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Urban Logistics in Master Plan and a Review on Istanbul Master Plan

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Urban Logistics in Master Plan and a Review on Istanbul Master Plan

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ABSTRACT

Urban logistics is a specific subsection of logistics concept. Urban logistics is generally based on logistics and freight activities in urban areas and focus on these activities' linkage with urban areas.

Urban logistics is a concept that has to deal with social, cultural and environmental issues besides economic subjects. All these subjects have to base on sustainability. Urban logistics covers such a wide range that consists logistics service suppliers, logistics service consumers, public sector, military services, various sector institutions, chambers. While realizing this role, citizens as participants give a direction to planning process regarding with logistics issues.

In order to ensure sustainable logistics, urban master plans approach matters. The location of logistics functions need to be approached with multidiscipline viewpoint such as spatial accession, transport networks, interaction with the urban. This study consists of urban logistics issues by the overview of İstanbul Master Plan.

Key words: Urban logistics, Istanbul, Istanbul Master Plan

1. Introduction

Urban freight distribution has an important role to play in the context of urban life: it is fundamental to the economic vitality and competitiveness of industrial, trade and leisure activities that are essential to wealth generation. An efficient distribution system plays a significant role in the quality of life. And distribution system is an important element of the urban economy, both in terms of the income it generates and the employment levels it supports.

Urban freight movement using road-based vehicles has led to many urban traffic problems, including high level of traffic congestion, high energy consumption and negative environmental impacts. A new area of transport planning has emerged called "city logistics" to address these problems. Co-operative operation of freight transport systems are among the key city logistics initiatives (Taniguchi et al, 2001). These systems offer a potential to satisfy the needs of companies aiming at cost reduction as well as reduce the total social and environmental

costs for the whole community (Ogden 1992). Urban freight transport and logistics operations are concerned with the activities of delivering and collecting goods in town and city centers. These activities are often referred to 'city logistics'. Urban freight activities entail the processes of transportation, handling and storage of goods, the management of inventory, waste and returns as well as home delivery services. Often many of these processes, or parts of them, are undertaken outside urban areas but they still have impacts on urban operations. Therefore, freight transport and logistics operations need to be studied in the context of the entirety of supply chains that typically cross the geographical boundaries of urban areas.

The growing significance of urban logistics is related to increased population and sustained economic growth in urban areas. Goods transport in cities represents from 10 to 18% of road traffic. As the majority of the population in İstanbul (almost 99%) lives in urban areas and the bulk of industrial production is dispatched to these areas, the result is an increased demand for freight transport. Furthermore, as urban freight transport deals primarily with the distribution of goods at the end of the supply chain, many deliveries tend to be made in small loads and in frequent trips, thus resulting in many vehicle kilometers.

In İstanbul, the urban environment is characterized by high settlement and population densities and high consumption of goods and services. In such environments traffic infrastructure and the possibilities for its extension are both limited and unsustainable. This dilemma between demand and limitations of the urban environment has resulted in significant problems associated with urban logistics. The combined effects of these problems are both economic and social. These problems can reduce the efficiency and effectiveness of urban freight transport and logistics operations while have impact on the well-being of a nation by decreasing the quality of life of citizens. In March 2008, in its Policy Brief, the OECD pointed out that in logistics "İstanbul has a long experience as the node of Turkey's international transportation corridors, processing 60% of the country's total trade volume, strengthened by recent major transnational transport infrastructure projects, expansion of the modal transport and improved port management systems" (OECD, 2008). Therefore, İstanbul, as well as maintaining air and overland routes to other countries, is a key part of a major industrial area which is located close to the vital Black Sea-Mediterranean sea route.

In 2006 the Greater İstanbul Municipality planning department, prepared an Environmental Plan. In the plan report the objective of competitiveness and promoting İstanbul

as a “global city”, and the objective of environmental sustainability were both emphasized. The report asserted that the advantage of geographical proximity of Istanbul to Europe should be fully utilized to promote the city as a logistics center for companies operating in the Mediterranean, Black Sea and Middle East markets. Because the quality of products and their fast and cheap delivery has become a priority, Turkey should be able to compete with China or other countries (IMP, 2007). In order to provide access for inflows and outflows of industrial products, the Greater Istanbul Municipality also proposed new logistics centers, port developments, transportation infrastructure embellishments, and improvements in existing ports and airports. In the plan, various measures have been proposed in order to relieve the city from unwanted traffic, and to increase the efficacy of logistics activities.

The aim of this paper is after a brief introduce to concept of urban logistics, to inform about the principal problems and plan proposals of Istanbul in the context of urban logistics.

2. The Concept of Urban Logistics

When logistics activities naturally takes place in urban areas they show unique characteristic making them different from the general logistics activities, which is the reason why freight transport in urban areas and specifically the freight flows associated to the supply of city centers with goods, is usually referred to as city logistics or urban logistics (Barcelo, et al, 2005). Tanigucci et al (1999) identify urban logistics as **“one of the most important concepts that has come forward lately”**. Taniguchi define city logistics as the process of totally optimizing the logistics and transport activities by private companies in urban areas while considering the traffic environment, traffic congestion and energy consumption within the framework of a market economy. Among the special characteristics of urban freight transport there are two particular relevances: its contribution to the traffic flows and the subsequent environmental impacts. Hesse (2002) state that from the total traffic within urban areas, freight transport has an average share of about 10%. The share of pick up and delivery operations, which often take place in urban areas, on the total door-to-door cost is in combined transport about 40%. From the systems approach City Logistics systems have many components usually related to the stakeholders playing a role in the system, whose relationships can be described in the following terms:

- **Shippers**, as for example manufacturers, wholesalers, retailers, etc. operating for warehouses and/or City Logistics Centres, whose location should be appropriately determined when looking for optimal operations.

- **Freight carriers**, i.e. Transporters, warehouse companies, operating the fleets supplying the customers demand whose optimal operation required the appropriate decisions on fleet sizes, types of vehicles, vehicles routes, scheduling, dispatching and monitoring systems.
- **Residents**; consumers and clients, in the urban area, located at specific points in the urban area, whose demands have to be supplied timely.
- **Administrators**, at city levels in this context, who define the operational traffic and supply policies in the operational area.(Barcelo, et al. 2005)

Urban logistics infrastructure, terminals, equipments and networks occupy a large area in the city. These functions represent a significant part of the complex structures within the spatial system of the city.

Urban logistics is related to many other disciplines such as geography, population, urban planning and industry. In order to interpret urban logistics, the needs and expectations of logistics sector should be understood. In this context, it is very important to ensure commercial competitiveness of the city. In order to achieve sustainable urban logistics planning, environmental and social dimensions should be considered before the economic dimension.

According to the experiences of different national and international researches, projects and procedures, there are not general or uniform solutions to solve the problems arising due to congestion and inappropriate traffic/transport organization. However there a lot of technical or organizational tools of city logistics available, which –in the case of practical use- can be combined and adapted to the local specific conditions. Local authorities play a very important role in balancing the different interests and reaching consensus when allocating routes and resources. Figure 1 illustrates the structure inspired from Tanczos and Bokor, (2004) elaborate method for conceptual planning of the city-logistic system. As an example, the model for analyzing an urban logistics systems processes and milestones, following issues might take into consideration:

1. High level analysis of the framework-international, national and regional economic and logistic trends, current practices in urban transport, etc.
2. Identifying the partners interested in improving city-logistics-local authorities, logistics service providers, forwarders, commercial and industrial organizations, inhabitants-finding out their point of views and moreover the possible conflicts which can hinder the implementation proposed measures.

3. Developing a methodology for getting information on current status of goods flows in the city; data gathering and processing by using the former methods.
4. Organizing the collected data and based on this structured data bases typifying goods flows according to loading places, routes, time periods, frequencies, volumes etc.
5. Identifying the bottlenecks in supply chains caused mainly by infrastructure scarcity and the lack of coordinated logistics planning
6. Elaborating proposals (alternative or collateral techniques and organizational measures) aiming at removing bottlenecks and improving effectiveness of the logistic system
7. Evaluating the possible socio-economic effects of the proposed development paths by using a determined method
8. Dissemination of the project results among the interest groups.

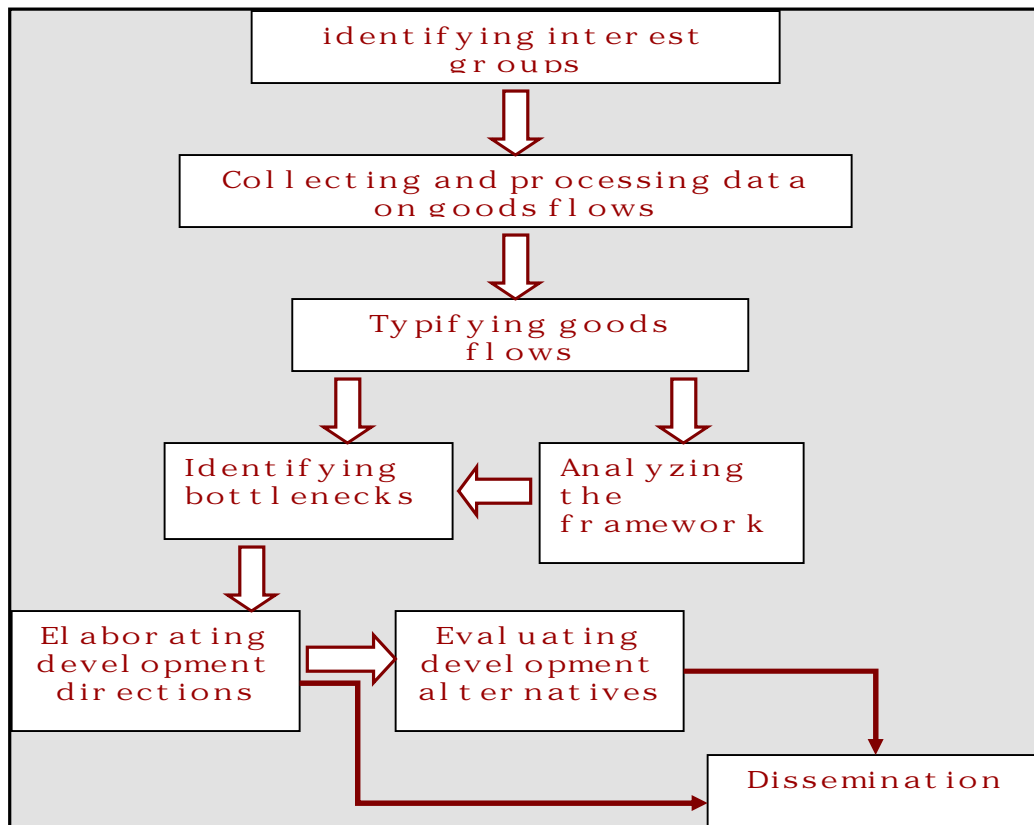


Figure 1. Suggested steps for forming a city-logistics conception (Inspired from Tanczos and Bokor, 2004)

3. The Core Geographical Dimensions of Logistics

The structural change in distribution and logistics has distinct geographical dimensions, investigated by transport geography, and which are expressed in terms of flows (information,

freight, transportation and vehicles), nodes and networks within the supply chain. Recent commentators also noted a rising interest in hubs, flows and networks in the broader sense (Crang, 2002; Creswell, 2001).

3.1. Flows

Getting easier of the interaction between geographical areas and gaining time owing to developing transportation technologies raise amount of freight transport. The traditional arrangement of goods flow included the processing of raw materials to manufacturers, with a storage function usually acting as a buffer. The flow continued via wholesaler and/or shipper to retailer, ending at the final customer. Delays were very common on all segments of this chain and accumulated as inventories in warehouses. This procedure is now going a different way, mainly by eliminating one or more of the costly operations in the supply chain organization. An important physical outcome of supply chain management is the concentration of storage or warehousing in one facility, instead of several. This facility is increasingly being designed as a flow- and throughput oriented distribution center, instead of a warehouse holding cost intensive large inventories. Recent freight flows tend to be of lower volumes, of higher frequency, often taking place over longer distances. These flows have been associated with modal adaptation. The magnitude of change can be characterized by the growth of urban areas of interaction, and by the temporal flexibility of freight flows, both resulting in a rising amount of freight transport. The distribution center thus becomes the core component of such a distribution system.

3.2. Nodes and locations

Distribution is increasingly planned and operated on the basis of nationally designed networks, due to the premise of cost reduction by economics of scale. According to this particular pattern of re-structuring, favorite locations are either those gateways or transportation corridors with access both to traditional gateways of trade (interfaces) and to large consumer markets (destinations). Owing to the increased competition between distribution locations, all major freight hubs (large ports, freight airports, inland hubs) are currently committed to expanding their infrastructure. The expansion of such places is primarily due to the growth of trade and transport in general, supported by economic growth and the enlargement of market areas, both favoring scale economies. Yet the strategy of concentrating freight at hub locations is

increasingly becoming restricted, due to density, land constraints, and congested traffic arterials (Comtois and Rimmer, (1997), Rodrigue, (1999).

Compared with core urban areas, suburban sites offer larger and cheaper land resources, unrestricted transport access, a “robust” environment for round-the-clock operations, and the locational advantage of intersections, connecting local and long-distance flows (Hesse, 2002). Existing facilities often do not fit into the customers’ profile, particularly with old buildings, or if they are surrounded by sensitive neighborhoods. Trade-offs between inventory and transport costs is also highly supportive for suburban locations, since mobility (freight transport) and immobility (land use) are closely intertwined. In order to find the optimal ratio between low land prices and short distances to the point of final distribution, firms move their distribution center location as far away from expensive land markets as necessary. For logistical and cost reasons, they also need to stay as close to their customers as possible. Not coincidentally, most recent construction of distribution centers and warehouses takes place in metropolitan regions, at the urban fringe or beyond.

3.3. Networks

The spatial structure of contemporary transportation networks is the expression of the spatial structure of distribution. Network building leads to a shift towards larger distribution centers, often serving significant transnational catchments. The structure of networks has also adapted to fulfill the requirements of an integrated freight transport demand, which can take many forms and operate at different scales.

Point-to-point distribution is common when specialized and specific one-time orders have to be satisfied, which often creates less-than-full-load as well as empty return problems. Corridor structures of distribution often link high density agglomerations with services such as the landbridge where container trains link seaboards. Traffic along the corridor can be loaded or unloaded at local/regional distribution centers. Hub-and-spoke networks have mainly emerged with air freight distribution and with high throughput distribution centers favored by parcel services (O’Kelly, 1998).

Many varieties of freight flow can be present in an urban area. Most obvious ones in the city center are distribution of goods to retail stores, mail and parcel distribution/collection and solid waste collection. In industrial areas, raw materials are transported to factories and finished goods are carried from factories either to the urban areas or out of town. Transit flow also occurs

in most cities, especially in those that have a seaport. Ensuring smooth and fast flow of freight in urban areas is one of the most important objectives of urban logistics planning.

4. Review on Istanbul Master Plan

The Ninth Development Plan (2007–2013) prepared by the State Planning Organization has framed policies to promote important ports to be developed as logistics centers, to encourage transportation of freight through railways as opposed to motorways, and to create an integrated and safer network of various transportation modes. Parallel to central government efforts, a number of proposed infrastructure investments in ports, airports, cargo villages, and railway modernization projects have also been supported by the Greater Istanbul Municipality, to promote Istanbul as a principal logistics center for the wider region beyond Turkey.

Furthermore, different interest groups have offered their own solutions by negotiating with the Planning Department of the Istanbul Metropolitan Municipality. For example, International Transporters Association, Istanbul Chamber of Commerce, and the largest non-profit business organization in Turkey: The Union of Chambers and Commodity Exchanges of Turkey, negotiated with the Istanbul Metropolitan Planning Department in 2007 for approval of two new proposed logistics centers on the Asian and European sides of Istanbul. Similarly, Turkish State Railways has also announced plans to build a 17.5 hectare logistics center on the European side of the city. In addition to these proposals, the Automotive Manufacturers Association has been collaborating with the State Planning Organization on the logistics activities and locations of logistics centers in the Marmara region, to support the automotive industry. As the abovementioned examples suggest, there has been an ongoing effort by various actors to promote Istanbul as an international logistics center (Özdemir, 2010)

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transportation infrastructure embellishments, and improvements in existing ports and airports. In the plan, various measures have been proposed in order to relieve the city from unwanted traffic, and to increase the efficacy of logistics activities. These measures include the removal of customs facilities from residential areas, launching new roll-on, roll-off (ro-ro) lines in the Marmara Sea, banning further housing development around existing ports and airports, and providing facilities for combined transportation (IMP, 2007).

4.1. Problem Definition

Istanbul is a growing center for regional and global trade, industry, tourism, finance and health sector. Istanbul, with its recorded official population of almost 13 million, has major problems in urban logistics issues. Besides being the most populated city in Turkey, İstanbul achieves the highest economic growth rate and existing industrial production in Turkey. Due to its young population and highly active economic structure, Istanbul is a dynamic but a problematic city.

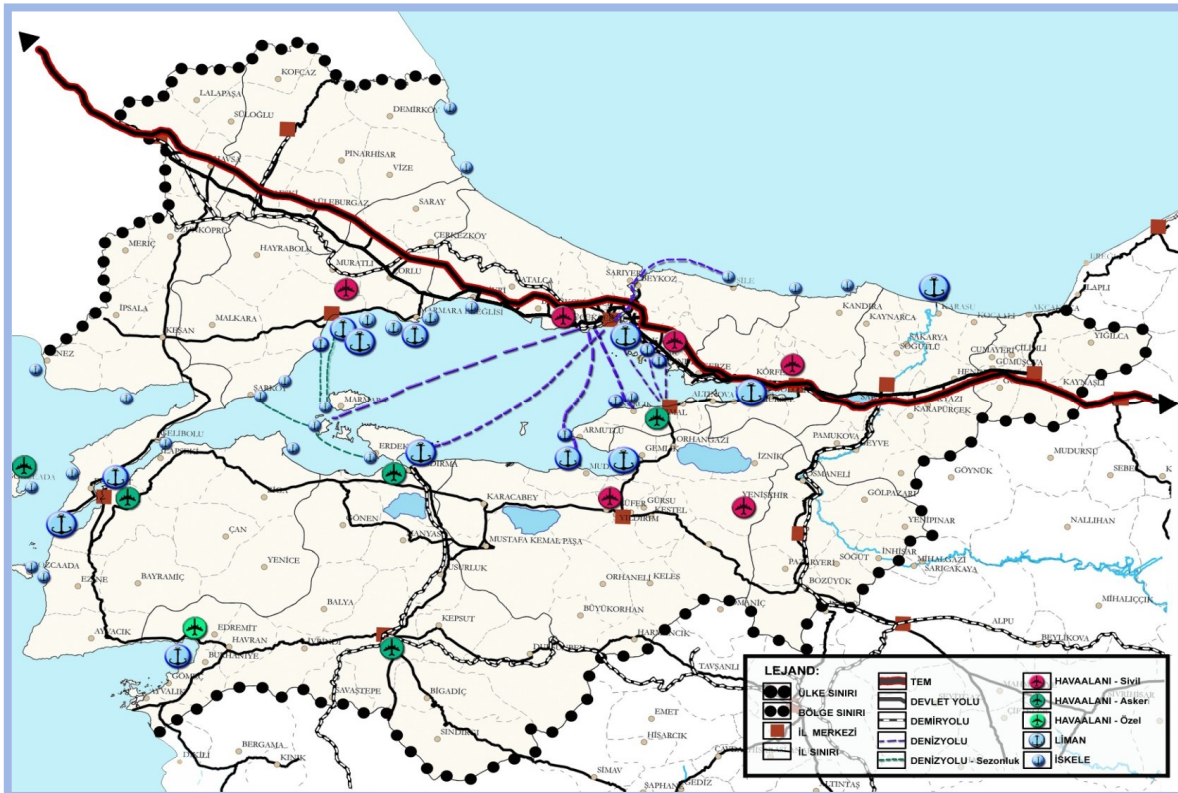


Figure 2. Overview of Marmara Region Transportation Facilities

Both in Turkey and Istanbul logistics activities are mostly consist of transportation and custom operations. In Istanbul logistics functions have been located unplanned and unbalanced and do not fits the requirement. Logistics centers require mass and huge spatial zones. Besides the development problems, the existing ports (Ambarlı and Haydarpaşa) have inadequate capacity and do not have linkage with rail system even sometimes have problem regarding with highway linkage. Here is a brief of appointed problems of Istanbul regarding with logistics sector.

- ***Absence of a logistics center:*** In Istanbul, the absence of a logistics center entails scattered depots located in and around the city, with unwanted truck traffic in residential areas, and decreasing competitiveness of logistics activity as a whole at least partly explained by this deficiency (IMP, 2007).
- ***Implementation problems and managerial inadequacy:*** In the case of air transport, the lack of a master plan for air transport, and lack of research and development, is compounded by various inadequacies and management problems in cargo terminals which are already very limited in number. Also, regarding railway transportation, logistics firms suffer from an accumulated lack of investment, limited rolling stock, management problems, and an outmoded and inadequate network (TUSIAD, 2007)
- ***Limited opportunities for ports:*** As a result of a lack of infrastructural development, integrated forms of transport have rarely been achieved. As suggested in Haydarpaşa port in Istanbul, located in an inconvenient site on the Asian side of the city and Ambarlı Port located on the European side, occupy restricted spaces without railway connections and adequate storage facilities (Oğuztimur, 2007). Moreover, Ambarlı Port is built on land which is not particularly earthquake-resistant, and the location of customs facilities, as well as their cumbersome bureaucracy and inefficiencies, does little to reduce transport costs or traffic volume with the city.
- ***Inconvenient location of customs:*** The location of two major customs facilities located in the city, Erenkoy and Halkalı, promote further traffic congestion, with thousands of trucks each day entering and leaving the residential areas where they are located.
- ***Lack of organizational review to the logistics problems:*** Excessive bureaucracy and complicated customs regulations, land lack of planning and coordination are mentioned for all modes of transport. The lack of harmonization in legislation or a holistic approach to transport policy, lack of integration with other modes, lack of representation of a multitude of non-

governmental organizations in the sector, and the uncoordinated actions of various public bodies have all been noted (TUSİAD, 2007).

4.2 Master Plan Proposals

Proposals for the existing logistical problems have to response problems in distinctive scales: international, national, regional and urban. The logistics centered solutions for the problematic are grouped under 5 issues:

- **Organizing Logistic Centers and the Integration of Logistics System:** With respect to the analysis and the field research, it has been planned that totally three logistics zones will be structured by stages. These zones are called as Tuzla and Hadımköy, will be located respectively in the east and west end. The third will be in Silivri in far-west of Istanbul. All of those three logistics centers need to be connected with railways, maritime and highway system as it has done in modern world models. Definitely international and national freight passing through Istanbul, should be oriented to Ro-La principally. This proposal will be a solution for the disorganized custom services.

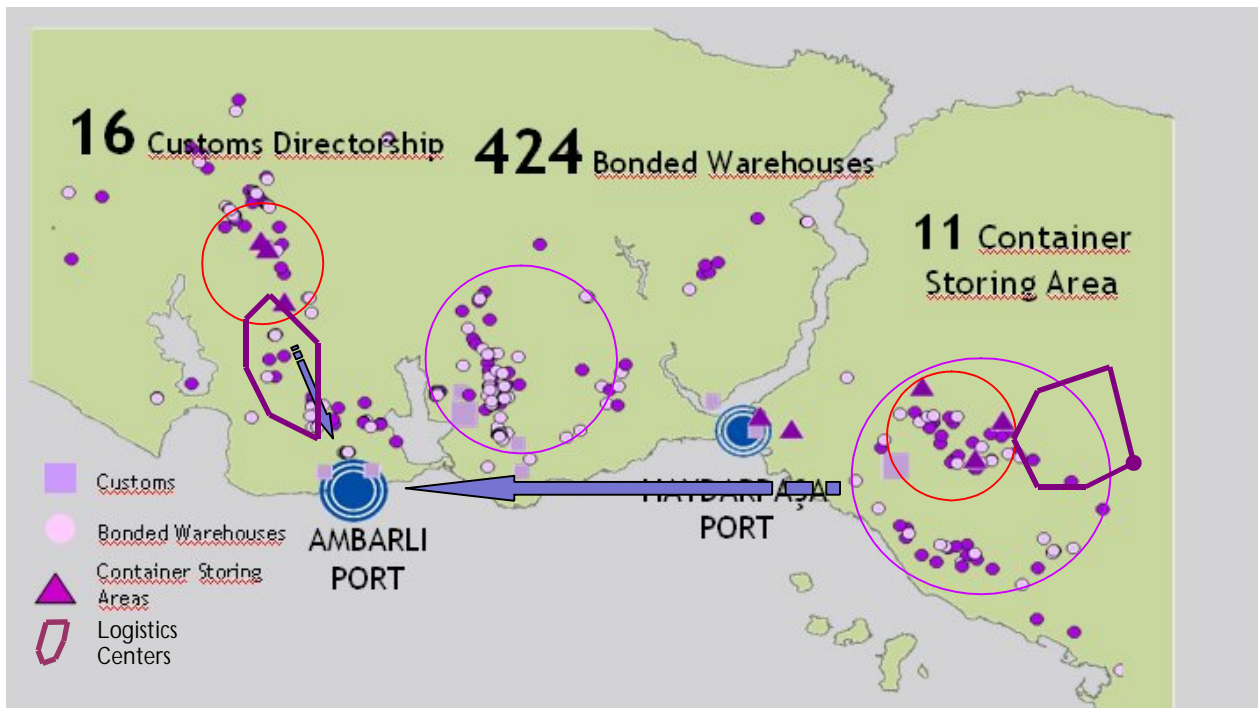


Figure 3. The location of Logistics Facilities in Istanbul Metropolitan Area

- **Developing Rail system for Urban Freight Transportation:** Marmaray has been designed in order to serve for freight transport in the night time and for public transportation in the day time. Trucks and other transporters are planned to be serving round trip between the terminals which are in the east and west ends of the city. For this purpose, there need to be located loading-discharging terminals at the intermediate points. Within middle and long term, mass industrial areas are planned to be connected within Ro-La system same as current organized industrial zones and proposed logistics centers.



- **Developing New Ro-Ro Routes:** The connection between South and North Marmara within the nodes of Gemlik, Yalova, Mudanya, Bandırma with Ambarlı and Silivri with Pendik would benefit for the economy by means of cost and timing.

- **Capacity Enlargement of the Ports:** In the Nationwide Port Development Master Plan, it had been projected that Marmara region would reach up to 2,5 million TEU's in 2015. But it is clearly observed that the performance of ports in the region have achieved the projections almost 7 years betimes. The development ratio increases more than expectations and it seems as if it will go on. Ambarlı Port realize a dramatic truth that although Ambarlı Port is the highest performed

port which was ranked 37th of the world container ports with 1.541.000 TEU in 2008, occupy restricted spaces without railway connections and adequate storage facilities (Oğuztimur, 2007). Due to this reality Port of Ambarlı Port require development area. On the other side, this busy port causes Istanbul's traffic more and more traffic density. In order to depress freight transportation density, a logistics zone has been planned in Hadımköy. The proposal, which is more important and more necessary, is rail connection with the port.

- **Logistics Planning in case of Disaster:** Logistics planning in emergency cases involves dispatching commodities (e.g., medical materials and personnel, specialized rescue equipment and rescue teams, food, etc.) to distribution centers in damaged areas as soon as possible so that relief operations are accelerated. In proposal plan, a planning model that is to be integrated into a natural disaster logistics centers located in two linear ends of the city in east and west.

5. Conclusion

City logistics planning is vital to improve goods transport in urban areas. It involves consolidation and coordination of goods transport activities to reduce the negative impacts of freight transport on city residents and their environment. Considering these objectives in mind, municipal administrations and logistics operators are involved in several sustainable city logistics initiatives such as time-access restrictions, vehicle sizing restrictions, full truck loading, urban distribution centers etc.

The Marmara Region is the most developed region in Turkey, with important manufacturing clusters. The socio-economic development indices of the State Planning Organization show that the first five most developed provinces in Turkey are, in order, Istanbul, Ankara, Izmir, Bursa and Kocaeli, with the Marmara region including Istanbul, Bursa and Kocaeli. A huge volume of logistics activities have been generated through the continuing growth of economic activities in this area. In this paper Istanbul has been searched. Local government has produced plans/projects to deal with Basic logistics problems and opportunities, and support the objective of making Istanbul an internationally recognized and prominent logistics center in the region.

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