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"Integration of Knowledge management and supply chain for transformation of SMEs from domestic market to global market: a special focus to Asian market"

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Abstract

In this turbulence time when big companies are struggling with survival, its very difficult for SMEs to maintain their existence and sustain their success. In developing countries, a vast majority of SMEs are suffering from market failure due to insufficient provision for integrated, reliable, relevant and solution oriented business information. SMEs need support for effective linking with global markets both for their inputs and outputs. Globalization of supply chains, rapid technology advances, superior returns on intellectual capital, growing importance of knowledge management-intensive industries make Knowledge management a strategic tool in the growth and success of business. Aim of this paper is to propose a model based on using ICT and knowledge management to facilitate SMEs participation from domestic to global with special focus on supply chain network. The proposal is directed towards the development of a methodology for integration of KM, ICT and Supply chain for Asian SMEs.

Introduction:

The basis of global competition has changed. No longer are companies competing against other companies, but rather supply chains are competing against supply chains. Indeed, the success of a business is now invariably measured not by the sophistication of its product nor by the size of the market share. It is usually seen in the light of the ability to sometimes forcefully and deliberately harness its supply chain to deliver responsively to the customers as and when they demand it. Countries, and firms alike, that desire to participate in global supply chains must understand and embrace (without further hesitation) the new mantra of SCM on which the new competition is premised. Likewise, Asian enterprises must adopt these new technologies to effectively participate and navigate successfully in the new economy.

one prime concern highlighted (APO symposium, 2001) was the financial and organizational ability, and maybe willingness, of indigenous SMEs to invest in much needed IT infrastructure (which might not yield a correspondent rate of productive return) and the other related technologies to improve on their supply chain processes. Issues like complexity, time and space compression, and co-operating in eMarketplaces are all new challenges that SMEs must face and survive the test or risk being marginalized to either commodity players with a low value proposition at best

or forced into oblivion in the worst case scenario. In addition, SCM would have to integrate such SMES to ensure greater collaboration between supply chain partners, in particular, those SMEs who serve as suppliers to larger corporations responsible for either semi-finished goods or finished goods, and work towards a synchronized value collaboration network.[1]

The rapid penetration of these new technologies such as the Internet is also transforming global commerce, shrinking the marketplace, forcing situations of highly unstable and unpredictable demand intensities, and shortening the lead times of critical information flow. In this setting, the literature, both trade and academic, has repeatedly reported how technology as a driver of change has influenced the supply chain practices of many multinational corporations (MNCs). World over, Small and Medium Enterprises (SMEs) sector has acquired a significant and pivotal position in the entire development process. Over the years it has played a critical role in developing economy by generating new employment opportunities and making significant contribution to the national / global economy. However, the sector suffers from various constraints. In today's context of fast emerging digital economy and dominance of regional and global supply chain system, the SMEs in developing countries, besides facing traditional hardships of finance and procedural delays, are critically lagging behind due to obsolete technology and production process, lack of modern delivery and marketing techniques, information asymmetry and lack of knowledge management capacity. An important and comprehensive issue relating to all these factors is the concept and practice of much needed global supply chain, which is yet to find proper place in the SME sector.

Vertical linkages, in particular backward linkages, have been most useful for domestic enterprises, especially SMEs in developing countries. Such linkages allow SMEs to become strongly embedded in the value chain, which has been increasingly extended across borders [13]. This endeavor, however, rests on development of a friendly national business environment and operation of a comprehensive supply chain capacity building exercise covering all critical aspects including importance of knowledge management as distinguished from ICT, usage of ICT in supply chain network and management, which go to explain and promote better understanding of the global supply chains. This would enable SMEs to profitably respond to the various requirements. While many of the Asian countries are increasingly adopting to operate on the basics of ICT usage and supply chain, the level of attainment is varying between the countries, i.e. from zero to nascent and from nascent to near satisfactory.[2]

The knowledge economy has impacted SMEs both positively and negatively. Supply-chain risk and inventory management are the major challenges faced by Asian SMEs today. These companies are facing strong pressure from customers who demand continually shorter lead times, and of course from Chinese pricing. Customers also offload as much supply-chain and inventory risk as they can to the SME manufacturers today. To survive, SMEs in Asia are learning to make highly complex supply chains work like well oiled machines: not at all an easy job. SMEs now work with multiple suppliers, usually spread across Southeast, South and North Asia. In many cases, they also form close partnerships with a subset of reliable suppliers.[3]

In the given situation, this Paper aims to propose a model based on using ICT and knowledge management to facilitate Asian SMEs participation from domestic to

global with special focus on supply chain network. Unfortunately in these economies, SMEs are failed as they repeatedly encounter barriers to internationalization; however this problem could be overcome through their successful integration into the regional and international supply chain. This exercise, therefore, makes a modest attempt to help SMEs of Asia in their pursuit to become active players of global supply chain network and foster their successful integration into the international supply chain through intense use of ICT and knowledge management and make a significant presence in Global market.

Asian SMEs and global Supply chain:

“Asia - The power of effective supply chain management is still largely lost on Asian SMEs, reveals a study by UPS.”- Angeline Yeo., 2008

SMEs in Asia will remain as pillars to the economic growth in the region. Although these SMEs are at various stages of development, concerns and challenges confronting them across Asian countries are similar. These challenges include the impact of increased globalisation and liberalisation, rapid technological development, access to market and information, skilled human resources and entrepreneurship competencies as well as limited access to finance. According to the SME Manual (more commonly know as the “white cover papers”) published by the Small & Medium Business Administration-Ministry of Economic Affairs (MOEA):A small portion of SMEs in Taiwan has becoming multi-national conglomerates; however, around 70% of such SMEs aim productions mainly for domestic markets – only 30% target the global markets. Like many SMEs in Asia, Singapore SMEs have to look beyond the domestic market to fuel their growth. [4]

Figure 1: Comparison of the Composition of SMEs in the Asia-Pacific Region3

Country	SMEs as % of all enterprises	SME employees as % of the total employed population
Hong Kong	98.0	60.0
Japan	98.9	69.2
Malaysia	96.1	45.0 (manufacturing)
Philippines	99.6	70.0
Republic of Korea	99.8	86.7
Singapore	99.7	57.0
Taiwan	97.7	68.8
Thailand	99.7	60.0

Source:White Paper on Small and Medium Enterprises in Taiwan, 2006.
<http://www.moeasmea.gov.tw/eng/2006whitepaper/2006white.asp>

In Singapore, a majority of SMEs remain apathetic about the potential to improve internal efficiencies by better managing their supply chain. Thirty-seven percent reported that they are not changing their supply chain practices, while almost half (40 percent) said they were focused solely on reducing transportation and distribution costs. In order to ride out the recession and compete in the global market, short-term cost cutting measures are not adequate. A more effective way of managing costs is by actively reviewing overall resource allocation, including the complete supply chain to better manage their business[5]. Of all the factors contributing to SME competitiveness, Japanese SMEs felt that "Supply-chain efficiency" was the least important, rating it at only 59%. The average across the region was 84% and this particularly low rating in Japan indicates low awareness of supply chain management.[6]. Though 80% of SMEs across the region believe supply chain efficiency is important to their competitiveness, the majority seem unsure about how to achieve this. Nearly one third of SME respondents are still experimenting with ways to manage their supply chains more effectively, and over a quarter acknowledge they are underutilizing the power or neglecting the management of their supply chains.[7].

The UPS Asia Business Monitor, says in 2007 survey that Indian SMEs highlight the problems faced in supply chain management. Forty-two percent of SMEs in India express difficulty in forecasting demand which affects the efficiency of their supply chain. Of these, 33% state a lack of knowledge and expertise in supply chain management and that their supply chain was fragmented with too many parties involved. The UPS Asia Business Monitor, which polls a total of 1,201 SMEs across 12 markets in Asia, found that while 80% of SMEs across the region believe supply chain efficiency is important to their competitiveness, the majority are still unsure about how to achieve this. UPS 2008 study reveals that only 32% of SMEs polled are experimenting ways to manage their supply chain, while 30% consider themselves to be effectively managing their supply chains. 22% of SME leaders are under-utilising the power of the supply chain and a further 6% are neglecting the management of their supply chain completely. The latest UPS Asia Business Monitor (ABM) 2009 found that SMEs can leverage on strong supply chain management (SCM) practices in the local market to stay ahead of the competition. [8]

According to APO, the symposium on on supply chain management for SMEs, (2001) find following are the challenges SMEs in Asia must over come to be part of global supply chain and be a player in global market:

1. Awareness of good SCM practices among SMEs is still low.
2. SMEs are slow to implement SCM.
3. Management of supply chain among SMEs is limited and localized
4. Information sharing is lacking among and between SME vendors and customers.
5. SMEs still employ a low level of IT usage for SCM.
6. Lack of collaboration from other suppliers in network

Thus, SMEs need to be vitalized for competitiveness and sustainable growth under new world trade rules and faster technological changes, including wider use of ICT, besides new business models. SMEs need to adopt internationalization strategies in tune with objectives and strategies and global supply chain management of transnational corporations (TNCs) or large companies.[9].

Need of Integration of KM, ICT and Supply chain for SMEs:

Knowledge management is concerned with recognizing and managing all of an organization's intellectual assets to meet its business objectives. Organizations are redesigning their internal structure and their external relationships, creating knowledge networks to facilitate improved communication of data, information, and knowledge, while improving co-ordination, decision making, and planning (Warkentin et al., 2001). Knowledge networks allow their participants to create, share, and use strategic knowledge to improve operational and strategic efficiency and effectiveness. E-business knowledge can be created and shared more effectively by a combination of new organizational designs and adoption of new technologies, such as data mining and intelligent agents. Managers are beginning to leverage their information system assets to react to market demands more efficiently. Partnership is critical to the creation and spread of knowledge, and creation and diffusion of innovations [14].

To achieve success at SCM, an organization must possess--and share--knowledge about many different facets of this process. The knowledge sources are both internal to the organization (e.g., knowledge of the whereabouts of subassemblies, knowledge of sources of manufacturing delays) and external to the organization (e.g., knowledge of the final customer's expectations, knowledge of where en-route components are and when they are expected to arrive at their destinations). To be truly effective, an organization must achieve knowledge sharing and coordination along the entire supply chain network. Lack of information sharing between members of the supply chain has been shown to significantly affect total profitability [15,16]. As such, we argue that KM can enhance the degree of success of existing SCM efforts as well as increase the likelihood of success of new SCM undertakings. While many SCM projects have resulted in improved performance., we believe that higher levels of performance improvement are possible by coupling KM initiatives with SCM programs.[10]

The adoption of Information and Communications Technology (ICT) is spreading rapidly in supply chain management. As companies seek to improve supply chain efficiency through increased integration, ICT can be considered as a key enabler for supply chain management by supporting information-sharing. The complexity of SCM has also forced companies to go for online communication systems. For example, the Internet increases the richness of communications through greater interactivity between the firm and the customer (Watson et al., 1998). Graham and Hardaker [17] highlight the role of the Internet in building commercially viable supply chains in order to meet the challenges of virtual enterprises. Supply chain management emphasizes the overall and long-term benefit of all parties on the chain through co-operation and information sharing. This signifies the importance of communication and the application of IT in SCM. This is largely caused by variability of ordering (Yu et al., 2001). Information sharing between members of a supply chain using EDI technology should be increased to reduce uncertainty and enhance shipment performance of suppliers and greatly improve the performance of the supply chain system .[10]

The practicing companies could successfully utilize the ICT and Information sharing techniques by [2]:

- giving more focus on reducing response time

- redesigning the business processes
- streamlining logistic activities across the supply chain to reduce cost and improved efficiency
- developing high valued supply chain relationships
- enhancing customer services for competitive advantage, and
- trying to attain global standard and access to world market.

Figure 2: Benefits of ICT Tools Categorized under Porter's Value Chain

Inbound Logistics	Operations/ Manufacturing	Outbound Logistics	Marketing and Sales	After-sale Service	Margins
<ul style="list-style-type: none"> • Cheaper and faster communication with suppliers through Supply Chain Management 	<ul style="list-style-type: none"> • Improve Inventory Management systems • Enterprise Resource Planning software • Rapid Prototyping and Manufacturing programmes 	<ul style="list-style-type: none"> • Easier to link to global supply chains and outsourcing opportunities 	<ul style="list-style-type: none"> • e-Commerce • e-Marketing through websites 	<ul style="list-style-type: none"> • Customer Relationship Management software 	
Firm Infrastructure (Finance, Planning) <ul style="list-style-type: none"> • Better accounting and financial management practices • Improved communication between different departments through the intranet • Better grasp of business trends and market prices through easier access to information • Use models to enhance business planning capabilities 					
Human Resource Management <ul style="list-style-type: none"> • e-Learning for employee training 					
Technology Development <ul style="list-style-type: none"> • Better Knowledge Management within the firm • Integrate different software platforms through Enterprise Application Integration 					
Procurement <ul style="list-style-type: none"> • Use e-procurement for cheaper and faster communication with suppliers 					

The adoption and application of ICT not only create SMEs that are competitive in terms of price, quality, delivery and efficient services, but it also enables them to respond to real time market demands and changes.(fig 2). This will also enable to integrate Knowledge management in to the supply chain to be competitive and be part of global supply chain hence, there is need of a methodology which should not overcome challenges and limitations of Asian SMEs but can be an effective in complex situation of SCM and lead them to Global market.

Methodology for Integration of SCM & KM: transformation of SMEs from domestic market to global market

In the context of Porter’s framework of competitive advantage strategies and the given characteristics, opportunities & challenges facing SMEs, the competitive success of these companies need to focus on how they are unique and critical to their trading partners (Quayle, 2002). Thus, it is essential that SMEs can link their business strategies to that of the supply chain. The organic organizational structure of

SMEs should enable them to develop strategic alliances with their trading partners in the supply chain so that they are able to leverage skills & expertise of suppliers of Supply chain. For this Knowledge management should be used in to over come challenges of SMEs for internationalization. For this purpose I am proposing following methodology for integration SC with KM.

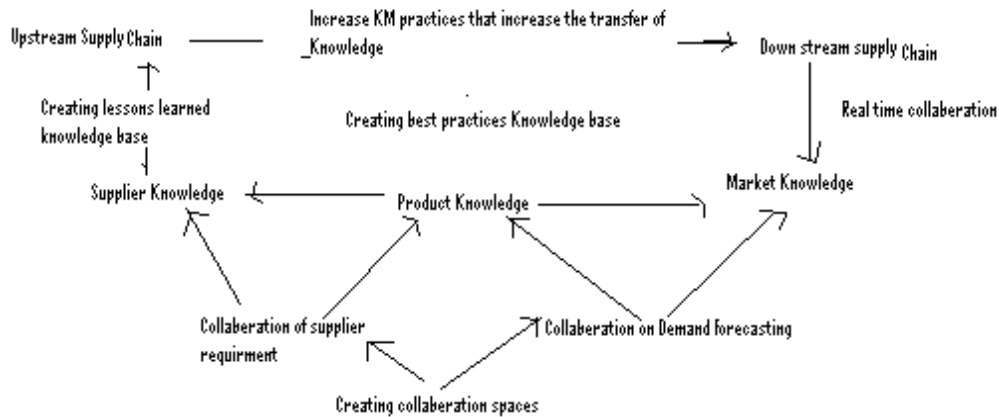


Fig 3: Propose methodology for Integration of SC & KM: Asian SMEs

Fig 3 shows a supply chain integration with Knowledge management that links company with its suppliers upstream and its distributors & customers at downstream. Upstream supply chain includes the organization's first tire suppliers and their suppliers. Downstream supply chain includes all the processes involved in delivery the product or service to the final customers. Supply chain includes information floe along with physical flow, and the procedures that support the movement of a product/services. Managing these physical & information flow efficiently & efficiently through knowledge management increases organizational relationships & foster the sharing strategy, technology efforts and Knowledge. (Sabbaghi, Sabbaghi, 2004)[12].

1. **Implement KM practices that increase the transfer of Knowledge:** The challenge of capturing, organizing, and disseminating knowledge throughout the aggregate supply chain is a huge undertaking. Complexity increases by several magnitudes when one considers a multi-tiered supplier chain in which numerous dynamic interactions happen between several suppliers and manufactures, distributors, and clients. The flow of knowledge between these interfaces is critical to the success of the supplier chain (Desouza et al., 2003). Hence, increase the participation in Global supply chain for both Backward and forward stream.
2. **Creating best practice knowledge base:** it will help to an operative SCM to approach optimal level of performance.
3. **Creating lesions learned knowledge bases:** it could improve the transfer of knowledge between all suppliers.
4. **Creating collaboration spaces:** this will expedite the process of design and planning for demand forecasting and suppliers selection. Demand

collaboration allows the SMEs to forecast their demand properly, through supply collaboration they can optimize their order fulfillment.

5. **Real time collaboration:** direct linkage with market/customer will help to assess the need on time thus reduce the inventory cost. this will help to SMEs to share critical information within the business functions in real time.

By having KM methodology implemented, the Supply chain management system will (a) solve novel nonrecurring problem faster, (b) will adopt more rapidly to unpredictable change, (c) allow for shorter training times for new workers with few errors. Thus, helping SMEs to be proactively part of Global supply chain and be internationalized. For the supply chain to be optimized all elements of the supply chain must be connected to enable the flow of knowledge. Connectivity is the first attribute to allow the flow of knowledge throughout the supply chain. The second attribute is the communication of this knowledge in a fashion that allows all the users in the supply chain to make business decisions that maximize client value while reducing costs and cycle times. The third attribute of supply chain KM systems is the ability to collaborate in a real-time fashion, encouraging knowledge sharing and allowing the supply chain to adjust to market changes. The ability to make rapid decisions constitutes a competitive advantage by decreasing the cycle time and by increasing the flexibility in order to respond to the change of customer's demand. In this way, enterprises share knowledge to improve the global value carried out by the supply chain.

Conclusion:

Although small, SMEs need not be constrained by their size. In fact, being swift and nimble, they can be a formidable driving force for our economies. They were quick to respond to the crisis - re-examining their business models, strengthening their capabilities, and streamlining their systems and processes. Supply chain is indeed an important factor to be successful in global competitive market and by applying KM practices in Supply chain both buyers and suppliers benefit from knowledge-sharing activities, understanding the benefits of absolute versus relative gains is critical when building world-class global supply chains. Sharing knowledge effectively means understanding that a disparity in benefits is part of what it takes to build partnerships that last.

Unfortunately, SMEs fail much more frequently in knowledge economies. They repeatedly encounter barriers to internationalization; however, several of these obstacles could be eliminated through successful integration into the international supply chain. Globalisation of supply chains, rapid technological advances, superior returns on intellectual capital, growing importance of knowledge-intensive industries make KM a strategic tool in the growth and success of businesses. Access and integration of SMEs with regional, national and international supply chains require bridging the gaps between the requirements of supply chains and efficiency of SMEs' KM system besides their capability.

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