

The International Maritime Transport and Logistics Conference
"Marlog 10"

Digitalization
in Ports & Maritime Industry



Container Market Concentration in the Era of Digitalization: Evidence from North African Sea Ports

Dr. Ahmed Ismail, Cap. Abdulla Wanis and Dr. Arbia Hlali.





Presentation outline:

1. Introduction
2. LR
3. Methodology
4. HHI analysis
5. BCG analysis
6. Conclusion
7. Policy implication





Introduction

North Africa area and study limits

17 container ports in 10-year period between 2009 and 2018.

Selection of ports is based on their geographic position, since they generally share the same foreland.





Study aim and objectives

This paper aims to review the literature related to container ports concentration through assessing the concentration ratios and to outline competitiveness level of major North African container ports and terminals through the BCG and HHI analyses.



Literature review



AUTHOR(S) / YEAR	CONCENTRATION INDICATORS USED	STUDY AREA / FIELD	STUDY RESULTS
Varan and Guldem (2014)	CR, HHI, SSA	Turkish container ports system	There is a necessity to reconstruct port policies in order to achieve competitive advantage for the stated ports
Elsayeh (2015)	CR, HHI, GC, SSA	Mediterranean container ports	Market tends to de-concentrated
Li et al., (2015)	CR	Coastal ports in China (1982-2012)	Concentration ratio decreased continuously since 1982 which means the stated ports are de-concentrated.
Elbayoumi et al., (2016)	HHI, SSA	24 container terminals in 12 MENA countries	5 out of 24 terminals were growing constantly
Pham et al., (2016)	CR1, CR3 GC SSA	North Vietnamese port system (2005-2014)	The market experienced de-concentration trend due to perfect competition.
Liu et al., (2016)	BCG, HHI, SSA	Trade traffic in major northern China ports (2004-2014)	The market is oligopoly.
El-Haddad et al., (2017)	CR3, CR5, HHI and SSA	East–Mediterranean region container market 1995-2014	Piraeus & Ambarli ports tend monopoly
Ismail A., (2019)	CR, HHI	Top 10 Mediterranean container ports (2013-2017)	The empirical results show that the market is low concentrated
Constantinos and Theodore (2019)	CR4, CR8, HHI	The U.S West and East Coast ports (2005-2015)	Ports have evolved from being de-concentrated towards a high and moderate concentration levels respectively
Nguyen et al., (2020)	GC, CR, HHI	Top 10 SE Asia container ports between 2007-2017	SE Asia ports become moderately concentrated in 2017, contrasting from highly concentrated in 2007, which indicating a tendency towards de-concentration.



Methodology

Define North African Container Market leader and most profitable port through using BCG.

Assessing North African Container Market Concentration through using HHI

Total container throughput in North Africa region has experienced a moderate growth between 2009 and 2018, respectively from 5,751,404 TEUs to 8,952,957 TEUs

$$\text{Relative Market Share} = \frac{\text{Your firm's market share (or revenues)}}{\text{Largest competitor's market share (or revenues)}}$$



HHI

HHI index “is the sum of the squares of each carrier’s market share”



$$HHI = \sum_{i=1}^n S_i^2, \quad \frac{10000}{n} \leq HHI \leq 10000$$

S_i is the market share and n is total number of selected ports in the market

Concentration level	Type of market	HHI value
Non-concentrated market	Efficient competition, Part of monopolistic	>100-1000
Moderately concentrated	Part of monopolistic	1000-1800
Highly concentrated market	Tight oligopoly, dominant firm	>1800



BCG Matrix





Stars means a port is operating in a high growth industry that take a significant part in high market share.

Cash cow is the most profitable brands, and should be “milked” to provide as much cash as possible.

Question mark holds a low market share in fast growing markets consuming large amount of cash and incurring losses. Thus, it requires much closer consideration.

Dogs hold a lower market share in comparison with other competitors, and is operating in a slowly growing market.



Results



In 2009, average HHI value was 1461.973, this indicates the market is moderately concentrated.

Between 2010 & 2012, HHI value increased to 1687.06, this means decreasing of competition level.

In 2013 average value of HHI decreased to 1553.103, this means the stated market is moderately concentrated, and competition level between ports was increased.





Since 2014, the average values of HHI were increased year by year as the following; 1821.521 in 2014, 1971.616 in 2015, 1994.16 in 2016, 1958,653 in 2017 and 2054.059 in 2018. this means the stated market was highly concentrated.

Overall, the stated market is highly concentrated and the mean HHI value was at 1760.437 during period of study.

Increasing HHI trend over time indicates that competition level between North African container ports and terminals is shrinking



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PORT	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
W.PORT SAID	203.900	151.7138	166.9268	170.5016	122.2508	45.91584	60.14486	30.21031	35.54363	31.24875
DAMIETTA	356.716	339.9028	212.4494	145.535	120.2221	96.28384	69.21133	77.08857	95.6338	159.9526
ALEXANDRIA	465.040	408.7947	339.2204	340.4326	448.7945	398.206	377.7055	424.3961	390.8651	365.4979
KHOMS	0.166	0.827114	0.581384	0.070287	1.106486	1.106667	0.904872	0.772028	0.433138	0.538719
TRIPOLI	2.713	1.558943	1.358247	0.398296	1.161021	1.406694	1.362241	0.635473	0.259919	0.166132
MISURATA	11.371	17.36113	12.1002	7.453734	14.15828	16.18778	12.56953	13.32419	9.071929	5.722933
TOBRUCK	0.001	0.0001	0.000324	0.000895	0.008447	0.013255	0.005539	0.038863	0.03288	0.01776
RADES	43.696	37.23278	33.19556	35.3576	22.65111	20.89491	13.35462	13.68751	13.72112	10.66889
SOUSSE	0.001	0.001042	0.001136	0.001804	0.189489	0.135269	0.141387	0.171078	0.393502	0.36128
SFAX	0.292	0.287201	0.281196	0.320704	0.889546	0.821448	0.974247	0.928506	1.035865	0.91811
LA GOULETTE	0.0380	0.0105	0,0001	0.0002	0.0103	0.0007	0.0088	0.0014	0.0149	0.0090
ALGIERS	111.077	107.7305	76.36041	95.60156	104.0336	93.78257	101.3122	108.0162	117.3618	101.2459
ANNABA	0.055	0.0262	0.462023	1.751733	3.558185	3.555746	3.407626	3.811638	3.728618	3.539123
BEJAIA	4.097	5.993314	5.041068	7.281118	11.01586	10.69608	7.690148	9.454644	10.41237	6.973112
SKIKDA	3.573	3.173026	2.173814	2.664342	2.578006	3.019507	3.037498	3.822604	4.190167	3.274094
ORAN	3.023	1.892916	1.496953	1.282815	1.347478	1.104236	0.883671	0.952909	0.932155	0.612475
TANGER MED	256.213	391.4101	783.0608	878.4067	702.2847	1129.348	1322.611	1308.347	1279.811	1367.221
MEAN	1461.973	1467.746	1634.475	1687.061	1553.103	1821.521	1971.616	1994.162	1958.653	2054.059



BCG Matrix analysis has shown that ports of Damietta, West Port Said and Algiers are the market leaders.

Ports of Khoms, Sfax, Annaba and Sousse hold low market share in a fast growing market, and require more consideration.

Port of Algiers is the most profitable port.

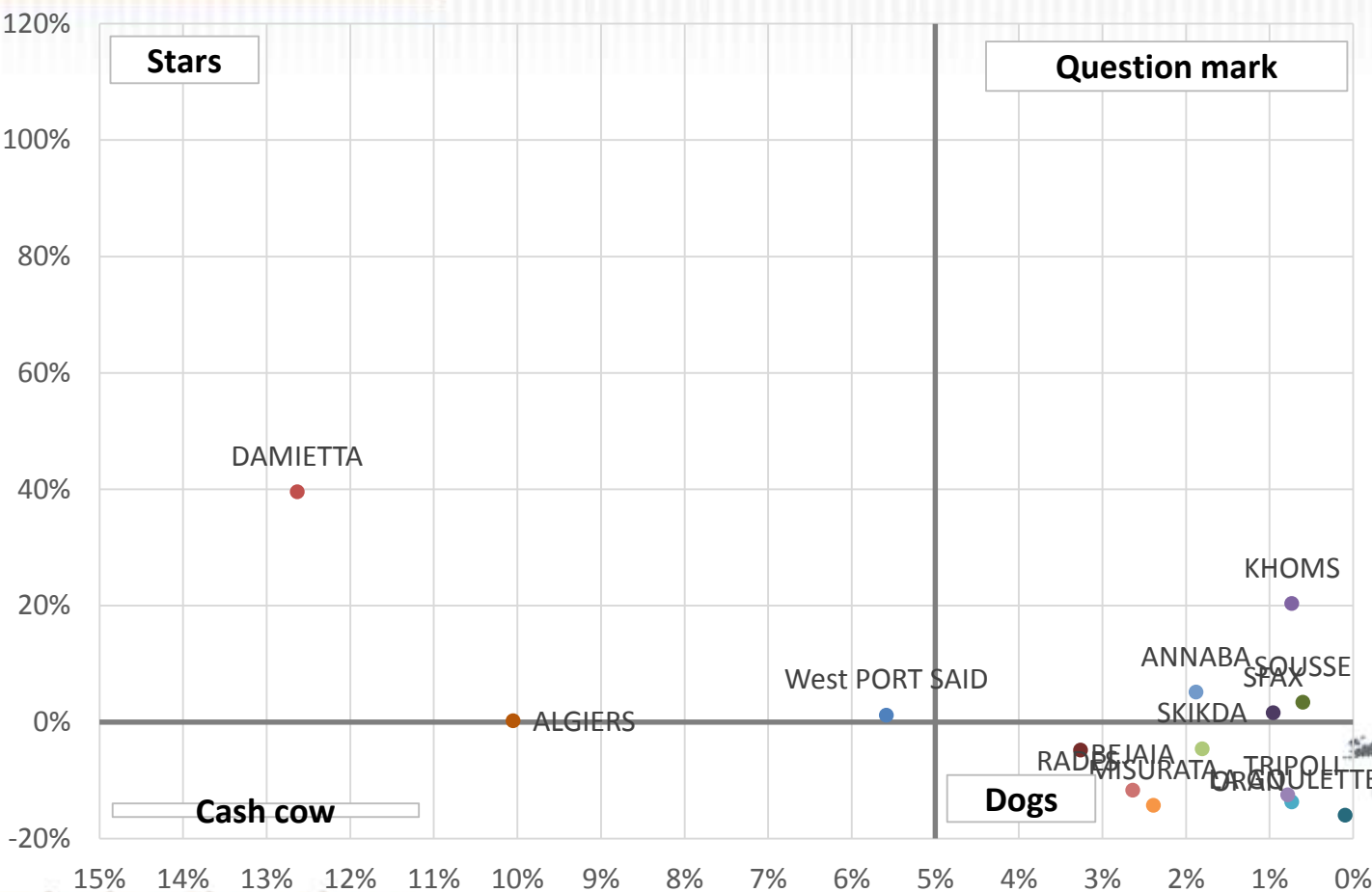
Other ports under this study hold the lowest market share and operate in a slowly growing environment.



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Conclusion



North African market is highly concentrated market.

Ports of Damietta, West Port Said and Algiers are the market leaders, while Port of Algiers is the most profitable port

The dynamic motion of maritime industry towards digitalization and innovation is another important factor for container ports future demand.

The ability of digitalization and innovation, such as big data, AI, IoT and smart containers, tend to reduce maritime transport and coordination costs, and could reinforce the competitiveness level of maritime industry.



Policy implication



Cooperation, rather than competitiveness, among ports of study in proximity represents a prime way for enhancing competitiveness level.

An effective planning for transport infrastructure, such as ports and their connections to railways, roads, and inland waterways, requires a foresight of what a potential future flow of maritime trade could look like.

Enabling the participation of the private sector in North African container port operations should be considered.

In addition to the current digital technologies, it is recommended to introduce additional digital technologies in providing quality seaport services and investing in their implementation represent an important task for policy makers and port managers to elaborate.





Thank you

