Integration Quality Management For Seaports in Supply Chains?

Hai Tran
Australian Maritime College, Tasmania, Australia
Tranth@amc.edu.au
Integration Quality Management For Seaports in Supply Chains?

Hai Tran

Australian Maritime College, Tasmania, Australia

Tranth@amc.edu.au
ABSTRACT

The competitive international business, an uncertainty of financial environment, specifically challenges facing by maritime industry in last decade has pushed organizations to reform. To be sustainable, organisations choose merging and integrating with other organisations rather than being isolated. Seaports are no exception. Over the years, seaports have reformed through various generations and now become an integral node of supply chains. A new structure requires seaports changing the way of management to provide high quality of services. This can be achieved by implementing the right quality management. This paper is to initially outline the possible internal and external quality management practices for seaports successfully integrated in global supply chains.

Keywords: Continuous improvement, quality management, supply chain management, integration, continuous innovation

Introduction

Economic downturn now exists in many countries, and the financial crisis is still a matter of uncertainty. In the major economies, the crisis has deeply affected a number of major developed and developing economies (UNCTAD 2009). In the uncertain financial environment, organizations must change to adapt to a new situation. The organizations are seeking a new method of management,
launching new business, changing organizational structure by merges or consolidation with other organizations to be sustainable and long term profitable. Quality management has proved to be an imperative for the long term survival and competitive advantages of an organization (Mehra and Agrawal 2002; Maguad 2006), one of the most economical means for organisations to improve performance, reduce costs (Powell 1995; Terziovski and Samson 1999; Zhang 2000).

However, in seaports quality management seems do not utilize these advantages. Ngoc (2008) argues that seaports in developing countries implement ISO quality management for obtaining a Certificate as ‘a ticket to access to the international trade’ rather than for gaining long-term sustainability and comparative advantage. While seaports become a part of global supply chains, which involve multinational organizations, a question to ask is what appropriate management method seaports should employ to maximize all existing and potential resources, increase efficiency and facilitate primary and secondary flows and effectively integrate with other stakeholders in supply.

This paper attempts to propose the relevant quality management practices for seaports in supply chains by reviewing the evolutions of quality management and seaport, the major practices using in each stage of their evolutions. Whist the role of a seaport changes towards supply chains, its relationships with stakeholders need to be examined to suggest the integration factors for a seaport. The proposed practices for a conceptual framework are selected based on the
outcomes of these discussions.

**Literature Review**

**Quality management in traditional seaports**

*First generation:* before 1960s, seaports were interchange points between sea and land. The functions of seaport are traditional include loading, discharging, cargo handling, storage, navigation, quay and waterfront area (UNCTAD 1992; 1999). Non quality management practices had been used in this stage. *Second generation:* after 1970s, seaports has enlarged their functions, initially provided some of value added services for examples simple ship provision, repairs (Beresford et al. 2004). Quality assurance ISO (UNCTAD 1998) had been implemented in very small scale with focuses on failure detection. *Third generation:* after 1980s, seaports become a dynamic node into logistics, distribution centres (UNCTAD 1992; UNESCAP 2002). Seaport activities have been expanded towards landside (Beresford et al. 2004; World Bank 2007). A full package of quality assurance ISO has been recommended (Beresford et al. 2004; UNCTAD 1992). *Fourth generation:* after 1990s, Paixao and Marlow (2003) propose a new concept of leaness and agility, which provides more flexibility in distribution networks, eliminates unnecessary wastes and reduces total cost for seaports. Total Quality Management has been recommended by these researchers with addition of just-in-time and process optimisation factors. Recently many seaports are using environmental-related ISO 14001 (Fremantle Seaport 2008; Port of Brisbane 2008; seaport of Los Angeles 2009); ISO 9001
for quality (Fremantle Seaport 2008; Port of Brisbane 2008) and AS 4801 for
(Fremantle Seaport 2008), Seaport Everglades has earned ISO 9001:2008
certifications for the Florida International Terminal. Virginia seaport is using
ISO 9001 (Rodney 2010), and PSA in Singapore implementing the ISO standard
for quality management for bunker supply chain – QMBS
(Singaporestandardseshop 2010).

Seaports in supply chains

The challenges from business environment have reformed the organizational
structure from a single to merged or integrated organization. Seaports are not
exceptional, from 2000s onwards (the fifth generation) they become a part of
global supply chains (Magala and Sammons 2008; Notteboom and Winkelmans
2001; Robinson 2002; Rodrigue and Notteboom 2005). Depends on the
complexity of a supply chain a seaport can be a central node, in the traditional
logistics or an integral node of upstream and downstream stakeholders (Figure
2). Precisely, seaports also are logistical platforms, where a supply chain can
produce value added services to end customers (World Bank 2007) and an
economic and cultural interchange point. The position makes seaports
significantly contribute to the efficiency of supply chains. A seaport can be a
bottleneck, where congestions more occur than elsewhere, thus maintaining
good relationships with stakeholders in supply chain is critical.

Discussing the relationships in supply chains Coyle et al (2008) state that they
are actually the relationships between the stakeholders in upstream and
downstream and in logistics centers. The upstream are material suppliers, manufacturing plants; products processing centers, work-in-process inventory, manufactures, producers, whist downstream include retail outlets, finished products distributors and end users. Gattorna (2006) explains in more details that each stakeholder in the supply chain takes outputs from an upstream stakeholder for their input then transfers it to the next downstream stakeholder. These mutual and interrelated relationships make collaboration and coordination in supply chains significant important. It is specifically right in a global supply chain context, which is complex, involves different types of organizations, multi-national and multicultural entities working together (Figure 2).

Quality management for supply chains has been discussed in the study of Lambert and Cooper (2000). These authors define factors for supply chain quality management, which include planning, control, work structure, organisational structure, product flow facility, information flow facility, management methods, power and leadership structure, risk and reward structures, cultural factors and attitude. However, the framework of Lambert and Cooper (2000) does not conclude how these factors should be arranged in order to have a more effective and efficient supply chain structure, nor examine the supply chain from an integrated perspective. Lummus et al. (2001) suggest similar factors but add production capability, supplier relationships, transport and warehouse systems, and e-business readiness. This is in line with the study of Carbone and De Martino (2003), with the exception that they include the
impact of information technology and communication as being important among the supply chain participants to speed up the processes, reduce product life cycles, and lead to closer long-term relationships. They assume that all these functions must work together but co-ordination in the supply chain is essential.

Chen and Paulraj (2004) determine eight components of quality management existing in supply chains synthesised from a review of four hundred articles, them being, environmental uncertainty, a customer focus, management support, supply strategy, information technology, supply network structure, managing buyer-supplier relationships, and logistics integration. These components are supported by the findings of Flynn and Flynn (2005), Foster (2008), Lin et al. (2005) and Robinson and Malhotra (2005). These researchers also found a strong positive relationship between quality management and supply chain efficiency and suggest practical implications for managers to leverage this relationship as a competitive weapon in the increasingly complex global environment (Flynn and Flynn, 2005). Similarly, Sila et al. (2006) report that although organisations believe supply chain quality management has a positive impact on the quality of the final product, they do not fully implement it. Their study found that leadership, strategic planning, customer focus, human resource management, process management, and supplier management are the most common factors, of which the relationship with suppliers and customers is most important and directly related to process management. Thus, it seems that quality management may extend across organisational boundaries. Coyle et al.
(2008) and Wisner et al. (2008) state that organisations need to communicate and collaborate their business policies, plans and information to upstream and downstream supply chain stakeholders, which may result in more successful supply chains. Besides JIT, other key factors that stakeholders should consider when operating in a network include a quick response, lead-time management, lean logistics, and agile logistics (Kuei, Madu and Lin, 2008; Sayareh, 2009).

To summarise, the quality management practices most commonly recommended by researchers of supply chain quality are leadership, customer focus, process, information and technology, collaboration, coordination, and human resources. In general, the literature suggests these practices will help stakeholders in supply chains manage major flows including material, finances and information smoothly, seamlessly, and with minimal costs and errors.

**A Conceptual Framework**

Even though ISO and TQM appear irrelevant quality management for seaports as a part of supply chains, but in the context of a single organisation, ISO is recognised as effective and having positive impact on the organisational performance, a number of seaports worldwide is currently being implemented ISO and some of them implements TQM (as discussed above). Thus, the framework was built on an assumption that a seaport should remain ISO and TQM for the internal dimension. The external dimension includes the practices that make seaports harmonically operated with other stakeholders of supply chains. These practices also need to satisfy the objectives and requirements of
supply chains, which is efficient freight movement, minimal total cost. Therefore, factors such as collaboration, coordination, communication and integration become crucial and should be included in the external dimension of the framework (see Figure 3).

1. Internal quality management dimension (derived from ISO and TQM)

Leadership this is the prevailing practice in the quality management literature in general and in transport and logistics in particular. It has been evidenced in the literature that the leadership and involvement of the senior management in any organization is the pre-requisite for success of any management activity, including quality management. Without top management commitment and leadership, quality-related processes and procedures may well be taken short cut by employees who do not see the real value of quality management from their management’s actions. In other words, top management must set a good example by first devoting themselves in their leadership and commitment to quality improvement. The demonstration of senior management’s leadership and commitment should therefore be through a number of attributes as follows:

• The long term commitment of top management to the quality performance
• Direct responsibility of top management in quality policy, strategies and plans
• Comprehensiveness of the quality goal-setting process
• Providing adequate resources to quality improvement efforts
• Clear quality collaboration policy with the other stakeholders
• Participation of top management in quality improvement process
**Customer focus** this is considered as the guidance line for the seaport’s quality management efforts. While top management commitment and leadership is critical to the seaport’s quality management success, the focus on customers as the centre of the organization’s business planning and formulation of strategies, processes and procedures will guide these management efforts to realize organizational outcomes. To this end, on the one hand, seaports should focus on measuring key performance indicators, which aims to creating and delivering value to customers, such as customer satisfaction and customer loyalty. On the other, feedback from customers should be treated as critical inputs of the quality improvement process in the seaport organization. As such, this quality management component is reflected as follows:

- Establishing goals exceed customer expectations
- Creating and delivering value to customers is seaport’s business philosophy
- Customer satisfaction and loyalty are measured as the seaport’s important key performance indicators
- Customer feedback on seaport’s service is used as critical input in quality improvement process
- Employee knowledge about attributes of customer value
- Stakeholders should be treated as customers

**Human resource** Employee’s involvement and empowerment has positive impact on employee commitment to quality. While employee involvement is essential in this respect, they should be empowered so that they can be involved
voluntarily. As a result, seaport organizations should develop formal systems to encourage, track, and reward employee involvement in the quality improvement process. This should also include a system to measure employees’ satisfaction as this greatly affects their involvement in any quality improvement effort, thus the success of the seaport’s organizational outcomes. The following attributes therefore can be used to demonstrate this quality management practice:

- Employee participation in quality process
- Effectiveness of employee participation in quality decisions
- Requirement of the same level of employee competence among stakeholders
- Port employees are encouraged to provide feedback on quality problems
- A system of rewards is in place to recognize seaport employee efforts
- Responsibility of seaport employee for error free outputs

*Continuous improvement* is one of the fundamentals of quality management philosophy. Indeed, quality management should be treated as a philosophy rather than a program. As customers keep raising the bar of their requirements and expectation, it is unreasonable for the seaport organization to start their quality improvement efforts once in a time, but this should be conducted in a continual basis. In this respect, the continuous quality improvement can be realized through the following attributes:

- Seaport policy, strategies, processes and procedures for quality improvement are continually monitored and reviewed
- Using quality improvement teams to facilitate quality improvement efforts
• A formal system and procedure of review for quality improvement
• Identification of areas for improvement.

*Process management* is acknowledged in quality management literature that in-process control and management is always more effective than final inspection at the end of the process. This emphasizes the importance of ‘making things right the first time’, especially in the context of service given its simultaneity characteristics. Therefore, business processes in the seaport organization must be strictly controlled and managed to ensure satisfactory outcomes. As a result, this quality management practice can be reflected in the followings:

• Control and continuous improvement of key seaport processes
• Comprehensiveness of quality plans
• Preventing faulty services is a strong practice
• Root causes, quality problems, are continually tracked and fixed

*Quality measurement* a seaport should first have in place a key performance indicators system to place the foundation for quality measurement. The use of other quality measurement tools such as internal and external audits is also advisable. In addition, a system of quality reporting from the frontline employees back to top management should also be in place. This reflects in the followings:

• Using Key Performance Indicators (KPIs) for quality improvement
• Determine Performance Indicators (KPIs) for seaport operations and management

• A system of recording and reporting quality problems

• Reports from internal and external audit are used as input for quality improvement

• Quality data and reporting

*Quality education and training* should be provided to both seaport management and employees so that they can comfortably exercise the above quality factors. This should first begin with the seaport management to allocate resources including training for employees as mentioned earlier. Furthermore, everyone in the seaport should exercise training on seaport quality improvement, not just those in the quality improvement committee or team. Results of quality measurement and reporting should be used as the proxy for training development in the seaport. These training activities, in addition, should be conducted on a continual basis to sustain the capability and commitment of seaport management and employees. This quality management practice can be demonstrated in the following attributes:

• Training and education in the same level for all stakeholders

• Results of quality measurement and reporting are used for training development

• Quality training and education is continuously conducted

*Social benefits* it has been argued that the integration of safety, security and
environmental management in the seaport's overall business management forms an indispensable part of a successful quality improvement. In this connection, it was also reasoned that the seaport should utilize fundamentals of quality management such as top management commitment and leadership, employee involvement and empowerment, training to manage safety successfully, security and environmental management issues. In addition, the seaport should be clear about its community and have a clear corporate social responsibility strategy as an integrated part of its business strategy to act as a good citizen in the society.

As a result, the following attributes are used to address this practice:

- A clear policy on safety, security and environmental management
- Application of the Green system in place (salvage and disposal)
- Contribution to public interest
- A clear social responsibility to local community

2. **External dimension** includes practices that are essential to the management of relationships between a seaport and its stakeholders for assuring the quality of the whole seaport supply chain rather than the seaport alone. In this connection, they refer to the management of stakeholder relationship across the seaport supply chain, covering both upstream and downstream partners, as well as the communication of quality management values to these partners and consultation from them to enhance these values.

**Integration** quality is the philosophies of Total Quality Management literature is the extension, group-wide quality management, of quality culture and activities
beyond the organization to its business partners. This is particularly essential in the context customers choose a seaport based on the competitive advantage of its supply chain rather than the seaport itself. For instance, the seaport does not perform cargo handling activities but may have different stevedoring companies doing the job. Customers’ perception of the seaport’s quality service may start immediately at the service interface with their stevedores. The same practice will also apply to others such as procurement process. This practice, therefore, is demonstrated as follow:

• Selection of stakeholders is based on their quality
• Long term collaboration and cooperation among stakeholders
• Participate of stakeholders in quality improvement efforts
• Building up stakeholder trust
• Commitment of stakeholders by documentation to provide the same quality of products/services

*Communication and information technology* can be seen as a backbone of a supply chain. No flows, transactions and operations would be facilitated without communication and information technology. This practice therefore requires adopting an effective information technology system, which will support for quick identification of market trends and patterns and flexible analysis of business data. Information technology also enables to highlight an organization’s strength and weaknesses, combining together with customer’s feedbacks can help organizations to forecast market demands and align their
business in accordance with the needs of the customers. It is reasonable to argue that, since stakeholder quality management is a fundamental component of the overall quality management effort, and that customer feedback should always be encouraged and considered as input for quality improvement, these will not be facilitated without the continual communication and consultation with the seaport’s stakeholders. This practice is therefore reflected as follow:

• Application of an effective information technology system
• Effectiveness of the information channel among stakeholders
• A clear system of records and feedback from stakeholders and customers

**Quality culture**: the end users now seek for good quality with less cost and more value to meet their expectations, supply chains should have good image, the trust, stable reliability, surety high integrity among stakeholders and customers, more value added service, this practice becomes more crucial in global supply chain context.

• Creating trust and openness within supply chains

Network optimization requires each member of a network chain to have a flexible or lean structure that can work together in a quick and rapid response on the customer’s needs. This practice can be measured by designing an optimal network configuration, lean organizational structure for smooth material, information and people flows to reduce cycle time and the total costs.

• Designing for an optimal and effective network
• Use one link ERP system to minimize the total costs
• A clear system of records and feedback on quality issues from stakeholders

IV. Conclusion

This paper presented the development of quality management and seaports through different stages of evolution. It also reviewed the implementation of quality management in seaports of each generation to understand and compare the relevance. This study may enrich the contemporary literature on quality management for seaports integrated in supply chains. Whist examining the consistency with earlier studies in the field, this study attempts to propose some new quality management practices, which should be continuously explored and empirically validated. At the same time, this study may draw attention of seaport managers in considering quality management as one of the most economical way for seaports to be efficient and effective in supply chains. Depending on each seaport context a seaport managers may find suitable quality management practices to their organisations. This appears that the complexity of supply chains, a dominant power of a key stakeholder have not been taken in to account, thus it may leave a room for the further discussions.
References


Port of Los Angeles (2009) Air emissions inventory continues to show a


UNESCAP (2002) Value-added services of logistics centres in seaport areas, in Commercial Development of Regional Ports as Logistics Centres, United Nations Obtaining through the Internet http://www.unescap.org/tdw/Publications/TFS_pubs/pub_2194/pub_2194


Figure 1. Seaport and quality management evolution

![Figure 1](image1)

Figure 2. A seaport in supply chain relationships

![Figure 2](image2)
Figure 3. A framework of seaports integrated quality management