Improving the Competitiveness of Nigerian LNG Shipping Sector: a Cluster Policy Perspective on the Economic Development of Nigerian Maritime Resources

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Preface

The new macro-economic environment indicates that it is becoming less attractive for LNG firm competitiveness to be led by market position, rather, resource position, flexibility, buyer and supplier relations, and cooperation. Long term sustainable performance rests on companies' competitiveness in terms of the available competencies and capabilities, coupled with country's attractiveness as host for companies. Where companies are competitive and the country is less attractive, the companies will relocate or diversify investment to other countries. A less attractive country environment will create difficulty in encouraging resource inflow. On the other hand, a country that is attractive for existing firms that are less internationally competitive, will have its industry remain national, and even in the case of an oligopolistic LNG industry, will have its market share and earnings decline as the industry tends towards competition. Both scenarios are fast becoming the case in the Nigerian LNG industry.

Of equal importance in competitiveness is bridging the gap between value creation and economic integration to safeguard capital flight, promote local productivity and economic development; a challenge that has attracted different policy orientations between the developed and developing economies in fiscal incentives and local content development. The question arises as to the extent that these policies are effective in achieving the required objectives.

Meanwhile, cost competitiveness and productivity growth of each node in the LNG chain will be crucial to the optimisation of the entire chain. This will require knowledge and innovation in resource development and utilisation for economic growth, with policy at the heart of development. Then, the question arises as to the extent to which LNG shipping could be developed from the entire LNG value chain, and the extent that value creation in LNG shipping can be integrated for the development of Nigeria's maritime resources.

This study focuses on strategic management in shipping and policy implications for the development of shipping activities within the frameworks of a cluster policy, trusting that it contributes to knowledge in this course.

However, this study could not have been put together without the intellectual prowess of Mr. Maurice Jansen, who has provided support and re-engineered my critical thinking skills, an innovator indeed. Further, this thesis research is a consolidation of the knowledge shared by a team of enviable islands of maritime knowhow at the Netherlands Maritime University (NMU), and would not have been conceived without their knowledge invested in me. Special thanks to Mr. Erik Hietbrink, Mr. Arjen Uytendaal, Mr. Arjen Gerretssen, Mr. Theodor Strauss, Mr. Luc Cuyvers, Mr. Arjen van Klink, Mr. Wouter de Leeuw, Mr. Anne Padmos, Ms. Leonie Teunissen, Ms. Audrey Ernst, Ms. Reinild van der Vecht, and all other staff that I am not opportune to mention in this preface. Also, to Ms. Mijung Kim, Mr. Alex Teahan Song, and the entire 12.04 Korean class for their support and contribution to developing my maritime knowledge.

Equally, I appreciate Mr. Erik Jakobsen, Managing partner at Menon; Ms. Funmi Folorunso, Executive Director African Ship owners’ Association; Mr. Peter Myles, Chairman Nelson Mandela Bay Maritime Cluster; Mr. Rudolf Huber, Energy expert; Mr. Peter Olorunfemi, CEO Peter Maritime Consulting; Mr. Ezo Goddey, Business Developer AG Butler Nig. Ltd.; and Mr. Godwin Anene, Operations Manager AG Butler Nig. Ltd., for their genuine support.
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List of Abbreviations

AESML Anglo-Eastern Ship Management Limited
AMC African Maritime Charter
ANMC African Network of Maritime Clusters
BCF Billion Cubic Feet
BI Norwegian Business School
BGT Bonny Gas Transport
CIF Carriage Insurance and Freight
CISA Coastal and Inland Shipping Act
CIRR Commercial Interest Reference Rate
CVFF Cabotage Vessel Financing Fund
DPSA Development and Production Sharing Agreements
EDBI Ease of Doing Business Index
EPSA Exploration and Production Sharing Agreements
EU European Union
FID Final Investment Decision
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
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<tr>
<td>FLNG</td>
<td>Floating Liquefied Natural Gas</td>
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<td>FPSO</td>
<td>Floating Production Storage and Regasification Unit</td>
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<td>FOB</td>
<td>Free On Board</td>
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<tr>
<td>GCI</td>
<td>Global Competitiveness Index</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GITR</td>
<td>Global Information Technology Report</td>
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<tr>
<td>HSEQ</td>
<td>Health, Safety, Environment and Quality</td>
</tr>
<tr>
<td>IMCO</td>
<td>International Maritime College Oman</td>
</tr>
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<td>IOC</td>
<td>International Oil Companies</td>
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<td>ISAN</td>
<td>Indigenous Shipowner’s Association of Nigeria</td>
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<td>JV</td>
<td>Joint Venture</td>
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<td>JOA</td>
<td>Joint Operating Agreement</td>
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<td>KEXIM</td>
<td>Korean Export Import Bank</td>
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<td>LPI</td>
<td>Logistics Performance Index</td>
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<td>LPG</td>
<td>Liquid Petroleum Gas</td>
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<td>LNG</td>
<td>Liquefied Natural Gas</td>
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<td>MAN</td>
<td>Maritime Academy of Nigeria</td>
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<td>MARUT</td>
<td>Norwegian Maritime Advisory Board</td>
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<td>MFI</td>
<td>Singaporean Maritime Finance Initiative</td>
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<tr>
<td>MRP</td>
<td>Ministry of Petroleum Resources</td>
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<tr>
<td>MTPA</td>
<td>Million Metric Tonnes per Annum</td>
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<tr>
<td>MT</td>
<td>Million Metric Tonnes</td>
</tr>
<tr>
<td>NAKILAT</td>
<td>Qatar Gas Transport Company Limited</td>
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<td>NCF</td>
<td>Norwegian Continental Shelf</td>
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<td>N.D</td>
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<tr>
<td>NIMASA</td>
<td>Nigerian Maritime Safety and Administration</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<td>NIPEX</td>
<td>Nigerian Petroleum Exchange</td>
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<tr>
<td>NIS</td>
<td>Norwegian International Ship Register</td>
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<td>NLNG</td>
<td>Nigeria Liquefied Natural Gas Limited</td>
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<tr>
<td>NOC</td>
<td>National Oil Company</td>
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<td>NOGICD</td>
<td>Nigerian Oil and Gas Industry Content Development Act 2010</td>
</tr>
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<td>NNPC</td>
<td>Nigerian National Petroleum Corporation</td>
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<td>NSML</td>
<td>NLNG Ship Manning Limited</td>
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<td>NSDP</td>
<td>Nigerian Seafarer’s Development Programme</td>
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<td>NRI</td>
<td>Network Readiness Index</td>
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<td>OCT</td>
<td>Norwegian Ocean Talent Camp</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
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<td>OIT</td>
<td>Norwegian Ocean Industry Talent</td>
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<tr>
<td>OPEC</td>
<td>Organisation of Petroleum Exporting Countries</td>
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<td>PSC</td>
<td>Production Sharing Contract</td>
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<td>PTDF</td>
<td>Petroleum Technology Development Fund</td>
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<td>QNB</td>
<td>Qatar National Bank</td>
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<td>QP</td>
<td>Qatar Petroleum</td>
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<td>QPI</td>
<td>Qatar Petroleum Investment</td>
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<td>QG</td>
<td>Qatar Gas</td>
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<td>QS</td>
<td>Qatar Shipping</td>
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<tr>
<td>SASF</td>
<td>Ship Acquisition and Ship Building Fund</td>
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<td>SDFI</td>
<td>State’s Direct Finance Interest</td>
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<tr>
<td>STASCO</td>
<td>Shell International Trading and Shipping Company Limited</td>
</tr>
<tr>
<td>STCW</td>
<td>Standards of Training, Certification and Watch keeping</td>
</tr>
<tr>
<td>SWF</td>
<td>Sovereign Wealth Fund</td>
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<tr>
<td>TSCF</td>
<td>Trillion Standard Cubic Feet</td>
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<tr>
<td>UNCTAD</td>
<td>United Nations Convention on Trade and Development</td>
</tr>
<tr>
<td>WEF</td>
<td>World Economic Forum</td>
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Executive Summary

This study focuses on improving the competitiveness of Nigerian LNG shipping sector for the economic development of Nigerian maritime resources\(^1\) from a cluster perspective, and explores the application of a maritime cluster framework in Nigeria, taking into account, the dimensions of cluster policy, shipping industry dynamics, location attractiveness and industry competitiveness\(^2\). The aim is first, to explore and propose recommendations on how the competitiveness of Nigerian LNG shipping sector can be improved. Second, on how competencies and value creation in the LNG shipping sector can be leveraged to develop complementary shipping sectors and overall maritime resources in Nigeria.

Cluster policy is the combination of instruments cutting across different sub-sectors of a target industry and complementary industries, designed by the relevant authorities to stimulate cluster competitiveness, co-operation, and internationalisation, for a sustainable economic development. Policy consideration encompasses industrial production and relations, Small and Medium scale Enterprises (SME), regional relation, education, research and innovation, finance, and fiscal considerations to facilitate local, national, and regional development.

In a maritime cluster, new creation, sustainance, and spillover of knowledge is the basis for cluster competitiveness. Consequent upon knowledge and innovation is the development of a competitively co-operative demand pull sector, quality labour pool arising from quality maritime knowledge institutions, and cluster’s ability to sustainably attract talents. Also, an effective policy initiative involving public-private dialogue, put differently- lobbying, on the premise of knowledge and competence, failing which policies are apt to be counter-productive. Policy consideration will vary according to the demands of a particular terrain; industry structure, the level of knowledge within the cluster and a collective vision of the future, taking into account, political and cultural factors. However, specific polices targeting demand pull sectors are less effective without regard for a wider cluster policy.

Despite the availability of natural resources and potential demand for maritime operations in Nigeria, domestic productivity in shipping and contribution to GDP is insignificant. Less efficient institutional environment, less stable political and social environment, low technological readiness and less skilled human resources for cluster attractiveness leads to high operational costs that serve as a dis-incentive for future location decisions. This constitutes a weakness for cluster formation.

Industrial strategy has been based on short term capital requirement and earnings over long term returns in competence development, safe for the introduction of local content to improve domestic value creation. Competence and capital gaps spread across the ocean industries influencing maritime policy, shipping and education, with the implication of a weak domestic industry.

\(^1\) Defined as ports and logistics, shipping, offshore, oil and gas production and exploration, ship building and repairs, equipment manufacturing and supplies, maritime services and most significantly, maritime human resources
Demand for shipping in Nigeria is driven by oil and gas, other raw materials and consumables export and import. The redistribution of Nigerian oil and gas export to Asia will increase the tonne mile with accompanying opportunities for shipping in increased tonnage supply, while growing population will create larger consumer market capable of driving the demand for shipping. Hence, shipping companies need to position to take advantage of these opportunities.

The local market is relatively more competitive than the domestic market with the implication that the existing firms may lack the capacity to favourably compete internationally. Whereas customers within the sector are demanding, creating a platform for innovation in other for firms to be able to upgrade and favourably compete. Lack of finance for local firms and purportedly, monopoly of shipping activities by “foreign shipping companies” are considered to be responsible for low demand condition in the Nigerian maritime sector. Co-operation necessary for clustering among domestic firms is weak; the level of trust to create informal relations, synergy and allow labour mobility is low; the quality of maritime education to provide institutional knowledge flow to the industry for competence development is average; entry barrier is considerably high, judging by the political environment; and there is lack of leader firm behavior.

An assessment of the LNG shipping sector diamond in relation to the maritime sector indicate an average factor condition for the LNG shipping sector, due to quality human resources, while the overall factor condition in the maritime sector is low. Demand condition relative to local shipping companies is less competitive. Related and supporting sectors; the context for firm strategy, structure and rivalry, government; and chance all ranked low, indicating a less sustainable maritime sector.

Qualitative review of the competitiveness of Nigerian LNG shipping sector indicates that competitiveness depends on the extent that available resources are used to take advantage of market opportunities. Market understanding is reflected in its ability to leverage on relationships to exploit market opportunities and the flexibility to adjust to market conditions. Strategic direction is evidenced by its interactions with other value-adding companies home and abroad, and the extent that it can leverage on its corporate portfolio to exploit opportunities in the shipping market. Ability of available competencies to manage future competitive demands determines how it can position for opportunities. Value proposition for Nigerian LNG shipping sector depends on how it intends to compete in the future; product oriented or sustainability oriented.

However, competitiveness of the Nigerian LNG shipping sector can be improved through competence development and strategic connectivity. The LNG shipping sector’s competitiveness can be leveraged for the competitiveness of the maritime cluster through internal connectivity, while external connectivity will engender knowledge accumulation, capital accumulation, and sustainable value creation. In the same vein, developing maritime education requires connectivity.

Knowledge based industrial maritime cluster policy will be required for sustainability. This can be achieved by increasing government funding for localised maritime education, training and research activities, based on an integrated view of maritime competencies and a prioritised vision of the future; external acquisition of knowledge and capital to facilitate education attractiveness which requires a liberalised maritime policy, based on partnership with foreign knowledge institutions, supported by a self-regulatory maritime educational system; establishment of a competence based Maritime Cluster Development Board, to set an agenda for the development of a
Nigerian Maritime Cluster that would work at a continuum towards internationalisation, with a collective vision of the future; government’s encouragement of private sector investment in maritime education, training and research through fiscal incentives on selected skills and competencies, subject to local training engagement to facilitate competence development, labour mobility and local retention of talents; stimulation of the local demand condition to facilitate specialisation; and a public transparency led private sector engagement to facilitate increased private sector participation in the development of maritime and ICT infrastructure as well as increased public-private sector adoption of ICT to improve transparency and efficiency of business processes.

Nigeria requires a competence based collaborative industry that can be leveraged on the establishment of a national oil company to improve domestic demand, pressure to innovation and ensure optimal utilisation of Nigeria’s energy resources; an inclusive competence based resource and asset transfer, rather than time based handing over; organised knowledge of the available competencies and a cost benefit oriented local content to improve the productivity of existing firms and attract new companies to locate; mergers and consolidations among domestic firms to foster co-operation, size and service standards for cluster development; consideration for a possible shift in oil and gas production mix towards LNG to reduce long term revenue loss from oil theft; propel NLNG/Bonny Gas Transport to a leader firm role for cluster wide development; and possible adoption of an inclusive strategy to attract local and foreign shipping investment as well as facilitate maritime finance knowhow.

Shipping company managers require a customer focused learning culture, built on developing competencies in shipping management knowhow for competitiveness; a collaborative orientation through partnerships and joint ventures to fill knowledge and capital gaps; and possible facilitation of a private fund to engender a private sector lead solution to ship finance in Nigeria.

Recommendation to maritime educators consists in daring to develop a conceptual framework for shipping company competitiveness, to help structure and assist in transferring knowledge on shipping company corporate strategies and competitiveness for sustainable value creation.

Sustainable economic development of Nigeria’s maritime resources can therefore be achieved with an efficient institutional framework, and adequate knowledge accumulation leveraged on its maritime people; government administrators, managers, educators, industry professionals and the maritime workforce for a sustainable maritime future.
1 Introduction

Global liquefied natural gas (LNG) market is gradually tightening. Importing countries are taking direct interest in production to ensure security of supply. Exporting countries are taking more political interest in the development and marketing of their resources to improve Gross Domestic Product (GDP) contribution and direct earnings; net exporters are becoming net importers; new exporters are emerging; and LNG value chain is increasingly being fragmented with the development of FLNG\(^2\) and FPSO\(^3\). As these developments unfold, the rate of change will be contingent on continued economic growth, industry dynamics and development in alternative energy sources.

West African supplies are instrumental to the development of LNG spot market. Declining import demands in the Atlantic Basin as a result of United States of America’s shale gas production provided impetus to finding new market in Asia. West African LNG cargoes destined for Europe and America due to long term contracts are diverted to Asia-Pacific Basin to profit from the premium pricing differences. The question arises as to the extent that these countries benefit from portfolio LNG purchasing.

Nigeria Liquefied Natural Gas Limited (NLNG), ‘... in just 13 years of production, brought in over $51 billion in revenue, delivered $9 billion to Nigeria in dividend, and paid $10 billion to the Joint Venture companies’.\(^4\) Despite the continued growth in the LNG industry and a record 333 annual LNG cargo produced by Nigeria in 2012, it suffers from declining earnings for reasons of portfolio LNG sales, declining market share due to limited investment in LNG infrastructure and project delays. In 2011, 460 billion cubic feet of natural gas worth $2 billion were reportedly flared with accompanying environmental costs. In 2005, sales and purchase agreements were reported to have been executed with five international buyers and Pre-FID\(^5\) agreements reached in 2007 for the construction of train seven but delayed, perhaps due to financial tightening following the 2008 financial crisis or government’s policy decision on conditions for approval. The project is expected to cater to gas flaring, attract over $8 billion in foreign direct investment, and provide 10,000 jobs. However, 8 years on at the time of writing this thesis paper, government’s approval is yet to be publicly clarified. This raises the question of, how long will it take to execute the proposed Brass and Olokola LNG? These issues underscore the complexity of the Nigerian business environment.

Nigeria’s liquefaction capacity stands at 22 mtpa\(^6\) since 2008 and market share had declined from 10 per cent to 7 per cent as at 2012. Qatar’s liquefaction capacity grew from about 30.2 mtpa in 2007 to 77 mtpa in 2010, while Australia with 20 mtpa capacity in 2008 will potentially move to the 70 mtpa bracket by 2020. This is evidenced by the UNCTAD, 2012 report, that Qatar will lead the first wave of LNG export, followed by Australia by 2014, West Africa by 2020, then Norway and Russia by 2030. The challenge for Nigeria is not only in its current competitiveness but also the optimal utilisation of its resources for economic growth as well as relevance during the

\(^2\) Floating Liquefied Natural Gas
\(^3\) Floating Production Storage and Regasification Unit
\(^4\) Excerpt from speech delivered by the former military head of state General Yakubu Gowon during a visit to NLNG’s facility in Finima, Bonny Island, Rivers State, September 18, 2012.
\(^5\) Final Investment Decision
\(^6\) Million metric tonnes per annum
envisaged West African boom, when indeed, it comes. Much as this study benchmarks the stagnant growth in the Nigerian LNG industry against the booming Qatari industry, it considers the geo-political, socio-cultural and industry dynamics.

More than ever, especially for developing economies as Nigeria, stakeholders in the LNG industry need to understand trends in shipping. As the market grows in flexibility, so does the possibility of a fragmented value chain. The question arises as to how each element in the value chain can be used to maximise productivity and contribute to GDP growth. Shipping, traditionally being an engine-room for economic growth, can be used to contribute to LNG resource utilisation for growth in this regard.

As competition for both foreign direct investment and access to market are growing along with co-operation as complement, Nigeria can no longer be complacent in its approach to investment, management and marketing of its resources; natural, physical, and human. Government and policy makers need to understand the economic effects of existing policies in a rapidly changing knowledge economy to be able to adapt existing policies, and develop effective policies that cater to a sustainable future, while firms have a role for productivity growth.

Clusters and LNG shipping have been subjects of scientific literature from different perspectives. The application of clusters from a strategic management perspective to LNG shipping, to the best of the researcher’s knowledge at the time of writing, is yet to be described in the existing literatures. This study aims to contribute to knowledge on the application of cluster policy as a tool for policy makers, managers, educators and industry professionals for the development of LNG shipping relative to the maritime industry. Further, it provides insights into the nature of shipping, competitiveness and the influence of culture and politics for understanding the maritime sectors in developing economies and can be instrumental for future studies about maritime cluster in Nigeria and other emerging maritime sectors.

1.1 Overview of global LNG industry

Increasing demand for cleaner and cheaper energy, favours natural gas as an important source of fueling global economic growth. In 2011, international gas trade represents 30 per cent of global consumption, while LNG trade represents 10 per cent of total trade, amounting to about 33 per cent of international gas trade. LNG trade has grown at an average of 6 per cent compared to 3 per cent growth in natural gas trade, since 1990 and it is expected to reach approximately 14 per cent of gas trade by 2025. LNG spot trade grew from 4 per cent in 1992 and 16 per cent in 2006 to approximately 25 per cent in 2011 (IGU, 2012). The number of importing countries has grown from 8 countries in 1990 to 19 countries in 2012, while exporting countries grew from 8 to 26. The number of exporting countries is expected to reach 22 by 2020 with the addition of Canada, Mozambique, and Papua New Guinea (LNG Journal, June 2012).

Global demand for LNG remains strong and promising. In 2010, total LNG trade grew by 22 per cent; in 2011, by 8 per cent to approximately 241.5million tonnes (IGU, 2012). Trade hovers around 240million tonnes in 2012 (Besty, S. February, 2013).

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7 International Gas Union
perhaps owing to supply tightness and economic slow-down. Demand is driven by Asian growth with Japan, South Korea, China, Taiwan, and India at the core of import drive. Malaysia and Indonesia have also influenced demand as net importers, while new importers from South America seek energy alternatives for diversification and energy security to feed economic growth.

The Asia-Pacific basin led LNG trade in 2011 with 153mtpa representing 63 per cent of total trade; an increase from its 60 per cent share of trade in 2010. The Atlantic basin traded 85.8mpta, while the Middle East traded 3.6mtpa. Qatar supplied 54 per cent of the Asia-Pacific trade, and North Africa accounted for 35 percent of supplies.

Japan’s nuclear power plant shut down has strongly impacted the LNG market. Its LNG imports represents a third of the world’s import at 80mtpa. Forecasts for 2025, is expected to be over 100mtpa with Japan’s future energy policy on both nuclear and methane discoveries expected to impact future LNG demand.

China imported 12mt in 2011. Total import forecast for 2012 as at June 2012, at a monthly rate of 1.3mt was 16mt and expected to grow by 19 per cent to 19mt in 2013 (LNG Journal, June 2012). The relatively low LNG demand in China despite 43 per cent growth in 2010, given its energy requirement, stems from China’s coal preference for power generation. China is expected to drive LNG trade in the near term. LNG import forecast for 2020 stands at 50mt. Demand for LNG is expected to grow overtime owing to environmental considerations and the need to diversify its energy. However, it is necessary to watch the extent that pipeline deals with Myanmar and Russia’s Gazprom as well as shale gas will influence China’s LNG demand.

Increasing environmental regulation in Europe and the development of natural gas fuelled ships indicates increasing demand for LNG as the preferred alternative for diversification of sources from Russia to enhance security of supply. The European trade is expected to be more commoditised in the near future, due to increasing supply relative to economic growth according to speculation.

United States’ energy independence and Asia-Pacific’s rising demand has two implications for existing exporting countries; the need for diversification of supplies and the opportunity to optimise future resources. Equally important for importing countries is the need to ensure the competitiveness of their LNG chain. The development of new potential exporters, without undermining project developments in Australia and Russia as well as China’s shale deposits as a potential flip in the uncertainty mix, points to a future tending towards shorter contracts and rising spot LNG, consequently, shipping.

To simply put, LNG is a means of transporting natural gas by ship. The supply chain consists of liquefying natural gas to liquid state, in order to reduce the volume by approximately 600 times for the economy of storage, transportation and shipping at a temperature of -160°C for regasification into natural gas. Shipping is central to production and marketing. Therefore, LNG shipping activities are bound to mirror the changing dynamics of the LNG market.

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8 Idem
Notably, shipping complements LNG competitiveness. Increasing number of importers and exporters indicates strong demand for LNG shipping with increasing opportunities for spot activities, because growth in terminals means LNG ships can call more terminals, thereby increasing shipping activities, support spot trading, and perhaps, minimise ballast.

Overall, market outlook remains strong with challenges and opportunities. Safe for shock events, economic down-turn or technological developments in alternative energy sources unfavourable to LNG, future LNG trade is positive for developments in shipping.

### 1.2 Importance of LNG to the Nigerian economy

According to NLNG, Nigeria is ranked 10th in proven gas reserves, estimated at over 182 trillion cubic feet, with about 50 percent associated and non-associated gas apiece. On the other hand, proven crude oil reserves as at 2013 stands at 37.2 billion barrels. Crude oil reserves is expected to have an economic life of 46 years at current production rate as reported by Nigerian National Petroleum Corporation (NNPC), whereas, natural gas reserves is expected to have an economic life of about 109 years.

Revenues from energy constitute over 80 percent of the national income, while energy contribution represents about 14 per cent of annual GDP, of which LNG contributes 4 percent; an indication of the mis-match between earnings and productivity in the economy. To put into perspective, Nigeria’s crude oil exports to the United States of America fell in February, 2013 by 246,000 barrels per day to 196,000 barrels per day.\(^9\)

Momentum in energy independence, growth in natural gas and other alternative energy sources, and increasing environmental regulations, indicates that energy sources can only get greener. This poses a threat to future economic sustainability. However, LNG provides the opportunity to sustainably diversify Nigeria’s earning sources with accompanying shipping knowledge that can be modeled to development maritime resources for economic growth.

### 1.3 Nigeria Liquefied Natural Gas Limited (NLNG)

NLNG was incorporated as a limited liability company on May 17, 1989, to harness Nigeria’s natural gas resources and produce Liquefied Natural Gas (LNG) and Natural Gas Liquids (NGLs) for export. The company has a wholly-owned subsidiary, Bonny Gas Transport (BGT) Limited responsible for shipping services for NLNG and Nigeria LNG Ship Manning Limited providing personnel for NLNG’s vessels.

Nigeria LNG currently has six trains in operation with an overall capacity of about 22 million tonnes per annum of LNG and 4 million tonnes per annum of LPG. It requires about 3.5 billion cubic feet (bcf) per day feed gas intake at full production. Plans for building Train 7 that will lift the total production capacity to over 30mtpa LNG is subject to government’s approval as pointed out in section 1.

\(^9\)NNPC Managing Director, Andrew Yakubu, quoted on Platts, May 6, 2013
However, NLNG’s business model is largely dependent on producing and trading companies over selling to end users. This may be challenged in the near future as the new business environment for Nigeria will require a holistic approach in strategy formulation with a clear policy on LNG investment, production, regulation, marketing, and shipping.

1.4 Problem statement and research objective

In reference to the background on developments in Nigeria, the maritime sector mirrors the disconnect between value creation in the oil and gas industry and other related sectors. Developments in maritime economy is less than proportionate to the level of activity or potential in shipping; local productivity in shipping activities is limited and contribution to GDP is insignificant; services are fragmented; maritime knowledge is equally limited, while policies aimed at dealing with these challenges are either counter-productive or not implemented.

Going forward, using LNG shipping as a point of reference, this thesis research explores the application of cluster policy to drive maritime services in Nigeria. To achieve this objective, the research problem is defined as follows:

Improving the competitiveness of Nigerian LNG shipping sector: a cluster policy perspective on the economic development of Nigerian maritime resources

Stemming from this research problem are three main questions:

The first being: how can the competitiveness of Nigerian LNG shipping sector in relation to Nigerian maritime sector be determined?

Second: how can the competitiveness of the LNG shipping sector be improved?

Third: how can the competitiveness of the LNG shipping sector be leveraged to develop the maritime sector in Nigeria?

Based on these research questions, this thesis aims to provide an understanding on the role of maritime education, training and research institutions in developing the maritime sector and policy initiatives. For this, a forth question is derived:

What will be the role of maritime education in improving the competitiveness of Nigerian LNG shipping sector relative to the maritime sector?

This thesis research examines the link between shipping company management knowhow and competitiveness in LNG shipping in relation to other shipping sectors. Secondly, it considers the link between shipping and other maritime services. Thirdly, it considers the link between knowledge on maritime administration, policy development and implementation.\(^{10}\)

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\(^{10}\)Line of argument drawn from Nijdam and Van der Horst
With this research, the aim is to approach the problem from a cluster policy perspective. First, is to explore and propose recommendations on how the competitiveness of Nigerian LNG shipping can be improved. Second, on how competencies and value creation in LNG shipping sector can be leveraged to develop complementary shipping sectors and overall maritime resources in Nigeria.

This study acknowledges the works of Professor Grammenos (1992) on cluster development from a shipping perspective, based on the ‘Double levered’ triangular core of ship owners, ship managers, charterers and brokers. However, the departure in this study is based on the premise that policies aimed at stimulating shipping activities are only as effective as the sources of demand for shipping activities and the level of knowhow within the industry.

1.5 Research outline

This research paper draws from initiatives in the development of the Norwegian maritime cluster and Qatari LNG shipping sector to proffer strategic directions for the development of a maritime cluster policy that caters to the development of maritime education, services and resources in Nigeria.\(^\text{11}\)

Chapter two discusses the research design and methods of data collection. Chapter three discusses the theoretical framework to provide insight on existing literatures about clusters, maritime clusters and policy as well as understanding the maritime industry. Chapter four provides an overview of shipping in relation to LNG shipping, giving insights on shipping company competitiveness, ship management, ship finance and national flag reputation. Chapter five profiles Nigerian, Norwegian and Qatari economic environment to get an overview of the institutional frameworks and environment that these industries operate, while in chapter six the study presents a benchmark on these countries from the dimensions of oil and gas industry, maritime policy, shipping industry, and knowledge infrastructure. Chapter seven presents the analysis of results on data collected from survey and desk research to get an overview of cluster dynamics in Nigeria. In chapter eight, the research summary and conclusions are presented, and finally, chapter nine highlights recommendations based on the analysis of results and conclusions.

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\(^\text{11}\)Line of argument drawn from Gailitis, R. and Jansen, M.
2 Research design and methodology

This chapter highlights the research framework to understand the functions required to achieve the research objective, the methodologies adopted to provide clarity on research direction, and the limitations in executing the research.

2.1 Research framework

The objective of this study is to explore and propose recommendations on how the competitiveness of the Nigerian LNG shipping sector can be improved, and how competencies and value creation in LNG shipping sector can be leveraged to develop complementary shipping sectors as well as industry wide maritime resources in Nigeria. It defines competitiveness from a resource perspective to identify reasons for the discrepancies between shipping activities and local productivity.

The thesis research aims to deal with the problem statement using Rob van Tulder’s reflective cycle of research; a combination of descriptive and prescriptive analysis. The descriptive section of the study takes an exploratory perspective through the analysis of cluster approaches to understand existing literatures, the current status and applicability to the research object taking into account cluster characteristics from other locations. In the prescriptive part, the analysis of survey results and desk research were used to identify patterns, diagnose areas for improvement and make recommendations accordingly.

The research model in Figure 1 outlines the relationship between variables and possible deliverables for understanding.

![Research Model Diagram](image-url)

**Figure 1: Research model**

Source: Adapted from Tulder Van, R. 2012 and NMU thesis guidelines 2012
By clarifying the relationship between variables, the aim is to establish the relevance of variables to the research objective and the nature of relationship between variables. Economic development is identified as the dependent variable, while the independent variables to achieve economic development of maritime resources are competitiveness of LNG shipping sector, ship management, access to finance, and country flag reputation. However, intermediary variables and intervening variables, both influencing the interaction between the dependent and independent variables were identified. The intermediate variables are location attractiveness and industry competitiveness, while the intervening variables are political and cultural influences. A combination of politics, policy and location determines the relationship between the variables through the business environment, cultural influences and industrial relations. For simplicity, this study assumes a positive relationship between the dependent and independent variables.

In view of the problem statement, the theoretical framework is based on cluster theory, with a complementary resource based theory of the firm. The literature review stresses Porter’s diamond framework from a cluster perspective and draws from the cluster publications of the Dutch Maritime Network by Wijnolst et al., (2003; 2006), as well as Jacobsen et al., (2003), for insights on maritime clusters given that the works of the two bodies of knowledge on maritime clusters are central to the development of documented knowledge externalities in European Maritime Networks. Martin Stopford’s works on maritime economics (2003; 2009) and Peter Lorange’s work on shipping strategies (2007) forms the nucleus of the literatures on shipping and LNG shipping, given the authority of the two authors on shipping knowledge. Development in Nigerian maritime sector is benchmarked with the economic development of Norwegian and Qatari maritime sectors to gain insights on what has been done elsewhere, to be able to design an outcome suitable for cluster development of the LNG shipping sector in Nigeria.

The framework for this research is divided into four levels. The first level focuses on understanding the overlap between clusters and maritime clusters, the second level bothers on the overlap in characteristics between shipping in general and LNG shipping, as regards management knowhow and competitiveness. The third level identifies the frameworks for cluster development in Nigeria, Norway, and Qatar to prepare for the fourth level on prescriptive analysis for recommendations in relation to the Nigerian industry.

2.2 Research methodology

Benchmark analysis was applied to identify the general characteristics peculiar to the three industries of Nigeria, Norway, and Qatar, in order to uncover gaps as well as the unique characteristics of the Nigerian industry, so that an appropriate outcome may be designed. Choosing Norway was informed by its leading role in maritime cluster performance, impressive oil and gas vis-a-vis maritime sector contribution to the GDP, and shared characteristics with Nigeria in geographical location off major trade lanes. Qatar was chosen for its leadership in LNG production and shipping, taking into

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12 Line of argument drawn from NMU thesis summary guidelines ref. Matus Huerta, E. D., 2009
13 Idem ref. Bustos, E. and Jansen, M. 2009
account, the fact that it is an emerging industry and it is also a developing nation which fits into Nigeria’s profile maritime wise.

2.3 Data collection methods

Desk research involving books, journals, publications, annual reports, magazines, and internet websites were used to gather qualitative and quantitative data, covering a review of existing literatures and pool of available industry knowledge on the subjects of cluster theory, maritime clusters, shipping, economic and logistics performance, institutional efficiency, regulatory environment, industry characteristics, maritime policies, maritime and ICT infrastructure, and knowledge infrastructure within the benchmarked countries.

Data were also gathered via survey questionnaires and expert interviews. Web based questionnaire with closed ended multiple choice, rating and likert scales as well as open ended questions were sent out to collect data on the questions bothering on cluster development, competition, co-operation, collaboration and linkages, competence development, public policy, and location attractiveness in relation to the Nigerian maritime industry.

A total of 6 structured interviews involving three e-mail interviews and three face to face interviews were conducted to capture information and insights that may otherwise not have been obtainable via survey, bearing in mind that survey questionnaires are subjectively interpretable and limiting in the depth of response. Unstructured interviews involve informal conversations with a number of industry professionals that preferred not to grant interviews.

Primary data collected from survey questionnaires were grouped into four units of analysis comprising competitive linkages, co-operative linkages, competence development and policy consideration in relation to cluster dynamics. Relevant survey population consists of a cross section of industry actors comprising shipping, maritime administration, banks, ship owners, managers and company representatives, maritime lawyers, seafarers, shipbrokers, ship agents, maritime educators and port personnel.

A total of 190 web based e-mails were sent out, specifically targeted at individuals that are directly active in the described population. A total of 27 responses representing 14.21 per cent were received, of which only 16 respondents completed the survey and indicated the sector they are active. This comprised of shipping (1), ship building (1), ports and logistics (4), maritime consultancy (2), oil and gas (6), and regulatory authorities (2). Of these 16 respondents that indicated their business segments, there are 7 senior level managers, 7 middle level managers, and 2 lower level managers made up of 15 Nigerians and 1 non-Nigerian. The purpose for distinguishing nationality was to have clarity on views from indigenes and non indigenes to check the possibilities of knowledge convergence or otherwise.
2.4 Research limitations

Maritime clusters are fundamentally assessed on the basis of value added, employment, and investment, failing which cluster studies may prove incomplete. This study has relied on quantitative data about production and production capacity to make judgment about the probable value of shipping activities. Also, the views of 27 industry professionals may not be representative of the overall cluster characteristics, while the quantitative assessment of national performances and the stages of economic development may be subjective. An attempt to look at Nigeria in isolation given these factors will be futile, hence, the resolve to benchmarking with Norway and Qatar.

In defining maritime services, the study limits the unit of analysis to financial services to assess the extent of interaction between shipping and maritime services as well as to underscore the importance of capital in the development of shipping activities within the Nigerian environment. Second, is to create a balance in research execution given the limited time for research delivery.

Although it is common knowledge that emerging industries require some form of protective measures, high entry barrier may be counterproductive to cluster development, especially with the clamour for cabotage laws in Africa and the need to develop the maritime sectors. This study has relied on the judgments of 26 respondents and may not be sufficient to weigh the effects of high entry barrier on cluster performance.

Facts about the pool of seafarers, demand and supply in the Nigerian industry remain obscure due to the lack of organised information or data base on seafarers. Thus, this thesis research has been based on qualitative judgment of the seafaring condition in Nigeria.

Knowledge gap is one of the difficulties encountered in the course of conducting this research; industry professionals are challenged on cluster knowledge, while there is knowledge convergence towards cabotage and local content making interview responses and opinions minimalistic. In the same vein, foreign professionals are less knowledgeable about local conditions to make informed judgements.

2.5 Conclusion

Cluster policy for the economic development of maritime resources in Nigeria has been applied to execute this thesis research on the premises of a competitive shipping sector, using competenceis in ship management, ship finance, and national flag reputation as nodes for maritime resource utilisation, taking into account, cultural and political factors, while a benchmark analysis of Nigeria, Norway and Qatar, supported by a combination of desk research, survey and expert interviews has been adopted to gather data.

Existing literatures on clusters by the Dutch Maritime Network (DMN) and Menon Business Economics research, led by Niko Wijnolst and Erik Jacobsen respectively are central to the cluster review in this thesis. The works of Martin Stopford and Peter Lorange were explored in understanding shipping, without disregard to other studies and publications consulted or referenced in this research.
3 Competitiveness, clusters and cluster policy

Cluster policies have been widely applied for industry and economic development. However, attempt to explore the application of cluster policy requires an understanding of the determinants of cluster competitiveness in relation to industry specific characteristics. First, there is need to understand competitiveness and the strategic discourse on competitive advantage. Next, explore existing literatures on cluster development and determinants of competitiveness. Subsequently, examine clusters from a maritime perspective, taking into account, specific industry drivers, maritime cluster performance indicators, cluster policy, and potential maritime cluster enablers that policies may be directed for cluster development.

3.1 What is competitiveness?

Competitiveness is the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the level of prosperity that can be earned by an economy (WEF, 2013). Competitiveness can be observed as a mutually interrelated function at three levels of country, industry, and company (Jacobsen et al., 2003). Country competitiveness defines the attractiveness of a country as host for an industry; industry competitiveness refers to the attractiveness of a location in creating higher factor returns over the global industry average; while firm competitiveness implies the ability to gain market share. Within the context of this research paper, competitiveness is referred to as country and industry or firm’s ability to sustainably create value, gain market share, and attract investment.

3.2 Perspectives on competitive advantage

Discussions on competitive advantage have been classified into three schools, based on the unit of analysis (Van Den Bosch and De Man, 1997). The resource based view stresses the ability of the individual firm to combine difficult to imitate resources in a coherent way, with a focus on management competencies and capabilities. The second school is based on industrial policy with industry as the unit of analysis. The focus of the industrial school is how government can shape the industry environment to facilitate growth, profitability, and competitiveness of the firms within the industry. The third school focuses on the impact of macro-economic environment on the business community, with a focus on factors, monetary and fiscal policy. The two latter schools falls within the outside-in approach and draws from a firm’s understanding of its environment to create competitive advantage.

3.3 Outside-in versus Inside-out

The outside-in school, also known as “positioning school” is led by Michael Porter, based on the premise that business competitiveness is achieved through positioning. Positioning view of competitiveness consists in a firm achieving higher profit above industry average by adapting the firms strategy to its environment with emphasis on competition and profitability to gain market power via low cost and differentiation (Van den Bosch and De Man, 1997). The inside-out school posits that companies should develop competencies and capabilities in relation to its resources, then, bring new
products to the market by matching the company’s strengths and weaknesses with the available opportunities and threats in the market (Barney, J. 1991), taking into account, the value, rarity, imperfect imitability and the absence of strategically equivalent substitutes. Porter’s ideas on competitive advantage is far from static, cited in Van den Bosch and De Man’s ‘Perspectives on Strategy’, he noted his recognition of the importance of competencies and capabilities to achieve strategy implementation and firm innovation as: ‘defining new position, or finding new value in an existing position’. However, Porter emphasised that stress on resources must complement, rather than substitute for stress on market position.

3.4 Why location, in competitiveness?

Location as a tool in competitiveness has been widely researched. Literatures suggest that earlier research has been based on the premises of industry structure and economic geography. Recent literatures indicate that globalisation is gradually diminishing the importance of geography to competition. Increased trade liberalisation, flow of information with the development of internet, ease in communication, capital flow, technological developments, and increasing importance of transportation cost all serves as impetus to global sourcing. Porter (1998), points to the paradox of economic geography in an era of globalisation. Although, globalisation has diminished the traditional role of location in proximity to factors and cost minimisation, it only tends to mitigate disadvantages over creating advantages for the reason that anything that can be efficiently sourced is deemed to have nullified competitive advantage in advanced economies. Competitive advantage, therefore, rests on productivity through localisation (clusters) by specialising in the industries where companies in a country are more productive, and import in industries where the companies are less productive. This lends a hand to questioning the extent to which global sourcing creates advantage in developing economies. Current economic developments suggests the erosion of cost advantages in outsourcing, and arguments in most developing economies have been profound in capital flight, resulting to low productivity contribution to GDP and clamour for local content development. These support the argument that local productivity growth is the bedrock of competitive advantage, a course to which Porter is currently an advocate.

3.5 What are clusters and why clusters?

Clusters are geographical concentrations of inter-connected companies and institutions in a particular field or geographically co-located end producers, suppliers, service providers, research laboratories, educational institutions, and other institutions in a given economic field (Porter, 1998). The essence of clusters is to gain competitiveness through productivity and specialization, aided by innovation, synergy across industry businesses, related industries, and the development of new firms within a cluster.

Clusters are also defined in terms of evolution or process of development. The discourse on the process of clustering identifies clusters as material constructions or discursive constructions. Clusters as material constructions refer to clusters originating from a network of related firms through a bottom up approach. On the other hand,

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14Idem
clusters as discursive constructions refer to clusters originating from the ideas of policymakers, academics, and stakeholders of a potential cluster following a top-down approach (Floysand et al., 2012). Citing Atherton and Johnson (2008), Floysand et al. noted how clusters can develop from a potential cluster to a developed cluster:

In a potential cluster firms start to recognise that there may be scope for working together. The possibilities for firm co-operation are latent, and certain mutual recognitions are needed to get development under way. When such mutual recognitions have been triggered, the cluster can move into the phase of an emerging cluster. In this phase, firms start to collaborate and processes of inter-firm knowledge sharing and learning exist in the initial stage... If these initial collaboration projects turn out to be successful, the emerging cluster will eventually turn into an established cluster, where structure and processes of group collaboration can be formalised.

The above is closely related to Menzel and Fornahl’s (2010) concept of cluster lifecycle, also emphasised by Floysand et al. This involves four stages of emergence, growth, sentiment and decline as indicated in Appendix 1. Emerging clusters have few companies, relatively heterogeneous firms, and performance is relatively average; growing clusters experience firm increases with increasing heterogeneity of knowledge and profile; sustaining clusters have a strong competence based firm rivalry, although with declining growth; finally, declining clusters experience decreases in the number of firms and employees, and are also hampered by closed networks and negative sentiments. The movement from one stage to another is not mechanical, it follows a dynamic process and strongly influenced by the level of heterogeneity or convergence of knowledge at any given stage.

The organisation of clusters requires conscious and deliberate effort by the private and public sector, based on mutual trust and bargaining, to work towards a common objective that revolves around competitiveness and economic development regardless of the causal direction of initiative (CECMC, 2007).

Synergised clusters promote firm competitiveness via increased productivity and innovation; development of new businesses within the cluster, especially to consolidate for critical mass in an underdeveloped or developing cluster (Porter, 1998); knowledge sharing and improvement; mobility of resources and information within target industry as well as related and supporting industries; access to pooled resources such as information, knowledge, training and research facilities; and specialised factor inputs, either to achieve international competitiveness or to improve local productivity contribution to GDP growth, in both context, overall economic growth.

Clusters can be assessed on the dimensions of industry competitiveness and location attractiveness. Industry development rests on long term productivity growth. The conditions for long term productivity rest on the international competitiveness of companies and the country’s attractiveness as a host for these companies (Jacobsen et al, 2003). Where an industry is competitive but the location is unattractive as a host, existing companies will have the tendency to relocate their operations or investments, while attracting new companies will become challenging and vice versa. Location attractiveness as a necessary condition does not by itself constitute competitiveness or
guarantee productivity. Productivity refers to the internal capability of an organisation, while competitiveness refers to the relative position of an organisation against its competitors. International competitiveness can be enhanced through protectionism\textsuperscript{15} or currency devaluation\textsuperscript{16} without any increase in productivity (Cho and Moon, 2005). Close linkages among actors are important to efficiency and rate of progress (Porter, 1998). Clusters engender the cumulativeness of firm productivity through specialisation in an industry to create advantage, and the extent of value creation is consequent upon firm productivity, while mere presence does not guarantee competitiveness if firms are less productive.

Porter stressed the need to understand industry segments in order to understand the drivers of productivity. In order to ascertain the determinants of productivity there is need to understand the areas of firm or industry advantage for consolidation or areas of weakness for upgrade. The diamond framework shown in Figure 2 below seeks to achieve this with the interaction of six elements comprising four major elements of factor condition; demand condition; related and supporting industries; and firm strategy, structure and rivalry; while the two related elements are chance and government. These factors are considered as the determinants of competitive advantage.

\textbf{Figure 2: Porter’s Diamond model}

Source: Competitive advantage of nations, 1990

\textbf{Factor condition}

The productivity growth achievable at any given location depends on the quality, allocation, specialisation, sustainability, and efficient use of the available resources in that particular location. Resources include basic resources; natural resources, land, human resources, capital resources and physical infrastructure. Advanced resources; specialised workforce, knowledge institutions and infrastructure. Porter argues that

\textsuperscript{15}A case in most developing economies or industries

\textsuperscript{16}A case in China in recent times
sustainable competitiveness can only be built on advanced factor conditions, while advantage from basic factor condition can easily be eroded.

**Demand condition**

The quality of domestic demand influences competitive advantage. This is hinged on the composition of domestic demand, size and pattern of growth, willingness of firms to move from cost minimisation to differentiation, and internationalisation of domestic demand. Sophisticated domestic buyers will anticipate and enforce international standards, demonstrate product knowledge and preferences, thereby forcing firms to innovate and improve productivity.

**Firm strategy, structure and domestic rivalry**

Firm strategy, structure and rivalry emphasises the way firms form strategies, deal with clients and external environment on one hand, and intensity of competition on the other hand (Van den Bosch et. al., 2011). Firm competitiveness is influenced by differences in business environment, values, cultural dimension, organisational structure, economic structure and policy. The differences in pattern of competitiveness shape industry strategy and structure. Porter stresses that domestic rivalry encourages firms to move towards differentiation.

**Related and supporting industries**

The localisation of internationally competitive related and supporting or interconnected firms create external economies of scale which may arise from access to networks of leveraged input resources, knowledge resources and shared innovation. These create cost advantages and productivity growth that metamorphoses into international competitive advantage.

**Chance**

Chance refers to events outside the national environment with the potential to create forces that reshape industry structure, allowing a shift in competitive position. Chance may be as a result of changes in macro-economics, changing trade patterns, and foreign or domestic policy, which may be favourable or unfavourable to a firm or industry’s competitiveness.

**Government**

Government’s role is to use public policy to upgrade the quality of home demand, safety, environmental standards and the development or early adoption of new products. Porter noted that government in a bid to promote national competitiveness may end up undermining it. However, government’s involvement in developing countries is bound to be direct at an early stage of development but becomes less direct relative to stages of development.

The influence of each of the above elements depends on the development and interaction with other elements. Positive interaction of the factors are critical to the success of clusters to garner and sustain critical mass, in order to prevent cluster
convergence arising from diminishing returns or declining potential for growth in the level of economic activity (Mercedes et al., 2010).

**Cultural influence**

Van den Bosch and Van Prooijen in their 1992 article, “The Competitive Advantage of European Nations” criticised Porter for failing to explicitly define the role of culture in national competitiveness. This is especially true in developing economies, given that, culture influences the social, economic, political and technological characteristics of nations. The authors integrate Porter’s analysis of culture with Hofstede’s (1980) dimension of national culture to explain the role of national environment in the competitive position of industry and firms. They cited Krober and Klokhohn (1952) to explain culture as traditional (historically derived and selected) ideas and their attached values; either as products of actions or conditioning elements of further action. Van den Bosch and Van Prooijen further classified culture into three levels using Schein’s framework (1985); first, behaviour and artifacts as an embodiment of language, technology and art; second, beliefs and values; third, basic assumptions such as time orientation, relations between a group and the environment as well as relations among members of the group.

Taking culture into account, the level of uncertainty avoidance affects the business environment. It influences firm strategy and human resource values because the way people are disposed to managing uncertainty and the urge to manage uncertainty is attributable to national culture. Second, demand condition anticipates internationalisation, however, success in export according to Van den Bosch and Van Prooijen (1992) depends on a country’s international orientation to sell products or services abroad and the receiving country’s receptive capabilities of new products from abroad, largely dependent on the level of uncertainty avoidance, given that, such products are often accompanied by habits, ideas and other parts of foreign culture that may be new to the receiving country. Third, relations between related and supporting firms are influenced by national culture. In countries characterised as strong uncertainty avoiders, people tend to stabilise the relations they form, while in countries with less need for uncertainty avoidance relations are looser and hesitation to change is minimal.

Further, the level of masculinity or femininity of a country determines the extent that people and businesses are geared toward competition. A masculine country will be more competitive because achievement, wealth accumulation, organisational rewards, and the importance of performance and growth are entrenched in the culture. Meanwhile, a feminine country will be less competitive, service oriented, and focused on the quality of life as well as stability.

In addition, a country’s level of individualism or collectivism; power distance; and term orientation influences competition. For example, Hofstede noted that long term oriented countries are more disposed to achieving long term results, while short term oriented countries will be disposed to quick results. These factors affect people and businesses in the way competition is perceived and ought to be considered in defining clusters, given that, it affects cluster formation and interaction according to Van den Bosch and Van Prooijen.
The presence of leader firms

Porter’s position on the effects of foreign direct investment on competitive advantage was criticised for being indifferent to the role of multinational corporations in enhancing the international competitiveness of countries, and its applicability to smaller economies (Krugman and D. Cruz, 1993). In response, Porter developed the “Double diamond” to demonstrate the importance of multinationals in achieving global competitiveness and posits that the existence of internationally competitive firms by itself neither guarantees productivity nor international competitiveness. This can be explained with the concept of leader firms.

‘Leader firms are firms in a cluster that have - because of their size, market position, knowledge and entrepreneurial skills - the ability and incentive to make investments with positive externalities for other companies in the cluster (Michael Nijdam and Peter de Langen, 2003).’ Leader firm investments encourage innovation through advanced demand in relation to suppliers; enable internationalisation by acting as a channel for selling the cluster’s products in foreign markets; improve the quality of labour pool by acting as lead user; and contributes to the competitiveness of other firms within the cluster through strategic outsourcing, knowledge sharing, forming a bridge between different networks and focusing on competition on a value chain or network level over firm level according to Nijdam and De Langen.

Positive externalities are classified into network externalities and cluster externalities. Network externalities generate innovation and internationalisation benefits across cluster networks. Cluster externalities refer to investment in training and education, knowledge and information infrastructure, and information for collective action to improve cluster competitiveness. Such investments are further classified into investments in which there are sufficient internal benefits for leader firm investment and investments in which incentives are based on shared benefits. This is particularly important for the distinction between leader firms and multinationals. Leader firms are more embedded in their home country and have more local partners in their innovation and production networks. Thus, may be more disposed to investing for collective benefits.

From the foregoing, we can understand that leader firms may be or become multinationals but multinationals are not necessarily leader firms. Sufficient internal incentives have to exist for multinationals to invest for collective productivity growth and internationalisation in line with Porter’s claims. Also, the right environment for integration and partnering with local networks has to exist. The positive effects of multinationals or leader firms on cluster productivity and competitiveness will be contingent on whether they exhibit leader firm behaviour or otherwise.

Government officials/administrators as endogenous factor

Cho and Moon (2005) proposed the nine factor model as an extension of Porter’s diamond framework to enhance its application to relatively small economies, integrate the role of multinationals or FDI’s, and emphasise human factor as the main driver of competitive advantage. The model emphasised the combination of human factor with physical factors in a productive way, in line with Porter’s position that sustainable productivity and innovation through human capacity building are the underlining factors for achieving competitive advantage. Human factor is grouped into four sub-elements
to include professionals and entrepreneurs on one hand, which may not be far from Porter’s notion of specialised skills. On the other hand, politicians and bureaucrats are considered to be endogenous factors; though government may be exogenous given Porter’s claims, however, government officials work as employees within industry. This may be considered a reality in developing economies, given that government dominates the fabrics of the industry in emerging maritime sectors.

**Achieving competitiveness via optimal human factor strategies**

Cho and Moon also incorporated Porter’s corporate strategy of cost and differentiation into national competitiveness in relation to human factor. According to the authors, cost strategy involves low cost and high efficiency, while differentiation involves high cost but high value with a focus on professionals and markets. Strategies are weighted and values are attached based on the competitive variables of each strategy. Countries are classified by economic scale (size) and competitive structure. Size in accordance with population and land size, while competitiveness will be decided on how strong, intermediate or weak a country posits. In other words, countries have to adopt human factor strategies that maximises their competitiveness.

**Achieving optimal factor combination**

Factor view of clusters is strongly emphasised by Paul Krugman’s “New Economic Geography”. It attempts to define clusters by virtue of spacial equilibrium. Solving unequal spacial development at different spacial scales to achieve equilibrium (Thisse, J. F., n.d) or achieve optimisation in the location of industries by determining optimal production at a given location; exchange of goods and factors between locations; and the difference in prices and factor earnings between firms. Spacial equilibrium focuses on agglomeration economics to explain cluster development. This is based on the premises of three main drivers (De Lange P.W, 2002; Valerie, B. and Michael R.B. n.d):

- The presence of large labour pool reduces search costs and allows for specific training and education programmes to upgrade the quality of labour pool.
- The presence of suppliers and proximity to customers offer cost advantages to reduce transaction cost and create informal face to face relations.
- Knowledge spillover facilitated by close interactions between local firms

Krugman according to Valerie, B. et al. concludes that these three factors drive industrial clusters and the injection of policy and innovation facilitates cluster development.

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17 Line of argument drawn from Weinschenk et al. n.d
3.6 Resource based view of clusters

This section examines location attractiveness and industry competitiveness based on the existence of the relevant resources in terms of competencies and capabilities to ensure firm competitive advantage. This is subject to the characteristics, importance and intensity of usage, mobility, and imitability of the resources. It is based on the view that a firm employs multiples of resources in value creation and firm resources are heterogeneous. A firm will seek to locate where these resources can be competitively accessed or considering the economics of globalisation seek to outsource. According to Jakobsen et al., 2003:

‘If the geographic distribution of a resource is uneven and the geographic mobility is limited, then, company’s capability to execute their activities in an effective way will be contingent on the location of the activity.’

Availability of competent human resources and organisation of a firm’s resources determines its value creation activities. Some of these resources are either too expensive and non-imitable or immobile. The concentration of such resources in a firm’s activities creates competitive advantage and vice versa. The view on mobility can be mitigated with network companies. However, the more the mobility or imitability of a resource the less important it becomes for location decisions.

3.7 Resource upgrading

Going forward, four basic resource upgrading mechanisms peculiar to clusters from different perspectives can be deduced in line with Jakobsen et al., 2003:

- The importance of knowledge and innovation to drive cluster productivity
- The effect of agglomeration economics in knowledge spillover or diffusion
- The synergies or integration of goods and services to enhance the economic growth of the cluster (complementarities)
- The development of infrastructure; transport, communication, and information to aid the flow of goods, services, information exchange, and reduce transaction cost within clusters.

These will have at the nucleus of execution a well-defined common objective backed by a cluster policy that cuts across all facets of a given industry to create a dynamic cluster.

3.8 Knowledge based cluster dynamics

Central to location attractiveness and industry competitiveness as identified in the previous section is knowledge and innovation. Creating a sustainable globally competitive cluster requires the creation of a knowledge based and environmentally robust industry (Sasson and Blomgren, 2011). Knowledge based industrial development is argued to occur in global knowledge hubs characterised by high concentration of industrial actors interacting with advanced research institutions, venture capital firms and competent owners to foster cluster attractiveness, education attractiveness, R&D and innovation attractiveness, talent attractiveness, ownership attractiveness, and environmental attractiveness with a collective effort from firms, local authorities, and governments to create conditions under which industrial based
development can thrive. Economic performance of clusters will be determined by the level of interaction and relationship structures within these dimensions.

3.9 Maritime clusters

Maritime cluster refers to the agglomeration of inter-connected companies and institutions in maritime industry and services comprising shipbuilding, equipment manufacturing and supplies, offshore, shipping, ports and terminals, banking, admiralty, insurance, ship management, ship broking, consultancy, education and specialised training, research and development, public institutions, and regulatory authorities.

Maritime cluster initiatives, most notable in Europe and Asia reveals conscious policy backed co-operation between the private and public sector, formed with a view of a common strategy and partnership to achieve a common objective of economic growth and international competitiveness through the effective utilisation of resources.

The Norwegian maritime cluster renowned for its relative completeness illustrates in Figure 3 below, the possible activities within a maritime cluster. The core activity upon which the cluster was built is shipping, complemented by offshore exploration and oil production, maritime equipment supplies, maritime services, and fisheries. While other sectors are dependent on these core activities, it is interesting to note that maritime education, classification and maritime authority activities directly feed into these core activities, consequently, the entire cluster.

Figure 3: Norwegian maritime cluster

Source: Lorange, P., 2007, p17

The most notable maritime clusters today are Singapore, Oslo, Rotterdam, Shanghai, New York, London, Hong Kong, Tokyo, Hamburg, and Piraeus. These clusters indicate a balance in industry competitiveness and location attractiveness. Traditionally, maritime cluster competitiveness is a function of geographical location, proximity to suppliers,
and competitiveness of maritime services. However, the business environment is crucial to creating a platform on which clusters can thrive.

Location in maritime business serves as a distinct natural resource from location rising from proximity to suppliers. Geographical advantage rises from deep drafts in ports, inland access to markets and proximity to major trade lanes. The former limits or creates advantage in the size of ships that can be accommodated, in turn, the scale of operations in maritime services capable of creating critical mass in an era of scale economics in shipping. The latter creates advantage in serving as a connection to other ports, markets and trade routes. Singapore and Rotterdam are examples of clusters that have benefited from the optimal use of their locations in this context.

Proximity to suppliers and markets enables cluster development. The three major economic centres of Asia, Europe, and North America dominates maritime trade by controlling world manufacturing, technological developments, global investment, and trade in raw materials, in turn, seaborne trade. This explains the concentration of major maritime clusters along the west line trade lane across the Atlantic, Indian Ocean, and the Pacific as explained by Stopford. The concentration of industries in a region or location creates the supplies and markets responsible for generating the traffic in maritime trade that creates clusters.

Although maritime finance is implicit in maritime services, the sophistication of maritime finance defines the sophistication of the maritime cluster owing to the intensity of capital required in maritime transport. Shipping companies want to locate where such finance is relatively easily assessable. Singapore, Oslo, Shanghai, and London are clusters benefiting from such financial market sophistication.

Maritime transport is a business of margin where every penny counts. According to Stopford (2009), corporations and traders will continuously search the regions of the world for cheaper supplies and new markets. Companies in an effort to locate proxy to suppliers and markets seek minimal service cost and maximum value to aid their competitiveness. Economic returns to ship owners and corporations are affected by the availability of competent human resources and ship management companies relative to cost. This underscores the importance of investment in maritime training and human resource development as well as infrastructure to minimise transaction cost for cluster competitiveness.

Maritime clusters may be essential for African countries to cater to effective resource utilisation, eliminate inefficiencies, generate employment, and possibly, contribute in transition to knowledge based economies. Given the above factors and the gap of a less sophisticated maritime history, the challenge of creating internationally competitive clusters in Africa, with the exception of the peripheral North African countries and South Africa being proxy to major trade lanes, consist in geographical distance from major trade lanes; shallow draft; low technological and maritime knowhow; low industrialisation and investment attractiveness necessary for garnering critical mass;

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19 According to the provisions of the African Maritime Charter (AMC) and the objectives of the African Network of Maritime Clusters (ANMC)
non-existent maritime financial services and knowhow; high transaction costs rising from inadequate infrastructure; and political instability.

The opportunity for Africa lies in the abundance of less skilled labour force and natural resources that can be upgraded to create centers of excellence, with a focus on exports and cost competitiveness rising from relatively lower labour cost on one hand, and increasing shipping activities rising from imports to feed the growing population and economic activities on the other hand. The extent that these two scenarios can be transformed into economic growth through maritime clustering will be contingent on the scale of shipping activities, location attractiveness and industry competitiveness with an endearing government commitment.

Maritime clusters compete to attract leading shipping companies, services and activities as well as specialised human resources and talents. Cluster performance may be benchmarked on a number of indicators built around sectorial activities or functions at the discretion of the researchers. An example, the Menon business economics’ analysis of shipping capitals (clusters) published in November, 2012, ranked Singapore, Oslo, London, Hamburg, and Hong Kong as the top five maritime cities based on the number of listed shipping companies and market capitalisation; the size of maritime finance in terms of ship finance portfolio and value of shipping companies listed on the stock exchange; competence level and number of listed companies in maritime law and insurance; maritime technology and competence on the premise of the size of ports and port operators; and the concentration of classification activities. These parameters can be primarily defined within the nine performance indicators identified by Wijnolst et. al., (2003), as crucial for eliminating inefficiencies and stimulate cluster development, consequently, improve cluster competitiveness.

3.9.1 Maritime cluster performance indicators

Generally, cluster performance is measured by value added; increase in value added signifies improved performance and vice versa. However, it may be misleading for cluster performance to be absolutely guided by numbers as we shall see in succeeding paragraphs. Nevertheless, De Langen P.W. (2002) identifies two growth mechanisms for value added in clusters; incumbent growth and population growth. Incumbent growth refers to the growth of firms in the population (cluster), while population growth refers to net entry surplus; more start-ups and new entrants than bankruptcies and exits.

De Langen further classified the factors influencing cluster performance into cluster structure and cluster governance. Performance based on cluster structure engenders agglomeration economies, internal competition, entry and exit barriers, and heterogeneity of the cluster population. The stronger the agglomeration effect, the better the cluster performance; internal competition improves specialisation and services to specific markets; entry barriers have a detrimental effect on cluster performance, whereas economic exit barriers add to cluster performance by tying firms to the cluster; and heterogeneity of firms reduces transaction cost, improves the heterogeneity of knowledge and information spillovers.
Cluster governance refers to a mix of relations and mechanisms to co-ordinate the interaction between different actors within a cluster. Performance based on cluster governance revolves around trust; the presence of intermediaries and leader firm behaviour; and the quality of solutions to collective action problems. The presence of trust reduces transaction costs; the presence of intermediaries reduces transaction cost; the presence of leader firm behaviour improves cluster performance; and the quality of collective action problems influences cluster performance.

Wijnolst et al., 2003 identifies nine performance indicators to proffer a direction on how policy may be guided towards key drivers and upgrading mechanisms for cluster development. The performance indicators are illustrated in Table 1.

<table>
<thead>
<tr>
<th>Maritime cluster performance indicators</th>
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<tbody>
<tr>
<td>1. Structural indicators</td>
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<td>2. Economic indicators</td>
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<tr>
<td>3. Internationalisation</td>
</tr>
<tr>
<td>4. Critical mass</td>
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<tr>
<td>5. Level playing field</td>
</tr>
<tr>
<td>6. Innovation</td>
</tr>
<tr>
<td>7. International frameworks and business networks</td>
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<tr>
<td>8. Labour market and education</td>
</tr>
<tr>
<td>9. Image and communication</td>
</tr>
</tbody>
</table>

Table 1: Maritime cluster performance indicators
Source: Wijnolst et al., 2003

Maritime clusters are classified into demand pull and supply push sectors. The broader the number of sectors and the concentration of demand pull sectors as shipping, offshore, and fishing over the supply pull sectors of shipbuilding, marine equipment and maritime services, the greater the cluster potential for synergy vis a vis productivity growth and vice versa. Geographical concentration or dispersion may also influence the level of cluster interaction. Concentration of cluster actors within a sizable geographical reach will encourage synergy, while geographically dispersed clusters may be relatively less synergised.

The concentration or development of demand pull sectors creates a multiplier effect through demand and supply interaction with the supply pull sectors to create added value, productivity growth, employment generation, and attract investment. The higher the level of goods and services exchange within the cluster, the greater the potential contribution to GDP growth.

\[20\] Idem

\[21\] Collective action problem refers to disincentives arising from firms’ refusal to contribute to collective solutions in the interest of the cluster due to perceived insufficient internal benefits.
Internationalisation is based on the premise that maritime clusters are able to export at the most efficient cost with high value, attract foreign direct investment for sustainable growth, and stimulate entrepreneurship to establish global presence through cooperation. The higher the level of internationalisation, the greater the cluster’s potential.

Critical mass is a point at which the scale of maritime operations is large enough to propel competitive advantage. Examples are defined by increasing returns to scale; either in economy of scope involving decreases in average total cost as a result of increases in product mix; economy of scale involving a reduction in cost per unit resulting from increased production, achieved through operational efficiency; and economy of time achievable from being first to market, possibly through efficiency, technological knowhow and information. Critical mass may be realised through the inflow of investment, integration, mergers or takeovers, and diversification of operations. Consolidation drives the emergence of leader firms and the presence of leader firms facilitates innovation, investment, internationalisation and upgrade to sustain growth.

Global maritime sector is characterised by market distortions via government regulations, protectionism and inducements – not least in hidden government subsidies and interventions. For example, United States’ Jones Act. Countries or governments that are able to create a level playing field for their maritime clusters are better placed for sustainable cluster development.

A strong R&D and marine equipment sector is presumed to be indicative of maritime cluster innovativeness. However, Wijnolst et al posits that innovation can be product oriented; concerning product or service development, for example in marine equipment and supplies for competitiveness. Process oriented; concerning the way products are produced or services are rendered to the market in order to gain advantage. The level of innovation is indicative of cluster performance and evolution to prevent convergence.

The composition of the business networks in terms of numbers, size, and quality of companies vis-à-vis the quality of institutional networks and the level of interaction within the overall network as well as interaction with policymakers and politicians - not least their commitment to cluster development is a requisite for sustainability.

A pool of well-educated workforce and a broad maritime expertise attracts companies, which in turn, creates variety of opportunities for a maritime carrier and attracts talents. This will usually be accompanied by quality educational infrastructure to feed the labour pool required for cluster growth. The sophistication of the available workforce and educational infrastructure is an indication of cluster performance.
3.9.2 Cluster policy

Cluster policy is a combination of instruments cutting across different sub-sectors of an industry and complementary industries designed by the relevant authorities to stimulate cluster competitiveness, co-operation, and internationalisation for a sustainable economic development (Wijnolst et al., 2006). Policy consideration encompasses industrial production and relations, SME, regional relation, education, research and innovation, finance, and fiscal considerations as well as incentives to facilitate local, national, and regional development. Cluster initiatives may be directed towards creating incentives to specialise in certain capabilities and to build centers of excellence. Otherwise, incentives could be aimed at supporting existing clusters to achieve critical mass rather than creating new clusters.

In a bid to design policies aimed at stimulating clustering, policy makers may be tempted to apply policies that have been applied in other regions or industries with less regard for differences in industry structure, cooperation, interdependencies, social and political factors, thereby resulting to policy failures. Thus, cluster policies have to be tailor-made to the demands of a particular region or country. Wijnolst et al. cited Isaksen, 2001 on the differences in industry situations and writes:

In peripheral regions there is often no innovation system, due to lack of relevant local actors. There will not be a dynamic promoting cluster development and collective learning will be low. In such a situation, possible policy instruments are to link firms to relevant knowledge outside the region and attract companies and skilled labours to the area. In other regions there might be relevant companies, but they operate independently. In such a situation policy instruments are to invite the firms to develop regional strategy and create nodes for regional co-operation. It may also be relevant to create a collective vision on the future. An example is the Leadership 2015 agenda of the leader firms within CESA (European Shipbuilders), which is a powerful tool to create focus and enthusiasm and to obtain resources. In a situation where there is a regional innovation system, but where the system is closed to the outside and the technology is specialised and outdated, it will be necessary to mobilise the community toward re-orientation and to open up the networks to the outside.

\[22^{Idem}\]
\[23^{See ~15}\]
These examples are analogous to scenarios in developing, developed economies and converging clusters. Table 2 outlines the scenarios and possible policy tools.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Possible policy tools</th>
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<tbody>
<tr>
<td>Lack of relevant or sufficient local actors</td>
<td>Links to external resources and acquisition</td>
</tr>
<tr>
<td>Lack of regional co-operation and mutual trust</td>
<td>Develop regional club goods and stimulate collaborative efforts</td>
</tr>
<tr>
<td></td>
<td>Create a collective vision of the future</td>
</tr>
<tr>
<td>Regional industry specialised in outdated technology</td>
<td>Open up networks towards external actors + local mobilisation</td>
</tr>
</tbody>
</table>

Table 2: Policy dimension on cluster scenarios
Source: Wijnolst et al., 2003, p97

3.9.3 Cluster enablers and policy dimensions

Maritime cluster performance indicators have to be translated into concrete enablers that can be used as policy instruments by stakeholders to improve the collective performance of the cluster (Wijnolst et. al, 2003). The researchers proposed seven cluster enablers that are deemed crucial for maritime cluster upgrading and policy initiative as illustrated in Table 3.

<table>
<thead>
<tr>
<th>Maritime Cluster enablers</th>
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<tbody>
<tr>
<td>1. Defining cluster, establishing significance, and promoting visibility</td>
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<tr>
<td>2. Defining an industrial policy</td>
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<tr>
<td>3. Strengthen demand pull sectors</td>
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<tr>
<td>4. Monitor and maintain a level playing field</td>
</tr>
<tr>
<td>5. Promote export and internationalisation</td>
</tr>
<tr>
<td>6. Strengthen innovation, R&amp;D and leader firms</td>
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<tr>
<td>7. Education and labour market</td>
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</tbody>
</table>

Table 3: Maritime cluster enablers
Source: Wijnolst et al., 2003, p181

Maritime clusters have to be defined in terms of structure and value added. Factors bothering on the number of active sub-sectors, importance of these sub-sectors, the nature of relationship and contribution to the cluster differs accordingly. Cultural influence on competition, co-operation, business behaviour, and the potential value creation by the industry to the economy has to be defined, communicated and visibly promoted to stir the mindset of all the cluster actors, stakeholders and government towards the promotion of a favourable cluster policy.

Upon identifying maritime cluster as an important building block of the economy and promoting visibility, industrial policy has to take a long term adaptive view towards changing industry dynamics and competitive tendencies, taking into account, the need
to maintain a level playing field. Government’s policy dimension needs to focus on long term industrial development, based on which long term policies can be devised for the cluster of sectors, industries, and companies, failing which entrepreneurs are left in isolation and less effective in the absence of a clear vision.

The demand pull sectors as shipping and offshore can order equipment and use servicers domestically or outside, while supply push sectors as ship building and other maritime services are more exposed and vulnerable to foreign competition. Also, shipping creates agglomeration effects in knowledge and labour market development (Nijdam and Michael, R.B. n.d). Demand pull sectors, therefore, constitute the strength of maritime clusters and drives the supply sectors where synergy exists. Cluster policies are then aptly built around the demand pull sector as an enabler of economic growth. However, specific policies targeting the demand pull sectors are less effective without regard for a wider cluster policy.

A level playing field is a prerequisite for cluster development. The maritime industry is faced with unequal level playing field in international shipping due to various national, regional and global regulations. For example, added regulatory measures in Europe creates a disadvantage for cost competitiveness, forcing ship owners to flag-out vessels to flags of convenience, in order to take advantage of cost minimisation in tax incentives, crew choice as well as fiscal and corporate protection.

Although African countries are not immune to these regulatory measures, knowledge and competence gap, lack of capital, and lack of critical mass constitutes a disadvantage that creates distortions in industry competitiveness. There is need for a level playing field to aid their international competitiveness. Government has a role in monitoring competition in co-operation with trade organisations and other stakeholders. Appropriate government intervention will maintain a balance between protectionism, FDI attractiveness, and local productivity.

The size of the domestic maritime industry is essential for cluster development. Countries with a relatively small maritime home market have to grow through specialisation and exports. Examples are found in the Norwegian and Dutch maritime clusters. Cluster policy has to create an enabling environment to continuously grow existing companies’ exports and attract new entrants for development.

According to Wijnolst et al (2006), companies can only maintain their export position in the long-term through constant upgrading of their products, services, and production processes. This is based on the premise of strengthening research and development, infrastructure, and developing policies that stimulate entrepreneurs to innovate, exchange information, and take calculated risks together. The presence of leader firms is important cluster upgrading processes.

Cluster policy is targeted at maintaining quality maritime educational infrastructure as an important enabler. Maintaining a pool of competent maritime labour force as well as attracting talents via two-way communication between the sectors and the general

24 Idem
public, to keep the required skills inflow for cluster development and to create opportunities that will engage the pool is essential for cluster sustainability.

Co-ordinating authorities have a responsibility to foster cluster development by identifying market failures; fostering co-operation and synergy within the cluster; initiating R&D; ensuring the provision of quality maritime education and management training; cluster branding and reputation; providing an enabling platform for networking, infrastructure and communication; financial support to aid cluster productivity growth; and co-ordinating public-private dialogue for sustainable growth.

At the end, cluster policies are based on the premises of appropriate and adequate knowledge of the industries, the business environment, the international market and best practices, leveraged on a vision of the future to drive public and private dialogue towards continuous upgrading. In the absence of the requisite knowledge by policymakers, policies are apt to become inefficient or counter-productive.

3.10 Conclusion

Cluster policy is a combination of instruments cutting across different sub-sectors of an industry and complementary industries designed by the relevant authorities to stimulate cluster competitiveness, co-operation, and internationalisation for sustainable economic development. Policy consideration encompasses industrial production and relations, SME, regional relation, education, research and innovation, finance, as well as fiscal considerations and incentives to facilitate local, national, and regional developments.

In a maritime cluster, new creation, sustainance, and spill-over of knowledge is the basis for cluster competitiveness. Consequent upon knowledge and innovation is the development of a competitively co-operative demand pull sector, quality labour pool rising from attractive maritime education and cluster’s ability to sustainably attract talents. Also, an effective policy initiative involving public-private dialogue, put differently- lobbying, on the premise of knowledge and competence, failing which policies are apt to be counter-productive.

Clusters are fundamentally measured by value added, based on the growth of firms within the cluster and entry surplus. Performance may be influenced by structural and governance factors. Structural factors include agglomeration economics, internal competition, entry and exit barriers, and heterogeneity of firms within the cluster, while governance factors comprise trust, the presence of intermediaries and leader firm behaviour, and the quality of solutions to collective action problems.

Policy considerations will vary according to the demands of a particular location; industry structure; the level of knowledge within the cluster and a collective vision of the future; taking into account, social, economic, political and technological factors. However, specific polices targeting the demand pull sectors are less effective without regard for a wider cluster policy.
4 Shipping industry dynamics

This chapter explores the possibilities for strengthening the demand pull sector of shipping as an aid to cluster development. First, it presents an overview of shipping for understanding shipping industry dynamics and the main driving forces. Second, it explores strategic dimensions for shipping company competitiveness. Third, examines the effect of ship management, ship finance, and national flag reputation on shipping company competitiveness and cluster development.

4.1 Shipping at a glance

Shipping is the nucleus of a maritime cluster. It interacts with other sectors to open the economy to trade and attracts industries in tandem with the size of the market and the degree of specialisation in a location (Stopford, 2003).

Historically, shipping is characterised by competitiveness, with entrepreneurialism; innovation in shipbuilding; port infrastructure and cargo handling equipment; industrial production; population growth; world trade growth and pattern; developments in oil prices or crisis; political conflicts; random shock events such as the 2008 financial crisis; globalisation and currently climate change, all acting as drivers and change agents.

The cyclical nature of shipping, increasing volatility and capital intensity arising from technological changes over the years facilitated the evolution of new shipping corporations borne out of a series of mergers and acquisitions, conferences, pools, alliances and joint ventures to gain competitive advantage in a bullish shipping market and to cope with financial and competitive pressures during a downturn.

Shipping sectors are either commodity-based or niche-based. Commodity based sectors include tankers, bulk carriers, and containerships while niche based sectors may include reefers, vehicle carriers, offshore vessels, cruise ships, livestock carriers, chemical carriers, LPG carriers and LNG carriers.

The LNG sector is characterised by few firms producing the bulk of the output. The capital and technological requirements of the industry creates entry barriers to preserve profitability. Although developments suggests a shift in future markets, products are still less commoditised, pricing is fragmented and projects for entry takes relatively long time if they eventually come online. LNG shipping as an arm of the supply chain mirrors the larger industry characteristics because majority of the ships are project-tied and owned by exporting countries and the major importing countries.

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25 Sectors with active spot freight market and open Sale and Purchase market
26 Less commoditised or specialised sectors
27 LNG pricing is governed by different price regimes for each trade
4.2 Shipping demand

Shipping services is a derived demand driven by seaborne trade that depends on the world economy. The relationship between seaborne trade and world economy is influenced by the business and trade cycle with the potential to alter the demand for sea transport. Business cycles are generated by fluctuations in the rate of economic growth. These changes filter through seaborne trade, creating patterns in the demand for ships to lay the foundation for freight cycles. Trade cycles are generated first, by changes in the economic structures of countries generating seaborne trade and second, by their rate or desire to be self-sufficient in raw material demand or superiority in the quality of foreign supplies, and the availability of cheap sea transport, thereby influencing the demand for shipping (Stopford, 2009).

World trade volume, estimated at about 80 per cent seaborne and 70 per cent by value grew 5.9 per cent in 2011; a decline from 2010 growth of 13.9 per cent due to weakened economy and supply chain disruptions, while seaborne trade recorded 4 per cent growth propelled by 8.6 per cent and 5.4 per cent growth in container and dry bulk trades respectively (UNCTAD, 2012). Trade has grown considerably above the world GDP from 2002 to 2007. In 2008, trade growth declined below GDP growth rate by about 10 per cent, signifying the impact of the global financial crises and the beginning of a recession that has re-shaped the maritime industry till date, perhaps, till the immediate future. World GDP and trade are expected to grow by 3.6 per cent and 4.5 per cent respectively in 2013. Trade is estimated to grow steadily above the world GDP over a period of time (Bimco, January 2013). However, the positive influence or otherwise of this growth on shipping will be contingent on tonnage supply.

The LNG trade and shipping, although not immune to these market developments, especially in terms of project and ship finance, is an exception. LNG trades and shipping has been growing as indicated in section 1.1, in the face of the global economic and shipping downturn. This is as a result of three factors, first, the niche and oligopolistic structure of LNG shipping characterised by close ties to the customer’s value chain and limited number of actors providing specialised services (Lorange, 2007). Second, increasing demand for cleaner energy. Third, growing demand for energy in the Asian region.

The demand for raw materials as well as shipping in Asia, led by China and India can be explained by changes in global economic structures evidenced by the scale of industrial production and import and export flow. In 2011, Asia accounts for 39 per cent of imports and 56 per cent of exports, while developed countries account for 41 per cent of imports and 34 percent of exports. Transition economies’ share of imports and exports are 6.2 per cent and 2 per cent respectively (UNCTAD, 2012).

Sea transport demand is measured in ton-mile, defined as the tonnage of cargo shipped multiplied by the average distance over which it is transported according to Stopford. A point of reference for Stopford’s analogy is the 1956 closure of the Suez Canal, where a vessel sailing the Arabian Gulf to Europe will travel at a distance of 11000 miles instead of 6000 miles. This has implications for cost, revenue, ship employment, and possibly, application of scale economics to gain advantage.
Changing trade patterns and shock events have the effect of altering the average haul as well as shipping demand. Increasing North-South trades, especially with industrial concentration and demand for raw materials within the intra-Asian region, signifies short-haul but fast turn-around. The effect on ship demand is a redistribution of tonnage to smaller and more flexible ships, leaving the bigger ships with tonnage oversupply and depressed market.

This is the case in the tanker market at the time of writing. Tanker market has been depressed for the combined reasons of weak demand; oversupply of tonnage; rising energy cost due to high exploration costs attributable to deep ocean exploration; diversification of energy mix by industrialised countries for environmental and cost implications; the relatively short-haul characteristics of the West Africa-Europe trades and Middle East-Asia trades; and most importantly, United States energy independence. On the contrary, LNG carriers benefit from the Fukushima nuclear crisis, not only in trade demands but also the distance covered in tonne-mile, specifically, West African tonnage supply. This may be good news for LNG shipping. However, it will have cost implication on the overall LNG chain, depending on the nature of operation. From a ship owner’s perspective, it is ideal to think that this is an advantage and the extent of advantage or otherwise will be contingent on whether it is spot LNG shipping or contract.

Demand for shipping in African is driven by the exports and imports of raw materials, most significant for Nigeria, oil and gas exports as well as importation of consumer goods. The nature of demand for shipping is represented by the structure of imports and exports. An increase or decrease in exports and import activities in these areas will have a direct effect on shipping activities.

The decline in the imports of Nigeria’s energy products in the Atlantic basin is reported to have been substituted by import demands from China and India. Diplomatic ties have been intensified by President Goodluck’s visit to China, on July 10, 2013, to secure new markets for Nigeria’s energy exports. The implication for shipping is an opportunity for increased tonnage supply, given the long haul characteristics of the West Africa-Asia route. On the other hand, the potential for future import demands indicates a positive outlook for shipping, given that United Nations’ 2012 review of population prospects ranks Nigeria as third behind China and India with a projected 974m at 2100. This will be a major driver for shipping activities as the future unfolds.

4.3 Shipping supply

Shipping is a suppliers market. To put into perspective, the following extract from Stopford (2007) provides a picture:

*The supply of ships is controlled, or influenced, by four groups of decision-makers; shipowners, shippers/charterers, the bankers who finance shipping, and the various regulatory authorities who make rules for safety. Shipowners are the primary decision-makers, ordering new ships scrapping old ones and deciding when to lay-up tonnage. Shippers may become shipowners themselves or influencing shipowners by issuing time charters. Bank lending influences investment and it is often banks that exert the financial pressure that leads to scrapping in a weak market. Regulators affect supply through safety or environmental legislation which affects the transport capacity of the fleet. For example, the update to international Maritime Organisation (IMO) Regulation*
13G introduced in December 2003 requires single hull tankers to be phased out by 2010, leaving shipowners with no choice over the life extension of their ships.

However, the new environment in ship supply might include shipbuilding as a much more influencing factor. Excess capacity and competition in ship building evidenced by China's ambition to overtake Korea's differentiated industry with a cost strategy exerts pressure on the supply side to take ordering cost advantage especially in the dry bulk and tanker market. Ship production has also been a strategic tool for raw material importing countries as China, to influence transportation cost in bulk trades distorting the custom demand –supply dynamics. This underscores the important role of ship production by industrialised countries in supply analysis.

Traditionally, the ship-building industry adjusts to changes in demand from the shipping market. However, the time-lag between ordering and delivery owing to the longer cycle in ship-building, creates on one hand, an advantage during market boom to push freight rates, sale and purchase market, and fleet productivity upward while depressing the demolition market due to shortage in tonnage supply. On the other hand, the time-lag becomes a disadvantage during a downturn, depressing the freight market, sale and purchase market, and fleet productivity while increasing demolition activities due to surplus tonnage generated by backlog in delivery. This interplay of differences in cycle is influenced by the ship type, market segment, and order book. An average tanker may take two years from ordering to delivery, while an LNG ship may take between two to four years depending on the order book owing to the specialisation required. The shorter the time-lag the better decisions can be adjusted to market trends given the volatility in shipping.

The ship-building industry is important for employing the labour force in a country. Government intervenes in stimulating the industry for production to keep a balance in the economy and to prevent job loss. This has a multiplying effect on ship supply. Technological development and out-sourcing in ship-building has increased the potential for supply to catch up fast with demand which may lead to shorter cycles, and increased production ultimately influencing supply.

For simplicity, balance between new deliveries and demolition determines fleet growth. Discrepancies occur between ordering and delivery due to cancellation and speculative ordering, while discrepancies in unemployed ships and scrapping are accounted for in lay-ups. Differences in shipping segments in terms of demand, trends, and viability of ship sizes resulting from changes in trade patterns and flexibility creates fault in generalization when looking at shipping markets. Increase in overall fleet could draw contractions in other segments, especially niche segments or in ship sizes within the same segment necessitating the movement of surplus tonnage and capital investment between segments. Stopford referred to this as lateral mobility.

World fleet reached over 1.5billion tonnes dead weight in January 2012 amounting to 37 per cent increase through 2008 to 2011. The order book was 21 per cent of existing fleet, down from 44 per cent in 2008 due to the economic and financial crisis. Annual total tonnage growth in 2011 was 10 per cent with the highest growth recorded in the bulk carrier segment at 17 per cent bringing its share of world’s total capacity to 40.6 per cent. Oil tankers recorded 6.9 per cent growth in tonnage with total world capacity share of 33.1 per cent; Container-ships tonnage increased by 7.7 per cent representing 12.9 per cent of world tonnage. The rest of the world fleet grew by 150 per cent, while

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general cargo tonnage declined by 2.4 per cent with a total fleet capacity of 6.9 per cent. Average age of world fleet in 2011/12 was 21.9 per cent, a decline of 0.58 per cent from 2010/11 figure of 22.49 (UNTAD, 2012). This indicates an oversupply of tonnage in the absence of a parallel growth in demand for shipping and the growth in each sector may signify the extent of depression in that sector relative to demand.

LNG fleet has grown from 70 ships in 1990 to 365 ships in 2012 (BG Group, Jan 2013) and 367 in March 2014. Fleet utilisation was reported to be above 90 per cent, given about 340 monthly loading of LNG cargos according to LNG Journal. LNG fleets are relatively young with majority in the range of 5 to 10 years (See Appendix 2) and ship recycling in this segment is to a large extent insignificant. Order deliveries in 2013 and 2014 are expected to be high while fleet productivity might decline owing to LNG liquefaction project delays.

The productivity of ships is measured by speed, port time, deadweight utilisation and loaded days at sea (Stopford, 2009). Speed determines the time a vessel takes in a voyage. Age and hull maintainance influence vessel speed. Fuel consumption due to increase or decrease in speed and availability of surplus tonnage or otherwise serves as decision elements. Added vessel tonnage can influence fleet capacity by increasing or decreasing capacity while slow steaming allows for fuel cost saving and more vessel employment and vice versa. Given a fixed demand, increase in fleet capacity will reduce fleet productivity and reduction in fleet capacity will increase fleet productivity.

A ship is meant to sail loaded. Unproductive and ballast days at sea rising from inability of vessels to secure back haul cargoes increases tonnage supply while productive days expended in ports reduces supply. On one hand, port draft serves as a limitation in deadweight utilisation thereby increasing supply relative to vessel flexibility, bunkers, stores, and water salinity. On the other hand, a congested port becomes less competitive with losses to ships in sailing days and costs. This necessitates investment in the efficiency of handling equipment and administrative processes for time and cost savings. Increase in port efficiency increases the supply of available ships for trading while port inefficiency reduces the supply of ships.

Oversupply of tonnage depresses the freight market, with ship recycling as a mechanism for mopping up excess capacity. However, this is dependent on vessel age, technical obsolescence, scrap prices, current earning and market expectations. Repairs and maintenance, manning, and fuel costs increases with vessel age\(^{28}\), making older vessels uncompetitive and likely for recycling depending on market expectations, whether positive or negative. Technical obsolescence may render a vessel inefficient. European emission regulations and rising bunker cost are instances necessitating emission and fuel efficient ships. These developments will consequently lead to recycling of ships younger than otherwise will have been recycled for reasons of compliance and cost competitiveness in line with excerpts from Stopford above. Developments in steel demand and price influences ship recycling prices. Ship recycling prices influences the decision to recycle. Beyond mopping excess capacity ship recycling can be used as a strategic tool for decisions. For instance exiting an

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\(^{28}\)Average economic life of ships is estimated at 25 years.
unprofitable segment based on expectations to move to a profitable segment or redirecting investment within the same segment for flexibility to cope with volatility.

Interplay of the forces in the industry rests on the balance of demand and supply as well as expectations on the other hand. This relationship is summarised in Figure 4.

Figure 4: Shipping demand-supply model
Source: Stopford, 2009, p716

The upper part of the model depicts the relationship between world economy, sea borne trade and ship demand discussed in section 3.7.2, while the lower part captures the complexity of the supply side in the relationship between ship investment, order, scrapping, and merchant fleet. The balance between demand and supply is supported by the parallel relationship between freight prices and ship prices, both influencing investor decisions.

Although freight rate determines ship supply, there is reversal causality between freight rate and supply of ships, tonnage supply determines the freight rate commanded ab initio. Safe for shock events as the 2009 financial crisis or economic downturn, long term charter relatively immune to daily market fluctuations, and political interventions as protectionism or cabotage, the freight market regulates ship supply. In the short run, supply responds on prices with decision makers adjusting their capacity, operational speed, move to and from layup, and improve their services while in the long run, freight rates contribute to the investment decisions resulting in scrapping and ordering of ships.
Local tonnage supply in Nigerian shipping industry is insignificant compared to the scale of activities. This is due to the low level of knowhow and lack of capital while the perception of shipping is rather opportunistic. To address this challenge a cabotage regime was introduced in 2003 and came into force on May, 2004 to enhance local ownership. However, the implementation of this regime has proven ineffective in attracting foreign direct investment due to the seventy percent local ownership requirement and the lack of proven efficiency by local shipping firms to improve industry competitiveness.

Nigerian Shipping companies in a bid to stay afloat resolve to chartering and lease arrangement to execute contracts. Others look to the S&P market, especially in Europe for second hand vessels. The quality of second hand vessels finding their way into African industries has been a major concern due to environmental concerns, however, the discourse on second hand vessel is outside the scope of this research.

Productivity in Nigerian ports, notwithstanding reports of improvement and proposed expansion plans have been a challenge for industry competitiveness. Inadequate infrastructure in handling equipment, IT infrastructure to aid documentation process, less motorable port access, bureaucracy, corruption and collusion by officials all serve as a disincentive to productivity. Congestion and delays in ports have the implication of increasing transaction cost and serves as a disincentive to cluster attractiveness.

Regardless of these challenges the prospects for shipping in Nigeria is positive, however, development in the shipping industry will be contingent on shipping companies’ competence and proactiveness, local industry competitiveness, and government commitment.

4.4 Shipping risks and distribution

Competitiveness for shipping companies and clusters require an understanding of the risks associated with shipping and locations. The more dynamic a shipping company is the better at managing market risks. More importantly, the riskier a location for shipping business, the more expensive is the cost of doing business at the location or country and vice versa. The extent that the Nigerian environment is conducive for shipping business and the long term prospects of sustaining an oligopolistic LNG shipping sector is assessed in this section.

4.4.1 Economic risk

Economic risk in shipping rises from economic cycles, given shipping’s dependence on world economy. Currency risk and interest rates may also have implications on shipping company margin. Stability of these economic indicators may serve as an incentive for location decisions. Sustainability in shipping activities will be dependent on overall future economic performance in Nigeria.
4.4.2 Market risk

Shipping market risk redistributes income and responsibilities for losses between shipowners and cargo owners in the interplay of demand and supply. Too much cargo chasing less than proportionate ships redistributes income in favour of ship owners while too many ships chasing less than proportionate cargoes redistributes income in favour of cargo owners as shown in Figure 5. This illustrates the balance in market risk and return distribution implicit in shipping cycle.

![Figure 5: Shipping market risk and distribution](image)

Source: Stopford, M. 2007, p102

In a perfect market T1 represents the long-term break even cost curve for operating ships. This is the freight rate that is just enough to cover operational cost. The bargain for risk and returns between actors revolves around this curve with ship owners seeking higher rates and cargo owners seeking lower rates. When cargo owners get the better of shipowners with surplus tonnage, shipowners bear the extra cost of transportation and cut back on investment at point B, evidenced by shipowners’ preference to maintain ship employment to cover operating cost. For example, there are reported instances where vessels were chartered out at zero rates following the 2009 downturn. When ship owners get the better of cargo owners following a shortage in ship supply, freight rates escalate, redistributing income in favour of shipowners who respond by ordering more ships.

Stopford noted three options available in managing shipping market risk. This is illustrated in Figure 5 with bulk shipping as a point of reference and best captured in extracts from Stopford as indicated in Appendix 2. Three lessons can be drawn. First, raw materials become increasingly commoditised overtime and so do shipping in that segment. Second, growing spot market invites the inflow of liquidity. Third, shipping risk remains inherent regardless of redistribution overtime and timing of redistribution only requires a combination of factors to happen so fast. Drawing a parallel from the tanker market in the early 1980s with a futuristic view of LNG shipping in early 2020s, notably following an economic downturn in 2009 as well, 10 years is a long time in shipping. It is worthy of note that predicting the future of LNG shipping is outside the scope of this
research. However, it point to the inevitable increase in volatility in LNG shipping overtake. The challenge consists not only in the unpredictability of the timing but the ability of firms to understand the mechanics of risk redistribution in the new environment, and most importantly, profit from it.

### 4.4.3 Industry risk

Safe for the risk of grounding and collision, piracy has been a major threat to shipping activities and more than ever, still rank tops on the list of shipping risk. Consequences of piracy include loss of life, cargos, vessels, and ransoms. Mitigation in armed guards and insurance has been a subject of discussion. However, this is outside the scope of this research. In the Gulf of Guinea, attacks in Nigerian waters have been highest due to the sizable shipping activities compared to other neighboring countries. This constitutes a threat to the development of shipping activities in Nigeria, so does security threats in political unrest, kidnapping for ransom, and cargo theft, creating a disincentive to shipping activities due to the potential extra costs attributable to these activities.

### 4.4.4 Environmental risk

Environment has never been more profound on shipping agenda. Managing the risks of pollution from atmospheric emission, oil and ballast water discharge, waste disposal, and noise, not least in regulatory compliance, have become prerequisites for shipping company and cluster competitiveness. Shipping company suppliers and customers shall increasingly consider regulatory compliance for doing business while regulatory compliance and environmental responsiveness becomes crucial for location decisions, possibly, flagging decisions. To this end, Nigeria might be less attractive as a location for shipping companies with an eye for best practices. However, it is important to note that this challenge is institutional and beyond the confines of the maritime industry in Nigeria.

Possible mitigations for shipping companies may include insurance, contingency plans for responsiveness, crew training, regular maintenance of equipment, and outsourcing to ship management companies (Uytendaal, A. 2012).

Going forward, five strategic decisions among many facing a shipping company can be deduced. First, the decision to order or not based on current market conditions, availability of charter contracts or future expectations influenced by sentiments; second, the decision to buy or sell in the sale and purchase market given the latter factors combined with recourse to asset play; third, playing the spot market or settling for contracts; combined in voyage, time or bareboat charters and freight derivatives; fourth, decision to layup or recycle in times of a downturn relative to vessel age, market conditions, expectations and obtainable prices; finally, decision to outsource ship management as recourse to risk management. All of these combined in the complexity of cycles, bargaining, and most important, timing; indeed, timing of investments,
decisions, and time to markets. In the end, it is only a matter of choice, and choice means strategy.29

4.5 Corporate strategies in shipping

This section examines the nature of competition in LNG shipping by referencing Porter’s five forces; the threat of new entrants; threat of substitute products; bargaining of suppliers; bargaining power of customers; and industry rivalry. According to Porter these five forces shape industry structure in profitability, bearable cost and prices that can be charged, and investments required for competing in the industry. Stopford commented:

The threat of new entrants limits the overall profit potential because new entrants bring new capacity and seek market share, pushing down margins, whilst powerful buyers or suppliers bargain away the profits for themselves. The presence of close substitutes limits the price competitors can charge without inducing substitution. Industries that have some degree of protection from these five competitive elements are likely to have higher profits. This protection may take the form of barriers to entry, strong brand recognition, weak buyers and a degree of monopoly power. When none of these protective factors exist, the industry reverts to the classic perfect competition model.

Drawing a parallel with the LNG industry we have seen new capacities building up with growth in speculative new building. Limitations in liquefication capacity have the effect of pushing down margin with growing spot market. We have seen growth in buyer power with the Asian powers opting for spot LNG and pushing for price convergence. Although there is no close substitutes for LNG shipping, increasing pipeline activities for example the China-Gasprom deal, project cost in LNG, and growth in renewable energy. Technological developments in any of these substitutes may render LNG projects less viable and consequently shipping, safe for political patronage and possible safeguard to protect investment returns. Capital intensity in LNG shipping creates entry barrier while there is high exit barrier due to inflexibility and high switching costs.

For modern shipping companies to stay competitively viable, necessary human resources built around a network organisation with a customer orientation, clear commercial focus in organisational culture, strong and entrepreneurial leadership, flexibility and cost competitiveness needs to be developed according to Lorange (2007). These are further summarised into four prerequisites for success in shipping companies; know-how base, ability to change, simplicity and focus, shipping companies as highlighted in the next sections.

4.5.1 Know how base

Shipping companies need to possess the competences and capabilities to meet strategic needs; a market culture to understand shipping markets; an operational culture for delivering the best service at the lowest possible cost; a business analysis culture necessary for pursuing strategies; and a financial culture with the ability to

29Line of argument drawn from Lorange (2007)
manage financial flows and budgets, deal with currency issues, interest rates
developments and possible future market are the most requisite knowhow for modern
shipping companies to navigate the stormy cyclical shipping markets. These four
know-how bases are leveraged on customer focus and building a network organisation
through outsourcing and alliances to compensate for gaps in know-how. The real
competitive advantage for shipping companies according Lorange is in the brains,
visions, and innovative capabilities of shipping executives and not in the steel.

4.5.2 Flexibility

Ability to change is a critical success factor for shipping companies. The speed of
evolution in shipping markets requires that value chains and business models are
continuously innovative and adaptive; otherwise competitive edge in value creation is
easily lost to changing market dynamics or copied by competitors. Network
organisations are required to meet such market dynamism.

Network organisations are less hierarchical, less bureaucratic, and much flexible to suit
the evolving shipping characteristics. Lorange cited four network models depicted in
Figure 6

![Network Models Diagram]

Figure 6: Network models

Source: Lorange, P. 2007, p151

The portfolio model is less outsourced and activities are heavily internalised.
Constellation model is heavily networked and outsourced. Co-operative model has all
the network relationships as part of the inner network, while the franchise model
accords investors some level of independence with part investment in each ship
venture as a separate entity.

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30 Idem
Success in running these networks will be based on organising the requisite knowhow; executive, mid and low level for the objective of meeting customer needs. The complexity of the network determines the level of core competence required to execute each strategy and the nature of decision dimension, whether top-down, decentralised, or bottom-up.

4.5.3 Simplicity and focus

Complexity in the number of sectors that a shipping company is active will demand corresponding level of competence. However, for shipping companies to optimise value creation, it is important to focus on a few growth platforms that its value creation capabilities can be effectively released.

4.5.4 Cost competitiveness

Lower long term cost relative to competitors is essential for shipping company competitiveness. Cost optimisation entails leveraging the activities in the value chain on management and human resource competence and capabilities.

4.6 Competitive strategies in shipping

The strategic challenge in shipping is a product of cyclicality and turbulence on one hand, and carving out niches on the other hand. Success in the former is characterised by taking advantage of volatility by understanding how to execute an effective commodity strategy in a perfectly competitive market segment. Success in the latter is achievable by identifying less competitive segments and adding distinctive competencies.

Four strategic possibilities are derivable from this classification. Protect and extend strategy is based on the premises of a shipping company having good market understanding, contacts, and know-how on one hand, and linking such to the firm’s core business operations. Strategic considerations consist in improving market position via building new competences, better market understanding, cost efficiency, growing fleet size and efficiency, and effective value proposition relative to good timing as shown in Figure 7 below.
Lorange noted that the starting point is to adopt protect and extend strategy at the shipping company’s area of strength taking into account existing competencies and capabilities. Identifying opportunities before they are obvious and having the requisite competencies and capabilities to seize new opportunities is crucial, while the importance of timing cannot be over emphasised.

Drawing a parallel with the LNG shipping sector as shown in Figure 8, a build strategy may involve building new competences in LNG terminal investment and relationships to integrate customer’s logistics chain and develop new market contacts for exploring the LNG spot market. The leverage strategy may consist of portfolio diversification into related segments and to cover new segments or take competences and capabilities to other locations through partnerships, mergers, and joint ventures. The transform strategy may be realised with a combination of the two analogies. According to Lorange (2008), a direct leap to the transform section of the matrix is less realistic than first, building new competencies, then transform with application to new markets or geographies or leverage through entering new markets, then transform by applying new competencies.
Figure 8: Corporate growth dimensions for LNG shipping company

Source: Adapted by researcher from De Wit & Meyer, 2004; Lorange, P. 2007

Where a combination of the four strategies is applied to industrial LNG shipping, a new corporate portfolio can be derived as illustrated in Figure 9. To put into perspective, a 25 per cent (Stopford, 2009:486; Lorange, 2008: 92) dynamic subsidiary shipping company will be born compared to the traditional project-tied LNG shipping company with the capabilities to strengthen complementary for maritime clustering, especially in export oriented emerging industries. This will require a corresponding know-how base to manage the complexity of shipping operations.
Shipping executives may also have to answer the generic strategic questions on corporate composition and management; in what complementary shipping sectors should the corporation be active? What should be the relative weight of each sector? What organisational system is required to run the corporation? How can business synergies be realised to reach the optimal potential for value creation? And how can this be balanced with responsiveness to changing market dynamics (De Wit and Meyer, n.d).

Much will depend on the shipping company executive’s vision, entrepreneurial prowess, knowhow, and the available competences and capabilities. A well run diversified portfolio of commodity and niche-based shipping business with focus and portfolio balance, taking into account counter cyclicality, cash flow cycles and risk exposure is crucial for success (Lorange, 2007).

4.7 Ship management

Ship management entails manning, repairs and maintenance, procurement, administrative and regulatory activities in health, safety, environment and quality (HSEQ) that are central to shipping companies’ operations.

Shipping companies’ competence in ship management creates the necessary technical and operational know-how, as well as scale economies that enable operational excellence for sustainable value creation. Ship management companies provide services encompassing such knowledge to shipping companies in developed industries that enable the companies to focus on core operations, while it provides the necessary know-how in this regard, to shipping companies in emerging industries, where such knowledge might not be sufficiently available for competitiveness. The latter case represents the scenario in Nigeria.
As noted in section 4.5.1, the competitiveness of a shipping company is not in its physical assets, rather in its know-how base. This is described by Stig Tenold (2000) as knowledge capital; defined by Dunning's eclectic theory of internationalisation (1981), using the three conditions necessary for foreign direct investment to take place. First, ownership advantage; shipping companies’ firm specific assets in knowledge of shipping sector, proficiency in vessel operations, professionalism, long standing business relations, high level of competence and reputation. Second, international advantage; difficulty and lack of desire to sell or lease the firm specific advantages stemming from the fact that a shipping company benefits from using the advantage itself over selling or leasing them to foreign shipping companies and such knowledge are less transferable than technology and processes, however, ship management companies provide an avenue to buy and sell these competences. Third, location advantage; exploitation of the firm specific assets in a new market stemming from combining ownership and internationalisation advantages with lower cost factor inputs, transaction cost, and proximity to suppliers and markets.

Four implications can be drawn. First, operational and technical know-how base is required for both domestic and international competitiveness. Second, foreign shipping companies having the know-how base are less willing to transfer the knowledge capital to potential importing countries and would rather use it in exploitation of a foreign market where the right conditions exist for cost competitiveness. Third, competence gap by local shipping companies can be filled by engaging ship management services to achieve competitiveness and internationalisation. Finally, having the right location incentives will attract shipping companies and ship management companies to locate.

Location of ship management companies contributes to cluster development by employing firm infrastructure, developing shore based know-how and serves as a pipeline for engaging, developing competences and exporting seafaring talents.

**4.8 Ship finance**

For shipping companies to be able to take advantage of market opportunities domestically or internationally, it requires access to adequate capital. The ability of shipping companies in the Nigerian maritime sector to attract ship finance, foreign and domestic, will be essential for both shipping company competitiveness and critical mass. However, an argument for lack of competitiveness of domestic shipping companies has been lack of capital. This section provides insights on ship finance and the possibilities available to shipping companies within the context of a cluster.

Ship financing consist of a mix of debt and equity. Debt financing can be loans, leases, bonds and credits. Equity financing comprises of owners and shipping companies’ retained earnings, public and private investments. Delving into the details of ship finance is outside the scope of this research, so, for simplicity the scope of financing instruments shall be limited to project finance within which bank debt, equity investment, export credit, and ship funds can be explored.

The ease of accessing debt capital depends on the underlying shipping segment and market confidence. This is contingent on the segment’s capital requirements, risk profile, complexity of market entry, exit, and availability of S&P market, lenders’ understanding of the market and access to market information, the level of
specialisation or standardisation, and availability of a relatively transparent charter market (Drewry, 2007).

Financing arrangement can be bilateral,\(^{31}\) based on acceptable management and legal jurisdiction, first priority mortgage, earnings, insurances and where necessary, corporate guarantees. Where large scale funding is required, syndicated financing involving one lead bank underwriting an offer supported by many banks or club deal involving partnerships to arrange a loan with different offers to finance client needs subject to ship-owner accepting all the offers will be sought.\(^{32}\) This might be the case for financing LNG ships due to the intensity of capital requirements.

LNG ship financing is to a large extent project-oriented with long-term employment and steady cash flow as prerequisite. However, probable growth in speculative new building points to increase in short-term contracts which may have implications on future financing arrangements. The nature of finance is characterised by non-recourse,\(^{33}\) interest and debt repayments are secured on the asset and cash flows from charter arrangements. Market confidence is positive; LNG sector is highly specialised with non-existent S&P market. The spot market is growing, yet less transparent; and risk may be spread through the entire LNG chain. Project viability, shipping company’s experience and track record are also prerequisites for financing in the LNG sector as other sectors.

Banks advance loans in return for interest based on agreed tenor and terms. Loans can be syndicated through asset distribution to split large loans into small packages distributable among several banks. Through syndication risks can be spread while banks without the requisite expertise can participate in the syndicate under the guidance of a lead arranger that has the required expertise (Stopford, 2003), whether local or internationally. Figure 10 illustrates the structure of syndicated loan. Marine Money’s 2012 Bank Debt Deal of the year puts loan syndication in LNG financing into perspective in Appendix 3.

\(^{31}\)One borrower one lender
\(^{32}\)See 33
\(^{33}\)Without collateral
The sophistication of maritime finance, organisation or participation of local banks in such deals, coupled with expertise in other maritime finance services such as risk management, cash flow management, and mergers and acquisition creates the leverage in value creation, synergy that serves as a cluster enabler to which policy may be directed. Again, there will be a renaissance of maritime finance knowhow given the specialist nature of ship finance for banks in developing economies or industries, especially in Africa. Other factors to consider will be the availability of capital for banks, commercial risks, political risks and sovereign risks.

Ship-building contracts may be leveraged with credit schemes. Credit schemes can be domestic; involving government financial support to domestic shipping companies for tonnage development and to stimulate local ship-building, or foreign; involving government support of shipyards by offering favourable buyer credit terms to stimulate ship-building and gain competitive advantage. An example, Korean ship-building credit scheme consist of domestic credit-scheme co-ordinated by Korean Development Bank (KDB). Under the domestic schemes, financial support is provided to domestic shipping companies to the tune of 80 per cent of ship-building contract value (Taehan, A. S. 2009). Marine Money’s 2012 Project finance deal of the year puts the Korean domestic credit into perspective in Appendix 4.

Export credit scheme co-ordinated by Korean Import Export Bank (KEXIM) has a coverage to the tune of 80 per cent of contract value. Loan is provided through a Korean shipyard at either a fixed interest rate; Commercial Interest Reference Rate (CIRR) plus margin, or floating rate; or London interbank offered rate (Libor) plus margin, with a 12 year maximum tenor, secured on the asset and charter income from vessel employment and a guarantee from a credit worthy international bank, the importer’s government or the central bank of the importing country. The facility shall be subject to fees accordingly, while other terms shall be observed under the Organisation for Economic Cooperation and Development (OECD) arrangement.
Project sponsors in a ship project may be trading, producing companies, other equity contributors or ship funds. The development of ship funds and partnerships has proven over the years to be instrumental to stimulating the demand pull sectors. Examples are the Norwegian Kommanditt Selskab (K/S), German Kommanditgesellschaft (KG), Dutch Commanditaire Vennootschap (CV), and Singaporean Maritime Finance Initiative (MFI). The underlining purpose for these funds is fiscal incentives, specifically tax benefits to create a level playing field and attract shipping business. Generally under ship funds, ships are financed through subscription in return for dividends. With the exception of MFI where ship management may be outsourced, operational control is placed with a ship manager and the ship manager is required to take an equity stake in the investment vehicle or one ship company (Drewry, 2008).

Lease arrangements can be categorised with sponsorship equity within the frameworks of project finance as leasing is an off balance sheet transaction and capital funding may be provided by sponsors for the acquisition. Lease arrangements can be operating or finance. Operating lease involves the use of an asset subject to return at the lease end of the lease period for a rental, while finance lease involves the operational ownership of an asset by a lessee with an option to purchase or obtain legal ownership or title from the lessor at the end of the tenor. Under the finance lease all risks of ownership during the tenor is transferred to the lessee mirroring a typical bareboat charter.34

Overall, we can deduce that ship finance is a function of relationship structures and financial innovation leveraged on the availability of requisite know-how and good reputation backed by quality charter arrangements.

4.9 The role of national flag reputation

This section focuses on the benefits accruable from leveraging on flag reputation, rather than flag attachment to physical assets. Given the global characteristics of shipping and the high mobility of factors of production, flag registration may be less significant for host countries. However, national flag policies are based on national preferences; large national fleet may be considered as an advantage, especially for emerging nations as a stepping stone to increasing domestic maritime activities according to Tenold (2000). Flag reputation has become increasingly important for Nigeria as domestic shipping activities increases to maintain best practices in accordance with international standards while building up domestic fleet to mitigate capital flight, develop nautical competences and help to prepare for future internationalisation.

Quality certification for both ships flying the national flag and seafarers by the maritime administration will be essential; quality certification for ships, as a yardstick for enforcing international standards in accordance with the role of the flag states in line with the United Nations Convention on the Law of Sea (UNCLOS), 1982 and quality certification for seafarers as a validation of the quality as well as seafarers’ competence in line with STCW ’95, as a criterion, for the white list. Quality certification may

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34Idem
contribute to the employability of seafarers, attract ship management companies and improve Nigeria’s reputation in the international maritime domain.

4.9 Conclusion

This chapter elaborated on the factors influencing the demand and supply for shipping, giving insights on shipping risks and market risk distribution. It identified that the demand for shipping in Nigeria is driven by oil and gas, raw material export and import, and imports of consumables. The redistribution of Nigerian oil and gas export to Asia will increase the tonne-mile with accompanying opportunities for shipping in increased tonnage supply. Population growth will create larger consumer market to drive the demand for shipping in consumables, while piracy; political unrest; kidnapping; and cargo theft serves as disincentives to shipping business in Nigeria.

Also, the possible corporate and competitive strategies in shipping markets were highlighted, giving insights on how companies should position in order to profit from market opportunities. The fundamental prerequisites for shipping company value creation consists in the knowhow base to meet strategic needs; encompassing a market culture to understand shipping markets; an operational culture for delivering the best service at the lowest possible cost; a business analysis culture necessary for pursuing strategies; and a financial management culture. Further, flexibility, simplicity and focus, and lower long term cost relative to competitors is essential for shipping company competitiveness.

Conclusively, it emphasised the influence of ship management activities, access to capital and flag reputation on shipping company competitiveness from a cluster perspective, noting that competence gap in local shipping companies can be filled by engaging in ship management services to achieve competitiveness and internationalisation; shipping companies’ financial knowhow and access to capital may impact the ability to take advantage of market opportunities; and flag reputation may be leveraged for internationalisation.
5 Location attractiveness

This chapter considers cluster competitiveness in attracting new firms essential for critical mass by looking at the developments in Nigeria, Norway and Qatar to identify gaps in economic, institutional, regulatory, logistics performance and potential demand for maritime activities in the competitive environment. Also to point to how these differences in countries or locations influence industry competitiveness. Comparison with Norway and Qatar was informed by the fact that these two countries are benchmarked in this study and looking into these indicators will help to have a better understanding of industrial performance. Attractiveness of a country for maritime business location in this chapter is based on World Economic Forum’s (WEF) Global Competitiveness Index (GCI), Global Information Technology Index (GIT/NRI), World Bank Ease of Doing Business Index (EDBI), Logistics Performance Index (LPI) and the United States Energy Information Administration’s (EIA) data on oil and gas production. First, it considers economic competitiveness using the GCI indicators; secondly, the friendliness of the regulatory environment to attract and retain new firms within a cluster through the EDBI; thirdly, efficiency of information and communication technology (ICT) for business competitiveness through the NRI; fourth, the ease and efficiency of sea-hinterland connection via the LPI; and fifth, the potential demand for maritime activities via EIA production and reserve data.

5.1 Economic competitiveness

The GCI measures a country’s ability to generate sustainable economic growth through increases in per capita GDP, on the premises of 12 pillars for creating competitiveness (Medina, F. L., n.d.). Countries adopt a mix of the 12 pillars to create an environment in which domestic and multi-national companies located within its borders to develop, depending on a country’s individual needs in determining national productivity. This is formed on the bases of a continuum of three stages of a “factor driven economy”, “efficiency driven economy”, and “knowledge economy”. Long term sustainability rests on the 12th pillar of innovation to drive countries towards knowledge based economy, raise living standards of its populace, and provide system dynamism to create competitive advantage.

A factor driven economy is characterised by the dominance of un-skilled labour market, commodity sales, low wages, lack of technological development, and high economic sensitivity to global cycles; while competitiveness is based on low labour cost and unprocessed natural resources. Progress would be achieved by improving the efficiency of institutions, infrastructure, macro-economic stability and education. A country becomes efficiency driven upon maturity in production of manufactured goods established from being factor-driven, focus shifts to efficiency of production, processes and quality of products, providing support and stability to competitiveness and less exposure to external factors. Progress would be achieved through the improvement of higher education and training; goods market efficiency, labour market efficiency, financial market sophistication, technological readiness, and market size. The third stage is becoming an innovation driven economy on the premises of business sophistication and innovation. At this stage, value creation is high and knowledge based, products and services are differentiated, and competitiveness relies on the existence of knowledge based clusters.
Nigeria is factor driven, Norway is innovation driven and Qatar is in transition from a factor driven to an efficiency driven economy according to GCI 2013 report. However, economic stages whether factor, efficiency or innovation driven, does not occur in its absoluteness. A factor-driven economy as Nigeria’s, requires a considerable level of efficiency and innovation, while Qatar and Norway’s economies in transition and innovative-driven respectively, requires efficient institutions and quality education to sustain competitiveness. The trend in these countries’ competitiveness is shown in Table 4.

Table 4: Nigeria, Norway, and Qatar GCI from Year 2007 to 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Year/GCI Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway</td>
<td>16</td>
</tr>
<tr>
<td>Qatar</td>
<td>31</td>
</tr>
<tr>
<td>Countries analysed</td>
<td>131</td>
</tr>
</tbody>
</table>

Source: Compiled by researcher, on the basis of WEF GCI index

Nigeria’s competitiveness declined between 2007 and 2011 but has improved by 10 ranks from 127th to 115th in 2012 taking into account additional 2 countries analysed. Norway’s competitiveness has been consistent during this period while Qatar has significantly improved from 31 in 2007 to 11th in 5 years. This is a reflection of the economic maturity, efficiency of the institutions and efficiency in the use of knowledge in these economies. Table 5 indicates the state of 6 of the 12 pillars that this study considers for knowledge based competitiveness, while Table 6 provides insight on Nigeria’s performance over a period of 3 years.

Table 5: Nigeria, Norway, and Qatar GCI indicator ranking for Year 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Institution</th>
<th>Infrastructure</th>
<th>Higher education and training</th>
<th>Technological readiness</th>
<th>Business sophistication</th>
<th>Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>117</td>
<td>130</td>
<td>113</td>
<td>112</td>
<td>112</td>
<td>66</td>
</tr>
<tr>
<td>Norway</td>
<td>8</td>
<td>27</td>
<td>12</td>
<td>13</td>
<td>19</td>
<td>66</td>
</tr>
<tr>
<td>Qatar</td>
<td>4</td>
<td>31</td>
<td>33</td>
<td>27</td>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: Compiled by researcher, on the basis of WEF GCI index
Efficiency of these factors signifies a country's competitiveness. Qatar and Norway’s competitiveness rest on quality and efficient institutional frameworks, low levels of corruption and undue influence on government decisions, efficient government institutions, and high levels of security according to GCI report. We can also deduce from the above table that these economies are leveraged on good infrastructure, as well as quality and representative higher education and training that lays the foundation for technological readyness, business sophistication, most importantly, innovation. Nigeria’s institutional environment on the contrary is less competitive due to its poor performance in the previously mentioned indicators, lack of transparency and unethical behaviour both in the public and private sectors. An industry expert comments:

...quite a few contractors (mostly the political and not the professional contractors), run away with mobilisation fees, milestone payments and some even abandon projects when the stress gets to them. Until NIPEX starts publishing the names of erring contractors, as well as those who have successfully completed projects of significant complexity, serious contractors may find themselves being penalised for the errors of political jobbers who have absconded with funds having hid under the umbrella of the NOGICD Act to get a contract awarded to their company...

The state of infrastructure, higher education, and technological readiness are also relatively less attractive for business location in Nigeria. However, Nigeria’s performance in business sophistication and innovation relative to other variables is leveraged on its large market size and improved efficiency in the use of professionals and talents.

<table>
<thead>
<tr>
<th>Year</th>
<th>Institution</th>
<th>Infrastructure</th>
<th>Higher Education and Training</th>
<th>Technological Readiness</th>
<th>Business Sophistication</th>
<th>Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012/13</td>
<td>117</td>
<td>130</td>
<td>113</td>
<td>112</td>
<td>66</td>
<td>78</td>
</tr>
<tr>
<td>2011/12</td>
<td>111</td>
<td>135</td>
<td>114</td>
<td>105</td>
<td>64</td>
<td>82</td>
</tr>
<tr>
<td>2010/11</td>
<td>121</td>
<td>135</td>
<td>118</td>
<td>104</td>
<td>76</td>
<td>98</td>
</tr>
</tbody>
</table>

Table 6: Nigeria’s GCI performance from 2010 to 2012

Source: Compiled by researcher, on the basis of WEF GCI index

Nigeria’s institutional efficiency improved between 2010 and 2011 but worsened in 2012. The state of infrastructure has slightly improved in 2012 while higher education and training has remained relatively stagnant since 2010 considering that 139 countries were analysed in 2010 compared to 144 in 2012. Performance in these three indicators partly points to the decline in technological readyness. However, business sophistication and entrepreneurial innovation have gained considerable since 2010.

These factors are essential for shipping company or maritime business location from an environment and resource perspective. Efficiency and transparency of government and regulatory institutions, adequate security, quality of port infrastructure, roads and rail-roads for hinterland connection, quality of educational system and training activities for the supply of talents and competent human resources, and the quality of internet and mobile infrastructure are all essential for maritime cluster attractiveness,
synergy within a cluster and for the global competitiveness of a location, given that shipping is global.

5.2 Ease of Doing Business

Ease of Doing Business Index (EDBI) assesses the conduciveness of the regulatory environment for firms in a country based on 10 indicators of starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. The 2013 DBI report assesses the performance of 185 countries and ranks Nigeria 131st, Norway 6th and Qatar 40th, indicating a highly attractive Norway, relatively attractive Qatar and a less attractive Nigeria. However, drawing 7 indicators considered to be important to this research as indicated in table 8, it is important to note that these figures may not be absolute determinants as qualitative factors might play a role. Exit regulations in both Norway and Qatar are far relaxed than entry regulations while exit regulations are relatively as challenging as entry regulations in Nigeria. The state of electricity in Nigeria with a ranking of 178th of 185 countries indicates a high operation cost rising from extra cost of power generation. Although Nigeria ranks higher in getting credit, interview with professionals in the Nigerian industry indicates that banks are only interested in short term financing and so, operates as cash centres. An inefficient tax system may equally give room to companies circumventing the tax system and creates undue advantage, whereas ranking figures suggests otherwise. Also, there could be gaps between regulations, implementation and enforcement.

![World Bank Ease of Doing Business Index](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>Nigeria</th>
<th>Norway</th>
<th>Qatar</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>108</td>
<td>11</td>
<td>n/a</td>
</tr>
<tr>
<td>2009</td>
<td>118</td>
<td>10</td>
<td>37</td>
</tr>
<tr>
<td>2010</td>
<td>112</td>
<td>10</td>
<td>39</td>
</tr>
<tr>
<td>2011</td>
<td>127</td>
<td>8</td>
<td>50</td>
</tr>
<tr>
<td>2012</td>
<td>133</td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>2013</td>
<td>131</td>
<td>5</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 7: Nigeria, Norway, and Qatar’s DBI from Year 2008 to 2013

Source: Compiled by researcher, on the basis of World Bank EDB index

The performance of the countries under study over a period of 6 years is indicated in Table 7. The ease of doing business in Nigeria worsened prior to 2012 but improved considerably in 2012. Norway’s position continued to improve since 2008 till date, while Qatar’s gain in 2012 has been offset by a decline in its position in 2013. The efficiency
and friendliness of the regulatory environment in these countries in 2013 is illustrated in Table 8

<table>
<thead>
<tr>
<th>Country</th>
<th>Variable/DBI 2013 Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Starting a business</td>
</tr>
<tr>
<td>Nigeria</td>
<td>119</td>
</tr>
<tr>
<td>Norway</td>
<td>43</td>
</tr>
<tr>
<td>Qatar</td>
<td>109</td>
</tr>
</tbody>
</table>

Table 8: Nigeria, Norway, and Qatar DBI indicator ranking for Year 2013

Source: Compiled by researcher, on the basis of World Bank EDB index

Nigeria’s performance in these variables over time is illustrated in Table 9. Procedure for starting a business worsened in relation to other countries through 2011 to 2013, electricity remains the same considering that additional 2 countries were analysed, and investor protection declined, possibly as a result of local content.

<table>
<thead>
<tr>
<th>Year</th>
<th>Nigeria/Year</th>
<th>Variable/DBI Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Starting a business</td>
<td>Getting electricity</td>
</tr>
<tr>
<td>2013</td>
<td>119</td>
<td>178</td>
</tr>
<tr>
<td>2012</td>
<td>116</td>
<td>175</td>
</tr>
<tr>
<td>2011</td>
<td>110</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Table 9: Nigeria’s DBI performance from 2011 to 2013

Source: Compiled by researcher, on the basis of World Bank EDB index

The implication for shipping companies consists in high entry barrier, high cost of operation, exposure to unethical conduct of local partners, and access to short term corporate financing over long term asset financing.

5.3 Technological impact on economic and business development

WEF Global Information Technology Report currently assesses 144 countries’ Network Readiness by virtue of their adoption of information and communication technology (ICT) for improving productivity. Economic impact of ICT is leveraged on internet and mobile communication efficiency, productivity, employment, efficient business processes, innovation, and speed. ICT impact on economic development is measured in 10 variables comprising the friendliness of the regulatory environment for ICT adoption, business frameworks to facilitate entrepreneurship and innovation in ICT products, development of ICT infrastructure, affordability, ability of the populace to make effective use of ICT, the extent of individual, business and government usage, the economic and social impact of ICT.
Nigeria’s ICT penetration declined since 2009 till 2011, but moved up one place in the ranks as indicated in Table 10. However, its position remains static in 2012 compared to 2011, given the addition of two countries while Norway and Qatar have both improved significantly since 2007 to 2013. Norway moved up two ranks while Qatar gained by five ranks. In Table 11 the implication of the efficiency in seven of the ten variables on the overall performance of the countries are shown while Table 12 digs into Nigeria’s performance over a period of three years.

Table 10: Nigeria, Norway, and Qatar’s NRI from Year 2007 to 2012

Source: Compiled by researcher, on the basis of WEF NR index

The regulatory environment has improved in Nigeria with the establishment of a national policy on ICT, business innovation in ICT declined in 2012 but has gained in 2013, and ICT infrastructure also gained, government adoption of ICT slightly improved while business adoption of ICT moved up by 11 ranks in 2013. However, the economic impact of ICT in Nigeria worsened in 2013, while individual ICT skills remain unchanged.

Table 11: Nigeria, Norway, and Qatar NRI indicator ranking for Year 2013

Source: Compiled by researcher, on the basis of WEF NR index

The regulatory environment has improved in Nigeria with the establishment of a national policy on ICT, business innovation in ICT declined in 2012 but has gained in 2013, and ICT infrastructure also gained, government adoption of ICT slightly improved while business adoption of ICT moved up by 11 ranks in 2013. However, the economic impact of ICT in Nigeria worsened in 2013, while individual ICT skills remain unchanged.
ICT infrastructure and availability of competent human resources for ICT adoption are essential for shipping company competitiveness. An inefficient internet facility and mobile telecommunications would serve as a disincentive to effective communication within the Nigerian cluster and for shipping company location decisions.

### 5.4 Logistics Performance

World Bank 2012 Logistics Performance index (LPI) assesses the logistics performance of 155 countries of which Nigeria is ranked 121, a decline from its ranking of 100 of 155 in 2010, while Norway and Qatar were ranked 22 and 33 in 2012 respectively. The LPI measures performance based on the efficiency of the clearance process; speed, simplicity, and predictability of formalities by border control agencies including customs. Secondly, the quality of trade and transport related infrastructure; ports, railroads, and information technology. Thirdly, the ease of arranging competitively priced shipments. Fourthly, the competence and quality of logistics services; transport operators and customs brokers. Fifth, ability to track and trace consignments. Additionally, the frequency with which shipments reaches the consignee within the scheduled or expected delivery time. Table 13 indicates the logistics competitiveness of the countries under study.

**Table 12: Nigeria’s NRI performance from 2011 to 2013**

<table>
<thead>
<tr>
<th>Year/Year</th>
<th>Variable NRI Rankings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Environmental Readiness</td>
</tr>
<tr>
<td>2013</td>
<td>89</td>
</tr>
<tr>
<td>2012</td>
<td>91</td>
</tr>
<tr>
<td>2011</td>
<td>107</td>
</tr>
</tbody>
</table>

**Table 13: Nigeria, Norway, and Qatar’s LPI from Year 2007 to 2012**

<table>
<thead>
<tr>
<th>Country</th>
<th>Year/LPI Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
</tr>
<tr>
<td>Nigeria</td>
<td>53</td>
</tr>
<tr>
<td>Norway</td>
<td>15</td>
</tr>
<tr>
<td>Qatar</td>
<td>45</td>
</tr>
<tr>
<td>Countries</td>
<td>150</td>
</tr>
</tbody>
</table>

Source: Compiled by researcher, on the basis of WEF NRI index

Source: Compiled by researcher, on the basis of World Bank LPI index
While Nigeria’s LPI consistently declined from 2007 to 2012. Norway, gained considerably during the years but its position declined in 2012 by 12 ranks compared to 2010. Qatar gained by 23 ranks in 2012 compared to 2011. Table 14 indicates the reasons for these countries’ logistics competitiveness. Location attractiveness from a logistics perspective is based on efficiencies in these variables as demonstrated by Norway and Qatar.

<table>
<thead>
<tr>
<th>Country</th>
<th>2012 LPI Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Customs</td>
</tr>
<tr>
<td>Nigeria</td>
<td>146</td>
</tr>
<tr>
<td>Norway</td>
<td>21</td>
</tr>
<tr>
<td>Qatar</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 14: Nigeria, Norway, and Qatar LPI indicator ranking for Year 2012

Source: Compiled by researcher, on the basis of World Bank LPI index

Nigeria’s LPI performance in specific variables over 5 years is shown in Table 15. These factors signify government’s efficiency in providing logistics services, investment, infrastructure and enforcing best practices within the private sector and government institutions for a competitive international trade which in turn affects shipping.

<table>
<thead>
<tr>
<th>Nigeria/Year</th>
<th>2012 LPI Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Customs</td>
</tr>
<tr>
<td>2012</td>
<td>94</td>
</tr>
<tr>
<td>2010</td>
<td>109</td>
</tr>
<tr>
<td>2007</td>
<td>94</td>
</tr>
</tbody>
</table>

Table 15: Nigeria’s LPI performance indicator from 2007 to 2012

Source: Compiled by researcher, on the basis of World Bank LPI index

A closer look at the changes in Nigeria’s rankings from the first LPI in 2007 indicates increasing customs inefficiency largely as a result of solicitation of informal payments, pre-shipment inspection delays (World Bank 2012), and inadequate use of ICT in customs clearance. Despite reports of government investment in port infrastructure, the gap between project execution and trade expansion creates a lag. The ease of arranging competitively priced shipments also declined largely due to the aforementioned challenges. Efficiency in consignment tracking declined. However, the frequency with which shipments reach the consignee within the expected time improved considerably. Inefficiencies in these variables have cost implications for shipping companies and will consequently affect Nigeria’s attractiveness.
5.5 Potential demand for shipping activities

Oil production and reserves indicates the potential demand for shipping activities in the oil and gas sector relative to a location. Nigeria appears to be attractive for shipping activities subject to sustainable demand for crude and LNG export. Growth in oil production peaked in 2010 at 11 per cent and remained modest in 2011 and 2012 at 3.9 per cent and 1.2 per cent respectively as deduced from Figure 11. Increased exploration activities will be contingent on domestic pressure to innovate. On the other hand, LNG production capacity remains static at 22mpta as a result of infrastructural constraint, though with proposed expansion plans.

![Figure 11: Oil and gas production and reserves in Nigeria, Norway and Qatar](image)

Norway’s crude production declined by 22.8 per cent between 2008 and 2012 due to declining reserve while LNG production capacity remains at 4.2 with possible expansion plan. Qatar’s crude production increases peaked in 2010 at 18.8 per cent, followed by 13 per cent growth in 2011 and a negative 0.62 per cent in 2012. In addition, it maintains a leading position in LNG production with a capacity of 77mtpma. These capacities give an indication of the possible scale of shipping operations in each location relative to the depth of exploration and technological innovation.

Overall, the indicators applied in this chapter provide useful information in making judgements about the attractiveness of the locations under study. However, it is necessary to emphasise that these indicators may be subjective and cannot be taken in absoluteness as indicated in section 5.2 in case of getting credit in Nigeria. Thus, qualitative factors peculiar with the environment of the locations needs to be considered.
5.6 Conclusion

The economic characteristics of a country form the basis on which competitiveness can be derived. Nigeria is factor driven; the institutional environment is less competitive due to its lack of transparency and un-ethical behaviour both in the public and private sector; the state of infrastructure, higher education, and technological readiness are also relatively less attractive for business location. However, Nigeria’s performance in business sophistication and innovation relative to other variables is leveraged on its large market size and improved efficiency in the use of professionals and talents. Competitiveness will be based on low labour cost and unprocessed natural resources, while progress would be achieved by improving the efficiency of institutions, infrastructure, macro-economic stability and education.

Norway is innovation-driven; value creation is high and knowledge based, products and services are differentiated, and competitiveness relies on the existence of knowledge based clusters. Qatar is efficiency-driven; focus will be on efficiency of production, processes and quality of products, providing support and stability to competitiveness in the factors of production and less exposure to external factors. Progress would be achieved through the improvement of higher education and training, labour market efficiency, financial market sophistication, technological readiness, and market size.

Contrary to Nigeria, Qatar and Norway’s competitiveness rest on quality and efficient institutional frameworks, low levels of corruption and undue influence on government decisions, efficient government institutions, high levels of security, good infrastructure, as well as quality and representative higher education and training that lays the foundation for technological readiness, business sophistication, innovation.

Economic stages whether factor, efficiency or innovation driven does not occur in its absoluteness. A factor-driven economy as Nigeria requires a considerable level of efficiency and innovation while Qatar and Norway’s economies in transition and innovative-driven respectively, requires efficient institutions and quality education to sustain competitiveness.

Institutional and economic environment vis-a-vis the availability of the required resources, for effective operation of shipping companies or maritime business at large, will impact location decisions of new firms as well as retention of existing firms. Where the location is attractive and the institutional frameworks are weak, there will be a disincentive for cluster development. On the other hand, an efficient and friendly environment requires the presence of the resources necessary for a competitive operation of shipping activities.

Despite the availability of natural resources and potential demand for maritime operations in Nigeria, the implication of an in-efficient institutional environment, less stable political and social environment, low technological readiness and less specialised human resources for cluster attractiveness, consists in high entry barrier, high cost of operation, and exposure to un-ethical conduct of local partners, all serving as disincentives for future location decisions that constitutes a weakness for cluster formation.
6 Industry competitiveness

This chapter benchmarks the three oil and gas producing countries; Nigeria, Norway and Qatar, to get a view of the cluster wide characteristics and success drivers from different backgrounds, to be able to identify the unique conditions for cluster development in Nigeria. First, it considers the country’s economic characteristics and an overview of the framework on which the oil and gas industry is structured; secondly, consideration of the maritime policies that might have shaped the development of shipping activities; thirdly, the current state of shipping in view of the demand condition, synergy and internationalisation; finally, developments in knowledge infrastructure in relation to maritime education.

6.1 Nigeria

Nigeria is one of the leading oil and gas exporting countries. As indicated in section 4.2, its maritime industry is driven by oil and gas exploration and production, raw material exports and imports and importation of consumer goods. Nigeria’s coast-line stretches 853km. It has a population of 168.8 million. GDP at current prices in 2012 was USD262.6 billion, a 26.79 per cent growth from 2008 figure of USD 207.12 billion. GDP at 2005 constant prices in 2011 was USD166.76 billion, while exports and imports as a percentage of this was 50 per cent and 35.5 per cent respectively. The oil and gas industry’s contribution to GDP in Nigeria has been deemed to be about 14 per cent on an annual basis.

6.1.1 Nigerian Oil and Gas Industry

Shell D’Arcy made the first commercial oil discovery at Olobiri, Niger Delta State in 1956. At the time the company was the sole concessionaire. Oil production began in 1958 and between 1960 and 1965 exploration rights were extended to Mobil, Chevron, Elf, and Texaco. Nigeria joined OPEC in 1971. Prior to joining OPEC government played a passive role in the industry, however, OPEC encouraged members to take active participation in their petroleum industries. In 1971, Nigerian National Oil Company (NOC) was incorporated to monitor government’s stake in exploration activities under Joint Operating Agreements (JOA), while in 1975 the Ministry of Petroleum Resources (MRP) was created for regulatory activities. Nigerian National Petroleum Corporation (NNPC) was incorporated in 1977 as a merger of NOC and MRP with the objectives of managing government’s stake in the JOA’s, capacity building, engagement in domestic and international commercial activities, and ensuring energy security.

JOA’s operated as partnerships, where concessions are jointly owned in proportion to equity contribution, costs and revenues are shared in accordance to equity contribution, and products are lifted accordingly subject to a memorandum of understanding. The International Oil Companies (IOC) is designated as operator while the NNPC reserves the right to become an operator. NNPC JV stakes with the IOC’s ranges between 55 and 60 per cent.

As the scale of operations shifted offshore, more investments were required and operations became riskier, requiring more regulations. With government lacking the financial capability to invest in these complex operations, a funding arrangement that achieves government object without negative financial impact was a necessity.
Production Sharing Contracts (PSC) was then introduced in 2003. Under the PSC, NNPC has the sole right to concessions; contractors bear all costs of exploration even where no oil was found in the acreage and in the event that oil was found, contractor’s capital and operational expenses are reimbursed with the allocation of crude oil. Current production composition consists of 64 per cent JV and about 36 per cent PSCs.\(^{35}\)

NLNG started operation in 1999 as a JV of NNPC (49%), Shell Gas BV (25.6%), Total (15%), and ENI (10.4%). It has maintained the same capacity since 2008 and plans for expansion are yet to be clarified at the time of writing. However, Brass LNG is currently receiving attention from government. It is expected to have an estimated capacity of 10mtpa originating from two trains. Costs are estimated between US$8 to $18 billion and the company will operate as a JV comprising NNPC (49%), ENI (17%), Total (17%), and Conoco (17%).

Given the low level of competence within the oil and gas industry, Nigerian Oil and Gas Content Development Act (NOGICD) was established in 2010 to improve local value creation and human capacity building. Under the policy, human capacity development plan and R&D plan are prerequisites for contract and licenses, while indigenous companies are given contractual preferences subject to qualification. This is in line with the Nigerianisation policy of the Nigerian government.

The NOGICD is complemented with the Petroleum Industry Bill (PIB) with the objective of reforming the institutions and policy in the Nigerian oil and gas industry. According to NNPC, the proposed institutional reform is to separate policy, regulation, monitoring and commercial operations, that are currently indirectly concentrated in NNPC. Under the reform agenda, the Ministry of Petroleum Resources shall be responsible for the evolution of policy in the oil and gas sector. Under the ministry there will be two new regulatory institutions; upstream petroleum and downstream petroleum inspectorates, with the responsibility for both commercial and technical regulation and monitoring, while the NNPC will be replaced with the establishment of a 30 per cent privately held National Oil Company with the responsibility for commercial operations, an Asset Management Limited Liability Company to manage the JV assets on behalf of the federation and a Nigerian Gas Company (NGC) as a separate 49 per cent privately held entity to cater for domestic gas marketing and gas infrastructure development.

The Asset Management Company Limited is expected to be capitalised with a two year loan instead of annual budgetary funding from the Federal Government and would later be self financed by the retention of its earnings instead of the current direct flow of earnings to the Federation Accounts under the NNPC, while all royalties and taxes would be paid to the government.

\(^{35}\)Diezani Alison-Madueke (Mrs.), Minister of Petroleum Resources, in her ministerial keynote address delivered at the Nigeria Economist's Group Summit, “The Future of Nigeria’s Petroleum Industry”, May 24, 2013
The new National Oil Company, National Petroleum Development Company (NPDC), the current three domestic refineries (WRPC, KRPC and PHRC) and the Pipelines and Products Marketing Company (PPMC) will be capitalised by PSC assets.

The rationale for these reforms was highlighted by the Petroleum Minister:

Nigerian energy infrastructure has been solely financed by government because of the social and economic impact, high investment requirements and long gestation period. Over 5000km of petroleum product and gas pipelines, storage depots, refinery, power generation, transmission and distribution infrastructures were all built through direct government funding.

Due to competing needs for government resources from other public sector services such as education, health and transportation infrastructure etc. most energy infrastructure development projects should be financed and managed through private sector participation. It is in the light of this that comprehensive energy reforms to fast track the development of energy infrastructure and deregulates the energy market for effective competition and efficient service delivery was embarked upon. 36

6.1.2 Maritime history and policy

Nigeria’s shipping history can be assessed from pre-independence, post-independence and post-civil war. The pre-independence era was characterised by manpower development in shipping and port management leading to the establishment of Nigeria National Shipping Line Limited (NNSL) in April 1959. This was in line with the Federal government’s (FG) Nigerianisation policy. NNSL started operations with 3 vessels and initial capital structure comprising FG (51%), Elder Demster (33%) and Palm line (16%). The two British companies were expected to be responsible for technical management and training of Nigerian personnel in Navigation, engineering and management.

However, FG acquired the 49 per cent shares held by the two companies in 1961 and the company became wholly owned FG Company marking the beginning of post-independence era. A Nigerian became the head of NNSL in 1964 and in 1965 NNSL partnered with Elder Demster and Palm Lines to establish the African Containers Express. NNSL suffered from ethnic influences in the build up to the Nigerian Civil War (1967 to 1970), leading to the resignation of the indigenous manager. NNSL vessels were used by the Nigerian military to convey troops during the War.

Post-civil war, government invested in the expansion of NNSL fleet, bringing it to a total of 15 vessels in 1971 under the umbrella of post war economic revitalisation. In 1972, another indigenisation policy by the FG necessitated the training of Nigerian seafarers. NNSL was used as a platform for training in nautical and marine engineering, shore management and transport logistics, and port pilotage. Its total fleet would later reach 24 vessels prior to liquidation in 1995. NNSL suffered from undue government interference, decisions on ship acquisitions were not motivated by business needs, services offered to government were not paid, vessels were becoming

36Idem
obsolete, debt on repairs and maintenance were pilling, and trade creditors lost confidence.

Mindful of the need for local participation in shipping, the Ship Acquisition and Ship Building Fund (SASF) was established in 1987 but failed in realisation of its intended objectives. Subsequently, in 2003, the Coastal and Inland Shipping Act (CISA) was established and it came into force in May, 2004, to reserve local port to port commercial activities for domestic vessels. The provision cedes 64 per cent ownership and voting rights to Nigerian shipping companies subject to a minimum of 60 per cent in the event of a waiver. This is accompanied with Cabotage Vessel Financing Fund (CVFF) guaranteed by Nigerian Maritime Safety and Administration (NIMASA) to aid implementation but the CVFF as well has suffered from lack of implementation.

Provisions were also made under the NOGICD Act 2010 on crew percentage, man-hour operations, percentage spend on maritime and marine logistics services and the percentage spend on shipping to facilitate the localisation of maritime activities.

6.1.3 Shipping industry

Shipping in Nigeria as indicated in section 4.2 is driven by first, oil and gas exploration and production. Secondly, raw material imports and exports as well as consumer goods. Reports have suggested that the real driver of growth in the future might be deep sea shipping given the large market size and a growing middle class. This makes the port sector an important part of Nigeria’s cluster structure.

However, shipping is dominated by foreign shipping companies without core operational activities in Nigeria. This has an implication of creating a weak domestic market necessary for cluster development. The gap in industry structure is reportedly due to inadequate shipping know-how and capital requirement, while majority of the vessels within the industry are over aged and uncompetitive. Further-more, weak domestic shipping sector signifies a lack of integration in industrial activities.

Visible international shipping in Nigeria is strongly tied to NLNG with a fleet of 24 LNG vessels. In 2013 orders were reportedly placed for additional four LNG vessels to be delivered from 2014 onwards. In accordance with the revised Nigerianisation policy in 2004 NLNG reached agreements with its managing companies- Shell International Trading and Shipping Company Limited (STASCo) in 2009 and Anglo-Eastern Ship Management Limited (AESML) to transfer ship management and manning skills to NLNG Ship management services (NLNG SS) and according to NLNG, as at 2012, management of 6 LNG vessels has already been transferred from STASCo and additional 10 vessels are expected through 2014.

Nigeria was not included in the Paris MOU 2013 performance list.

6.1.4 Knowledge infrastructure

The Nigerian maritime industry lags in specialised knowledge, skills, maritime education and research facilities. Whereas, the development of the Nigerian maritime industry will be dependent on human capital competence given its factor driven economic position. Investment in knowledge and infrastructure is crucial to supplying its current and future maritime human resource needs.
Government devotes about 5 per cent of the annual budget to education, one of the highest in the competing sectors for budgetary funding. The Petroleum Technology Development Fund as an arm of the NNPC, has being a vehicle for government investment in science based education. The PTDF partners selected local Universities, however, a substantial part of PTDF’s funding is directed at overseas scholarships.

Government investment is captured in annual funding of the Maritime Academy of Nigeria (MAN) from 5 per cent of NIMASA’s annual income and 3 per cent deduction from awarded contracts of which 1 per cent is scheduled for Nigerian Content Development (NCD) and 2 per cent human capital development administered by NIMASA. Also, the federal government was reported to have approved N2billion intervention fund built into the 2013 budget for the development of facilities and upgrade of MAN into a degree awarding institution.

Prior to 2012, there were two national nautical institutions in Nigeria;

- Maritime Academy of Nigeria
- Federal College of Fisheries and Marine Technology

Combined courses offered include marine engineering, nautical sciences, maritime transport and business management, fisheries technology, and general studies. MAN has announced a newly established Meteorology and Marine Research Department and proposed the establishment of two maritime development training centres in Lagos and Port Harcourt. In addition, two State Universities offer courses in marine engineering, while several Universities offer courses in maritime transport and logistics. Few private maritime academies also offer courses in marine engineering and nautical sciences.

Tenders have also been invited by NIMASA as at the time of writing for the following:

- NIMASA Institute of Maritime Studies, Ibrahim Badamasi Babangida University, Niger State
- NIMASA Institute of Maritime Studies, Niger Delta University, Wilberforce Island, Bayelsa State
- NIMASA Institute of Maritime Studies, University of Nigeria, Nsukka, Enugu State
- NIMASA Institute of Maritime Studies, University of Lagos, Akoka, Lagos State
- Nigeria Maritime University, Okerenkoko, Delta Sate
- NIMASA Science and Technical College, Okoloba, Delta State

Nigerian Seafarers Development Programme (NSDP) was facilitated by NIMASA in 2009, with the objective of training 5,000 seafarers by 2015 and subsequently 10,000 by 2020. Under the NSDP, cadets and ratings are granted 40 percent scholarship by NIMASA. Beneficiaries are undergoing training in Britain, Egypt, South Africa, and Philippines. The Director General of NIMASA Mr. Patrick Akpobolokemi, stated in a
media chat in April, 2013, that over 600 seafarers were already trained on naval architecture, marine engineering, and nautical sciences prior to date and additional 800 were being prepared for training abroad.

6.2 Norway

Norway is a leading maritime nation. Its maritime industry is driven by oil and gas exploration and production, ship building, and equipment manufacturing with substantial knowledge capital. Norway has a 25, 148 km coastline. It has a population of 5.019\textsuperscript{37} million. GDP at current prices in 2012 was USD499.7 billion, a 10.09 per cent growth from 2008 figure of USD 453.9 billion. GDP at 2005, constant prices in 2011 was USD321. 27 billion, while exports and imports as a percentage of this figure were 40 per cent and 32.71 per cent respectively. The oil and gas industry accounted for 19 per cent of the GDP in 1985, 7 per cent in 1988, 27 per cent in 2008, 21 per cent in 2009, and 22 per cent in 2011 respectively.

6.2.1 Norwegian Oil and Gas Industry

Oil and gas was discovered in Norway at the Ekofisk field in 1969 by Phillips while production commenced in 1971 (Sasson & Blomgren, 2011). In the first decades of oil and gas exploration, Norwegian participation in the development of the oil and gas industry was limited; engineering and procurement were mainly carried out in London (Hagen, quoted in Sasson & Blomgren 2011: 13). Majority of licenses were awarded to foreign oil and gas firms to operate and service or outsource oil field services. Statoil was established in 1972 by the Norwegian parliament with a direct operating license and in 1981, became the first Norwegian owned oil and gas operator and was later responsible for about 70 per cent share of production. Government currently holds 67 per cent stake in Statoil. Prior to 1981, Norwegian government introduced the use of Norwegian personnel as a criterion for assessing foreign petroleum firm’s applications for new licenses. To maintain level playing field in the Norwegian industry, the government decided in 1984, to split its engagement in the oil and gas industry making Statoil the main arm to participate in the concession rounds, while the second arm involves government’s direct ownership of stakes in oil-fields through the State’s Direct Financial Interest (SDFI) which was managed by Statoil until the SDFI went public in 2001, when the management was transferred to Petoro, a 100 per cent state owned entity established for that purpose.

The parliament resolved that 21.5 per cent of the SDFI's assets could be sold, of which Statoil was entitled to 15 per cent and 6.5 per cent was sold to other licences. Statoil was partially privatised and listed in June 2001 and in 2007 the company merged with Hydro, one of two earliest Norwegian licensees to strengthen the company for international expansion.\textsuperscript{38} Statoil is now responsible for over 70 per cent of oil and gas production on the Norwegian continental shelf (Sasson & Blomgren, 2011) and it operates about 80 per cent of production from the SDFI portfolio, meaning that the

\textsuperscript{38}Norway’s oil history in 5 minutes as published on the website of the Ministry of Petroleum and Energy: \url{http://www.regjeringen.no} September 2, 2013
choices made by this company have great significance for further development of the NCS and the SDFI according to Petoro.

Norwegian government’s holdings in oil and gas licences on Norway’s continental shelf (NCS) through the State’s Direct Financial Interest (SDFI) represents about a third of Norway’s total oil and gas reserves (Petoro’s 2012). The SDFI’s are managed by Petoro AS, with a mandate by Norwegian parliament to ensure the highest possible value creation through commercial operations that benefits Norwegian state as a whole.

Petoro safeguards government’s interests in relation to licences, operators, suppliers, and technological specialists and partners through collaboration and influence. It supports and challenge operators, performs independent studies and assessments with funds allocated to it through government budgets, as well as exerts its own expertise and capacities to fulfil these responsibilities while interacting with external expertise to supplement its intended 60 permanent staff to maintain a clean, effective, and flexible organisation. Petoro maintains total staff strength of around 70 employees at the time of writing.

The company is responsible for the state’s interests in production licences and other partnerships. The number of licences under its coffers is reported to have increased from 80 in 2001 to 158 at the end of 2012, spanning 33 production fields. It monitors the sale of the state’s oil and gas by Statoil under SDFI, accounts for the SDFI, and has the same rights and duties as other licences or partners on the NCS.

The Snohvit LNG plant located at Melkoya is operated by Statoil but jointly owned by the licences to the Snohvit field comprising Statoil with 33.53% interest, Petoro (30.00%), Total E&P Norge (18.40%), Gaz de France (12.00%), Hess Norge (3.26%) and RWE Dea with 2.81. Gas discoveries at the Snohvit field dates back to 1984 but proposals for LNG production were made by Statoil in 2001. Amidst controversies over the environmental sensitivity of the Barrent Sea and the plant increasing Norway’s total CO2 emission, the project was realised in 2007 with Statoil partnering Linde to develop specialised technologies to cater for these concerns. The LNG train has a 4.2mtpa capacity originally contracted to customers in Spain and United States of America but market developments have seen supplies being redirected to Asian market. However, the plant’s reliability has been a major concern due to recurring technical faults reportedly due to its construction outside Norway and a design that makes repairs lengthy. Snohvit’s proposed 4.3mtpa expansion targeted for production in 2018/19 suffered a setback due to investor’s preference for stability in the current plant over a brownfield project.

Growth in contribution of the oil and gas industry to the national GDP is not only attributable to increased production but the development of Norwegian based supplies, formed on the bases of knowledge and technological development of oil and gas equipment supplies on the NCS. Reportedly Norway’s largest mainland industry, with a nationwide representation and a turnover of NOK 360 billion in 2011 of which NOK 152 million were from abroad, the equipment supplies sector is Norway’s second largest

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39 Idem
export sector behind oil and gas, and the industry rests on decades of maritime expertise (Norske olje & gas, 2012).

Norway has produced about 40 per cent of the expected total oil and gas resources on the NCS as at 2010. 35 per cent are reserves yet to be developed, while 25 per cent were undiscovered resources, two thirds of which are expected to be gas and one-third oil. In 2011, twenty two new discoveries were made from exploration and 13 discoveries in 2013. Oil production has declined by 50 per cent since 2000 while gas is gaining prominence.

6.2.2 Maritime history and shipping policy

Norway’s maritime history dates back to the Stone Age (1500 BC to 500 BC) and the Vikings already introduced specialisation in merchant and warships in 800 AD, according to Wijnolst et al. (2003). Norwegian shipping industry went global in line with the industrial revolution in the 19th century and grew until its fleet was depleted during World War I (WWI). Following WWI, a boom in shipbuilding and emergence of aggressive shipbrokers in oil transport, Norway’s shipping industry recovered. The outbreak of WW II depleted Norway’s fleet and it witnessed another boom in shipbuilding with accompanying growth in the maritime industry spurred by growth in global demand.

Norwegian shipping industry suffered a decline as a result of a weak global demand for shipping following the 1973 oil crisis and competition from Asian countries in low cost shipbuilding. In order to stay competitive Norwegian ship-owners flagged out their vessels and Norwegian crews were replaced by cheaper foreign seafarers until the introduction of the Norwegian International Ship Register (NIS) in 1987 as an alternative register to the Norwegian Ordinary Ship Register (NOR), first, to maintain and develop maritime competence, while simultaneously countering ship-owners from flagging out their vessels (Tenold, S. 2000).

Prior to the NIS, only Norwegian owned vessels were allowed to fly Norwegian flag and prior to 1979 Norwegian vessels were not allowed to flag out (Tenold, S. 2000). Conditions for Norwegian Nationality were laid by The Norwegian Maritime Act 1893 and currently section 1 of the Norwegian Maritime Code 1994 ceding 60 per cent ownership and voting rights to Norwegian shipping companies. Government provisions for the flagging out of Norwegian vessels to mitigate high Norwegian costs were turned down by the parliament as a result of fears that foreign labour might push down salaries and labour rights (Gammelgaard et al., 2013). The approval came in 1979 as an alternative to the sale of the vessels to foreign companies following the 1973 crisis.

40 Five in North Sea, Five in Norwegian Sea, and three in the Barents Sea
41 Idem
42With later amendment up to 2010
43Cabotage
Ships registered under the NIS are not allowed to carry cargo or passengers in domestic trade between ports in Norway or transport passengers between Norwegian and foreign ports except for dispensation granted on a case-by-case basis (Shipping industry almanac, 2012). Oil and gas installations are regarded as ports under the provision. The introduction of NIS, a ship building credit scheme and more favourable taxation of KS-shipping companies delayed flagging out from Norway according to Tenold.

In 1996, harmonised tonnage tax system inspired by the Netherlands was introduced. Under the scheme, shipping companies are taxed on the tonnage of their ships rather than their income, and this spurred another recovery of the Norwegian maritime cluster with another dip after 2002 as we shall see in the next section.

Norwegian Maritime Advisory Board (MARUT) was established in 2004, to foster government prioritisation of the maritime industry to enhance value creation and international competitiveness, especially in the area of research with an annual budgetary funding of NOK 190 million. It operates as a cooperative effort of the Ministry of Industry and Trade Affairs, regulatory bodies and the maritime industry including educational institutions, Norwegian Research Council, Norwegian Ship-owners Association, Norwegian Confederation of Trade Unions and Norwegian Industry. MARUT is chaired by Trade and Industry Minister and it is charged with the responsibility of discussing the overall economic policy issues related to the maritime industry and to provide guidelines for its mandate. This led to strategic initiatives in Maritime 21 to establish a roadmap through co-operation, technological innovation and environmental value creation for maintaining Norway’s competitive edge by 2020. The establishment of MARUT underscores Norway’s transition from an industrial cluster to a knowledge based cluster while building the platform for linkages and co-operation within the cluster.

6.2.3 Shipping industry

Norwegian maritime cluster comprises three main groups (Jakobsen, in Wijnolst et al. 2006); Shipping, maritime services, and ship industry. These groups are supported by facilitating associations, maritime educational and research institutions, and maritime authorities and regulatory bodies. Norway’s industry weakness despite its relative completeness consists in the minor inclusion of ports in industry analysis. The shipping sector constitutes a larger share of the industry, contributing approximately 50 per cent of the maritime industry’s share of Norway’s GDP between 2002 and 2008 (Jakobsen, E., n.d.). The maritime sector’s share of Norway’s GDP grew from approximately 3.7 per cent in 2002 to over 5.5 per cent in 2008 and 2009, 3 per cent in 2010 (Gammelgaard et al. 2013) while value creation in 2011 constitute 5.3 per cent of GDP (Nor-Shipping, 2013).

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45 Comprising Tankers, bulk, rigs, offshore, containers ships, cruise & ferry, ship management
46 Ship broking, ship finance, classification, insurance, legal, shipowners, maritime consultants
47 Shipbuilding & repairs, ship equipment, naval architects, offshore exploration, and aquatics
48 Argument drawn from Wijnolst et al. 2003
49 Idem
Growth in the Norwegian industry is driven by the offshore segment and marine equipment with strong ICT connection in marine electronics constituting a move from low end price driven markets to specialised shipping and high end knowledge driven markets. Shipping, offshore and seafood industries recorded 212 new companies in Norway in 2010 and 2011.\textsuperscript{50} Value added in this segment grew from zero per cent in 2000 to 320 per cent in 2009 while deep sea shipping recorded a negative growth. This explains the minor emphasis on port activities in the cluster. While Norwegian controlled deep sea fleet declined considerably since 2002, there have been growths in offshore fleet, reportedly with an orderbook comprising 326 vessels worth $36.1 billion in 2012.

Major shipping companies located in Norway include BG Gas, Hoegh, Seadrill, Wallenius Wilhelmsen, Farstad, Teekay, Kavness, Norgas among many while Golar LNG is listed on the Oslo stock exchange. These shipping companies are instrumental to the internationalisation of the Norwegian cluster and the operational location of core and competence based activities in Norway, sustains know-how in market understanding, commercial, operational, technical and financial managements.

Norway hosts two of the top ship broking houses in Fearnleys and R.S Platou. Sizable ship management companies in BW Shipping Management, Belships Management, OSM Ship Management, and Thome Offshore Management. DNB and Nordea, two of the global maritime finance institutions are located in Norway, while Skuld and Gard with a combined 20 per cent market share in maritime insurance are headquartered in Norway. Norwegian Det Norske Veritas (DNV) classes 17 per cent of world fleet. Norway has 75 ship yards controlling 7 per cent share of the ship-building market according to Nor Shipping, and knowledgeable ship-owners.

Norway is ranked 7\textsuperscript{th} in the Paris MOU 2013 performance list with 1697 inspections and 24 detentions while special incentives are granted to ships meeting specific environmental requirements. Norwegian owners have since 1960 owned more half the Nordic fleet in Tonnage terms according Gammelgaard et al.

\subsection*{Knowledge infrastructure}

Norwegian maritime industry thrives on specialised knowledge, skills, and synergy. Investment in and collaboration with education and research institutions to attract young talents to the industry as well as create new knowledge are central to sustaining cluster growth and development.

According to Gammelgaard et al., the government launched a joint promotion of Mathematics, Science and Technology (MST) in 2006, with the aim of attracting young people to apply for mathematics, science and technology based education necessary to fulfill future maritime needs. Norway devotes 9 per cent of its GDP to education at all levels, above OECD average of 6 percent (OECD, 2013). Meanwhile, 96 per cent of expenditure on tertiary education comes from public spending, above the OECD average of 68\% and EU 21 average of 77\%. 23,400 new study places were planned for enrolment capacity expansion from 2009 to 2017, of which two thirds of these will be

\textsuperscript{50} See 21
allocated to mathematics, natural science and technology, health and social sciences, teacher education and early childhood education.

Norway had a lower proportion of doctoral candidates in natural sciences, technology and engineering relative to other Nordic countries prior to 2012. 18 per cent of Norwegian PhD candidates completed degrees in natural sciences, technology and engineering in 2010 relative to 36 per cent in Finland, 26 per cent in Sweden and 21 per cent in Denmark. In 2012, 1461 doctoral degrees were completed in Norway representing a 10 per cent increase over 2011 figures mainly from science based Universities. However, foreign students constitute 35 per cent of the doctoral degree.

Norway has four major nautical colleges:

- Hogskolen i Alesund, Alesund
- Hogskolen i Stord/Haugesund, Haugesund
- Hogskolen i Tromso, Tromso
- Hogskolen i Vestfold, Tonsberg

These Universities offer specialised courses in maritime economics, engineering and logistics. They are supported by a host of other Universities and colleges offering maritime courses at the graduate and undergraduate levels. In addition, BI in Oslo offers executive MBA in shipping, offshore, and finance.

Ocean Talent Camp (OCT) was launched in June 2013, following Nor shipping campus as a long term recruiting initiative for the maritime industry on the premises that growth in innovation can only be sustained with a steady stream of competent workforce. The OCT is aimed at exposing young students- 8th, 9th, and 10th graders to shipping, offshore and aquatic industry by introducing industrial materials into school curriculum on career guidance. OCT is hosted by Ocean Industry Talents (OIT), a reputation building initiative comprising the maritime industry and Universities for promoting the industry and accessing potential recruits.

51 Idem

52 See 14
6.3 Qatar

Qatar is a leading nation in LNG production and shipping. Its industry is driven by oil and gas exploration and production. Qatar’s coastline stretches 563 km53. It has a population of 2.015 million.54 GDP at current prices in 2011 was USD173 billion, a 50.39 per cent growth from 2008 figure of USD115.02 billion. GDP at 2005 constant prices in 2011 was USD115, 68 billion, while exports and imports as a percentage of this figure were 53 per cent and 23.08 per cent respectively.

6.3.1 Qatari Oil and Gas Industry

Oil was discovered in Qatar as early as 1939. Oil production started in 1947 and the first crude export was in 1949. The largest offshore crude field (Bul Hanine) was discovered in 1970 and came on stream in 1972 while the North Gas Field was discovered by Shell in 1971 (Teulings, A. 2012), with reported total recoverable gas of more than 900 trillion standard cubic feet (tscf) according to Qatar petroleum. Qatar Petroleum (then Qatar General Petroleum Corporation) was established in 1974 as a state owned entity with responsibility for all the activities in the oil and gas industry including exploration, drilling and production, refining, transport, storage, marketing and sale of all energy products. QP’s operation is directly linked to state activities. Its current Chairman and Managing Director Dr. Mohammed bin Saleh Al-Sada doubles as Qatar’s Minister of Energy and Industry, while QP’s 9 subsidiaries, 19 JVs, 8 sub-subsidies55, sub-JVs56 and other investments cut across varieties of industries within and outside the energy sector.

QP’s strategy is to participate in exploration and production through Exploration and Production Sharing Agreements (EPSA) and Development and Production Sharing Agreements (DPSA) in partnership with major international oil and gas companies in return for their expertise and finance. The company was responsible for 41% of production in the oil and gas fields in 2008 and 40% in 2011.

Gulf drilling international was incorporated in 2004, as a Joint Venture company between Qatar Petroleum 60% and Japan Drilling Company 40%. QP’s holding was later increased to 69.99% upon exercising an option within the Joint venture agreement and subsequently transferred the holding to Gulf international services. Gulf drilling owns 9 rigs, all contracted to QP or its affiliates.

Qatar Gas (QG) was incorporated in 1984 as a Joint venture of QP, British Petroleum (BP) and CFP (Total) to develop and process natural gas from Qatar’s North field for LNG production but did not start production until 1998. Shipping was interrupted in the Persian Gulf as a result of the war between Iran and Iraq. Concerns about capital redundancies and security of supply by Japan disrupted agreements, resulting to project delay (Teulings, 2012). QGPC initiated a three phase plan starting with the development of gas production for domestic consumption. The second phase was the

53 See 1
55 Subsidiaries of QP’s subsidiaries
56 Joint ventures of QP’s subsidiaries
development of an export pipeline to supply Dubai, Bahrain, Saudi Arabia, and Kuwait which did not come to fruition due to political tensions; Saudi’s refusal to grant pipeline passage through its waters due to the discoveries of its own gas reserves, and Kuwait’s invasion by Iraq as well as Qatar’s border dispute with Bahrain, left Qatar solely responsible for the project. The third phase of the QGPC development plan was to build liquefaction facility for LNG export, shifting its energy portfolio towards natural gas.

BP withdrew from the Qatar Gas project in 1992 due to corporate crisis, limiting its ability to invest in new projects. The first LNG was reportedly delivered to Japan in October 1996 (QP, 2011). Exxon Mobil stepped in, and in 1997 QG 1 became a JV of QP (65%), Mobil (10%), Total (10%), Marubeni (7.5%) and Mitsui (7.5%), with US, French and Japanese interests respectively. Qatar Gas1 started production in 1998 with two LNG trains for a capacity of 6.4mtpa per annum and later reached 10mtpa per annum with the completion of train three in 1999, to supply to Spanish and Japanese markets with 10 dedicated LNG fleet and 5 chartered-in vessels. QG’s production capacity as at December 2012, was 42mtpa per annum, given the addition of 4 mega trains with a production capacity of 7.8mtpa per annum respectively. QG 2 in 2009; train 4 owned by QP (70%) and Exxon Mobil (30%) and train 5 owned by QP (65%), Exxon Mobil (18.3%), and Total (16.7%) reportedly the world’s first fully integrated LNG supply chain with 14 fleet of Q-Flex and Q-Max LNG vessels to supply terminals in United Kingdom, US, Asia, and Europe respectively. QG 3 in 2010; train 6 is owned by QP (68.5%), Conoco Phillips (30%), and Mitsui (1.5%) with a fleet of 10 LNG vessels predominantly to supply US, Asia, and European markets. QG 4 in 2010; train 7 owned by QP (70%) and Royal Dutch Shell (30%) with a fleet of 8 Q-Flex and Q-Max vessels, mainly to supply North America, Asia and Middle East markets.

Ras Gas company limited (Ras Gas) was established in 2001 as a Joint Stock company of QP (70%) and Exxon Mobil (30%) to develop, operate and manage all projects associated with the production and exporting of LNG and related products. Ras Laffan. It currently operates 7 trains with a total production capacity of 36.3mtpa. Ras Laffan (RL) 1.Was established in1993. It started operations in 1999 with QP, Exxon Mobil, Kogas, Itochu, and LNG Japan as owners and currently operates 2 trains with a production capacity of 6.6mpta aimed at Asian market. RL2 was established in 2001, reflecting Ras Gas ownership structure of QP (70%) and ExxonMobil (30%) with trains 3 aimed at Asian market, 4 aimed at European markets, and 5 aimed at Europe and Asian market, and started production in 2004, 2005, and 2007 respectively. Each train has a capacity of 4.7mpta and a total capacity of 12.21mpta. RL3 was established in 2005, with the same ownership structure as RL2. It came online in 2009 and 2010 respectively, each of 2 trains with a capacity of 7.8mpta aimed at North America, Europe, and Asian markets, and a total capacity of 16.5mtpa. RG’s supply chain is less integrated and flexible with a customer base spanning Korea, India, Italy, Spain, Belgium, Taiwan and United States while its dedicated fleet of 27 LNG ships is based on Long term charter agreements.

57 Idem
Qatari government placed a moratorium on further project development at the North field in 2005, in order to evaluate the field for effective utilisation of its future resources and to complete existing projects approved under the moratorium reportedly due for completion in 2014 vis-a-vis other ambitious National projects. Qatar’s LNG production is expected to remain constant in the near term, an implication of a stagnant growth in the demand for LNG shipping in Qatar, in the event of the exhaustion of the existing capacity.

Qatarisation\(^{58}\) plan was established with the goal of ensuring 50% participation of the national work force in the energy sector. Percentage of national workforce permanently employed in the industry at the end of 2011 was 21%.

6.3.2 Maritime history and policy

Early shipping history in Qatar is that of a trading and trans-shipment center, dating back to the 3rd and 2nd millennium BC. The Arabian Gulf served as a trade center linking West and East. Qatar participated in purple dye and precious pearls trading with links to the Greeks and Romans, later the Portuguese, British, and Turkish. However, Qatar’s shipping sector emerged with the development of LNG.

6.3.3 Shipping industry

Qatar’s shipping sector is rooted in partnerships with foreign companies, public-private co-operation and government financing. The industry lacks the requisite foundation of a maritime nation and active local participation in shipping started with the establishment of Qatar shipping (Q-Ship) in December 1992. Q-Ship was listed on the Qatar Exchange with ownership structure comprising QP (18%), Qatar Navigation (now Milaha, 15%), individual public (40%) and other companies (27%). Q-Ship became wholly owned by Milaha- a publicly listed company incorporated as a shipping agent in 1957, now a fully integrated maritime and marine logistics company. Q-ship is a founding holder of 15 per cent share in Qatar Gas Transport (Nakilat) and also holds a 50:50 joint venture established in 2008, with Nakilat for ownership and management of four LPG carriers. QP has a vested interest in Nakilat (10%), Milaha (9.4%) and Nakilat Shipping Qatar Ltd. (5%).

In 2004, Nakilat was established as a Joint stock shipping company to cater for Qatar’s LNG shipping. The founding share-holders held 50 per cent share, while 50 per cent is traded on the Qatar Exchange. However, it has transformed to an integrated marine company with operations spanning LNG, LPG, ship-building, ship repairs and fabrication via joint ventures with Keppel Offshore and Marine (N-KOM) and Damen Shipyards (NDSQ).

Nakilat boasts of 54 LNG vessels, reportedly the largest fleet of LNG carriers in the world and have arranged $917 million refinancing with Qatar National Bank (QNB), for additional 25 LNG vessels secured on a 25 year charter. The company has also increased its stake in Maran Nakilat Ltd., a JV agreement between Maran and Nakilat for additional 2 LNG vessels to be delivered in 2014. The nature of JV agreements is evidenced by Nakilat Teekay Ltd.; a JV agreement between Nakilat and Teekay. The company is wholly owned by Teekay with charter agreements, allowing Nakilat an

\(^{58}\)Qatari local content development
option to exercise purchase right up to 30 per cent stake in the vessels. Majority of the vessels chartered in by Nakilat are under a one ship company agreement in partnership with the companies. This gives the company some flexibility and the opportunity for building reputation through relations with leading shipping companies.

The extent of local know-how in the Qatari shipping sector can best be captured in Nakilat managing director’s message;

‘In 2012, our wholly-owned subsidiary, Nakilat Shipping Qatar Limited (NSQL), took on the management and operation of its first four ships, adding the roles of ship manager and operator to Nakilat’s portfolio of activities for the first time. The long-term objective is for the transfer of management and operations of all Nakilat’s wholly-owned ships to NSQL’.

Knowledge gap in the sector is compensated by Qatar’s attractiveness for foreign talents and professionals.

Internationalisation in Qatar’s industry is strongly linked to LNG. The LNG arm of Qatar Petroleum Investment (QPI), a wholly owned subsidiary of QP, is responsible for LNG terminal investments.\(^5^9\) QPI’s investment covers three LNG terminals; Adriatic terminal (22%), South Hook (67.5%) and Golden pass (70%).

The Qatari national flag was not included in the Paris MOU 2013 performance list.

6.3.4 Knowledge infrastructure

Qatar’s transition to an efficiency driven country is leveraged on international workforce. Education is outward oriented. Scholarships are granted to students to study at foreign institutions. However, new trends have emerged in the foreign institutions locating satellite campuses in Qatar. It invested 4.1% of its GDP on higher education in 2012.

Qatarisation stretches through the shipping sector. Marine cadet program was established to develop nautical competences among Qatari nationals on scholarship. Candidates for the program are sent to International Maritime College Oman (IMCO) reportedly under close supervision by Nakilat personnel. The first set of 4 candidates signed up for the programme in September 2013, with plans to train minimum of 10 cadets annually. However, Qatar shipping offers ship management services in Qatar and established Qatar Shipping Company (India) Pvt Ltd., Mumbai in 2008, to improve the quality of the officers and crew recruited according to Qatar Shipping. This suggests that crews are recruited from India to meet local demand.

\(^{5^9}\)In line with section of this study
6.4 Conclusion

There is a mis-match between oil and gas history and industry maturity in Nigeria. Nigeria commands a modest annual oil and gas industrial contribution to GDP, relative to the scale of operation in the oil and gas industry. Factors contributing to the disproportionate productivity include the lack of local competence and capabilities, and lack of capital put differently and lack of government investment.

Industrial strategy has been based on short term capital requirement and earnings over long term returns in competence development until the introduction of the NOGICD Act 2010, to improve domestic value creation. Competence and capital gap spreads across the ocean industries influencing maritime policy, shipping and education. Industry synergy is non-existent with the implication of a weak domestic industry. And there is lack of direct government investment in maritime education and research activities, while government’s direct involvement in shipping has proven to be in-efficient due to undue political and ethnic influences in the past.

Norway’s industry is knowledge based with considerable government’s direct investment in competence development following the implementation of a local content development. Norway commands an impressive oil and gas industry contribution to GDP stemming from productivity growth and the development of Norwegian based equipment supplies through investment in research and technological innovation supported by adequate capital attractiveness.

Oil exploration and production is state controlled, leveraged on effective and efficient institutional framework and domestic pressure to innovate. The oil and gas industry is supported by strong maritime and shipping competences focused on innovation, synergy, internationalisation, knew knowledge creation, strong ICT connection and attractive education supported by direct government investment in competence development and research activities.

The foundation for Qatar’s industry consists in efficient government institution, government investment in knowledge and competence, talent attractiveness, efficient service delivery, long term customer relations, effective co-operation, collaboration, and economic integration.

Qatar’s shipping sector is rooted in partnerships with foreign companies, public-private co-operation and government financing. However, lack of domestic maritime education, infrastructure and recruitment from foreign countries, serve short term needs and may be least sustainable in developing the maritime sector in the long run.
7 Cluster dynamics in the Nigerian maritime sector

The dimension of location attractiveness and industry competitiveness describes the conditions under which shipping companies can excel.\(^6\) The extent that firms can benefit from these dimensions depends on the extent that they can create a dynamic environment. Cluster upgrading mechanisms identified in section 3.7 are residual in a dynamic environment. In this context, dynamism is a function of competitive linkages, co-operative linkages, knowledge and infrastructure upgrade. Based on the results of an online survey received from industry professionals, desk research, interviews and expert opinion, the interaction between these mechanisms within the Nigerian maritime sector is examined in this chapter.

7.1 Competitive linkages

Nigerian shipping sector is evolving from the doldrums of the 1990s and early 2000s, to an active industry as a result of the local content. From a location perspective 70.37 per cent of respondents consider the industry as an emerging cluster, while 26.63 per cent of respondents consider it as a potential cluster. The availability of requisite human resource base necessary for the attractiveness of the Nigerian industry is deemed moderately available by 66.67 percent of respondents possibly signifying insufficient industrial skills. To the extent that there is free mobility of labour this might not be an issue. However, local content puts a restriction on foreign firms in exercising that international mobility in sourcing competence, and might affect location decisions. Overall, Nigeria as a location is considered very attractive by 50 percent of respondents with considerably high entry barrier at an average rating of 2.80 of 4 and a moderate exit barrier at an average rating of 1.96 of 4.

Sub-clusters are deemed to be relatively more competitive with an average rating of 2.88 over the domestic market's rating of 2.67 as indicated in Figure 12. This reflects industry maturity and the scale of local shipping firm's engagement or competitiveness. More competitive domestic environment signifies more matured industry, more competitive shipping firms and potential to internationalise.

\(^6\) Line of argument drawn from Sasson and Blomgren, 2011
On the other hand, there is little difference in the extent what the domestic customers are demanding compared to international customers, with an average rating of 3.29 and 3.22 of 4 as shown in Figure 13 respectively. This indicates that there is pressure to innovate, with the implication that less competitive shipping firms will be forced out of the market.

Companies with low efficiency, poor management, service level, and poor maintenance culture stands little chance to favourably compete. The concentration of such firms within industry structure weakens the cluster. In this regard, absolute enforcement of local content may lower overall productivity.

Highly educated maritime labour (3.56), skilled maritime labour (3.50), and communication and internet facilities (3.44) are considered most essential for firm competitiveness by respondents, while these three are subordinated by foreign direct investment (3.40), maritime infrastructure (3.38), credit finance (3.38), and co-operation.
with other companies (3.13), all out of a ranking of 4 (essential). The emphasis on skills is in line with respondents’ choice of competence development as the main strategy for competitiveness and it is largely supported by long term customer relations product and technology development with 3.19, 3.06 and 3.13 rating of 4 respectively.

For future firm competitiveness, 13 of 27 respondents submitted their views. 36 per cent considered training and competence as important for future competitiveness of their firms; access to finance represents 18 per cent; improved legislation, local content development, stability of the maritime environment, and improved electricity supply were all rated by 10 per cent as important.

7.2 Co-operative linkages

Maritime is a global business. The extent that firms can benefit from their productivity and ability to innovate depends on the conduciveness of the environment. This can be exerted from top-down or bottom-up. Conduciveness from a firm perspective is a function of innovation, co-operation, and collaboration.

Assessment of the co-operative efforts in the process of innovation indicates that customers, suppliers and maritime consultants are the main source of generating new ideas, processes, products, and services in the maritime sector. This is supported by the fact that customers in the sector are demanding. On a scale of 1 (no co-operation) to 4 (strong co-operation). Figure 14 shows that there is considerable co-operation with lots of room for improvement. Respondent’s ranking on strong co-operation are: customers (33.33%), suppliers (13.33%), Maritime consultants (12.50%), Universities and research institutions (6.67%) and competitors (0%); while overall average rating were 3, 2.73, 2.56, 2.27 and 2.33 respectively. It is important to note that innovative linkages with Universities and research institutions necessary for knowledge upgrade ranks lowest.
There is moderate co-operation among local and domestic firms, while co-operation among international firms is considerably stronger. This has an implication on the pattern of competitiveness. Ranking based on strong co-operation indicates that the strength in local co-operation (5.56%) is weak, domestic co-operation (0%) is non-existent, while international firms (23.53%) are stronger at co-operating, however, overall ratings on co-operation are 2, 2.06, and 2.76 of 4 respectively. Further look into the reason for the weakness in co-operation, indicates that the level of trust among domestic firms is low. This is supported by 82.35 per cent of respondents to the question as indicated in Figure 15 below.
Knowledge and awareness are keys in the process of innovation, co-operation and collaboration. While such knowledge can be gathered in the process of co-operation with other firms, relations with educational, training and research institutions provide a direct knowledge feed. Assessment of the extent of collaboration between these institutions attended to by 16 of the 27 respondents indicates a relatively low relation; 31.25 per cent close relation, 43.75 per cent sporadic relation and 25 per cent no relation. Findings on the reasons for the low relations attended to by 11 respondents point to low quality of maritime educational and research institutions as shown in Figure 16.
One factor to consider is the way firms within the industry perceive knowledge institutions\textsuperscript{61} and the benefits accruable from their collaboration with such institutions. Regardless, the results also show that there is a lag in the specialisation of research institutions. This signifies that educational and research institutions equally have a responsibility to develop knowledge bases that are most relevant to industrial needs.

7.3 Competence development

Cluster productivity is increasingly dependent on the human resource knowledge base. Access to requisite know-how and the ability to channel the knowledge for productive use is essential to firm and industry competitiveness. Results from 16 of the 27 respondents on the sources of firm competence development in Figure 17 shows that recruitment from educational and research institutions ranks lowest.

\textsuperscript{61}Educational, training and research institutions
This can be partly explained by the perceived average quality of maritime education and lack of confidence in the system expressed in Figure 18 below. The perception in this regard is that the quality of institutions influences the quality of graduates and their productivity, but graduates—considerably out of school for at least one year or mostly underemployed, might be more exposed to work environment, life’s experiences and learning to shorten the overall learning curve. Firms preferably recruit graduates and invest in on-the-job training and internal courses as indicated above.

**Figure 17: Sources of firm competence development**

Source: Survey result, 2013
This has a cost implication on firm activities and partly explains the considerably high investment in training in the last year as indicated in Figure 19 attended to by 17 of 27 respondents. On the other hand, investment in research is perceived by interviewees from two perspectives. First, perceived indirect investment through contract earnings deduction as contribution to the Nigerian Content Development dominates responses. Direct investment is considered to be largely donations to research institutions within the local community, especially the oil producing communities.
Highly skilled and knowledgeable employees are considered essential to the sector and there is considerable labour mobility within the industry to facilitate knowledge externalities as earlier indicated in figure 16.

Challenges for the competitiveness of firms within the industry in the immediate future are considered to be largely availability of competent human resources and access to affordable capital. This is subordinated by growth in competition, inconsistent government policy and maritime security. At the industry level, two thirds of respondents consider human competence development essential for the competitiveness of Nigerian maritime sector, while this is subordinated by the establishment of a Maritime Bank by government, transparent policy on maritime training and development, emergence of a regulatory agency, improved port infrastructure and efficiency of operation, finance and local content implementation.

On perceptions about public policy in relation to oil and gas, maritime education and shipping; on a scale of 1(poor) to 4(excellent) respondents considered oil and gas policy to be 2.13 -slightly above average, while policy on maritime education and shipping were rated 1.67 and 1.88 - both below average respectively.
7.4 Analysis of findings

The objective of this study is to explore and propose recommendations on how the competitiveness of the Nigerian LNG shipping can be improved and how competences and value creation in LNG shipping sector can be leveraged to develop complementary shipping sectors and industry wide maritime resources in Nigeria. However, analysis will be considered in a global context to identify with differences in cluster and industry characteristics in relation to the Nigerian context. A top down approach is adopted by first, considering cluster characteristics; secondly, location attractiveness; thirdly, industry competitiveness, and fourthly, shipping company competitiveness.

7.4.1 Cluster characteristics

This study has established that the development and competitiveness of a maritime cluster resides in sustainable creation of knowledge, concentration (critical mass) of the knowhow base and the extent that the knowledge interacts within the cluster; contingent on the location attraction and industrial competition.

Clusters require a reasonable level of critical mass to develop. Nigeria may be disadvantaged in terms of geographical location and port draft. First as a distant location from major trade lanes; secondly, due to its modest port draft that may have an implication on the scale of operations. The drive for clustering will be internally generated and dependent on sustainable economic growth; the demand for Nigeria’s exports, domestic demand for imports, increased localisation of firms, specialisation and productivity growth.

Over two thirds of survey respondents consider the industry as an emerging cluster, while all the respondents believe that Nigeria has the potential to be an internationally competitive cluster. Some industrial views also likened local content policy to cluster initiatives, however, a maritime cluster expert interviewed commented:

‘Indirectly local content policy may have an important, and even critical, role in cluster development, but I would not consider it a “cluster initiative”. More a strategy for cluster development.’

Much as there are cluster tendencies within the Nigerian maritime sector, especially as a result of local content policy, development of a “Nigerian maritime cluster” will be contingent on the factors mentioned in the first and second paragraphs of this section. The expert commented further that:

Knowledge creation and dispersal is crucial for cluster development. Small, entrepreneurial companies that serve the large oil producers and oil service companies have to continuously upgrade their skills and knowledge base, co-operate with other companies to gain synergies, size, and grow to be able to conduct larger and more advanced projects. The companies should share information, co-operate, and allow transfer of key personnel between the companies.

Competitive domestic industry is required for knowledge creation, upgrade and dispersal. As indicated in section 7.1, the Nigerian maritime industry is evolving; industry maturity is at its early stage and the domestic market is relatively less competitive, signifying that majority of the local shipping companies serving the large
oil producers, may lack the requisite knowledge. Other arguments for low demand condition in the Nigerian industry have been the lack of finance for local firms and purportedly, monopoly of shipping activities by “foreign shipping companies”, with the implication of capital flight. Nevertheless, the reality is that none of these scenarios is healthy for industrial development. It however points to the need for government to maintain a balance between the local content and stimulating the competitive environment for upgradation on innovation, capabilities and service standards.

The essence of co-operation is to engender agglomeration effect for synergy among firms to facilitate cost efficiency, knowledge spillover and specialisation. A combination of desk research, survey results and interviews with industry professionals indicated that there is knowledge gap within the industry; co-operative efforts among domestic firms to aid knowledge spillover and information flow is weak; the level of trust to create informal relations, synergy and allow possible transfer of key personnel between companies is low; local maritime labour pool requires upgrading and expansion for sustainability; and the quality of maritime education to provide institutional knowledge flow to the industry for competence development is average, all serving as disincentives to cluster formation.

Further, this study has established with lessons from Norway and Qatar, that sustainable industry development requires a strategic direction in investment and competence development, based on the prioritisation of the maritime sector as an engine for economic growth of which direct government funding should be committed. For example in the case of Norway, government’s prioritisation of the maritime industry is evidenced by MARUT with a mission to enhance value creation and internationalisation through a research and innovation strategy in maritime 21court ing an annual budgetary funding from government.

On the contrary, Nigeria is lacking a strategic direction for the maritime industry. Government investment in maritime competence and the development of maritime knowledge infrastructure to support the industry, whether direct or indirect, is less than proportionate to make meaningful leap towards sustainable industry and cluster development. There is equally an implementation gap in the event that policies from other locations are adopted, whether effective or otherwise.

These challenges stem from insufficient industry knowledge and competence among policy makers, regulators, administrators and industry professionals as well as corruption; institutional inefficiency; lack of transparency; undue government influence; and nepotism that characterised the Nigerian environment.

Although the challenge is partly institutional, lacking the knowledge basis from the highest point of the industry constitute a weakness in cluster development. Thus there is need for knowledge upgrade in these quarters.

Mindful of this need, lessons from the Norwegian industry indicates a collaborative effort between education and research institutions and industry. In Nigeria, collaborative linkages with maritime and research institutions is relatively low as a result of the quality of maritime institutions, innovative linkages with the institutions is low, and it ranks lowest as a source of competence development. Given that this is the nucleus of cluster development, it is necessary to improve and maintain the quality of maritime education to guarantee the much needed knowledge feed for sustainable
development bearing in mind that this is a systemic problem and further establishment of multiple maritime educational institutions may not guarantee quality.

Where the right incentive exists within the Nigerian maritime industry; whether for shared benefits or sufficient for individual firms’ investment benefits, the IOC’s may assume the role of leader firms. More importantly, the NLNG/Bonny Gas Transport shipping being the leading home shipping company with vested interest from the IOCs. Cluster development will be contingent on the behaviour of these firms towards competitiveness, cooperation, competence development, further investment for critical mass, networking into complementarities, and internationalisation subject to policy, political and social stability, institutional efficiency and the corporate culture in the supposed leader firms.

From a network external perspective, inter-firm and cross sector investment improves both network competition and cluster development. This is the case in Qatar; Nakilat taking the lead role in co-ordinating and creating new opportunities for a network of shipping, ship management, shipping agency, integrated logistics, and ship building and repair companies. Norway as most European clusters on the other hand takes a bottom up approach; inter-firm net-working and investment is stirred from small and medium scale firms at the same level, though supported by integrated government policies with probably less co-ordinating role for leader firms due to the presence of more leading firms within the cluster. The difference in approach may be attributed to industrial and economic maturity. For Nigeria, the Qatari case appears to be more realistic.

From a cluster externalities perspective according Nijdam and De Langen (2003), the IOCs, NLNG/ Bonny Gas Transport shipping assuming leading firm positions should invest in training and education, knowledge and information infrastructure, and organisational infrastructure for industry wide benefit. However, such investments pose a collective action problem and may be attributable to governance and cultural contexts. European clusters may be successful at managing such challenges as a result of efficient institutional frameworks and informal bottom up relations while collectivism peculiar with Middle East and Asian countries evidenced by the Qatari regime creates a natural environment that fosters investment for shared interest and benefits.

Nigeria is an individualistic society; power distance dominates the fabrics of relations; trust is low; cooperation when it exists is transaction oriented; organised industry investment for shared benefits is to this point alien and this poses a challenge for cluster externalities. This is evidenced by the NLNG and NIMASA face off through 2013. In addition, Musa Yahaya in his 2011 ’Seafarers Competence and the Development of LNG Shipping Capacity in Nigeria’ commented:

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62Bearing in mind that government has a stake
interview shows that Nigerian LNG is not aware of the seafarers’ development program run by NIMASA to train manpower for Nigerian maritime industries despite the aim of the two year old project to involve private sector. Furthermore, the company shows skepticism to partner the project because of the inconsistency and continuity of government project. Despite the surrounding circumstances, the company commended the project for its policy objective.

To be specific on training and educating the labour pool for industry benefit, one of the disincentives for organisations investing in human resources is the fear of retention motivated by loss of competition. The challenge for cluster development is first, ensuring sustainable competent human resources; secondly, labour mobility; and thirdly, retaining talents within the cluster, leading to collective action problem. Policy consideration will have to accommodate incentive to facilitate inter firm labour mobility.

Dealing with collective action problems requires the presence of intermediaries. Examples can be found in Norwegian MARUT and the Dutch Maritime Cluster Association (DMC). Within the Nigerian context, responsibility for such organisations will include but not limited to fostering knowledge creation and diffusion, aligning interests and co-operation among firms, dialogue between government and private sector, improving service standard, while ensuring cluster attraction and investment inflow subject to a collective vision of the future of the Nigerian maritime industry.

From the fore-going discussion, policy dimension will encompass the three scenarios proposed by Wijnolst et. al., (2003). First, to stimulate the concentration of local actors for critical mass by creating links to external resources and acquisition; secondly, stimulate collaborative efforts to counteract the lack of mutual trust; thirdly, local mobilisation and external networking for sustainable specialisation.

7.4.2 Location attractiveness

In this section, location attraction is established on the availability of competences required for the location of maritime businesses, quality of infrastructure; maritime transport and ICT, and industrial entry and exit policy.

From a resource perspective, maritime skills in the Nigerian maritime sector were considered moderately available, where as availability of highly educated and skilled maritime labour is considered by industry professionals to be most essential for firm competition. Firms will locate where resources can be competitively accessed. Limitation on foreign human resources through the local content cum Nigerianisation policy, indicates that companies’ capability to execute their activities in an effective way will be contingent on the local availability of the requisite competent human resources. Although waivers are allowed where requisite competences are unavailable, such waivers constitute a mitigating measure and may not in itself create an incentive for location attractiveness but worse in the Nigerian context, constitute missed opportunity in using the large labour pool as an instrument for location attraction.

63Line of argument drawn from Jacobsen et al. 2003
Secondly, maritime labour skill is communication and internet facility. Communication and internet facilities in the Nigerian environment are rated average by industrial professionals. This is essential for business communication and information flow, especially for shipping companies considering market volatility and efficiency of business processes for value creation. Generally, ICT adoption for productivity both in the private and public sector is low partly due to inadequate ICT infrastructure. The implication for businesses is high transaction cost, whereas increased adoption and improved ICT efficiency will aid industrial productivity, transparency of public processes and may serve as an incentive for location attraction and cluster formation.

The quality of maritime infrastructure in the Nigerian domain is considered average, whereas this is essential for competition. Adequate infrastructure; ports, roads and railroads aid the efficiency of logistics operation that may serve as an incentive for location attraction. Prior to the establishment of the Nigerian Sovereign Wealth Fund (SWF)\textsuperscript{64} investment in maritime infrastructure has been based on a combination of direct government investment and concessions to the private sector. However, part of the mandate for SWF is the development of maritime infrastructure. The possibilities for project development are yet to be known at the time of writing whereas investment is expected to command returns from executed projects for reinvestment.

Entry and exit barriers may have an effect on cluster formation. Whereas the extent of this effect may not be easily captured and could be an area for further research, especially for African countries on the development of the envisioned “African Network of Maritime Clusters” and campaign to attract foreign direct investment to the shipping sector relative to cabotage. While survey results indicated a relatively high entry barrier, the reality for Nigeria is that the political, institutional and business environment is relatively more risky and 64 per cent ownership under the cabotage law may be unrealistic, compared to better stable countries like Norway (60%), though implementation gaps have to be considered. Business judgements or location decisions will have to weigh risk factors in deciding a high entry and exit barrier and may be subjective depending on individual company’s risk appetite. However, relaxing entry barrier while creating economic exit barrier such as the European tonnage tax system will help to attract companies to the Nigerian maritime industry and retain such companies subject to political and social stability.

Nigeria’s attractiveness as a location for maritime activities will require adequate maritime labour skills, improved maritime infrastructure and ICT, and a friendly maritime and regulatory policy supported by a stable political and social environment.

\textsuperscript{64} The Nigerian Sovereign Wealth Fund is adopted from the Norwegian Government Pension Fund aimed at reinvesting oil revenues into the economy.
Industry competitiveness has been considered on the premises of industry structure for efficiency and effectiveness, synergy and competence development. The succeeding paragraphs put these into perspective.

Establishment of a 30 per cent privately held National Oil Company (NOC) has been proposed to substitute NNPC's inactive commercial role in exploration and production under the PSC, while an Asset Management Limited Liability Company (AMLLC) shall be responsible for managing the JV assets on behalf of the Nigerian government. With the unbundling of NNPC, the NOC and the National Petroleum Development Company (NPDC) will supposedly be capitalised with PSC assets, while the AMLLC is to be capitalised through an initial two year loan followed by an expected self-financing from retained earnings. Also, two regulatory institutions with responsibility encompassing commercial and technical regulation for the up-stream and down-stream sectors have been proposed. However, this raises questions of structure for efficiency and effectiveness, funding and competence development for sustainability.

On structure, the need for an efficient and effective institutional and organisational framework cannot be over emphasised. In this regard, two issues are worth considering; responsibility overlap and the extent of integration among organisations in the industry. At the time of writing the full functions of each of the above organisations are yet to be clarified, a close assessment indicates that there is a possibility of three regulatory inspectorates in the industry comprising the Department of Petroleum Resources (DPR) supposedly responsible for regulatory activities and the two proposed up-stream and downstream inspectorates. Depending on the functions, creation of a new up-stream regulatory inspectorate will raise questions of either the relevance and competence of the DPR or the necessity of a split between technical and commercial supervision in the up-stream and asset management, which seems to be a modification of Norway's Petoro AS. Also, questions should be raised on the relevance of the NPDC in the event of establishing an NOC, while the equity composition in the AMLLC shall speak volume of the strategic direction on the JV agreements. Although it appears too early to make judgements on the newly proposed Nigerian model, a simple, flexible and competence based institutional and organisational framework evidenced by the Norwegian oil and gas industry comprising the Ministry of Petroleum and Energy, equivalent of the Nigerian Ministry of Petroleum Resources; the Norwegian Petroleum Directorate, equivalent of the Department of Petroleum Resources; Petoro AS, probably an equivalent of the proposed Nigerian up-stream inspectorate and AMLLC; Statoil, an NOC equivalent; and Gassco AS, a possible equivalent of the Nigerian Gas Company. In other words, we can deduce that there is a semblance in the Norwegian and the proposed Nigerian industry model. However, there is need to avoid the multiplicity of institutions, overlapping responsibilities and encourage lean, competence based organisations or parastatals. On the other hand, there is also the need for integration to avoid the traditional organisational silos peculiar with the Nigerian industry. Inter organisational investment

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65 A fully owned subsidiary of NNPC currently responsible for oil and gas exploration and production
66 NNPC has reportedly assumed regulatory roles due to DPR's lack of competence
will help to build relations and cluster the industry as evidenced by the Norwegian and Qatari industries.

The Minister of Petroleum Resources in her ‘The Future of Nigeria’s Petroleum Industry’ address puts the state of funding into perspective:

*Funding and the capitalisation of the new national oil company in the midst of competing demands by other sectors of the economy would continue to require attention*

‘Rising cost of exploration and production especially in the deep-water mainly as a result of rising oil prices. These rising costs also means increased competition for government funding in the sector amidst other priorities’

‘Some of our indigenous contractors lack proper business structure; they are small, fragmented and often times incapable of packaging or attracting loans. Only a few of them can deliver turnkey projects without resorting to some form of partnership agreement for equipment, expertise or technical support’

‘...some of our local banks also lack the financial base to make any meaningful impact on local content development. Even the biggest Nigerian banks are limited when it comes to energy financing although a couple of loans syndication has recently been achieved’

Perhaps, this partly explains the need for a self financed asset management company in comparison to a budgetary financed Petoro AS, while NNPC is reportedly considering the bond market as an alternative funding arrangement in its JV with Mobil Producing Nigeria Limited. Much higher private sector participation above the proposed 30 per cent may be ideal to effectively capitalise the National Oil Company.

Industry professionals are averagely content with the Nigerian oil and gas policy, whereas shipping and maritime education policies are considered below average. Policy effectiveness is considered based on the implementation of local content, which provides for both local engagement in oil and gas and maritime activities. Reservations on maritime education and training policy was expressed in lack of a transparency. Part of the challenge is that these policies are seen in isolation whereas there is need for an integrated policy to encourage synergy and industry wide value chain competitiveness.

Effective interaction of the LNG shipping sector with other related sectors; horizontal diversification and integration; and backward vertical and forward vertical integration, is currently lacking or insufficient relative to Qatar or Norway, by industry maturity. An expert commented:

‘It’s a point to point business today. It has to become a net-worked business’

From a cluster perspective, the know-how base of LNG shipping will be necessary to be able to command foreign direct investment for expansion, as well as net-working complementary to industrial development, though complementary sectors are lacking in competences and capabilities. As indicated in section 7.4.1, low level of co-operation and trust among domestic firms, contributes to industrial fragmentation and lack of
competition, while low quality of educational and research institutions, as well as non-existent knowledge infrastructure, accounts for the relatively low collaboration with knowledge institutions to provide the necessary support in institutional knowledge supply to the industry.

On competence development, investment in knowledge has been externally focused at the expense of local productivity. Although, government’s proposed local investment in maritime knowledge infrastructure suggests a future re-direction of scholarship grants by NIMASA to local institutions. However, at the time of writing, both the NIMASA and PTDF scholarship grants are both executed abroad with accompanying capital flight and missed opportunity in knowledge clustering. In this regard, such scholarship grants if re-directed into the industry will boost local productivity.

Facts about the pool of seafarers, and demand and supply in the Nigerian industry remain obscure, due to lack of organised information or data base for seafarers. While there are claims in some quarters that there is a shortage of seafarers, others believe that there is a glut of unemployed seafarers or potential seafarers that are unable to get the required sea-time experience for certification due to the distress in local shipping activities (Akinola, B., July 8, 2013). Regardless, operating shipping companies within the industry are supposedly reliant on foreign seafarers at the expense of local maritime labour, perhaps partly due to competence gap and the quality of education as evidenced by the survey result. This constitutes a missed opportunity for shipping companies within the industry in cost advantage that would have been gained in the event of the availability of sufficient competent seafarers and also a weakness for long term cluster competition. This should be subjected to further research to have a data-base of the pool and competence level of seafarers available within the Nigerian maritime sector. Secondly, to identify the factors necessary for improving the employment viability of Nigerian seafarers in line with the supposed ambition of becoming a seafaring nation, of which culture gap and the quality of seafarer certification needs to be considered.

In view of the above analysis, industrial competitiveness might be leveraged on the efficiency of the proposed institutions, private sector participation, an integrated maritime policy and improved leading firm behaviour to work towards synergy, local productivity in maritime education and organised knowledge of the available local competences within the industry.

### 7.4.4 Shipping company competitiveness

First, this study has established that a maritime cluster development requires strengthening the demand pull sector. Secondly, the long term competitiveness of shipping companies is in the know-how base; market understanding, business analysis culture, operational excellence and financial management, failing which flexibility, simplicity focus, and cost competitiveness become un-attainable or in-sufficient.

However, results have shown that there is local knowledge and culture gap in the Nigerian shipping sector, to effectively manage existing shipping operations or position to take advantage of market opportunities subject to the Nigerianisation policy and that the concentration of such firms constitute a weakness for cluster development.
A survey of twelve indigenous shipping companies in Lagos and Port-Harcourt comprising Equitorial Energy, Oceanic Energy, Morlap Shipping, Peacegate, Genesis Shipping, and Multi trade Group in Lagos; Niger Delta Shipping in Warri, and Starz Investment Group in Port Harcourt, according to Ships and Ports newspapers, indicated that only two companies operating outside Lagos are viably operating, while the ten companies based in Lagos are distressed due to the lack of vessel employment.

Leading to vessel unemployment as a cause of distress for companies within the industry are factors such as poor service and maintainance culture, over aged vessels and reluctance to engage professional services. A ship-broker in the industry commented:

*It is sad that a Nigerian entrepreneur will rather travel to Europe or Asia, buy a vessel without engaging the services of ship-brokers. Due to ignorance of the Nigerian entrepreneur, we have seen cases of buyers losing their initial deposit due to inability to meet obligations; buying vessels at overpriced cost; buying old and outdated vessels that are largely economically inefficient in terms of fuel consumption, cost of maintenance, engine speed etc.*

On the other hand, Ocean Marine Tankers reportedly registered Nigeria’s first indigenous newly built crude carriers with MT Abiola and MT Igbinosa, both flagged in Nigeria and each with a capacity of 45, 000 metric tonnes for crude transportation to Warri and Kaduna refineries. This is a confirmation of the survey result that the environment for an up-graded local shipping company to favourably compete, exists within the Nigerian industry as opposed to the view that foreign shipping companies enjoy a monopoly.

To this end, managerial, commercial and technical competences are essential. A match between experience based executives and professionally trained executives are critical to avoid an either or culture (Lorange, P. 2007: 143). In addition, a combination of experience based and professionally trained commercial and technical managers are essential. However, traditional experience based know-how is often peculiar with a maritime history. First, in an industry without a sophisticated maritime history- put differently, an emerging industry, shipping becomes an opportunistic venture, leaving gaps in market, commercial and operational understanding. Secondly, well trained professional executives or managers are often relatively scarce, as a result of inadequate knowledge infrastructure and competitive shipping companies for practical maritime knowledge accumulation. Thirdly, a shipping company with gaps in these knowledge areas becomes less competitive, while from a cluster perspective, this constitutes a threat to cluster formation or competition. Fourthly, such knowledge can be imported or acquired under the right conditions, both for shipping company value creation and cluster development. This represents the typical scenario in the Nigerian context.

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67 Executives that have been trained in-house in the shipping industry from an early age with key market understanding
68 Executives trained in formal shipping education from finance or technical areas
Knowledge in ship broking and chartering is a necessary condition. However, emphasis has been placed on ship management as a critical element because of its supply side operational, technical and cluster effect. Given the Nigerianisation policy, the management of NLNG vessels is expected to be transferred to indigenous ship managers by 2014. The question is, will this be sufficient for future competitiveness or could there be other alternatives? Past experience with the Nigerianisation of Nigerian National Shipping Lines, lent the company to politicisation of its corporate affairs and eventually its demise. Presuming that the current scenario is different, consideration should be given to optimising NLNG's shipping potential in line with the objectives of this study, given that the competitive landscape for future LNG shipping may be different.

In view of a shipping sector led cluster development, location attractiveness for ship management companies will be essential to fill knowledge gap. This may be contingent on the availability of competent maritime labour pool, significantly, competent seafarers; the right institutional and administrative environment; and on a business case level ship management companies’ risk appetite. The visible case for Nigeria is that the current pool of maritime labour is insufficient. This may serve as a dis-incentive to Nigeria’s attraction as a location for ship management companies considering Nigeria’s supposed ambition to be a seafaring nation and the perceived desire to develop the maritime sector. Further research may be required on the necessary conditions for the location of ship management companies.

Going forward, improving the know-how base, co-operation and collaboration, and access to competitively priced human resources are prerequisites to shipping company competitiveness in the Nigerian shipping sector.

7.5 Conclusion

Nigerian shipping sector is emerging as a cluster. However, it may be disadvantaged in terms of geographical location and port draft. First as a distant location from major trade lanes; second, due to its modest port draft that may have an implication on the scale of operations. The drive for clustering will be internally generated and dependent on sustainable economic growth; demand for Nigeria’s exports, domestic demand for imports, increased localisation of firms and productivity growth.

The local market is relatively more competitive than the domestic market with an implication that existing firms may lack the capacity to favourably compete internationally. Where-as customers within the sector are demanding, creating a platform for innovation in order for firms to be able to upgrade and favourably compete. Lack of finance for local firms and purportedly, monopoly of shipping activities by “foreign shipping companies” are considered to be responsible for low demand condition in the Nigerian maritime sector. Co-operation-necessary for clustering among domestic firms is weak; the level of trust to create informal relations, synergy and allow labour mobility is low; the quality of maritime education to provide institutional knowledge flow to the industry for competence development is average; entry barrier is considerably high judging by the political environment; and there is lack of leader firm behaviour.
A competitively co-operative domestic industry based on the flow of knowledge, innovation and capital, leveraged on effective collaboration with educational and research institutions with quality maritime education and investment will be essential.

Investment for shared benefits is required to facilitate cluster externalities, whereas this is lacking in the Nigerian maritime sector. Also, attempts at investing for shared benefits will tend such investments to collective action problems due to the individualistic nature of organisations, low trust and co-operation.

Nigeria’s attractiveness as a location for maritime activities will require adequate maritime labour skills, improved maritime and ICT infrastructure, and a friendly maritime and regulatory policy supported by a stable political and social environment.

Industry competitiveness might be leveraged on the efficiency of the proposed NOC, AMLLC and regulatory institutions, private sector participation, an integrated maritime policy and improved leader firm behaviour to work towards synergy, local productivity in maritime education and organised knowledge of the available local competences within the industry.

Considering shipping, improving the know-how base, co-operation and collaboration, and access to competitively priced human resources are prerequisites to shipping company competition in the Nigerian shipping sector.
8 Summary and conclusions

In the past, the LNG shipping sector was to a large extent point to point and oligopolistic. Today’s LNG shipping sector has become a net-worked business. As the industry moves towards competition with accompanying opportunities and challenges, it is imperative to position the LNG shipping sector in Nigeria, for the effective utilisation of resources to take advantage of shipping market opportunities, mitigate risks, increase value added and develop the maritime sector at large.

This chapter highlights the results of the application of a maritime cluster framework and shipping company competitiveness to the LNG shipping sector in Nigeria relative to the maritime sector, taking into account, cluster policy, shipping industry dynamics, location attraction and industrial competition, cluster dynamics in Nigeria and syntheses of research findings.

8.1 Problem statement

Domestic value added in shipping in the Nigerian environment is less than proportionate to the scale of operations, while policies aimed at resolving these challenges are either counter-productive or suffer implementation gaps.

The objective for this research is to explore and propose recommendations on how the competitiveness of Nigerian LNG shipping sector can be improved from a cluster perspective, however, by first determining its competitiveness; how competences and value creation in the LNG shipping sector can be leveraged to develop the maritime sector in Nigeria; and to emphasise the role of maritime education and training.

8.2 Research design and methodology

Cluster policy for the economic development of maritime resources in Nigeria has been applied to execute this thesis research on the premises of a competitive shipping sector, using competences in ship management, ship finance, and national flag reputation as nodes for maritime resource utilisation, taking into account cultural and political factors, while a benchmark analysis of Nigeria, Norway and Qatar, supported by a combination of desk research, survey and expert interviews has been adopted to gather data.

8.3 Cluster policy

In a maritime cluster, new creation, sustainance, and spillover of knowledge is the basis for cluster competitiveness. Consequent upon knowledge and innovativeness is the development of a competitively co-operative demand pull sector, quality labour pool rising from attractive maritime education and cluster’s ability to sustainably attract talents. Also, an effective policy initiative involving public-private dialogue, put differently- lobbying, on the premise of knowledge and competence, failing which policies are apt to be counter-productive.
Clusters are fundamentally measured in value added based on the growth of firms within the cluster and entry surplus. Performance may be influenced by structural and governance factors. Structural factors include agglomeration economics, internal competition, entry and exit barriers, and heterogeneity of firms within the cluster, while governance factors comprise trust, the presence of intermediaries and leader firm behaviour, and the quality of solutions to collective action problems.

Policy considerations will vary according to the demands of a particular location, industrial structure, the level of knowledge within the cluster and a collective vision of the future, taking into account social, economic, political and technological factors. However, specific polices targeting the demand pull sectors are less effective without regard for a wider cluster policy.

8.4 Shipping industry dynamics

Demand for shipping in Nigeria is driven by oil and gas, raw material export and import, and imports of consumables. The redistribution of Nigerian oil and gas export to Asia will increase the tonne mile with accompanying opportunities for shipping in increased tonnage supply. Growing population will create larger consumer market to drive the demand for shipping, while piracy, political unrest, kidnapping, and cargo theft serves as dis-incentives to shipping business in Nigeria.

It is necessary for shipping companies to position in order to take advantage of these market opportunities. The fundamental prerequisites for shipping company value creation consists in the know-how base to meet strategic needs, encompassing a market culture to understand shipping markets, an operational culture for delivering the best service at the lowest possible cost, a business analysis culture necessary for pursuing strategies, and a financial management culture. In addition, flexibility, simplicity and focus, and lower long term cost relative to competitors is essential for shipping company competition.

The influence of ship management activities, access to capital and flag reputation on shipping company competition from a cluster perspective cannot be over emphasised. Competence gap in local shipping companies can be filled by engaging ship management services, to achieve competition and internationalisation; shipping companies’ financial know-how and access to capital may impact the ability to take advantage of market opportunities; and flag reputation may be leveraged for internationalisation.

8.5 Location attractiveness

Economic characteristics of a country form the basis on which competitiveness can be derived. Nigeria is factor driven; the institutional environment is less competitive due to its lack of transparency and un-ethical behaviour both in the public and private sector; the state of infrastructure, higher education, and technological readiness are also relatively less attractive for business location. However, Nigeria’s performance in business sophistication and innovation relative to other variables is leveraged on its large market size and improved efficiency in the use of professionals and talents. Competitiveness will be based on low labour cost and unprocessed natural resources, while progress would be achieved by improving the efficiency of institutions, infrastructure, macro-economic stability and education.
In an innovation drive economy as Norway’s, value creation is high and knowledge based, products and services are differentiated. And competitiveness relies on the existence of knowledge based clusters, while in an efficiency driven economy as Qatar’s, focus will be on efficiency of production, processes and quality of products, providing support and stability to competitiveness in the factors of production and less exposure to external factors. Progress would be achieved through the improvement of higher education and training, goods market efficiency, labour market efficiency, financial market sophistication, technological readiness, and market size.

Contrary to Nigeria, Qatar and Norway’s competitiveness rest on quality and efficient institutional frameworks, low levels of corruption and undue influence on government decisions, efficient government institutions, high levels of security, good infrastructure, as well as quality and representative, higher education and training that lays the foundation for technological readiness, business sophistication, and innovation.

Economic stages, whether factor, efficiency or innovation driven, does not occur in its absoluteness. A factor driven economy as Nigeria requires a considerable level of efficiency and innovation, while Qatar and Norway’s economies in transition and innovative-driven respectively, requires efficient institutions and quality education to sustain competitiveness.

Institutional and economic environment vis-a-vis the availability of the required resources for effective operation of shipping companies, or maritime business at large will impact location decisions of new firms as well as retention of existing firms. Where the location is attractive and the institutional frameworks are weak, there will be a dis-incentive for cluster development. On the other hand, an efficient and friendly environment requires the presence of the resources necessary for a competitive operation of shipping activities.

Despite the availability of natural resources and potential demand for maritime operations in Nigeria, the implication of an in-efficient institutional environment, less stable political and social environment, low technological readiness and less specialised human resources for cluster attractiveness consists in high entry barrier, high cost of operation, and exposure to unethical conduct of local partners, all serving as dis-incentives for future location decisions that constitutes a weakness for cluster formation.

8.6 Industry competitiveness

There is a mis-match between oil and gas history and industry maturity in Nigeria. Nigeria commands a modest annual oil and gas industrial contribution to GDP relative to the scale of operation in the oil and gas industry. Factors contributing to the disproportionate productivity include the lack of local competence and capabilities, and lack of capital- put differently, lack of government investment.

Industrial strategy has been based on short term capital requirement and earnings over long term returns in competence development, until the introduction of the NOGICD Act 2010, to improve domestic value creation. Competence and capital gap spreads across the ocean industries influencing maritime policy, shipping and education. Industry synergy is non-existent with the implication of a weak domestic industry. And there is lack of direct government investment in maritime education and research activities,
while government’s direct involvement in shipping has proven to be in-efficient due to undue political and ethnic influences in the past.

Norway’s industry is knowledge based with considerable government’s direct investment in competence development following the implementation of a local content development. Norway commands an impressive oil and gas industry contribution to GDP, stemming from productivity growth and the development of Norwegian based equipment supplies through investment in research and technological innovation supported by adequate capital attraction.

Oil exploration and production is state controlled, leveraged on effective and efficient institutional framework and domestic pressure to innovate. The oil and gas industry is supported by strong maritime and shipping competences focused on innovation, synergy, internationalisation, know knowledge creation, strong ICT connection and attractive education supported by direct government investment in competence development and research activities.

The foundation for Qatar’s industry consists in efficient government institution, government investment in knowledge and competence, talent attraction, efficient service delivery, long term customer relations, effective co-operation and collaboration, and economic integration.

Qatar’s shipping sector is rooted in partnerships with foreign companies, public-private co-operation and government financing. However, lack of domestic maritime education infrastructure and recruitment from foreign countries serve short term needs and may be least sustainable in developing the maritime sector in the long run.

8.7 Cluster dynamics in Nigeria

Nigerian shipping sector is emerging as a cluster. However, it is be disadvantaged in terms of geographical location and port draft. First as a distant location from world major trade lanes; second, due to its modest port draft that may have an implication on the scale of operations. The drive for clustering will be internally generated and dependent on sustainable economic growth; demand for Nigeria’s exports, domestic demand for imports, increased localisation of firms and productivity growth. The local market is relatively more competitive than the domestic market with an implication that existing firms may lack the capacity to favourably compete internationally. Where-as customers within the sector are demanding, creating a platform for innovation in order for firms to be able to upgrade and favourably compete. Lack of finance for local firms and purportedly, monopoly of shipping activities by “foreign shipping companies” are considered to be responsible for low demand condition in the Nigerian maritime sector. Co-operation necessary for clustering among domestic firms is weak; the level of trust to create informal relations, synergy and allow labour mobility is low; the quality of maritime education to provide institutional knowledge flow to the industry for competence development is average; entry barrier is considerably high judging by the political environment; and there is lack of leader firm behaviour.
A competitively cooperative domestic industry based on the flow of knowledge, innovation and capital, leveraged on effective collaboration with educational and research institutions with quality maritime education and investment will be essential.

Investment for shared benefits is required to facilitate cluster externalities, where-as this is lacking in the Nigerian maritime sector. Also, attempts at investing for shared benefits will lend such investments to collective action problems due to the individualistic nature of organisations, low trust and co-operation.

Nigeria's attraction as a location for maritime activities will require adequate maritime labour skills, improved maritime and ICT infrastructure, and a friendly maritime and regulatory policy supported by stable political and social environment.

Industrial competion might be leveraged on the efficiency of the proposed NOC, AMLLC and regulatory institutions, private sector participation, an integrated maritime policy and improved leader firm behaviour to work towards synergy, local productivity in maritime education and organised knowledge of the available local competences within the industry.

Considering shipping, improving the know-how base, co-operation and collaboration, and access to competitively priced human resources are prerequisites to shipping company competition in the Nigerian shipping sector.

8.8 Synthesis

Changing dynamics in the global energy market raises among others two concerns; security of supply for importing countries and security of demand, as well as resource utilisation for exporting countries, especially developing economies, for economic sustainability with implications for maritime activities. In the past, the LNG shipping sector was to a large extent point to point and oligopolistic. Today, research and expert opinion indicates that LNG shipping has become a networked business and essential for effective utilisation and development of the maritime sector in exporting countries as the industry moves towards competition. In this section, the concepts adopted for improving the competition of Nigerian LNG shipping sector in relation to the development of its maritime resources from a maritime cluster perspective are reviewed.

Maritime cluster concept is essential to the optimisation of a country’s maritime resources. As a tool for resource utilisation from a location perspective, maritime cluster development and competitiveness depends on the location attraction and industry competitiveness (Jakobsen et. al., 2003). Given that industries do not compete, competitiveness rests on the cumulativeness of firm productivity through specialisation to create advantage (Porter, 1990), while synergy between cluster actors is important for efficiency and progress (Porter, 1998).

Sustainable productivity and innovation stems from investment in knowledge and skills combined with physical assets (Porter, 1990). The presence of large labour pool attracts investment in specialised training and education to improve specialisation and knowledge spillover from close interactions between local firms as well as reduce transaction costs (Krugman, P. 1991 cited in De Langen P.W., 2002). Further, countries should adopt human factor strategies that maximises their competitiveness.
human factor cost strategy involves low cost and high efficiency, while differentiation involves high cost but high value professionals. Investment in knowledge and skill and a good blend of appropriate factor strategies creates competitive advantage.

From a resource perspective, location attractiveness and industry competitiveness is based on the existence of the relevant resources, significantly, core competences and capabilities to ensure firm competitive advantage subject to the characteristics, importance and intensity of usage, mobility and imitability of the resources (Jakobsen et al., 2003). The concentration of immobile and non-imitable resources within a cluster or in firms within a cluster creates advantage and such resources become important for location decisions. From a knowledge perspective, knowledge based industrial development is argued to occur in global knowledge hubs characterised by high concentration of industrial actors interacting with advanced research institutions, venture capital firms and competent owners; leading to cluster attractiveness, education attractiveness, R&D and innovation attractiveness, talent attractiveness, ownership attractiveness, and environmental attractiveness (Sasson and Blomgren, 2011) with a collective effort from firms, local authorities, and governments to create conditions under which industrial based development can thrive.

Social, economic, political and technological characteristics of a nation influences cluster dimensions and performance. The resources required for sustainable cluster development is tied to a country’s ability to generate sustainable economic growth. A factor driven country dominated by unskilled labour market, commodity sales, low wages, lack of technological development and high economic sensitivity to global cycles should compete on low labour cost and unprocessed natural resources, while cluster competitiveness would be achieved by improving the efficiency of institutions, infrastructure, macro-economic stability maritime education and training. An efficiency-driven country that emerged from being factor driven, characterised by efficiency of production and processes, and less exposed to external factors would achieve competitiveness through the improvement of maritime education, labour market efficiency, technological sophistication, research and innovation. In an innovation-driven economy, technological knowhow is high, value creation is high and knowledge based, while products and services are differentiated; competitiveness relies on the existence of knowledge based clusters. These economic stages do not occur in absoluteness; hence, clusters as economies would work at a continuum to being knowledge based.

The political and institutional environment influences cluster development. Where the location is attractive and the institutional framework is weak, there will be a disincentive to cluster development. On the other hand, an efficient and friendly environment requires the presence of the resources necessary for a competitive operation of maritime activities. In addition, a politically and socially unstable environment will serve as a disincentive to cluster development.

Further-more, social influence on cluster dimension is evidenced by cluster formation and interaction; whether top-down or bottom-up; the level of trust influences cooperation and informal relations required to achieve agglomeration effect within a cluster; the level of uncertainty avoidance influences firm strategy, the way people are disposed to managing un-certainties and receptive of foreign firms, products, ideas and manage relations (Van den Bosch and Van Prooijen, 1992); the level of masculinity or
femininity of a country determines the extent that people and businesses are geared toward competition; individualism or collectivism, power distance and term orientation influences competition and cooperation. These factors are to be considered in defining cluster synergy, competition and internationalisation.

Maritime clusters critically depend on the strength of the shipping sector. Industrial clusters attract shipping activities for raw material and equipment supplies, and exports. On the other hand, a strong shipping sector attracts industrial concentration and enables economic growth. The competitiveness of the shipping companies within a cluster becomes essential for cluster growth and synergy. Shipping company competition may be assessed from a location perspective; geographical location influences cluster development, with a multiplying effect on shipping companies within a cluster, through the level of industrialisation, level of proximity to major trade lanes, port draft, investment attractiveness and the presence of leader firms which in turn influences the scale of operations and industrial competitiveness.

From a strategic perspective, shipping companies’ know-how base determines competitiveness. Shipping companies need to possess the competences and capabilities to meet strategic needs; a market culture to understand shipping markets, an operational culture for delivering the best service at the lowest possible cost, a business analysis culture necessary for pursuing strategies, and a financial culture with the ability to manage financial flows, all leveraged on customer focus (Lorange, P. 2007).

However, strategy determines the knowhow requirements of shipping companies. This reinforces the tension between the outside-in and inside-out discourse. Research on strategic management in this direction has focused on an either or culture, to defining the sources of competitive advantage with less emphasis on bridging the gap between the inside-out and outside-in approaches. Strategic management in relation to shipping presents a situation where combining the two strategic dimensions, is essential for shipping company competitiveness. The challenge for shipping companies in identifying with the sources of competitiveness, consists in knowledge gap and to the best of the researcher’s knowledge at the time of writing, probably lack of a synthesised framework for shipping company competitiveness. Thus, there is need for an improved strategic clarity to aid shipping company management, especially in emerging maritime sedctors where there is knowledge gap in management know how and companies need to position to take advantage of market opportunities. This study attempts to bridge the knowledge gap and emphasise how volatility shapes shipping company strategy, ties shipping strategies to a broader strategic management literature and proposes a conceptual framework for reviewing shipping company competitiveness, as well as contribute to theory building in this regard.

The positioning school emphasised that a firm should position itself by adapting its strategy to the environment to gain profitability above industry average. Regardless of the differences in firm strengths and weaknesses, the long run competitive advantage consists in low cost and differentiation resulting from a firm’s ability to out-perform

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69 Idem
competitors in relation to the five forces that shapes industrial structure. On the other hand, the resource based view suggest that a firm’s ability to gain sustainable competitive advantage depends on its ability to grow and exploit management competences and capabilities to be able to take advantage of opportunities and neutralise threats, leveraging on the value of resources; its ability to exploit opportunities or neutralise threats. The rarity of resources; whether being scarce among firms within the industry and potential competition, imperfect imitability; either through unique historical conditions, causal ambiguity and social complexity; and without strategically equivalent substitutes for resources that are valuable but neither rare nor imperfectly imitable (Barney, J 1991). For the proposed framework resources is defined as the stock of physical assets, management competencies and capabilities, activity system and organisational processes.

The conceptual framework covers five major aspects of shipping companies’ corporate strategy; market understanding, strategic direction, competences and capabilities, value proposition and corporate culture. This is integrated with four major nodes in the shipping company business system; business synergy and responsiveness, the stock of physical assets/ resources, activity system and value creation, paying attention to the volatile industry characteristics. The conceptual framework for reviewing shipping company competitiveness is depicted in Figure 20. These elements are explained below.

![Conceptual framework for reviewing shipping company competitiveness](image)

**Figure 20: Conceptual framework for reviewing shipping company competitiveness**

Source: Developed by researcher on the basis of Lorange, Porter and Barney’s works

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70 Generic competitive strategies by Porter in De Wit and Meyer ‘Strategy : Process, Content, Context
Market understanding

Market understanding is based on the premises of customer focus; changing market conditions based on changing demand and freight dynamics or a niche market becoming commoditised; and changing regulatory and industry structure. A shipping company requires adequate knowledge of the relevant shipping markets that it operates or intend to operate. Market understanding becomes an advantage when a firm is able to use this knowledge to improve efficiency and effectiveness in creating value, implementing strategies and building new competences. This will be achieved by understanding customer value chain; having a good knowledge about market turning points and freight market dynamics; ability to manage and leverage on cash flows; and the ability to leverage on regulatory practices and above all take advantage of market opportunities.

Porter stresses the necessity of adapting strategy to the environment. The threat of new capacities have the implication of eroding market share, bargaining power of buyers and suppliers increase overtime to erode profit, industry competition increases overtime and the presence of close substitutes limits pricing options. As these changes erode market share and profitability, firms need to ‘define new position, or find new value in an existing position’ which necessitates a strategic direction.

Strategic direction

Strategically, companies can achieve a new position or find new value in an existing position by setting goals and finding a balance between business responsiveness and business synergy. Business responsiveness is the ability to respond to the competitive demands of a specific business segment in a timely and adequate manner, while business synergy is the additional value created by working in two or more segments, over and above the sum of the business parts; from a shipping company view, a corporate portfolio perspective to combining commodity based and niche based shipping vis-à-vis strategies. Thus, new positions can be competitively amplified by continuously improving via protect and extend strategy to effectively match existing market understanding with relationships; build new competences, whether technological or process driven; build new relationships to take advantage of market opportunities and neutralise threats; while ensuring asset and resource management to complement new positions.

Competencies and capabilities

Dealing with the above industry complexities requires adequate management know-how, to take position for above industry average returns; whether being led by market opportunities or unique resource development, the underling basis for competitive advantage is low cost, differentiation and profitability. Developing competences and capabilities is necessary but not a sufficient condition. Management know-how only becomes a competitive advantage to the extent that it takes advantage of market opportunities, neutralises threats and effectively exploits existing and potential assets and activity system to achieve low cost, differentiation, customer value and
profitability.\textsuperscript{71} Thus, adequate understanding of the environment is required to anticipate what competences and capabilities a firm needs to develop and how to fully exploit strengths, mitigate weaknesses and determine customer value.

Management competence and capabilities as a resource has to be effectively combined with the stock of physical assets and activity system to optimise a firm’s value creation capabilities. Shipping companies require competences in market understanding as already indicated above. Operational competence is required to achieve the lowest possible cost without compromising service excellence. For example cost advantage can be gained from ship configuration and design, bunker cost, speed management, preventive maintainance, IT application and logistics integration with customers’ value chain. Competence in financial management can also be leveraged on cash flows, risk management and relationship structures to create advantage.

Sustainable competitive advantage from a resource based view rests on the assumptions of resource heterogeneity among firms within an industry and long term immobility of resources (Barney, J. 1991). Competence based sustainability suggests rarity among firms and imperfect imitatibility by other existing and potential entrants. However, firm resources become homogeneously distributed and mobile overtime due to competition and industry evolution.\textsuperscript{72} Sustainable competitive advantage only suggests that the unique resources will not be competed away by imitation but may become unsustainable overtime due to unanticipated changes in the economics of industry structure.\textsuperscript{73} Such changes in industry structure may also create new bases for sustainable competitive advantage or improve industry wide profit making imitatibility of resources less important.\textsuperscript{74} Thus, it is necessary for firms to become moving targets by continually investing in competences and capabilities to improve position or define new position.

It is noteworthy that the combinations of network, corporate and competitive strategies, are decided in the top right quadrant of the framework; between market understanding, positioning and corporate culture but are implemented in the bottom left quadrant; between competences and capabilities, value proposition and corporate culture. Thus, strategic tension exists in the course of implementation within this quadrant.

A firm’s ability to deliver on its value proposition may be constrained by existing competences and capabilities, and activity system. This raises questions of how to compensate for such short fall to deliver value to existing and potential customers. Volatility suggests that unique competences become easily un-sustainable and developing unique competences for substitution may be short to the market. Strategic consideration consists in leveraging on a combination of networks, relationships and organisational processes. This will depend on the extent of existing competences and capabilities, and corporate culture consideration to find a balance in implementation.

\textsuperscript{71}Line of argument drawn from Jay Barney
\textsuperscript{72}See 2
\textsuperscript{73}Idem
\textsuperscript{74}See 2
Value proposition

Value proposition refers to the way a firm intends to create value for customers. The resources at a firm’s disposal; physical and human assets, competences and capabilities, and activity system determine its value proposition. From a resource based point of view, developing unique competences and capabilities in relation to the activity system should be prioritised over being led by market position, however, the optimal combination of resources will be led by value proposition which realistically is aimed at profitability. Hence, value proposition defines a firm’s positioning resource wise, because the propositions are products of set objectives derived from strategic directions and may be subject to change depending on the environment. In the same vein, focus on developing rare or distinctive competencies to gain advantage cannot be said to be independent of firm positioning for competitiveness and above industry average profits. On the other hand, above industry returns from positioning is a function of the returns to the distinctive resources that offers competitive advantage.\(^75\)

Product offering refers to the combination of services offered as a function of different positions that are aligned to create value for customers. A shipping company needs to focus on few growth platforms to eliminate complexity and improve efficiency of operations and services to customers, as well as optimise its value creation capabilities for example by increasing customer switching costs. In addition, a firm should narrow her customer scope within a segment to be differentiated in terms of cost and services to create sustainable competitive advantage.\(^76\)

The merit or otherwise of value proposition is contingent on customer satisfaction and profitability, whereas volatility in shipping as indicated earlier suggests that customers’ value chain is constantly evolving, markets evolve, competitors imitate, basis for differentiation becomes less important and profits are easily eroded. The ability to effectively manage this complexity and maintain sustainable value creation will depend on the economy of time and management decisions. First, timing and efficiency of management decisions will be crucial; secondly, being first or fast to and from markets,\(^77\) taking into account social, economic, political and technological changes while leveraging on trust, quality, competence, long term commitment and relationships will be essential for sustainability.

Corporate culture

Corporate culture influences competitiveness. Culture affects a firm’s perception of customer relations; transaction oriented or customer focus/relationship oriented. It influences entrepreneurial focus; responsiveness to market uncertainties, threats, opportunities, environmental responsibility and perception on strategic planning rising from time and term orientation, and the way strategy may be implemented. Furthermore, a firm’s ability to innovate, is a function of its orientation towards business or

\(^75\) For better insights on the practical approach to the resource based view on strategy formulation for competitive advantage the reader is referred to Robert M. Grant’s work as noted in the bibliography

\(^76\)\textit{Idem}

\(^77\) In-out, long-short, asset and risk management, and relationship decisions as well as taking new competences to markets
service excellence and competence development; technological, process and management driven; while the learning capabilities determines the extent that firms can adjust to changes in markets, competence and capability requirements, organisational processes and relationship requirements. It is noteworthy that as corporate culture influences all the variables, there is reversal causality between corporate culture and firm competences and capabilities. Corporate culture feeds into decisions on business management, operational activities and financial management, while management competences and capabilities in these areas, have the potential to redirect or influence corporate culture.

Going forward, good market understanding combined with a balance between business responsiveness and synergy to find a new position with the optimal combination of assets effectively exploited through management competences and capabilities in shipping company management, operational excellence, and financial management leveraged on the effective utilisation of the activity system for optimal value proposition to release the value creation capabilities will create sustainable competitive advantage. However, corporate culture will influence a shipping company’s effective combination of these variables and the way value creation capabilities can be optimised. In the end, it is important to emphasise that the complexities of shipping company operations cannot be easily captured in a single framework with absoluteness, though the emerging industry, market and strategic dynamism can be managed within the context of market understanding, strategic direction, developing competences and capabilities, value proposition and corporate culture awareness.

From a resource perspective, a shipping company needs to build the requisite competences and capabilities to understand the market, develop a strategy involving the required resources to achieve a mission (positioning), and get the right product and services to the market at the right time (value proposition). The outside-in perspective on the other hand takes a reflective approach; understand the market, position with a mission. For example, to be the leading LNG shipping company within a time frame, and develop competence to get the right products to the market at the right time (value proposition). The reality for shipping companies will be a balance between these two complementary approaches; top-down and bottom-up, due to the volatile nature of shipping and the underlining importance of timing. Both approaches consist in bridging the gap between existing resource base and value proposition and creation, eliminating threats and inefficiencies while seizing new opportunities.

The points of contact between the two approaches are:

- Market and customer satisfaction are the focus for shipping companies
- Positioning is inherent in the two approaches and not static due to volatility and even in the case of LNG shipping sector, increasing competition compensates for volatility
- Value creation is a return to the combination of resources applied
- Corporate culture will influence perception in balancing the two approaches
- Capabilities can be mitigated with local and international networking to bridge the gap in competence and other resources required for execution in an era of "produce it yourself".

- Timing is of the essence; whether long-term, short-term, decisions or market oriented.

The framework suggests empirical variables that can be measured to assess their logical relationship with competitiveness. Whether market understanding will lead to competitiveness; positioning will lead to competitiveness; prioritising competence and capabilities will lead to competitiveness; differentiation in value proposition will lead to competitiveness; and corporate culture influences competitiveness. The extent that these variables lead to competitiveness and operationalisation\(^7\) of the variables will be a subject for further research. However, the position in this report is that sustainable competitive advantage is value derived from the synergy of the competitive advantage, generating potential of each variable over and above the sum of the competitive advantage generated from each part and nodes of the conceptual framework.

### 8.9 Towards a competitive Nigerian maritime sector

To address the strategic challenge of a competitive Nigerian maritime sector relative to Nigerian LNG shipping sector, it is imperative to understand the competitive position of both objects. This inferably, qualitatively examines to what extent is cluster theory applicable and how the competitiveness of Nigerian maritime sector in relation to the LNG shipping sector can be determined? In this regard, Michael Porter’s Diamond model is applied to Nigerian maritime sector, acknowledging that the LNG shipping sector in Nigeria is monolithic. Also, assuming that the competitiveness of the sector as a sub-cluster, partly depends on the competitiveness of its shipping arm. On that basis, the suggested conceptual framework for reviewing shipping company competitiveness is qualitatively applied to assess its competitiveness from a shipping company context.

#### Factor condition

Factor condition captures the presence of basic inputs that are imitable or unsustainable overtime and advanced factors as a basis for sustainable advantage. Nigerian maritime sector exhibits basic factor advantages in the availability of natural energy and mineral resources, low labour cost as a result of a large human resource base. It exhibits basic factor disadvantages on location in relation to regional and world shipping lanes, insufficient quality labour force, limited capital resources, and inadequate port, logistics and ICT infrastructure. Most significantly, it suffers factor disadvantages in the advanced factors of industry specific knowledge infrastructure and research and educational institutions required for creating sustainable advantage.

\(^7\) The process of identifying the actual measurement scales to assess the variables of interest.
The LNG shipping sector derives factor advantages from low labour cost but quality work force in contrast with the wider maritime sector. This is achieved through considerably consistent investment in training and education to upgrade work force quality. In consistence with the Nigerian maritime sector, it suffers relative advance factor disadvantages in industry specific knowledge infrastructure and knowledge institutions. This is due to the fact that investment in training and workforce upgrade has been largely externally focused, thus, less sustainable.

A point to note is that as industry matures, factor advantages in low labour cost become less important and less competitive. Further determinant factor condition resides in innovation around factor disadvantages that may lead to sustainable competitive advantage. The more specialized factor conditions become, the better the factor advantages derivable for firm and industry competitiveness.

**Demand condition**

Structure, sophistication, size of demand and growth rate of investment influences demand condition. Demand structure for shipping in Nigeria can be segmented into energy; comprising liquid bulk, LNG and offshore, and containerization. Internationally competitive firms operating in these segments and capable of stimulating domestic demand in Nigeria mainly include Shell, Agip, Eri, Chevron, BG Group, APM terminals and Grimaldi - custodian of Ports and Terminal Management Limited (PTML). However, the demand structure in Nigeria depicts domination by multinationals over local companies.

The extent that the sophistication of demand constitutes an advantage depends on the domestic economic value added. However, domestic shipping companies are challenged on the necessary know-how in market understanding, operational efficiency and financial management to position for market opportunities. This raises the issue of capital flight, which in turn, forces distinction between indigenous firms and foreign firms operating in the domestic market. The scenario in Nigeria is such that a balance between the sophistication of demand and economic value added becomes necessary, while growth rate in economic value added signifies the extent of advantage derivable from a sophisticated demand condition. Both local content and cabotage laws are attempts by government to strike this balance.

Nigerian maritime sector derives demand advantages in large market size from its growing population, dependence on refined petroleum importation and increasing global energy demand. However, the demand advantages are undermined by inherent factor disadvantages of energy and port and logistics infrastructure, first to get the energy products off the ground to markets, thereby creating shipping and employment opportunities. Second, to facilitate localization for critical mass, and third, to unplug bottlenecks and open up the hinterlands for improved economic activities.

Competition in the LNG shipping sector can only be assessed on a global scale for reasons that local transportation of natural gas is often conducted via pipelines. Though the LNG shipping sector might contribute to demand condition relative to related and supporting sectors, such contribution may not be distinctively separable from a broader demand condition in the maritime sector or significant to constitute demand advantages or otherwise for the LNG shipping sector.
Porter argues that the growth rate of investment signifies the rate of development. The pattern of investment reflects re-investment by existing companies over new companies located in Nigeria. This may be attributed to locational challenges, for example, disincentives in the institutional frameworks, public policy towards investment such as NOGICD Act and cabotage, and of course, political and social instability. These may have implication for improving critical mass, however, Porter further suggests that the sophistication of demand is more important over the size of demand. The sophistication of demand is by itself a catalyst for localization. Given that the essence of the sophistication of demand condition is internationalization, long term sustainable advantage consists in the internationalization capabilities of local shipping companies.

**Related and supporting industries**

Competitive related and supporting industries challenge the target sector to innovate, while clusters of competitive related and supporting industries foster innovation driven competitiveness. This raises two questions in the Nigerian scenario, first, the competitiveness of related and supporting industries. Secondly, the extent that firms are clustered. Related and supporting industries in the Nigerian maritime sectors are by and large less competitive compared to the buyer company’s needs, while services are fragmented. For example, maritime education and research, shipbuilding and repairs, marine insurance, and ship finance are sub-sectors that are yet to take off by regional and global standards. This constitute a weakness for clustering, given that innovation driven competitiveness, derivable from clustering may be undermined where knowledge accumulation is insufficient to foster agglomeration effects. Also, cultural influence poses a challenge to co-operation, in turn, clustering in the Nigerian maritime sector. Although, interview with industry professionals indicates that indigenous companies induced by local content cooperate to execute projects. However, cooperation to execute projects and services falls short of clustering, unless otherwise defined by innovation to achieve scale advantages in cost and differentiation.

**Firm strategy, structure and rivalry**

It is important for industry structure to enhance competition, promote innovation, and be attractive for investment. Analysis of demand condition in the Nigerian maritime sector, supported by survey results indicates a competitive environment. Contrarily, competitive gap between local and foreign firms puts a question mark on industry competitiveness in line with Porter’s suggestion on the merit of including transnational firms in the analysis of domestic demand.

From a strategic dimension, firms in Nigeria are not deficient in entrepreneurial and general management skills; rather, local firms in the maritime industry are challenged in specific maritime industry (sectoral) know-how, trust, co-operation, long term focus, and maintaining international service standards. These challenges have negative implications for competitiveness and potential to innovation in the sector.

Further, industry structure had been motivated by the exploitation and exports of natural resources to destination markets by multinationals supportive of Nigerian government’s quest to earn revenue, contrary to building a sustainable economic base.
for industry development with such resources. Also, port development in Nigeria had been motivated in phases by raw material exports and import congestion, contrary to sustainable development through strategic positioning supported by efficient inland logistics infrastructure and international connectivity. For example, to serve the landlocked countries bounding Nigeria, open up the hinterlands for trade, drive traffic in-flow to Nigeria through strategic connectivity with foreign ports, and reduce long term port operating cost to position for regional competitiveness. In the same vein, the development of local firms in the domestic market had been motivated by “participation in local in trades”, contrary to being geared towards international competitiveness of domestic firms as suggested by Porter. Overall, it reflects short term orientation and perhaps, a shortfall in the know-how base across board required to build sustainable innovation driven competitiveness.

These mis-matches in firm strategy, structure and rivalry have implications for investment attractiveness. For example, questions about local firms’ service orientation, business ethics and potential to partner or co-operate with international maritime and shipping firms may be tied to firm strategy, while NOGICD Act and cabotage law shapes industry structure and rivalry. In both cases, questions can be raised about contribution to Nigeria’s attractiveness or otherwise for location of maritime businesses.

LNG industry in Nigeria emerged from government’s ambition to monetise Nigeria’s natural gas resources, invariably, an avenue to export natural gas resources to earn revenue, instead of strategic use of natural gas resources for economic sustainability, in effect, limiting the potential to innovate. Despite 4 per cent annual GDP contribution and acclaimed 18000 cumulative jobs by NLNG, investment dipped considerably with negative implications for LNG shipping compared to Qatar. This difference can be partly accounted for in a monolithic industry structure compared to Qatar’s dual LNG company industry structure evidenced by Qatar Gas and Ras Gas with advantages in scale returns and increased potential to innovate; politicising of investment decisions, and locational disadvantages.

Government

Government’s role in emerging sectors is to shape the context of firm strategy, industry structure and rivalry to stimulate competition, promote innovation, and ensure institutional efficiency to promote internationalization and investment attractiveness by influencing the four determinants through policy and participation. However, government’s influence as suggested by Porter could have positive or negative implications for industry competitiveness. To this end, the level of knowhow within industry attached government institutions becomes crucial to success.

Further, efficiency of target and related institutions constitute a source of competitive advantage. Given this, efficiency of government institutions can be assessed first, within the context of a competitive diamond, next, by evaluating the effects of existing policies on industry competitiveness. With regards to the efficiency of government institutions in the maritime sector, appointments are rather politically motivated than competence based, while training of government officials are often budgetary than specialization focused (context for firm strategy, structure and rivalry). These leads to inadequate knowledge accumulation in the institutional environment (factor condition). Government institutions are less collaborative and less transparent in public-private
sector engagements (related and supporting industries), also, less oriented towards innovation (demand condition). These factors reflect wider institutional challenges in Nigeria that contributes to the positive or negative effects of policies and administration on the competitiveness of the Nigerian maritime sector.

Effects of NOGICD Act and cabotage law can be assessed from three dimensions of motivation, competition and investment attractiveness (context for firm strategy, structure and rivalry). Local content was motivated by the need to increase sectoral economic value added through increased local productivity. This has considerably improved domestic demand condition with regards to the upgrading of local firms and the development of the work force. Examples of companies that have benefitted from local content development are Ladol and Japual. Yet, local content is challenged in the availability and adequacy of industrial specific skills that may compromise productivity in the event that sufficient knowledge flow is not maintained. Cabotage aimed at allowing indigenous firms to benefit from the exploitation of opportunities in the domestic market is equally challenged in knowledge and capital accumulation. The reality is that in the absence of these two elements cabotage could undermine productivity and when projected in a “keep foreign shipping companies out of Nigerian waters perspective”, it becomes deterrent to investment attractiveness.

A third policy consideration is the shipment of Nigeria’s energy exports on FOB terms. This has a negative implication on the development of maritime services to support economic value added in shipping (related and supporting activities). Whereas CIF terms presents an opportunity to leverage shipping for increased value added in marine insurance and maritime financial services, for example, save for insufficient knowledge and capital accumulation.

Government involvement with factor conditions and demand conditions are more direct in form of investment in physical and knowledge infrastructure, as noted in section x and joint ventures with multinationals respectively. These investments have the effects of shaping the context of firm strategy, structure and rivalry, in turn, the competitiveness of Nigerian maritime sector.

Chance

Nigeria derives benefit from changes in global economic structures with the potential for considerable investment inflow, and significantly, re-investment by existing companies to exploit opportunities. These investments will often be accompanied by increasing demand for shipping activities. For example, project cargoes, material inputs and consumables, thereby creating opportunities for domestic shipping companies.

Also, increasing global demand for LNG, growing spot LNG activities, and the development of proxy new markets in South America present market opportunities for LNG shipping. However, the extent that chance constitutes an advantage depends on the exploitation of such opportunities. In what follows, competitiveness of the LNG shipping sector from a shipping company perspective will be qualitatively reviewed.
8.9.1 Competitiveness of LNG shipping in Nigeria: conceptual framework for reviewing shipping company competitiveness

Competitive LNG shipping firm is central to the competitiveness of LNG shipping sector as a cluster. For that purpose, a complementary conceptual framework for reviewing shipping company competitiveness was developed and theoretically applied, to have an overview of the competitive dynamics of the shipping unit of the LNG shipping sector in Nigeria.

Market understanding

As competition increases in the global LNG shipping sector due to new capacities and increasing buyer bargaining power, it is imperative for LNG shipping sector in Nigeria to position in order to take advantage of market opportunities. This can be achieved by leveraging on market understanding and may be defined by increasing flexibility, leveraging on competences and relationships and increasing value creation. Example of such LNG market exploitation is evidenced by Nakilat’s joint venture with Maran and Teekay with far reaching implications for customer focus, cycle, cash-flow, asset and risk management, as well as value creation. Also, increased vessel utilisation rates through backhaul one-off cargo charters and possible cargo swaps as instances.\(^7\)

It is unrealistic to make judgment about the concentration of local knowledge in market understanding in relation to Nigerianisation policy. However, questions can be raised about the extent that such knowledge has been used by the LNG shipping firms in Nigeria, so far, to take advantage of market opportunities.

Strategic direction

Strategic direction requires setting goals and objectives, analyzing existing position and repositioning for competitive advantage. Notwithstanding the existing limitations in LNG production infrastructure in the Nigerian LNG industry, shipping presents an opportunity to continuously improved value creation. Corporate shipping portfolio in NLNG could not be clearly ascertained at the time of writing. However, the point to note is that, existing competences in LNG shipping can be leveraged to take advantage of increasing LNG spot activities, more importantly, to exploit opportunities in other shipping segments in the domestic market to maximize added value, improve domestic demand condition and internationalization. The question to answer is, to what extent has the LNG shipping sector used this leverage to maximize value creation?

To reposition for such challenge, the goal and strategic planning should be clear. Relevant corporate and competitive questions are to be raised regarding the vision and mission of the company. what market segments should the company be active? what should be the composition of each segment in the portfolio? What competences will be required? How should it be organized and managed? How can existing competences and relationships be leveraged? And what will be the value contribution of new

\(^7\)See ICIS 2012, LNG: Barriers remain to shipping optimisation
competences and relationships if required? Flexibility to be able to react to market conditions for greater efficiency.

**Competencies and capabilities**

To take advantage of market opportunities, requisite know-how base for shipping company management is necessary. Anticipated transfer of 16 vessels from STASCO and AEML as indicated in section 6.1.3 signifies increasing local know-how in the LNG shipping sector. However, it raises questions as to the ability to build sustainable competitive advantage, given potential future changes in the LNG competitive landscape. Although LNG shipping in Nigeria may be constrained by production capacity, locational disadvantages and inadequate capital accumulation, it is no excuse for gaps in management and process innovation compared to Qatar.

**Value proposition**

Optimal combination of resources, specific, competences and capabilities required of a shipping company depends on its value proposition derived from strategic direction. If the objective of LNG shipping in Nigeria is to export LNG to destination markets, then, building distinctive competences and external knowledge acquisition may be less desirable. However, such position is less sustainable for the competitiveness of the LNG shipping sector and the economic development of Nigerian maritime resources. On the other hand, if the objective is for sustainable development in the LNG shipping sector in relation to a broader Nigerian maritime sector, developing distinctive resources and external knowledge acquisition becomes central to achieving competitive advantage. The question to answer is, the extent that Nigerianisation contributes to building such distinctive resources to fully exploit both domestic and international shipping opportunities.

**Corporate culture**

With references to customer relations, entrepreneurial focus, innovation and learning orientation, Nigerian shipping companies may be challenged in a corporate orientation required of a competitive shipping company. This challenge stems from a cultural background and a business environment that is transaction oriented, short term and less service oriented, less environmentally responsible, less competence driven and paradoxically with high learning capabilities but low learning orientation.

8.9.2 Improving the competitiveness of Nigerian LNG shipping sector

Having determined the sources of competitive advantage for the Nigerian LNG shipping sector in section 8.8, this section answers the second research question; how can the competitiveness of Nigerian LNG shipping sector be improved? Based on the preceding analyses, the answer is to improve Nigerian LNG shipping sector diamond. But how can this be achieved? First, and most significant, by improving the know-how base. Secondly, is to improve its internal and external connectivity.

Analysis of Nigerian LNG shipping sector has indicated that the underlining factor for innovation driven competitiveness is the know-how base. This could not have been more profound with the emergence of a competitive global LNG shipping sector from the traditional oligopolistic LNG market which indicates that the emerging platform
requires specialised skills in LNG market, and significantly, shipping company management know-how for sustainable competitiveness. Therefore, it is important for knowledge accumulation in the Nigerian LNG shipping sector to project future market development for sustainability.

Sustainably improving the know-how base will have high impact on the LNG shipping sector’s advanced factor condition as a source of sustainable competitive advantage, improve physical and capital factor conditions, in turn, form the basis for improving other determinants of the diamond. For example, the development of seafarers, management know-how; market, technical, operational and financial, as well as institutional knowhow, given that government administrators are endogenous, will have a positive effect on related and supporting industries in terms of knowledge spill over, innovation, and connectivity, subject to the intervening factors of culture and politics. Also, this will impact the context of firm strategy, structure and rivalry in terms of strategic use of LNG resources, improving industrial structure and regulatory environment, building networks, attracting investment and innovation for sustainable advantage. At this juncture, the question to answer is, how can the know-how base be sustainably improved? To put into perspective, the answer is connectivity. Connectivity with maritime education, training and research institutions to ensure sustainable knowledge flow as well as connectivity with networks for knowledge acquisition.

In relation to the LNG shipping sector in Nigeria, connectivity contributes to competitiveness from three dimensions; knowledge accumulation, capital accumulation, and sustainable value creation. Internal connectivity with related and supporting industries increases the value added capabilities of the LNG shipping sector in Nigeria, through portfolio diversification. Next, it increases knowledge accumulation, capital accumulation, and economic value added in the maritime sector in Nigeria. Qatar’s LNG shipping sector indicates the impact that leader firm behaviour could have on cluster development. Nakilat maintains a lead role in a network of shipping, ship management, shipping agency, integrated maritime logistics, and ship building and repair companies. External connectivity will increase knowledge accumulation and capital accumulation in the LNG shipping sector in Nigeria as well as value added to customers abroad.

8.9.3 Leveraging on the competitiveness of Nigerian LNG shipping sector to improve the competitiveness of Nigerian maritime sector

To answer the second research question; how can the competitiveness of Nigerian LNG shipping sector be leveraged to improve the competitiveness of Nigerian maritime sector, the two diamonds are compared. Comparing results of the analyses of Nigerian LNG shipping sector diamond with the maritime sector diamond, it is understandable that improving the competitiveness of LNG shipping sector will provide valuable factor contribution, specifically, shipping knowledge to the Nigerian maritime sector. Also, valuable contribution in upgrading related and supporting industries, demand condition, and the context for firm strategy, structure and rivalry. For example, portfolio diversification can improve demand condition in the liquid bulk sector, while increased connectivity with financial services, marine insurance and ship building and repairs supported by efficient institutional frameworks can increase economic value added in the maritime sector.
8.9.4 Leveraging on knowledge institutions

Answering the three research questions has implications for the development of maritime education, training and research institutions in Nigeria. In this regard, a fourth question may be inferred; what is the role of maritime education in positioning Nigerian LNG shipping sector vis a vis the maritime sector in Nigeria?

The importance of maritime education, training and research institutions for the success of the maritime sector in Nigeria cannot be overemphasized. It serves as a source of knowledge supply to government, institutions, ports, shipping and logistics companies, and educating maritime officers with the expectations of leveraging on the perceived global shortage, as an opportunity to employ Nigeria’s large workforce. Secondly, as Nigeria experiences development in its national economy, it is imperative to work towards commensurate growth in shipping and port activities oriented towards increasing economic value added. Taking advantage of these opportunities requires commensurate local maritime human resource expertise facilitated by commensurate local quality knowledge institutions and infrastructure for sustainable development with policy as a central element for success.

Improving the competitiveness of Nigerian LNG shipping sector with a strategic focus indicates that continuous competence development vis-a-vis innovation and long term focus in related government institutions (policy and administrative context) and shipping company management know-how, is the underlining factor for positioning the LNG shipping sector. Therefore, competitive maritime knowledge institutions are required to provide impetus for developing the requisite competences.

A quick assessment of maritime education in Nigeria within the context of the diamond framework points, to a weak maritime and educational system. The factor condition is characterised by inadequate knowledge accumulation, insufficient funding and inadequate knowledge infrastructure. Despite global standards for seafarer competences through the STCW and perhaps the presence of demanding customers in the maritime sector, its demand condition suffers from factor disadvantages and lower demand condition from indigenous shipping companies due to the level of competitiveness. Related and supporting industries (administration, shipping and ports) are equally less competitive and less co-operative, partly due to quality stemming from factor disadvantages and cultural influences, while from the context for firm strategy and rivalry, government’s new-found interest in developing the maritime sector and NIMASA’s international focus to position maritime education, in order to serve the global shortage of officers may be positive for the maritime sector in Nigeria, the question to answer is whether the new environment shall promote competition and tailored to attract investment.

Going forward, three issues are of importance for maritime education, training and research in Nigeria: quality, connectivity and competitiveness of related sectors. On quality, the challenge for maritime education is institutional and peculiar with the wider educational system in Nigeria; inadequate funding, poor infrastructure, quality of tutors, and vices; examination mal-practices, corruption and nepotism leading to “unemployable graduates”. Although government has made concerted effort to develop maritime education and training infrastructure, first, such infrastructure should be complemented with maritime R&D infrastructure. Secondly, developing multiples of knowledge infrastructures may not eliminate quality issues. The question to answer is
how adequate funding can be guaranteed for maritime education, training and research institutions, and how quality can be ensured for the employability of graduates and knowledge attractiveness of the Nigerian maritime sector.

Lessons from Norway and Qatar has indicates that government’s direct funding based on a prioritised maritime sector for economic development supported by a vision of the future (strategic direction) forms the basis for sustainable competence development. However, inadequate capital due to competing budgetary needs of other sectors of the economy, is argued to be the cause of government’s lack of investment in maritime education, training and research activities. Leading to inadequate capital, are low local productivity in oil and gas exploration and production vis-à-vis maritime activities and capital flight. However, it is necessary to understand that the causality of low productivity contribution to GDP through capital flight is lack of competence. Where-as, government’s direct funding for maritime education and research, is a prerequisite, lack of transparency, undue influence, un-ethical conduct and institutional in-efficiencies in the Nigerian environment, puts a question mark on the efficiency of a competence development vehicle reliant on government funding.

Considering connectivity, first, questions about quality of maritime education, will require external acquisition of resources on the premises of quality of tuition and research activities, to fill knowledge gap. For example, to the best of the researcher’s knowledge at the time of writing, companies in Nigeria conduct maritime simulation activities outside the country, where-as facilitating the localisation of such research activities, have the potential to add value in the domestic economy, while external connectivity potentially increases knowledge accumulation. Additionally, the institutional and structural framework for maritime education may have to be reframed to create an internationally focused quality controlled or self-regulatory maritime educational system to mitigate the vices that characterised Nigerian educational system. Next, internal connectivity with related and supporting sectors is essential for value creation, knowledge accumulation through collaborative research activities or innovation for instance, and employment of graduates. The cases where-by local seafarers are unemployable by internationally competitive firms and new graduates are unable to secure sea time are perfect examples.

Competitiveness of related sectors; maritime administration, shipping and ports, in this case indigenous actors inclusive, will create demanding customers that will enable knowledge institutions to improve and innovate. On the other hand, such demanding customers may provide reversal flow of knowledge through co-operation, formal and informal relations.

Overall, international competitiveness of maritime knowledge institutions, not least in regional competition, is essential for positioning the LNG shipping sector and the maritime sector in Nigeria.
8.10 Conclusions

Significantly, this thesis research has indicated that the reality of positioning the LNG shipping sector in Nigeria, from a maritime cluster perspective, depends on the social, economic, political and technological conditions peculiar to Nigeria in relation to the available resources on which competitiveness can be derived, in this case, quality human resources at a relatively lower cost.

In answering the research questions, specifically, determining the competitiveness of Nigerian LNG shipping sector in relation to Nigerian maritime sector, three contributions have been made to the body of knowledge on strategic management in shipping. First, the application of Porter’s cluster theory to the LNG shipping sector and the maritime sector in Nigeria with the following implications for Porter’s study:

1. Competition in the LNG shipping sector is on a global scale and the conditions for domestic rivalry may be insignificant for determining competitiveness, however, the LNG shipping sector contributes to the demand condition for related and supporting industries to compete and innovate.

2. Given the global characteristics in shipping, it is imperative to make a distinction between indigenous and foreign shipping companies operating in the domestic market in the analysis of demand condition, supportive but in alternative to Porter’s suggestion of eliminating trans-national companies in the analysis of domestic demand. However, distinction is by no means an easy task. Indigenous shipping companies act in favour of foreign shipping companies to obtain contracts under the local content provision. Next, the reality for emerging maritime sectors is, that multinationals drive demand for shipping activities and to a large extent act directly or indirectly as suppliers of shipping services. Whereas this has implications for the nature of competition and value added in the Nigerian maritime sector, it does not by itself constitute lack of competitiveness, rather, competitiveness in the domestic context is to the extent that indigenous shipping firms can internationalise.

Again, complementary, conceptual framework for shipping company competitiveness was developed and qualitatively applied, insightfully capturing the determinants for shipping company competitiveness. Thirdly, the study demonstrated the application of Porter’s framework to determining the efficiency, put differently, competitiveness of government institutions.

Based on the analysis of results and research findings, conclusions can be drawn from three perspectives related to the research questions: competitiveness of the LNG shipping sector in relation to the maritime sector; improving the competitiveness of LNG shipping sector, and the role of knowledge institutions:

1. Competitiveness in the Nigerian LNG shipping sector, in relation to the maritime sector is less sustainable, given overall low factor condition, a demand condition undermined by less competitive and less co-operative targeted and related sectoral actors, and a context of firm strategy motivated by short term economic gains over sustainable competitive advantage.
2. Positioning Nigerian LNG shipping sector for innovation driven competitiveness requires strategic internal and external connectivity for knowledge accumulation, capital accumulation and sustainable value creation.

3. Competitive maritime education, training and research institutions will provide leverage for sustainable competitive advantage in the LNG shipping sector relative to the maritime sector at large.

4. A competitive Nigerian LNG shipping sector vis-à-vis the maritime sector will improve economic and social value added in the domestic environment.

5. The current state of factors is less significant for future competitiveness than the extent that they are domestically upgraded and developed.

6. Government has a role in creating the right environment through increased efficiency in policy, participation, investment, creating and mobilising towards a sustainable vision of the future, contingent on knowledge and innovation.

Overall, sustainable economic development of Nigeria’s maritime resources can be achieved with efficient institutional framework and adequate knowledge accumulation leveraged on its maritime people; administrators, managers, educators, industry professionals and the maritime workforce for a sustainable maritime future.
9 Recommendations

Based on the analysis of research findings and conclusions, this chapter presents recommendations to policy makers, industry, managers of shipping companies and maritime educators. It highlights the limitations to this research and suggests areas for further research.

9.1 Recommendations for public policy

Industry strategy in Nigeria has been based on the premise of lack of capital, while the overriding goal of local content policy is to improve oil and gas industry’s contribution to the GDP. The strategy to achieve this goal has tended towards reducing capital flight by improving indigenous companies’ participation, build up competences and stimulate investment in equipment manufacturing. The challenge is how public policy can contribute to optimising existing local companies’ value creation, attract new foreign companies to locate and further stimulate existing foreign companies’ to invest.

Knowledge based industrial maritime cluster policy

There have been considerable efforts by government in developing maritime education in Nigeria but three questions have been raised. First, will the existing and proposed maritime knowledge infrastructure projects be enough to educate the populace? The answer is no. Do public institutions in Nigeria have the competences and capabilities to effectively manage and maintain these institutions for quality, reliability and internationalisation? The answer is no. Will the existing and proposed institutions be capable of satisfying industrial needs, attract new businesses, talents, and potential future students to Nigeria? It depends. But how can these challenges be mitigated?

- Prepare for localised increase in government funding of maritime education, training and research infrastructure based on a prioritised vision of the future

Lessons from Norway and Qatar indicate that there is need for a strategically focused competence development backed by government funding. However, the reality for Nigeria is that low productivity contribution to GDP and the complexities of a large population compared to Norway (5million) and Qatar (2million) creates pressure from competing sectors for budgetary needs. In addition, mis-appropriation of funds in the public sector sometimes lends public funding to waste. Nevertheless, success can hardly be achieved without adequate government funding.

Currently government funds science based education from oil revenue through the PTDF and maritime education from revenues generated through NIMASA on maritime activities. Where-as, if these two funds have been externally focused, there is need to re-channel the funds for developing local knowledge institutions. Secondly, government’s alienation of maritime education from oil and gas activities may be unrealistic; investment in maritime education should be seen in the light of building competences and capabilities in administrative knowhow, shipping management know-how, marine and offshore technological know-how, and nautical know-how to assist companies within the Nigerian industry regardless of nationality to adjust to the new environment and to create a cluster wide competitive advantage in high value and relatively low cost human resources capable of benefiting the companies and contributing to GDP growth.
For a sustainable maritime competence development government should increasing funding for science based education and maritime education. Also, maritime education and research should benefit directly from the PTDF. Thus, there is need for an integrated maritime education funding based on prioritised competence development on the premise of a vision of the future.

- **Consider partnering foreign educational and research institutions with a self-regulatory maritime educational system to maintain quality and facilitate maritime education attractiveness**

The basis for cluster policy is the utilisation of resources through cluster wide value chain competitiveness. Hence, the question that needs to be answered is how maritime education can be leveraged for GDP growth. The answer is education attractiveness through connectivity.

To achieve maritime education attractiveness in Nigeria there is need for a liberalised maritime education policy that will provide incentive for selected foreign maritime educational, training and research institutions to locate with a commercial focus built on government support. The essence is to fill competence and capital gaps and maintain attractiveness.

A new model for maritime education may be required; a National Maritime Institute (NMI) managed in collaboration with international maritime organisations, whereas the NMI will act as a knowledge hub for policy makers and administrators, a monitoring board for seafarer competence and certification to ensure quality, a platform for promoting excellence in maritime management and an avenue for projecting the Nigerian maritime sector.

- **Establishment of a competence based maritime cluster development board**

A composition of competent professionals with proven track records of experience in related fields working across industrial sub-sectors to set an agenda for the development of a Nigerian maritime cluster that would work at a continuum towards internationalisation with a collective vision of the future.

- **Tax incentive on human resource training as a deductible from earnings on specific skills and competences**

Government should encourage firm investment in training and research by offering tax deductions on selected skills and competences on conditions of local training engagement. This will facilitate competence development, labour mobility and local retention of talents.
• **Stimulate domestic demand condition to facilitate innovation**

To maintain a balance between local content and a competitive domestic industry, government should stimulate the demand condition by:

- Establishing minimum capital requirements for shipping companies to facilitate consolidation, co-operation and collaboration as well as sanitise the industry from the domination of less competitive shipping companies with accompanying requirement for service standards.
- Create the modality for gradual redirection of oil and gas lifting contracts from FOB to CIF
- Establishment of a ship-building credit guarantee fund to assist credible shipping companies with proven track records
- Introduction of ownership to chartered vessel ratio for resident shipping companies regardless of nationality
- Provide incentives for ICT, equipment manufacturing and maritime related companies to locate

Cluster formation will be contingent on Nigeria’s attractiveness as a location for shipping companies and other maritime services and quality infrastructure provides an incentive for localisation of firms. Thus there is need to:

• **Prepare for increased private sector participation in the development of maritime infrastructure**

Ethnic confrontations dominate Nigeria’s polity, corruption and nepotism is entrenched in the fabrics of public institutions and maintenance culture is lacking. The reality is to acknowledge that business decisions have no control over these intervening variables but to use them in reframing the structures of national engagement. Efficiency in provision and maintenance of maritime infrastructure, can only be effectively achieved with the private sector. Where-as establishment of the SWF is a step in the right direction, government should provide incentives that will attract foreign direct investment.

• **Prepare for a network economy**

Increased public sector adoption of ICT will improve transparency and reduce bureaucracy in the process of public-private sector engagement, while increased private sector adoption of ICT will improve business to business information exchange and service interface both domestically and internationally. The reality is that there is need for increased business innovation and private sector investment in ICT while public role should be that of a facilitator.
9.2 Recommendations to industry

Competence based and collaborative industry development

Industry competitiveness rests on the productivity of institutions and firms, competence development, investment attractiveness and synergy. These can be achieved by:

- **Establishment of a competence based national oil company**

  Establishment of a national oil company will improve domestic demand, pressure to innovation and ensure optimal utilisation of Nigeria’s energy resources. The NNPC has proposed an industry model synonymous with the Norwegian industry. However, there is need to avoid the multiplicity of institutions, overlapping responsibilities and encourage lean, competence based organisations. There is also the need for integration to avoid the traditional organisational silos peculiar with the Nigerian industry.

- **Continued partnership with the IOCs**

  For the Nigerian maritime cluster to integrate and ensure productivity growth; an objective for which the NOGICD Act and the Petroleum Industry Bill were intended, it is necessary to attract, retain, and expand. Continued collaboration is important first, to attract other firms to locate, but most importantly to retain for critical mass and partner in an inclusive competence based resource and asset transfer, rather than a time based hand over, given that there will be decades long of learning curve, failing which productivity may eventually decline.

- **Establishment of an organised knowledge of the available competences and a cost benefit oriented local content to improve the productivity of existing firms and attract new companies to locate in Nigeria**

  Local content has been focused on the number of employment created, assets to be transferred and value of contracts awarded to indigenous companies over the composition of new competences and capabilities realised, new companies that locate and existing companies furthering their investment for productivity growth. Realisation that the transfer of employment and assets is necessary but insufficient for productivity growth is key. The industry also needs to realise that investment in human resources vis-à-vis local content policy should be projected as an international cost benefit for new firms to locate and existing firms to be encouraged.

- **Prepare for mergers and consolidations among domestic firms**

  Co-operation, size and improved services are essential to cluster development in Nigeria. Where the nature of local content is specifically tailored towards indigenous value creation and business ethics, co-operation, trust, and service level are considerably low; mergers, consortiums, and service level requirements become handy to prepare firms for domestic competitiveness and develop potential for internationalisation.
• **Further investment in LNG to mitigate the loss of revenue from oil theft**

A shift in oil and gas production mix towards LNG will reduce long term revenue loss from oil theft and if combined with the right incentive to prevent gas flare will reduce pollution.

• **Prepare for a networked LNG shipping company**

Leveraging on the possibility of a fragmented future LNG shipping to fully utilise Nigeria’s maritime resources for cluster development is essential. However, market risk in future LNG shipping consists in overcapacity and lack of flexibility due to specialisation. From a shipping company perspective this can be mitigated first, by networking into complementarities to create a robust shipping company. Secondly, the creation of one ship company to de-emphasise capital as the main factor for the lack of development in domestic shipping activities and to create flexibility between ownership and chartering. These can be adapted from Nakilat’s business model and will improve value creation, domestic demand condition, and attract foreign investment.

• **Prepare for an inclusive strategy to accommodate existing foreign shipping companies and attract investment**

Emphasis has been on the lack of shipping companies’ access to capital in the Nigerian maritime sector. However, the challenge is not only in sourcing capital but also effectively managing the cash flows and recovering the funds. Safe for political and sovereign risks, it is important to deal with corporate issues leading to the lack of capital; structural risks in shipping companies, sustainable vessel employment, maintenance culture, and service culture for instance. Gaps in these areas serve as dis-incentives to investment attractiveness. Ship finance solutions will have to stress these areas for international competitiveness and shipping executives have to be enlightened.

A partnership involving an intermediary organisation, local banks and leading international banks with the technical know-how in ship finance may be considered. The intermediary organisation’s responsibility will be that of a facilitator, government acting as a guarantor via credit guarantee fund or through the central bank, and the international lending institutions acting as a channel for foreign direct investment leveraged on syndication involving local banks. This will also create an avenue for local banks to develop competences in the long run.

Local content constitute a cluster strategy. For instance, the Nigerian Oil and Gas Industry Content Development (NOGICD) Act, 2010, provides for local spend on shipping. Charter contracts from the implementation of such provisions can be leveraged for financing new buildings, provisions can be made for ownership to chartered vessel ratio, while such vessels can be registered under the national flag. However, success will be contingent on the implementation of the provisions under the NOGICD Act 2010.

An inclusive strategy to accommodate foreign shipping companies and attract foreign direct investment involving project financing tailored to Nigerian needs can be adopted to finance shipping. This will create flexibility in sourcing capital for fleet development, especially the creation of one ship companies. This can be facilitated by an
intermediary organisation, government or shipping companies. Equity can be provided by government, shipping companies, international oil companies (IOCs), investment funds, and private investors. Debt can be leveraged on syndication as described above, while the project can be leveraged on export or buyer credit from ship-yards secured on charter contracts ranging from 5 to 15 years. Such projects can be built into the Nigerian Sovereign Wealth Funds (SWF) for instance or the SWF could become part project sponsors. Alternatively, a private ship fund managed by competent professionals may be considered. Figure 21 is an illustration of a possible project finance model adapted for ship finance to give a clear idea.

Figure 21: Project finance structure for ship acquisition

Source: Adapted by researcher from project finance structure presentation by Arjen van Klink, STC-NMU, 2013

Under the Nigerian SWF, investment advice will reportedly be provided by City Group, Goldman Sachs, and Credit Suisse. These are banks with expertise in ship finance, perhaps a partnership in creating a ship finance vehicle or investment advice may be considered. Overall, this provides an avenue for government investment of oil returns in developing the shipping industry without stressing competing budgetary demands.

9.3 Recommendations to shipping company managers

Customer focused learning culture

- Prepare for intensive investment in shipping company management knowhow for competitiveness

The main competitive advantage is in shipping executives, shipowners, and managers’ competences and capabilities. Knowledge in market understanding, management, technical operations, financial management and long term customer relations are key to building distinctive competences.
- Prepare for joint ventures and partnerships with foreign shipping and ship management companies to fill knowledge and capital gaps, and prepare for internationalisation.

Opportunities for shipping in Nigeria will grow as the oil and gas industry matures with the implementation of local content, rise in population and the emergence of the middle class; reminiscent of the 1970s importation explosion and congestion. Shipping companies with a broader view will have the advantage of providing services and buying into foreign firms' global operations for internationalisation.

In the case of Nigeria's LNG shipping, a joint venture with STASCo and AESML on condition to locate in the event that they are not already located in Nigeria might just be the right antidote over outright takeover of the management of the LNG vessels. It is not about Nigerians managing these vessels, but about maximising returns from Nigeria's ownership of the vessels.

- Dare to establish a credible private ship fund

Sizeable Nigerian capital is lying in foreign accounts waiting to find the right investment opportunity. The challenge consists in negative business ethics, lack of trust and corruption. Establishment of a credible shipping investment vehicle will attract domestic and foreign capital. Hence, it is not an issue of capital; it is about the right motive, the right attitude, the right opportunity and the right environment.

9.4 Recommendation to maritime educators

Maritime management courses, specifically corporate maritime management and strategies requires an understanding of shipping company’s competitiveness. Given that the complexity of shipping knowledge is challenging to harness, it is worthwhile to consider the development of a conceptual framework to help structure and assist in transferring knowledge on shipping company corporate strategies and competitiveness for sustainable value creation.

9.5 Research limitations

Maritime clusters are fundamentally assessed on the basis of value creation failing which cluster studies may prove incomplete. This study has relied on quantitative data about production and production capacity to make judgment on the probable value of shipping activities, while industry data is nonexistent and unreliable. Also, the views of 27 industry professionals might not be representative of the overall cluster characteristics, while quantitative assessment of national performances and the stage of economic development may be subjective. An attempt to look at Nigeria in isolation given these factors will be futile, hence, the resolve to benchmarking with Norway and Qatar.

In defining maritime services the study limits the unit of analysis to financial services to assess the extent of interaction between shipping and maritime services, as well as to underscore the importance of capital in the development of shipping activities within the Nigerian environment. Second, is to create a balance in the research execution given the limited time for research delivery.
Although it is common knowledge that emerging industries require some form of protective measures. High entry barrier will be counterproductive to cluster development, especially with the prevalence of cabotage laws in Africa and the need to develop the maritime industries. This study has relied on the judgments of 26 respondents and may not be sufficient to weigh the effects of the entry barrier on cluster performance.

Facts about the pool of seafarers, demand and supply in the Nigerian industry remain obscure due to the lack of organised information or data base for seafarers. Thus, this research has been based on qualitative judgment of the seafaring condition in Nigeria.

Knowledge gap is one of the difficulties encountered in the course of conducting this research. Maritime cluster experts seldom have knowledge of the local environment; industry professionals lack adequate cluster knowledge, while there is knowledge convergence towards cabotage and local content making interview responses and opinions minimalistic. In the same vein, foreign expert’s knowledge about the local environment is limited.

9.6 Suggestions for further research

Implicit in the objective for this research is to use the findings as a basis for further research. Based on the analysis of results and conclusions, this thesis research has opened the following avenues for further research.

Empirical research to ascertain the value added contribution of LNG shipping and the Nigerian maritime sector at large will prove indispensable.

Limitation of maritime services to financial services is minimalistic and requires further research especially on the impact and necessary conditions for the location of ship management activities for cluster development.

Given the limitation on the representativeness of the 26 survey respondents, an empirical study to determine the exact impact of entry barrier on cluster development will prove useful.

Future research on the pool, demand and supply, and competence level of seafarers in the Nigerian maritime sector will be useful for planning and policy consideration. Secondly, to identify the factors necessary for improving the employability of Nigerian seafarers in line with the supposed ambition of becoming a seafaring nation, a research in this direction will be necessary.

As stated in section 8.6, further empirical study could be considered on the proposed conceptual framework for reviewing shipping company competitiveness. For example, to determine the extent that the variables contribute to competitiveness and can be operationalised.

Conclusively, with commitment from the Nigerian government; an attractive maritime education; inclusive cluster strategy- cluster actors have to co-operate and collaborate; quality maritime infrastructure; and considerable investment in maritime administration and shipping management know-how – a balance between administrative and management competences and capabilities, and seafaring competences; the theme for Nigeria can change from participating in domestic trades to internationally competing.
Appendices

Appendix 1: Cluster lifecycle

![Cluster lifecycle diagram](image_url)

Menzel and Fornahl 2010
Appendix 2: LNG fleet

![LNG fleet chart]

Source: Lloyds list intelligence

Appendix 3: Notes to shipping market risk (excerpts from maritime economics)

‘If owners feel very confident about their future cargo flows and want to control the shipping, they may decide on option 1, which involves buying and operating their own ships. In doing this they cut the ship-owner out of the equation (though they may use shipping company to manage the vessels) and take all the shipping risk themselves. If all cargo owners do this, the spot market phenomenon disappears and the role of independent shipowners shrinks. There are many examples of this. For example, most LNG schemes were set up using vessels owned or leased by the project and until 1990 almost all the container-ship fleet was by the liner companies.

However, if they are reasonably certain about future cargo volumes, but feel independent ship owners can do the job cheaper, they may prefer option 2, which involves taking long-term charters from independent owners. They pay an agreed daily rate, regardless of whether the ship is needed, whilst leaving the cost management and the residual risk with the ship-owner. For example, Japanese corporations often arrange for foreign owners to build ships in Japanese yards and charter them back on long-term contracts. These are also known as tie-in-ships or shikumisen. Raw materials such as iron ore, coal, bauxite, nonferrous ores and coal are often shipped in this way. The longer the charter the more risk is taken by the cargo owner and less by the ship-owner, and long charter became so common that in the early 1970s that Zannetos commented: ‘I know of few industries that are less risky than the oil tank ship transportation business. Relatively predictable total requirements, time-charter agreements, and, because of the latter, availability of capital mitigate the risks involved in the industry’. In this business the challenge is to win the contract and deliver the service at a cost which leaves the ship owner with a profit. Although the ship-owner is freed from market risk, that does not remove all risk. Charterers strike a hard bargain, often leaving the owner vulnerable to inflation, exchange rates, mechanical performance of the ship and, of course, the ability of the shipper to pay his hire. As an
alternative to a physical contract, charterers could take financial cover using the derivative market and, for example, a forward freight agreement.

Finally, cargo owners can pass all the shipping risks to the shipowner by using the spot market, option 3. They hire the ships they need on a cargo basis, so if for some reason there is no cargo, shipowner carries all the cost of the ships which are unemployed. However, everything has a price and when ships are in short supply, cargo owners with no cover must pay a premium. Both the period and the spot markets have cycles, but the spot cycles are the most volatile.

These three options do not change the amount of shipping risk; they just redistribute it between the cargo owners, who take all the downside risk under option 1 and none under option 3, and the shippers, who take no risk (except possibly as ship manager) under option 1, take time charter risk under option 2, and become primary shipping risk takers under option 3. So ship-owners have very different strategic options. They can trade on the spot market and become risk managers or become subcontractors and ship managers, focusing on cost and management. Cargo owners have strategic choices, too. The distribution of risks between the spot and period markets is a matter of policy, and the balance will change with circumstances. Oil transport provides a good example. In the 1950s and 1960s the oil companies owned or time chartered most of the ships they needed, taking only 5-10% from the voyage charter market, so in 1973 there was 129 m.dwt of independent tanker tonnage on time charter and only 20 m.dwt on the spot market. However, after the oil crisis in 1973 the oil trade became more volatile and oil shippers, which now included many traders, started to switch to the spot market, so by 1983 the tonnage trading spot had increased to 140 m.dwt and only 28 m.dwt was on time charter. So in 10 years tanker shipping risk was completely redistributed. One benefit of this was that with such a large spot market there was increased liquidity, making it more viable transport source for shippers than the tiny spot market in the early 1970s.

Appendix 4: Excerpts from Marine Money’s Bank Debt Deal of the year 2012

Jim Lawrence writes:

‘Citi as a Sole Co-ordinator, Book runner and Mandated Lead Arranger for ASGL’s (Angelicaoussis shipping group limited) debut loan facility for the pre-and- post delivery financing of 9 LNG vessels. The facility closed at US$1.25 billion with US$1.5 billion of commitments received representing 1.2x over subscription. The transaction constitutes the largest shipping debt facility for 2012. Ten years ago Marine Money wrote that Citi deals rarely were less than nine figure transactions. Today it may be TEN.

The term loan has a loan to value of 65%, a tenor of five years with a repayment profile of 15 years. All nine vessels are on long-term charters to high quality counterparties that cover the life of the facility. During the pre-delivery stage, 65% of each installment to the shipyard will be financed by the facility. The facility is the first syndicated loan facility across any of ASGL’s subsidiary companies: Anangel American Ship holding Limited, Dry bulk; ACOL Tankers, tankers; Maran Ventures, LNG interests. The facility is part of Maran Venture’s plan to have in place a long-term, consecutive capital structure that materially enhances its equity story for a potential IPO. Other participants in the syndicated loan include: Common wealth Bank of Australia, Credit Suisse, Deutsche Bank, DNB, Nordea, ITF Suisse, Bank of America Merrill Lynch and SEB’. 
Appendix 5: Excerpts from Marine Money’s Project Finance Deal of the year

Campbell Houston writes:

‘... Government owned Korean Development bank has spearheaded the country’s efforts to support the shipping industry, and launched the one trillion won Lets Together Shipping Fund. Though this fund is not used in the award-winning deal, KDB arranged a loan facility that financed one of the biggest deals by tonnage of the year. In August, Polaris Shipping co. inked a deal to purchase ten 300,000 DWT bulk carriers from Vale International. The ships were built in 1993/4 as single-hulled VLCs, and purchased by Vale in 2009, which had them converted in China to VLOCs. The $60 million price tag Polaris paid for each of the vessels freed much needed cash for Vale, which had begun taking deliveries of its 400,000 DWT Valemax ships. Polaris chartered the vessels back to Vale for 12 years on a mixture of time charters and consecutive voyage charters. KDB led a group which also consisted of government owned Korea Exchange Bank, commercial bank Kookmin Bank, and cooperatives NongHyup (National Federation of co-operatives). The group announced in October that it had assembled a $334 senior term loan facility for Polaris Shipping, in which, in conjunction with $200 million private equity fund investment and $66 million seller’s credit from Vale, solidified the sale. The banks considered the vessel lifespan and the cash flow from the leaseback arrangement in determining the payback period, which is reported as 7 years. Although KDB and KEB are government owned banks, because commercial banks participated in the deal, it had to be done on a commercial basis. Figure 13 depicts the structure of the project finance deal’.

![Diagram of the project finance deal structure](image-url)
Appendix 6: List of interviewees

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Position</th>
<th>Relevant knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Erik Jakobsen</td>
<td>Menon Business Economics</td>
<td>Managing Partner</td>
<td>Maritime clusters</td>
</tr>
<tr>
<td>Ms. Funmi Folorunsho</td>
<td>Association of African Shipowners</td>
<td>Director General, African Shipowners' Summit/ Member ISAN</td>
<td>Maritime clusters</td>
</tr>
<tr>
<td>Mr. Godwin Anene</td>
<td>A.G Butler Nig. Ltd.</td>
<td>Operations Manager AG Butler/ Member ISAN</td>
<td>Maritime, Marine logistics, shipping and ship management</td>
</tr>
<tr>
<td>Mr. Ezo Goddey</td>
<td>A.G Butler Nig. Ltd.</td>
<td>Business Developer</td>
<td>Oil and gas and marine logistics</td>
</tr>
<tr>
<td>Mr. Akin Adegoye</td>
<td>Peter Maritime Consulting</td>
<td>Managing Director</td>
<td>Maritime</td>
</tr>
<tr>
<td>Mr. Obiora Efoji</td>
<td>Century Ports and Terminals Ltd.</td>
<td>Maritime logistics professional/shipbroker</td>
<td>Ports, shipping, logistics and shipbroking</td>
</tr>
</tbody>
</table>

Appendix 7: Questionnaire

7.1 How would you characterise Nigerian maritime sector as a cluster?

- Developed Cluster
- Emerging Cluster
- Potential Cluster

7.2 Do you believe Nigerian maritime sector has the potential to develop towards an internationally competitive cluster?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

7.3 How would you characterise the availability of competent human resources required for maritime cluster development in Nigeria?

- Abundantly available
- Sufficiently available
- Moderately available
- Non existent

7.4 How would you characterize educational and training opportunities for maritime competencies development in Nigeria?

- Abundantly available
- Sufficiently available
- Moderately available
- Non existent
7.5 How would you characterise your country’s maritime sector’s entry/exit barriers?

<table>
<thead>
<tr>
<th></th>
<th>1=Low barrier</th>
<th>2=Moderate barrier</th>
<th>3=Considerably high barrier</th>
<th>4=High barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exit</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

7.6 How would you characterise Nigeria’s attraction as a location for maritime business?

- Very attractive
- Attractive
- Moderately attractive
- Not attractive

7.7 Based on a total evaluation, how strong would you say your relations/linkages to the following companies or institutions are?

<table>
<thead>
<tr>
<th></th>
<th>1=No relation</th>
<th>2=Moderate relation</th>
<th>3=Substantial relation</th>
<th>4=Strong relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship owners</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ship Yards</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment supplies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port and maritime logistics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime consultancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship management</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ship brokers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship Agents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing and insurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime law firms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities and training institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil and gas operators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory authority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information and communication technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.8 How demanding are your customers?

<table>
<thead>
<tr>
<th></th>
<th>1=Not demanding</th>
<th>2= Moderately demanding</th>
<th>3= Demanding</th>
<th>4=Very demanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic customers</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>International</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.9 How would you characterise the competitive environment in the Nigerian maritime sector in relation to the following (please note: local refers to sub-clusters e.g. Lagos and Port Harcourt while domestic refers to national)

<table>
<thead>
<tr>
<th></th>
<th>1=Not competitive</th>
<th>2= Moderately competitive</th>
<th>3= Considerably competitive</th>
<th>4=Very competitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local market</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Domestic market</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

7.10 Based on experience/evaluation, how would you characterise co-operation among the firms in the maritime sector?

<table>
<thead>
<tr>
<th></th>
<th>1=Not competitive</th>
<th>2= Moderately competitive</th>
<th>3= Considerably competitive</th>
<th>4=Very competitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local companies</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Domestic companies</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>International companies</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

7.11 How would you characterise the level of trust among firms operating within the domestic market?

<table>
<thead>
<tr>
<th></th>
<th>1= No trust</th>
<th>2= Low trust</th>
<th>3= Considerable trust</th>
<th>4= High trust</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
7.12 How would you characterise the following factors for your company’s competitiveness?

<table>
<thead>
<tr>
<th>Factor</th>
<th>1= Not important</th>
<th>2= Important</th>
<th>3= Very important</th>
<th>4= Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unskilled maritime labour</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Skilled maritime labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highly educated maritime labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication and internet facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime transport infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-operation with other companies</td>
<td></td>
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</tr>
<tr>
<td>Credit financing</td>
<td></td>
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</tr>
<tr>
<td>Equity financing</td>
<td></td>
<td></td>
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<tr>
<td>Foreign direct investment</td>
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</tbody>
</table>

7.13 How would you characterize the quality of these factors in your location?

<table>
<thead>
<tr>
<th>Factor</th>
<th>1 = Poor</th>
<th>2 = Average</th>
<th>3 = Above average</th>
<th>4 = High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unskilled maritime labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skilled maritime labour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highly educated maritime labour</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Communication and internet facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Maritime transport infrastructure</td>
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</table>

7.14 To what extent does your company follow these strategies for competitiveness?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>1= No extent</th>
<th>2= Some extent</th>
<th>3= Considerable extent</th>
<th>4= Large extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence development</td>
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<tr>
<td>Joint venture</td>
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<tr>
<td>Horizontal integration</td>
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<tr>
<td>Vertical integration</td>
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<tr>
<td>Portfolio management</td>
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<tr>
<td>International expansion</td>
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<tr>
<td>Outsourcing</td>
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</tr>
<tr>
<td>Long term customer relation</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product and technology development</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
7.15 Based on the total evaluation how strong would you say your relations to maritime companies/institutions in the following countries are?

<table>
<thead>
<tr>
<th>Country</th>
<th>1= No relation</th>
<th>2= Considerable relation</th>
<th>3= Strong relation</th>
<th>4= Very strong relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Netherlands</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sweden</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.16 How would you rate your company’s co-operation with the following industry actors in the development of ideas, processes, product and services?

<table>
<thead>
<tr>
<th></th>
<th>1= No Cooperation</th>
<th>2= Moderate cooperation</th>
<th>3= Considerable cooperation</th>
<th>4= Strong Cooperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppliers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities and research institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime consultant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.17 Has your company undertaken in-house maritime training or research activities in the last year?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.18 How perceive the quality of maritime educational and research institutions in Nigeria?

<table>
<thead>
<tr>
<th></th>
<th>1= Poor</th>
<th>2= Average</th>
<th>3= Above average</th>
<th>4= Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.19 How would you describe your company’s relations with educational, training and research institutions in the local maritime sector (check only one)?

- Close relation
- Sporadic relation
- No close relation

7.20 If no relation with maritime educational or research institutions, which of the following factors would you consider to be responsible?

- The quality of maritime educational, training and research institutions are sub-substandard
- We do not have the capacity to engage in external training and research activities
- Research is not commercially viable
- There are no specialised research institutions in the maritime sector

7.21 To what extent are the following strategies used to develop competencies in your company?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>1= No extent</th>
<th>2= Moderate extent</th>
<th>3= Considerable extent</th>
<th>4= High extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recruitment or graduate</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Recruitment from educational &amp; research institutions</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Recruitment of personnel with international experience</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Recruitment of people with experience from competitors</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Internal courses</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>On-the-job training</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Executive education</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

7.22 How many of your employees are...

<table>
<thead>
<tr>
<th>Category</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unskilled in maritime and logistics (Shipping and ports)</td>
<td></td>
</tr>
<tr>
<td>Are skilled in logistics and supply chain</td>
<td></td>
</tr>
<tr>
<td>Are highly educated in maritime and logistics</td>
<td></td>
</tr>
</tbody>
</table>

100 %
7.23 Rate the distribution of nationalities among your employees

<table>
<thead>
<tr>
<th>Nationality</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
</tr>
<tr>
<td>European</td>
<td></td>
</tr>
<tr>
<td>Asia</td>
<td></td>
</tr>
<tr>
<td>African</td>
<td></td>
</tr>
<tr>
<td>American (North/South)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

7.24 How would you characterise national policy on the following subjects?

<table>
<thead>
<tr>
<th>Subject</th>
<th>1 = Poor</th>
<th>2 = Average</th>
<th>3 = Above average</th>
<th>4 = Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and gas exploration and production</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shipping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.25 How satisfied are you with the following?

<table>
<thead>
<tr>
<th>Service</th>
<th>1 = Not Satisfied</th>
<th>2 = Fairly satisfied</th>
<th>3 = Satisfied</th>
<th>4 = Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperate tax system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal tax system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government support and subsidy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local content</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour market policy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Import/export regulations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7.26 What factors do you consider for your company’s competitiveness in the next years?


7.27 What are the two main challenges for your company in the next years?


7.28 What are the two main factors you consider important for the competitiveness of the Nigerian maritime sector in the next years?


7.29 In which of the following sectors are you active?

<table>
<thead>
<tr>
<th>Sector</th>
<th>1=No relation</th>
<th>2=Moderate relation</th>
<th>3=Substantial relation</th>
<th>4=Strong relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship owners</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship Yards</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment supplies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port and maritime logistics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime consultancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ship brokers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing and insurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime law</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maritime education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil and gas operators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory authority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information and communication technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Improving the Competitiveness of Nigerian LNG Shipping Sector:  
a Cluster Policy Perspective on the Economic Development of Nigerian Maritime Resources

Adedapo Adewale, Maurice Jansen

Whereas the oil and gas industry is the mainstream of the Nigerian economy, domestic value added in shipping is less than proportionate to the scale of operations. The question is how to position the LNG shipping sector for competitiveness, and what will be the role of maritime knowledge institutions. This thesis explores the cultural and institutional influence on cluster interactions and the implications for policy making. This can serve as a basis for further studies on improving domestic value contribution, not only in Nigeria, but also in other emerging maritime sectors.

Literatures on clusters indicate that the key upgrading mechanisms are knowledge and innovation, synergy from quality cluster interactions, and the development of infrastructure to aid the flow of information, goods, and services. Analysis of cluster dynamics in this thesis, therefore, focuses on competitive linkages, cooperative linkages, competence development, and policy efficiency. However, results indicated that cluster interaction in Nigeria is far from exhibiting these upgrading mechanisms.

The shipping sector in Nigeria possess the competitive platform to innovate, however, indigenous firms lack the capacity to favourably take advantage of available opportunities. Competencies for such competitiveness are relatively insufficient; cooperation among domestic firms is weak; level of trust to create synergy is low; quality of maritime knowledge institutions is average; and the efficiency of maritime policies is considered average. These pose a challenge for cluster competiveness.

The maritime sector benefits from lower labour cost, though, disadvantaged in specialised workforce, maritime knowledge and physical infrastructure necessary for sustainable development. Indigenous shipping firms’ low productivity rising from these factor disadvantages undermines domestic demand; related and supporting

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maritime services are fragmented and less competitive; while government’s motivation for firm strategy, structure and rivalry is less sustainable.

Cluster competitiveness of the Nigerian LNG shipping sector depends on the extent that available resources can be leveraged to take advantage of shipping opportunities at large. This demands building distinctive resources and knowledge acquisition for a sustainable competitive advantage, contingent on the extent that competencies can be domestically upgraded. Such distinctive competencies can be leveraged via internal connectivity to develop cluster wide shipping management knowhow and the maritime human resources, through cooperation, collaboration, and a customer focused learning culture to fully exploit existing and future opportunities.

Conclusively, positioning the LNG shipping sector for cluster competitiveness depends on the social, economic, political, technological, and geographical conditions peculiar to a particular location in relation to the available resources on which competitiveness can be derived. Stakeholders such as policy makers, industries, shipping companies and maritime educators have to collaboratively develop quality maritime infrastructure; efficient institutional framework; and strategic connectivity® to improve domestic economic and social value added from shipping activities. Eventually, this joint effort in building inclusive business models will bring long term value added to all stakeholders, for a sustainable maritime future.