

## **The Effect of Forming Dry Port in Spatial and Regional Planning System in Yazd Province**

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**Abstract:** The container freight industry has a significant development in the method of its function from its appearance in large-scale since 1960s. Nowadays, the maximum of goods transportation is done through sea transportation. From another side, using the container has also been increased significantly. Besides developing ports and docking ability for big ships with containers, a considerable mass of goods will be brought to ports. This view has been general and the guideline development of combined terminals implicates a new concept as a “dry port” that one of its explanations is so: a dry port is a combined terminal in hinterland connected to a coastal port. The necessary and enough equipment is considered for encountering with traffic of different methods of transportation such as road, rail and air ones and customers can send their goods to it or receive from it through these various methods. One of the significant economic positions in South of Iran is considering goods warehouse, exchange, imports and exports. Entering to this category and considering experts’ attention require a position close to railway and communication roads away from urban crowd and traffic. Therefore, this essay studies the effect of creating a storage site and goods exchange that has combined exit and entry ways including road, rail and railway and all services of storage, keeping goods and export, even it performs customs services under a roof.

**Key words:** Logistic, container, combined transportation, dry port, Yazd Province

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### **INTRODUCTION**

The container freight industry has a significant development in the method of its function from its appearance in large-scale since 1960s. This industry is the base of world trade that allocated 13% of sea transportation and 49% of these freights validity to itself. The importance of this industry in present situation that has lost the concepts such as its time and base place is more related to reduction of costs than increase in speed. Based on Kalinin and Kana Sea part of transportation chains uses ships approximately bigger to satisfy ever-increasing society requirements and reduce costs. Besides ships that have been served recently and their capacity is 14000TEU, it can be expected that the method of ports and behind coastal regions function to be developed and led to reducing costs. In addition to huge investments which are done in relation to container terminals capacity, sea ports functions are encountered with problem intensively by the reference of bigger ships and containers to ports. The capacity of ports can be

increased by developing them but this fact needs much costs and difficulties. Equipping ports or increasing profiting through new techniques through information systems are considered as the other ways for increasing capacity of ports. The transportation services in behind coastal regions of ports that van killing and van den Burgh calls it “inside region profited from port services” is pressed with increasing container freights. Based on European Union Road Federation between 1996 and 2006, the share of transportation market of behind coastal regions in roads has been increased to 5% while the share of railroad has an increasing by 4%. In addition, the road transportation has the most shares in the market equals to 76% even by entrance of double-decker trains to USA railway in 1998; it has not any profit and development in the road part of transportation chains like the sea part. However, there are moving double-decker containers in China electric ways now and countries such as Sweden and Netherland are studying their usages.

The most important problems that coastal ports are encountered with because of quick growth of using

container in sea transportation nowadays are the lack of enough space for storing and also the lack of desired access to goods destinations because of using traditional transportation methods. The traditional methods of goods transfer from ports have been in this way that the process of goods transportation has been existed among ports and different destinations in many roads and several railroads led to ports. From one side, the increase of using containers in ship transportation and on the other hand, the significant growth of very big ships with container causes the considerable increase of goods rate in ports and consequently, traffic congestion in ports and ways lead to ports and also the lack of suitable space for containers loading, unloading and storage. The development of factories, modern industries and increase of goods supply and demand rate related to sea transportation makes necessary the development of port and way of goods transportation to ports that this fact causes the increase of goods traffic, decrease of space and finally leads to the necessity of renewing ports and access structure to hinterland (Pelgrum, 2001).

Nowadays, the maximum of good traffic rate has been performed by sea transportation in the world. From another sides, using container has also been increased significantly. Also, a considerable amount of goods will be brought to ports by development of ports and the ability of big ships wharf with container. This is a general view and strategic development of combined terminals implies on a new concept as “dry port” that one of its explanations is: “the dry port is a combined terminal in hinterland that is connected to a coastal port”. Enough and required equipment for encountering with traffic of several methods of transportations such as road, railroad and air transportation have been considered on it and customers can send their goods to it through these various methods or receive from it. In addition to basement services which are submitted by traditional goods terminal in hinterland, the services such as goods storage, keeping empty containers, repairing containers, custom affairs, clearance and supporting goods are presented in the dry ports. The amount of access to dry port and also the quality of road and railroad intermediates define the rate of every terminal function. Thus, this fact is very important that there should be a planned and confident transportation between the coastal port and dry port. In Iran, a big mass of transit and goods transportation have been transferred by the road and railroad method. This issue needs creating of a combined transportation site which submits all goods warehouse, exchange, import and export services even custom services based on the high capacity of transportation in the region and lack of proper substructure. The existence

of some problems such as low capacity of coastal ports, low production in coastal ports, high traffic of ports and port cities, consuming fuel, transportation costs from southern ports, also shortage of warehouse for storage and keeping stock of freights in coasts from one side and moreover the advantage of existing a port in the center of Iran for increasing port services in central part of the country, decreasing the demand of using border lands of coast, expedition of economic development and logistical integration of internal regions, total reduction of transportation costs and landed cost of goods, encouragement to using railroad and therefore less damages to environment have caused the establishment of a region in the center of Iran which is called “dry port” in this study. Yazd Province is located among world corridors and approximately is considered as a main road of Iran transit. In this way, the road of Yazd to Mehriz can be the center of goods depo in Iran. Presently, regardless to traditional views toward development and more than ever affirmation to sustainable development, the importance of space and spatial planning are reduplicated. Based on existed damages in spatial planning system of the country and also the purpose of regional planning which is the same economic growth for upgrading material and welfare level, reducing spatial inequalities and protecting valuable environmental sources. In relation to this fact, creating the dry port is a strategy for proper distribution of situations (such as employment) and regional integrate development.

**Purposes of dry port:** The most important purposes of establishing dry port are summarized as followed:

- Increasing port services in Iran internal region
- Reducing demands for using coast border lands
- Increasing the application of transportation
- Improvement of substructures situation related to transportation
- Improving financial and economic situation
- Increasing direct investment of foreign countries
- Expedition of economic development and logistical integration of Iran internal regions
- Improving sustainable development process and
- Reducing environmental effects

## **Theoretical literature**

### **Concepts**

**Combined transportation:** If a country or a region can provide a situation to be profited from all transportations types which means having a trait from all types, the transportation function will be performed with more speed, safety and less cost and it is called a combined transportation.

The combined or multimodal transportation is not a kind of transportation but it is a system for coordinating different methods of transportation for goods and humans that total output is more than each output.

The most general method of transportation which is used in the combined or compound transportation is rail-road and sea transportation. This kind is developed and prevalent in the world. Sending postal goods in the world is a manifest model of transportation. The most important advantage of combined transportation is that the owner of goods signs an agreement with a carrier at the beginning of the way instead of making a contract with several institutions. In this way, the pursuit of transporting process will be easier and the owner can supervise the process of function just through one institution which accepts the transportation responsibility from departure to destination. Certainly, this method has especial difficulties because an institution should have instruments and tools of combined transportation; in addition to this fact the most important points are the management, experience and expertise in this part that lack of each of them causes a problem and an inadequacy in the system.

**Dry port:** The dry port is a combined terminal in the hinterland which is connected to a coastal port. The required and necessary equipment for encountering with traffic of several models of transportations such as road, railroad and air transportation have been considered on it and customers can send or receive their goods through these various models (Violeta, 2007). For better understanding of dry port application it can be said that dry ports are container ports which are located inside of the country to provide the possibility of transporting exchange container like border ports from one hand and the required facilities for submitting services and container logistic from another hand. Another explanation of the dry port in the united nations conference in 1982 is provided so that: an internal terminal which issues bills of lading of import and export goods for shipping line companies by accepting the whole responsibility of costs and conditions. The dry port is a kind of internal combined terminal which is connected to one or more coastal terminals and at its entrance the facilities such as custom control is predicted. Based on roso and leveque, the title of dry port is just allocated to an internal terminal which has these three criteria:

- The direct relation to a coastal port
- The existence of transportation lines with high capacity
- The access to services which are found in coastal port

The dry ports have been located at the center of the countries close to production and consumption markets based on requirement to market development of container logistic and services and its key applications and duties can be summarized in four scales (Jarzemskis and Vasiliauskas, 2007):

- Transferring containers among different kinds of transportations such as rail, road and internal canals as a multimodal container terminal
- Performing other popular functions in port container terminals
- Performing custom affairs
- Submitting logistic services

One of the most important points which are obvious in all explanations is that one part of transportation is coastal ports and it is necessary to provide conditions among transportation methods to create primary justification of dry port.

**Literature review:** The first explanation of dry port has been stated in united nations documents in 1982. In this simple explanation, the dry port is considered as an internal terminal that transportation companies can issue bill of lading for import and export of their goods. Then a more comprehensive explanation has been provided that based on this, the dry port is a place for gathering imports and exports for custom inspection and can be the departure and destination of exchanged goods through related documents such as bill of lading. This explanation caused the possibility of transportation with several vehicles in dry ports. These explanations provide a background for more attention to the dry port.

Based on the mentioned subject, the dry port is introduced as a combined internal terminal that directly is connected to the coastal port and has high capacity for all traffics and customers can send or receive their goods through multimodal loading like coastal ports.

In addition to primary services, the possibility of presenting services such as storage of goods, empty containers, containers repairing and keeping, goods clearance from custom should be existed. It is better that this kind of ports be in connection with one or several coastal ports and railroad directly (Roso and Lumsden, 2010).

According to studied researchers, the last definition for dry port has been presented by professors and university students in United Nations Economic and Social Commission for Asia and the Pacific (ESCAP). In this definition, it is a place for services related to control or temporary storing of containers or frights entered to the dry port through any transportation vehicles such as

Table 1: Basic concepts in dry port definitions (Heidari *et al.*, 2014)

Important concept	Related materials	References
Terminal	Internal multimodal terminal Container terminal	Roso and Lumsden (2009a, b), Darijani and Zimmer
Services similar	Different transportation methods	ESCAP, Harrison
shipping port	Departure or destination of moving freights Physical earth is an answer for transportation market	Unctad Zimmer
Connection with	Direct railroad connection with at least one port	Roso and Lumsden (2010),
shipping ports	Applying logistic centers role or dispensing freight in distances of shipping port Presenting value added services and also backup logistic services	Roso and Lumsden (2009a, b) Harrison, Rahimi, Roso and Lumsden (2010)

road, railroad and ship or air ones. Custom services and other services including primary inspection for imported and exported freights should be improvised in the dry port.

Through studying research literature review, it is defined that there is not a consensus about a unique definition about the dry among academic societies but some important concepts are in all these definitions as followed Table 1.

Summarily, some of studied researches are mentioned in relation to dry port inside and outside of the country. Divandare and Yousefi have studied the development of Iran sea transportation based on dry port establishment and operation activities of Iran container terminals in their research. According to their views, reviewing and investigating the dry port establishment are necessary for increasing container loading and unloading cost in Iran container terminals for developing Iran sea transportation. Saeedi has studied the concept of dry port based on an especial view toward necessities for its creating in Iran in their essays. The main purpose of their essay is to develop dry port concept and submit a definition for all triple dry ports: distant ports, mid-range ports and close ports. The achieved results illustrate that the dry port concept can be led to recognition various ways of transferring freight volume through roads as more effective transportation methods based on energy consuming for lesser environmental damages and reduce the aggregation of works in shipping ports and it will be effective for accessing to solutions for submitting better equipment to loading ships in behind coastal regions. First, Kazeni and Mohammadi (2008) have studied port concepts and then all kinds of dry ports, their relation method with each other and port cities and also, advantages and disadvantages of its establishment and location.

**Research scope:** Yazd Province with 120000 km<sup>2</sup> width is located in the center of Iran and latitude from 29°52'-33°27' North and longitude from 52°55'-56°37' East and based on the recent administrative divisions it has seven countries such as Abarkuh, Ardakan, Bafq, Taft, Mehriz, Meybod and Yazd. It is surrounded from North by Semnan and Khorasan from South by Kerman from

West by Isfahan and from Western South by Fars ([www.yazd.ir](http://www.yazd.ir)). Yazd can be considered as a gravity center for Iran transportation because of its excellent location in Iran transportation corridors and Iran excellent location in International transportation corridors, its high standard levels in navigation and aviation operation scope of its airport, its location in special junction zone 6 of Iran railroad and the existence of economic especial zone in it and being neighbor to Iran railroad. The project of Yazd dry port is located in 20 km of Yazd-Mehriz axis and 9 km of Mehriz Tejarat Siman road.

## MATERIALS AND METHODS

Based on the nature of research and its objectives, its dominant methodology is descriptive and applied one. First, the concept of dry port is defined based on foreign published works in this field such as essays, reports and several related books because of the shortage of information and same researches in Persian language. Then, its classification and the advantage of its establishment, operation and also its effect in Yazd planning system are introduced and studied.

**The classification of dry ports:** Dry ports are classified to three types based on service and location position: distant, mid-range and close to coast (Roso and Lumsden, 2009a).

**The dry port distant from coast:** The distant dry port from coast is the most usual kind and has the longest background. The most important reason for its establishing is the measure of distance and amount of goods flow that can perform railroad and river transportation at the result of economic evaluations. In comparison to traditional methods of rail goods transfer, basically, the difference of this method leads to submitted services in these ports in the field of custom issues and also, reducing direct relations of roads to coast and finally reducing traffic of terminal roads to coastal port. Based on this fact that each train can be the replacement of 40 trucks approximately, the environmental effects around roads to coastal port such as air pollution, noise pollution, etc. can be reduced (Roso, 2008; Rutten, 1998).

**The mid-range dry port from coast:** This kind of dry port is located at the distinctive distance from coastal port and according to road access it is connected to production and attraction centers of more goods. This kind of dry port is considered as a connected place of different rail services and some part of administrative and technical duties of coastal port (Rutten, 1998).

**The close dry port from the coast:** The close dry port from coast is one of the most important problems that the coastal ports are encountered based on the development of using container in sea transportation. For encountering with this demand degree in coastal ports, their capacities can be increased through establishing dry ports near the coast in the boundaries close to coast or coastal cities borders to solve this problem. The ability to offer services will be more and quick by increasing port capacity and then bigger ships with container will come to this kind port. It is the confluence place of many road ways of production and goods attraction centers outside of the mentioned coastal city and also rail road especially into port without using urban roads and disorder in their functions.

In comparison with traditional method of transmitting goods to ports there is not any direct road connection with port in this method and this function is performed through an especial rail road between the dry port and coastal port. Extracting traffic of road vehicles reduces the environmental effects in mentioned city.

**The effect of operating dry port:** The most important advantage which is achieved from dry port operation can be as followed (Rosso, 2008):

- The general decrease of transportation costs
- Encouraging to use rail road and consequently less damage to environment
- Empowering ports situations in transportation chains
- Empowering combined solutions for transportation
- Reducing needs for buying expensive lands in the area of port border
- The possibility of significant decrease of traffic congestion in urban roads and gates for changing method from road transportation to rail one
- Reducing the problems related to issues of environment in coastal cities
- Integration of coastal area with cities
- Developing inside areas of the country and providing different job opportunities especially in undeveloped countries
- The possibility of increasing custom process speed for freight goods by establishing dry ports equipped with custom services

The dry port concept based on its chosen purposes and different advantages is a suitable way for encountering with problems derived from traffic congestion in ports and presenting other portal services outside of it. It is a proper option for promoting sea transportation level of the country in comparison with neighbor countries and from another side; it causes the development and investment in rail transportation section. Its other advantage such as environment effects will be useful. Principally, establishing dry ports is led to reducing existed distance between rail and road transportations. The dry ports have an important role in developing goods transportation and its location region.

The important points which are expressed in the way of performing dry ports in the country including codification of universal regulation, choosing proper kind of dry ports, presenting welfare and entertainment services, important issues related to executors' support, state organs, investment and partnership of state and private departments, integration among different organs in the field of policymaking in local, regional and national dimensions and solving administrative and bureaucracy problems. Evidently, paying attention and performing mentioned options cause the quick process of establishing dry port and also combined transportation in the country. Based on this fact that one of dry port effects has been promoting combined transportation, the advantage of this method of transportation is mentioned here.

One of the effective and considerable costs in the price of exporting goods is transporting cost and every producer that minimizes this cost and increases its contest ability against other similar producers; consequently he can export more goods to other countries. One of the effective indexes in exporting goods is transport time it means when the goods will reach to destination in proper time. The concept of transportation speed includes operation ability in transportation by transportation companies based on existed equipment such as operations from departure to destination for goods owners are very important and last index for an exporter is security. It means that exported goods are carried with least probability near to zero for inserted damages from departure to destination. Now, for such operations, there are different transportations methods including road, rail, air and sea and transporting through pipe that each of them has especial usages and applications based on geographical situations of different regions.

According to scop agreement, 9 regions are notified and approved in Iran for establishing dry port that these regions are classified based on priorities or as primary-secondary such as:

**Primary priorities:**

- Iman khomeini international airport (Tehran Province)
- Shahid motahari station (Khorasan Province)
- Salafchegan Qom economic especial zone (Qom Province)
- Sirjan economic especial zone (Kerman Province)

**Secondary priorities:**

- Arvand free zone (Khuzestan Province)
- Sahlan economic especial zone (East Azarbayajan Province)
- Sarakhs economic especial zone (Khorasan Province)
- Shahid dastgheyb international airport (Shiraz-fars Province)
- Zahedan logistic center (Sistan and Baluchestan)

## **RESULTS AND DISCUSSION**

Area and human's group activities are main elements in regional planning. Prophecy of spatial planning is allocated to best sources for economic growth, social justice, environment protection and totally is for resistance. The realization of social justice with relative distribution of rights and resources and creating equal opportunity in society are formed which inevitably manifested in space. The spatial planning considers economic development along physical and environmental planning. Based on this fact that one of regional planning purposes is economic growth for promoting material level and life welfare, reducing spatial inequalities and protecting valuable environmental sources; for organizing and systematizing of internal and inter-regions relations, it is necessary to apply seriously the decentralization policy in directions. In another words, not only decentralization in making decision and planning process but also in civil and development investments especially in peripheral arena should be followed and applies. Against theories of growth pole theory and center in periphery theory, development approach has a regional tendency principally and follows a kind of integrated regional development and more than anything affirms spatial-locational aspects of development. In regional planning considering especial attentions to border regions can be important based on several options: creating equilibrium in the region and filling vacuities in spatial development of region. Regulating proper and concrete spatial structure of region. Being strategic and sensibility of region and activating existed and inactive potentials, etc.

In addition, regional planning guarantees the success of urban and local planning. Based on present methods, the subject of economic development guides us to combine and container transportation operations which have been started during 1960s of 20 century in Europe

and USA. Now, developed logistic has found an especial position in chain discussions for providing goods. When the subject of unitization and integration has been mentioned in logistic arena, individuals who have worked on logistic and industrial fields, paid attention that unitization would be possible through combine or container transportation; it means along this chain of providing goods, the thought of containerization has been created.

The existence of some problems such as low capacity of coastal ports, low profiting in coastal ports, high traffic of ports and urban ports, fuel consuming and transportation costs from Southern ports of the country and also the shortage of warehouse for storing and keeping freights in coasts from one side and also the advantages of existence of one port in Iran center such as increasing port services in internal region, reducing demand for using the coastal border region, expedition of economic development and logistic universalization of internal regions, total decrease of landed costs, encouraging for using railroads and consequently, less damages to environment causes the regional establishment in Iran center to get form which is called the dry port in this plan. Yazd is located among universal corridors and approximately is considered as main road of Iran transit. Along this point, the road of Yazd to Mehriz can be center of goods DEPO in Iran. The project of dry port is located in 20 km of Yazd-mehriz axis and 9 km of Mehriz Tejarat Siman road that the certificate of 700 ha earth along road of Tejarat Siman and Yazd-Eghlid railroad is establishing now.

Yazd can be considered as a gravity center for Iran transportation because of its excellent location in Iran transportation corridors and Iran excellent location in International transportation corridors, its high standard levels in navigation and aviation operation scope of its airport, its location in special junction zone 6 of Iran railroad and the existence of economic especial zone in it and being neighbor to Iran railroad. The most important purpose for establishing the dry port in Yazd is reducing demand for using the coastal border land, increasing transportation application, improving related sub-structural position with transportation, increasing direct investments of foreign countries and expedition of economic development and logistic universalization of internal regions of the country. Location of Yazd in the center of the country (geographical zero point) and having high level of security coefficient in passive defense plan of the country (distance from country borders in probable wars time and the minimum of access distance to all country parts in natural crisis for transferring goods to those parts) is one of the most important factors for choosing Yazd as a place for performing dry ports plan. Determining Yazd in logistics

studies of the country as one of the four proper regions for unloading and loading affairs and goods warehouse over countries, its excellent location in Iran transportation corridors and Iran excellent location in international transportation corridors, the existence of approximately, 16% main and secondary rail roads of the country in the scope of Yazd and Tabas (East) Railway Offices are other options of Yazd advantages. Also, locating of Yazd in an especial zone of intersection 6 of Iran railways and the possibility of increasing the capacity of rail transportation navigations through establishing site and DEPO centers and protecting exporting and importing goods in the place of important communication intersections of Iran railway in Yazd-Bandar Abbas, Yazd-Zahedan, Yazd-Kerman, Yazd-Tehran, Yazd-North are the other advantages that can be mentioned.

The other advantages for choosing Yazd including options like using the capacity of Yazd based on having 40% of freight transportation in Iran railway and having first rank of the country according to loading tones indexes, income and tone kilometer of loaded freight, the existence of rich mines, the possibility of creating and developing mineral and metal industries (Yazd national documents of development) and accessibility to permanent development and growth of industry and mine (Yazd national documents of development). The existence of developed region for container DEPO, the possibility of establishing supplementary industries, the possibility of development for open space beside the dry port, being close to located industries in Yazd, the closeness of the place to railway station and connection to transit road are the most important advantages of this project.

For applying this project, different organs and consulates such as Yazd governor general and Yazd railway management, Yazd custom management, terminals and transportation management are presented. While the information technology projects are performing, it should be said the establishment of this dry port and services which information technology is going to give us will be one of the biggest Iran information technology. So, the project of dry port can create many economic profits in Yazd Province and reach to regional planning which means economic growth for promoting material level and life welfare, reducing spatial inequalities and providing the background of universalized regional development.

## CONCLUSION

The especial geographical location of Iran and its location in international treatment way create a proper market for submitting transportation services (goods and passengers transits) in Iran. Located in the North-South corridor way and increase the share of transit and commercial volume of goods and services in the world

remind the necessity of paying attention to this matter more than ever. Based on United nation researchers' prediction in the field of international transportation, about 50% of world transportation is performed between far East and other part of the world. The 2-3 world transportation corridors that United Nations experts have predicted have crossed through Iran. The idea of establishing the dry port in the world has formed as a solution for reducing the traffic of coastal cities and transferring a part of port activities to a region in more distance from sea, also reducing cost and promoting transportation quality. As it is said, the complete recognition with the principals of creating container dry ports can be led to saving consuming energy, reducing environmental pollutions, reducing coastal cities traffic, increasing the usages of ports in transferring goods and facilitating logistic process for exporter and importer's goods.

Yazd can be considered as a gravity center for Iran transportation because of its excellent location in Iran transportation corridors and Iran excellent location in International transportation corridors, its high standard levels in navigation and aviation operation scope of its airport, its location in special intersection zone 6 of Iran railroad and the existence of economic especial zone in it and being neighbor to Iran railroad. The most important purpose for establishing the dry port in Yazd is reducing requirement demand for using the coastal border land, increasing transportation application, improving related sub-structural position with transportation, increasing direct investments of foreign countries and expedition of economic development and logistic universalization of internal regions of the country. Yazd dry port can plan an effective role in facilitating import and export of the country. Yazd universalization in the country and locating in the road, railway and air transportation corridors are the significant features of this province for establishing the dry port. It creates better conditions for clearance of goods for exporters and exporters. Establishing the dry port in Yazd can help to its economic improvement and consequently reach to regional universalized and spatial planning.

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