A Proposal

On

The Efficiency of Ports and Implementation of Supply Chain

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The Efficiency of Ports and Implementation of Supply Chain

1. Introduction:

In the 21st century, network of global trade relations can be effectively maintained through use of supply chain. Supply or logistics chain helps in process of integration of various shipping companies as well as other agencies which further helps in increasing smooth functioning of ports. Various aspects such as stakeholders as well as factors of import and export along with factors such as exchange of raw materials are analysed for proper integration into the system. As per the view of Stadtler (2015), the flow of export and import thoroughly depends on supply chain management. For its proper functioning, it is important to maintain port logistics chain. In the fierce age of competition, proper planning of port and its management is utmost important for doing business regarding exports and imports (Ott and Longnecker, 2015).

There are various factors which influence the functioning of a port. Supply chain management is one of the core factors which help in maintaining its proper functioning. According to the opinion of Christopher (2016), through the implementation of supply chain, the performance of ports can be made more efficient. The factor of arrival as well as departure time of various exports and imports directly impact functioning of ports. These factors in turn strongly impact the various stakeholders who maintain the logistics supply chain. As regarded by Bray *et al.* (2015), it is important for the focus of supply chain management to be directed towards better coordination through the help of proper physical and documentation flow regarding functioning of the ports. These aspects help in the process of analysis of the ports through understanding the concept of supply chain.

In the period of globalization, the aspect of supply chain management is becoming more and more important. Strategic function of business can be maintained through the help of global management of logistics or in other terms known as supply chain management (Baldwin and Lopez-Gonzalez, 2015). This aspect not only helps in increasing the efficiency of ports but also helps in creating a proper plan for maintaining as well as scheduling various factors in alignment

with imports and exports. Supply chain management also helps in controlling various other aspects of a port through which cost of goods along with transportation cost are also thoroughly maintained. The impact of globalization has also negatively affected the process of supply chain in some aspects. The taxes regarding export and import along with interest rate as well as exchange rate have increased. The rate of customs has also been directly impacted due to factor of globalization (Schabenberger and Gotway, 2017).

This aspect of globalization has led to increase in pressure in the proper operation of ports. Due to these, the system of supply chain management is evolving rapidly to keep in pace with standards of the industry. As asserted by Rodrigue and Notteboom (2017), maintenance of flexibility in the structural as well as functioning change in supply chain is important for efficiency of ports. Both of these factors are needed to be fully integrated and aligned with each other for its smooth functioning. Higher the integration process is the conduction of management of various ports becomes much more valuable. According to Tovar and Wall (2017), these aspects have an implication on the functioning on the business as a whole. It has a direct impact on the economic conditions of a country as a port helps in maintaining export and imports with foreign countries for maintaining efficient trade relations.

The usage of ports can be determined through its aspects of efficient cost management. This is one of the core factors which ports utilize in functioning of a business. Exports and imports as well as exchange of raw materials along with other products can be done through a much cheaper rate through sea than using any other modes of transportation (Rodrigues *et al.* 2015). This can only be possible when the ports are efficient enough to handle such activities. The process of selling or exchanging goods can undoubtedly be done in a better manner which has also increase the rate of international flow of trade. According to Loh and Van Thai (2014), the integration of supply chain thoroughly helps to maintain a harmonious trade process and ensures that no disruption at a large scale occurs.

One of the factors which are needed to be understood by the port authorities as well as logistics of the third party engaged with business is the aspect of supply chain orientation. As opined by Nooraie and Parast (2015), the knowledge of network structure are also needed to be understood by both the parties for maintaining role of proper trans-shipment. It is important for the ports to be prepared in such a way that they are oriented towards functioning of proper supply chain. Through this, not only exports and imports can be properly integrated but other business process

can be enhanced as well. The shipping ports needs to have proper strategies for its functioning for aligning with market maturation (Bode and Wagner, 2015).

Short term strategies are better in compared to long term strategies in the functioning of ports. Through this aspect, the flow of logistics can be widened in accordance to economic as well as global perspective. As stated by Farahanim *et al.* (2014), one of the major aspects of the authorities who maintain functioning of the port is to regulate the cost. In some aspects, the function of port authorities can be deemed as negative, especially for development of regional economic conditions. Though in most cases the authorities who handle functioning of port provides digital system of information for proper communication facilities as well as provides possibilities for intermodal transfer at a lower cost.

These various factors directly implicate on the efficiency of ports due to which it is important for the operators to understand the framework for supply chain. This is needed to be done in order to properly integrate various other service provides for smooth running of business. For maintenance of dominance over supply chain in a port strategy, asset management is needed to be done in a thorough manner (Lewis, 2015). The network of global production are embedded in a far better process through the help of supply chain management which helps in maintain trade relationships with various other parts of the world.

2. Scope and Significance of Study:

Ports play a major role in the growth engine of corporate houses, society and nation after all. They not only connect different cultures of various nations but also promote international trade (Wilmsmeier, Hoffmann and Sanchez, 2006).The demand and supply of goods and services impact the inflation, pricing, profit margins in general. Hence, the journey of products from manufacturing houses to reaching them in the hands of end-users should be flawless and timely (Paik and Bagchi, 2000). When international trade activities are encouraged, it gives an exposure to importers in terms of foreign investments, availability of multiple choices of products etc. On the other hand, more business avenues are opened for the exporters. When the cost of transportation is cheaper, traders are self-motivated to run their businesses more aggressively than ever with no compromise in levying the taxes. In fact, it can generate revenues for a nation (Rushton, Oxley and Croucher, 2000).

Ports are the key links between trades by sea and land both. Hence, they have gained momentum these days. The job opportunities are also created at multiple levels. As per the Global Insight Report (2007), the World Container Trade Volumes will be doubled by 2020 (from 59 in 2000 to 243 Million TEU in 2020 approx). Lower energy consumption, environment-friendly ports help in developing cities around them. Sectors like Finance, Insurance, Banking and Logistics are boomed through port activities (Ballou, 2004). Some governments have encouraged the firms to opt for waterways through tax exemption. In addition, the industrial clusters, special economic zones are created nearby the ports to attract foreign companies and investments as a strategic move (Shih, 2015). All of these initiatives empower the governments for ease of doing business for target firms. The developed nations like U.S.A. and U.K. have become successful in making an optimum use of ports for trade (Ayers, 2001).Now-a-days; developing nations like India have understood the importance with an initiative of launching a flagship program called 'National Maritime Development Programme (NMDP).' European nations are having started it already. However, a lot can be done in the phase of extension.

This study has been prepared for understanding the implementation of supply chain management in several companies of UK and USA so that every single resources and entities are involved in the creation of values. It is found that the idea of efficiency of port has been found by emphasizing the connection with the sea in order to strengthen the landside connection. In the recent years, ports have found to have conceptual changes and the traditional indicators of performance of ports are having sufficient connection with landslides. This indicates that better coordination is the factor for improving the function of port. Different studies have been proposed for measuring the efficiency of port by paying attention on the activities of loading and unloading of goods. Port efficiency is a significant indicator which helps in presenting low transportation costs and helps in importing and exporting goods of the country (Rodrigue and Notteboom, 2017). Different components such as provision and structure of storage network are responsible for aiding the stream administration. The countries having political and monetary setting has an extra advantage of having understanding of exchange due to globalization.

This study has discussed the effectiveness of supply chain in companies such as Exmouth, Plymouth, King's Lynn Docks, Harwich port and Cowes port. It is found that supply chain helps a firm to upgrade the standard by creating the base of the company. During the consideration of the efficiency of supply chain, joint exertion present in store network is helpful for removing

stress. For example, best way to understand the success of the company, maintaining a realistic schedule are helpful for gaining experience in business. This study conveys that participation of suppliers which is found to be absolutely critical in a collaborative project. Effective business models such as tools, services and enhancing supply chain network creates sustainability by applying new solution of supply chain. Gaining inventory network is found to be original examination due to less trust and information that is shared between the open and close partners. As mentioned by Ascencio *et al.* (2014), lack of integrated management related to port activities is responsible for the absence for actual community along with competitive scenario. Moreover, resilience and agility plays an important role in enhancing the effectiveness and efficiency of supply chain of port. Considering the above line, literature review section deals with the need and awareness of presenting greater integration in supply chain. At the same time, adopting a systematic approach in port helps in creating greater propensity in order to interacting and collaborating with the export partners.

A well established stockrooms, storage house and control data and adequate planning technologies are used for associating right amount of work along with proper network administration. Thekdi and Santos (2016) highlighted the fact of managing logistics chain is essential concept of harmonic fashion. Evolution has been found in technologies for ensuring the relation and learning process appropriately. Ports of UK have developed smart service system which helps in the learning process, business management and rational innovation for enhancing the effectiveness of improving relationships. This study has done an observed investigation for deciding the effectiveness of port area. In addition, it is required for worldwide elements in bringing strategic chain in business. There is a requirement of establishing a consolidated system for bringing innovation in business of port. The community of port consists of members, public and private entities those are responsible for providing port services. This study has shown the strategies that are implemented for elevating the performance of supply chain. For instance, in Harwich port, variety of data is circulated among PCMs on regular basis for implying higher costs in trade. On other hand, in order to implement supply chain, transportation process in the ports helps in eliminating process of waste for securing agile services in the port.

Transportation in any association has turned into a key business work because of increment in transportation cost to offer huge number of merchandise. In the meantime, if there is any postponement in transportation of merchandise, it will badly affect the execution of the

association. At the point when worldwide exchange exercises are supported, it gives a presentation to merchants as far as outside ventures, accessibility of various selections of items and so on. Then again, more business roads are opened for the exporters (Dasgupta and Sinha, 2016). At the point when the cost of transportation is less expensive, dealers are self-propelled to maintain their organizations more forcefully than any time in recent memory with no trade off in charging the duties. The port co ordinations chain administration that can improve the coordination and compelling combination of private and open partners to plan, actualize and control the sea stream and ground transport, data and payload stream to goal point from birthplace in a successful way to decrease the cost amid benefit level necessities of exporters and merchants. Production of network structure and force has a relationship and alteration of stock system structure according to the market needs will have an enormous favoured viewpoint. This is a worthwhile for the capacity considering the circumstances, for instance, seaport groups (Coto Millan, BanosPino and Rodriguez Alvarez, 2000). Execution assessment of production network has been wound up being a key part on the present general condition, and co tasks related to stock system can be appreciated through utilization of central procedures. The closeness of a colossal number of private and open assistants that work in transport activities and co appointments of across the board load makes fundamental coordination issues among the port terminals and their basic clients, requiring endless structures. Such attributes eagerly impacts the productivity of vehicle business, the shipper along with the exporter influencing blockage at the section to point to the terminal and besides long holding up times at the different focus purposes of the widespread trade computed chain. Ports went about as an association among shore and ships through conceding berthing space and safe house, establishment and brief amassing to work and move inside port (Dasgupta and Sinha, 2016).

3. Research Question:

As ports fuel the business growth of any nation, their role is very crucial in supply chain and logistics management of various sectors and fields. The ports are under-utilized which can be understood when taking the growth potential into account. Their performance can be optimized to the great extent (Fourgeaud, 2000:35). Their efficiency is a matter of concern. One side, the cost is cheaper by sea. On the other hand, their overall efficiency and effectiveness is not up-to-mark. They fail in meeting the emerging needs and overcome the challenges (Seo, 2017). Hence,

the research question is “What factors make the ports efficient influencing supply-chain management system?

Capability of ports to upset supply chains is the result of improved mix of supply chains and ports. Port-related supply chain interruption demonstrate including hazard administration application, quality administration speculations and business congruity administration are examined in the investigation keeping in mind the end goal to improve port flexibility in such a way which can upgrade the production network progression (Schøyen and Odeck, 2013). Port experts and port administrators were used to gather the essential information for display approval through auxiliary condition demonstrating. It was closed from the outcomes that treatment of port related supply chain disturbance with the assistance of administration display aids the recognizable proof of outer and interior openings. It has been found from the investigation that seaside dangers and adjustment choices goes about as boost to port experts for chance identified with their activities and resources, just few have moved towards the execution of adjustment techniques. Practice and research groups must work together with each other and different partners must be occupied with request to adjust arranging process (MORAWSKI and GAJDA, 1975).

Ports are consistently searching for the powerful ideas for supply chain administration. Associations can offer the items speedier and at sparing costs if there will be a viable inventory network administration idea (Coto Millan, BanosPino and Rodriguez Alvarez, 2000). The vehicle of merchandise and enterprises and the assessments impact the estimating variable to the immense degree. Henceforth, port assumes a critical part in arranging and execution of supply chain administration. As the cost of carriage of products via ocean is less expensive, water transport is favoured by business firms. In any case, the ports should be sufficiently productive to meet the prerequisites in an expert and auspicious way. Coordination and production network administrations are specifically connected with the ports (Seo, 2017).

It is universal fact that ports are playing a very important role in the growth of the business of any country. Their increasing role in the entire logistics system certainly requests a detailed examination of the port supply chain management. Their changing role in the supply chain management can certainly prove to be effective and help the Logistic industry perform much better. However, it has been found out that many ports are not efficient enough to offer the

businesses with the best services of transportation. Although it is possible to increase their efficiency, it certainly requires some sort of strategy and hard work. Therefore, this study will focus on the question of "how the ports can become more efficient and support the supply chain management system better?" Through this Research question, we are going to find out what are the limitations different ports are faced with during their functions of transportation and distribution and what factors can influence them to overcome these limitations and provide better opportunities to the business organization and achieve growth (Dasgupta and Sinha, 2016). The fact that most of the ports do not have the effectiveness required to fully support the import and export activities, alone invites this question on how the supply chain management can be enhanced by making necessary modifications in the ports. Therefore, in this research study, our Main aim will be to identify the required changes in the ports distribution system and how it can be achieved. The research is presented with a background, which is the strategy adapted by the ports so as to enhance the supply chain management system along with the organisational characteristics. The strategy of integration of the ports and the performance of the ports can be described as the consequence of the strategy in order to elevate the supply chain management (CotoMillan, BanosPino and Rodriguez Alvarez, 2000). The research questions which have been discussed in the paper are as follows:

1. What are the strategies adapted by the ports so as to elevate the performances of the supply chain?
2. What are the capabilities and qualities which encourages implementation of the strategy along the ports?
3. What factors make the ports efficient influencing supply-chain management system?
4. What impact can be noticed on the port performance after the strategy of improving supply chain being adapted?
5. How does the above asked, capabilities and qualities contribute its importance to the implementation of the strategies?
6. Is it possible for these relationships being equally applied to all types of environments?

4. Objectives:

The study aims to develop a proper understanding of the efficiency of ports and how well they contribute to the supply chain management system. The companies involved in international supply chains due to globalization which involves exchange rates, duties, interest rates, custom regulations and taxes. Pressure in port operations have been increased due to such concerns and introduction of new distribution patterns and structural logistic changes (Schøyen and Odeck, 2013). Financial flows, material and information of two different organizations have been linked up through supply chain. Organizations can be logistic service providers, part producing firms, end product producing firms and customer. Strategic coordination nature required between trading partners can be easily recognized through supply chain management. A firm will perform better if it has a higher integration degree. Complete integration between customers and suppliers must be there for business procedures (Seo, 2017). There is competition amongst the supply chains in today's era which is considered as the most significant production system requirement to manufacture the products or services. Collaboration in supply chain in different companies can lead to resolve all the concerns such as aligning strategies, organizational barriers and speeding up issues (MORAWSKI and GAJDA, 1975). Collaborative working of two isolated companies to plan and execute operations related to supply chain leads to more productivity and success for organizations in comparison to working at individual level (Schøyen and Odeck, 2013).

The movement of products and ventures and the duties impact the evaluating variable to the immense degree. Consequently, port assumes a noteworthy part in arranging and execution of inventory network administration. As the cost of carriage of merchandise via ocean is less expensive, water transport is favoured by business firms. Be that as it may, the ports should be sufficiently effective to meet the necessities in an expert and auspicious way (MORAWSKI and GAJDA, 1975). Coordination's and supply chain administrations are straightforwardly connected with the ports. Their execution is negative in example of overcoming adversity of a country.

It prompts age of more income for the association at e-markets and at worldwide level. Worldwide coordination administration has turned into a critical angle in business tasks because of web based business, globalization and mass customization patterns. Transportation in any association has turned into a key business work because of increment in transportation cost to offer huge number of products (Schøyen and Odeck, 2013). In the meantime, if there is any

postponement in transportation of products, it will badly affect the execution of the association. At the point when universal exchange exercises are supported, it gives an introduction to merchants regarding remote ventures, accessibility of various selections of items and so on. Then again, more business roads are opened for the exporters. At the point when the cost of transportation is less expensive, brokers are self-inspired to maintain their organizations more forcefully than any time in recent memory with no trade off in charging the duties (Dasgupta and Sinha, 2016).

Competitiveness of the supply chain can be improved if the two organizations work in collaboration. Supply chain structure and competitiveness has a relationship and adaptation of supply chain structure in accordance with the market needs will have a significant advantage. This is a beneficial capability for environments such as seaport clusters (Coto Millan, BanosPino and Rodriguez Alvarez, 2000). Performance assessment of supply chain has been turned out to be a key component on the current worldwide condition, and interactions related to supply chain can be understood through application of systemic approaches (MORAWSKI and GAJDA, 1975).

It has been examined and demonstrated that the limit is impeding which is variable to gauge the viability of port tasks. The assets used ought to be most extreme regarding innovation, work, and gear and framework improvement. They can be additionally reached out for monetary, business, down to earth limits prompting cost-viability. As indicated by their assessment, a considerable measure of exercises is incorporated in the period of development. They begin from interest determining, prescient investigation to shared administrations. Presently a-days, data and correspondence innovation is more obvious. Innovation has changed the criteria of estimating achievement in coordination's administration. It is inspected that the administrative viability can be accomplished through careful arranging, checking, coordination, skilful utilization of innovation considering the new patterns. Individuals, items and process must create fundamental arrangement of activities and stick to them. All ought to be engaged with the basic leadership process for effective execution. It is the need of time.

Supply chain structure and intensity has a relationship and adjustment of inventory network structure as per the market needs will have a huge preferred standpoint. This is an advantageous ability for situations, for example, seaport bunches. Execution evaluation of supply chain has

been ended up being a key part on the current overall condition, and co operations identified with inventory network can be comprehended through use of fundamental methodologies. The nearness of a monstrous number of private and open accomplices that work in transport exercises and co ordinations of widespread cargo makes basic coordination issues among the port terminals and their essential customers, requiring countless structures. Such characteristics vehemently influences the profitability of the vehicle business, the merchant, and the exporter making blockage at the passage point to the terminal and furthermore long holding up times at the diverse centre points of the universal exchange calculated chain. Ports went about as a connection amongst shore and ships through granting berthing space and safe house, foundation and brief stockpiling to work and move inside port.

The presence of an immense number of private and public partners that work in transport activities and logistics of universal freight creates critical coordination issues among the port terminals and their primary clients, requiring a large number of documentation forms. Such qualities emphatically affects the productivity of the transport business, the importer, and the exporter creating blockage at the entrance point to the terminal and also long holding up times at the different hubs of the international trade logistic chain (Schøyen and Odeck, 2013). Ports acted as a link between shore and ships through imparting berthing space and shelter, infrastructure and temporary storage to operate and move within port. However, supply chain evolution urges other market players such as shipping lines, inland transport operators, stevedoring companies, custom officers, shipping and evaluate their role in the process of logistics. It imparts major challenges in their role as functional nodes amongst the logistic networks which lead to the development of an active role in supply chain (Dasgupta and Sinha, 2016).

The study will help us to find out various objectives which include:

1. The importance of ports in the import and export activities.
2. The various challenges and limitations ports face during their Logistic activities.
3. To find out the relationship between the supply chain management system and the performance of the port.
4. To identify the scope of ports in import-export activities
5. To study the challenges faced by the different ports

6. To examine the co-relationship between the performance of ports and their impact on supply-chain management system

5. Hypothesis:

The researcher has framed the null hypothesis. They are mentioned below:

Hypothesis 1:

H_0: There is no significant relationship between the port performance and supply chain management.

H_1: There is significant relationship between the port performance and supply chain management.

Hypothesis 2:

H_0: There is no significant relationship between the port performance and the use of technology.

H_1: There is significant relationship between the port performance and the use of technology.

Hypothesis 3:

H_0: There is no significant relationship between the cost of manufacturing and supply chain management.

H_1: There is significant relationship between the cost of manufacturing and supply chain management.

All these hypotheses will help in understanding the interaction between the supply chain management, the port performance and the use of Technology along with the manufacturing cost which will help us identify the efficiency of the port and how significant its role is in the supply chain management system.

It has been discussed and proved that the capacity is the detrimental factor to measure the effectiveness of port operations. The resource utilization should be maximum in terms of technology, labour, equipment and infrastructure development (Hlali, 2018). They can be further extended to economic, commercial, practical capacities leading to cost-effectiveness. According to their opinion, a lot of activities are integrated in the phase of evolution. They start from

demand forecasting, predictive analysis to shared services. Now-a-days, information and communication technology is more visible. Technology has changed the criteria of measuring success in logistics management (Schøyen and Odeck, 2013). It is examined that the managerial effectiveness can be achieved through meticulous planning, monitoring, coordination, skilful use of technology taking the new trends into account. People, products and process must develop necessary plan of actions and stick to them. All should be involved in the decision-making process for successful execution. It is the need of time (Dasgupta and Sinha, 2016).

Supply chain management represents a strong weapon that is required for gaining competitive advantage in trade and business. Based on supply chain management's approach, every port can operate the flow of doing business of goods and other commodities with other countries. Kamble *et al.* (2018) analysed the perspectives of service providers of port for developing values for the clients. It is found that bringing change in supply chain, ports can conduct every activity in proper time. Since, the performance of logistic and supply chain is directly linked with ports, global logistics becomes a significant aspect for presenting e-commerce and other trends of mass customization. It is found that when activities of international trades are encouraged, foreign investment is achieved which helps in running the business smoothly. On other hand, when transportation costs are cheaper, traders may feel very arrogant and fail to run their business successfully. However, logistic chain of port is helpful for bringing coordination among the public and private stakeholders for controlling the system of marine flow. International trade is encouraged in order to gain more revenue in business from the foreign exporters.

Supply chain management helps in achieving dominant logic for reflecting value and creation in trade. The performance of port ultimately reflects the position and economy of the nation. Moreover, for transportation of good, strategic plan and supply chain logistics help in presenting the information about the quality of good in an effective manner. As presented by Lam (2015), concepts of port logistic helps in rationalizing data and improve the traffic flow in business. Moreover, indicators of port logistic helps in increasing visibility in transport chain for emphasizing an effective integration in business. Role of supply chain management helps in delivering the logic perspective in the business. In order to fulfil the requirements of merchant trading in ports, every worker requires adopting the aspect of supply chain for getting profit in business.

Supply chain can be characterized as the port strategic chain administration that can improve the coordination and compelling incorporation of private and open partners to plan, actualize and control the sea flow and ground transport, data and load flow to goal point from cause in a viable way to lessen the cost amid benefit level prerequisites of exporters and merchants.

Extra concerns have been presented for the organizations including in worldwide supply affixes because of globalization which includes trade rates, obligations, loan fees, custom directions and charges. Weight in port tasks have been expanded because of such concerns and presentation of new appropriation designs and auxiliary strategic changes. Budgetary flows, material and data of two unique associations have been connected up through supply chain. Associations can be calculated specialist co-ops, part creating firms, finished result delivering firms and client. Key coordination nature required between exchanging accomplices can be effortlessly perceived through inventory network administration. A firm will perform better on the off chance that it has a higher combination degree. Finish coordination amongst clients and providers must be there for business methodology. There is rivalry among the supply chains in the present time which is considered as the most critical creation framework prerequisite to make the items or administrations. Joint effort in supply chain in various organizations can prompt purpose every one of the worries, for example, adjusting procedures, hierarchical obstructions and accelerating issues. Synergistic working of two segregated organizations to design and execute activities identified with supply chain prompts greater profitability and accomplishment for associations in contrast with working at singular level. At the point when the cost of transportation is less expensive, dealers are self-inspired to maintain their organizations more forcefully than any other time in recent memory with no trade off in requiring the duties. Their execution can be improved to the immense degree. Their productivity involves concern. One side, the cost is less expensive via ocean. Then again, their general productivity and viability isn't doing mark. They bomb in meeting the rising needs and conquer the difficulties.

6. Review of Literature

Council of Logistics Management (CLM) has defined logistics as “The branch of military science having to do with procuring, maintaining, and transporting material, personnel, and

facilities."Hence, it deals with material, machinery and manpower as well. In addition, the storage of goods and services is also included.

Wilson, Mann and Otsuki (2003) in their "Trade Facilitation and Economic Development: Measuring the Impact" discussed on communication, coordination and collaboration and interdependence as key elements defining the scope any business. Transformation, extraction and flow of materials and information play pivotal roles in the overall supply chain management system.

Tongzon and Heng (2005) have published a research paper entitled "Port Privatisation, Efficiency and Competitiveness: Some Empirical Evidences from Container Ports (Terminals)." According to their opinion, a lot of activities are integrated in the phase of evolution. They start from demand forecasting, predictive analysis to shared services. Now-a-days, information and communication technology (ICT) is more visible. Tools like GPRS are used extensively to track the present status of transportation. Technology has changed the criteria of measuring success in logistics management.

Croucher and Baker (2010) published the book entitled as "The Handbook of Logistics & Distribution Management."They have underlined the significance of logistics from industrial and economics perspectives. This is because logistics has direct impact on marketing, finance, production and distribution of a company. Stocking, packaging, distribution and delivery are dependent on the logistics management system.

In another book named "Logistics Management and Strategy: Competing through the Supply Chain" Allan Harrison and Remko Hoek (2008) illustrated the competitiveness as a detrimental factor in supply chain system. According to them, the strategy should be planned and executed by 'putting the end-customer first. 'Naturally, one has to work on knowing the customer expectations at deep level understand their typing buying behavioural patterns and revolutionize the information channels for proactive involvement. Setting priorities is the key to effectiveness in their opinions.

Hummels (2001) in his “Time as a Trade Barrier Logistics” has discussed about value proposition. In addition, it creates strong value chain system engaging all the stakeholders like retailers, wholesalers, distributors, franchisers, vendors, agents and end-customers too. The good logistics creates activity mix which keeps on adding values all the time.

Han Shih (2015) in the research article published on “Facility Location Decisions Based on Driving Distances on Spherical Surface” has stated the relationship between cost and facility management. It is the poor facility location which leads to financial losses, high cost of transportation, irregular supplies of material, manpower etc. Hence, location analysis is the key to success in this regard.

Ballou (2004) has published an interesting book on “Planning, Organizing and Controlling the Supply chain.” It is examined that the managerial effectiveness can be achieved through meticulous planning, monitoring, coordination, skilful use of technology taking the new trends into account. People, products and process must develop necessary plan of actions and stick to them. All should be involved in the decision-making process for successful execution. It is the need of time.

In the book “Innovative Methods in Logistics and Supply Chain Management,” Blecker, Kersten and Ringle (2014), the authors have stated the principles applicable to the profitability analysis with respect to vehicle cost accounting. ‘The Calculation Schema’ factor is considered based on notable variables like kilometre, time, mode of convenience, types of vehicles etc. Electrical drives are recommended after the detailed analysis of existing transportation system.

Dr Khalid Bichou (2013) has expressed notable views on with specific reference to port management. His book on “Llyod’s Practical Shipping Guide: Port Operations, Planning and Logistics” is helpful to understand the significance of ports, their roles and functions. In his opinion, ports are as equally important assets as others. Ports perform various functions such as

industry clusters, networking centres, trading hubs and distribution parks for multi-national firms. The socio-economic dimensions are closely associated with the ports as change catalysts. Various approaches, models (economists, environmental, general equilibrium) are linked with the ports.

Kessides (2004) published the report in association with World Bank entitled as "Reforming Infrastructure: Privatization, Regulation, and Competition." According to him, capacity is the detrimental factor to measure the effectiveness of port operations. The resource utilization should be maximum in terms of technology, labour, equipment and infrastructure development. They can be further extended to economic, commercial, practical capacities leading to cost-effectiveness. Structural measures should be taken on three levels; High, Medium and Low (Lee and Whang, 2005).

Bichou (2008) in "Security of Ships and Shipping Operations has closely examined some serious challenges which posted a threat to the business traders' community. It has violated the business principles of trust, safety of life, transparency, sustainability and mutual relationships due to security threats. In order to promote, the concerned governments are expected to take serious actions and safeguard the goods and services coming to the port locations.

Martin Christopher (2011), an expert of SCM shred his valuable thoughts in his book "Logistics and Supply Chain Management." He has established the co-relation between the Logistics and Customer Value successfully. The journey starts from creating values to retention of customers through strategic planning and competitiveness. The need of setting standards is crucial to compare and contrast the inputs verses outcomes.

Recent literature has well documented the tendency towards logistics integration and supply chain orientation in the maritime industry and port. There is a requirement for port authorities, third party logistics and port system shippers to reconfigure port network structure. Therefore, to manage the diversifying and varying requirements of customers and users, port must be oriented towards supply chains. Inland transport films and maritime shipping lines who needs to develop effective business relationships must have to orient and focus towards effective supply chain

management. Logistics techniques, information and resources can be shared through several strategies such as network integration and joint ventures. A logistic management framework and improvisation of inter-enterprise procedures can be imparted through these principles. It involves resources and common areas which must be administered through different individuals. Empirical study has been done by researchers to determine the impact of supply chain on port sector. Shipping line calling and port terminal operator were the perspective considered under the study. The study contains the impact analysis on the port terminal performance and major variations amongst perspectives. Achievement of the supply chain integration is the major study finding due to deficiency of trust and cohesion and data sharing amongst the private and public stakeholders. Additional services which can create value must be generated along with the improvement of port access to improvise the port attractiveness for its users (JA Felício, 2015).

Another study includes the measurement of cohesion degree between the port supply chain stakeholders and the satisfaction level in response to received service level. It was found in the study that stakeholders possessing high interaction frequency amongst them received greater satisfaction and service level in comparison to those who have low level of interaction frequency. Low level of confidence and trust was imparted in response to port terminal services, warehouses and empty container depots were found along with low level of satisfaction related to price-quality ratio. Possible threats, areas for improvement and major limitations related to port systems were identified through group sessions. The requirement for an international entity has been observed as a major concern which can increase the collaboration and integration amongst various stakeholders (LM Ascencio, 2014).

A strategic role is played by port authority during the interaction with stakeholders associated with international trade logistics such as importers, custom agents, logistics operators, exporters, shipping lines, and inland carriers to determine the key factors which can impact the port system logistic performance. A collaborative framework is presented in the research to enhance the inter-enterprise procedure for port logistic chain. The study was performed to regulate the collaborative operations on the basis of supply chain management principles during transport interactions, international trade. A set of approaches to integrate warehouses, manufacturers, suppliers and stores to effectively plan, implement and control the information and material flow to destination point from origin in order to produce and distribute merchandise at right time in right quantity to right location is involved in supply chain management (M Formentini, 2016)

There are several studies in literature to calculate port efficiency. Through the effective use of survey, calculating of port efficiency can be conducted in order to obtain necessary data. It is found that survey utilization has limitation such as it is mainly dependent on perspective of participants of survey which may create disturbance in the trading process of ports. Existing survey that is present only shows the information of a particular time. Moreover, efficiency of business and port are measured based on the effective production of frontier and it is measured based on frontier deviation. Arvis *et al.* (2016) mentioned that economic estimation is alternative option for measuring the efficiency of ports. However, at this time, standard errors are often found for finding the efficiency of ports using econometric estimation. One limitation of using this method is, it requires massive data especially for input, labour measurement and capital. Different challenges are found to be faced by ports of UK in implementing supply chain management which cannot be resolved using internet paradigms. At this time, e-commerce techniques are used for shipping goods and transport in port sectors. It helps in saving the communication costs and administration costs by providing clients proper information and schedules for managing the financial transaction. Moreover, advanced information as well as ship technology successfully helped in decreasing the operational problem by developing well-furnished infrastructure. Navigation technology helps in making the communication easy which can be used by the supervisors and engineers of port. Gibbs *et al.* (2014) commented that computer based logistic techniques in port are available which are used for maintaining the stock control of trade. In order to effectively plan supply chain in port, unifying data, port coordination and other information services are required.

Prediction of vessel motions during the early port planning stage can assist in determining the port efficiency. Optimal port efficiency can be ensured through several steps such as considering the boundary conditions, application of numerical modelling and extreme value analysis and conduction of dynamic mooring analysis. Boundary conditions must be taken into consideration by the port planner such as space for vessels to turn and bypass facilities, transport, and pier operator space to handle cargo, etc along with thinking about environmental aspects. Port planner must think about breakwaters, reducing current and reduction of vessel motions. Higher terminal efficiency can be achieved through smaller vessel motions. Numerical modelling and long-term measurements can assist in the prediction f currents, waves and wind conditions in a port which can ultimately impact berthing conditions. For instance, terminal operability can be

minimized through long period waves. Obtained data from numerical modelling can be directly utilized in dynamic mooring analysis which imparts vessel motions, fender and line forces. Hydrodynamic and meteorological data can be easily combined in this tool (T Serebrisky, 2016).

The impact of external and internal sustainable collaboration of supply chain management on sustainability performance has been examined in research in context to ports. Survey data from 135 respondents who were at supervisor or above position in major international authorities based in Taiwan was collected through structural equation modelling. It was concluded from the results that internal sustainable management is positively associated with external sustainable collaboration. Sustainability performance is positively influenced through internal sustainable management. Mediation of the external sustainable collaboration effects were obtained through internal sustainable management on sustainability performance.

Ports contribute an essential economic activity especially in coastal region. In addition, these are also significant for developing crucial connection among land and sea transport. Seaports are present in centre position for the past few decades and provide benefits in water transportation of the country. However, there is a great impact of supply chain management on ports of coastal region due to the unethical activities that take s place in the operation and assets. Silvestre (2015) opined that risk is mainly found on coastal region due to climatic change and huge disruption in the port. Only few ports of UK are found to get accustomed with the adaptation strategies of supply chain. Interviews and questionnaires are prepared to collect data from the firms of South Korea.

Water transport has been playing a major role in the economy of UK as it is energy efficiency and cheap source of export and imports. There are many rivers such as Trent and Themes which are linked with ports. These are the rivers that are responsible for facilitating transportation in the country. On the contrary, despite of growing importance of ports in the country, the structure and management of ports are not adequate. In context of mechanical and labour, the ports are inferior to the ports of other countries. There is an accumulation of soil and sand on eastern coasts where navigation is not at all possible. However, there are many positive impacts of having collaboration of supply chain which results in making improvement in performance of ports. It is found that that effect of full mediation is observed which has lead to have advantage in the port performance.

Port resilience is considered as a significant parameter for the continuity of supply chain in current business environment of port. The outcome of supply chain has enhanced the integration of ports by implementing supply chain disruption model which involves risk management procedures for enhancing the resilience of port so that supply chain continuity is enhanced. Port operators and port authorities are responsible for collecting the information and making changes in the model validation by using disruption in supply chain (Grant *et al.* 2017). It is found that port handling is done by identifying internal and external opportunities in management. Ports are the important aspects in the country for bringing social connection with the ecosystem and the public. By developing efficiency in port, traders can build relationship with the foreign exporters. It will have a positive influence on the market reputation and financial health of port (Hui ShanLoh, 2014).

Different countries, cities and regions want to enter into the position in this globalization era to obtain profit from the globally integrated economy. There are several factors which can support of fail in the participation of a country, city or region to enter into global trade such as regional or country based trade barriers, global trade pattern and supply chain network structures. These factors assist in the flow of services and products of global trade. Asia-Pacific nations with different financial and political foundations built up an administration of two-sided organized trade agreements due to globalization. Due to the 1997 and 2008 money related emergencies, this Asian exchange administration has stayed in place, in spite of the fact that the most effective partners have changed positions, as shown by the solid development of China in the previous decade. Endeavours of key exchanging accomplices to handle non-levy hindrances (e.g. traditions customs) in the area have yielded little advance so far. Rather than going for a provincial agreement on non-duty boundaries by all part expresses, a global supply chain (GSC) approach is suggested. Mature hub ports at vital areas with cutting edge institutional measures could set up universal exchange assistance focuses co-finding multinational traditions conventions. This GSC approach may likewise be embraced to build a GSC centre advancement display that clarifies the change of centre ports (DW Song, 2015).

Territorial exchange is having fundamental expansion in the bilateral and bloc based agreement that is usually set for encouraging divisional generation in the nation. Outward-arranged economies are mainly preferred for using supply chain network. For instance, it is found that China and Asian nations that are presented in Southeast has moved from the underdeveloped

economy for developing unique culture. Progress are found in these countries which has helped in creating free trading environment which has enhanced the network structure of transport and has played a devastating role by making gateway ports in UK. In European countries, it is found that outer duties are together brought and in Asia, nations are working together based on FTAs for promoting segment exchange in the economies of Asia. Total number of goods that ar4e transported by the ports of UK has grown more than 60% from the past decades in 2017. The objectives of European commissioners are to achieve sustainable transport by creating supply logistics in order to generate shifts in the water transport and reduce the link among the demand of transport and demand (Arvis *et al.* 2016). On other hand, ports are found to have negative impacts on landscapes and habitats. The infrastructures and activities of ports are used for carrying out the trade business of good and transports and this can only be possible when regulation and policies of government are maintained systematically.

The hub and spoke system of the universal shipping network has been built up as a multi scale framework that serves maritime, worldwide territorial linkages, and is complimentary to some point-to-point administrations at the provincial (Short Ocean or beach front) scale. TEU holder vessels were recently conveyed as a component of the GSC equipment for center to-center shipments, a demonstration showing that transportation lines as key players in the game will keep on using the hub-and-spoke technique. More hub and spoke exercises are completed out by significant delivery firms at hub ports were observed by some European scholars. A few examinations have revealed comparable patterns in Asian hub ports where more business exercises have been increased because of globalization. Development of hub port and system availability with the hinterland has progressed toward becoming patterns of port regionalization. Transport hub system formation must not be considered as the single mode perspective irrespective of the complete reflection of hub-and-spoke port network system. Multilayered hub applications in a network of passengers, information and goods flow is represented in a study in which airlines and shipping companies complement with each other. It was further elaborated by other researchers who demonstrated that ports must be considered as a significant part of value chains at global level due to their integration within distribution and production process. A multilayered hub services can impart various services to different destinations through maritime.

7. Research Methodology:

It is the core element of present study. The study has pre-defined the flow of action to be carried out the research in a systematic and scientific manner.

Type of Research	Mixed (Descriptive + Explorative)
Research Method	Experimental Research
Area of Study	Production &Operations (Supply Chain Management- SCM)
Sample Size	250
Data Collection	Primary (Questionnaire= 10 Questions) Secondary (Reports, Books, Journals, Magazines, Online databases, reviews, expert opinions, research articles, blogs etc.)
Tools	Questionnaire, MS-Excel and Online resources

Table 1: Research methodology

A mixed type of research including descriptive and explorative study was conducted to effectively accomplish the study. Experimental research was done through operations and production parts related to supply chain management. A total number of 250 have been taken as sample size. Data was collected through primary resources in form of questionnaire consisting of 10 questions and secondary resources such as journals, reports, online databases, expert opinions, books, magazines, reviews, research articles, expert opinions, and blogs.

Research Outline

In this research, it is important to understand the framework of supply chain in order to understand its integration in ports for maintaining its efficiency. As per the view of Ascencio *et al.* (2018), the method of descriptive research is needed to be utilized for understanding the various aspects regarding supply chain and its implication of efficiency on ports. Through this the outcome of the research can be predicted which is needed to be properly analysed. According

to Silverman (2018), deductive reasoning is an appropriate technique which is needed to be used for logical reasoning of usage of supply chain. Existing properties as well as current phenomenon regarding supply chain are needed to be analysed through the help of reason as well as logic for its proper outcome regarding the relationship between functioning of ports and supply chain (Govindan *et al.* 2015).

Data Collection

Tools and technique

For understanding the alignment between process of supply chain management and its impact on efficiency of ports, the help of primary research is needed to be taken. Questionnaires are one of the most effective tool through which informative data can be collected (Dumay and Cai, 2015). For the collection of data, about 250 employees from Exmouth, Plymouth, King's Lynn Docks, Harwich port and Cowes port have been selected who are engaged in trade relations with foreign countries who use the system of ports. Through the use of email services, selective questions which are close ended are needed to be sent to these employees. Through this process of close ended questions, the research outcome can be narrowed down which is needed for understanding of the functioning of ports in accordance with supply chain.

8. Limitations:

The present study is restricted to the area of port operations and supply chain management only. The data is/are collected from 2007 to 2017. Hence, the results may vary to certain extent based on the time trends.

Even though the entire research was performed carefully, there are various limitations and shortcomings which are associated with this research It aims to provide the most effective and best possible knowledge about the efficiency of ports and their relationship with the supply chain management system, however, as the data was collected between the time periods of 2007 to 2017, therefore it cannot be stated that the research provides all the necessary knowledge regarding the subject. It is possible that there were some other instances before 2007, which needs to be evaluated which was not done due to the lack of data and information. Thus, we can state that some additional information was required to complete the research study

Cost is one of the core reasons due to which this research has not been able to be executed in a perfect manner. The lack of implementation of enterprise planning systems has lead to disruption of information in the management of the supply chain. Through this the calculation of various data from the surveys conducted could have been done. The implication of cost can be thoroughly understood in this aspect as these software packages are quite costly to be used in this research. Due to the lack of this resource, the research lacks in certain areas where the efficiency of supply chain in management of ports has not been properly recognised.

Therefore we cannot state that the number of ports utilized for the study may not represent the majority of ports. Finally, the information collected from the ports which have designed this research might not actually provide the evidence of their real efficiency in the import and export activities and their support to the supply chain management system, even though the information can well be used to get a good insight on their role in the supply chain. Moreover, since the data collected for the research paper is not from the primary sources, there are chances that the information provided is flawed.

9. Analysis:

1. What you think makes a port efficient?

Categories	No of respondents	Total no of respondents	Percentage
Lower transportation cost	78	250	31.2
More secure	82	250	32.8
Carry bulky products	90	250	36

Table 2: Efficiency of ports

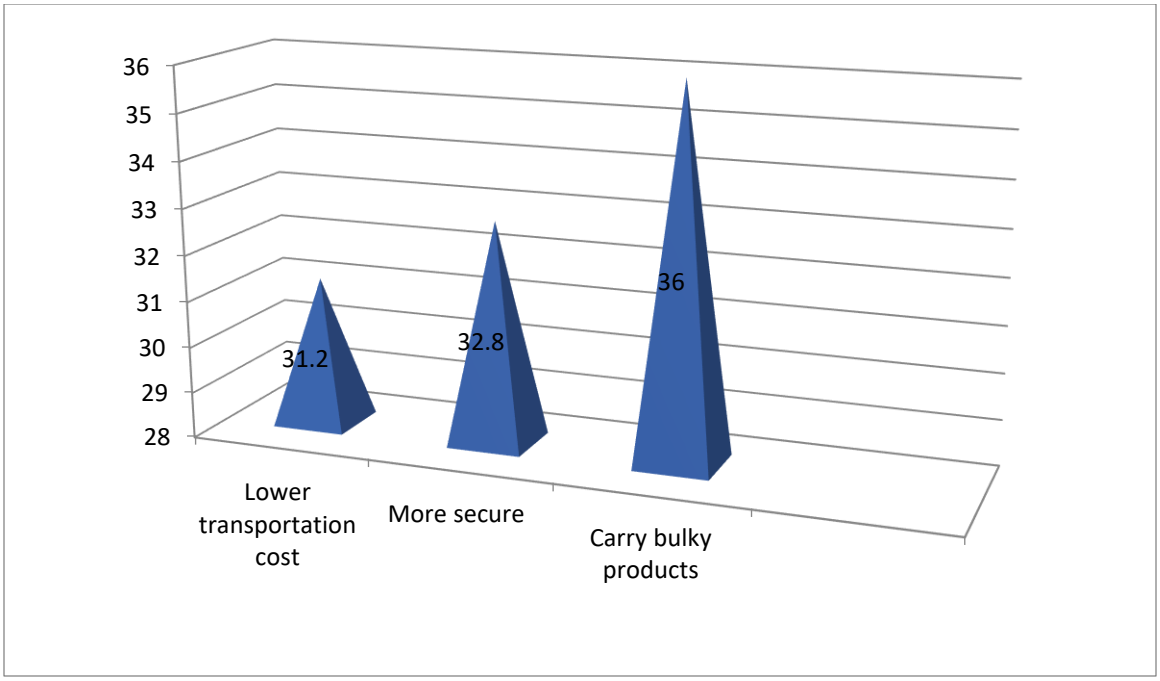

Figure 1: Efficiency of ports

Findings and Analysis

The above graph shows that 31.2% of employees believe that lower transportation cost can enhance the efficiency of ports. 32.8% believes that security helps in making port efficient whereas 36% believe that carrying bulky products ensure efficiency of ports. This implies that efficiency of ports depends on a number of factors like transportation, carrying of luggage, decreasing in warehouse costs and security in loading and unloading goods.

2. What are the factors which enhances the supply chain performance of ports?

Categories	**No of respondents**	**Total no of respondents**	**Percentage**
Reliability of transit time	56	250	22.4
Reduction in order management costs	85	250	34

Accurate information in the shipment process	59	250	23.6
Reduction in costs of warehousing	50	250	20

Table 3: Factors which enhances the supply chain performance of ports

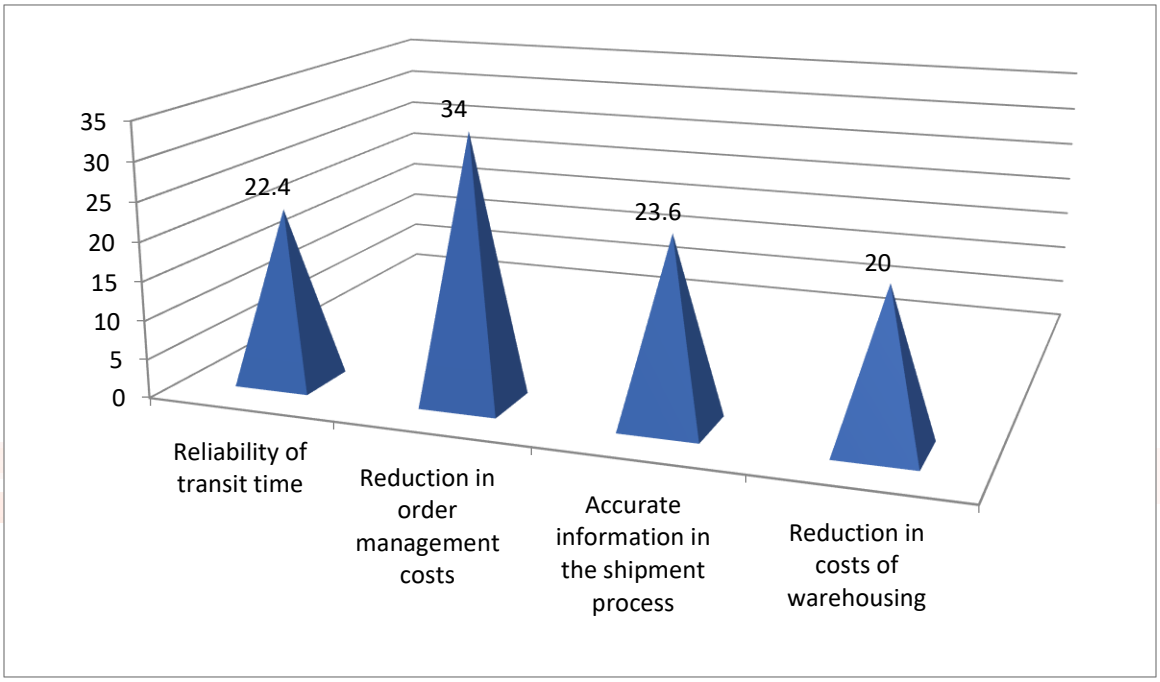

Figure 2: Factors which enhances the supply chain performance of ports

Findings and Analysis

The above graph shows that 22.4% of employees believe that reliability in transit of time helps in enhancing supply chain management system in ports. 34% believes that reduction in costs of order management helps in increasing efficiency of supply chain management system while 23.6 believes that accurate information in the shipment process can bring in efficiency in supply chain management process. 20% is of the view that reduction in warehousing costs helps in enhancing supply chain management system in ports. This shows that for supply management to be effective in ports, it is imperative to reduce warehousing costs and ensure accurate information

so that goods can be loaded and unloaded in stipulated times in ports. This can help in reducing unforeseen incidents.

3. Do you agree that an efficient port enhances export and import?

Categories	No of respondents	Total no of respondents	Percentage
Agree	72	250	28.8
Strongly agree	76	250	30.4
Neutral	47	250	18.8
Disagree	50	250	20
Highly disagree	5	250	2

Table 4: Efficient port enhances export and import

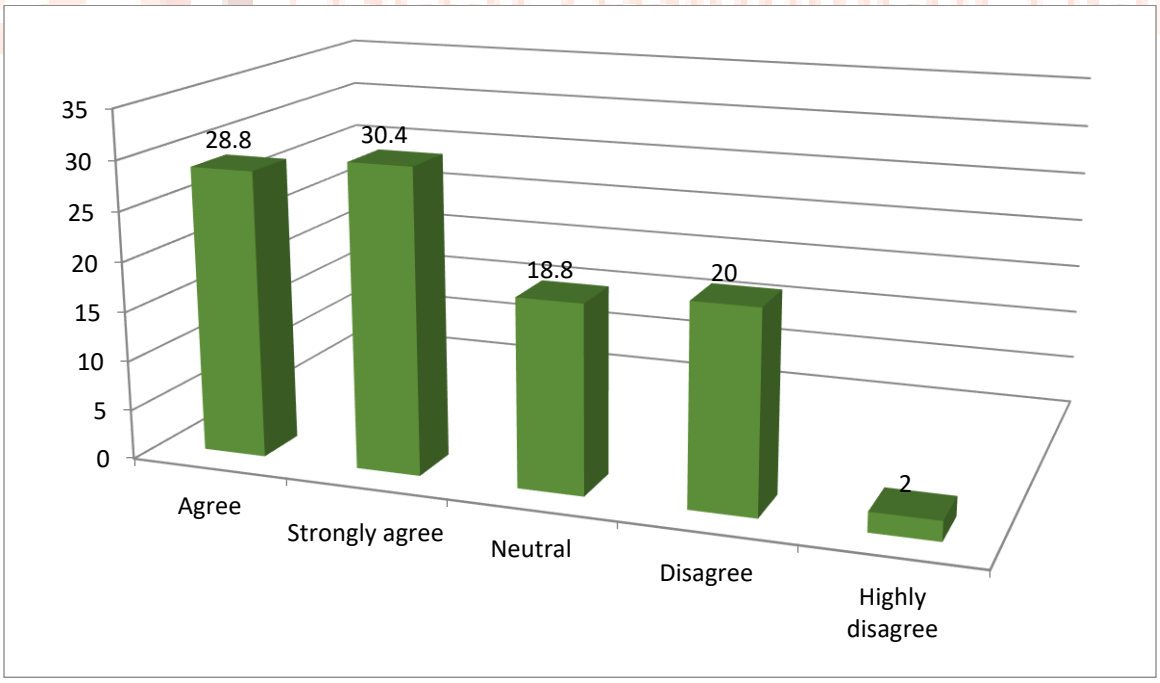

Figure 3: Efficient port enhances export and import

Findings and Analysis

The above graph shows that 28.8% of employees agree that efficient port system can help in enhancing both imports and exports. 30.4% strongly agrees with the fact whereas 20% disagrees with the fact. 2% of employees disagree with it while 18.8% is having neutral opinion. This shows that for increasing of exports and imports it is imperative to have effective ports. Effective SCM helps in managing ports and earning good revenue from exports.

4. Do you agree that effective management of ports impacts effective management of supply chain also?

Categories	**No of respondents**	**Total no of respondents**	**Percentage**
Agree	85	250	34
Strongly agree	65	250	26
Neutral	37	250	14.8
Disagree	43	250	17.2
Highly disagree	20	250	8

Table 5: Effective management of ports impacts effective management of supply chain

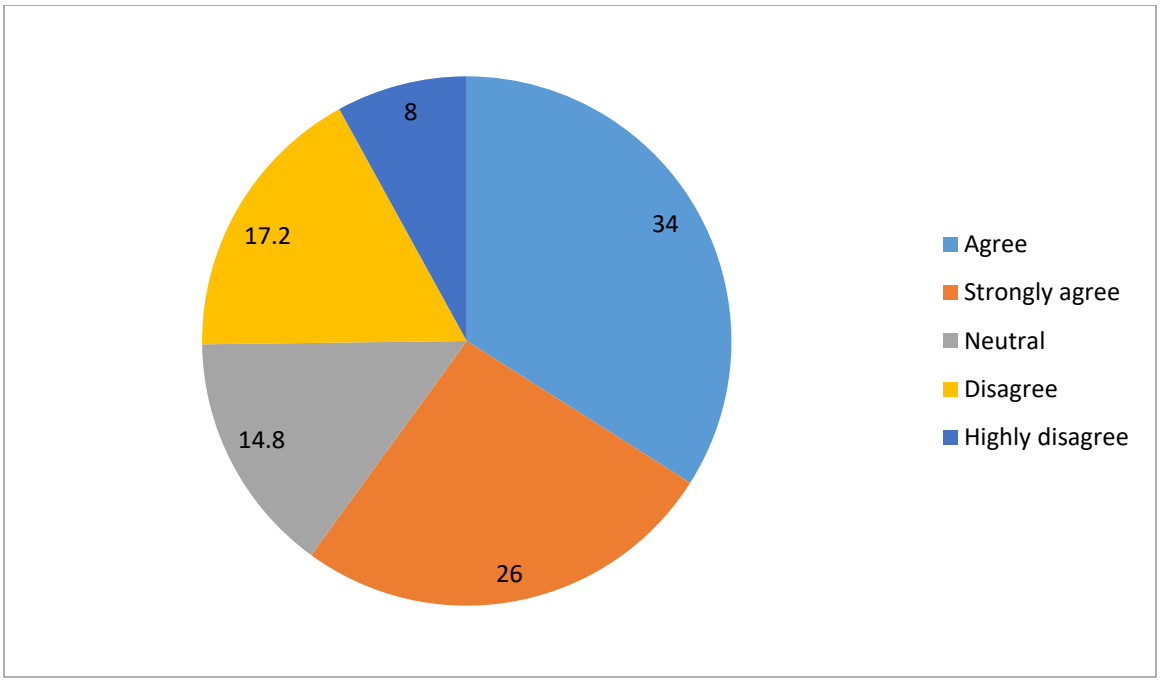

Figure 4: Effective management of ports impacts effective management of supply chain

Findings and Analysis

The above graph shows that 34% of employees agree with the fact that proper management of ports impacts effective supply chain management also. 26% strongly agrees with the above statement whereas 14.8% remain neutral with the above statement. 17.2% disagrees with the statement and 8% highly disagrees with the above statement. This shows that if ports are managed properly then they can deliver effective supply chain management practices. Good SCM practices help in carrying of loads in stipulated time and reduce wastage of goods.

5. What is the most important wing of globalized supply chain?

Categories	No of respondents	Total no of respondents	**Percentage**
Regulations	55	250	22
Foreign Exchange	76	250	30.4
Operating costs	59	250	23.6

Boost customer service	60	250	24

Table 6: Important wing of globalized supply chain

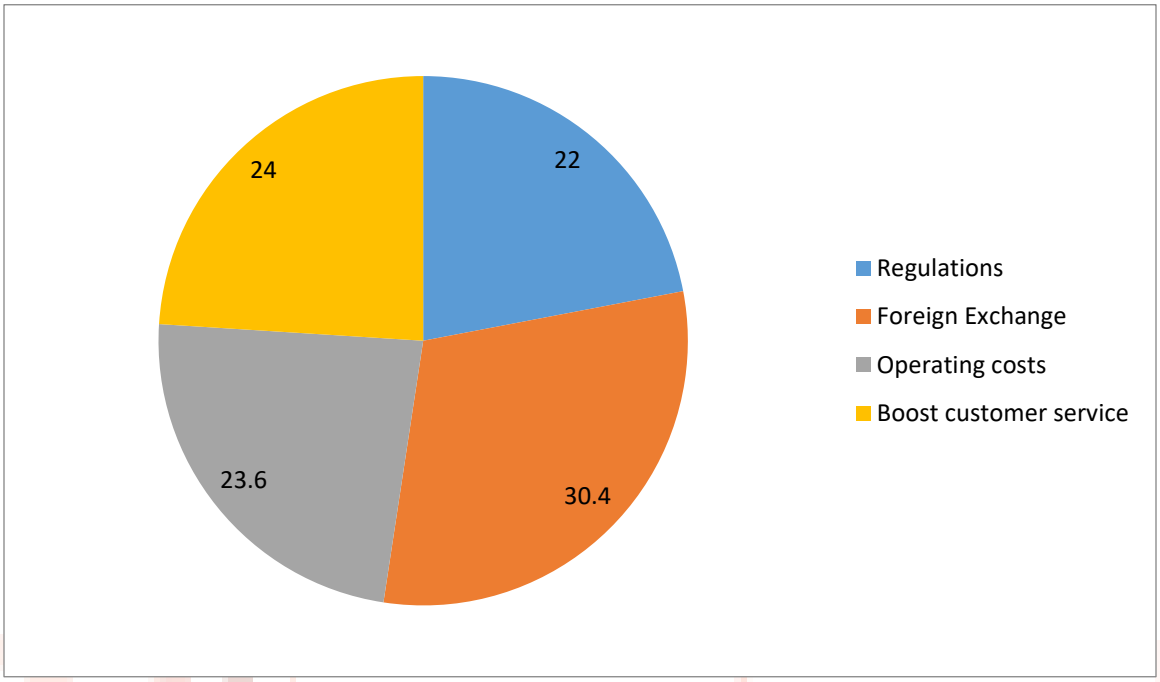

Figure 5: Important wing of globalized supply chain

Findings and Analysis

The above table shows that 22% of employees of Newhaven believe that regulations are the important wing in globalised supply chain management system. 30.4% believes in foreign exchange whereas 23.6% believes in operating costs to be important in globalised supply chain management system. 24% consider boosting of customer services as the most important wing in globalised supply chain management system. This shows that effective supply chain management helps in managing of ports and reduces operational and other costs.

6.Which aspect of the industrial performance connects the port with supply chain management?

Categories	**No of respondents**	**Total no of respondents**	**Percentage**

Minimizing time in supply of production	92	250	36.8
Managing time for collecting raw materials	80	250	32
Finishing the transportation work in reasonable costs	78	250	31.2

Table 7: Aspect of the industrial performance connects the port with supply chain management

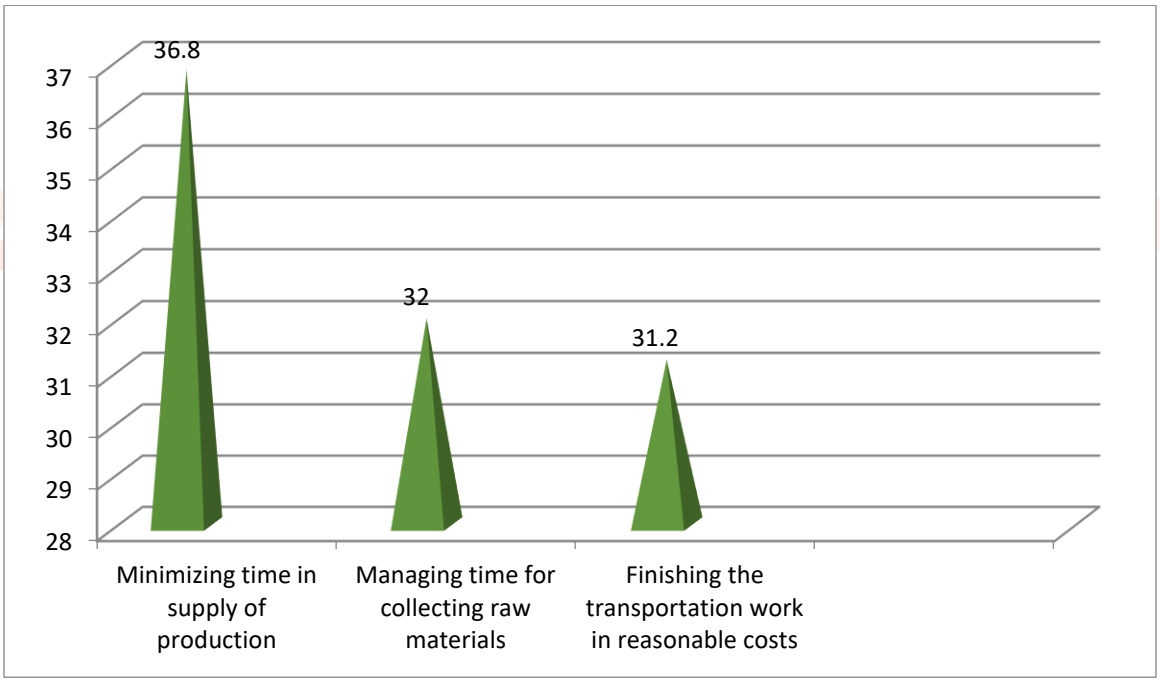

Figure 6: Aspect of the industrial performance connects the port with supply chain management

Findings and Analysis

The above table shows that 36.8% of employees believe that minimising time in supply of production is the main aspect of industrial performance which can connect the port with supply chain management system. 32% of employees consider managing time in collection of raw

materials as the main aspect in enhancing industrial performance. On the other hand, 31.2% believe that finishing of transportation work in reasonable costs as the aspects in enhancing industrial performance. This shows that for enhancing the industrial performance, it is required for the companies to have an effective supply chain management system for better delivery of goods.

7. What is the most important quality of an efficient supply chain?

Categories	**No of respondents**	**Total no of respondents**	**Percentage**
Return on investment	72	250	28.8
Increase productivity	52	250	20.8
Increased demand	66	250	26.4
Decrease cost effects	60	250	24

Table 8: Important quality of an efficient supply chain

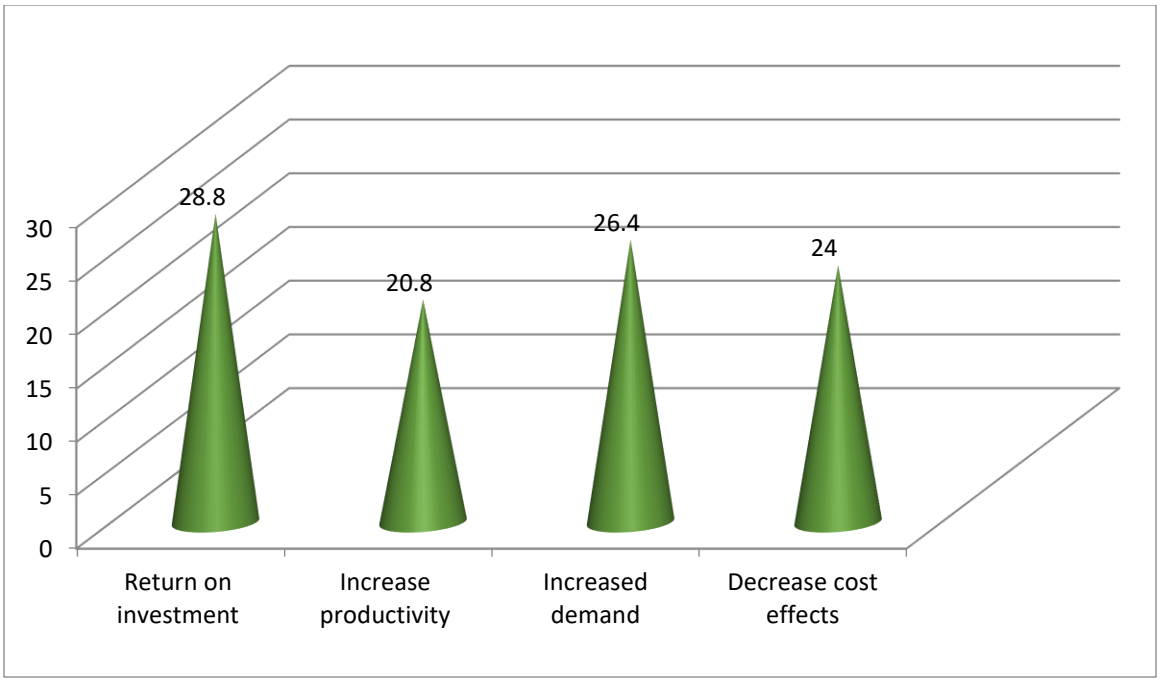

Figure 7: Important quality of an efficient supply chain

Findings and Analysis

The above table shows that 28.8% of employees believe that return on investment is the most important quality for effective supply chain management system. 20.8% of employees believe that increased productivity is the important quality of an effective supply chain management system. 26.4% attributes increased demand while 24% attributes to decreased cost effects as the important qualities in supply chain management system. This shows that for enhancing the performance of a company, it is required to have increased demand for products as it can help that company to upgrade its supply chain management practices.

8. How far do you think ports is important in the decision making process regarding management of supply chain?

Categories	**No of respondents**	**Total no of respondents**	**Percentage**
Important	76	250	30.4
Very Important	72	250	28.8

Neutral	30	250	12
Less important	34	250	13.6
Not important	38	250	15.2

Table 9: Place of ports in the decision making process

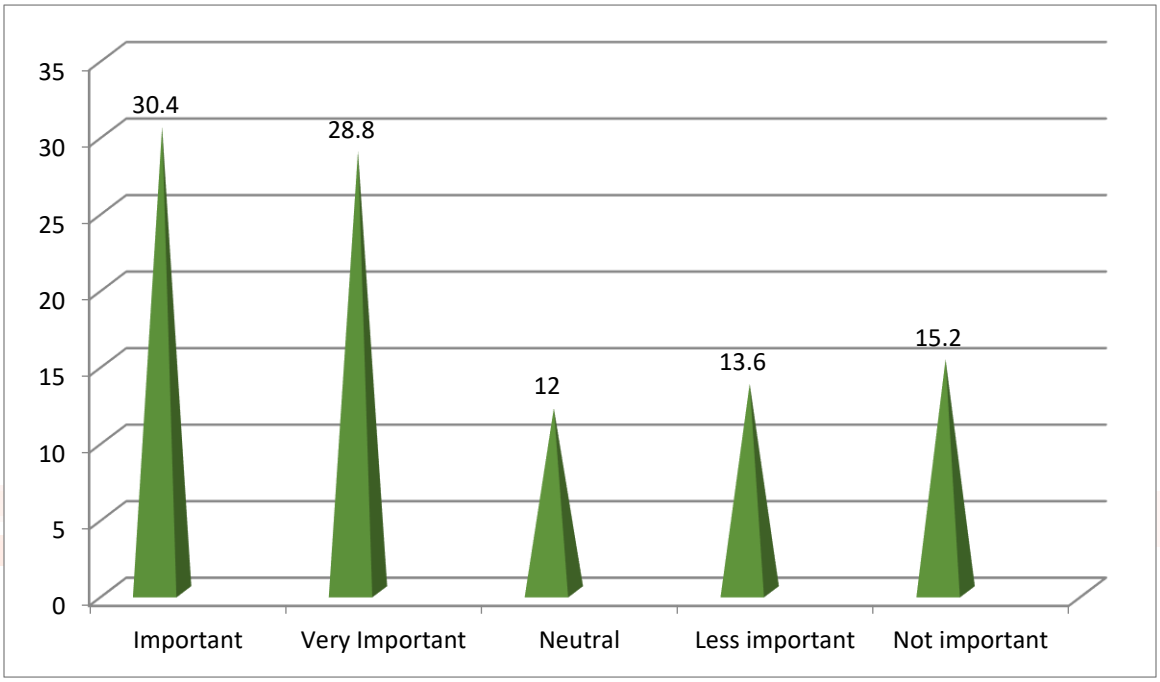

Figure 8: Place of ports in the decision making process

Findings and Analysis

The above graph shows that 30.4% of employees believe that it is important for the ports to get engaged in effective decision making process for better supply chain management system. 28.8% believe that involvement of ports is very important in taking decisions for upgrading supply chain management practices. 12% are neutral with the above statement whereas 13.6% consider it to less important. 15.2% of employees believe that involvement of ports is not important in making effective decisions for supply chain management practices. This shows that ports need to make effective decisions in supply chain management practices so that goods can be delivered in proper time and proper place.

9. In which way can effective supply chain impact the performance of a port?

Categories	No of respondents	Total no of respondents	Percentage
Maintenance of time at the time of collecting raw materials	82	250	32.8
Maintenance of time at the time of delivering products	80	250	32
Avoiding delay in porting	88	250	35.2

Table 10: Way to effective supply chain impact the performance of a port

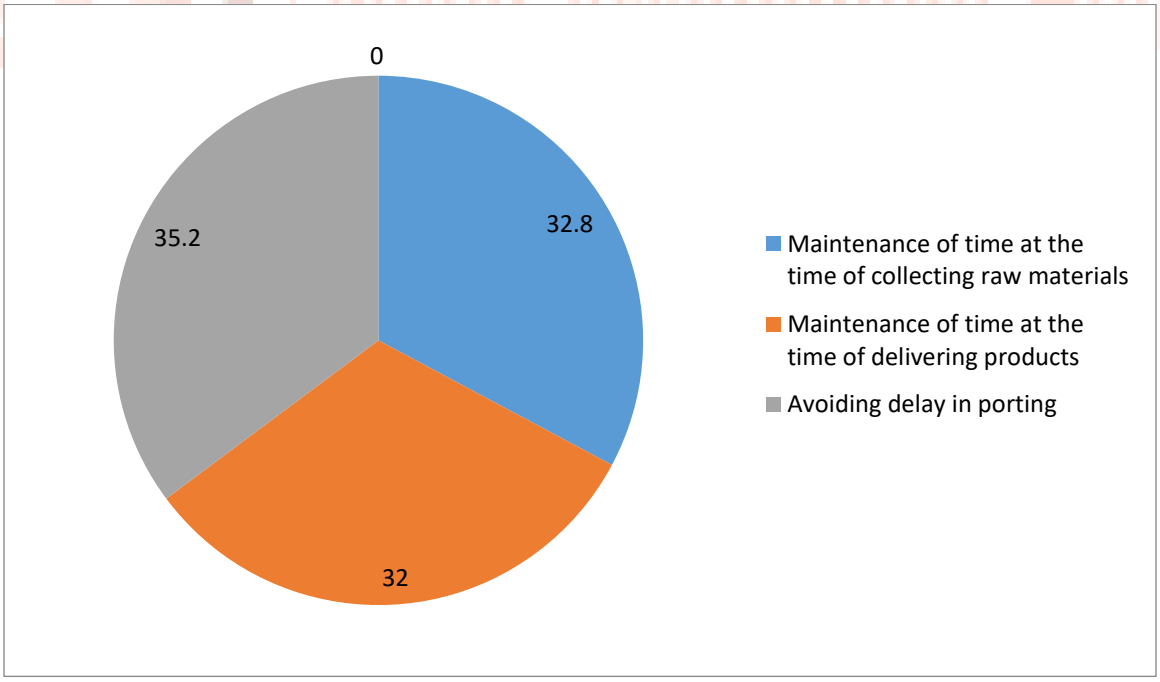

Figure 9: Way to effective supply chain impact the performance of a port

Findings and Analysis

The above table shows that 32.8% believe that effective supply chain management system helps in maintaining appropriate time for procuring of raw materials and delivering them in appropriate place. 32% believes that it helps in delivering of appropriate and bulky goods in stipulated time while 35.2% believes that it helps in reducing delay in loading and unloading of goods from dockyard. This shows that effective supply management practices have positive effects on ports as it helps in reducing lead times and ensure delivery of goods without facing any unforeseen incidents.

It can be analysed from the above tables and graphs that for enhancing industrial performance, companies need to have effective supply chain management system. It can help them in loading and unloading of goods from dockyard and reducing lead times. However, supply chain management system implies that warehouses should be maintained and good transportation is required. It can help in reducing wastage and harm to perishable goods as goods are transported and delivered in proper place and proper time. This help in export and imports and generating of revenue as customers are able to get required goods in good condition. Effective supply chain management system helps in reducing operational costs, shipment damages, logistics administration costs and transportation costs. It can help the companies to fulfil the promises that they have made to their clients regarding procurement and delivery of goods. Moreover, it ensures product, process, launching and expansion flexibility whereby companies are able to deliver good quality goods in domestic and international market.

From the above tables, it can be analysed that ***robust supply chain management system*** and ***effective infrastructure*** are required for maintaining of ports. Ports are regarded as efficient mode of transportation as they have low transportation costs. They have the ability of carrying bulky products and are able to provide secured shipment facilities. Factors like reliability in transit time, transmission of accurate information, reduction in warehousing and management costs can help in enhancing the performance of supply chain management system. The main purpose of this vertical integration is to value add logistics through which control over shipment processes can be improved and demand of customers for door to door service and one window just in time can be met at predetermined prices. According to Ascencio *et al*. (2014), effective partnerships can help in devising supply management strategy, relationship orientation and market orientation. Effective supply chain management system helps in reducing costs of transportation, prevent damage of perishable goods, managing of warehouses and prevent

occurrence of accidents. This helps in increasing of exports and imports. Exports help in increasing foreign flows whereas imports help in increasing the supply of those items which are scarce or are not available.

Ports can be effectively managed if the organisations are able to give required resources, skills, market oriented resources and physical resources in their development. However, most organisations may lack adequate resources, skills or market oriented resources for managing ports. Moreover, transportation of goods is not only prone to human error but also can face climatic hazards. Therefore, the organisations need to have effective monitoring system through which they are able to prevent any damage arising from climatic hazards. It is important to share information in those ports which are involved in multiple transportation modes, elements and shipments are present. Development of Port Community Systems helps in exchanging of information which results in effective globalised supply chain management system. Rodrigue and Notteboom (2017) stated that the important wings in the globalised supply chain management system are adequate regulations for preventing unethical and unlawful practices, operating costs, strategies of boosting customer services and increase in foreign inflows. Though ports are the means of increasing source of revenue, any damage or accident can lead to utter loss of logistics and financial sector. These results in declining profits and organisations tend to become bankrupt. Ports are prone to pirates and accidents which cause huge loss of goods, thus resulting in ineffective supply chain management system. Increase in supply chain management system enhances the performance of organisations as it helps in minimising time for supply, doing transportation work in reasonable rates and getting time for gathering raw materials.

Logistics techniques, information and resources can be shared through several strategies such as network integration and joint ventures (Hlali, 2018). A logistic management framework and improvisation of inter-enterprise procedures can be imparted through these principles. It involves resources and common areas which must be administered through different individuals. The empirical study has been done by researchers to determine the impact of supply chain on port sector. Shipping line calling and port terminal operator were the perspective considered under the study (Coto Millan, BanosPino and Rodriguez Alvarez, 2000). The study contains the impact analysis on the port terminal performance and major variations amongst perspectives. Achievement of the supply chain integration is the major study finding due to deficiency of trust and cohesion and data sharing amongst the private and public stakeholders. Additional services

which can create value must be generated along with the improvement of port access to improvise the port attractiveness for its users (Nakabayashi, 2014). Low level of confidence and trust was imparted in response to port terminal services, warehouses and empty container depots were found along with low level of satisfaction related to price-quality ratio. Possible threats, areas for improvement and major limitations related to port systems were identified through group sessions (Güner, 2017). The requirement for an international entity has been observed as a major concern which can increase the collaboration and integration amongst various stakeholders. A combined framework is presented in the research to enhance the inter-enterprise procedure for port logistic chain. The study was performed to regulate the collaborative operations on the basis of supply chain management principles during transport interactions, international trade (Hlali, 2018). A set of approaches to integrate warehouses, manufacturers, suppliers and stores to effectively plan, implement and control the information and material flow to destination point from origin in order to produce and distribute merchandise at right time in right quantity to right location is involved in supply chain management (Wang, Knox and Lee, 2013).

The competitive performance of ports have given rise to integrated logistic sector depending on the strategic relationship of supply chains rather than on traditional port activities like physical infrastructure and size of hinterland. The main aim of logistics sector in the ports is creation of value and enhancement of capture. However, Snyder *et al*. (2016) argued that ports have become an increasing source of illegal and unlawful activities resulting in increased crime. In some cases, laws are not robust enough to punish pirates or hackers who cause huge damages to goods. Moreover, third parties or intruders can have access to information security system which can disable logistics system of ports. Logistics system or supply chain management system has other ability of displacing local or regional players due to intense competition in the market. However, ports organisations are willing to get involved into supply chain management procedures as it helps them to get an insight into main resources like expertise, markets, capital, knowledge and technology (Brandon-Jones *et al*. 2014). Being inserted into the supply chain management implies that organisations are able to contribute in economic activities of the country. Over the years, the port operators and authorities have made robust supply chain management system by enhancing their landslide connections, giving financial incentives along with lease connections

for attracting more port calls and shipping lines. This has resulted into reduction in transportation costs and reaching of cargoes to proper destination.

However, port authorities suffer from scarce asset or competency like ability of handling niche cargoes and exploitation of economies of scale for transportation of goods. Horizontal and vertical integration by terminal operators and shipping lines have de facto increased control over logistics and bargaining power (Silvestre, 2015). This helps the established ports to reconsider their capacity of services, arrangements of property of rights, connections of hinterland and pricing policies. However, spatial dimension of global chain strategies cannot be reduced as the port organisations are subjected to place oriented and path dependent institutional framework. This framework is both enabling and constraining which implies that ports need to be sensitive to spatial aspects of supply chain management. The degree of competition between ports of region and within ports is different as intra port competition helps in garnering huge profits whereas inter port decrease profits due to varied costs. Thus, supply chain management system plays an important role in reducing transportation costs and increasing supply of quality products and raw materials to designated area in stipulated time. Engagement of local resources, labour and infrastructure helps in production, consumption and distribution of resources, leading to prosperous economy.

Prediction of motion of vessels during the early port planning stage can assist in determining the port efficiency. Optimal port efficiency can be ensured through several steps such as considering the boundary conditions, application of numerical modelling and extreme value analysis and conduction of dynamic mooring analysis (Nakabayashi, 2014). An important role has been played by port authority during the interaction with stakeholders. These stakeholders have been associated with international trade logistics such as importers, custom agents and logistics operators. Some more include exporters, shipping lines, and inland carriers to determine the key factors which can impact the port system logistic performance. Numerical modelling and long-term measurements can assist in the prediction f currents, waves and wind conditions in a port which can ultimately impact berthing conditions. For instance, terminal operability can be minimized through long period waves. Obtained data from numerical modelling can be directly utilized in dynamic mooring analysis which imparts vessel motions, fender and line forces (Güner, 2017)

PCS can be implemented by using open sourcing products instead of using commercial products. Development of port community system or PCS enables the ports to save environment from degradation by reducing wastes and supply of cargoes and products to prospect customers. It can help in reducing transportation costs and tracking of goods and cargoes which have been out for delivery. Moreover, it can help in tracking of customers and provide then instant help in case they face accidents or mishaps. This PCS system enables sharing of information with other ports and enable for business transactions. However, Farahani *et al*. (2014) argued that it is susceptible to threats as increase of technology has resulted into attacks from third parties or intruders. Though PCS system has the ability of reducing paperwork and proper tracking of goods and cargoes, it has resulted into vulnerability of attacks. Any third party can hack the system and resort to theft of goods and cargoes causing loss to millions. It is required for the ports to have effective and skilled personnel who can handle this supply logistics sector and prevent unwanted third party attacks. Asgari *et al*. (2015) stated that integration of port-web connect platform can help the port organisations to integrate and track supply of their goods and procurement of raw materials. Integrated and upgraded logistics system helps in reduction of emissions by intensification of logistics activities and reduction of paper documents. Through the optimisation of routes of transport and capacity of load, use of centralised servers and tracking of cargoes, the logistics systems in ports have been able to reduce environmental pollution.

10. Recommendations:

The impact of internal and external sustainable collaboration of supply chain management on sustainability performance has been examined in research in context to ports. It was concluded from the results that internal sustainable management is positively associated with external sustainable collaboration. Sustainability performance is positively influenced through internal sustainable management (GÜNER, 2015). Mediation of the external sustainable collaboration effects were obtained through internal sustainable management on sustainability performance. Port flexibility is considered as a significant parameter for the continuity of supply chain in current business environment of port. It will have a positive influence on the market reputation and financial health of port.

Supply chain plays a very important role in maintaining the efficiency of ports for the process of trading. It is important for the ports to properly integrate the concept of supply chain in order for

its efficient outcome. Through the process of supply chain, various imports as well as exports are allowed to be processed at a rapid rate. The whole process of supply chain is needed to be made more secure for increasing the efficiency of ports through which trading along with other businesses can be carried forward. The transport and logistics system which is a part of supply chain needs to be properly assessed during every shipment so that piracy, theft or even other criminal activities can be properly avoided.

The worldwide popular hub and spoke system of the universal shipping network has been built up as a multi scale framework that serves maritime, worldwide territorial linkages, and is complimentary to some point-to-point administrations at the provincial. A few examinations have revealed comparable patterns in Asian hub ports where more business exercises have been increased because of globalization (Nakabayashi, 2014). Due to the 1997 and 2008 money related emergencies, this Asian exchange administration has stayed in place, in spite of the fact that the most effective partners have changed positions, as shown by the solid development of China in the previous decade. Development of hub port and system availability with the hinterland has progressed toward becoming patterns of port regionalization. Transport hub system formation must not be considered as the single mode perspective irrespective of the complete reflection of hub-and-spoke port network system (Güner, 2017). Multi layered hub applications in a network of passengers, information and goods flow is represented in a study in which airlines and shipping companies complement with each other. It was further elaborated by other researchers who demonstrated that ports must be considered as a significant part of value chains at global level due to their integration within distribution and production process (Wang, Knox and Lee, 2013). Based on the readings, key observations and expert opinions, the following key recommendations are provided:

1. The ports authorities should work on in-depth SWOT and PESTLE Analysis taking the diverse customer needs into account.
2. They should design and develop Standard Operations Procedures (SOPs) matching the international standards.
3. There should be an effective use of technology for database management, traffic routing, congestion, and communication and information purpose.

4. The Strong Disaster Management System must be in place to mitigate emergency challenges like terrorist attacks, earthquake.
5. Weather report updates must be communicated by taking help of satellites.
6. Integrated models and comprehensive plans will improve the overall performance of ports.
7. Quality (functionality), Service (availability), Cost (customer transaction), and Time (turn-around-time) will ensure accuracy and speed at ports (Coto Millan, BanosPino and Rodriguez Alvarez, 2000).
8. The analysis of traffic assignments (of last ten years) should be done. Accordingly, the demand projection can be considered with certain deviation.
9. The healthy relationships between trade unions and port authorities should be emphasized to the great extent. It will help in understanding the ground realities and fixing the problems in a timely manner.
10. It is essential to involve all the stakeholders in the decision-making process. It will lead to high people acceptance at all levels. Cooperation, commitment and creativity work well to solve the problems as a team.

Following are the SMART recommendations for increasing efficiency of ports through supply chain management system

1. There is need of effective monitoring and evaluation system

Specific	It is required for the ports to have proper monitoring and evaluation system. Robust information security system is required for preventing unauthorised tampering or controlling of system.
Measurable	It can be measured by its revenue and ability to reduce lead times in delivery of goods.
Achievable	It can help in stabilising port system and reduce unauthorised access to products.
Realistic	It is realistic as effective information system has helped in proper flow of communication from port authority to supply chain management system. The

	port authorities will have information regarding the quantity of goods and cargoes which have reached to its destination.
Timeframe	It can be achieved in six months.

Table 1: SMART recommendations

(Source: Learner)

2. There is need of skilled professionals

Specific	Mere robust system will not be able to make supply and production effective. It is required to have talented and skilled expertise that can be able to handle and control information system. Radio tracking system should be used in order to track the location of goods which are travelling.
Measurable	It can be measured by tracking the time of unloading and loading of goods.
Achievable	It can be achieved through time to time interventions and having adequate knowledge of changes in weathering pattern.
Realistic	It is realistic as this system can help in giving adequate information regarding supply and production of goods. Moreover, it ensures involvement of public and private sector that can manage and develop ports.
Timeframe	It can be achieved in a year.

Table 2: SMART recommendations

(Source: Learner)

3. Need to involve stakeholders in decision making process of supply chain management system

Specific	Ports are required to involve stakeholders in their decisions making process regarding supply chain management system. If stakeholders are not satisfied with the performance of ports then it can lead to dissatisfaction among consumers and passengers.

Measurable	It can be measured by performance review and feedback from stakeholders.
Achievable	It can be achieved by implementing the decisions of stakeholders in their supply chain management procedures. This can help in boosting their customer services and enhance import-export services.
Realistic	It is realistic as involvement of stakeholders helps in giving a wide perspective to ports with the help of which it can upgrade its logistics sector.
Timeframe	It can be achieved in a year.

Table 3: SMART recommendations

(Source: Learner)

11. Conclusion:

The ports are the growth engines of our economy. They have larger than life impact on our society, domestic as well as international markets. They play significant role in foreign trade policies, import-export mission, tariff plans etc. The carbon emission of green-house gases has posed a threat to the human mankind affecting our planet. Hence, sustainable development is the need of time. Eco-friendly ports serve purpose (Kamble, Raoot and Khanapuri, 2010). They are affordable empowering the business firms to reduce the costs. However, collective efforts are required to deal with the existing challenges related to ports to make them efficient coined with excellence in supply chain management. It will be the gift for coming generations. It is universal fact that ports are playing a very important role in the growth of the business of any country and their increasing role in the entire logistics system certainly request a detailed examination of the port supply chain management. Their changing role in supply chain management can certainly prove to be effective and help the Logistic industry perform much better. However, it has been found out that many ports are not efficient enough to offer the businesses with the best services of transportation. Although it is possible to increase their efficiency, it certainly requires some sort of strategy and hard work (Doi, Tiwari and Itoh, 2001).

With the help of construction of modern port facilities along with the combination of sophisticated package of incentives in investment, ports can take full advantage of strategic location in the UK. The country provides a wider base for exporting of goods which are the great source of income. Moreover, with sophisticated technologies in supply chain management

system, the customers are attracted in travelling via ports. The governance structure can help in mobilising resources, infrastructure and land structure for up gradation and modernisation of ports. The ports have been able to integrate vertical and horizontal strategies for better management, controlling and creation of synergy between spatial and economic aspects. However, the shipping lines are restricted for terminals which have constrained the entry of local entry in the market by terminal operators. Involvement of skilled professionals can help in monitoring and controlling of ICT for tracking of goods and passengers and reducing lead times. Adequate sharing of information can also help the ports to have knowledge regarding production, supply and delivery of goods to proper customers in stipulated time. For improving this information exchange system in supply chain management system, some ports have developed port community systems (PCS). These PCS serves comprehensively for sharing and exchanging of information. In the course of using PCS, multiple communication or bilateral communication system is not required as all ports send its information to a centralised system which is accessible by other ports when they require. It has been reported that these have enabled ports to reduce their logistics costs due to reduction in paper work and personnel along with automation and harmonisation of port oriented systems. The survey on internet regarding port systems has shown that there are various kinds of port systems in the world which have helped in building of robust supply chain management system. It provides for an integrated centralised system in which ports are able to track their cargoes or goods and prevent their loss.

The importance of supply chain management system of ports for trading has been thoroughly felt in this research. This was understood through performance of survey questionnaires to various employees which was done through the process of email. Through the help of this process, required data is noted for the analysis through which, it has been found that more than half of the population who were included in the survey agreed to the fact that transportation cost is much lower which makes usage of ports more efficient. This would undoubtedly make ports a better alternative for the process of trade with other countries due its aspect of cost effectiveness as agreed by most employees (Friese, 2014). One of the flaws of using ports is the security issue which most of the employees of the survey agrees upon. Better implementation of security would definitely enhance the usage of ports for the functioning of exports and imports. Majority of the employees have agreed with this aspect as well.

The objective regarding scope of ports for activities such as export and import have been met through this analysis. It has been understood that for smooth functioning of ports, proper utilisation of supply chain is needed which have been agreed upon by most employees as well. Supply chain fulfils the most important objectives according to majority of the employees on the aspect of return of investment. This factor increases the need for ports through which various new trades can be welcomed for growth of the country. Many of the employees who participated in the survey also agreed to the fact that ports play a very important role in maintenance of trade relations through which supply chain can be effectively maintained.

Western Europe and parts of South Eastern, Eastern and Southern Asia have developed PCS where there is concentration of pots containers. Some of the PCS operates as centre for delivering of messages while others offer applications as well as delivery of messages to various ports. This help in preventing of conflicts and problems among the ports regarding procurement and delivery. As for example, Plymouth port uses community system which can help in solving flow of information for better business activities. Port community systems can help in improving environmental aspect of logistics in two ways. Firstly, it helps in reduction of emissions by intensification of logistics activities, decreased manpower and reduction of physical documents. Through the optimisation of routes of transport and capacity of load, along with the use of centralised servers and tracking of cargoes, the logistics systems have been able to reduce environmental pollution. Secondly, PCS contains a separate solution for reporting of environmental changes, concerns, hiring of skilled personnel for tracing and tracking services. It helps the ports in giving competitive advantage over others and promotion of environmental protection by reducing wastage and preventing delay of supply and procurement of goods and cargoes.

Different countries, cities and regions want to enter into the position in this globalization era to obtain profit from the globally integrated economy (Coto-Millan, Banos-Pino and Rodriguez-Alvarez, 2000). There are several factors which can support the fail in participation of a country, city or region to enter into global trade such as regional or country based trade barriers, global trade pattern and supply chain network structures. These factors assist in the flow of services and products of global trade.

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