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## Evaluation of intangible assets and best practices in a medium-sized port community

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### Abstract

This paper analyses the main factors involved in the knowledge management of different actors participating in a Chilean port community. The intangible assets participating in the creation of value of the port community, which are expressed in ideas, attitudes, perceptions, experiences, information and knowledge management, are evaluated and classified according to community members' core competencies. Then, the current situation of public institutions and companies participating in the port community is diagnosed utilizing interviews to experts and relevant actors. The role of the intellectual, structural, and social capital is examined in relation to strategic statements present in the missions of public and private port system companies. The results of the assessment enable to identify the main critical factors in knowledge management, transference, dissemination, collaboration and team work, storage, and best practices. In particular, the Conversation System stage of the Primary Model is analyzed and evaluated, as well as its causes, by actors of the port community and experts. Initiatives fostering collective work and encouraging conversations are proposed. Some of the best practices developed by the port community to create and disseminate stakeholders' knowledge are presented. Also, a set of knowledge management indicators and indexes is developed and presented.

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### 1. Introduction

With globalization and continuous technological advances, it is increasingly more necessary to deal with the knowledge society. Currently, organizations are embedded in political, economic, social, technological and environmental settings continually changing; therefore, they are forced to adapt quickly [1]. To adapt to the environment, each actor must incorporate in his/her own factors knowledge, strategies that allow him/her to manage his/her social, intellectual and structural capital [2-4].

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It is necessary to observe Chilean ports as systems with mixed networks permanently improving, composed of tangible and intangible assets that are more complex to measure. Non-explicit intangible assets represented in ideas, perceptions, experiences, information management, and attitudes are important to evaluate and classify. On the other hand, port relationships with society show the importance of the social and relational capital. The port - city interaction generates positive and negative externalities since ports are built in physical spaces and citizens who make an economic impact become a concern for public organizations [4-6]. In addition, the discussion topics generated between public and private actors of the port system during their informal relationships can be represented by those concerns and negotiations coming from private businesses, social groups, trade associations and public organizations. It is noteworthy that public or private union leaders are constantly conversing with port stakeholders and, in case of not setting an agreement; they paralyze port activities generating shortages in markets to halt the import and export of goods. This situation causes micro and macro-economic problems since the quantity of goods is reduced in some markets and the country's economy decreases (the GDP decreases) [7-11]. This work aims to identify some intangible assets related to the existing tacit knowledge in the Chilean port system. Informal relationships that turn knowledge into action are translated into explicit indicators and indices and later analysed to make the social and relational capital, managed by each actor of the medium-sized Chilean port system, a useful tool.

## 2. State of the Art

Knowledge plays an important role in the development of communities. Different authors conclude that it is personal; it originates and resides in people, as a result of their own experience. Knowledge use allows us to understand those phenomena perceived by people and also to evaluate them; it serves as a guide for people's action [4-7], [12]. In more recent times we can find references to knowledge characterization from a business perspective, under the heading of explicit knowledge, which can be found directly in instructions, manuals and standard operating procedures; and tacit knowledge, learned and acquired indirectly through experience and values [13]. The strategic plans port companies develop favor the design and implementation of port business platforms and Knowledge Management, in order to promote foreign trade and the creation of new businesses, also providing a higher quality of port services, and the growth of the structural capital of the companies [4-10].

Some authors have identified different mechanisms and operations of subsystems, as well as ICT systems required for the port connectivity systems [8-14]. Also, it is possible to associate the development of knowledge synergy to the network of organizations participating in the community that make use of ITC [8-10]. On the other hand, knowledge creation plays an important role in the innovation processes developed by the members of a community, using phases of socialization, externalization, combination and internalization [8], [13-14]. Companies participating in the port community develop appropriate strategies to achieve a proper choice for the integration of special technologies and the development of learning capacities [7-8], [15-16].

Several authors favour the idea that it should be the port authority who should lead the port community under collaborative management, allowing the various actors to move forward together toward common goals, to improve the port competitiveness and innovation activities [17]. Public and private community companies invest in networks of knowledge innovation and transfer, improving the intellectual and structural capital of all actors including their supply chains [4], [18]. It is recognized by different authors that when organizations share knowledge, are better prepared to learn together and collaborate in joint activities, acquiring new skills and abilities in knowledge management [4]. Some KM-enabling skills include: business process identification and analysis; knowledge asset identification, creation, maintenance and exploitation; knowledge mapping and flow; change management; project management and Information structuring and architecture. In this context, it is necessary to go deeper in the primary model of knowledge management of the port community, and in particular in the factors that promote collaboration and coordination among actors [19]. KM measurement is directly related to the success achieved by organizations and they are made explicit through the Balanced ScoreCard [20]. Other assessments may give an account for the intellectual, structural and social capital [21].

### 3. Method

#### 3.1. Collaborators in the port community

The port community is composed of a set of actors and stakeholders that act independently but collaborate among themselves through a Logistic Forum. Different public and private companies sharing activities, information and knowledge are identified: Port Company, Port Terminals, Export Associations, Leasing Companies, National Fishing Service, Regional Health Service, Logistics Associations, Sea Port Chamber, Customs Chamber, Agriculture and Live-stock Service, Port Captainship, National Association of Customs Officers, Truck Owners Federation, Regional Customs Board, Shipping Association and outsourced logistics services. The Logistic Forum (FOLOVAP) facilitates the exchange among foreign trade organizations. Also, it allows to pursuit integration of the community, facilitating the development of innovative solutions and contributing to improve port competitiveness. This organization integrates the different actors dealing with the Administration and the Port Operation, and is involved in the political, economic, social, technological and environmental aspects of the community. The actors participating in the port community have representatives at the regional level, who use the FOLOVAP logistics forum to discuss common issues and make decisions together. The actors participating in the logistic chain are not always integrated in a business model that generates a collaborative system for sharing information produced at strategic and operational levels.

#### 3.2. Creating value in the knowledge economy

The knowledge economy is based on intangible assets which turn knowledge into action, permitting the use of new technology networks. In the medium-sized Chilean port system it is necessary to determine and quantify intangible assets, so as to afford them and determine their variable and fixed costs that generate added value for knowledge management. In addition, when the value of intangible and tangible assets meet, Management can improve decision-making and define more efficient and effective strategies, strategic and operational objectives, targets and indicators. Moreover, under knowledge economy, port strategies must be defined and adapted to emerging political, technical and economic aspects that change ideas and call for constant innovation [10-11], [19]. It is important to examine the constituent factors involved in data, information and knowledge processing and the distinctive competences present in the port community, described in Fig. 1.

#### 3.3. Explicit and intangible assets in the creation of value for the port community

The port community feeds on traditional factors such as tangible assets: materials, energy, technology and money, that comprise the tangible capital owned by the community. However, the value process criterion that promotes the creation of new knowledge, feeds primarily on intangible assets, as shown in Figure 2. Three main actives are involved in this process: intellectual capital; organizational capital; and relational capital. Intellectual capital deals with skills, knowledge, motivation and training of people participating in the port community. Organizational Capital takes quality into account, shown by the companies participating in the logistic chain in their processes, products and services, which enable a competitive advantage. It also considers the research, development and innovation developed by companies participating in the community. It requires knowledge of the investments made to develop new products, new technologies, and improvements in the systems. Relational capital includes commercial and communicational capital. Commercial capital deals with the relationships with suppliers and customers of the chain supply, as well as their degree of satisfaction. Communicational capital deals with the resources intended by the different companies participating in the community in order to communicate among themselves within its marketing activities: sales promotion, public relations, advertising, and personal selling.

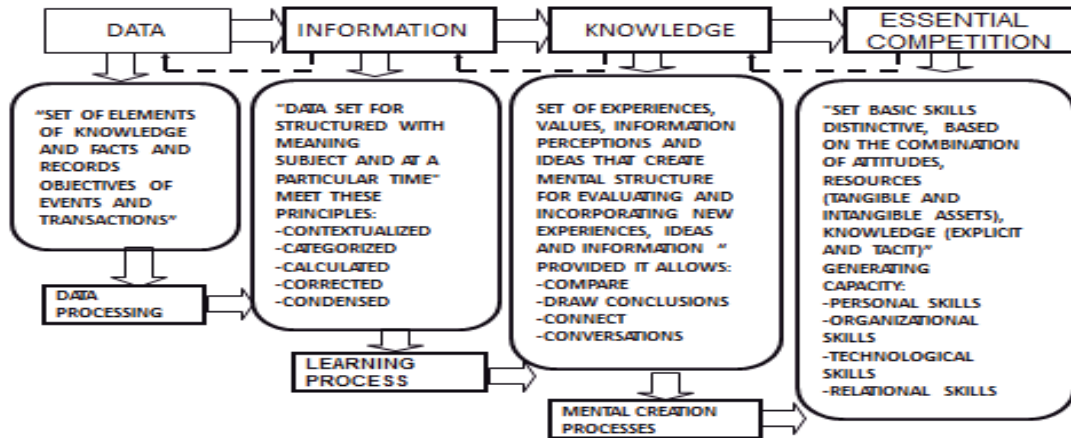


Fig.1. Creating value in the knowledge economy

## 4. Intangible Assets

### 4.1. Intellectual Capital

- Different Programs of Continuous Education in the areas of: Operations Management and Logistics, Certification in Labor Competencies, Energy Efficiency and Training courses for port service providers are developed by Port Companies.
- A lack of synergy of knowledge as well as of innovation networks involved in port activities is perceived.
- There exist a compromise of companies involved in port activities for maintaining an ethical conduct in the processes of decision making and daily operations.

### 4.2. Structural Capital

- A lack of operational coordination between the actors of the logistics chain is perceived.
- The logistics chains companies undertake to contribute to the continuous enhancement of processes.
- Public institutions that participate in the port community wish to provide specialized services in transport and transfers, and services related to this activity.
- Some private companies are developing innovative initiatives that add value to the members of the community.
- Information Technologies ICT's have increased the role of governance and have modified the role of the port management. Some ports lack a communications network for emergencies.
- The companies supporting port activities want to be recognized by the logistic services they offer on their platforms. Companies are affected by bottlenecks, in some of the services provided, and by the difficult access to the platforms.
- The surrounding population is not aware of the role of the port. They neither recognize the port as an economic engine, nor its strategic role as an infrastructure or its importance as an institution.
- Society only considers the port when a negative externality occurs and directly affects the population.

### 4.3. Relational Capital

- Companies part of logistic chains primarily use commercial criteria, and in some cases, environmental and social criteria in their steering, control and management systems.
- The port community demonstrates a permanent concern on media communication. Logistics forums collaborate in communicating knowledge transfer between the different participants of the port community. Valparaiso port created the FOLOVAP logistics forum, whose main objectives are to analyze and optimize documentary exchange processes and those related to the entry and exit of goods to and from the port.
- There are informal relationships of actors involved in the port community due to border problems between countries (case of the port of Arica).

Intangible assets are not shown explicitly; therefore, the Port Community involvement in the community and its environment is uncertain. The port administrator must learn and transfer business activities, represent trademarks, follow Joint Venture strategies, interact with a changing environment and is focused both in the institutional and regulatory frameworks. The port system requires management and measurement indicators and indices of organizational learning; measurements must be linked to human and structural capital [4-20-22].

### 4.4. Critical Factors in the port community

A medium-sized Chilean generic port is composed of private service providers, trade associations, social groups and public organizations of the State of Chile. It contains different actors who relate among themselves at the operational, business and strategic level in a mixed network [7-8], [20]. Some of the strategic statements present in their mission are shown in Table 1.

Table 1. Strategic statements present in the missions of public and private port system companies

Factor	Actor	Strategic statements present in the mission
Cultural	Shipping company	Deliver excellent customer service and shipping while respecting the environment and culture of the countries.
Leadership	Customs Chamber of Chile	...under ethical and social responsibility standards... assuming the leadership of the sector at national and international level.
Innovation and leadership	Production Promotion Productivity Development Corporation (CORFO).	Encourage entrepreneurship and innovation to improve the productivity of Chile, and achieve a world leadership position in the field of competitiveness.
Innovation Culture	Roads Directorate	...safeguarding their quality of life, promoting social, ethnic, gender equity, safeguarding road safety, giving environmental sustainability and systematically incorporating innovative technologies in the field of roads and transportation.

Port actors learn interaction and cooperation when they relate themselves; so, the port becomes a joint system. The interaction among themselves is made up of multi-criteria which may have greater or lesser

relevance, depending on the level of knowledge synergy that is generated. Synergy can be measured through the existing exchange among actors: information, data, knowledge and distinctive core competencies. With regard to a Chilean medium-sized port, there are different levels of knowledge transfer among private companies, trade associations, social groups and public organizations. To measure different aspects of knowledge, it can be concluded that there exists a low cultural exchange, dissatisfactions in the dissemination of knowledge, lack of collaboration and teamwork, little knowledge storage and emerging best practices [4].

Another factor related to knowledge, is the leadership exercised by the port administrator who acts as the leader of the port community, which is regulated by the State seaport law and State agencies in matters related to legal regulations and port infrastructure. In addition, there are technological processes innovation networks and their business Plan allows the integration of relationships between the port and the city to attend issues of social responsibility and sustainable development. On the other hand, to consider the interaction between the port community and its environment it can be observed that there is a low level of knowledge synergy, since the port community is more concerned with efficiency rather than generating learning, despite of the fact that the community is inserted in an evolving changing environment and it owns learning networks.

## 5. Model of Knowledge Management

### 5.1. Primary, Intermediate and Advanced Model. Diagnosis.

The intellectual, structural and relational capital and also the transformation of knowledge through the mechanism of externalization corresponding to the conversion of tacit knowledge into explicit concepts, allowed identifying the main factors involved in the development of those capitals. These factors are pointing to coordination and collaboration, the collaborative construction of knowledge between actors and collaborative learning. A model that establishes the development stages for achieving knowledge management in medium-sized port companies was developed. This model is shown in Fig. 2.



Fig.2. Model of Knowledge Management

The Primary Model proposed is composed of six general projects: conversation systems, knowledge inventory, and transformation of tacit knowledge, competence identification, document management and network usage [4].

Conversation Systems: it is an initial stage recommended for all types of models, since it has to do with the motivation of workers to communicate and disseminate what they are trying to do, what its benefits are and required efforts will be. At this stage, feedback is collected from members, who will have to agree, as a network, to work under certain commitments and parameters that enable the successful implementation of future projects. Players that make up the port community have developed formal and informal relationships which affect the generation of knowledge. Formal relationships between the port community and other stakeholders have been made explicit through information, digital and non-digital documentation flow. They are in contracts with service providers, agreements with trade groups and port legislation. Informal relationships are implicit and can be seen in the social relationships of the port community, in the links with the community and in the print media, among others. Informal relationships can be classified into the primary model in conversations systems. Then, it is possible to determine conversations of chronic type and conversations of possibilities for action, which are common in a Chilean medium-sized port.

Thus, the statements of various actors in social networks have been investigated and senior executives of two Chilean ports have held meetings with two experts in order to validate these talks. The causes of conversations are: players have little training which limits their knowledge capital and hence possible networks of coordination that can be produced through discussions of possibilities and for action. Also, document management is not efficient, making information prone to be duplicated or missed. On the other hand, the companies have different technological levels.

With regard to coordination of public bodies, this is low; Customs' technology is superior to the rest of supervising bodies. Document management lacks of coordination, generating an excess of documentation which hinders management. The main topics of conversation that the Chilean port community stakeholders argue are: Efficiency and operability for the Port Community; Integration of information systems for the Logistic Forum (the main problems are of confidence to share information).

## 5.2. Initiatives to improve cooperation and partnership

To improve cooperation and partnership networks there should be a different legislation that facilitates modernization processes and encourages their improvement. There are some initiatives that help strengthen the collective work and encourage conversations.

The State: By law, a port policy contributes to efficient management and delivery of the various elements that make up the activities of public and private port sectors. The State, to improve cooperation and partnership networks, should have a current, different legislation that facilitates and encourages innovation processes and their improvement. Inter-agency coordination and a supervising mechanism are also necessary.

Logistic Forum FOLOVAP: It is aimed at generating participation and collaboration of the port logistics community, in order to optimize current documentary exchange processes related to the necessary services for the entry and exit of goods through the port. It is need for constant approval of both national and international standards. An excessive reliance on documentation to carry out foreign trade activities is detected; a lack of protection against illegal strikes, a lack of competition in service supply (legal monopolies) is perceived. They allow the introduction of new technologies. FOLOVAP recognizes forwarders, freight forwarders or NVOCC ("Non Vessel Operators charge Carriers") as authorized customs operators; they also recognize the container as an independent transport cargo unit. Chilean legislation still takes it as a commodity that enters / exits the country under cover of a temporary admission system, despite having signed international agreements favoring this fact.

Accordingly, the State aims to improve regulations and laws for the development of the sector in:

- The design and approval of the multimodal operator to regulate issues like explicit duties and obligations for logistics operators and trade relationships that, so far, lack of an appropriate legal framework.
- Regulations concerning the treatment of containers as a means of transportation.

- The institutional strengthening of the Ministry of Transport and Communication as the responsible bodies for the design and implementation of maritime development policies in the port industry
- The creation of the Undersecretary of Trade as part of a modernization initiative of the Ministry of Foreign Affairs.
- Another conversation missing has to do with the logistic indicators measuring efficiency and quality systems, standardized for the entire port community. If they have those indicators they could make comparisons between the different actors involved in logistics system of foreign trade, and between this and the systems of other countries. According to the panel of experts, this role should be managed by the Ministry of Transport and Telecommunications.

### 5.3. *KM practices in the port community*

Members of the port community are interested in developing best practices and they agree on the need to create and disseminate knowledge. They have already begun to implement new standards on safety and environmental management, and corporate social responsibility, improving the processes and activities carried out in the port. They have formalized the principal procedures; they exchange information and knowledge between members of the port community and with the companies that make up the supply chain. Also, commercial and cargo handling practices have been developed and transport services have been restructured.

The main practices developed by the port community include the following:

- Host content in a Learning or Content Management System.
- Try emerging technology solutions.
- Knowledge Management convergence with e-business.
- Use of Knowledge Management to enhance innovation

The principal trends perceived through the study of the community members' behavior participating in the Logistic Forum are:

- Online Data Storage (Easy Access and share).
- Social Media (Analysis of comments on videos, social platforms or blogs).
- Gammification (applying engaging elements of game theory to non-game applications).
- On demand options.
- Mobile communication.

During the process of incorporation of best practices and development of indicators, tacit knowledge is being transformed into explicit knowledge, through the process of externalization, delivering tools to the community to be able to measure and compare the different actors involved.

### 5.4. *Management assessment of knowledge in a mixed medium-sized Chilean port*

Currently, the medium-size Chilean port does not measure its social and relational capital, making it difficult to quantify the inventory of intangible assets and design a risk matrix the port system must have. Then, it is necessary to explain this knowledge with management indicators and indexes, so as to assess the profitability it represents for the port community and especially, to make recommendations to help improve the management processes of the port. It should be noted that measurements have added value for they can quantify collaboration and knowledge synergy, content the port community must count on to become more efficient in their daily activities. Table 2 shows the principal intangible indicators.



Table 2. Intangible indicators and indices that contribute to knowledge synergy measurement

Indicator	Indexes
Percentage of improvement of a public or private actor's innovation skills	$\frac{\text{Total of improvements to compete on innovation from an actor}}{\text{Total of improvements to compete for the port system innovation}}$
Rate of innovation ideas implemented between a private and a public organization	$\frac{\text{Total of ideas of innovation implemented by an actor}_i}{\text{Total of ideas generated in the port system}}$ Where $i$ can be either an actor of the port community or a private service provider.
Total of implemented integrated technologies that automates the process of transaction (e-business) between port stakeholders	$\sum \text{TI implemented in the process of transaction between links}_j$ Where $j$ may be either an actor of the port community, a service provider or a public organization.
Rate of conversations of an actor of the port system	$\frac{\text{Total of talks by port actor}}{\text{Total of conversations of the port system}}$
Percentage of coordination conversations between actors by multi-criteria of the surroundings of the port community	$\frac{\text{Number of multi-criteria coordination talks}_k}{\text{Total of conversations coordinating port system actions}}$ With $k$ = political, economic, social, technological or environmental ambience
Total of strategic initiatives that are designed in a port system	$\sum \text{Strategic initiatives made explicit by actors}_l$ With $l$ = public or private actor that has strategic relationships with the port community
Rate of actors that exert leadership in a port system	$\frac{\text{Total of actors that exert leadership in the port community}}{\text{Total of actors integrating the port system}}$
Number of informal strategic relationships that generate knowledge in the port	$\sum \text{Informal strategic relationships that generate knowledge}$

## 6. Conclusions

This research has identified some of the tacit knowledge that exists on the port system. It is noted that the main conversation of the port stakeholders is related to the factors multi criteria linked to efficiency and some of the social factors, this is because the private companies, trade associations, social groups and public organizations are interacting in a different way and also with diverse interests. It is perceived that in their missions there are only a few of the stakeholders that show in their strategies, explicit links with aspects of knowledge: cultural, innovation and leadership. It is important that the community of port actors have common values and a clear understanding, above all, to transfer tacit knowledge. However, this situation is not so easy to generate when it comes to multiple public and private companies that have many units, which have different cultures, and develop different individual ways of learning. Although the dialogue seems to be a good remedy for this situation, it is also true that language does not always help communication as one would expect. It is of interest for the future, to study those actions that pave the way for a common understanding. It can be concluded that the dissatisfactions described in the medium-sized ports clearly reveal that a port stakeholder

cannot by him / herself meet the needs required by other port members, neither the market nor the environment.

In order to get to an acceptable level of knowledge synergy in the port community, a greater number of actors should specify aspects of knowledge and various intangible assets in their missions. It is necessary to extend the measurement of intangible assets to the Port Community in accord with the knowledge economy and to act more competitively, adapting to the changes that globalization currently requires.

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