowledge management in communities brings up the need to integrate personal and organizational intelligence into the collective management processes, generate learning mechanisms, interconnect people to dialogue and learn together, and design knowledge transfer mechanisms among the members of the community [6]. One of the experiments that should be highlighted is the management system developed in the port of Yantian in China by YICT and the Easyport [3].

This project considers a port community system that allows sharing information with the different agents that participate in port activity, and it has led to improved port efficiency and supervision. In this context methodological proposals have been developed that set the mission, vision and strategic objectives for the whole port community in the four perspectives of the Balanced Scorecard [14]. It therefore becomes necessary to identify the indicators related to knowledge management for the port community that show the added value and the efficiency of the activities of interest to the whole community.

2 Actors in the Port Community

Main Actors in the Port Community.

The Port Community is composed of a set of actors that are related to the logistics lines, among them the Port Authority itself. It is centered on the port's setting, in the same region, and is part of it [16]:

The Port Company is very important because it is the Port Authority that leads and drives the Port Community [8]. It leads the logistic chains and the development of the information systems used by the other actors in the port system. The Port Company is autonomous from the State (port logistics and authority) and is the owner of its facilities according to productivity indicators of ECLA [4]. It provides not only the infrastructure of the port terminals. It is not concessioner and is operated by the Port Company under a multi operator scheme. It does not include cargo moving jobs (they correspond to private companies). It does not have heavy machinery and it has physical and structural limitations. The Port Community is formed by multiple actors that participate in the processes related to a port's activity. However, in previous studies [5] it was detected that the three most relevant knowledge management actors that use efficiency and effectiveness measures are:

- Port Company Terminal.

They are companies in charge of the administration and operation of port terminals. They correspond to companies that render maritime/port services linked to the ship and the merchandise. They have fixed and mobile equipment: different capacity cranes, tractor trucks, and others. The Port Company is very important because it is the Port Authority that leads and drives the Port Community. It leads the logistic chains and the development of the information systems used by the other actors in the port system. The Port Company is autonomous from the State (port logistics and authority) and is the owner of its facilities according to productivity indicators.

- Outsourced Port Terminal.

They correspond to the concept of outer port where logistic activities are carried out that increase the port's productivity. They also use technologies that improve the operational efficiency of transporters and of the terminals. It is a zone under concession.

- Export and Import Logistics Chains.

They correspond to the set of companies that ensure that the import/export process is fulfilled completely. The companies that make up these chains are in some cases competitors among themselves. Figure 1 represents the import and export processes.

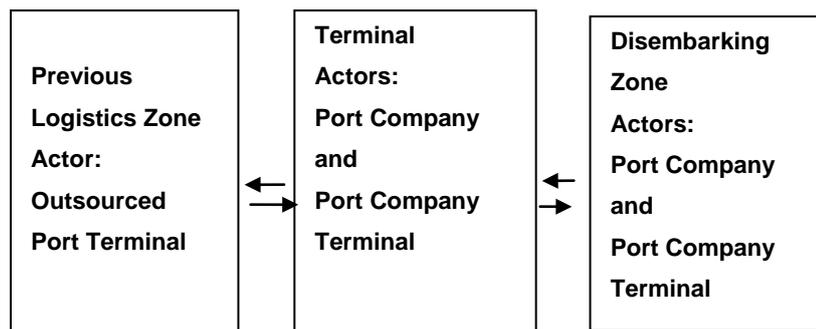


Fig. 1. Actors in the import and export processes.

Figure 2 shows the actors with their import and export logistics chains, which are repre-

sentative of the type of cargo used at the port.

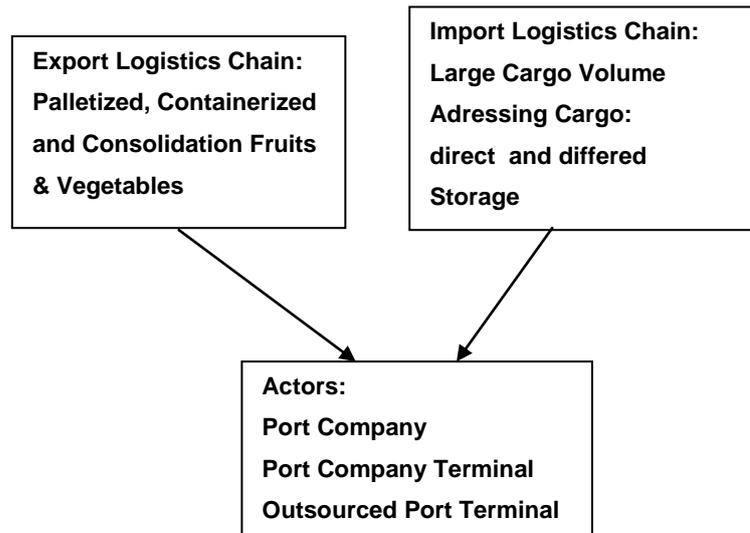


Fig. 2. Actors and the Logistics Chains.

The processes contain sub processes which in turn contain activities. The activities must be measured and must generate jointly indicators that are useful to the Port Community. Figure 3 shows some activities of the Previous and Terminal Logistics Zone sub processes. It is important to point out that these

sub processes have activities that must be measured and jointly generate indicators that can be shared by the actors of the port community. Figure 4 shows the activities of the Terminal Sub processes of the Export and Import Logistic Chains.

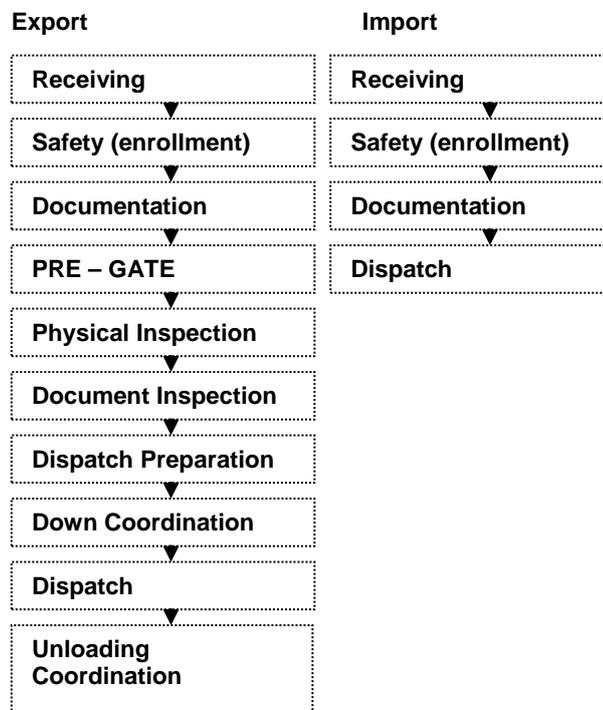


Fig. 3. Previous Logistic Zone Sub processes of the Export and Import Logistic Chains.

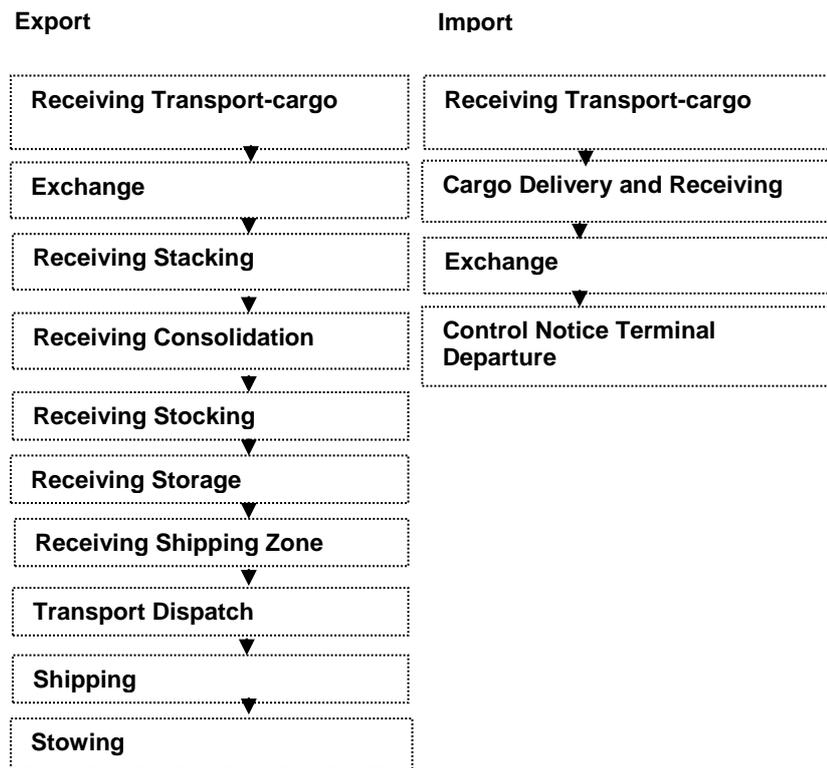


Fig. 4. Terminal Sub processes of the Export and Import Logistic Chains.

3 Development of the Strategy of a Port Community

Mission of the Port Community Actors.

The mission of an organization or company reflects the organizational purposes and its leadership with respect to its clients and the delivery of products and/or services [17], [18]. It must be composed of four fields of action: services, markets (or clients), geographic setting, and leadership factors (critical success factors).

The mission of each of the Community actors that generate knowledge based on efficiency and effectiveness is:

- Port Company: "Make the port attractive to the participants in the transport logistics chain, the investors, and the citizens. It must stand out, in the national and international port sector, for its infrastructure management, port facilitation, and sustainable development".
- Port Administrator: "Administrate the port".
- Port Company Terminal: "Operate and manage a Port Terminal."

- Outsourced Port Terminal: "Integrate our clients' logistics chains by means of a cargo services platform, with high levels of quality, safety, innovation and technology oriented at facilitating international commerce in a harmonic setting aligned with the environment."

To form a single business model it is necessary to have a single mission that integrates the interests of the three actors. To achieve this objective the following scopes will be analyzed:

Port Service: export, import, loading, unloading, cargo consolidation/deconsolidation, cargo storage, transport (sea, land, air).

Market: import and export companies of the mining, forestry, agriculture, and retail activity sectors.

Geographic setting: for importers it is the national territory and for exporters it is the European Zone, North America, Central America, Asia-Pacific, Latin America.

Unique competencies: agility in processes, technology, costs, prestige, and trademarks of global maritime transport, service quality.

Port Community Mission.

The missions of the actors are complemented so that a single mission can be established for the Port Community:

“Make the port attractive to the participants in the transport logistics chain, the investors, and the citizens. It must stand out, in the national and international port sector, for its infrastructure management, its port facilities, and sustainable development. It must administer and operate the Port with its Terminals, integrate the logistics chains of our clients by means of a cargo service platform, with high levels of quality, safety, innovation and technology oriented at facilitating international commerce in a harmonic setting aligned with the environment.”

Perspectives of a Port Community.

The perspectives in the context of the Balanced Scorecard allow to explain and to classify the Port Community strategy [10]. There are two types of strategies: external and internal. External strategies correspond to the financial and customer perspectives; they represent the results of the acting of the Port Community. Internal strategies include the process and learning perspectives; the objectives in which the Port Community has images of acting.

The methodological proposal MAPA is used to establish a single mission port community. This model is based on the RUEDA Knowledge Management Model [14]. The methodological proposal designs the mission through the import characterization of the Port Community and answering questions related to the transformation, actors, suppliers, clients, controllers, and owners.

The external and internal perspectives of the actors of a Port Community in the Balanced Scorecard context can answer the questions of the MAPA methodological proposal.

- Financial perspective: Generation of added value to achieve maximum profitability of the companies that operate in the port, as well as of the port authority. This means value to the environment. The

Transformation question is ¿What does it deal with and what is its result?

- Clients' perspective: Value to the surroundings, efficiency and integration. Maximize the generation of the port's added value, achieving maximum efficiency and competitiveness in service rendering, maximizing integration of the port with the surroundings. MAPA: Client question: To whom are the products and/or services created by means of the transformation process offered? Where are the products or services of the actors of the Port Community offered? These are questions that apply market segmentation techniques: types of clients, location, income level, main interests [13].
- Internal process perspective: Commercial and operations management with value to the surroundings, efficiency, profitability, and integration. MAPA: transformation questions. What are the present actors of the port community doing? Which are the starting materials used to carry out the transformation that characterizes the companies that participate in the Community?
- Learning and growth perspective: Value to the surroundings. The question is based on the leadership factors shown by the companies participating in the Community. How are the actors of the Port Community different?

Strategic Objectives.

The main strategic objectives in the context of the Balanced Scorecard are grouped for each of the perspectives. They must be desirable, feasible, quantifiable, understandable, motivating, and consensual [12]. Each objective has indicators, some of which are presented below:

- The financial perspective has Productivity strategy as its objective. It is aimed at measuring the profitability of the Port Community actors that are part of the business (it is related to the risk). The Port Community and the Port Company Terminal are considered different businesses because they have different taxation identification. By law the Outsourced Port Terminal and the Port Com-

pany form a single business with the same taxation identification.

The objective has the following indicators:

EBITDA: this indicator represents the Earnings before Interest, Taxes, Depreciation, and Amortization. It measures the profitability of each business, the Port Community and the Port Company Terminal, providing an approximate value of each organization or company.

ROA: this indicator represents the Return on Assets. It measures the profitability of the assets owned by the Port Community, the Port Company Terminal, and the Outsourced Port Terminal. It refers to assets such as land, buildings, and machinery.

- The client's perspective has Traffic Growth as its strategic objective. The Port Company and the Port Company Terminal each provide the infrastructure (terminals) required to increase the cargo traffic of the export logistics chains. They are the owners of the facilities (machinery and equipment). The objective has the indicator:

Traffic Movement (%): It measures the annual cargo traffic by type of merchandise.

- The Client's perspective has as strategic objective the Value for the client. The Port Company together with the Outsourced Port Terminal have the indicator:

Gross value added (GVA) generated by the conventional port activity. It is the difference between a company's inputs and outputs. It includes the company's labor costs, the intangibles amortizations, and the profit or loss (before tax).

- The internal process perspective has as strategic objective the Operations management process. The Port Company and the Port Company Terminal are the owners of their terminals. The indicators are related to the maximization of the productivity of the port operations at the terminals. We can have the indicator:

Mean terminal productivity index (%): It measures the cargo transferred at each terminal in TEUs and in Tons.

- The internal process perspective has as strategic objective the increased logistics activity of the port. The objective is related to

the delays at the Outsourced Port Terminal, which start when the trucks arrive and end when they get the permit to go to the port. The delays slow down the process. We have the indicator:

Average attention rate of a GATE (daily): Each cabin takes care of trucks that generate waiting lines. The entry data are verified at the cabin.

- Learning and growth perspective as Strategic information capital. The Port Company and Port Company Terminal have this objective because they are businesses with different taxation identification. We have the indicator:

Result of the exploitation: It shows the financial performance originated from carrying out the activity of each of the businesses. It is oriented at optimizing the management of operational costs and investments of the Port Company as well as of the service rendering companies (it is associated with the risk).

- Learning and growth perspective: as Technological Innovation in the Management. The Outsourced Port Terminal has Technology of Information and Communication (TIC). It uses its own system that allows sending SMS and electronic mail, coordinating and supervising the internal documentary processes of the Outsourced Port Terminal, and communicating with the Port Company. It has the indicator:

Rate of approved electronic documents (%): It processes electronic documents in which typing errors and delays occur between the time a task is requested and the time it is executed.

4 Strategic Planning of a Port Community Strategic map.

The strategic objectives arranged according to their perspective must be integrated and aligned with the strategies of the Port Community [10]. In the Strategic Map the strategic objectives are classified according to the growth and productivity of the Port Community in agreement with its perspective. The Outsourced Port Terminal shows strategic growth objectives. The Port Company and the Port Company Terminal show strategic

productivity objectives. Figure 5 shows the strategic map of the Cause – Effect relations between the indicators.

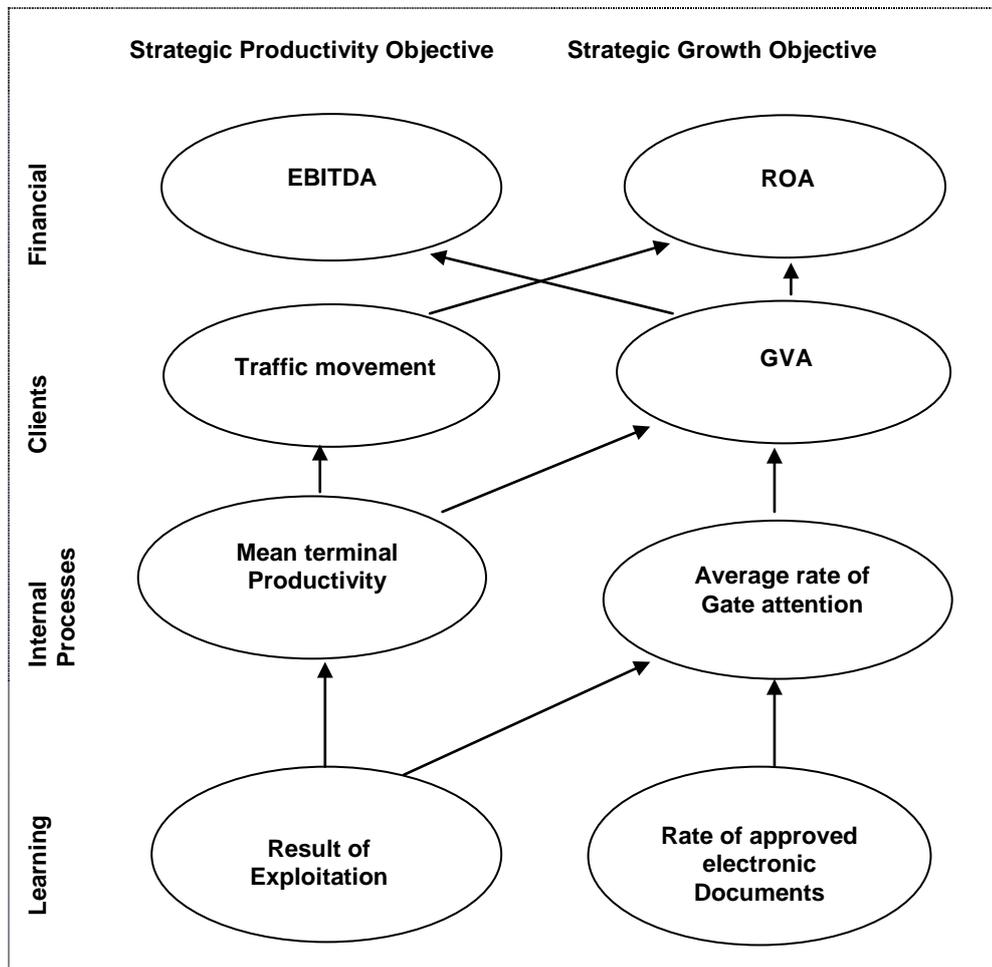


Fig. 5. Strategic Map.

Indicators.

The indicators are classified according to the financial, client, process and learning and growth perspectives:

Financial Perspective: the representative's indicators of this perspective are ROA and EBITDA.

- ROA of the Port Authority: it measures the annual variation (%). It reflects how profitable the business is.

$$ROA = \frac{Udi}{I} \times \frac{A}{TA} = \frac{UP}{TA} \quad (1)$$

Ud_i: earnings after taxes; I: income, A: assets
 UP: fiscal year profit loss, TA: total assets
 Land, buildings and machinery are considered as assets.

- Percentage of companies with EBITDA > 0

EBITDA: It is calculated with a company sample. It is not an accurate measurement, but it attempts to isolate the cash flow generation capacity of the company's operation.

$$EBITDA = \text{Earnings before interest} + \text{taxes} + \text{depreciation} + \text{amortization} = \text{gross operational profit} - \text{depreciation} - \text{amortization. Taxes are not included.} \quad (2)$$

The value of EBITDA greater than zero is used to know if the company will go broke in the future, i.e., if cash is going into its current account.

Client's Perspectives: the main indicators in this perspective are traffic turnover, gross value added and labor cost (confidential).

- Traffic turnover: It measures the variation (%) from one year to the next of cargo traffic by kind of merchandise. Only general containerized, dry, and refrigerated cargo and fractionated cargo is transferred. General cargo includes containers and fractionated cargo, and it is measured in tons.
- Gross value added (GVA) generated by the conventional port activity: The annual variation (%) of the GVA is measured.

GVA = labor cost (includes social security) + amortization of intangibles + result before income taxes and extraordinary items (profit or loss). (3)

Labor cost is confidential information of the company.

The nominal value is expressed in pesos.

Internal process perspective: the principal indicators are the mean terminal productivity index and the average attention of a gate.

Since there are two terminals, $i = 1, 2$.

- Mean terminal productivity index (%)
- $$= \frac{\text{Ton}S_i}{\sum \text{Ton}S_i} \quad (4)$$

TonSi: tonnage station i .

- Average attention of a GATE (daily)
- $$= \frac{\sum \text{Ttruck}_i}{\text{Tottruck}} \quad (5)$$

Ttruck _{j} : attention time of a truck j .

Tottruck: total number of trucks at a GATE in one day.

Learning and growth perspective: the principal indicators of this perspective are the result of the exploitation and the rate of approved electronic documents.

- Result of the exploitation: It measures the annual result obtained from the operation of the business; this indicator serves only to see if the company has been doing well or not.
- Rate of approved electronic documents (%) = $\frac{N\text{Doc}A}{\sum T\text{Doc}}$ (6)

NDocA: number of documents approved in one day.

TDoc: total number of documents processed in one day.

5 Conclusions

The Port Community is composed of different actors that are related, giving rise to a flow of information that can be transformed into a knowledge generating source. Each actor of the community had a different mission. In this work a single mission for the Port Community was achieved in order to complement the different missions of the actors participating in it. This unique mission has provided both common objectives and strategies for an organization that can be analyzed by means of the Balanced Scorecard. The perspectives can be obtained according to the MAPA methodology.

Those indicators strategic and recurring operational were selected, based on the generation of knowledge on interviews with different actors of the port community. A strategic map of productivity and growth classified according to the perspectives of the Balanced Scorecard is designed with the selected strategic and operational indicators. The design of indicators is aligned with the strategies of the port community that is generated with no elaborate information of the port authority.

A difficulty encountered in the design of indicators is that the port community does not act as a cooperative system that each actor maintains the confidentiality of the information that is required to develop strategic and operational indicators. This makes it difficult to generate knowledge and makes the actors to act on a competitive basis. If there is no cooperation between the actors the assessment of rates could not be useful for the port community because that could generate incorrect results or cancelled. If it does not manage their knowledge adequately, the port community may not efficiently compete with other ports around the world.

It is believed that the lack of cooperation between stakeholders could be consequence of the interaction that occurs in a system comprising both by public and private actors.

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