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TECHNICAL NOTE

An analysis of Role of Dry Ports on Development of Container Transit from the Iranian South Ports by Balanced Scorecard Method

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ABSTRACT

In this paper, we are going to investigate the growth of the Iranian maritime transport with a focus mainly on the North - South transit Corridor, review of dry ports in order to support the Iranian container terminals at the south ports in order to increase the volume of container storages at the terminals. For the purpose of assessing the outcome of port operational management, the Balanced Scorecard System is recommended for development of the Iranian South Ports and further consideration. Balanced Scorecard system is known as the most effective tool that successfully communicates strategic goals of the company with its operational management. Balanced Scorecard visualizes company strategy and links it to operational level. The main part of this paper is dedicated to evaluate the role of container transit from the North - South transport corridor with a focus on the Iran North South transport corridor in order to improve Maritime Transport of Iran and increase the Iranian transit market share. Next part of this paper will be designated to consider the Iranian Southern Container Terminals at Khoramshahr, Imam Khomani, Busher, Bandar Abbas and Chabahar port which have suitable strategic position as transit base in the region.

1. Introduction

Although, cargo as container has been increased more than five times since 1990, therefore it caused that the world's fleet of container ships has developed about seven times. Apart from the significance of time and expenses on transit of containers, safety of containers or quality of container handling operation is vital issue at the container terminals. The Balanced Scorecard (BSC) is a valuable management system which is used for different companies to elucidate and translate their strategies into execution; nevertheless the BSC has not been planned for container terminals and ports users' satisfaction in a great extent**.** In the last two decades, container transportation system has been faced under increasing development, in such a way that the rate of this development has reached to 7 or 9 percent in a year and it is predicted that this increase will have a rate of about 10 percent until 2020 while for other sea transportation means, the rate will be just 2 percent annually.[1] The development of dry ports has become possible owing to the increase in multi-modal transit of cargoes utilizing road, rail and sea. This paper presents the significance of dry ports on container transport development by means of BSC method. This method simultaneously determines the effects of four perspectives on the optimum operational strategy of the Iranian South Ports.

2. Description of BSC

The first BSC was created by Art Schneider-man in 1987. Art Schneider-man participated in an unrelated research study in 1990 led by Dr. Robert S. Kaplan in conjunction with US management consultancy Nolan-Norton, and during this study described his work on Balanced Scorecard. Subsequently, Kaplan and David P. Norton included anonymous details of this use of balanced scorecard in their 1992 article on Balanced Scorecard. The balanced scorecard is a strategic planning and management system that is used extensively in business and industry, government, and nonprofit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals. It was originated by Prof.Robert Kaplan and Dr.David

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Norton (Harvard Business School) as a performance measurement framework that added strategic non-financial performance measures to traditional financial metrics to give managers and executives a more 'balanced' view of organizational performance [1].

These four questions are the foundation of the Balanced Scorecard. Goal setting and tracking measures help to make the Balanced Scorecard a successful performance measurement tool for organizations. The balanced scorecard suggests that we view the organization from the four perspectives, and to develop metrics, collect data and analyze it relative to each of these perspectives: 1). The Financial Perspective: how are we doing for our shareholders? A financial perspective typically uses measures like cash flow, return on equity, sales, and income growth. 2). The Customer Perspective: how satisfied are our customers? A customer satisfaction perspective typically adds measures related to defect levels, on-time delivery, warranty support and product development, among others, that come from direct customer input and are linked to specific company activities. 3). The Business Process Perspective: what are our core competencies and areas of operational excellence? Internal business processes and their effective execution as measured by productivity, cycle time, quality measures, downtime, and various cost measures, among others, provide scorecard input here. 4). The Learning & Growth Perspective: how well are we continuously improving and creating value"?

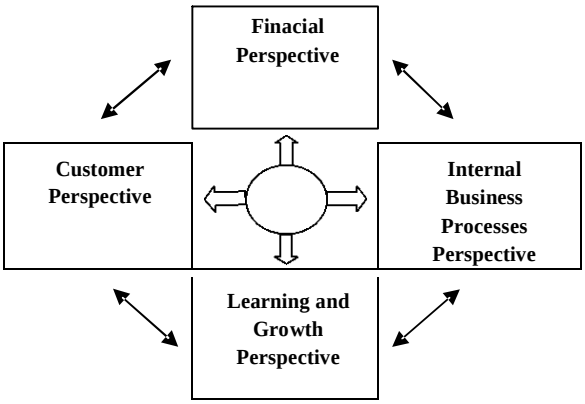

Figure 1. Balanced scorecard Method [15].

Eight years after introducing the BSC, Kaplan and Norton published an article entitled, Having Trouble with Strategy, Then Map It! The article introduced the concept of a "Strategy Map" to the BSC framework.

3. Global Container Trade

The Report of UNCTAD 2011 shows figure of the world container port traffic for 65 developing economies and Islamic republic of Iran with an annual percentage growth of container trade which changes between 2008- 2009 to 10.31 and between 2009-2010 to 17.50. It should be noted that Container trade in 2010 increased by 8 per cent on the Far East–Europe route, and by 10 per cent on the trans-Pacific Asia–North America route.

In 2010, the port of Shanghai for the first time took the title of the world's busiest container port from Singapore, with a throughput of 29.2 million TEUs. The country with the largest share of container throughput is China, with nine ports in the top 20. The Dominican Republic has been on the list of ports with double-digit growth for the last three years. The country with the largest share of container throughput continues to be China. [3]

Another table in the UNCTAD 2011 Report shows the world's 20 leading container ports such as Shanghai, Singapore, Hong Kong, Shenzhen, Busan, Ningbo, Guangzhou, Qingdao, Dubai, Rotterdam, Tianjin, Kaoshiung, Port Klang, Antwerp, Hamburg, Los Angeles, Tanjung Pelepas, Long Beach, Xiamen amd New York for 2008–2010. This list includes 14 ports from developing economies, all of which are in Asia; the remaining 6 ports are from developed countries, 3 of which are located in Europe and 3 in North America. The majority of the ports listed remained in the same position for the third consecutive year, although the ports further down the league were subject to considerable shifting of fortunes and jostling for position.[2] The top five ports all retained their respective positions in 2010, with Shanghai retaining its lead as the world's busiest container port, followed by Singapore, Hong Kong, Shenzhen and Bussan as stated before. The gap between Shanghai and Singapore shortened, Singapore was in first step in 2008 and 2009, the modification of the figures for the both terminals in 2010 is 638,200 TEUs, and in 2009 is 864,400 TEUs.

The resumption of manufacturing activity and global trade in containerized goods led to a recovery of demand for liner shipping services in early 2010. In 2009, however, the market was particularly bad for container shipping, as demand dropped by 9 per cent while supply grew by 5.1 per cent, the difference between these two figures being a staggering 14.1 percentage points.

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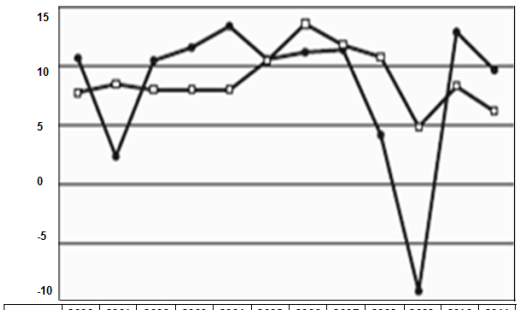

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Demand	10.7	2.4	10.5	11.6	13.4	10.6	11.2	11.4	4.2	-9.0	12.9	9.7
Supply	7.8	8.5	8.6	8.0	8.0	10.5	13.6	11.8	10.8	4.9	8.3	6.2

Figure 2. Supply and Demand of container shipping, 2000 – 2011 [2]

Over the last decade, exporters have benefited from the increased competition between containerized and specialized reefer transport providers. As the reefer fleet is getting older and vessels are being phased out, this market segment will become almost fully containerized.[2]

4. Iranian Container terminals Operation

Location of the Iranian container terminals are as follows: Khoramshahr, Imam Khomani, Bandar Abbas, Bushahr and Chabahar Port in South and Bandar Anzali, Noshahar and Amirabad Port in North of Iran. It should be noted that due to additional available capacity and a strong market, traffic at Bandar Abbas, Iran's main container terminal, has continued to increase. The port handled 2,231,200 TEU in 2010, an increase of 15% on the same period of 2009. The port is expecting to handle around 2.5M TEU for the year as a whole. Phase one of the port's second container terminal opened in February 2008, increasing overall capacity to 3.3M TEU per year and there are plans to double that in the next 36 months. Phase II of the new facility with another terminal operator became operational at 2012. Since 2010 a computerized system or automation system called TCTS 2010 system installed at Shahid Rajaee container terminal which is located a Bandar Abbas port. Based on the International regulations an online communication system can be carried out by port operator, custom, cargo receivers, shipping companies, and Transportation companies, etc.

5. Advanced Equipment reduce handling time of Container Transit at the Terminals

Container terminals are designated for the handling, storage, and possibly loading or unloading of cargo into or out of containers, and where containers can be picked up, dropped off, maintained, stored, or loaded or unloaded from one mode of transport to another (that is, vessel, truck, barge, or rail). Normally, a container terminal consists of different section such as POV (Parking Of Vehicles), Administration Building, Container yard, MY (Marshalling Yard) with inbound and outbound flow of containers in the terminal. It should be noted that the latest efficiency in container terminal automation provided by Zebra Enterprise Solutions is aimed at increasing container terminal capacity while improving port safety and security.[3] Designed to assist container terminal operators in the management of manned and automated port equipment, our container terminal automation solutions improve procedures and processes, as well as enhance container terminal equipment usage accuracy. Equipment management information such as maintenance schedules, equipment idle times, fuel levels and driver accountability of motorized and (non-motorized vehicles) and equipment can be tracked, monitored and managed in real-time. There have been a number of recent changes in the uses of advance technologies at Port container terminals that are designed to improve efficiency and productivity of operations. It is becoming common practice to see terminals operate with Optical Character Reader (OCR), Automatic Equipment Identification (AEI), Electronic Data Interchange (EDI), and other technologies such as cameras that are all designed to speed up the processing of containers through the terminal. In recent years, simulation has become as an useful tools in order to improve container terminal operation.

6. Dry Ports as Logistic Point for Container Transit of the Terminals

At first, it is better to understand the concept of a dry port. Mrs.Violeta Roso senior lecturer of Chalmers University in Sweden stated in this regard that "A "dry port" is defined as "an inland intermodal terminal directly connected to a seaport, with high capacity traffic modes, where customers can leave/collect their goods in intermodal loading units, as if directly at the seaport". And also, H.Yousefi (2011) expressed that A dry port is generally a rail terminal situated in an inland area with rail connections to one or more container seaports. The development of dry ports has become possible owing to the increase in multi-modal transit of goods utilizing road, rail and sea. This in turn has become increasingly common due to the spread of containerization which has facilitated the quick transfer of freight from sea to rail or from rail to road. So, Dry ports can therefore play an important part in ensuring the efficient transit of goods from a factory in their country of origin to a retail distribution point in the country of destination.[4]

The Persian Gulf has an area of approximately 240,000 km^2 and is very shallow, averaging just 50m-80m (1994; 1997), with only one opening– the Strait of Hormuz linking the Persian Gulf with the Arabian Sea. There are eight littoral Gulf States – Iran, Iraq,

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Kuwait, Saudi Arabia, Emirates, Bahrain, Qatar and Oman. The establishment of a shared place as dry port for all the above Gulf States will improve maritime transportation at the Persian Gulf. Based on IMO and WTO and the other relevant International regulations, it is necessary to consider the experiences of the container terminals operation at the Persian Gulf ports. It is useful for specifying the hub of container terminals at the Persian Gulf for further consideration. The capacity and operational methods of maritime transport, trade and transit of container at the terminals can be analyzed by using the Balanced Scorecard as an effective management tool which is used for improving container terminals activities at the Gulf.

7. Dry Ports in Iran

Aprin central terminal

Aprin is located at 21 kilometer of south western Tehran which is at the intersection of East-West & North-South railway junctions and is accessible to a number of highways. Aprin goods interchange central area is 100 hectares & construction of 110 storage houses & container Terminals are predicted in its area which their establishments are not completed. Aprin Terminal as a dry port has the potential to feed Tehran consuming Market & its surrounding industrial regions. At present, a storage house having the area of 9000 m^2 is activated at Aprin center & its annual output is approximately 5000 TEU. Aprin terminal which is equipped with Reach Stacker, Side lift, Lift truck, Bascule, container washing equipment 10 ton lift truck, the telescopic boom 35 ton crane, and a version of TPTS comprehensive & commence software is able to commence its activity as the first Iranian dry port.

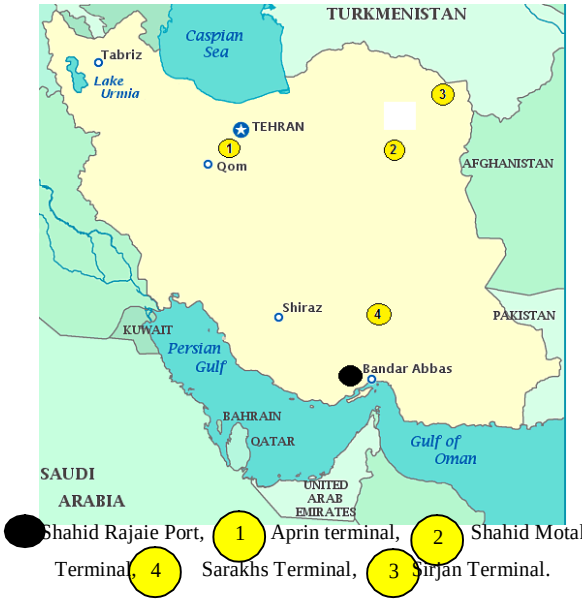

Figure 3. Four Intermodal Terminals in Iran Source: Compiled by the Author.

Shahid Motahhari terminal

This terminal is located at 36 km south of the city of Mashhad in the north-east of Iran. The site also has an access to the national highway. Its area is about 190 hectare and there are required facilities to handle container transport needs. [9]

Sarakhs terminal

This terminal is located at 170 km north-east of city of Mashhad in the northeast of Iran at Iran-Turkmenistan border. Its strategic position can be looked as an important gate to the markets of some land-locked countries. The site is also outfitted by required facilities (Domestic Various Related Statistics and Information [9].

Sirjan terminal

Sirjan is located at Kerman Province which is away 180 Km from the capital of the state, its distance from Banadr Abbas Port is 300 Km. Since Sirjan linked to Bandar Abbas port and Tehran through railway, therefore it has good location in order to support Shahid Rajaee Container terminal at Banadr Abbas Port.

8. The International North-South Transport Corridor

India has taken the lead in what it calls "kick-starting" an "international north-south corridor" from Iran to Russia via Turkmenistan and Kazakhstan to ensure a seamless connectivity to Central Asia. It should be noted that India wants this corridor to be operational by 2013. The North-South Transport Corridor is a term used to describe the ship, rail, and road route for moving freight from South Asia to Europe through Central Asia, the Caucasus, and Russia. [11] The route primarily involves moving goods from India via ship to Iran. From Iran, the freight moves by ship across the Caspian Sea or by truck or rail to Southern Russia. From there, the goods are transported by truck or rail along the Volga River through Moscow to Northern Europe. In 2001, Russia, Iran, and India signed an agreement to further develop the route. The Government of India had started this project with the view to enhance trade relations between South Asia and Central Asia. The primary step towards trade enhancement, was signing of Memorandum of understanding between Indian and Iran over the development of Chabahar port and transshipment facility at Banadr Abbas and Imam Khomani port. This "International North-South Transport Corridor" will have its starting point from Mumbai, and via transshipment the goods will reach Bandar Abbas Port in Iran, then a railway link will be established between Iran, Turkmenistan, Kazakhstan and it will finally reach Russia. India and Russia will strive to revive the North-South Transport Corridor

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(NSTC) through Iran that has failed to take off more than 10 years after the three countries signed an agreement to set up the trade route. This trade route will cut by two-thirds the time of cargo transportation from Indian Ocean areas and Persian gulf to Europe, and reduce the price of shipment of each cargo container by 400 dollars. By 2005 Russia, India and Iran plan to double cargo flows, bringing them to eight million tones.

Distance of new route (Green line in the following figure) in comparison to the previous route is 40% shorter; it means that instead of 45-60 days it becomes 25-30 days.

Figure4. Green line as new, short, and cheap route, Source: Y.Krupnov, Report of the new middle east: a Mega-Objective for Russia.

In addition, in the new route the price of shipment of each cargo container 30% cheaper than previous route.[11]. The INSTC was expanded to include eleven new members. The Astrakhan transport hub occupies an important location in the North-South Transport Corridor. It is a transit point for some three million tons of cargoes bound for Caspian Sea ports of Iran.

In near future, train ferries will take cargos to the port of Amir Abad in Iran. The construction of a container terminal in the port of Makhachkala began in 2002, and by the end of this year its capacity will reach 30520 TEU a year.[11] It is planned to bring the capacity of the terminal to 61000 TUE a year in the nearest future. At present, container shipment through the port of Makhachkala mostly proceeds along the Russia-Iran route.

9. The Role of BSC on Container Terminals

As Kaplan and Norton recommend looking at the business from four perspectives; using the overall corporate strategy as a guide, managers derive three to five goals related to each perspective, and then develop specific measures to support each goal.

According to a survey which has been carried out at Khoramshahr container terminal as a sample of the Iranian south container terminals; so, as consequence of the survey the following questions were asked from the participants:

Q.1). Have you heard the term Balanced Scorecard used in your container terminal?
Yes or No
Q.2). Is the Balanced Scorecard discussed in the meetings held in your container terminal?
Yes or No
Q.3). Is the Balanced Scorecard data used when setting the goals for your container terminal?
Yes or No
Q.4). Do you know how to access data gathered from the Balanced Scorecard?
Yes or No
Q.5). Do you feel the Balanced Scorecard is a significant factor in the decision making in your container terminal?
Yes or No

All employees within the Khoramshahr container terminal were invited to participate in a five-question yes/no survey. The survey was sent electronically to over 260 employees within the container terminal. Of more than 260 employees invited to complete the survey, 125employees completed the survey. For question 1, of the 125 participants, 3.2% of the participants had heard of the Balanced Scorecard; however, 96.8% had never heard of it before. For question 2, although 3.2% of the participants had heard of the Balanced Scorecard before, nobody stated the Balanced Scorecard was discussed in container terminal meetings. For question 3, 100% stated it was not used for goal setting in the container terminal. For question 4, Of the participants, 100% did not know how to access the data. For question 5, of those who participated the survey, 16% felt the Balanced Scorecard was significant in decision making, while 84% felt it was not a significant factor in decision making. The responses were clustered and find out that majority of the participants, 96.8%, have never heard of the Balanced Scorecard before! Therefore, it is suggested that the importance of Balanced Scorecard or other useful management tools should be taught to the employees of container terminals in order to improve volume of container transit from the Iranian container terminals.

10. Conclusion

Improvement of the Iranian container transit from the International transit corridor can be carried out by using the advanced equipment for handling operation at the container terminals; it causes to reduce the time vessels spent in the ports. It should be noted that the Competitive advantage of a container terminal at the Iranian ports is achieved by the integrated scheduling of various types of handling equipment with an aid of Balanced Scorecard at an automated container terminal. It can be observed that use of BSC at the container terminals as helpful tool may cause to develop the efficient scheduling of the equipment in

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order to increases the productivity of the container terminals.

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