

The Impact Of Applying Smart Port Concept On Enhancing The Performance Of Al-Faw Great Port In Iraq

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1. ABSTRACT: Generally speaking, Iraq suffers from the lack of a port that applies the concept of smart port management; which has led to putting Iraqi ports out of competition as a result of using paper management system. Hence, this has affected the productivity and efficiency of Iraqi ports, causing great losses with the long-time factor. In achieving the objectives of this research, the researcher has relied on descriptive-analytical approach. Therefore, an electronically designed questionnaire is used to achieve the aim of knowing the possibility of applying modern technology to Al-Faw great port.

An electronic questionnaire was distributed and analysed using SPSS program. Researchers have employed the international experiences applying smart ports concept to identify the most important requirements for its implementation. This research is limited to Al-Faw great port in Iraq for the year 2021.

Keywords: *Smart port, SPSS, Al-Faw great port, Iraq.*

2. INTRODUCTION

In recent decades, according to the development that occurred in the ports by becoming a centre for value-added activities, these ports have become in need of a central base for electronically exchanging information in order to become an integrated logistical point. There has become an urgent need to connect the port community with an electronic network that provides port workers with all information and procedures accurately and timely. In the appropriate time in this context, electronic information systems are applied at every stage of port operation, which positively affects the traffic of ships, gate management, shipping operations, customs procedures, and the exchange of documents. Accordingly, this increases the quality of services provided to all parties dealing with the port.

Definitely, application of technology will contribute to the increase in the efficiency of the port; subsequently, this would help reduce the time of keeping the ship on the berth. Eventually the productivity of the port will be enhanced with the same potential. Thus, applying information technology will increase the port's competitiveness, and the importance of adopting the concept of smart ports has actually emerged and is of great interest to today's ports as it is the basis for its future development and survival (Belfkih and Sadeg, 2017).

In fact, employing modern technologies will transform traditional port services into interactive and dynamic services and increase their transparency. The electronic port management system is intended to manage the operations of the movement of ships, goods and containers that take place inside the port through an integrated electronic system.

This system provides advance planning of operations and real-time follow-up of their implementation from the site of the operation with the achievement of an electronic linkage and information communication among all authorities and institutions in port.

Al-Faw port project is a part of the dry canal project that connects the Arab Gulf to northern Europe and will have a significant impact on the Iraqi economy as it can play a major role in pushing the wheel of the Iraqi economy forward. Al-Faw great Port is distinguished by a privileged location that makes it capable of being a sustainable smart port for the transfer of trade from the East to the West through the dry canal in the Al-Faw peninsula to Turkey and from there to Europe. Moreover, Al-Faw great port contains 96 berths varying between containers, general cargos, and oil berths. A draft for all berths amounts to 19 meters and the area of the port is 54 square kilometres. Figure 1 shows the general plan of Al-Faw great port based on the plan of the Iraqi Ministry of Transport to develop Al-Faw great port.

3. LITERATURE REVIEW:

In the information age of the global economic system, information and communication technology and efficient information flow have become a vital role in stimulating growth, promoting trade, attracting investments, and improving competitiveness and environmental factors. Therefore, it is important to determine the impact and importance of applying information and communication technology in ports and the transformation of ports from the traditional concept to smart ports.

El-Sakty (2016) explained that the importance of the concept of smart ports has increased in being strategic in recent years as a future direction in the maritime industry. This is due to the fact that the new trend of smart ports will lead to dependence on new administrative energy models that are based on low environmental impacts and embed innovations in both processes and technologies. Thus, smart ports will contribute to sustainability growth. Consequently, most countries and unions such as the European Union have issued new transport infrastructure policies with the purpose of strengthening transport networks around the world, removing technical bottlenecks and barriers, and

reaching distant markets in a far lesser time than before. Undoubtedly, all these trends depend on investing in new technologies.

Implementation of modern technologies will make the port easy and smooth in applying the procedures for ships and goods, as well as saving time and effort and minimizing the procedures that workers have to go through in the port to perform and complete the transactions related to ships or goods. As a targeted result, the port's productivity rates will rise. Therefore, the main objective of smart ports is to be capable of meeting the needs and requirements of users and customers with a guarantee of sustainability, and generating high quality services (Jarda et al., 2018).

In this context, Dounioui et al., (2019) provided a model for the concept of the smart port by identifying its basic pillars as well as the basic components for the success of each pillar. It is known that technology and innovation, such as the Internet of Things (IoT) are a driving force behind the productivity of smart ports. Thus, this type of technology in the form of physical infrastructure and IT infrastructure may be the best way to see the benefits in a smart port environment.

The Internet of Things (IoT) aims to support and develop the transportation industry in general and ports in particular. Therefore, ports are looking for a smart concept in order to improve operations in the port and support the flow of transportation within the port. Actually, the presence of IoT in ports has become necessary.

Among its tools are sensors, communications and cloud computing to ensure that all elements of the port are connected together, which would help to make intelligent decisions as well as provide intelligent solutions for data collection and monitoring of the port.

Yau et al., (2020) focused on new areas of investigation in smart ports, including the use of the Internet of Things platform, technologies to reduce emissions and enhance efficiency. New technologies will facilitate port trade operations and make it possible to reduce port operations costs. Accordingly, ports will require the new processes of information technology, the absorption of highly skilled workers, the improvement of the social

level of society, and finally all environmental problems should be taken into account.

Ismail (2021) studied the importance of future projects in Al-Faw great port in Iraq and its impact on increasing the competitiveness of Al-Faw great port. This research classified as descriptive research; where it relied on using SWOT during the year 2021; in order to define strengths and weaknesses, as well as opportunities and threats facing future planning operations of the Al-Faw port.

GAP ANALYSIS AND CONTRIBUTION

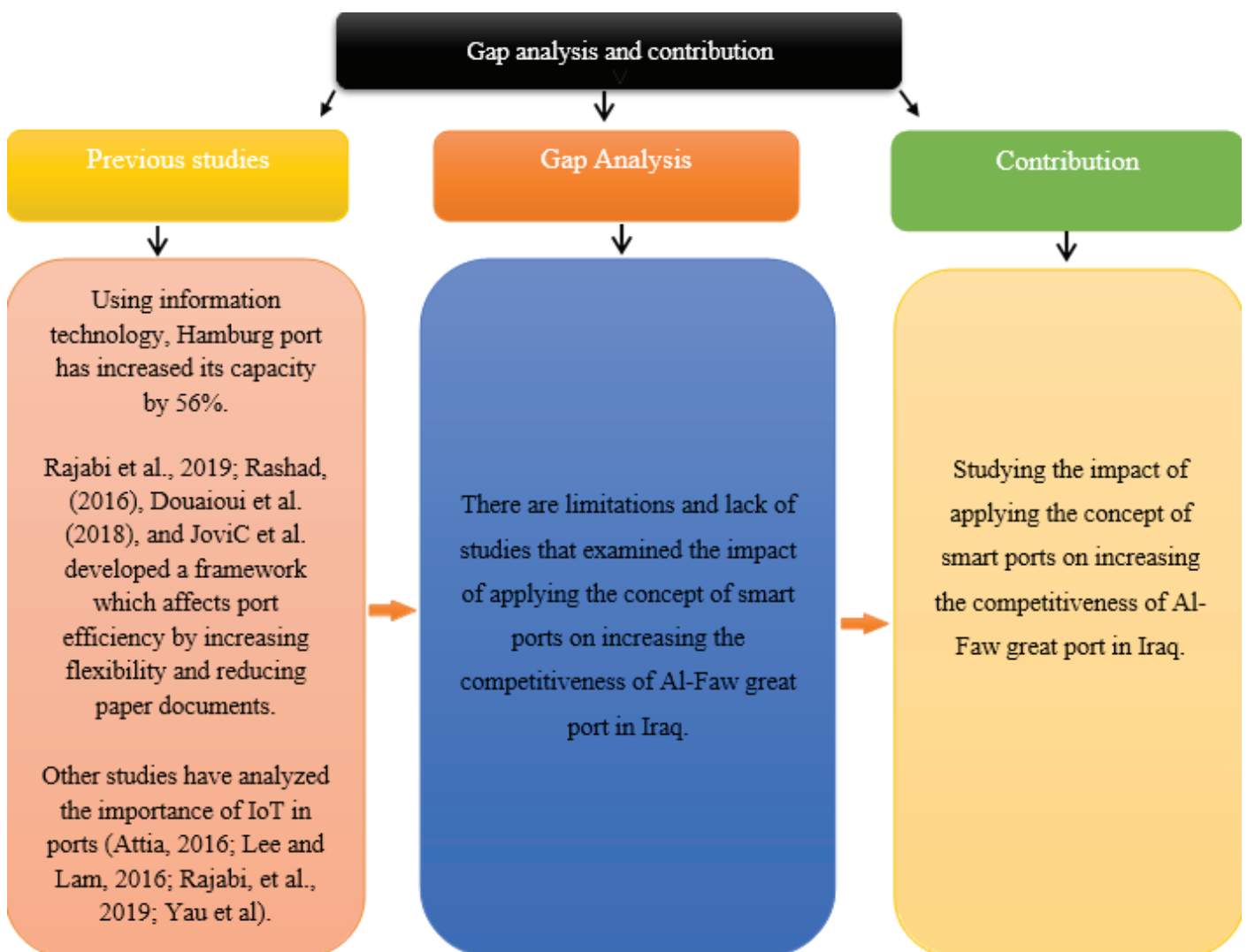


Figure (1) Gap analysis and research contribution.
Source: By authors

4. RESEARCH PROBLEM

Iraq suffers from the lack of a port that applies the concept of smart port management. This led to excluding Iraqi ports of competition as a result of using the paper management system, which affected the productivity and efficiency of ports. Consequently, this has caused great losses with the long-time factor. To sum up, the research problem is the absence of an electronic management system that deals with parties of commercial interests and the movement of ships dealing with Iraqi ports, which suffer from intense competition with the neighboring ports. So far there are no smart ports in Iraq and some of them do not rise to the implementation of the concept of the smart port. Therefore, the construction of the great port of Al-Faw great port with a draft of 19.8 meters and a distinct strategic location, will help to receive all modern ships that operate with a modern electronic management system.

5. RESEARCH QUESTIONS

To achieve the goal of the research, a number of questions were put forward, which the researcher answered in the study, as follows:

1. How is it possible to switch from the current traditional paper-based system to the proposed electronic system?
2. What are obstacles that face implementing the concept of electronic management?
3. How will the use of the electronic administration of Al-Faw great port affect the quality of service, customs procedures and the time factor?

6. RESEARCH AREA

With the development of global trade, maritime transport and the expansion of the fields and horizons of maritime navigation, Al-Faw has become the key to the East and the West. In other words, at present it is capable of linking the continent of Asia with the continent of Europe and linking the countries of the South with the countries of the North. The city of Al-Faw is the last Iraqi city in the south. Its benefits will spread to the entire region. Through the port of Al-Faw, the Gulf countries will be able to transfer their oil to Turkey at the lowest possible

cost and in the least time, and vice versa, the Turkish goods that depend on it will reach them in record time. Al-Faw great port will connect these countries with oil sources and commercial markets in the Gulf region.

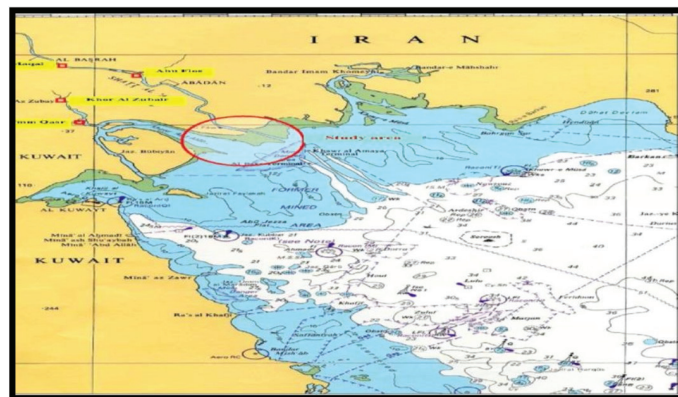


Figure (2) The location of Al-Faw great port in the Republic of Iraq
Source: Iraqi ministry of transport (2021).

7. RESEARCH METHODOLOGY

In achieving the objectives of this research, the researcher depends on a descriptive-analytical approach; as a main approach, as it is compatible to the achievement of this research objectives. In order for the researcher to achieve the desired goals of his study, the researcher will analyze the research studies to apply the concept of smart ports to Al-Faw great port in Iraq as well as the recommendations with the aim of connecting Al-Faw great port to become a pivotal port that competes regionally and internationally. The researcher will use the international experiences of one of the smart ports "Jebel Ali port" to determine the most important requirements for the implementation of smart ports concept.

8. RESEARCH VARIABLES

The research variables are divided into dependent and independent variables. According to the research objectives, the dependent variable is (TEUs) and ships call number. Independent variables are storage area, handling equipment, berth depth, berth length, as shown in the next figure No. (3).

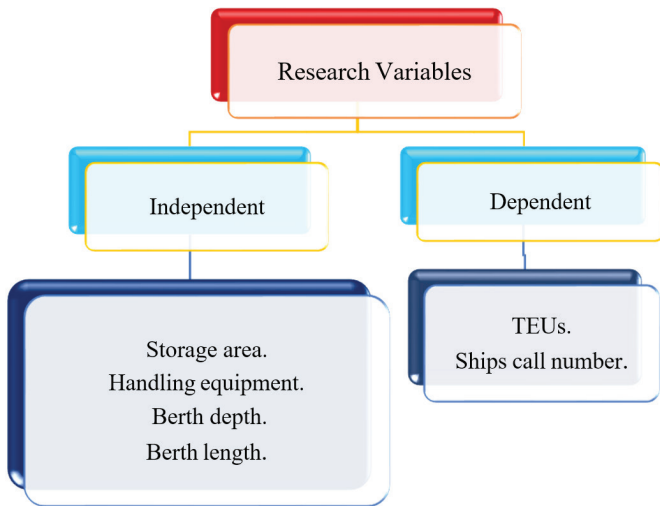


Figure (3) Research variables.
Source: By authors.

9. EMPIRICAL ANALYSIS

Results of the questionnaire for Al-Faw great port

When analyzing responses of the employers who answered the questionnaire (total number of the questionnaire was 228 forms), it was found that the largest percentage of the questionnaires' responses belong to the port's management category with a percentage of 40%, followed by the port workers' category with a percentage of 36%. It was followed by external customers with a percentage of 16%, and freight agents by 5%, while the lowest percentage of customs brokers was at 3%.

When analyzing years of experience, it was found that the percentage of the category of less than five years of experience was 27%, the percentage of the category of years of experience ranging from five to

Ten was 17%, the percentage of the category of years of experience ranging from ten to fifteen years was 18%, and the percentage of the category of years of experience ranging from fifteen to twenty years was 18%. The percentage of groups over twenty years in relation to years of experience was 20%. As for the analysis of the percentage of holders of higher degrees and knowledge of the certificates obtained by all those who were reluctant to respond to the questionnaire, it was found that the highest percentage of the answered questionnaires belonged to those with a bachelor's degree by 57%, next those who hold a master's degree with a percentage of 18%, followed by those with a doctorate degree with a percentage of 6%. Finally, those who hold a diploma or any other certificates with a percentage of 19%.

According to the analysis of the research, Alpha Cronbach's is used to measure the stability of choice, which is a measure of internal consistency, that is, the extent to which a group of items are closely related. The Alpha Cronbach's scale is a simple way to measure whether the result is reliable or not. Reliability refers to the amount of true variance that can be calculated by the observed variance. As a normal procedure, several coefficients have been proposed to estimate the reliability of the internal consistency. In fact, Alpha Cronbach's is one of the most widely used reliability criteria in social and organizational sciences. Thus, Alpha Cronbach's analysis in all the dimensions used in the questionnaire approximates to the correct number one, and there are no negative numbers, and it is higher than 0.5, as illustrated in table No.1; using the SPSS statistical program.

Table: 1. Cronbach's Alpha Analysis

General direction of port management	0.935
The impact of applying the concept of smart ports on meeting the needs of customers	0.926
The impact of applying the concept of smart ports in sustainable development	0.921
The effect of applying the concept of the smart ports on the marketing aspect	0.927
The impact of applying the concept of smart ports to Al-Faw great port on the economic aspect	0.933
Complete questionnaire	0.982

Source: by researcher.

A. General orientation of port management:

The researcher believes that the highest percentage in the questionnaire strongly agrees to the third and fifth question about the general direction of the port management on the administration's adoption of a strategy of competitiveness and providing high quality services and smart pollution-free ports in achieving economic development in Al-Faw great port. This is

achieved by strengthening application of the concept of smart ports and utilizing modern technology which corresponds to the modern era. It goes without saying, satisfying customers and port contractors is an important factor for the success of port management, the navigational movement of ships, the movement of goods flows, and the recovery of trade and economy; as shown in table No. 2; using the SPSS statistical program.

Table: 2. General orientation of port management.

	Q1	Q2	Q3	Q4	Q5	Q6
Strongly Disagree	3	3	4	5	3	2
	1.32%	1.32%	1.75%	2.19%	1.32%	0.88%
Disapproved	2	2	2	1	3	4
	0.88%	0.88%	0.88%	0.44%	1.32%	1.75%
Neutral	7	6	4	11	6	2
	3.07%	2.63%	1.75%	4.82%	2.63%	0.88%
Agreed	50	59	36	44	38	43
	21.93%	25.88%	15.79%	19.30%	16.67%	18.86%
Strongly Agree	166	158	182	167	178	177
	72.81%	69.30%	79.82%	73.25%	78.07%	77.63%

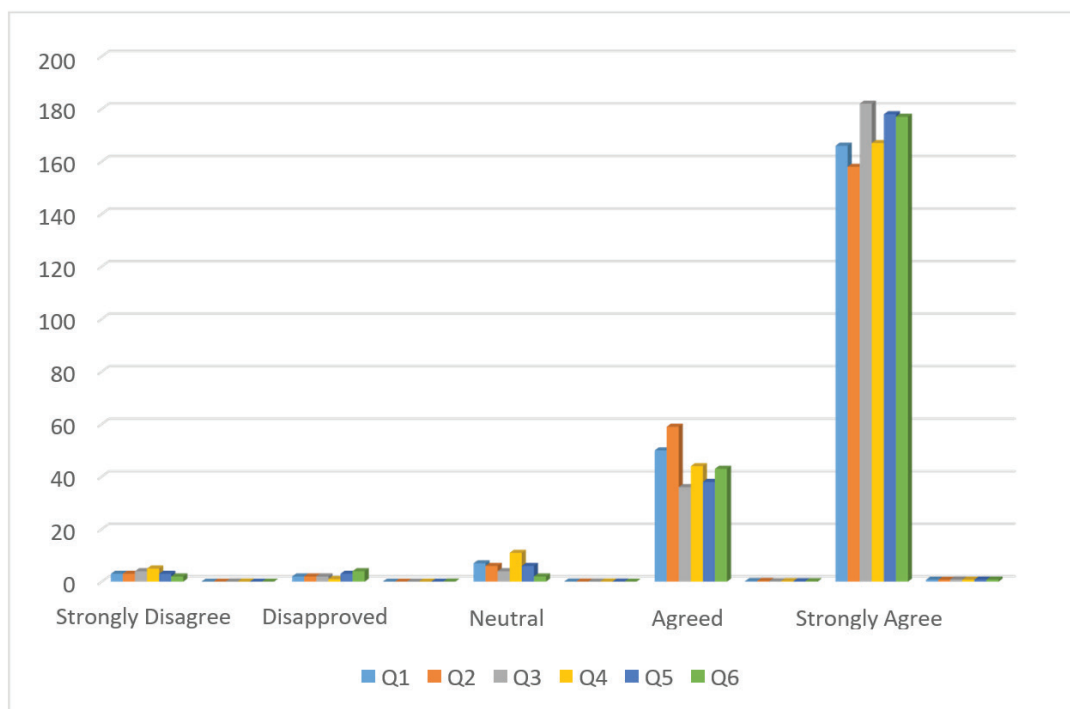


Figure (4) General orientation of port management.

B. The impact of applying the concept of smart ports on meeting customer needs:

The researcher believes that the highest percentage in the questionnaire who strongly agree with the sixth and third questions about the impact of applying smart ports' concept on meeting the needs of customers, will help to implement this concept for Al-Faw great port to abandon paper transactions. In fact. Paper transactions

increase the accumulation and loss of many containers as well as favoritism and excellence in the transaction. Hence, the transition to electronic dealing it will help in the long run to receive self-driving ships, which makes Al-Faw great port a smart port applying the concept of smart ports. An analysis of the impact of applying the concept of smart ports on meeting the needs of customers is shown on table No. 3; using the SPSS statistical program.

Table: 3. The impact of the applying of the concept of smart ports on meeting the needs of customers.

	Q1	Q2	Q3	Q4	Q5	Q6
Strongly Disagree	3	2	2	2	2	3
	1.32%	0.88%	0.88%	0.88%	0.88%	1.32%
Disapproved	0	0	1	1	1	1
	0.00%	0.00%	0.44%	0.44%	0.44%	0.44%
Neutral	1	8	5	10	5	5
	0.44%	3.51%	2.19%	4.39%	2.19%	2.19%
Agreed	50	52	44	53	45	42
	21.93%	22.81%	19.30%	23.25%	19.74%	18.42%
Strongly Agree	174	166	176	162	175	177
	76.32%	72.81%	77.19%	71.05%	76.75%	77.63%

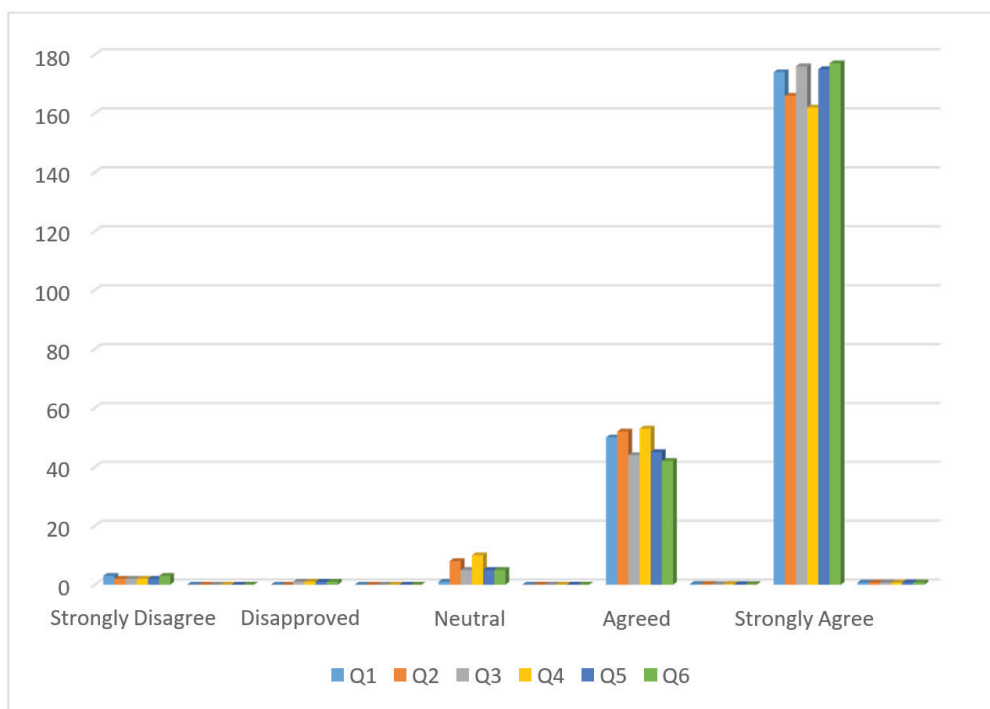


Figure (5) The impact of the applying of the concept of smart ports on meeting the needs of customers

C. The impact of the applying of the concept of smart ports in Al-Faw great port for sustainable development:

In addition, the highest percentage in the questionnaire represents those who strongly agreed to the first question about the impact of the applying the concept of smart ports in Al-Faw great port on sustainable development. It will help to receive the largest number

of giant ships and containers, making it a logistic area. Due to the distinguished geographical location of Al-Faw great port, in the north of the Arabian Gulf. Since it serves as a link between the East and the West, it will be the largest transit area for the transportation and flow of goods in the Middle East. Table No. 4 illustrates an analysis of the impact of applying smart ports concept in Al-Faw great port for sustainable development.

Table 4. The impact of applying the concept of the smart port on sustainable development.

	Q13	Q14	Q15	Q16	Q17	Q18
Strongly Disagree	3	2	2	2	2	2
	1.32%	0.88%	0.88%	0.88%	0.88%	0.88%
Disapproved	0	2	1	0	1	1
	0.00%	0.88%	0.44%	0.00%	0.44%	0.44%
Neutral	2	8	4	9	8	8
	0.88%	3.51%	1.75%	3.95%	3.51%	3.51%
Agreed	39	49	46	48	42	51
	17.11%	21.49%	20.18%	21.05%	18.42%	22.37%
Strongly Agree	184	167	175	169	175	166
	80.70%	73.25%	76.75%	74.12%	76.75%	72.81%

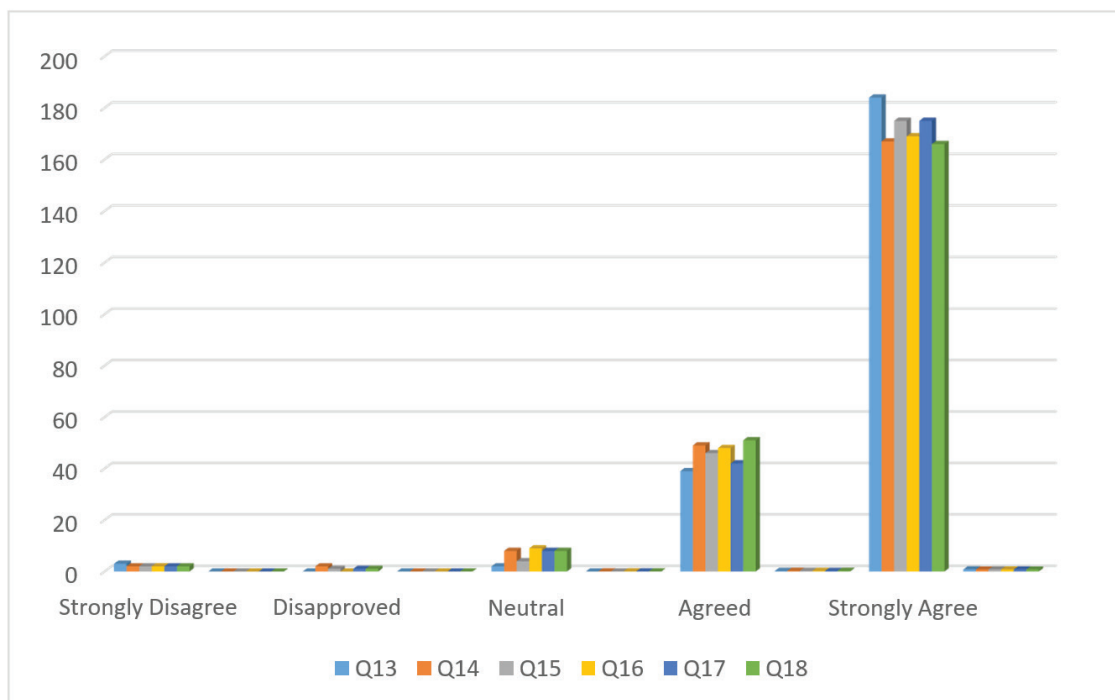


Figure (6) The impact of applying the concept of the smart port on sustainable development.

D. The impact of applying the concept of the smart port on the marketing side:

The researcher believes that the highest percentage in the questionnaire belongs to those who strongly agree with the sixth question about the impact of applying the smart port concept on the economic aspect. Application of this concept will help increase the number of ships and activate the navigational movement in Al-Faw great port.

Thus, the number of ships coming to the port is increased, which activates the marketing aspect in Al-Faw great port and the movement of goods that is second to Iraq and neighboring countries. An analysis of the impact of applying of smart port concept on the marketing aspect is shown in table No. 5; using the SPSS statistical program.

Table 5. The impact of applying the concept of the smart port on the marketing aspect.

	Q19	Q20	Q21	Q22	Q23	Q24
Strongly Disagree	3	2	2	3	2	3
	1.32%	0.88%	0.88%	1.32%	0.88%	1.32%
Disapproved	0	0	0	1	1	0
	0.00%	0.00%	0.00%	0.44%	0.44%	0.00%
Neutral	1	9	5	4	3	3
	0.44%	3.95%	2.19%	1.75%	1.32%	1.32%
Agreed	48	38	37	38	41	30
	21.05%	16.67%	16.23%	16.67%	17.98%	13.16%
Strongly Agree	176	179	184	182	181	192
	77.19 %	78.51%	80.70%	79.82%	79.39%	84.21%

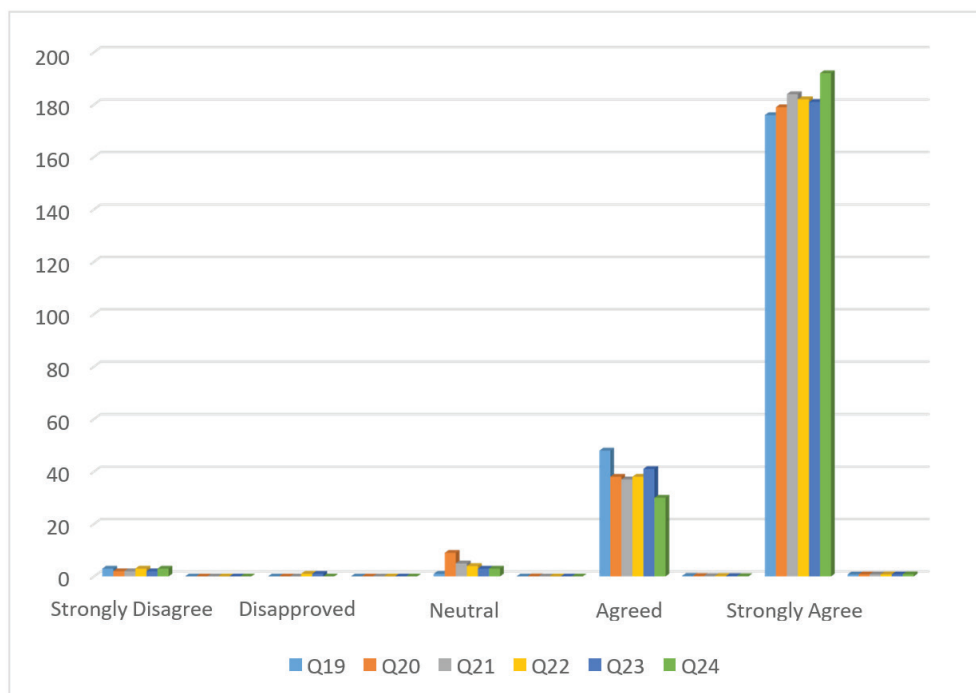


Figure (7) The impact of applying the concept of the smart port on the marketing aspect.

E. The impact of applying smart ports concept to Al-Faw great port on the economic aspect:

Furthermore, the highest percentage in the questionnaire belongs to those who strongly agree to the fourth and fifth questions with the same percentage above. In terms of the impact of the applying of the smart ports concept for Al-Faw great port on the economic aspect, it will help transfer trade from the East to the West, in

a far lesser time and lower cost. In addition, this would help to switch to the application of multimodal transport, and thus the port will achieve economic gains not less than the oil revenues. Furthermore, this will achieve great economic development and establish sustainable cities that are compatible with the concept of smart port technology in Al-Faw great port when analyzing the impact of the smart ports concept on the economic side, as shown in Figure No. 6; using the SPSS statistical program.

Table 6. The impact of applying the smart ports concept to Al-Faw great port on the economic aspect.

	Q25	Q26	Q27	Q28	Q29	Q30
Strongly Disagree	3	2	2	2	2	3
	1.32%	0.88%	0.88%	0.88%	0.88%	1.32%
Disapproved	0	1	2	0	0	0
	0.00%	0.44%	0.88%	0.00%	0.00%	0.00%
Neutral	7	7	6	6	3	5
	3.07%	3.07%	2.63%	2.63%	1.32%	2.19%
Agreed	46	48	41	37	40	42
	20.18%	21.05%	17.98%	16.23%	17.54%	18.42%
Strongly Agree	172	170	177	183	183	178
	75.44%	74.56%	77.63%	80.26%	80.26%	78.07%

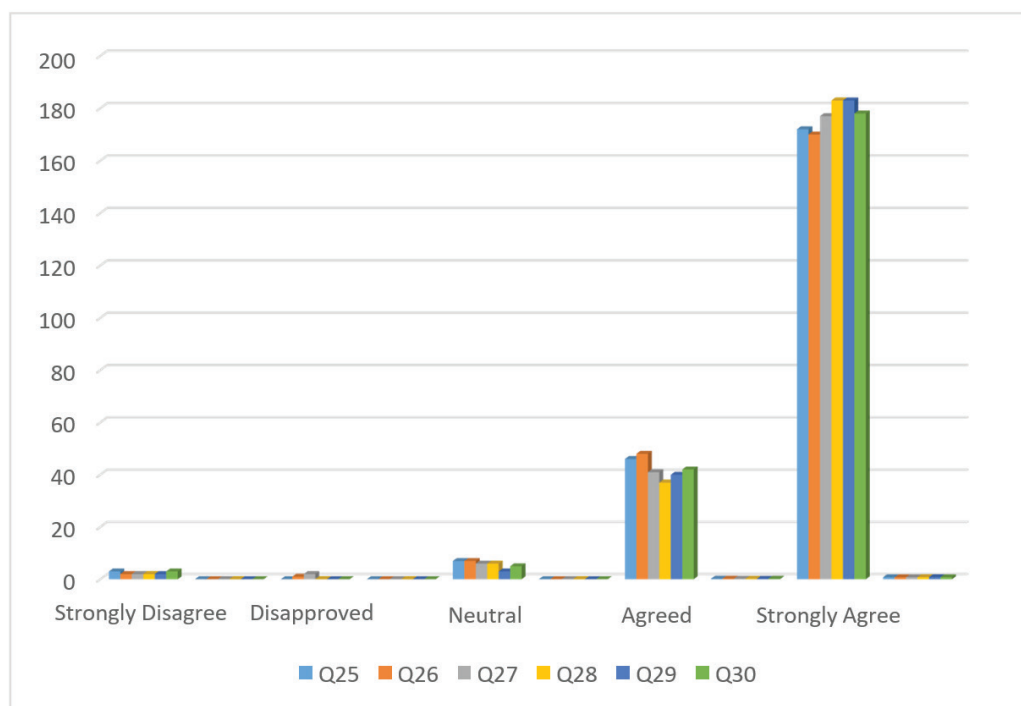


Figure (8) The impact of applying the smart ports concept to Al-Faw great port on the economic aspect.

F. Implementation of the (Zodiac) operating system in Jebel Ali Port

DP World has completed the implementation of the (ZODIAC) operating system, which contributes to enhancing the port's readiness in the future by adopting the techniques of the Fourth Industrial Revolution, to keep pace with the rapid developments and anticipate opportunities and challenges. The operating system includes 18 units. It will increase the utilization of the core competencies and operational assets in the terminal, which is an operating system in container terminal 3 in Jebel Ali port (CT3). This step represents an additional step to achieve the vision of DP World, the Emirates region, leading the smart transformation in its ports. The logistics center includes a fully automated system on advanced solutions for remote control of port facilities. With these achievements, CT3 will be able to integrate with any terminal that implements the same automation system and thus, enhance its ability to ensure smooth operations even during crises, and provide companies with full support to access the global supply chain with efficiency and high capacity.

The application of the ZODIAC system represents the latest version that was implemented in C13 in Jebel Ali port. A qualitative leap from its predecessor to 100% has been completed and CT3 has become one of the most advanced and intelligent port stations in the region compared to the best smart port stations in the world through the application of the ZODIAC system. In the future CT3 will be part of the largest global supply chain network, including DP World terminals around the world, in addition to other major terminals and ports. The digital ZODIAC system consists of 18 integrated internal systems, including crane automation system and dock planning. Moreover, it also manages railways and internal container depot, provides complete fleet management and control of container freight load, real-time container location tracking, clearance and delivery using invoicing systems, and it is powered by the Internet of Things system.

10. CONCLUSION AND RECOMMENDATIONS

Using IT helps to increase the port efficiency, for example, the process of loading and unloading can be

carried out simultaneously with the same port equipment and with the same inputs. This helps reduce the time the ship spends on the berth; eventually, it will increase the productivity of the port. In addition, using the smart ports concept will reduce wasted time, therefore using information technology will increase the efficiency of ports as well as increase their competitiveness.

The presence of some internal obstacles, such as weak financial resources and Iraq's economic inability to provide the necessary liquidity to secure its contracts with the implementing companies due to the size and magnitude of the project and its cost. This is in addition to the absence of alternative plans and openness with investment companies with the internal and external private sector and with companies specialized in information technology operation and smart ports. Other obstacles include natural challenges, narrow coasts, non-activation of agreements, maritime border overlap due to the geographical nature with some neighbouring countries (Iran, Kuwait) as well as lack of openness with neighbouring countries and countries in the region. The importance of Al-Faw great port project for these countries lies in the fact that it is capable of achieving economic gains for them and the participation of investment in this project. Furthermore, this port possesses a considerable strategic importance as a land bridge linking the East and the West.

This project faces a set of geographical challenges, as follows: natural challenges: represented by the narrowness of the Iraqi coast and its overlap with neighbouring countries, and the encroachment of the Iranian borders towards regional waters due to mud deposits. This is in addition to the bad weather conditions that impede maritime traffic, as the Iraqi oil pumping often stops because of that for several days. Moreover, there are human challenges: among them are the internal challenges which includes: the lack of a unified will to implement the project at the local level, absence of the secure and legal environment necessary for its success, administrative corruption, absence of an efficient transportation network commensurate with the size of the project.

On the other hand, external challenges include: the turbulent political situation in the region, neighbouring countries' sense of harm, especially Egypt, the

Emirates, Kuwait and Iran, and lack of confidence in the Iraqi national system, which prompts companies to hesitate to invest in it. The study of the impact of the application of the smart ports concept on improving the performance of Al-Faw great port concluded to the following recommendations:

- The electronic management application program in Al-Faw great port must be developed comprehensively in line with the concept of smart ports through the distribution of tasks between agencies and authorities operating in ports under the supervision of a higher authority. By linking the smart ports strategy with the general strategy of Al-Faw great port, and during the process of this change will occur through people who have this experience and knowledge in applying this global, regional and local electronic system.
- The necessity of shifting from the traditional paper-based system in the port to the proposed electronic system, by encouraging port workers to switch from paper-based management to electronic management and actually use the smart port concept application, by developing the necessary strategies to rehabilitate and train human resources on the use of information technology and its applications in smart ports, the establishment of training courses for workers in ports outside Iraq and visiting one of the smart ports, as an example of this e.g. Jebel Ali port for all administrative levels and granting distinguished workers in their operation material and moral incentives
- The necessity of addressing the challenges and the current situation that hinder the implementation of electronic management in Al-Faw great port, by reviewing and amending legislations and laws, and reformulating and preparing them in the port to keep pace with the technological developments imposed by the process of smart management of ports. This is because the implementation of electronic management requires changes in procedures and structure, through the combination of Local laws, international laws and ratification of international agreements on trade and the free zone.
- The necessity of completing the international roads linking Al-Faw great port with neighboring countries due to the lack of an efficient transport network

equivalent to the size of the project, through a proposed strategy to activate the logistics of multimodal transport by contracting with international companies specialized in this or by investing in the completion of international roads, as required by the modern international transport of goods as they have an impact on the contract of international maritime transport of goods and on the responsibility of the international carrier of goods.

- The necessity of linking the community of workers in Al-Faw great port with an electronic network that provides workers with all information and procedures accurately and timely, which increases the quality of the services provided to all parties dealing with the port.
- The file of the natural challenges represented by the narrow Iraqi coasts and their overlap with neighboring countries (Iran, Kuwait) must be resolved by entering into permanent and long-term international bilateral agreements, in particular with Kuwait, to address the problems that occur in navigation in the entry and exit of ships in Khor Abdullah Canal to Iraqi ports in general, and Al Faw great port in particular.
- The need to encourage investment in Al-Faw great port and investment openness with companies of the domestic and international private sector and increase financial revenues. The universe is a very large project that is not limited to government support only. It is necessary to promote dealing with companies specialized in the work of information technology and smart ports and opening the way for international companies specialized in smart ports and providing opportunities to compete, by providing a place and a ground as well all the requirements, facilities and the security and legal environment necessary for its success and government support for it, given that this project is one of Iraqi projects of political reform and national security.
- The formation of a higher operating committee, and the director general of the ports in it. This committee will speed up and facilitate the procedures by updating the legal legislation related to investments in the ports, following up on the work and completion of the implemented projects that will be implemented, as well as providing the financial funds and the human and technical capabilities necessary to support and

implement Al-Faw great port project which is considered as a priority.

- The necessity of communicating with regional countries without causing any harm to these countries, whether they are neighbors or regions, especially (Egypt, UAE, Kuwait and Iran) by providing them with investment opportunities and building roads and connecting railways with them, as well as benefiting from their experience in smart ports for the success of Al-Faw great port project, which will achieve strategic importance as a land bridge linking the East and the West, developing awareness and educational plans and programs for the public, dealing with the port to spread the culture of the concept of the smart port through holding seminars and meetings with specialists, provided that representatives of all influential parties affected by the application of the smart port concept in the port and exporters, importers, the private sector and banks should participate in such seminars and meetings until the facilitation is done

- The need to continue and expedite the implementation of Al-Faw great port project and the application of electronic management to it. This is for the purpose of reaching a smart port, improving service quality, simplifying and facilitating customs procedures, speed factor, shortening time and keeping pace with modern technological developments in the world.

- Senior administrations should not neglect concepts of smart management in the port and educate officials on the importance of relying on smart port applications to provide their services by facilitating the requirements for their applications in an integrated manner, by focusing on the technical and financial aspects and the need to provide an organizational climate that allows creativity and innovation for all administrative levels.

- There is an urgent need to coordinate and benefit from countries that have achieved clear and tangible developments in the regional and global field in the domain of developing and managing the smart ports sector, especially the neighboring countries such as the United Arab Emirates, which have made qualitative leaps in this field through Jebel Ali port.

- The necessity of working on managing the port

of Al-Laqa Al-Kabeer in specialized ways capable of simulating smart management methods in the developed international ports and granting powers that include the various activities of the port, including the administrative procedures, so that it can develop integrated plans for the management and operation of the port. There is a need for more studies and research on the importance of the application impact of the concept of smart ports on Al-Faw great port, because this project is the largest in Iraq. Therefore, it is suggested to pay attention to scientific research on the port using SWOT analysis mastering all the elements of power that can be used to deal with the threats and obstacles facing the port and offering ideas that keep pace with the trend towards establishment of smart ports.

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