



Diversion of containerized trade: case analysis of the role of Iranian ports in global maritime supply chain

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Abstract

This article aims to analyze the potential of Iranian ports for carrying some containerized cargo, from the Far East to the European Union, which is usually transported via traditional shipping routes. The idea of diverting cargo via an “Iran route” emerged from an examination of economic, trade and maritime transportation trends and events. This study presents a new idea for a freight route, designed in four segments for the benefit of the carrier. In order to make assumptions about the future in what are undisputedly widespread uncertain conditions, a scenario method has been employed. Following this a plausible future plan for a new terminal has been developed taking into account geographical, technical and economic themes for serving the container transit market until 2011.

Keywords: Iranian ports; Container transit.

Introduction

This article aims to analyse the potential role of Iranian ports for carrying a part of containerized cargo, which under present circumstances would be transported via ‘traditional’ shipping routes. By considering the shorter Iranian route in linking the European Union and Asia in terms of time and cost in comparison with the traditional shipping route, the scenario of a ‘route via Iran’ is proposed. This scenario reflects a way to extend the global supply chain and accelerate integration of the Commonwealth of Independent States (CIS) and Eastern European countries into the globalization process.

Iran, as a historical transit route, could play a new role in the changing world. After 1985 an increasing amount of containerized cargo has been transported between South East Asia and Western Europe. In this study, a scenario analysis was employed as a research tool to generate a ‘route via-Iran’ scenario. In order to generate such a scenario,

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micro and macro economic events, and ports, shipping and hinterland trends were taken into account. At a later stage, economic benefits and costs of diverting a share of transit cargo via the Iran route will be assessed.

The Iranian economy is very much dependent upon natural resources (in particular oil and gas) and therefore the degree of diversification is low. It is important for the country to search for opportunities and new ways to tackle its economic problems (manifested in high unemployment, an undiversified income source, and in a broad sense shortage of competitiveness) in order to establish itself as an important player in the global economy. The comparative advantages of an Iranian route, as opposed to the traditional ocean shipping route, are used as a theoretical basis to generate the scenario for this study. This scenario indicates that from a global perspective, it is possible to decrease costs and increase competitiveness due to the resulting shorter voyage time and consequent lower costs when using a transit route through Iran. This scenario leads to an assumption that because of Iran's comparative advantages in the foreseeable future, the Far East-European transit business could become one of the major commercial services in the country.

Research methodology

Scenario planning was deployed as the principal research method. It was developed at the California Rand Corporation for military use after World War II, and then was adapted by Kahn in 1960s as a more general business tool. Its most prominent utilization was carried out by Wack and Newland at Royal Dutch/Shell in the 1970's, when they examined the impact on oil prices in a number of potential scenarios.

Van der Werff (1998) described scenario planning as a method which can provide answers to 'What if...?' questions when the circumstances involve important issues and large external influences. Unlike strategic planning, which postulates a single anticipated future, scenario planning looks at alternative versions of the future. The goal of scenario planning is to *'enrich management's thinking, perceptions of reality, and modes of decision making when addressing important issues in the face of uncertainties'* (Van der Werff, 1998). Kahn (1965) as a pioneer of scenario planning defined it as *'hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision points'* (p129).

Kleiner (1995) added that *'contrary to what many people believe about scenario exercises, their purpose is not prediction. You don't predict what will happen: you posit several potential futures (...). A scenario planning exercise is a bit like a storytelling workshop, set up to bring forth distinction and phenomena that the conventional wisdom ignores'* (p275).

A scenario can emerge through rational trends and events or be created by its variables and their outcomes under uncertain conditions. Generally, scenario creation consists of three main steps - scenario generation, scenario development and scenario contraction.

In the first phase of scenario creation, the main developments of Iran's economy, trade, shipping, ports and their hinterland are considered. They are identified as scenario variables. The scenario notes the sphere of changes and a range of possible futures. In the second phase, according to the long term and operational environments of the story,

some themes are deliberately exaggerated. These themes are usually derived using Finlay's DEEPLIST (Demographic, Environment, Economic, Politics, Legal, Information, Social and Technology) method, which requires developing each theme through analyzing the present taken on into the future (Finlay, 2000).

The scenario planning method has been used by many researchers in the field of transport research. Some examples include Banister (1998), Bavarsad (1997) and Darzentas (1996); they all applied scenario planning to model a transportation system.

Scenario generation phase

Global maritime supply chain factors

It is quite clear that all transportation systems are affected by both internal and external factors. Internal factors affect the transportation system directly and include developments in transport technology, engine advancement, control systems, deregulation, containerization etc. External variables, which are most commonly dependent upon the global economy, are also very important and can have a very significant effect upon technological, social and integration concepts within the transportation system.

In the maritime supply chain, both internal and external factors are equally important, because a seaport serves as a link between the shipping industry and the port's hinterland. Both, the shipping infrastructure and the port hinterland are potential port customers and each is affected by forces in the national as well as the global economy. Scenario creation for the maritime transport sector is generally based upon this structure (Figure 1).

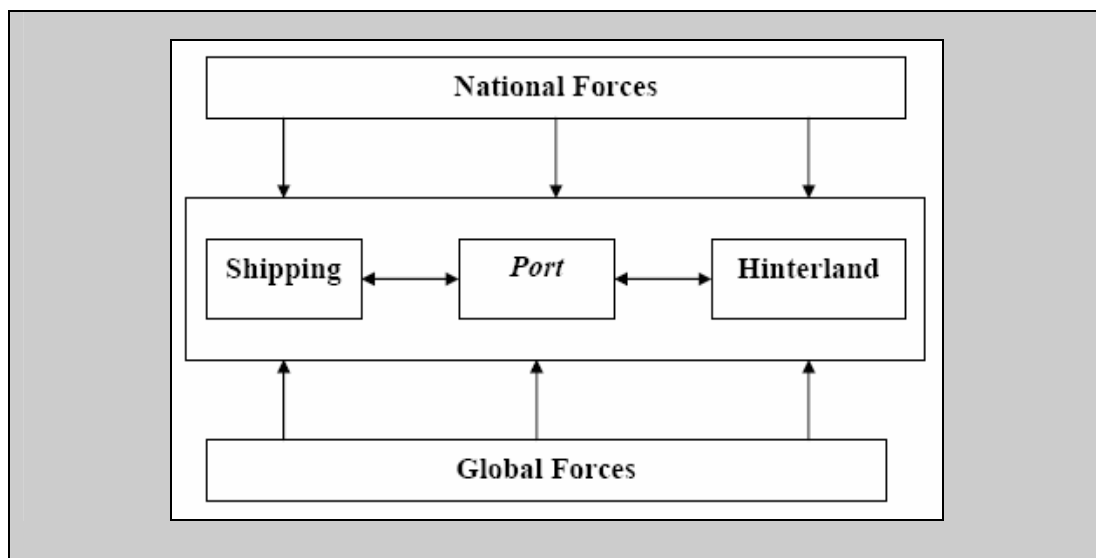


Figure 1: Scenario creation for the maritime sector.

Source: Authors.

Economic events and trends

Globalisation and international trade

Globalization as a term was developed in the industrial world and has stemmed from intense competition, because the omission of trade barriers, emerging multi-national companies and tendencies to sign regional agreements has led to intense competition among suppliers. As a result the movement of goods, information flows and financial operations has become an inseparable part of this process. Globalization means different things to different people. In its broadest sense, the term encompasses all types of economic and cultural transfers between nations – including domination of the media and widespread use of the World Wide Web. In a narrower sense, it refers to the economic exchange of goods and services internationally and international financial flows. Generally it could be said that globalization of economics has led to the construction of a world market. It also refers to the production and distribution of products and services of a homogeneous type and quality on a world-wide basis.

During the past few decades, world trade has been growing faster than the world's GDP, which implies that an increasing share of the world's output crosses international borders (Oman, 1994). Meanwhile, trade barriers have declined substantially as a result of successive trade negotiation rounds under the auspices of the GATT/WTO, unilateral trade liberalization and regional trade agreements. Integration of economics and a high rate of interchange have led to the situation where the growth of world trade twice exceeds the world GDP growth (WTO, 2002).

From 1955 until 2000, overall world export trade in merchandise increased almost 65 times, from US\$ 96 billion to US\$ 6,243 billion and during the same period, overall manufacturers' exports demonstrated a remarkable increase from US\$ 41 billion to US\$ 4,630 billion (WTO, 2002).

Introduction to the Iranian economy

Iran's economy is very much dependent upon crude oil and therefore each change in oil price is reflected in Iranian macroeconomic data. Such dependency (and in particular a fall in the price of oil) has led to a number of decisions to postpone development programmes, which were initially proposed by the Iranian Government. Approximately 91% of Iran exports are natural resources and 75-80% (by value) of overall exports is oil. In 2004, by the order of Ayatollah Khamenayee (the target Leader of Islamic Republic of Iran), the Iranian Government prepared a strategic perspective for economic development, which promoted economic diversification in an attempt to reduce this single export product dependency.

Other major concerns of the Iranian economy are unemployment and inflation. The official unemployment rate in 2004 was approximately 15-17% and the inflation rate 14% (unemployment rate for youth, age 15-29 was approximately 31% and is anticipated to reach 50% in 2006).

The Iranian transport sector has been performing well in all areas in recent years. For example, Shaheed Rejaee – a major container port, handled 1,151,989 TEU in 2003 and

it is expected that after a development programme is completed, the container capacity will reach 2.5 million TEU. Current trends also predict that the port will be able to handle 3.5 million TEU by 2010. Overall, Iranian ports attracted more ships in 2003, as they reduced their tariffs and improved their efficiency and performance levels. The current achievements confirm the positive development trends and increasing container capacity and transit expansion are setting high expectations for 2010 (see Figure 2).

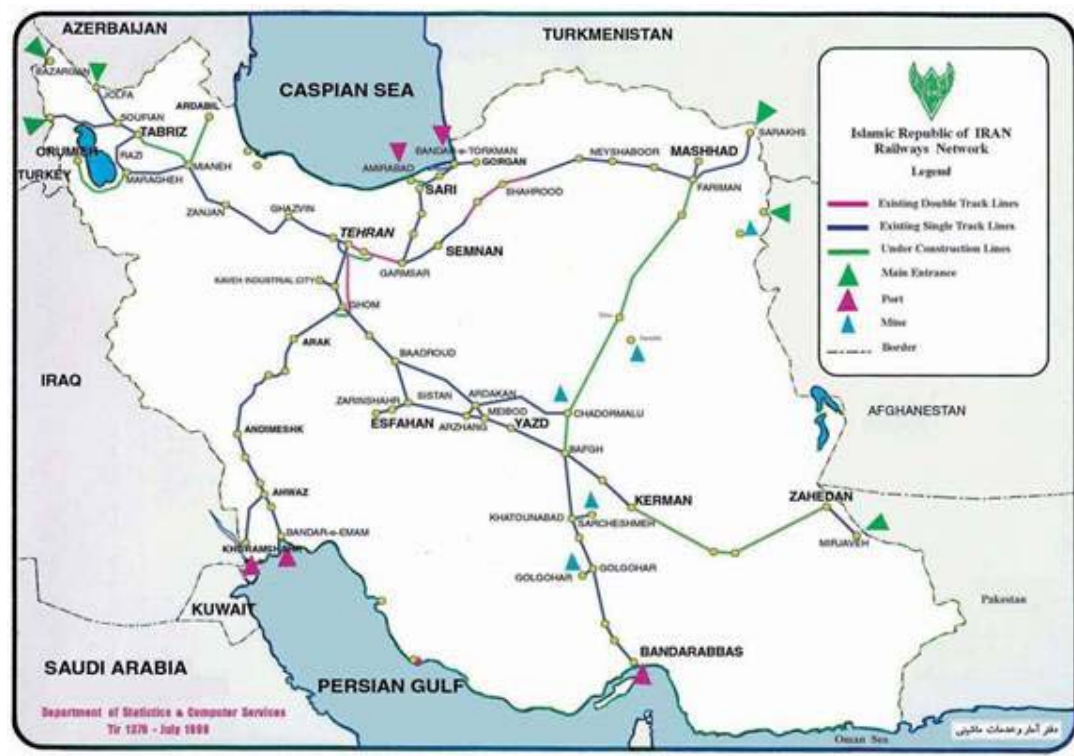


Figure 2: Iran: Ports and Main Rail Links.

Source: <http://web.archive.org/web/20040211212148/www.irirw.com/erailinfo/maps/rainetwork.htm>.

The potential of the Iranian route for EU-ASEAN trade

The European Union (EU) is the world's greatest trade area in volume; in 2001, the EU's share of world trade was 41.54% (US\$ 1.2 billion). More than 60% of this was intra-EU trade but the international EU-world trade remained a significant proportion.

As opposed to the long-established EU, the ASEAN region (Association of South East Asian Nations) emerged in 1967 and is a non-unitized trade area. The members are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

The main income of ASEAN and ASEAN+3 (China, Japan, Korea) countries comes from manufactured goods and international trade. On its own, the ASEAN countries were responsible for 5% of all world trade in 2001; however ASEAN+3 constituted 23% and 25% of world trade in 2001 and 2002 respectively (World Bank, 2003). The overall merchandise trade in 2001 between EU and ASEAN+3 was US\$ 466 billion.

In May 2004 ten new countries joined the EU many from Eastern Europe, and because of resulting change in EU borders, the Iranian route has gained advantages over the traditional ocean shipping route. First of all, the change of borders made the average distance between Iran and the EU shorter and secondly, because industrial centres are likely to develop more quickly in the new East European member states of the EU, the cost of transportation from ASEAN to EU will decrease using an Iran transit route especially compared with the traditional shipping route. This process of industrial repositioning in the EU towards the eastern periphery will be exacerbated by the lower labour costs of the region and this in turn makes alternative Far East – EU transport links (including that via Iran) more viable.

Transportation and maritime trends

Transportation as a part of the integrated global supply chain is affected by many variables that lie both inside and outside the sector itself. The international trade environment is one of the most significant of these variables and with its continuous growth in recent years, the transport industry has experienced the need to supply ever increasing numbers and quality of services in all areas of the world. From the internationally exporting manufacturers' point of view, transportation is an unavoidable part of the total manufacturing cost of their product. Considerable efforts are continuously made to reduce such costs, mainly because imported goods have to compete with locally manufactured goods not only in terms of quality but also perhaps more importantly, price. Nonetheless, the perception about transportation changed drastically during 1990s. A large number of logistics companies emerged, which provided not only transportation solutions, but also marketing, sourcing and other business supporting operations. Such companies started to offer value-added services in the supply chain and it was no longer viewed as a part of the production cost.

The development of multimodal transportation and the formation of improved transport corridors can also be viewed as variables in the global supply chain. Numerous developments in transportation technology and industry's need to introduce Just-In-Time delivery services (JIT) raised the profile of multimodal transport solutions (Rodrigue, 2003). The formation of improved transportation corridors to enhance the capabilities of the transport industry to deliver JIT services was a consequence of developments during this period.

In response, the ports and shipping industry found it necessary to react in order to improve their services and gain or retain business. Containerization became the leading edge within much of the maritime trade and developed rapidly in terms of capacity – vessels and terminals got bigger and more efficient within a relatively short period of time. The growth in capacity imposed new requirements upon the industry and a new type of collaboration emerged - mergers and strategic alliances (Evangelista and Morvillo, 1999). Shipping alliances control approximately 85% of container trade and are made up of all of the major liner shipping companies (Cario, 2002). These alliances link maritime and inland transportation systems creating economy of scale benefits. In turn this has meant that as container ships increased in size, they had access to only certain ports and this trend was exacerbated by the development of hub and spoke liner feeder systems with large vessels serving a few strategic ports and a number of smaller

vessels serving many other ports. The result was a division of ports into global hubs, regional hubs, sub-regional and local ports (World Bank, 2002), depending on their facilities and the hinterland they serve. In spite of what this classification suggests, each port still operates as a distribution centre (albeit of a different scale) within the global container supply chain.

In this context, most of the container traffic from the ASEAN+3 countries passing to Europe is transported using traditional ocean shipping routes. However, the global supply chain network and the needs of modern JIT means that alternative arrangements for such cargo are continuously assessed in logistical terms and the Iranian route has been identified as having potential to re-route some of this traffic away from the traditional ocean shipping network, utilizing hub ports in Iran to trans-ship containers onto a multi-modal rail network with access to East Europe and the countries of the Former Soviet Union, possibly both at lower costs and in a shorter time (see Figure 2 for main ports and rail links in Iran).

Container trade

Since 1990, container transportation growth has exceeded the growth of overall maritime trade (ESCAP/UNDP, 2001). In 2001 ESCAP published a long term Regional Shipping and Port Development Strategy, which predicted container trade developments until 2011. The world's container throughput in 2011 is expected to be approximately 122 million TEU and the distribution of the trade is presented in Table 1. The project stressed that Asia (South East and China) and Europe will be the most important regions in terms of container trade in the future and therefore will show the highest growth potential for long-distance container movements.

In 1998, 4.18 million TEU were transported between the Far East and Europe, but by 1999 the volume had increased to 4.25 million TEU. According to ESCAP, the container growth rate projection shows that total container traffic in 2011 on the traditional shipping route between Asia and Europe will reach 18 million TEU.

Table 1: Distribution of container volumes in 2011.

Region	Market share
Europe	22%
North America	14%
Latin America	7%
Middle East	3%
Africa	4%
ANZ/Pacific	2%
East Asia	23%
North Asia	10%
South East Asia	11%
South Asia	4%
Total	100%

Sources: ESCAP (2001), Regional shipping and port development policy, p23.

With such a large growth in container movements forecast it is reasonable to presume that the opportunities for modal and route changes would also exist and in the light of this it is possible that some of this container traffic could be diverted to the rail-based Iranian route utilizing traditional shipping between the Far East and Iran and then rail links through Russia to access markets in the FSU and Eastern Europe. This would save considerable sailing distance by traditional ocean shipping routes passing through the Suez Canal and around the continent of Europe and as a consequence considerable costs. Table 2 presents some tentative indications of the potential for this route based around container handling capacity until 2011.

Table 2: Potential container handling capacity of the Iranian route (million TEU).

Year	Europe-Asia	Asia-Europe	Total
2004	5.93	5.83	11.76
2005	6.23	6.21	12.53
2006	6.73	6.61	13.34
2007	7.13	7.01	14.14
2008	7.56	7.43	15
2009	8.01	7.87	15.88
2010	8.5	8.34	16.86
2011	9	8.85	17.85

Sources: ESCAP (2001), Regional shipping and port development policy, pp20-24.

Scenario development

Iran is geographically situated in a strategic location mid-way within major East-West and North-South trade routes and is relatively close to the border of an enlarged EU, a factor given more emphasis by the prospect of entry of Bulgaria and Romania by 2008 at the latest and Turkey some time after this. Iran therefore possesses the potential to provide a cheaper and quicker alternative to the traditional ocean-shipping based liner route from the Far East to Europe, and in this way diversifying and enhancing its own economy whilst also further integrating itself within the international global supply chain.

The scenario is developed using a series of basic variables, which in this case consist of a number of inter-related themes that together form a future contextual environment for the Far East – Europe container trade and the route choice to be made within this. The dominant features of this scenario are those that are represented by the transport elements rather than the external variables that may have some impact. These were chosen as their influence upon the market is sizeable and it is the cost of transportation which forms one of the most significant influences upon route and modal choice (Banister, 2000).

The most influential themes for this scenario are those related to the geographical, technical and financial/economy issues (Bavarsad, 1997). Geographical-based themes were developed in terms of costs and time required for cargo movement; technical themes related to the facility requirements; and the financial/economy themes were

developed in terms of costs of the construction/reconstruction of facilities required for cargo storage and movement.

The Far East – European freight market can be divided into four sections for the purposes of analysis of the potential that the Iranian land route offers. This will provide the opportunity to make comparisons with the ocean shipping route which, apart from a small number of containers that travel by the Trans-Siberian Railway, dominates the market (Pasukeviciute et. al., 2005).

The first section (shown as Segment 1 in Figure 3 – The Ocean Segment) can be defined as the stretch from the Malacca Strait (Singapore) to Bandar Abbas, the major Iranian container port located in the south of Iran. This section would only involve maritime transportation and apart from the port call in Iran, already constitutes the first stage of the existing shipping route.

The second section – termed the ‘Iranian segment’ (Segment 2) is an inland route from the Iranian port of Bandar Abbas on the Indian Ocean to Amirabad, a port located on the coast of the Caspian Sea, in the north of Iran. Containers would be trans-shipped at Bandar Abbas and then transported using railway and road links across Iran.

The third sector – termed the ‘Caspian Sea segment’ (Segment 3) would involve movement of containers by ship across the Caspian Sea, from Amirabad to Astarakhan or Lagan, both Russian ports on the north coast of the Caspian Sea.

The fourth and final sector is the ‘European segment’ (Segment 4) and would involve land (rail and road) transportation from Astarakhan or Lagan to Eastern Europe and countries of the Former Soviet Union thus avoiding the long sea voyage through the Mediterranean and English Channel, or the shorter but still largely unnecessary trans-shipment through South European ports such as Trieste and then onward movement by land.



Figure 3: The Proposed Iran route for far East - European trade.

Source: Map section from http://www.lib.utexas.edu/maps/world_maps/world_pol_2004.pdf.

Spatial comparisons between the route options

In terms of the spatial and economic issues, the alternative proposed Iranian route will now be compared with the traditional ocean shipping route which is used for the large majority of container movements at present, in order to assess its advantages in terms of both transportation time and cost. Table 3 presents the characteristics of both routes. It is important to note that a number of assumptions have been made in order to finalize the scenario; for example the distance in kilometres is provided assuming that cargo arriving via both routes is destined for the industrial regions of Eastern-Northern Europe which includes in particular the new Member States of the EU of the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia but excluding Cyprus and Malta as it is the East European region that offers most potential for the Iranian land route option. No attempt has been made to include the markets in the Former Soviet Union of central Asia, the Ukraine, Belarus, the Caucasus, Georgia or Moldova at this stage but their potential for being linked by this new routing should be noted. The opportunities afforded by Trans Siberian rail linkages should also be noted here as another alternative to the traditional ocean shipping route.

Table 3: Comparison of the traditional shipping route and the Iranian route.

	Ship Size in TEU	Average speed	Cost (in US\$)	Length (km)	Time (days)
Ocean segment	700-1,000	22.2 knots	200-700	4,270	6
	1,200	24.2 knots	200-700		5
Iranian segment					
Rail		27.3 km/h	210	1,795	3
Road		60 km/h	600		1.5
Caspian segment	Non container ship	22 knots	600	1,250	1-2
European segment					
Rail	x	41 km/h	520	4,369	5-6
Total Iranian route					
Sea-Rail			1,530-2,030	11,684	16
Sea-Road			1,920-2,420		14
Traditional shipping route					
	3,000-4,000	22.2 knots	1,370	20,250	27
	4,000+	24.2 knots	1,370	20,250	26

Sources: Transit (2002), Iran Transit Symposium, TTO, Behnami Pub, pp68-72; Asadi, (2004), Director of Caspian Shipping Company, Interview; UNCTAD, (2002), Review of Maritime Transport 2002, p60.

It can be clearly seen in Table 3, that the Iranian route has significant advantages in terms of transportation time and distance as it could reduce the journey time by up to 40%. However under the present circumstances it is likely to be more expensive especially because it involves multi border-crossings. In terms of costs, in the longer term they could be reduced by implementing changes such as operating bigger container ships for the Far East – Iran, Ocean and Caspian Sea segments and upgrading port facilities to enable them to handle these larger ships. The latter would particularly relate to the Caspian Sea ports, where significant investment would be required but which

might be justified if the new Iranian route could attract sufficient container traffic from this market. It was estimated that the price per container transported via the Iranian route would drop from US\$ 2,455 to US\$ 1,855 (using rail transport only) and from US\$ 2,895 to US\$ 2,295 (using both – rail and road transport) if these vessel and port economies of scale were achieved. These cost economies were based upon an assumption of 4000TEU ships for the Caspian Sea section (as well as the Indian Ocean) and development of the container terminals in Amirabad and Astarakhan to handle the larger ships.

Technical issues

Container handling efficiency in ports depends on a large number of variables the majority of which are technically based although those associated with organizational and administrative issues should not be under-estimated.

The technical issues which are important in terms of the proposed Iranian route focus in particular upon container port operations. There are main three phases following departure from the origin in the Far Eastern port. In the first phase cargo is shifted from ship to shore; in the second phase cargo is moved to a container apron; and in the third phase cargo is loaded onto the inland vehicle (truck or train). At the final destination, whichever route is used, there is of course a final transfer. In order to provide efficient services, the port requires modern gantry cranes for the first phase of the operation, quay(s) and apron space for the second, and some form of container crane/vehicle for the final stage.

According to the World Bank survey of port infrastructure, Iranian ports need to have the following facilities for the future:

- Quay length of 300-320m and port channel depth of 18-20m
- Gantry crane performance of 35-45 moves per hour and 22 hours of operation daily (281,000-361,000 moves per year)
- Total container waiting time in transit area less than 3 days
- Trailer turnaround time less than 30 minutes
- 4 to 5 gantry cranes with capacity of handling 800,000 TEU per year
- Capacity to handle 5000 TEU ships

These minimum requirements set the parameters for the proposed Iranian container landbridge link which this paper discusses.

Capacity calculations for potential demand

There were two possible scenarios considered in this case. First of all, in the case of 10% of the potential transit cargo from the Far East to Europe handled through Iranian ports and then trans-shipped onto the Iranian route this would amount to approximately 180,000 TEU per year at the current level of demand. Secondly, if demand for the Iranian route was to increase to a highly optimistic 50% this would amount to 900,000 TEU per year. Table 4 presents calculations for the required facilities for this level of demand based on the World Bank standards noted above.

Table 4: Estimation of required facilities, based on potential demand.

Potential demand		10%	50%	100%
Cranes	20ft	6	28	56
	40ft	3	14	28
Quays		3	5	10
Transtainers	20ft	18	84	168
	40ft	9	42	84
Trucks	20ft	60	280	560
	40ft	60	280	560

Source: Authors.

Economic issues

In this section the economic issues related to operating a specific container terminal largely dedicated to the Iranian route trade are calculated based on prices gathered from local and regional sources and the World Bank. Details are shown in Table 5 using the scenario assumptions made earlier.

Table 5: Total cost estimation for a new Bandar Abbas container terminal (mUS\$).

Facilities	10% Market Share	10% Market Share	50% Market Share	50% Market Share
	20'	40'	20'	40'
Quay (metres)	900	900	4500	4500
Quay (cost)	140	140	700	700
Gantry crane (number)	6	3	28	14
Gantry crane (cost)	3.6	1.8	168.0	84.0
Transtainer (number)	18	9	84	42
Transtainer (cost)	7.2	3.6	33.6	16.8
Other costs	100	100	150	150
Truck costs	8.4	8.4	39.2	39.2
TOTAL	291.6	270.0	1090.8	990.0

Source: Authors.

Meanwhile further calculations were aimed at assessing the transport costs of the new route and were based upon a number of additional assumptions to those made earlier:

- In terms of the Ocean segment (Far East – Bandar Abbas), Iranian interests have a serious chance of gaining some of the income from this segment in addition to benefits from cargo handling in Bandar Abbas.
- The port operation part of the Caspian Sea segment will be undertaken entirely by Iranian interests but the shipping element might be undertaken by a non-Iranian party.
- Within the Iranian segment, all activities will be undertaken by Iranian interests.

Table 6 show the operational costs for each segment based upon these assumptions and from this, plausible income scenarios can be derived. Table 7 shows these income scenarios transporting a TEU using the Iran route.

Table 6: TEU Cost for the Iranian scenario route (US\$ per TEU).

Route Segment	Caspian Sea Segment		Iranian Segment		Ocean Segment	
	Shipping	Port	Rail	Road	Shipping	Port
Cost (US\$)	250	100	210	650	450	100

Source: Authors.

Table 7: Estimation of total income for the Iranian scenario route (US\$ per TEU).

	Caspian Sea Segment		Iranian Segment		Ocean Segment		Total Income	
	Shipping	Port	Rail	Road	Shipping	Port		
	250	100	210	650	450	100		
Minimum Income	0	100	210	650	0	100	410	850
Maximum Income	250	100	210	650	450	100	1110	1550

Source: Authors.

NB. Shaded cells refer to a 20' container.

The total Iranian Route scenario income can now be derived from the potential demand that has been identified. Here the calculations are based upon each of the previous assumptions with the results displayed in Table 8.

Table 8: Total income of scenario based on each portion of potential demand.

Maximum (million US\$)		Minimum (million US\$)		Potential Demand (Mln TEU)	
2790	1998	1530	738	1.8	10% Potential Demand
13950	9990	7650	3690	9	50% Potential Demand

Source: Authors.

NB. Shaded cells refer to a 20' container.

The total Iranian Route scenario income, assuming 10% of containers are diverted from the traditional ocean shipping route, is US\$738-1530 million (minimum) rising to a maximum of US\$1998-2790 million. The minimum expected revenue following a 10% container diversion would be US\$ 1134million, US\$ 2394million maximum, taking the mean of the calculations as the most likely outcome.

Scenario obstacles

For each scenario a number of practical obstacles could be identified. In this final phase of scenario planning these issues are considered under the categories of geographical, technical, economic and methodological.

Geographical obstacles

These are summarised in Table 9 with obstacles to the development of the Iranian Route divided into the geographical segments identified earlier.

Technical obstacles

A number of technical weaknesses can be identified. In particular these can be associated with the performance of Iranian port terminals in terms of capacity and productivity.

Economic obstacles

These particularly focus upon uncertainties in stability in Iranian financial sources. These issues stem in particular from the country's economic dependency upon natural resources – in other words oil. There has also been a lack of transportation infrastructure investment for many years which needs to reposition the country within the global supply chain.

Table 9: Geographical obstacles to the Iranian route.

Segment	Weaknesses	Reasons
Ocean Segment	High cost of maritime transportation.	No large container ships serving the segment. Low efficiency performance of Iranian ports. An imbalance of ship capacity on the line. Currently no Iranian port of call by the liner alliances.
Iranian Segment	Insufficient capacity and quality of Iranian land transportation.	No high speed cargo train. High average age of technical facilities both by rail and road.
Caspian Segment	Low performance of ports.	Lack of container terminal facilities and appropriate vessels.
European Segment	Low capacity of some segments of the route.	Single track rail for some segments of route. Rail gauge incompatibilities. Multi-border crossing.

Source: Authors.

Conclusions

The Iranian economy can grow and diversify by identifying and utilising the opportunities which are increasingly offered by the process of global change. Long held

comparative advantages no longer can be seen as permanent and there has been a notable move towards dynamic advantage in international supply chain management. The Iranian economy can take advantage of these changes by planning to enter the Far East - European container transport market and acting as a landbridge as an alternative to the shipping route through the Suez Canal and Mediterranean Sea.

Scenario planning as a strategic tool can help decision-makers to plan for the future helping them use their creativity for picturing possible alternative solutions. The scenario presented in this paper would aid the Iranian national economy to overcome a number of obstacles some related to economic diversification, others associated with integrating modern supply chain management processes into the country and facilitating the exploitation of Iran's landbridge geographical position. Only 10% of the potential demand for this route would create revenues up to 30% of total non-oil exports. There is a great opportunity for Iran in this growing market but one so far which they have failed to gain access to.

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