Assessing the Impact of Maritime Trade New Trends on Egyptian Maritime Transport Performance: *An Empirical Study*[1]

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ABSTRACT

Maritime transport is a critical mode of transport, enabling worldwide trade, supply chains, utilization of resources, and overall development in the economy. It has an extensive effect on many sectors, directly and indirectly. Egypt borders on the Mediterranean, the Gulf of Suez, the Gulf of Aqaba, and the Red Sea, allowing it to be positioned at one of the main international maritime shipping lanes and transport routes. Along with Egypt's most recent initiatives, including the development of port capabilities, the sector must deal with issues of regional instability, which may impair its overall performance. The purpose of this study is to empirically assess the effects of new trends in maritime trade, such as port disruption, structural shifts in globalization, change in climate, and external disruptions, on the performance of Egypt's maritime transport, as keeping on the role of digitalization on enhancing the performance within those trends. A quantitative approach is used where an online survey was used as a tool to collect data. Using convenience sampling, a total of 394 participants from Egyptian Maritime Transport sector contributed. Structural equation modeling (SEM) is used to analyse the survey through SPSS and AMOS software. The findings supported all hypotheses and declared the effect of these trends on the maritime sector in terms of key performance indicators, or KPIs, including expenses, handling rates, waiting time, costs and others. Finally, the study filled a gap in the literature by providing participants and decision-makers with more knowledge regarding the development of Egypt's maritime transport sector.

Keywords: *change in climate, shift in globalization, disruption, digitalization, performance of maritime transport.*

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I. INTRODUCTION

Maritime transport is a critical mode of transport that enables worldwide trade, supply chains, utilization of resources, and growth in economy and development. It influences a wide number of sectors directly and indirectly, and it is believed to have a lesser effect on the environment than various types of transport (Fratila et al., 2021). Although several modes of transport are involved in international trade, maritime transport is one of the most important. Especially in some intercontinental transport, maritime transport is the only alternative. It is crucial to evaluate the importance of maritime transport, which might impact the country's economic status (Yıldız, 2022). Maritime transport connects the whole world in the exchange of people, goods, and other resources. The dynamics of population expansion and distribution worldwide, the structure of the global energy balance, global trade, protectionism, and the emergence of alternative transport markets are some of the variables that shaped the evolution of the maritime transport sector. In the current competing market conditions, maritime transport is becoming an increasingly widespread form of transport. Authors proceeded that the most prominent (almost monopolistic), least expensive, and most lucrative means of transport for both domestic and international is maritime transport. Therefore, from an economic perspective, maritime transport has several benefits (Naletina & Perkov, 2017).

Because maritime transport plays a vital part in both local and global economies, performance evaluation becomes relevantly important when it comes to critical economic sectors (Serra & Fancello, 2020). A performance measure is a parameter or statistic used to quantify the action effectiveness and efficiency is commonly used to evaluate performance. Furthermore, performance management systems are made up of many components that collaborate to improve organizational efficacy and performance (Ricci, 2019). Performance indicators must be quantified in order to compare and analyse the challenges. When considering container terminal handling performance, the performance indicators employed in four crucial areas of port operations including berth performance indicators, handling operation indicators, storage operation indicators and service quality indicators. Port operations performance can be

classified as physical, quality, and financial performance. Physical performance relates to the production of current assets. The quality performance corresponds to the quality of port services including reliability, flexibility and application of rules. The financial performance is the profit and loss achieved by each category of port operation and service (Gurbuz, 2023).

Maritime transport provides the physical framework for the world's freight flows, so it is the backbone of the economy. Containerization has a considerable impact on the evolution of maritime shipping, where the bulk cargoes continue to be the essential and long-lasting trades that underpin both the dynamism of maritime transport and the industrial sector. The future of globalization and maritime transport are strongly related since both industries depend on each other for enhanced trade and commercial flows. The two primary categories of maritime freight are the bulk cargo, which includes dry or liquid bulk materials and the break-bulk freight that has been wrapped in sacks, cartons, and drums. Additionally, passenger vessels are included among those with registered commercial vessels that facilitate international maritime transport (Rodrigue, 2017).

Freight pricing, government policies, and economic crises may all have an impact on maritime transport. so, the influence on national economies may vary over time. Since maritime trade is widely regarded as the foundation of global trade, most scholars hold the view that increased maritime trade openness will lead to a developed nation's economy, while some do not share this view (Osadume & Uzoma, 2020). The shipping schedules, port information platforms, and vessel data form the basis of the key performance indicators (KPIs). By analysing this data, port and shipping service providers and users can compare developments and increase the effectiveness and efficiency of maritime transport (Review of Maritime Transport 2021, 2021).

Egypt's boundaries encompass the Mediterranean, the Gulfs of Suez and Aqaba, and the Red Sea, allowing it to be positioned at one of the main international maritime shipping lanes and transport routes (Haddad, 2022). Egypt is a North African and Arab country possessing almost 3000 kilometres of coastline on the Mediterranean, Red Sea, Gulf of Suez, and Gulf of Aqaba, with an advantageous

location at the crossroads of Europe, the Middle East, Asia, and Africa. Furthermore, Egypt is home to the Suez Canal and the Suez-Mediterranean Pipeline (SUMED), which are the world's most significant routes (Salah et al., 2022).

Approximately 65% of Egyptian exports are handled by Egyptian ports. Due to the maritime and related logistics services connection with imports and exports, they are associated with several economic sectors. Enhancing the effectiveness of the maritime sector and other logistics sectors might yield noteworthy benefits. Together with other production services, the maritime sector accounts for 16% of employment in the economy and 36% of GDP. Because of the connection to the rest of the economy, efficient maritime and associated logistics services are supporting Egypt in achieving these objectives directly and indirectly. Given that a major part of Egypt's GDP derives from the maritime transport (Ghoneim & Helmy, 2010). As Hafez and Madney (2020) argued that almost 10% of worldwide trade depends on the Suez Canal for being the shortest route between east and west precisely because of its unique geographical position. Egypt decided to be one of the most prolific governments in the emerging global economy, with a meaningful role as an African hub point of entry and departure for trade between Asia, the Middle East, and Europe in the major positions of south to north.

Pascual (2018) mentioned that shipping is a derived demand, changes in the global economy, population, and GDP will continue to significantly influence the maritime demand. The Industrial Production Index and indexes of the Organization for Economic Cooperation and Development (OECD) demonstrate the link between world gross domestic product (GDP), merchandise trade, and seaborne trade during the period from 1975 to 2014 that will be presented in figure (1).
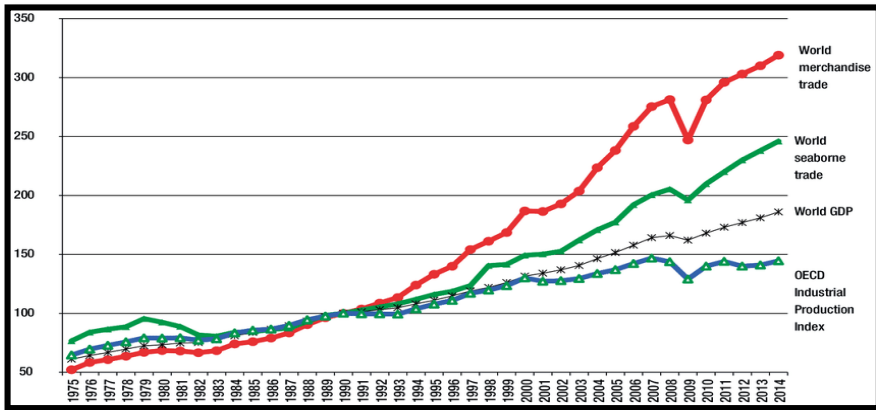
Figure 1: World GDP, Merchandise Trade and Seaborne Trade during (1975-2014) by the Industrial Production Index and indexes of OECD

Source: (Pascual, 2018)

There are challenges that are great opportunities to the maritime industry, where sustainability has a peculiar role. Given the various difficulties the shipping industry is currently facing, it is expected that these difficulties will have a wide variety of effects on the sector in terms of social, environmental, and economic factors (Kamandlou, 2021).

In terms of the impacts of maritime transport on worldwide trade, economy, and the sustainability of many different sectors, new trends and disruptions have lately emerged that may have an influence on the sector's performance. These new tendencies showed modest expansion in the global economy and commerce, but also creating uncertainty and completely transforming the platform. The "new normal" comprises disruptions, an accelerated environmental agenda resulted from the change in climate, new technologies, innovation and digitalization, and structural shifts in globalization. Prior research (Becker et al., 2011, Koetse and Rietveld, 2009, Sarwar, 2006, Solaymani et al., 2015, Zhang et al., 2022, Zittis et al., 2023) have found that change in climate has an influence on maritime transport performance. Several research studies (Almklov and Lamvik, 2018, Corbett and Winebrake, 2008, Dębicka et al., 2019, Przybyłowski, 2009) examined how structural changes in globalization affect maritime transport performance.

Tien et al. (2022) concluded that COVID-19 pandemic has increased burdens on the supply chains, affecting global trade patterns. Supply barriers and high transportation costs emerged from logistics disruptions, shortages, and the rising of energy prices. Against this context, the Russia-Ukraine conditions has added to the already strained global supply chain. Freight costs are currently quite high, particularly for sea and rail cargo, and they may increase considerably higher because of the conflict's negative repercussions. Pandemic has asserted the global interconnections among nations and created new trends that will reshape the maritime transport landscape (Arslanalp et al., 2021). Many studies (Georgiou, 2023, Kurt, 2023, McKibbin and Fernando, 2021, Ruan, 2021, Shahi, 2022, Yazir et al., 2020) assessed the impacts of those disruptions seemed to be external and the performance of maritime transport. Furthermore, the Red Sea disruption caused by al Hotheen attacks had a substantial impact on transport (Houthi Ship Attacks Are Affecting Red Sea Trade Routes, 2023).

In recent years, practically the majority of industries have begun examining new digital technology. This generally requires modifying essential business operations, which affect processes, goods, services, organizational structures, and management conceptions (Matt et al. 2015). According to Kitada et al. (2022), repercussions of digitalization on the maritime industry have been examined from the social, legal, and technical views. So, digitalization in the sector should be recognized as a transformation in the way business is provided using cutting-edge technologies.

Yan et al. (2021) discusses emerging technologies in maritime transport and their application in solving practical maritime problems, focusing on shipping and port issues. They predict that with digitalization and rapid advancement, these approaches will become more prevalent in the maritime industry. There is a growing interest in digitalization and the use of digital technologies to transform businesses. Some conventional organizations have created digital departments or designated a responsible individual to oversee digitalization. Additionally, the maritime industry has experienced a significant increase in these movements (ANDO, 2019).

2. RESEARCH PROBLEM

As keeping on the critical role of maritime transport in trade, new trends and developments exacerbated uncertainty and slowed the maritime trade growth in 2019 to its lowest level since the financial crisis of 2008 – 2009 that emerged globally. The unprecedented worldwide health and economic crises in early 2020 precipitated several developments that turned down the short-term prospects for maritime trade and maritime transport. After reviewing prior studies on the effect of new trends and disruptions on the performance of the sector, the researchers recognized "new trends" as change in climate, port and external disruptions, and the shifts in globalization. The unusual worldwide health and economic crises in early 2020 precipitated several developments that dimmed the prospects for maritime trade and maritime transport in short-term. By reviewing studies on international reports and reviews concerning the new trends and disruptions while considering the effects on the performance of the sector, the researchers found new trends in maritime trade. Earlier research was founded covered all of the major new developments but very limited studies covered the developments in the developing countries (Chapapría, 2017, Review of Maritime Transport 2019, 2019), as presented in figure (2).
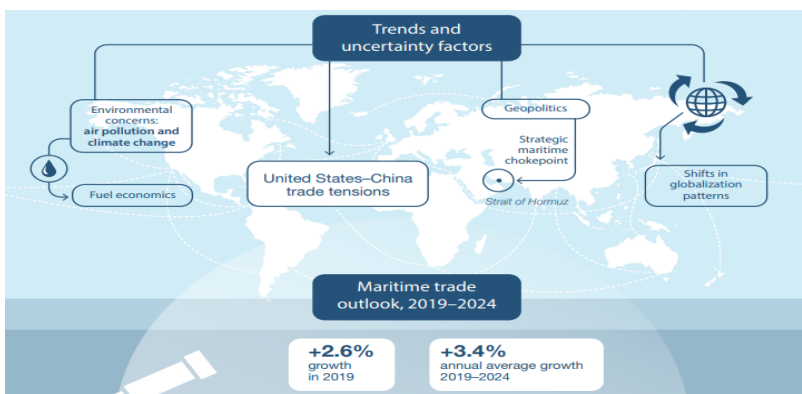
Figure 2: Trends and uncertainty factors
Source: (Review of Maritime Transport 2019, 2019)

Furthermore, maritime transport stakeholders are rapidly using digitalization, new technologies, and innovations through the promotion of collaboration platforms and solutions that alter their models of business to mitigate the impact

of disruption. However, most of the prior research have found that digitization has a minor impact on maritime transport performance. As a result, the research problem can be defined through these questions:

- What are the new trends that impact the performance of maritime transport?
- How can the new trends impact the performance of the Egyptian maritime transport?
- What is the role of digitalization in enhancing the maritime performance as keeping on the new trends?

3. RESEARCH OBJECTIVES

The aim of this study is to assess the impact of new trends in maritime trade including the change in climate, port and external disruption, and shift in globalization, on the performance of the Egyptian maritime transport sector and the role of digitalization practices in enhancing the performance while considering those new trends, as keeping on an empirical study on the Egyptian maritime transport sector. For that, the objectives of this study are:

- Assess the new trends that impact the performance of the Egyptian maritime transport.
- Analyze the impacts of the new trends on the Egyptian maritime transport sector by employing the key performance indicators while considering the digitalization practices.
- Propose recommendations to the Egyptian maritime transport sector stakeholders and decision makers to control the impact of the new trends and enhance the digitalization practices in the sector.

4. LITERATURE REVIEW

In this study, reviewing literature is broadened to encompass published material received from electronic sources including books, conference proceedings, and literature. Further to the search engines with regarding the databases of Google Scholar, Science Direct, and Springer Link. Related material was found using keywords relating to "maritime transport", "maritime trade", "Egyptian maritime transport", "key performance indicators", "change in climate", "port

disruption", "shift in globalization", "external disruption", "digitalization". The articles and reports were found in areas of maritime transport, trade and performance. To access further sources of information, the references cited in each relevant literature were identified and reviewed. As a result, a review of previous research studies was conducted using different academic publications during the period from 2006 to 2024.

Moreover, the researchers focused on conducting a comprehensive literature on the new trends that was presented in a paper that entitled "Investigating The Impact of Maritime Trade New Trends on the Egyptian Maritime Performance". This paper was presented at the International Maritime and Logistics Conference "Marlog 13" (Elbarky et al., 2024).

5. RESEARCH HYPOTHESES

Based on the literature review, this study will discuss the research variables and will assess the impact of new trends in maritime trade including the change in climate, port and external disruptions, shift in globalization on the performance of the Egyptian maritime transport sector with the moderating role of digitalization. So, with regarding the hypothesized model and reviewing of the related studies and theories, the study hypotheses were formulated as follows:

H1: There is a statistically significant relationship between the change in climate and the performance of the Egyptian maritime transport sector.

H2: There is a statistically significant relationship between the port disruptions and the performance of the Egyptian maritime transport sector.

H3: There is a statistically significant relationship between the structural shifts in globalization and the performance of the Egyptian maritime transport sector.

H4: There is a statistically significant relationship between the external disruptions and the performance of the Egyptian maritime transport sector.

H5: Digitalization moderates the relationship between the change in climate and the performance of the Egyptian maritime transport sector.

H6: Digitalization moderates the relationship between the port disruptions and the performance of the Egyptian maritime transport sector.

H7: Digitalization moderates the relationship between the structural shifts in globalization and the performance of the Egyptian maritime transport sector.

H8: Digitalization moderates the relationship between the external disruptions and the performance of the Egyptian maritime transport sector.

6. RESEARCH METHODOLOGY

The researchers developed the theoretical framework for the research variables based on reviewing the literature review. As to achieve the research's objectives, all of the research approach, strategy, time horizon, and data collection methods were presented. In addition, it demonstrates the Population and Sampling Methods, and the Pilot Study with the Research Validity and Research Reliability. The following table summarizes the research methodology.

Table 1: Summary of research methodology and design

Item	Types	Used in Research
Research purpose	Exploratory	both Descriptive and Explanatory research (Hypotheses testing)
	Descriptive	
	Hypotheses testing	
Research approach	Deductive	Deductive approach
	Inductive	
Research strategy	Survey	Survey: questionnaire and semi structured interview
	Experiment	
	Action research	
	Case study	
Research design	Quantitative	Qualitative and Quantitative
	Qualitative	
Research scope	Egyptian Maritime Transport Sector	
Time horizons	Cross sectional	Cross sectional We collect data to all people during certain period means time snap shat
	Longitudinal	
Data collection methods	Interview	Interview and Questionnaire
	Questionnaires	
	Observation	
Population & Sampling	Egyptian Maritime Transport Sector	Non-probability (convenience)
	Non-probability	
Sample size	394 Respondents	

Source: Researchers

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6.1 Data Collection Method

Data is mostly collected from two sources: primary, which means the data is acquired for the first time by the researcher, and secondary, which means the data has been already analysed by previous researchers and presented in previous studies (Iovino & Tsitsianis, 2020).

6.1.1 Secondary Data

Secondary data is gathered from sources other than the respondents. Data is collected inexpensively in terms of time and money. Secondary data may be highly useful for comparing two types of statistics and concluding. However, it might be out of date and subjective since it has already evolved in someone else's thinking. Secondary data can be obtained from a variety of sources such as Books, journals, newspapers, reports and publications, magazines, internet articles, government data, and corporate or organization statistics (Saunders et al., 2018).

To determine the new trends and role of digitalization, the researchers searched in electronic databases. Numerous empirical research studies were included in the literature review. The number of papers, reports, books, journals, and studies reached 200. The cited references throughout the literature were used for further sources of information.

6.1.2 Primary Data

Primary data is the gathered information for the first time or constructed to meet the study requirements. Primary data was obtained from the respondents or the study volunteers. There is adequate control over the gathered data. The primary drawback is that it requires more time. When adequate people or samples are not available, primary data collection process becomes more challenging. Primary data may be obtained from a variety of sources such as questionnaires, interviews, focus groups, case studies, experiments, observations, surveys, and discussions (Saunders et al., 2018).

6.1.2.1 Adopted Collection Method

Data was collected by administrating a questionnaire. The questionnaire results were analysed to assess the relation between research variables using the Statistical Package for the Social Sciences (SPSS), and the structural equation modelling (AMOS). As it should be noted that prior to this step of data collection, the researchers conducted qualitative research and used a semi-structured interview tool. These interviews were conducted with industry experts and leaders in the Egyptian maritime transport sector, as the ports that embraced digitalization were the focused sample. Interviews were conducted with the head of maritime transport sector, chairmen of some ports authorities and representatives of the maritime transport leading companies. The results of interviews were presented in the thirteenth annual conference on Sustainable Green Blue Infrastructure (MARLOG 13). This study will present the questionnaire results that was conducted with a number of 394 acceptable responses.

6.1.2.2 *Adopted Questionnaire Design*

The questionnaire started with general information about the participant. Then, there are three sections, where the first is on change in climate, port disruptions, structural shifts in globalization and external disruptions, the second is on digitalization, and the third is on the maritime transport performance.

A Likert-scale was used to measure opinions where (1) Strongly Disagree, (2) Disagree, (3) Not sure, (4) Agree, (5) Strongly Agree. The measurements of the research variables are summarized in the following table:

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Table 2: Variables Measurement

Variables	Measurement (statements)	Source (s)
Independent Variables		
Change in climate	5 items	(Findlater et al., 2019, Review of Maritime Transport 2018, 2018)
Port disruptions	5 items	(Hippold, 2021, Stephens et al., 2022, Loh and Thai, 2015)
Structural shifts in globalization	5 items	(Sarbah and Quaye, 2021, Aderibigbe and Wang, 2020)
External disruptions	5 items	(Maritime Trade Disrupted: The War in Ukraine and Its Effects on Maritime Trade Logistics, 2022, Kézai and Kurucz, 2023)
Moderator Variable		
Digitalization	5 items	(Jović et al., 2022)
Dependent Variable		
Egyptian Maritime Transport Performance	5 items	(Mukhobe, 2015, Stephens et al., 2022, Sarbah and Quaye, 2021)

Source: Researchers

For this research, population refers to Egyptian maritime transport sector. The response of employees, stakeholders, and decision makers of the Egyptian maritime transport sector is the target with regarding the close relationship and the professional experience in the sector. As to have a better proximity towards obtaining valuable information.

The adopted Sampling Method: Convenience sampling was used in this study because of its tremendous efficiency in terms of time, money, and effort. It drives the researchers to use the simplest subjects to obtain the data. Additionally, it supports useful sample selection, which supports the aims and objectives of the study. (Saunders et al., 2023).

The Research Sample Size: For researchers who determined a proper sample, identifying the sample size is significant. Collis and Hussey (2009) emphasize that the sample size needs to be sufficiently large to accurately represent the population. It is imperative that researchers address the research aim and objectives and generalize the findings.

The sample size of 384 is proper with the population of millions of individuals (at 95% confidence level and 5% margin of error) (Sekaran & Bougie, 2019).

The questionnaire of this research was administered to seven hundred (700) respondents. There were 394 acceptable responses, with a response rate of 56.3%, which is highly adequate for this study. As, 432 questionnaires representing 62% were returned, 38 questionnaires representing 5.4% were incomplete and 268 (38.3%) were not reached.

6.2 Pilot Study

A pilot study is often conducted through selecting a limited number of participants who serve as a sample. Pilot testing identifies the readability issues, unclear instructions, and questions that cause a discomfort situation for participants (Bryman & Bell, 2011). Before the final administration to the respondents, the research instrument was pre-tested. Saunders et al. (2019) argued that pre-testing detects the issues and errors prior to the process of actual data collection. A pilot study is deemed sufficient if 1% of the population is included. The pilot study of this research was conducted with 42 participants to test the employed questionnaire.

6.2.1 Research Validity

Saunders et al. (2019) presented four validity tests for survey research. The four types of validity are construct, criteria, face, and content validity. Spearman's rho, commonly denoted by the Greek letter ρ, is applied to measure the direction and strength of the relation between two ordinal variables where one of the variables is ordinal and the other is an interval or ratio. As for the results, it is the same as Pearson's r, as the computed value of rho can vary from 0 to 1 and can either positive or negative (Bryman & Bell, 2011). The research validity test results by analysis of 42 questionnaires is presented in Table (3).

Table 3: Research validity

Variable	Question	No of Items	Spearman's rho	Significance level
Change in climate	Change in climate is of serious concern for the maritime industry.	5 Questions	.638	.000
	The amount or extent of impact by climate-related events vary in terms of logistic services/ Physical damage/ Delays/ Interruptions/ or others.		.720	.000
	The magnitude of damage and/or disruption caused by climate related events changes over time.		.723	.000
	The observed trends necessitate adaptation responses (e.g., design of breakwaters, port entrances).		.790	.000
	The effects of change in climate should be considered in the planning for the next 5 to 10 years.		.651	.000
Port disruptions	The world is shifting from a global to a more regionalized supply chain model.	5 Questions	.772	.000
	Supply chain disruption orientation impacts the performance.		.594	.000
	Organizational cultures that reflect supply chain disruption orientation will lead to supply chain resilience.		.695	.000
	A detailed record of incidents which previously resulted in disruptions was kept and reserved.		.635	.000
	There are opportunities to overcome constraints by depending on advanced technologies.		.674	.000
Globalization	Globalization can bring flexibility in doing business/ operations in port/ company.	5 Questions	.885	.000
	Globalization supports innovative technology in port/ company.		.909	.000
	Higher profits can be achieved at the international market than domestic market through globalization.		.711	.000
	There will be better negotiations through globalization with customers abroad as compared to the domestic market.		.717	.000
	There is increased competition due to globalization.		.787	.000

Variable	Question	No of Items	Spearman's rho	Significance level
External Disruption	The Operational changes/ Adjustments have been implemented by the Port/ Company to mitigate the impact of COVID-19 disruption.	5 Questions	.617	.000
	The Prioritization of essential goods (e.g., pharmaceuticals, foodstuff) was effective as various response measures in terms of mitigating the impact of the COVID-19 disruption on operations.		.750	.000
	Closing of operations/ part of operations was effective as various response measures in terms of mitigating the impact of the COVID-19 disruption on Port/ Company operations.		.831	.000
	The Greater use of technology/digital tools was effective as various response measures in terms of mitigating the impact of the COVID-19 disruption on operations and business.		.667	.000
	There have been some impacts from the crisis (such as COVID-19 pandemic and Russian–Ukrainian war) you have experienced in the past year.		.574	.000
Maritime transport sector performance	The Port/ Company service performance creates higher value for customers.	5 Questions	.766	.000
	The Port/ Company can carry out Research & Development activities that have contributed to improving performance.		.781	.000
	The technological needs in the Port/ Company can be contributed to improve performance.		.833	.000
	Supply chain resilience has an impact on performance as the port/ company can be better able to serve their customers.		.847	.000
	The purpose of market diversification through globalization is to mitigate risk to improve performance.		.805	.000

Source: Researchers

The minimum Spearman's rho is 0.574, the maximum Spearman's rho is 0.909, and P-Value is less than 0.05.

6.2.2 Research Reliability

The capability to repeat research to achieve consistency is referred to as reliability so reliability is crucial for quantitative approaches because researchers are worried about how stable the measurements are (Bryman & Bell, 2011).

Bryman and Bell (2011) stated that one commonly utilized test for internal reliability is Cronbach's alpha. In essence, it finds the "mean" of all split-half reliability coefficients that can be determined. The degree of relationship between respondents' ratings on two sets of indicators is determined by the correlation.

According to Sekaran and Bougie (2019), the more the reliability coefficient closer to 1.0, the most optimal condition occurred. In general, reliability is poor with less than 0.60, and those in the range of 0.70 are acceptable, and those over 0.80 are good. The test re-test reliability results by analysis of 42 questionnaires is presented in Table (4).

Table 4: The test re-test reliability

Variable	No of Items	Removed questions	Cronbach's Alpha (α) with removed questions	Mark
Change in climate	5 Questions	-	.903	Acceptable
Port disruptions	5 Questions	-	.714	Acceptable
Globalization	5 Questions	-	.856	Acceptable
External Disruption	5 Questions	-	.743	Acceptable
Maritime transport sector performance	5 Questions	-	.875	Acceptable
Overall	25 Questions	-	.915	Acceptable

Source: Researchers

The overall Cronbach s Alpha coefficient for the 25 items that were analysed together is 0.915, where the minimum Cronbach s Alpha coefficient is 0.714, the

maximum is 0.903. This result indicates that the research instrument of this study is highly reliable since it exceeds the accepted reliability score of 0.7.

7. RESULTS OF THE QUESTIONNAIRE AND DISCUSSION

7.1 Descriptive statistics

Descriptive statistics are employed to characterize the fundamental properties of the data and offer concise summaries of the measurements and sample. Virtually all quantitative analyses of data are built up on the descriptive statistics, along with simple graphics and demographic analysis. To find outliers and examine the distribution of the data, simple frequencies, means, standard deviations, and correlations between variables and histograms are utilized.

7.2 Demographics analysis

The demographics of the respondents for the study are presented in the following table:

Table 5: Demographics analysis

Variables	Description	Frequency	Percentage (%)
Port / Company/ Organization name	Port	41	10.4
	Company	242	61.4
	Organization	64	16.2
	Others	47	11.9
The highest level of Education	High school graduate	34	8.6
	Bachelor's degree	246	62.4
	Master's degree	78	19.8
	Doctorate degree (DBA/PHD)	36	9.1
Total number of employees	From 1 to 9	27	6.9
	From 10 to 49	50	12.7
	From 50 to 150	50	12.7
	More than 150	267	67.8
Experience	From 1 to 5 year	90	22.8
	From 6 to 10 Years	90	22.8
	From 11 to 15 Years	74	18.8
	More than 15 Years	140	35.5

Source: Researchers

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7.3 Research variables

The new trends in maritime trade as the change in climate, port disruptions, structural shifts in globalization and the external disruptions are the independent variables, in addition to the digitalization that considered to be the moderator variable, and the performance of the Egyptian maritime transport sector is the dependent variable.

A frequency table will be presented for each variable that includes both absolute and relative frequencies. Such frequencies will be a measure of a participation's response opinion towards the factors of each dimension with a scale rating from 1 to 5, as 1 refers to "Strongly Disagree", which means that the respondent is fully unsatisfied with a specific' dimension, while 5 refers to "Strongly Agree", which means that the respondent e is fully satisfied.

To examine the relationships between the new trends in maritime trade (change in climate, port disruptions, structural shifts in globalization and external disruptions) and the performance of the Egyptian maritime transport, the Structural Equation Modelling (SEM) is adopted. To perform SEM, Amos 25 software package was employed to access the inter-relationships between the 5 constructs of the hypothesized model. SEM is a statistical method that enables evaluation of each variable's direct and indirect effects on the other variables. As stated by Hair et al. (2019), Testing the hypotheses that support the research model was performed to evaluate the structural model. Hypotheses Testing follows a confirmatory factor analysis. Given the nature of the research model, the testing of hypotheses, and the moderating effects, the SEM technique was employed.

SEM is a multivariate approach that examines the sequence of dependent relationships of the proposed model concurrently by combining multiple regression and confirmatory factor analysis (CFA). The measurement model and the structural model are the two mechanisms of SEM. The structural model is focused on the path strength and relation among the latent variables, while the measurement model primarily aims to assess the validity and reliability of both the latent and observed variables (Hair et al., 2019).

7.3.1 Measurement' Model

AMOS 25.0 is used to conduct a CFA to test the measurement model. The five latent variables that compose the measurement model are the change in climate, port disruptions, structural shifts in globalization, external disruptions and the performance of the Egyptian maritime transport.

There are 25 observable variables that measure these 5 latent variables. The standardized loading of the measurement items to evaluate the internal consistency of the constructs in the measurement model is presented in Table (6). The level of internal consistency for each construct was acceptable, as the standardized loading range is between 0.504 to 0.904 which exceeded the minimum hurdle of 0.50.

Table 6: Item Loading

Variable	Construct and Item	Standardized Loading
Change in climate	Change in climate is of serious concern for the maritime industry.	.847
	The amount or extent of impact by climate-related events vary in terms of logistic services / Physical damage / Delays/ or others.	.904
	The magnitude of damage and/or disruption caused by climate related events changes over time.	.832
	The observed trends necessitate adaptation responses (e.g., design of breakwaters, port entrances).	.520
	The effects of change in climate should be considered in the planning for the next 5 to 10 years.	.553
Port disruptions	The world is shifting from a global to a more regionalized supply chain	.862
	Supply chain disruption orientation impacts the performance.	.725
	Organizational cultures that reflect supply chain disruption orientation will lead to supply chain resilience.	.600
	A detailed record of incidents which previously resulted in disruptions was kept and reserved.	.826
	There are opportunities to overcome constraints by depending on advanced technologies.	.801
Globalization	Globalization can bring flexibility in doing business/ operations in port / company.	.708

Variable	Construct and Item	Standardized Loading
	Globalization supports innovative technology in port/ company.	.789
	Higher profits can be achieved at the international market than domestic market through globalization.	.843
	There will be better negotiations through globalization with customers abroad as compared to the domestic market.	.650
	There is increased competition due to globalization.	.520
External Disruption	The Operational changes/ Adjustments have been implemented by the Port/ Company to mitigate the impact of COVID-19 disruption.	.521
	The Prioritization of essential goods (e.g., pharmaceuticals, foodstuff) was effective as various response measures in terms of mitigating the impact of the COVID-19 disruption on operations.	.738
	Closing of operations/ part of operations was effective as various response measures in terms of mitigating the impact of the COVID-19 disruption on Port/ Company operations.	.872
	The Greater use of technology/digital tools was effective as various response measures in terms of mitigating the impact of the COVID-19 disruption on operations and business.	.876
	There have been some impacts from the crisis (such as COVID-19 pandemic and Russian–Ukrainian war) you have experienced in the past year.	.504
Maritime Transport Sector Performance	The Port/ Company service performance creates higher value for customers.	.782
	The Port/ Company can carry out Research & Development activities that have contributed to improving performance.	.875
	The technological needs in the Port/ Company can be contributed to improve performance.	.791
	Supply chain resilience has an impact on performance as the port/ company can be better able to serve their customers.	.780
	The purpose of market diversification through globalization is to mitigate risk to improve performance.	.593

Source: Researchers

According to Hair et al. (2019), The measurement model enables the researcher to employ multiple variables for a certain independent or dependent variable. The researcher can evaluate each scale item's contribution and consider the reliability of the scale's measure in the usage of a confirmatory factor analysis (CFA). The scales are then included in the structural model's estimation of the relationships between the independent and dependent variables. This process works similarly to use the factor scores from the factor analysis of the scale items in the regression.

Composite Reliability (CR) is used to measure the reliability of a construct in the measurement model. CR determines the consistency of the construct itself (Hair et al., 2019). The CR of change in climate = 0.792, port disruptions =0.877, structural shifts in globalization =0.768, external disruptions = 0.754 and the performance of Egyptian Maritime Transport Sector = 0.878). So, in measurement model all construct have good reliability.

Measurement items have standardized loading estimates ranging from 0.504 to 0.904 at the alpha level of 0.05, indicating the convergent validity of the measurement model. The degree to which a construct is different from others is demonstrated by Discriminant validity (Hair et al., 2019). The Average Variances Extracted (AVE) required to consistently be more than 0.50 (Hair et al., 2019). The average variances extracted (AVE) of the constructs (change in climate = 0.578, port disruptions = 0.590, structural shifts in globalization =0.551, external disruptions = 0.550 and the performance of the Egyptian Maritime Transport Sector = 0.593) are more than 0.50. Overall, these measurement results are satisfactory and is appropriate to proceed to the structural model.

The model demonstrated the presence of discriminatory validity. Fornell and Larcker (1981) stated that the square root of the AVE measures must be greater than the correlations between all constructs to ensure discriminant validity. Furthermore, discriminant validity is demonstrated when the correlation between the two constructs is not greater than each of their respective composite reliabilities (CR), according to O'Cass and Ngo (2007). This study demonstrates that the correlations' values are lower than their respective reliability. Therefore,

all constructs support the discriminant validity of the scales that have been used. The measurement model result - CFA will be presented as follows:

Table 7: Measurement Model Result

Goodness of Fit Measures	Name of index	Model Result	Remark
Chi-Square	x^2	594.972	accepted
Degrees of Freedom	DF	262	accepted
Chi-Square/ Degrees of Freedom	x^2/DF	2.271	accepted
Comparative Fit' Index	CFI	.952	accepted
Tucker Lewis Index	TLI	.945	accepted
Root Mean' Square Error of Approximation	RMSEA	.052	accepted

Source: Researchers

Measurement Model Summary: The AMOS software was used to apply CFA on the five factors. DF was 262 (it should be more than 0), x^2 /DF has a value of 2.271, that is less than 3.0 (it should be less than or equal 3.0). The RMSEA was 0.052 (it should be less than 0.08). The TLI index was 0.945 which is very close to 1.0 (a value of 1.0 indicates perfect fit). The CFI was 0.952. All indices are close to a value of 1.0 in CFA, so CFA's determination of the factor structure is well-supported by the measurement models.

7.3.2 Structural Model

Structural equation modelling (SEM) is a family of statistical models that seek to explain the relation between multiple variables. In doing so, it examines the structure of interrelationships expressed in a set of equations, much like a series of multiple regression equations. These equations indicate every relationship between the constructs (the independent and dependent variables) of the study. Constructs are unobservable or latent factors represented by many variables, just like variables constitute a factor in factor analysis. so, all multivariate approaches have been classified as either interdependence or dependency techniques; SEM may be recognized as a unique combination of these two techniques. Two popular multivariate techniques, factor analysis and multiple regression analysis, present SEM foundation (Hair et al., 2019).

According to Thakkar (2020) Structural equation modelling includes many key steps. In addition to data collection, the steps are model specification, identification, estimation, testing, and modification.

As the structural model is focused on the strength and relation among the latent variables, Figure (3) shows the Structural Model (Final Result)
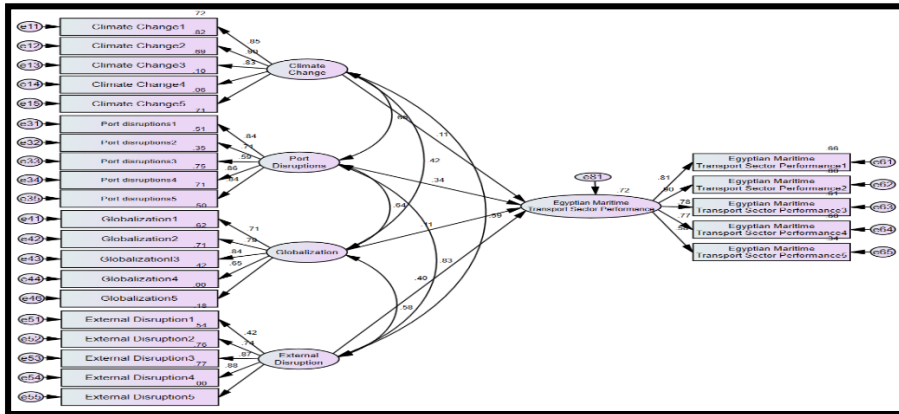
Figure 3: Structural Model
Source: (Researchers, 2024)

7.3.3   The Structural Model Validity – Final Result

The final result of the structural model will be presented in Table (8) as follows:

Table 8: Structural model - Final Result

Goodness of Fit Measures	Name of index	Model Result	Remark
Chi-Square	^{2}	643.983	accepted
Degrees of Freedom	DF	264	accepted
Chi-Square/ Degrees of Freedom	^{2}/DF	2.439	accepted
Comparative Fit' Index	CFI	.945	accepted
Tucker Lewis Index	TLI	.937	accepted
Root Mean' Square Error of Approximation	RMSEA	.055	accepted

Source: Researchers

Structural Model Summary: The results of structural model using the AMOS software, shows that DF was 264 (it should be more than 0), 2 /DF has a value of

2.439, that is less than 3.0 (it should be less than or equal 3.0). The RMSEA was 0.055 (it should be less than 0.08). The TLI index was 0.937 which is very close to 1.0 (a value of 1.0 indicates perfect fit). The CFI was 0.945. All indices are close to a value of 1.0 in CFA, indicating that the measurement model provides a good support for the factor structure determined through the CFA.

7.3.4 Direct Effects

According to Hair et al. (2019), the relations among the latent variables show that each of the hypothesized effects generated for this research model was appropriately estimated in terms of both strength and significance, resulting in a well-fitting model. The model's overall fitness measurement was higher than the generally accepted level. In this study the results show that:

The individual tests of significance of the relationship between the variables. It reveals that, as expected a relationship between change in climate and the performance of Egyptian maritime transport sector (β = 0.107, CR (Critical Ratio) = 2.402, CR > 1.96, p = 0.016, p<0.05).

Therefore, **H1: There is a statistically significant relationship between change in climate and the performance of Egyptian maritime transport sector is supported.** That result is consistent with (Becker et al., 2011, Koetse and Rietveld, 2009, Sarwar, 2006, Solaymani et al., 2015, Zhang et al., 2022, Zittis et al., 2023) who stated that there is a statistically significant relationship between change in climate and the performance of Egyptian maritime transport sector.

The result shows that as it predicts that there is a relationship between port disruptions and the performance of Egyptian maritime transport sector (β = 0.337, CR (Critical Ratio) = 4.250, CR > 1.96, p = 0.000, p<0.05)."

Therefore, **H2: There is a statistically significant relationship between port disruptions and the performance of Egyptian maritime transport sector is supported.** That result is consistent with (Andresen and Björn, 2022, Lam and Yip, 2012, Tran et al., 2022) who stated that there is a statistically significant relationship between port disruptions and the performance of Egyptian maritime transport sector.

Moreover, as it predicts that there is a relationship between structural shifts in globalization and the performance of Egyptian maritime transport sector (β = 0.111, CR (Critical Ratio) = 2.449, CR > 1.96, p = 0.014, p<0.05).

Pertaining to **H3: There is a statistically significant relationship between structural shifts in globalization and the performance of Egyptian maritime transport sector is supported.** That result is consistent with (Almklov and Lamvik, 2018, Corbett and Winebrake, 2008, Dębicka et al., 2019, Przybyłowski, 2009), and) who stated that there is a statistically significant relationship between structural shifts in globalization and the performance of Egyptian maritime transport sector.

As it predicts that there is a relationship between external disruptions and the performance of Egyptian maritime transport sector (β = 0.397, CR (Critical Ratio) = 4.960, CR > 1.96, p = 0.000, p<0.05).

The result shows that **H4: There is a statistically significant relationship between external disruptions and the performance of Egyptian maritime transport sector is supported.** That result is consistent with (Chua et al., 2022, Deeb and Leonardo, 2023, Georgiou, 2023, Gu and Liu, 2023, Kanrak et al., 2023, Narasimha et al., 2021, Oyenuga, 2021, Seif and Hafez, 2022) who stated that there is a statistically significant relationship between external disruptions and the performance of Egyptian maritime transport sector.

Furthermore, Results in Table (9) show that the estimated structural model corroborated the four hypotheses, as Maritime trade new trends (change in climate, port disruptions, structural shifts in globalization, external disruptions) construct explained 72.4% of variance of the performance of Egyptian maritime transport sector ($R^2 = 0.724$).

Table 9: Coefficient of determination

Variables	Coefficient of determination (R^2)
Egyptian Maritime Transport Sector Performance	.724

Source: Researchers

7.3.5 Moderating Effects (Multi Group Analysis)

Moderating variable is the variable that "moderates the effects" of an independent variable on its dependent variable. A moderator is a variable that "interferes" in the relationship between an independent variable and its corresponding dependent variable, according to social science scholars (Awang, 2014).

In this study, the interaction effect of "digitalization moderates" on the linkage between change in climate, port disruptions, structural shifts in globalization, external disruptions, and the performance of Egyptian maritime transport sector, as follows:

The relationship between change in climate and the performance of Egyptian maritime transport sector is stronger for "Hired new IT experts and expanded IT departments", (Beta (β) Value for "Hired new IT experts and expanded IT departments" =.103, Beta (β) Value for "Continuous training of employees in the field of technology" =.102, Beta (β) Value for "Participate in the development or adaptation of digital technologies" =.102, Beta (β) Value for "Clearly communicated vision toward the context of digital transformation" =.101, Beta (β) Value for "Digitalized business processes" =.101.

The result shows that **H5: Digitalization moderates the relationship between change in climate and the performance of Egyptian maritime transport sector is supported**, as it predicts that "Digitalization moderates the relationship between Change in climate and Egyptian Maritime Transport Sector Performance". That result is consistent with (Sarwar, 2006, Zhang et al., 2022) who stated that digitalization moderates the relationship between change in climate and the performance of Egyptian maritime transport sector.

The relationship between port disruptions and the performance of Egyptian maritime transport sector is stronger for "Participate in the development or adaptation of digital technologies", (Beta (β) Value for "Participate in the development or adaptation of digital technologies"=.294, (Beta (β) Value for "Hired new IT experts and expanded IT departments" =.291, Beta (β) Value for "Digitalized business processes" =.291, Beta (β) Value for "Clearly communicated

vision toward the context of digital transformation" =.288, and Beta (β) Value for "Continuous training of employees in the field of technology" =.284.

The result shows that **H6: Digitalization moderates the relationship between port disruptions and the performance of Egyptian maritime transport sector is supported**, as it predicts that "Digitalization moderates the relationship between port disruptions and the performance of Egyptian maritime transport sector". That result is consistent with (Andresen and Björn, 2022, Lam and Yip, 2012, Tran et al., 2022) who stated that digitalization moderates the relationship between port disruptions and the performance of Egyptian maritime transport sector.

The relationship between structural shifts in globalization and the performance of Egyptian maritime transport sector is stronger for "Clearly communicated vision toward the context of digital transformation", (Beta (β) Value for "Clearly communicated vision toward the context of digital transformation"=.118, (Beta (β) Value for "Continuous training of employees in the field of technology" =.117, Beta (β) Value for "Participate in the development or adaptation of digital technologies" =.114, Beta (β) Value for "Hired new IT experts and expanded IT departments" =.111, and Beta (β) Value for "Digitalized business processes" =.111.

The result shows that **H7: Digitalization moderates the relationship between structural shifts in globalization and the performance of Egyptian maritime transport sector is supported**, as it predicts that "Digitalization moderates the relationship between structural shifts in globalization and the performance of Egyptian maritime transport sector". That result is consistent with (Almklov and Lamvik, 2018, Corbett and Winebrake, 2008, Dębicka et al., 2019, Przybyłowski, 2009), who stated that digitalization moderates the relationship between structural shifts in globalization and the performance of Egyptian maritime transport sector.

The relationship between external disruptions and the performance of Egyptian maritime transport sector is stronger for "Hired new IT experts and expanded IT departments", (Beta (β) Value for "Hired new IT experts and expanded IT departments"=.440 (Beta (β) Value for "Continuous training of employees in the field of technology" =.430, Beta (β) Value for "Clearly communicated vision

toward the context of digital transformation" =.428, Beta (β) Value for "Participate in the development or adaptation of digital technologies" =.424, and Beta (β) Value for "Digitalized business processes" =.420.

The result shows that H8: **Digitalization moderates the relationship between external disruptions and the performance of Egyptian maritime transport sector is supported**, as it predicts that "Digitalization moderates the relationship between external disruptions and the performance of Egyptian maritime transport sector". That result is consistent with (Chua et al., 2022, Gu and Liu, 2023, Narasimha et al., 2021, Oyenuga, 2021), who stated that digitalization moderates the relationship between structural shifts in globalization and the performance of Egyptian maritime transport sector.

8. RECOMMENDATIONS

The researcher proposes the recommendation that related to each variable based on reviewing the previous studies and results of empirical studies as follows in table (10):

Table 10: Recommendations

Research Variables	Recommendations
Change in climate	1. Formulating a strategic and tactical plan for the impacts of change in climate on Egyptian ports and maritime infrastructure. 2. Assigning one of the international consulting offices to conduct the needed studies on the impact of sea level rise, weather conditions, the possibility of changing trade routes away from Egyptian ports, and the needed infrastructure to avoid the negative effects of these changes. 3. Consult specialized committee that includes specialist from the civil engineering sector in each port, the Engineering Consulting Office affiliated with the Faculty of Engineering, Alexandria University, the port chambers of navigation, the regional chambers of commerce. 4. Use the major reports by specialized committees, on climate action, economics and issues that highlighted the climate impacts and solutions issued by organizations as united nation after COP 27.
Port disruption	5. Conduct risk assessment to identify all potential risks in the port and update this assessment on planned intervals. 6. Make use of real-time data sources to avoid delay problems and acquire precise real-time and projected port performance information and make use of new sources of data to understand the live movements within the port itself, as the predictive

Research Variables	Recommendations
	analytics-based technologies are transforming the port-related problems. 7. To obtain strategic and diagnostic insights on the operation of ports, carriers, routes, and suppliers, use an analytic solution. 8. Utilizing an end-to-end multi-modal solution provides real-time visibility and forecasts for departing truck or rail movement and incoming ocean shipment via a single dashboard.
Structural shift in globalization	9. To determine areas for strategic development, compare Egypt's maritime development strategies and performance indicators to regional and global benchmarks. 10. Examine perspectives across Egyptian maritime stakeholders through surveys or interviews to better understand challenges and opportunities in the evolving landscape. 11. Boost the trade growth and encourage the participation of Egyptian maritime transport sector in global value chains, bearing in mind evolving trends in globalization patterns. 12. Promote product and market diversification to improve resilience and to cope with adverse trade shocks, including the geopolitics.
External disruption	13. Make use of predictive analytics to anticipate disruptions and events in advance, to to prompt corrective or preventative action. 14. Identify and analyse operational issues to improve practices, adapt easily and enhance efficiency, to overcome challenges before they become major issues. 15. Cooperate with international organizations to maximize the financial and technical resources available for promoting the green shipping corridors, port modernization, and regional collaboration on issues as piracy. 16. In response to global external issues, many boards have reviewed their oversight and managerial support, with an emphasis on scenario preparation, and associated action implementation.
Digitalization	17. Support new technology, innovation and digitalization and benchmark best practices, new programs and new initiatives that encourage worker training to strengthen the skilled workforce. 18. Increase funding and opportunities for workers and create incentives for scientific contribution and entrepreneurial talent. 19. Digital transformation requires cultural and behavioural changes, transparency, open communication, acknowledging difficulties, technical assistance, and encouraging co-creation to overcome resistance from all levels. So, it is not about introducing fancy tools and implementing sophisticated systems. 20. Develop new curriculum and delivery methods, attract talented workers and qualified managers who are required to support and encourage new technology, innovation, and digitalization, and strengthen the skilled workforce via education, training, and retention.

Source: Researchers

9. RESEARCH CONTRIBUTIONS

This study has both academic and practical contributions by assessing the impact of new trends in maritime trade including the change in climate, port disruption, structural shift in globalization, external disruptions, on the performance of the Egyptian maritime transport sector and how Egypt cope with the new trends. Furthermore, the study discusses how digitalization might improve performance within those trends as to efficiently execute sector activities. Moreover, this study provides practical contribution by proposing recommendations to enable sector authorities and stakeholders to adjust and adapt to the new operating landscape. The study also outlines best practices and lessons acquired from other developing and developed nations, which may be used to plan and execute policies and initiatives to cope with and adapt to Egypt.

10. RESEARCH LIMITATIONS

- **Generalizability:** As a case study of a single country, the findings obtained may have limited relevance to other countries with differing economic, geographic, and institutional settings. However, lessons may still inform comparative future study (El-Nahry & Doluschitz, 2009).

- **Interdependencies and cascading effects:** The complex interactions between climate, economic, political, and social systems make it difficult to isolate the specific impacts of any one driver on maritime transport. Unintended consequences are difficult to anticipate.

- **Future uncertainty:** Projecting how global trends and regional vulnerabilities may evolve involves making assumptions about uncertain future conditions, technologies, and policies. Scenarios can help bound uncertainty but not remove it.

- **Adaptation constraints:** The adaptive capacity of Egypt's maritime sector depends on many contextual factors like resources, institutions, and political will, which are challenging to comprehensively assess or compare between cases (Gupta et al., 2010).

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- **Data availability:** The study may be constrained by limited data on Egyptian port operations, and trade flows over long time periods that impact the depth of quantitative analysis.

- **Other changes and trends:** There are additional trends and disruptions that affect the Egyptian maritime transport sector, such as the concentration on climate impacts, which may not thoroughly investigate the impact of political instability, wars, economic crises, and other non-climate stresses on the sector.

II. FUTURE RESEARCH WORK

Researchers must keep incorporating insights from Egyptian maritime experts throughout the inquiry processes to conduct future research in the following areas:

- Assessing the disruptions that affect the Egyptian maritime transport sector, such as political instability, terrorism, and piracy, and evaluating how they affect the sector's performance.

- Examining the effects of innovation and technology, such as the use of block chain, autonomous ships, and other digital technologies, on the Egyptian maritime transport sector.

- Investigating the role of collaboration and coordination among stakeholders in the Egyptian maritime transport sector, including shipping companies, port authorities, and government agencies, in addressing the challenges posed by maritime trade new trends.

- Assessing the skills and training needs of the Egyptian maritime workforce to adapt the changing demands of maritime trade new trends and ensure a skilled and adaptable workforce.

- Exploring the adoption of sustainable maritime transport practices to reduce the environmental footprint of the sector.

- Promoting regional maritime governance and cooperation frameworks to address common challenges, share best practices, and enhance maritime security and safety in the region.

- Moving forward, with more worldwide dispersion of the ICT infrastructure and connectivity accompanied with a growing level of ICT adoption.

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تقييم أثر الاتجاهات المعاصرة للتجارة البحرية على أداء النقل البحري المصري: بحث ميداني

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ملخص البحث باللغة العربية

يعد النقل البحري وسيلة نقل في غاية الأهمية، وذلك في إطار الدور الفعال في دعم التجارة العالمية وسلاسل الإمداد والموارد والنمو الاقتصادي والتنمية، حيث يؤثر العديد من الصناعات، سواء بطريقة مباشرة أو غير مباشرة. وتحظى مصر بموقع متميز على حدود البحر الأبيض المتوسط، وخليج السويس، وخليج العقبة، والبحر الأحمر، مما يسمح لها بوضعها في أحد ممرات وطرق النقل البحري العالمية الرئيسية. وبالرغم من المبادرات الأخيرة في مختلف القطاعات المصرية، ومنها التي تهدف إلى تطوير الموانئ المصرية، يواجه القطاع إاضطرابات واتجاهات حديثة قد تعيق الأداء. وفي هذا الصدد، يهدف البحث إلى دراسة تأثير الاتجاهات المعاصرة للتجارة البحرية على أداء قطاع النقل البحري المصري، وتشمل هذه الاتجاهات تغير المناخ، واضطرابات الموانئ، والتحول الهيكلي في العولمة، والاضطرابات الخارجية، ومدى تأثير الرقمنة على الأداء في ظل الاضطرابات والاتجاهات المعاصرة. وخلال البحث، تم استخدام المنهج الكمي باستخدام أداة المسح عبر الإنترنت لجمع البيانات اللازمة، وجمع العينات لعدد 394 مشاركًا من قطاع النقل البحري المصري. وباستخدام برنامجي SPSS وAMOS، تم التحليل باستخدام نموذج المعادلات الهيكلية (SEM) لتحليل المسح وإيجاد العلاقة بين متغيرات البحث. وأظهرت نتائج الدراسة أن جميع الفرضيات مدعومة، وأوضحت التأثير الفعال لتلك الاتجاهات على قطاع النقل البحري، من حيث النفقات، ومعدلات وقت المناولة، ومتوسط زمن الانتظار، والرسوم، والتأخير، وغيرها من مؤشرات الأداء الرئيسية. وقد قام البحث بسد الفجوة من خلال مراجعة واستعراض الأدبيات، ويوصي بخطة عمل لتطوير قطاع النقل البحري في مصر.

الكلمات الدالة: تغير المناخ، التحول الهيكلي في العولمة، والاضطرابات، الرقمنة، أداء قطاع النقل البحري.

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