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# Semantic Intelligence in a Seaport Context

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**Abstract**— This research work proposes the framework for seaport partners to interact on a semantic level and scope related with jurisdictions/ecosystems and regions to share knowledge among partners. New steps towards dealing with the traditional common sense for managing or governing the seaport are required for assisting the new generation of managers and port authorities. Semantic intelligence answers dilemmas of complex realities and alignments of strategies such as which strategic position may have the seaport facing the growing number of international networks and international treaties. In Management and Computational Sciences, semantic intelligence has been discussed mostly from technological perspectives; however, a higher thinking intelligence for managing and govern the seaport surplus the classical intelligence approach found in literature.

**Keywords**— *semantic intelligence, seaport context*

## I. INTRODUCTION

This work proposes an understanding of the proximities/linkages in which seaport authorities will interact on a semantic level (understood as the correct understanding on the context) with a partner recognising the influences and trade-offs imposed by the jurisdictions, ecosystems and regions to which they belong to. In Management and Computational Sciences, semantic intelligence has been discussed mostly from technological perspectives (Semantic web standards). Recently, the IT term *Semantic Intelligence* represents information-based semantic patterns that support better understandings and insights in business decision-making [6].

## II. THE SEAPORT MANAGING AND GOVERNING CONTEXT

Strategies that define how dealing with the traditional common sense for managing or governing the seaport are required for assisting the new generation of managers and seaport authorities. Importantly is that instances of seaports depend on the concept of territory as a source of power, i.e., region, jurisdiction, proximity to neighbours, hinterland and internal boundaries. [9] states that studies within the context of a seaport jurisdiction including scope and administrative rank have been found very few in the literature; thus effectively exhibiting potential for the jurisdictional seaport perspective. An important aspect raising interest from the institutional perspective is the concept of a *jurisdiction*. A definition provided by Kaye says that a “jurisdiction is essentially the ability of a State to validly make laws over activities [4, p.3]”. Guy & Lapointe suggest that interregional and inter-jurisdictional perspectives are

attracting interest into transportation policies and seaport planning; however, that poses challenges for “integrating different modal cargo-based and regional segments of the transport industry [due to it also] raises governance difficulties because it involves more than one jurisdiction [3, p.161]”. [2, p.42] emphasises “the emergence of new territories of seaport governance and seaport development” which makes possible linkages and stimuli for possible mechanisms of comparison among instances. Authors such as [5] and [7] indicate that seaports exercise powers to restrict and control their jurisdictions.

A seaport state jurisdiction is defined by Rayfuse as “the jurisdiction a State may exercise over vessels visiting its (sea)ports...related to the safety and welfare of the State such as health and quarantine requirements as well as immigration and security restrictions [8, p.72]”. A seaport state jurisdiction recognises internal waters as a territorial boundary and that all seaport states are coastal states. Finally, a flag state jurisdiction is defined by Bateman as an “exclusive jurisdiction over ships flying their flags on the high seas (international waters) [1, p.34]”. We pose the use of semantic intelligence to answer dilemmas of complex realities and alignments of strategies such as which strategic position may have the seaport facing the growing number of international networks and international treaties.

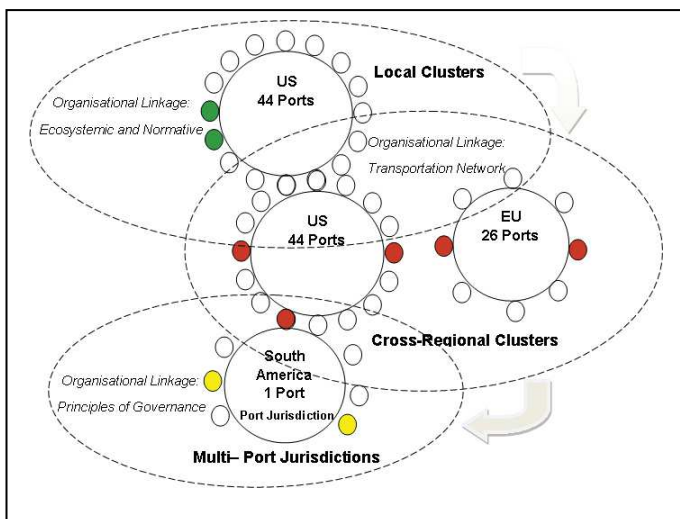
## III. INTERACCIONES ON A SEMANTIC LEVEL

The semantic intelligence is developed in this work from: i) an institutional perspective, namely: jurisdictional and ecosystemic contexts, and ii) a spatial perspective, namely: neighbouring and regional contexts. The jurisdictional and ecosystemic contexts allude to the institutional proximity among seaports that has an impact area in which seaports exercise controlling, surveillance and policing functions; whereas, neighbouring and regional contexts allude to the spatial proximity among seaports that may influence the land use area. Figure 1 shows the variety of size, spatial proximities, regulations and jurisdictions/ecosystems representing those complex realities and alignments of seaport strategies.

- In the first demarcated area (dots in green), seaports share a spatial proximity of neighbourhood or region in which physical connectedness take place. In the schema, this level is given by the analysis of local (existing or potential) seaport clusters in the United States (US).

- In the second demarcated area (dots in red), seaports share an institutional proximity (jurisdiction) in which seaport operational actions lead to growing emerging environments. It also constitutes different spatial port proximity; rather than a geographical delimitation, seaport proximity is based on jurisdictional mechanisms, which represent influential dynamics far from the port borders. In the schema, this level is given by cross-regional (existing or potential) seaport clusters in both US (NAFTA-Corridors East, West and Gulf Coasts) and The European Union (EU) (Rijn-Schede delta region).
- In the third demarcated area (dots in yellow), seaports share an institutional proximity in which seaport ethical and legal principles of governance are important determinants. In this context, multi-port jurisdictional proximities are possible.

Another distinction is based on the type of organisational linkage produced in each cluster. The schema proposes three types of port organisational linkages: local port clusters under ecosystemic and normative linkages; cross-regional port clusters under transportation network linkages; and port jurisdictions under mechanisms and principles of governance for common benefit.



With the proper understanding of the proximities/linkages in which seaport authorities will interact on a semantic level, potential collaborations arise:

#### A. Seaports sharing a spatial proximity of neighbourhood or region:

Seaports can promote semantic intelligence in seaport cooperative decision-making on environmental and ecological sustainability by recognising seaports as ecosystems in which normative, systemic and procedural dimensions take place; based on 1) who is the port leader, 2) the follower and 3) the average user of environmental management system (EMS) standards might be. As a result, they can come up with defining strategies to understand the consequences of cooperation between seaports using clear benchmarks and standards.

#### B. Seaports sharing an institutional proximity (jurisdiction) in which seaport operational actions lead to growing emerging environments

Seaports can promote semantic intelligence in seaports belonging to the same transport or (inter) organisational network, with similarities and differences among ports belonging to those networks. The main challenge is to find different scenarios of future development as a previous step for an advance coordination planning with the port partner. Analyses performed over the port partner in terms of its logistics performance and impacts observed on the local economic environment are necessary for the upcoming planning interval.

#### C. Authors Seaports sharing an institutional proximity (multi-jurisdiction) in which seaport ethical and legal principles of governance are important determinants

Seaports can promote semantic intelligence in seaports addressing compliance with code of security of ships or port facilities, safety environments and law enforcement. A lack of adherence to legal and ethical principles has harmful impact on cooperative relationships between seaports. In this context, the way principles of legal and ethical governance can be applied is on multiple jurisdictions.

We consider this framework allows the basis for seaport partners to interact on a semantic level related with their jurisdictions, ecosystems and regions, and in this way sharing knowledge among the partners.

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