الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري

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Impacts of the Fourth Industrial Revolution on Port-City Integration

"World Port Sustainability Program Aspects"

Evaluating the Competitiveness Level of North African Container Ports: An empirical study on the Egyptian and Libyan container ports using FAHP

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Presentation Outline:

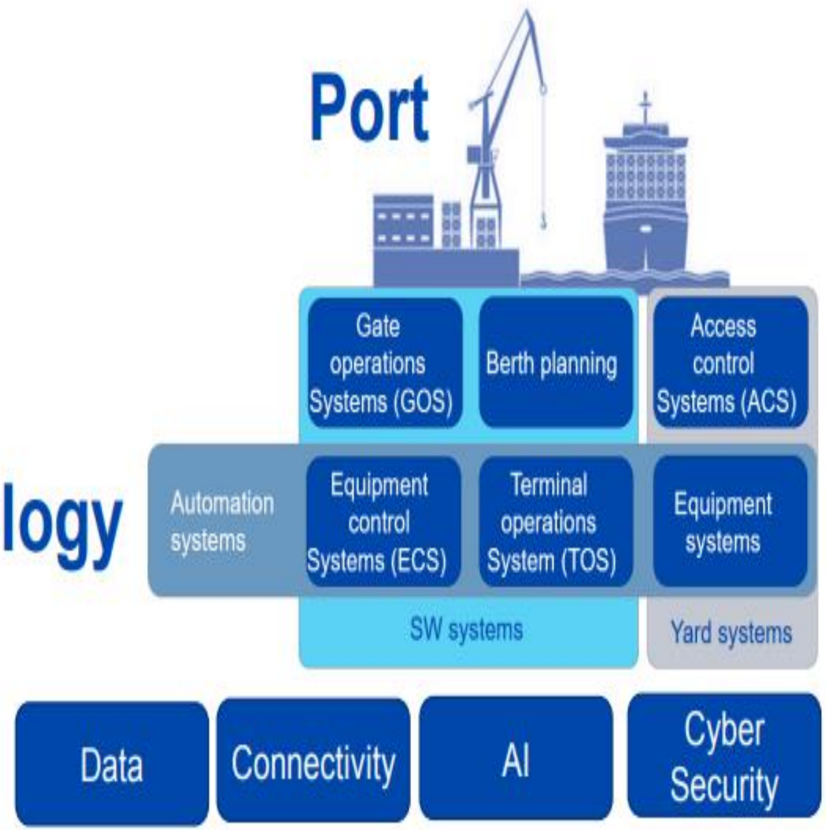
1. Introduction
2. L.R.
3. Methodology
4. The proposed framework
5. Empirical analysis and discussion
6. Conclusion

INTRODUCTION:

The geographical location of North African states is a backbone for the global powers in pursuit of furthering their economic interests as well as strengthening their regional connectivity at the crossroads of Africa, Asia and Europe. Moreover, North African Arab states, which participated in some of the oldest trade routes in human history, are less globally and regionally involved in recent trade.

Further, the routes through the Suez Canal and the Mediterranean have historically been very important as they connect Asia and Europe. In the era of containerization the old Mediterranean ports have changed their traditional roles, and the new ones have introduced relatively new concepts, such as transshipment and port networking, totally changing the commercial map

Application of technology



AREA OF STUDY

Ports of Dekhila, Alexandria, Damietta, Port Said, East Port Said and Sokhna from Egypt.

Ports of Tripoli, Khoms, Misurata and Tobruck from Libya.

2016-2018

LITERATURE REVIEW

Authors	Study conclusions
Gu and Dong (2006)	The study successfully overcomes the major drawbacks of the AHP which existed in the previous studies
Jimenez et al., (2013)	Monitoring a port's performance in an ever-changing environment is crucial for measuring its efficiency and competitiveness levels
Caldeirinha, et al. (2014)	Analysed the performance of a port through its characterising factors limiting their study to European ports.
Elsayeh (2015)	Studied the effect of technical efficiency on port competition in the Mediterranean Sea
Herrera and Ancor (2016)	Found that ports that operated in more competitive environments were more efficient.
Ismail and Elgazzar (2018)	Used Fuzzy Analytics Hierocracy Process (FAHP) to measure, assess, evaluate and benchmark the port efficiency of six container ports in Egypt.
Ismail and Elbishi (2019)	Identified the reasons for the inefficiency of Yemeni container terminals using FAHP.

Ports' role has changed.. more than an interface between sea and land.

Cut-throat competition facing ports at both national and regional levels

Slowing down global economy and trade

Emerging port ownership structures with an increased PPPs (Public Private Partnerships)

Port Sustainability

A more complicated role of being a main link within the global supply chains

Puts enormous pressure on port authorities to improve their corporate governance to attract customers & investors

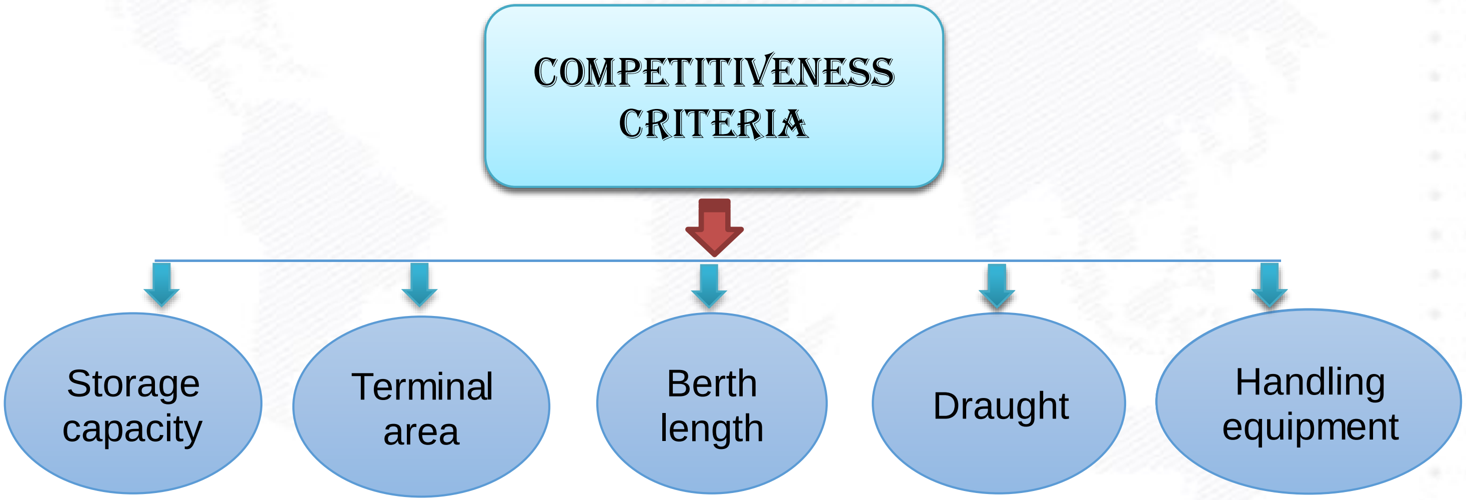
Makes it even tougher to sustain a profitable business model, so ports need to be more inclusive and support inclusive economic/social growth

Inevitable, because good CG mitigates investment risks

METHODOLOGY

METHODOLOGY

Step one: Identifying the criteria that used to evaluate efficiency level of the stated container ports 2016-2018



METHODOLOGY

Step two: Developing a FAHP survey to identify the relative importance of selected criteria

With respect to (Port efficiency)	Importance or preference of one factor over the frame of discernment (Decision Alternatives D.A.'s)									
Storage capacity	9	7	5	3	1	3	5	7	9	Terminal area
	9	7	5	3	1	3	5	7	9	Berth length
	9	7	5	3	1	3	5	7	9	Draught
	9	7	5	3	1	3	5	7	9	Handling equipment
Terminal area	9	7	5	3	1	3	5	7	9	Berth length
	9	7	5	3	1	3	5	7	9	Draught
	9	7	5	3	1	3	5	7	9	Handling equipment
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Draught	9	7	5	3	1	3	5	7	9	Handling equipment

1 denotes equally important, 3 denotes moderately more important, 5 denotes strongly more important, 7 denotes very strongly more important, 9 denotes extremely important

METHODOLOGY

Step three: Determining the relative importance weights of the selected criteria

Criteria	Priority	
Storage capacity	17%	3
Terminal area	11%	5
Berth length	11%	4
Draught	32%	1
Handling equipment	29%	2

Consistency Ratio (CR)

CR = 0.02

A five-point performance rating scale (very poor, poor, good, very good and excellent) is established based on ***the Triple E container ship***

METHODOLOGY

Step four: Establish a performance rating scale to evaluate each efficiency criterion

A five-point performance rating scale (very poor, poor, good, very good and excellent) is established.

After determining the performance rate (R) and the relative weight (W) of each criterion, the weighted rate (WR) of each criterion is calculated by multiplying the relative weight of each criterion by its performance rate

EMPIRICAL RESULTS

Container terminals	Storage capacity			Terminal area			Berth length			Draught			Handling equipment			SUM	Rank
	W	R	WR	W	R	WR	W	R	WR	W	R	WR	aW	R	WR		
Alexandria	0.17	0.2	0.034	0.11	0.2	0.022	0.11	0.4	0.044	0.32	0.4	0.128	0.29	0.2	0.06	0.286	7
El-Dekheila	0.17	0.4	0.068	0.11	0.4	0.044	0.11	0.6	0.066	0.32	0.2	0.064	0.29	0.4	0.12	0.358	5
Damietta	0.17	0.2	0.034	0.11	0.4	0.044	0.11	0.4	0.044	0.32	0.6	0.192	0.29	0.6	0.17	0.488	3
East Port Said	0.17	0.8	0.136	0.11	0.8	0.088	0.11	0.8	0.088	0.32	0.6	0.192	0.29	0.8	0.23	0.736	1
Port Said	0.17	0.2	0.034	0.11	0.4	0.044	0.11	0.2	0.022	0.32	0.4	0.128	0.29	0.6	0.17	0.402	4
El-Sokhna	0.17	0.2	0.034	0.11	0.4	0.044	0.11	0.4	0.044	0.32	0.8	0.256	0.29	0.4	0.12	0.494	2
Khoms	0.17	0.4	0.068	0.11	0.2	0.022	0.11	0.6	0.066	0.32	0.2	0.064	0.29	0.2	0.06	0.278	8
Tripoli	0.17	0.4	0.068	0.11	0.2	0.022	0.11	0.8	0.088	0.32	0.2	0.064	0.29	0.4	0.12	0.358	6
Misurata	0.17	0.2	0.034	0.11	0.2	0.022	0.11	0.8	0.088	0.32	0.2	0.064	0.29	0.2	0.06	0.266	9
Tobruck	0.17	0.2	0.034	0.11	0.2	0.022	0.11	0.4	0.044	0.32	0.2	0.064	0.29	0.2	0.06	0.222	10

The empirical results showed that:

- Egyptian container ports are more efficient than Libyans.
- East Port Said port took the first position, while Tobruck ranked as the last port .

The main outcome is;

, Using FAHP, the area that should be invested respectively by Port of ***Tobruck*** *as the least port in terms of efficiency, in order to improve competitiveness level are:*

storage capacity, terminal area, berth length, depth, and handling equipment

Thank You

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