



Towards new principles for planning sustainable logistic zones by analyzing the principles of international experiences by G.I.S

Mohamed M. ELbarmelgy, Mohamed A. Zayed, *Shery W. Salama

Architecture Dept. , Faculty of Engineering ,Cairo University, Egypt

Abstract : In terms of the importance of rehabilitating the zones assigned to provide logistic services, this study was initiated with the impartial of establishing design guidelines to such zones in order to meet the requirements of customers or corporations efficiently. The stages of logistic concept development were signposted. In addition, the main terminology so as definitions and the importance of logistics were identified. In addition, global experiences together with the lessons learned from them were analyzed, from which conclusions concerning the planning guidelines were deduced. and finally applied this principles to the Suez Canal region.

Keywords : Logistics activities ,Logistic center , sustainability ,Urban System.

Introduction

Logistics is organizing and implementing a complex operation. In business, logistics is managing the flow between point of origin and point of consumption to meet the necessities of clients or firms. The activities and logistics services enable countries , companies and individuals to adapt to the changing dynamics and needs of the global market, especially at the present time. This is to recognize that continuous innovation is a main factor in achieving sustainable competitive service in logistic zones.

Many developed countries are dependent on such zones as one of their main income resources .

As a result of the importance of the logistics sector has to be an attempt to exploit and harness all the material and human resources in order to reach logistic sector globally competitive and able to attract many foreign investments.

Consequently, their rehabilitation is an important goal to such countries to be competitive to other zones, worldwide.

Accordingly, this study was commenced with the *objective* of establishing design guidelines to such zones to meet the requirements of clients or companies efficiently.

As for the *research problem*, exploiting the areas that possess the components of logistical zones and converting them to income resources.

Regarding the *importance of the research*, it creates an innovative logistic zone, where all citizens are anticipating investment revenue. This is attributed to the fact that developed countries rely on such zones as income resources to elevate their national income so as the nation itself. Moreover, logistics importance

increased after realizing that business market faces quality problems due to import barriers and cost of storage, which elevate the products cost. Accordingly, attention should be directed towards logistics services to reduce their cost and provide them to consumer promptly.

Focusing on the *research questions*, they are to answer the following:

- How zones, with untapped urban elements, could be converted to logistic centers?
- What are the basics of planning to convert such zones to be competitive logistic centers?

Concerning *the research methodology*, it followed the deductive scheme via signposting the stages of logistic concept development; identifying the main terminology so as the importance of logistics; and analyzing the global so as historical experiences together with the lessons learned in order to reach to conclusions concerning the planning guidelines.

Stages of logistic concept development

The study of the concept of logistic services and its history will lead to the recognition of the logistics development in various fields, where the field of planning is the most important field. The following is a presentation of this development:

The logistics concept successively appeared in the field of mathematics, military sciences and institutions. It then developed to reach the urban planning field,¹.

Main terminology and definitions

Some of the terminologies are identified here, as follows:

Logistics activities: These activities are range of services or activities related to transport and logistics (i.e. transportation, warehousing, cargo handling, packaging and assembly activities. They can be classified as basic services and support services. Basic services encompass customer service defined by market, transport, inventory-management, flow of information and processing of orders. Support services include warehousing, material handling, procurement so as packaging, collaboration with production, operations and information maintenance.²

Logistic centers: These centers include all activities and services related to transport so as logistics, distribution of goods for the transit process (i.e. local or international). This is carried out on commercial basis by investors or the state. As launched by the state, the names of these zones differ³

Global Experiences

This section elucidates the important and successful international experiences in the field of logistics planning. The important logistics centers that proved their logistic, social and economic success were analyzed to perceive a conceptual basis for planning guidelines to the logistics zones, in terms of sustainability and urban planning system.

Singapore Logistic Center

- Location of the port is presented on figure (1,2).
- Reasons for choosing this center are attributed to:

✓ The success of this experience in transforming the island -state from a chaotic "third - world" country without adequate housing, basic sanitation and infrastructure in the 1960s, to the brilliant, efficient, well- run city it is today.⁴

The principles of planning singapore Logistics Center(by analyzing data by G.I.S program) figure (3,4)

- The existence of an industrial zone, its international trade of goods and land use, figure (9), [its area about(21%) (131.9km²)] .

- This network ensures a safe environmentally friendly transportation to oil, where it is pumped into it without any interruption.
- Existence of railway lines links the center to the industrial zones. In addition, road network is capable of transporting the goods by different transportation means .
- The presence of companies that produce liquefied natural gas .
- This network ensures a safe environmentally friendly transportation to oil, where it is pumped into it without any interruption .
- The integrated network of railways supported the export and import of goods.
- The center encompasses local, national and international shipping companies that provide logistic services (i.e. customs clearance and track the shipment via Internet). The technology implementation in management reduced the frequency of error and provided the investor with sense of safety while obtaining quality and efficiency. Figure (3,4) presents the land use in Singapore Logistic Center.[its area about(8.5%) (5.3km²)].

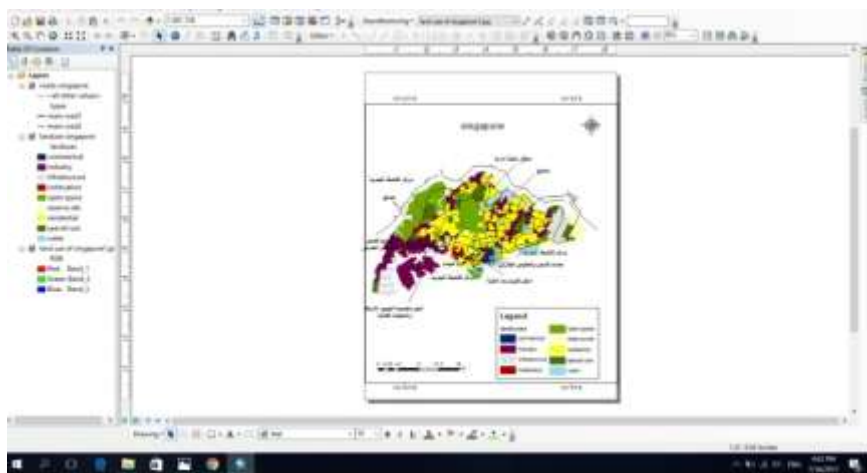


figure (1)



figure(2)

Singapore Port Location⁷



figure(3)

- The diversity of the performed activities in the logistics center (i.e. shipping, unloading, handling, transport, customs clearance, tracking of shipments and the collaboration with freight transport so as international transport companies) .
- The center motivated the establishment a residential administrative area with its parking area..[its area about(30.1%) (189.6km²)].
- The center attracted industrial areas.
- The center provided banking so as banking services.

- The center enhanced the zones variation (i.e. market zones and loading industrial production zones).
- The center provided provision of land plots for the future development.
- The center motivated the establishment a commercial area with its parking area.] its area about (1.4%) (9.3km²)].

Rotterdam Logistic Center

- Location of the port is presented on figure (5,6).

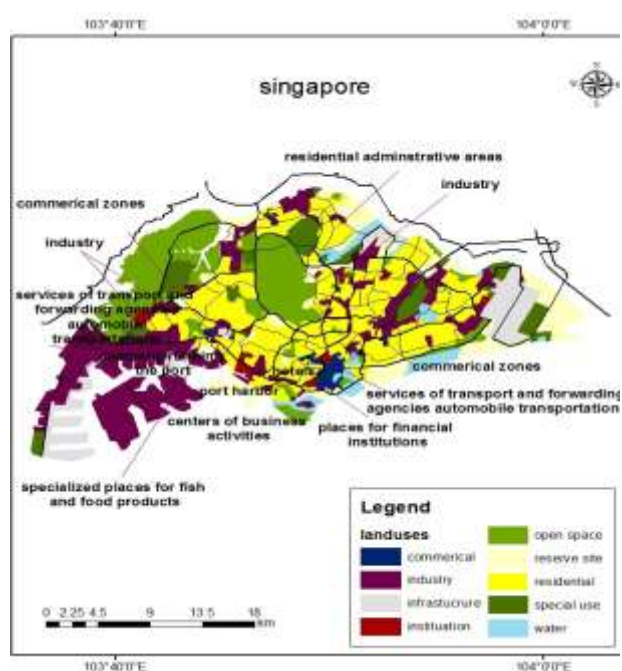
Reasons for choosing this center are attributed to⁵:

- its area (i.e. largest port in Europe).
- its accommodation to largest containers vessels .
- its economic success that flourished the Netherlands economic .

The principles of planning Rotterdam

Logistics Center_(by analyzing data by G.I.S program) figure (7)

- The existence of an industrial zone, its international trade of goods and land use. The industrial zone is specialized in chemical industry[its area about(31.8%) (27km²)].
- The presence of companies that produce liquefied natural gas (LNG) so as oil and chemicals in The Netherlands, Belgium and Germany that are linked by a huge network of underground pipelines.
- This network ensures a safe environmentally friendly transportation to oil, where it is pumped into it without any interruption. The continuous pumping without interruption in these networks led to the reduction of traffic networks use. This reduced the traffic volume and decreased the carbon emissions.
- The center encompasses local, national and international shipping companies that provide logistic services (i.e. customs clearance and track the shipment via Internet). The technology implementation in management reduced the frequency of error and provided the investor with a sense of safety while obtaining quality and efficiency. Figure (7) presents the land use in Rotterdam Logistic Center.[its area about(9.1%) (7.7km²)].
- The assembly is not performed in the port but in an area called the Plasdam, which is located 25 km away from the port. There the cargo is assembled and transported to the port. This reduced the number of land trips to the port and reduced the congestion. Moreover, a storage area was created for loading or unloading of vessels).



figure(4) land use of Singapore main port



figure(5)Rotterdam Port Location

- The integrated network of railways supported the export and import of goods.
- A road (fresh passage) was created for transporting or exporting fresh food products. A waterway was created instead of land transport to carry containers equipped for the transport of food products (i.e. refrigerated containers) reduced the cost. [its area about (28%) (23.7km²)].
- More than 500 shipping lines are connected to more than 1,000 ports worldwide.
- The diversity of the performed activities in the logistics center (i.e. shipping, unloading, handling, transport, customs clearance [its area about (3.2%) (2.7km²)], tracking of shipments and chemicals manufacture in industrial complexes and the collaboration with freight transport so as international transport companies).
- The port and the industrial complex extend 40 km along the coast. It covers 10.5 thousand hectares of which 5 thousand hectares function as industrial and commercial zones (i.e. 48% of the total area). 2 thousand hectares are railway lines, service corridors and green areas (i.e. 19% or 1/5 of the area). The remaining area is water.
- The area of dry bulk (7.7%, 14.2 km²) and liquid bulk (16.8%, 6.5km²)
- The center provides 700,000 direct jobs. The center provides 1200 jobs in port administration (i.e. an authority responsible for port operation). The center reduces CO₂ emissions by reducing road use by 59% to 35% and increases the rail transport by 11% to 20%.
- The center motivated the establishment a residential administrative area with its parking area.
- The center attracted industrial areas.
- The center provided banking so as banking services.
- The center enhanced the zones variation (i.e. market zones and loading industrial production zones).
- The center provided communication with international markets via wide geographical coverage by establishing road, sea and air networks to cover internal and external markets.
- The center provided provision of land plots for the future development.
- The center provided availability of connectivity through major regional routes.
- The center enabled the preparation for the network extension of the network lines of petroleum and hazardous materials.
- The center enabled the existence of a network of railways in remote areas.
- The center enabled connection to inland waterways.

-The center enabled the proximity to communications to ports of support and internal processing or availability of available land for development in order to establish the scope of the port.

- ✓ The center facilitated the availability of a large surplus of electricity.
- ✓ The center enabled the determination of interaction range of the port and the population size of each zone in order to provide services to the population in each.⁶

Bolognafreight village

-Location of the port is presented on figure (8).

Reasons for choosing freight village are attributed to:

- ✓ One of the largest and most important intermodal platforms in Europe⁷.

The principles of planning Bologna freight village :

(by analyzing data by G.I.S program) figure (9)

- A storage area was created for loading or unloading of vessels .
- The integrated network of railways supported the export and import of goods .
- The village provided provision of land plots for the future development. [its area about(26.2%) (0.053km²)].
- The commercial zone covers (6.2% , .012 km²).
- The village has storages provided availability of connectivity through major regional routes.[its area about (11.3%, 0.023km²)].
- The general stores cover (26.6% , .054 km²) .
- The stores connected to railways cover (10.5% , .021 km²) .
- The stores value added activities cover (11.2 % , 0.023km²) .

Experimental

-The previous Global Experiences data were analyzed and there was a conclusion on suitable land areas used and the distance between them and the ports and their geographical requirements and the relationship between them and the main and regional roads .

-In the next part these land areas and their ratios will be applied on East port said Harbor using G.I.S programme.(figure10)



Figure(6)Rotterdam Port Location

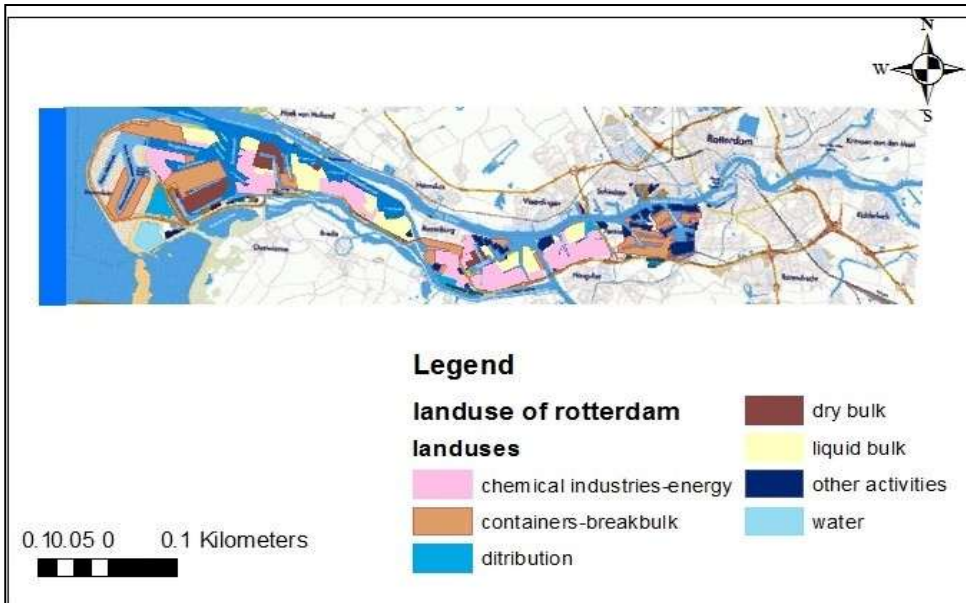


Figure (7) Land use in Rotterdam Port vicinity



Figure (8) Bologna Port Location

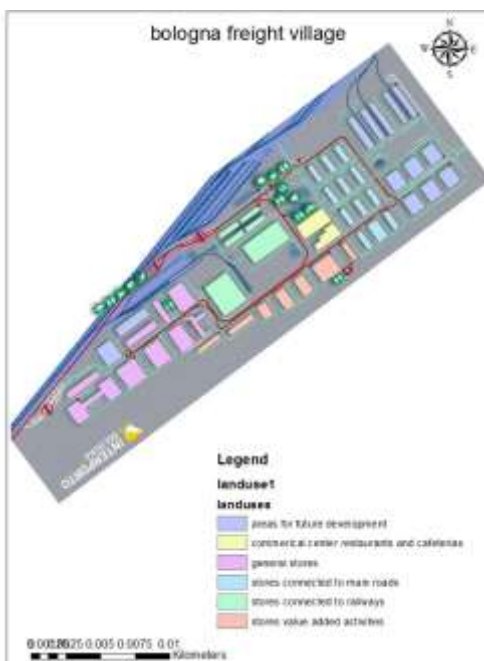


figure (9) land use of Bologna freight village

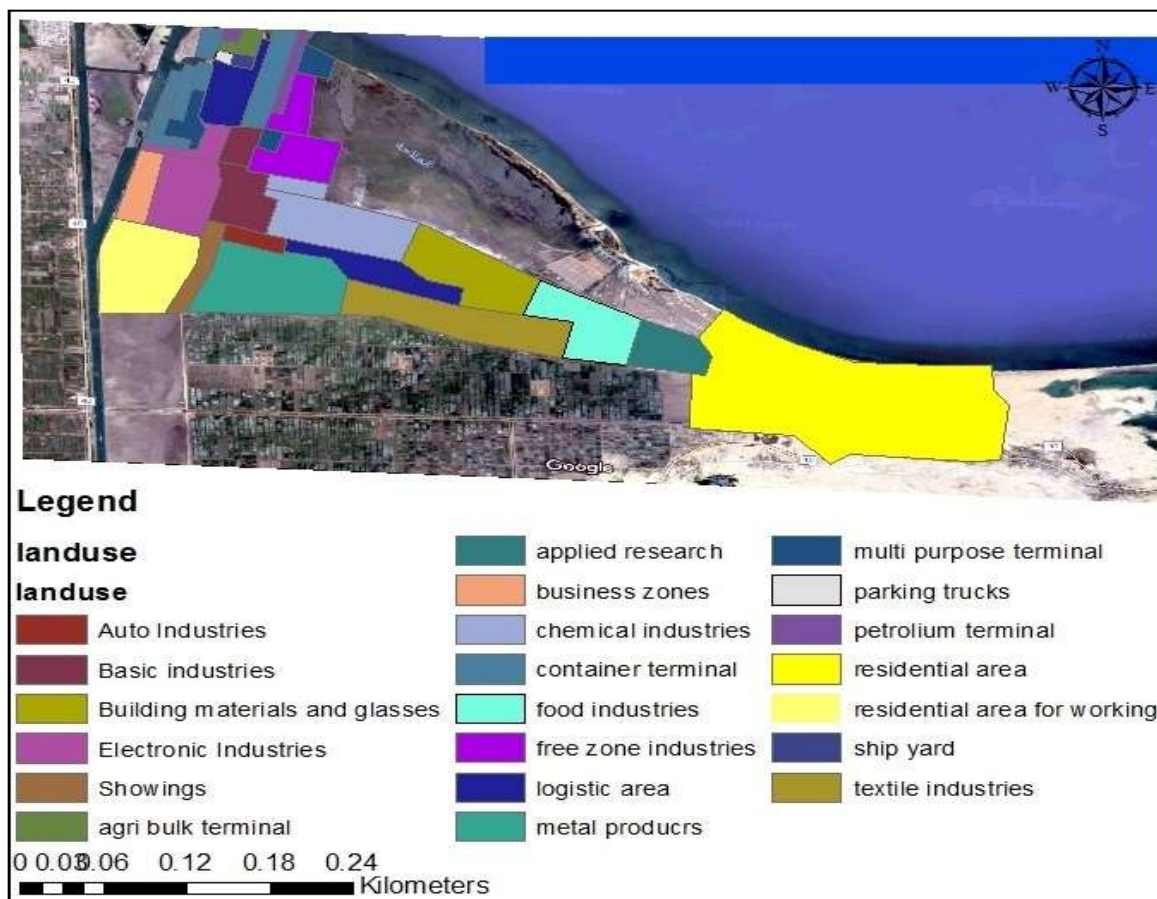


figure (10) land use of East Port Said Port

Results and Discussion

Based on the above analysis, it was obvious that the following guidelines should be implemented during urban planning:

Urban System Requirements

- Road networks linked to international markets
- Zones for future expansions
- Railway lines network to other ports
- Integrated Railway lines network
- Cargo assembly centers away from port
- Different transportation means network
- Zones linked to the port for goods sorting
- Environmentally friendly petroleum network
- Dividing the center to activities zones
- Underground natural gas Pipeline
- Equipped roads for fresh food
- Connectivity to international industrial centers
- Ports connected to other ports
- Road networks to hazardous petroleum products
- Railway lines network to remote areas
- Connectivity to inland waterway networks
- Industrial zone
- National/international transport companies
- Tracking shipment via internets
- Zones for assembly and assessment

Social System Requirements

- Offering jobs
- Residential areas
- Dividing residence according to activities

Environmental System Requirements

- Environmentally friendly network
- Reduced traffic
- Green areas

Economic System Requirements

- Various center activities
- Alliancing with international transport firms
- Varying the economic and industrial resources
- Offering jobs
- Offering banking services

Political Administrative System Requirements

- Implementing technology in management .

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