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Empirical Study of logistical Performance of Iranian ports using Importance–Performance Analysis

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ABSTRACT: The immediate research was implemented to identify the effective & key factors in ports' logistics performance & compering BIK & Bushehr's port's logistics performance based on the aforementioned factors using Significance- performance analysis modal. in The 1st phase by studying the research's background & also holding brain storm sessions, the effective factors in evaluating ports' logistic performance were identified & consequently 15 components for case ports logistic performance were chosen. Afterwards, using the performance- significance analysis modal, BIK & Bushehr's port logistics performance were compared & the significance- performance matrix for both ports (each one individually) was formed. The mentioned matrix for Bushehr port indicated that (A3) ،(A12) ،(A13) ،(A9 ،( )A7) ،(A2) & (A5) at chart 1 exist in this matrix, except for (A11) which is located in the 1st& 2nd chart, while the rest situated in 2nd chart. Also, the significance- performance matrix for BIK indicates that components (A3. (A12. (A13. (A9) & (A7) are in the 2nd part of charts 1 of significance- performance matrix.

Key words: Container port, Significance- performance matrix, BIK, Bushehr port, Logistics performance

INTRODUCTION

The globalization of the world economy has led to an increasingly important role for transportation. In particular, container transportation plays a key role in the process, largely because of the numerous technical and economic advantages it possesses over traditional methods of transportation (De Langen, 2004). Standing at the crucial interface of sea and inland transportation, the significance of the container port and its production capabilities cannot be ignored (Robinson, 2002). Compared with traditional port operations, containerization has greatly improved port production performance because of two reasons (Robinson, 2004). To reap economies of scale and of scope, liner shipping companies and container ports are respectively willing to deploy dedicated container ships and efficient container handling systems. In so doing, port productivity has been greatly enhanced (Baird, 2002). On the other hand, many container ports no longer enjoy the freedom yielded by a monopoly over the handling of cargoes from within their hinterland. They are not only concerned with whether they can physically handle cargo but also whether they can compete for cargo (Baird & Valentine, 2006). This inter-port competition, under the orthodox microeconomic framework, is believed to provide an incentive to improve port performance. Productive efficiency, therefore, is a survival condition in a competitive environment (Banomyong, 2005). Under such a competitive environment, port logistical performance measurement is not only a powerful management tool for port managers, but also constitutes a most important input for informing regional and national port planning and operations (Robinson, 2002).In this context, considering that what can be more accurate and more effective in increasing port logistical performance is necessary and important. Aimed to identification of factors affecting the extent of port logistical performance and also comparing BIK and bushehr ports based on this factors using importance–performance analysis, this research has been implemented.

Ports and global logistics chains

Increasing globalization and a growing degree of product customization have resulted in more complex supply chains that demand a more rapid response to order delivery and more effective movement of goods across the world, which makes logistics a new service sector crossing departments, industries and regions. How to make goods move more efficiently to satisfy international and national trading has thus become a key factor to drive the regional economy and its development, which cannot be separated from port logistical performance (Baird & Valentine, 2006).

Literature Review

De Langen(2003) proposes PPIs1 as throughput volume, ship waiting time, logistics value added and logistics space (m2) and investment level in port related manufacturing. Bichou and Gray (2004) identify that throughput measures for internal performance are the second most commonly used (only next to finance measures) whereas productivity and economic-impact indicators are more prominent for external comparison with other ports. Robinson (2006) considers minimum elapsed time, acceptable cost and required quality as the three value variables for delivery to shippers and stakeholders. Wu and Zong (2004) evaluate port performance by the approach of Analytical Hierarchy Process (AHP). Xiao et al. (2005) and Ren et al. (2007) assess port performance employing AHP as well, and adopt similar indicators. They identify that port charges, free trade, customs services, ICT level and other financial or insurance services, infrastructure and logistics services are more important than geographical factors and port services quality such as speed and risks. Bichou (2005) notes that most practical and theoretical approaches to port performance measurement benchmarking are three broad categories: performance metrics and index methods, economic impact studies and efficiency frontier approaches. He concludes that performance measures often fall into three categories: input measures, output measures (e.g., production/throughput, profit) and composite measures (productivity, efficiency, profitability, utilization, effectiveness). De Langen et al. (2007) claim that specific PPIs rather than common PPIs should be applied to different types of ports. Moreover, they propose new PPIs instead of the traditional ones. For example, they suggest ship turnaround time and connectivity index should replace ship-waiting time for cargo transfer ports; throughput volume per m2 should replace throughput volume as new PPIs, although ports do not report them systematically and structurally as they should. For logistics product, percentage of goods to which value is added in the port area is a relevant output indicator, which shows a logistics location. For port manufacturing product, the most relevant output indicator is the investment level in manufacturing facilities, which shows whether the investment is increasing or decreasing. Productivity of the industries and wage level are the two upgrade indicators. Pettit and Beresford (2007) note that volume of trade, total value of commodity throughput and port-related employment are all possible indicators to assess port performance. However, they realize that the indicators are difficult to quantify.

Origin of IPA[2]

Martilla and James (1977) initiated the simple technique of IPA to identify key attributes for the development of an automobile marketing program. They put mean customer ratings of each attribute‘s performance in quantization value on the horizontal axis, and then put mean customer ratings of each attribute‘s importance in quantization value on the vertical axis. A two-dimensional graph, with the mean importance and performance scale constituting the two axes, was constructed (Martilla & James, 1977). The values for each attribute were plotted as points on the importance-performance grid. The plots on the grid indicated the appropriate strategy for each attribute. In this technique, the attributes are plotted against each other and the resulting importance-performance space is divided into four quadrants, as shown in Figure 1.

Employment of IPA

Ever since Martilla and James (1977) demonstrated the technique of IPA, it has been widely used for prioritizing service improvements. It has attracted the interest of various academics and researchers and it has been applied in different research areas, such as manufacturing (Platts & Gregory, 1992. operations and engineer services (Slack, 1994. education services (Ford et al., 1999. hospitals (Yavas & Shemwell, 2001. professional associations (Johns, 2001. freight transportation (Mangan et al., 2002. financial service provider of banks (Yeo, 2003. highway transportation (Huang et al., 2006. human resources (Eskildsen & Kristensen, 2006. hotels (Deng et al., 2008. retailers (Shieh & Wu, 2009. and tourism (Lai& To, 2010). Brooks et al. (2010) used IPA to examine port

[1]port logistical performance indicators
[2] Importance–Performance Analysis

user's evaluation of port effectiveness. However, being so important and popular, IPA has not been applied to the port sector to identify factors influencing port logistical performance yet.

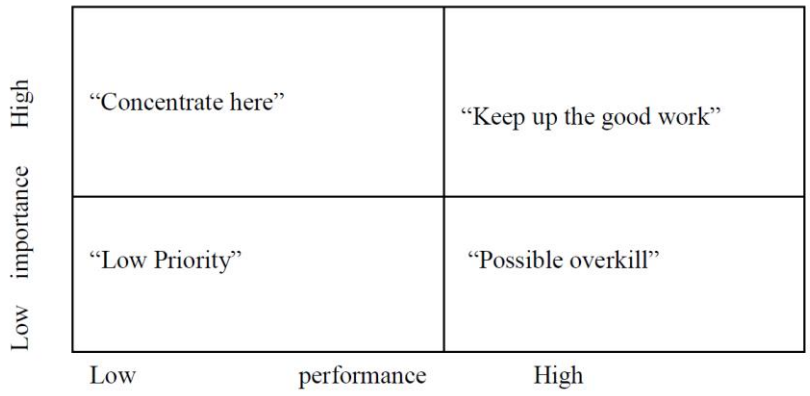


Figure 1. Importance-performance matrix

Martilla and Jamesinterpret the quadrants into - concentrate here (high importance with poor performance, items in this quadrant have high priority for the improvement of service quality. - keep up the good work (high importance with good performance. - low priority for actions (low importance with poor performance) and - possible overkill (low importance but good performance, which might be considered as a waste) (Martilla& James, 1977).

IPA and gap analysis

Apart from plotting items on a four-quadrant matrix, gap analysis is used to simultaneously consider importance and performance and identify the areas for improvement. There are two types of gap analysis in IPA.

The first type of gap is measured as performance minus importance. Platts and Gregory (1992) conducted IPA by employing the rating of importance and performance difference in manufacturing for strategy formulation. Ainin and Hisham (2008) applied the IPA to information systems in Malaysia. They indicated that the gap between the importance and performance implies the opportunities for improvement and guides the prioritization of resources and management intervention. Ford et al. (1999) developed a —gap-based approach that compared importance with performance to implicitly set improvement priorities. They regarded the gap of performance minus importance as the room to improve and applied IPA in the educational service. Two case studies were undertaken in New Zealand and the USA to develop a strategic tool for education service market improvement. Two important contributions they made to this research: 1. they identified the problematic attributes by the importance-performance difference. If the mean performance minus mean importance is negative, the attribute shows a potential problem. The bigger the difference is, the bigger the problem is with that attribute. 2. They identified a significantly different factor structure between the two countries, although they investigated the same attributes. The results suggest that trying to develop a single model of important facts to apply in a cross-cultural context might be a mistake.

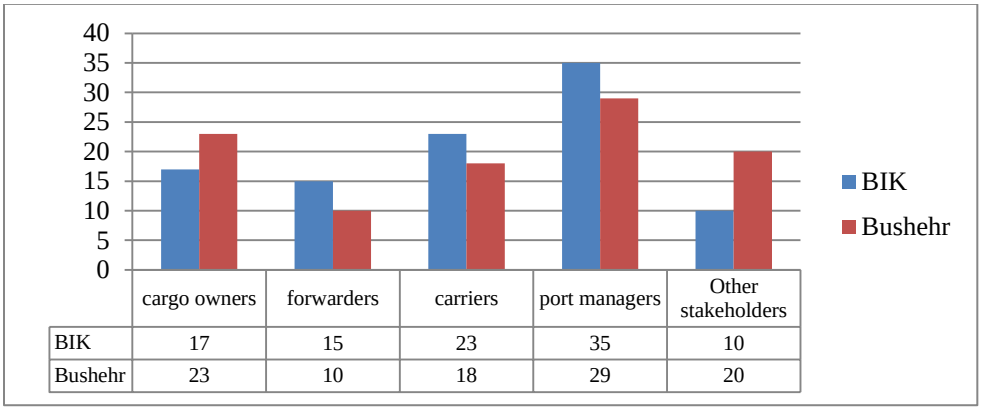
The second type of gap is measured as focal performance minus competitor or bench marker‘s performance. The competitors ‘performance is treated as an explicit benchmark by which to judge the operation‘s performance. The performance difference (Δ performance) is treated as the gap of the focal organization to improve. This is different from traditional IPA that only considers focal performance.

RESEARCH METHOD

The main goal of this research is to identify the effective & key factors in investigating port's logistic performance & comparing BIK & Bushehr port logistics performance based on utilization of the analysis method of significance- performance. The current research from goal aspect in a way that its results are useful for logistics performance of BIK & Bushehr, the research is considered to be practical.

Statistical Community

In this research, the statistical community is consisting of cargo owners, cargo shippers, products that made use of case work ports' services or in other words, are the beneficial & managers of these ports. In this research, to determine the size of the sample, a preliminary study was implemented by distributing questionnaire among 30 people who are PMO's experts. By assessing the primary sample variance at a certain level of 95%, the size of the sample was announced to be 200 people. In the current quest, a method of class sampling was used. The statistical sample is divided into two groups; the 1st group is the beneficial at BIK & the 2nd group is the beneficial in Bushehr. The size of each sample of the mentioned groups is 100 people. The mentioned 100- people at both ports are mentioned in figure2.



	cargo owners	forwarders	carriers	port managers	Other stakeholders
BIK	17	15	23	35	10
Bushehr	23	10	18	29	20

Figure 2. Respondents profile by company type and region (frequency)

Means & procedures for collecting data

In this quest, the means for collecting data is the questionnaire of significance- performance. In this quest a questionnaire with the following details was used:

The 1st questionnaire is about the fifteen significance components of ports' logistics performance, through statistical research sample in both ports (Bushehr & BIK. thus; the importance of the 15th components relative to ports logistic performance was extracted for both ports.

The 2nd questionnaire was the performance of the 15 components of Bushehr's logistics performance through Bushehr Beneficial's point of view.

The 3rd questionnaire of 15 components of logistics performance in BIK through BIK Beneficial's point of view

To study the normality of research's distribution of data, Klamgroof- Esmirnoof test was utilized. The so called test was implemented at the level of 95% regarding the fact that a meaningful level of the test is more than 0/05, that the normality assumption of the data is confirmed. Also, to investigate the abovementioned elements, the 5- option Likert scale was used, therefore; the maximum score was 5 & the minimum was 1. Determining the validity of the appearance of the questionnaires' content was implemented by experts' confirmation. For the final assessment of the questionnaire, the calculating Cronbach's alpha coefficient was used that its amount using SPSS software & according to table 1 was implemented. With regard to the calculated Cronbach's alpha coefficient for this researches' questionnaires, it is more than 0/72, thus it can be comprehended that the validity of the questionnaire is acceptable.

Table 1. Results of Cronbach's alpha test

Questionnaire	Cronbach's alpha coefficient
Performance questionnaire of ports' services the 27-quality components	0.87
1st questionnaire- significance questionnaire of ports' services the 27-quality components through container shipping line experts' point of view	0.82
2nd questionnaire- significance questionnaire of ports' services the 27-quality components through container shipping line experts' point of view	0.95

Using pattern of the significance analysis method- The performance in evaluating ports logistics function has been studies in cases1st step Importance analysis modal- The performance in a sense, is a modal of multi-criteria modal. To use this modal, we should determine the indicators that are to be analyzed & evaluated. In fact, the effectiveness of the importance- performance analysis modal strongly depends on analytical indicators or

components. Thus, in each field the 1st step in exploiting this modal is to know the relative analytical components (Mangan et al., 2002). In this research the so called components were recognized as the effective factors in evaluating ports' logistic performance by studying the researches background & also holding brain storm sessions. At last 15 components for ports' logistic performance evaluation which were studies in cases were chosen.

2nd step In this part based on the 15 determined components in the 1st step, were made into Likertz's five-option performance & importance questionnaires & presented to the statistical community which were asked to rank the indicators. It is worth noting that the performance of these components for BIK according to the Beneficial's point of view (in BIK) was specified for Bushehr based on its beneficial view. The significance of components is determined by both points of views.

3rd step is to make the significance- performance matrix, to do so, each axis is divided into two parts. In this research with respect to the fact that to measure the components, they have used Likert scale of five choices. To divide x & y axis, each axis of X & Y were divided in numbers of 3.5. Also, at this stage the results of the questionnaire were analyzed & by regarding the amounts relative to significance & showing them on the vertical axis & calculating the average of the amounts pertaining to performance & presenting it on the horizontal axis, the position for each component of quality was determined in the Significance- Performance matrix.

4th step, in this phase to specify the distance of level of performance for each 15 components of the significance level, based on the formula of (P-I. the average performance of each component was subtracted from the significance average & the differential scores are computed. After that using the significant even T test, the observed difference between the significance mean & performance for each component shall be tested. Whenever a significant difference & the difference was negative indicates that the performance level of a component has some distance from the Ideal position (significance level of components). Then to determine the 2nd split, the performance for both ports shall be compared with each other. To this end, the mean performance for Bushehr port is subtracted from performance mean components in BIK. In case the gained figure was negative, it shows that in that component BIK performed better than Busherhr port & vice versa. Then by using the even significant T test, the observed difference between performances of both ports shall be tested.

RESEARCHER'S FINDINGS & RESULTS

1st phase

By reviewing the research's background & also by holding brain storm meetings, the effective factors in evaluating ports' logistics performance became known & consequently 15 components for evaluating ports' logistics performance work is illustrated as the followings:

Table 2. The effective factors in the ports' logistics performance

Code	Factors
A1	Availability of shipping services (destinations, frequencies, etc.) and Feeder connections to the deep-seaports and the major shipping lines
A2	port information system
A3	Port/ terminal handling, warehousing and other charges
A4	confidence in port schedules
A5	Port / shipping service is on the cheapest overall route to the destination
A6	Port operations efficiency
A7	up-to-date technology
A8	Port/ terminal security and safety
A9	Technical infrastructure of the port (handling equipment, ICT, etc)
A10	Proximity of the port to your customers and / or sources of supply
A11	Availability of skilled employees in the region
A12	Quality of landside transport links (inter-modal links)
A13	Availability and quality of logistics services(warehousing, freight forwarding, cargo handling, etc) and Value-added services
A14	Ship turnaround time
A15	Depth of navigation channel

2nd phase

After knowing ports logistics performance components, the significance- performance mean for each component in BIK & Bushehr port was gained based on the comments of the statistical society as is described in tables 3 & 4. Then by using the significant even T test, the observed difference between the significance & performance mean for both ports shall be tested. With respect to the significant even T test, the difference between the mean of significance & performance for all components of both ports was confirmed. In the following step the

distance of performance level of each the 15 components from its significance level, is subtracted the mean significant of each in accordance with formula (P-I) & the differential score shall be computed.

Table 3. Significance- performance mean & logistics performance of split component in Bushehr Port

BUSHEHR Code	I	P	P-I	T	sig	H	R
A 1	4.4	4	-0.4	16.980	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A 2	3.98	3.4	-0.58	12.136	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A3	4.83	3	-1.83	21.025	0.005	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A4	4.48	4.3	-0.18	18.024	٠	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A5	3.7	3.49	-0.21	20.920	0.004	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A6	4.56	4.25	-0.31	17.262	0.001	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A7	4.08	3.35	-0.73	20.045	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A8	4.33	4.15	-0.18	20.224	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A9	4.65	3.19	-1.46	20.110	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A10	4.27	3.97	-0.3	17.155	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A11	3.73	3.5	-0.23	22.045	0.001	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A12	4.83	3.16	-1.67	15.544	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A13	4.92	3.14	-1.78	68.586	0.003	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A14	3.88	3.6	-0.28	85.732	0.001	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A15	4.4	3.8	-0.6	15.217	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$

The obtained results for Bushehr port indicates that following below components respectively has the maximum split. The component of (A3- Port/terminal handling, warehousing and other charges-) with the split of -1.83, the component of (Component of A12- landside transport links) with the split of -1.67, the component (A13- Availability and quality of logistics services) with the split of -1.61, component (Technical infrastructure of the port - A9) with the split of -1.46, component (A7- technology up- to- date) with the split of -0.73, respectively dedicating the most split to themselves.

By reviewing the results for BIK, the component (A3- charges Port/ terminal handling, warehousing and other) with the split of -1.63, component (A13- Availability and quality of logistics services) with the split of -1.61, component (Quality of landside transport links -A12) with the split of -1.44, component (A9-port Technical infrastructure of the) with the split of -1.3, component (A7- up-to-date technology) with the split of -0.77 respectively dedicating the most split to themselves.

DISCUSSION & CONCLUSION

This research was implemented to identify the effective & key elements in investigating ports' logistic performance of BIK &Busher's port based on indexes using performance- significance analysis method. In the 1st phase by studying the researches background & also by holding brainstorm sessions the effective factors on ports' logistics performance evaluation were identified & finally 15 components were chosen for evaluating case ports' logistics performance. The identification aspect for ports' logistics performance components are the average significance & performance per component for both ports in accordance to the computed statistical society's point of view & then by using the significant even T test, the observed difference between significance & performance average of both ports for all ports were tested as per all components. With regard to the significant even T test results, the difference between average significance & performance of all components were confirmed. The obtained results from this phase indicate that between the significance- performances of all components in both ports there exist a drastic split. Then to specify the 2nd split, the co- performance of both ports was compared to

each other. Therefore, Busher's port average performance for each of the components was subtracted from BIK's average performance. Afterwards, by using the significant even T test, the observed difference between both ports average performance was confirmed per component. Thus Busherhr's port in all components had a lower performance rate in comparison to BIK. In the 3rd step, by computing the relative significance average amounts & presenting it in the vertical axis & calculating the relative performance average amounts & presenting it on the horizontal axis, the situation of all the 15 components of the significance- performance matrix for both ports was accomplished. The significance- performance matrix for Bushehr's port indicated that the components (A3)،(A12 ،( )A13) ،(A9) ،(A7) ،(A2) & (A5) that exist in chart 1 of the so called significance- performance matrix, represent high significance & low performance & being at this position means an area of priority which requires an immediate measure. Except for component (A11) which are situated at the bordering area of the 1st& 2nd chart the rest of the components are situated in the 2nd chart. This implies high significance & low performance & indicates a suitable situation of the current system & its maintenance. BIK presents that component are situated in (A3. (A12. (A13. (A9) & (A7) of the 1st chart of significance- performance matrix & that the rest are all in the 2nd chart. The results of this research indicates that the significance- importance analysis model in evaluating ports' logistics performance enjoys higher capacity & is able to perform pathology for the whole Port system with full details offers assistance in ports' logistics performance development.

Table 4. The mean of significance, performance & split of BIK Logistics performance components.

BIK							
No	I	P	P-I	T	d.f	H	R
A 1	4.4	4.17	-0.23	17.990	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A 2	3.98	3.7	-0.28	13.166	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A3	4.83	3.2	-1.63	22.045	0.001	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A4	4.48	4.35	-0.13	21.004	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A5	3.7	3.56	-0.14	22.990	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A6	4.56	4.32	-0.24	13.166	0.004	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A7	4.08	3.31	-0.77	22.045	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A8	4.33	4.2	-0.13	159.217	.0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A9	4.65	3.35	-1.3	68.586	0.002	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A10	4.27	4.16	-0.11	85.732	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A11	3.73	3.6	-0.13	159.217	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A12	4.83	3.39	-1.44	68.586	0.001	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A13	4.92	3.31	-1.61	18.990	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A14	3.88	3.65	-0.23	13.166	0.002	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A15	4.4	4.17	-0.23	20.045	0.001	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$

Then to determine the 2nd- type split, the performance of both ports was compared. To do so, Bushehr port's performance mean for each component was subtracted from BIK's mean performance. The results are presented in table 5 to determine the 2nd- split type. Afterwards, using the significant even T test, the observed difference between both ports' performance, was confirmed. With respect to the obtained results of component (A2) with the split of -0.3, component (A12) with the split of -0.23, (A3) split of -0.2, (A10) split of -0.19, (A1) split of -0.17, (A9) with the split of -0.16 respectively enjoying the maximum split. The negative figure indicates that BIK's performance in that component is more that Bushehr's port. In other words, Bushehr's performance in the so called component is weaker than BIK's.

Table 5. observed difference between both ports' performance

NO	BUSHEHR P	BIK P	BUSHEHR-BIK P-P	T	d.g	H	R
A 1	4	4.17	-0.17	0	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A 2	3.4	3.7	-0.3	0.002	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A3	3	3.2	-0.2	0	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A4	4.3	4.35	-0.05	0	0.001	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A5	3.49	3.56	-0.07	0	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A6	4.25	4.32	-0.07	0	0.0013	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A7	3.35	3.31	0.04	.0	0.004	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A8	4.15	4.2	-0.05	0.001	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A9	3.19	3.35	-0.16	0	0.004	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A10	3.97	4.16	-0.19	0.002	0.005	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A11	3.5	3.6	-0.1	0	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A12	3.16	3.39	-0.23	0	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A13	3.14	3.31	-0.17	0.001	0.003	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A14	3.6	3.65	-0.05	0	0.001	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$
A15	3.8	4.17	-0.37	.0	0	$H_0: \mu_1 = \mu_2$ $H_1: \mu_1 \neq \mu_2$	$H_1: \mu_1 \neq \mu_2$

After computing the mean value pertaining to significance & showing it on the vertical axis subsequently calculating the mean value of performance & presenting it on a horizontal axis, the situation for each one of the 15 components in the performance- significance matrix for both ports is illustrated in table 1 & 2.

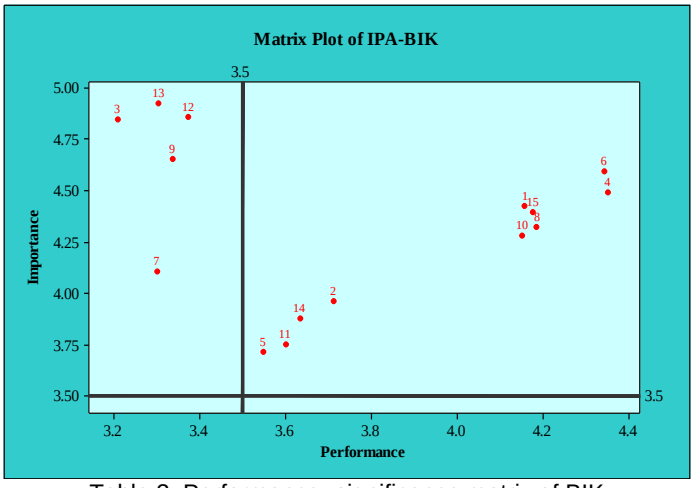


Table 3. Performance- significance matrix of BIK

Regarding the significance- performance matrix of BIK which indicates the components (A3- Port/terminal handling, warehousing and other charges. component (A13- Availability and quality of logistics services. component (A9- Technical infrastructure of the port) & component (A7- up-to-date technology. they are presented in chart no.1 of performance- significance matrix that indicates high importance & low performance & being at this position implies that it is an urgent matter & requires an immediate action. The rest of the component is presented

in chart no. 2 which indicates high importance & high performance & implies the current suitable situation of the system & the necessity to be maintained.

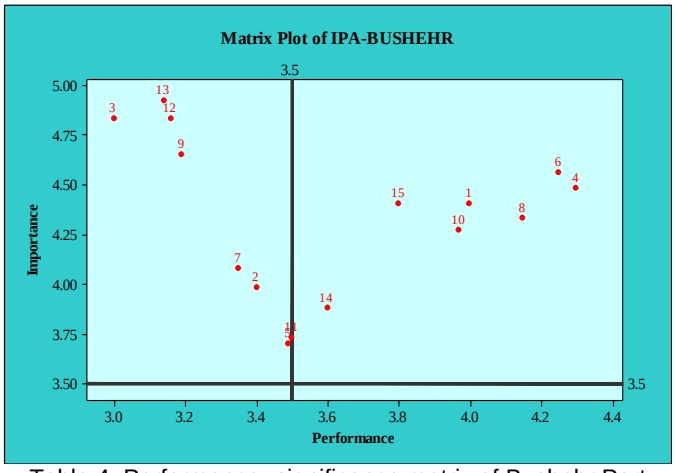


Table 4. Performance- significance matrix of Bushehr Port

Given the performance- significance matrix that shows the components (A3- Port/terminal handling, warehousing and other charges. component (A12- Quality of landside transport links. component (A13- Availability and quality of logistics services. component (A9- Technical infrastructure of the port. component (A7- up-to-date technology) & component (A5- Port / shipping service is on the cheapest overall route to the destination) are presented in chart no.1 of the performance- significance matrix which indicate high importance & low performance & being at this level means priority & requires urgent action. Except for the component (A11- Availability of skilled employees in the region) which is situated between of chart 1&2. The rest of the components are presented in the 2nd chart that presents high significance & high performance & indicates a suitable situation for the system & consequently requires maintenance.

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