WHY KNOWLEDGE ACQUISITION IS IMPORTANT TO EFFECTIVE SUPPLY CHAIN MANAGEMENT: THE ROLE OF SUPPLY CHAIN MANAGERS 'AS KNOWLEDGE ACQUISITORS.

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Abstract: The acquisition of knowledge either by organisations or individuals is considered critical to the success of the organisation in a dynamic and uncertain business environment. Likewise, the acquisition of knowledge in supply chain is seen to be of great advantage to the complex activities that goes on in the supply chain, where it is difficult to forecast demand and therefore maximise competitive advantage. Despite data, information, knowledge and knowledge sharing being critical to the success of supply chain, there are dearth of studies exploring how knowledge is acquired.

This paper explores the importance of knowledge acquisition for effective supply chain management. In doing so, supply chain managers are conceptualised as either active acquistors of knowledge, and thereby potential sources of competitive advantage, or merely passive recipients of data and information. We argue that to achieve improved supply chain management performance supply chain managers need to engage in active knowledge acquisition.

1.   Introduction:

Knowledge has been recognized as a source of enabling lasting competitive advantage in a dynamic and ever changing competitive business environment (Maqsood et al., 2007; Wu 2008; Supyuenyong et al., 2009; Pacharapha and Ractham 2012). However, only few businesses fully reap the benefits of knowledge for competitive advantage (Danskin et al., 2005). On the other hand, Holsapple, (2015) argues knowledge to be the only source of sustainable competitive advantage. Whereas, Teece, (2000) and Essex et al., (2016) are of the opinion that competitive advantage is dependent on the creation and exploitation of difficult hard to replicate assets and recognizes that knowledge assets are the most important. However, the mere existence of knowledge in an organisation does not automatically transfer into competitive advantage neither does it guarantee competitive advantage. What is recognised as important for competitive advantage is the availability of the right knowledge at the right time (and in the right place) and also the ability to create, acquire, transfer, utilize and protect difficult to imitate the knowledge asset(s) of the organisation (Bustinza et al., 2010). This is supported by Eris and Saaticioglu, (2007) who are of the opinion that the effective use of knowledge is important in every organisation, and this is more important for supply chains due to their complex nature. Therefore, the competitiveness of a supply chain is largely dependent not on the mere existence of knowledge in the system but on the effective acquisition and utilization of market dependent knowledge (Lin et al., 2008). Thus, the effective acquisition of knowledge should be a priority for supply chain managers.

A supply Chain (SC) is described as a chain of networks linking different 'actors' (companies) for smooth flow of material from one point to another (Desouza et al., 2003; He et al., 2012; Cruz-Gonzaloz et al., 2015). These 'actors' can be suppliers, retailers, distribution centres, manufacturing sites, while the materials could be any input involved in the creation of a product or services for the end consumer. Effective management of the supply chain is an important process of coordinating the business processes to meet both end user and stakeholder needs (Almuiet and Salim 2013). As Christopher (2011) put, companies no longer compete with each other, but their supply chain does. This view of Christopher is also supported by Sangari et al., (2015) who are of the opinion that in modern business environment, competition has shifted from organisational focus to supply chains.

In the same perspective, Lau, (2010) and Essex et al., (2015) are of the view that effective and efficient supply chain is now regarded as a key source of competitive advantage and vital

to organisation success. To this effect, supply chain managers play an important role in ensuring continued firm competitiveness and success (van Hoek et al 2002). Hence, the acquisition of knowledge in the supply chain by supply chain managers is an important process in order to balance demand with supply and to ensure the supply chain sustained competitiveness for improved performance.

Volatility of the market environment influences supply chain to be more open to acquisition of knowledge (Bhosale and Kant, 2016). In a supply chain, order amplification often increases upstream the chain towards factory and supplier(s) (Dejonkheere et al., 2004). As supply chain move from downstream to upstream, production and inventory can overshoot or undershoot their normal position (Kim and Springer, 2008) which could result in over stock or under stock respectively (Sterman, 2000; Bottani et al., 2010) and this can create uncertainty for supply chain managers as well as for trading partners (Shukla et al., 2009). In order to be able to reduce uncertainty, supply chain need to move from the level of information acquisition to knowledge acquisition for improved performance and competitiveness (Biotto et al., 2015). Supply chain managers' knowledge acquisition can help in reducing uncertainty and lead-time in the supply chain (Boon-itt, 2009; Olorunniwo and Li, 2010; Naslund and Hulthen, 2012).

The acquisition of knowledge in the SC domain has received little attention as compared to other processes such as knowledge sharing, knowledge creation, knowledge transfer (Malhotra et al., 2005; Cheng et al., 2008; He et al., 2013). Despite data, information, knowledge and knowledge sharing being critical to the success of supply chain, a review of literature reveals that there are dearth of studies on how knowledge is acquired within the supply chain before being shared amongst the supply chain managers and necessary functions (Patil and Kant 2013). Previous studies on knowledge acquisition have mostly focused on information technology (Yli-Renko et al., 2001; Motta, 2013) and artificial intelligent (McBride et al., 2012). As a theoretical contribution to knowledge, this paper focuses on the acquisition of knowledge by supply chain managers. This is done in order to gain insights into the knowledge acquisition activities of supply chain managers as it affects performance.

In this paper, the authors have categorized knowledge acquisition activities into passive and active. The authors define passive knowledge acquisition as the acquisition of voluntarily shared knowledge in the supply chain, and describe active knowledge acquisition as a conscious pull approach of knowledge where supply chain managers actively seek

knowledge. While some supply chains can be viewed to be passive knowledge acquisitor, others are seen to be undertaking a more active knowledge acquisitor activity (Kruschke, 2008). A traditional supply chain model for knowledge acquisition is design to wait for information coming from other members in the SC (passive), information such as sales information, delivery information, and forecast information (Mason-Jones et al., 2000). However, with the globalisation of industry and global economic crisis, supply chains are seen to be actively searching for information (Active) that can be used as knowledge to their advantage (Matin and Sabagh 2015; Alsqour and Owoc 2015). Examples of such companies are Amazon, Zara and eBay, these companies actively scan their environment for useful and timely information about their customers for informed decision making and to improve performance while at the same time creating more demand for their products and services

Amazon and eBay for example takes note of items customers looked at but did not purchase and subsequently displays it in form of an advert on the customer's web browser even long after the customer has closed the link(s) of the product he/she was looking at. Sometimes, they go as far as suggesting similar products to the one the customer looked at and did not purchase and also the recent product purchased by the customer. This practise on the front end is seen as marketing strategy, while at the back end, it can be described as a form of active knowledge acquisition activities where the companies picks up on products customer checks out and are able to make suggestions or recommendations. This activity can help a SC to be more proactive, make better informed decision and improve performance.

2.   Structured Literature Review

In order to provide an understanding of existing literature in the context of knowledge acquisition in supply chain, a structured literature review was conducted to give a rich foundation for the study. A structured literature review can be described as an organised process of identifying, appraising and synthesising relevant literature on a given topic (Petticrew and Roberts, 2006; Popay et al, 2006).

A literature search was carried out consisting of the following search terms – "information", "knowledge", "acquisition", "passive", "active", "pull", "push" in "supply chain". Business Source Complete, Emerald Insight and Science Direct databases were selected because of their rich impact in business and management (Christoffersen, 2013; Niesten and Jolink, 2015).

As part of the exclusion/inclusion measures for this study, the published date for the searched articles was restricted to a period between year 2000-2016. This was done to ensure relevant and recent materials were sought (Crechione and Esposito, 2015). The articles within the selected date range were further filtered by selecting articles with more than two search terms in the title. Example, 'knowledge…supply chain', 'knowledge acquisition…chain'. After which the abstracts of the selected articles were reviewed to be sure its focus is around knowledge acquisition and supply chain (Pittaway et al., 2004). The last exclusion/inclusion measure was selecting articles with its contents focused on knowledge acquisition and supply chain (Petticrew and Roberts, 2006; Easterby-Smith et al., 2012). A follow up literature search was done on reoccurring references cited in the literature that did not fall within the search date, these were also included in the study. Figure 1 below shows a breakdown of the literature search used for this research.

Search Terms	knowledge acquisition supply chain', 'knowledge acquisition supply chain manager' 'passive knowledge', 'active knowledge', 'push knowledge', 'pull knowledge'
Date range	2000 to 2016
Business Source Premier database	40 hits
Emerald database	7326 hits
Science Direct database	12 hits
Total hits	7348
After exclusion/inclusion measures	30 articles
Reoccurring cited references	10 articles
Total articles reviewed	40 articles

Figure 1. Literature Search Table

3.   Literature Review

3.1   Knowledge

One of the first and most cited models (Bellinger et al 2004; Rowley 2007; Fricke 2009; Masud et al 2010) used to understand knowledge is that of Ackoff (1989). This model is widely recognized as the knowledge pyramid and consists of "Data, Information, Knowledge and Wisdom". However, for the purpose of this paper, "Wisdom" will not be considered as it does not fit into the scope of this study that explores the role supply chain managers' plays in knowledge acquisition. Ackoff's model start with 'data' being raw facts which when interpreted it is transformed to 'information', and 'information' given meaning to become knowledge. This model went further to describe 'wisdom' as the process of understanding knowledge.

There has been a lot of debate around the knowledge model. Beirly et al., (2000) and Wang and Noe, (2010) among others sees Data, Information and Knowledge (D-I-K) as a prerequisite to each other, which forms a linear progression from data - information – knowledge. Some other authors are of the opinion that the knowledge model is in reverse order (Tuomi 1999; McDermott 1999; Braganza 2004). That is, the transition goes from knowledge – information – data, and others argue it's a cycle of process. That is, data, information and knowledge revolve in a circle (Quinta et al 1997; Hafeez et al 2000). All the three perspectives are represented in the figure 2 below.
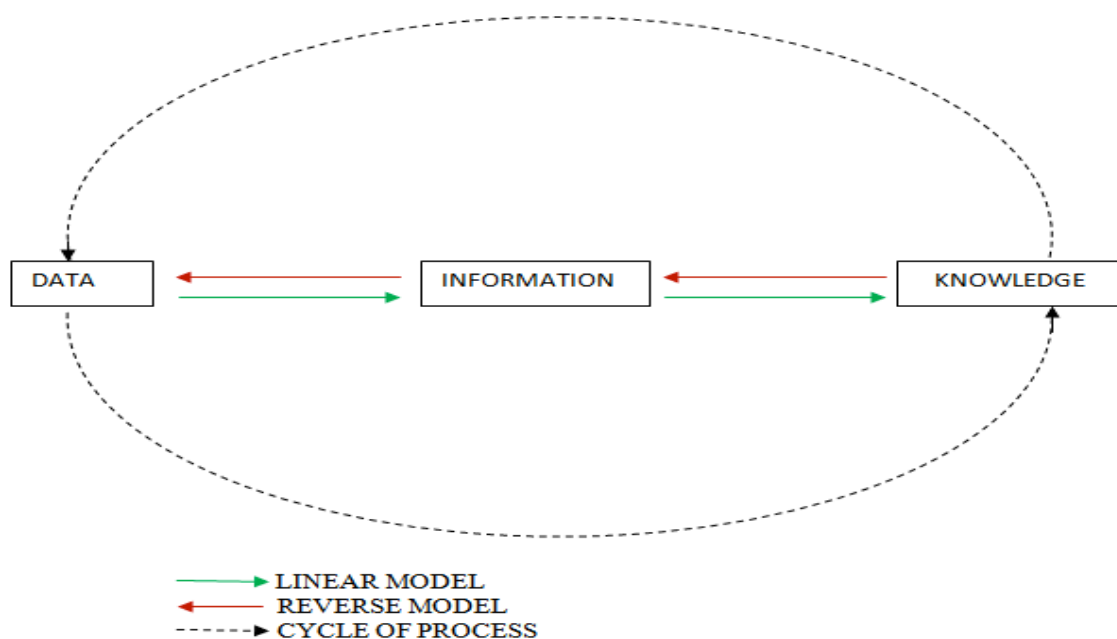
Figure 2. D-I-K Model

For the purpose of this paper, the authors' draws on the notion that data is raw figures and the collection of facts achieved from direct observation or from actual records (Lai and Chu 2000; Amaratunga et al 2002; Rowely 2008). While information is the processed, organised and articulated data (Lai and Chu 2000; Rollett 2012), and knowledge as an act of using information to make informed decisions in order to achieve set goals and objectives (Alavi and Leidner 2001; Nemani 2010). This research conceptualized knowledge as relevant information that has been interpreted and giving meaning to based on shared 'characterises' between the origin of the information and the destination. That is, where knowledge is used in this paper, it is believed to have been interpreted or will be interpreted in the right context it was designed for.

Defining knowledge is somewhat difficult to achieve, thus, there are no generally acceptable definitions of knowledge (Cheng et al 2012; Swigon 2013). Knowledge as describe by Friesl (2012) is an activity that can be socially constructed by individuals within an organisation as they engage in their daily activities to achieve set objectives. Alwis and Hartmann (2008) describes knowledge as an important source of competitive advantage whereas Dasgupta and Gupta (2007) and Sandhawalia and Dalcher (2011) argue that it is not the existing knowledge in a firm that serves as the source of competitive advantage, but rather the ability to apply such knowledge effectively to create new knowledge. In a competitive environment, typical of where supply chains operate and compete with each other as voiced by Christopher (2011), the availability of knowledge and the effective use of knowledge are essential for supply chain competitive advantage.

There are various categorization and ways of understanding knowledge - tacit, explicit, implicit, individual, organisational (Assimakopoulos and Yan 2006; Bustinza et al 2010; Capo Vicedo et al 2011). It is however mostly categorized in its 'tacitness' or 'explicitness' (Koskinen et al 2003; Assimaskopolus and Yan 2006; Sudhindra et al 2014). While there are debates around the existence of explicit knowledge (Tuomi 1999; Smith 2001), it is often characterized as easily codifiable and easy to share. On the other hand, tacit knowledge is seen as personal knowledge, thereby difficult to share and imitate (Capo Vicedo et al 2011), it is describe as the non-codifiable skills accumulated from practising over a period of time (Bustinza et al 2010).

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3.2   Knowledge Dimension

There are two main dimensions to knowledge - epistemological dimension and ontological dimension (Lam, 2000; Curado, 2006; Smiraglia, 2014). Epistemological dimension of knowledge is majorly concern with expressing knowledge in form of tacit and explicit. These two forms of knowledge can be broadly distinguished in terms of how they are codified, methods of acquisition and their utilization. Ontological dimension on the other hand is mostly concern with knowledge that exists with an individual or organisational level. In section 3.2.1 below, the authors discuss the ontological dimension and the epistemological dimension of knowledge.

3.2.1   Ontological dimension

The ontological dimension of knowledge is repeatedly represented in literature in two forms – individual and organisational (Lam 2000; Paavola and Hakkarainen, 2005; Curado, 2006). From the ontological dimension, knowledge can be possessed either by an individual or collectively within an organisation (Tsoukas, 1996). Lam (2000) describe individual knowledge as part of organisational knowledge which is possessed by individuals, further stressing that individual knowledge is domain specific and can be transferred among individuals. Also similar to the individual perspective of knowledge is the definition of knowledge provided by Sharat and Usoro, (2003) who are of the opinion that knowledge is an unquantifiable resource that can be located in the mind of the owner. In the same perspective with the 'individuality' nature of knowledge is the definition by Friels (2012), who is of the view that knowledge is an activity that can be socially constructed by individuals within an organisation as they engage in their daily activities to achieve set objectives.

The second aspect of the ontological dimension is the organisational perspective of knowledge. Organisation itself cannot create knowledge without individual employees within the organisation sharing their knowledge and expertise with other employees (Inkpen, 1998). Which means the creation of what is known as organisational knowledge requires individual employees sharing their knowledge and experiences (Inkpen, 1998; Bhatt, 2002). Organisational knowledge can therefore be described as the sharing and distribution of individual knowledge among members of an organisation (Lam, 2000; Curado, 2006).

Unlike most organisational assets, knowledge appreciates when shared (Connell and Voola, 2007). This means that when knowledge is shared, amplified, modified and re-used it

multiplies in its usefulness. That is, depending on the interpretation of the receiver, knowledge can be modified and re-used for other purposes different from the reason why it was shared (von Krogh et al, 2012). Organisations exist because of people (Von Krogh et al, 2012), therefore people make up an organisation, which means whatever knowledge an organisation claims to have, is owned by the individual employees of such organisation. This view is also supported by Chandler and Lyon (2009) who points out that knowledge acquisition is an activity which takes place at an individual level. However, organisations can take advantage of the knowledge that exists in an individual employee by capturing such knowledge into an organisational wide repository (Martensson, 2000; Ipe, 2003; Outahar et al, 2013). Section 3.2.2 below discusses the epistemological dimension of knowledge in terms of its 'tacitness' and 'explicitness'.

3.2.2 Epistemological dimension

Knowledge can be generally classified into two parts – Explicit and Tacit Knowledge (Nonaka and Takeuchi 1996; Assimakopoulos and Yan, 2006). The personal nature of tacit knowledge and its ability to be transformed into explicit knowledge is what makes it different from the other form of knowledge (Mohammadand Al saiyd 2012). Cook and Brown (1999) however argue that neither explicit knowledge nor tacit knowledge can be changed or transformed into the other. That is, tacit knowledge cannot be converted into explicit knowledge and vice-versa. Further stressing that "tacit knowledge is acquired on its own and not made out of explicit knowledge" (p385).

Nonaka and Konno (2000) are of the opinion that tacit knowledge is highly personal and difficult to validate, making it hard to share with others. This is also supported by Mohammadand Al saiyd (2012) who describe tacit knowledge as the know-how, know-why, working knowledge and the hard to express type of knowledge. This type of knowledge is difficult to share (Lopez-Saez et al, 2010), because it is rooted into routines, actions, value (Assimakopoulos and Yan, 2006) and closely linked to the person who developed it and mainly shared via direct contact (Dasgupta and Gupta, 2007; Faucher et al 2008).

Explicit knowledge on the other hand can be expressed in words, numbers and can be easily codified into different forms for easy access (Dasgupta and Gupta, 2007; Faucher et al 2008). IT tools can be used to help facilitate sharing, transfer, acquisition and codification of explicit knowledge (Assimakopoulos and Yan, 2006). This type of knowledge could be argued to be

data, in the sense that, explicit knowledge is derived from written documents and other tangibles that are easily retrievable.

The exploration and distinction between the epistemological dimension and ontological dimension of knowledge is crucial to the study of the role of supply chain managers as knowledge acquisitors, as this may help supply chain managers to better position themselves to both understand what knowledge to acquire and how to acquire it. Anand et al (2010) advocates the need for investigation into tacit knowledge in the supply chain, while Grawe et al (2011) also encourage researchers to explore various types of knowledge. Thereby stressing the need for further understanding of knowledge and knowledge types within the supply chain. The next section explores knowledge processes as a precursor to knowledge acquisition.

3.3   Knowledge Processes

Both tacit and explicit knowledge consists of processes that help enable the application and development of information (Gold et al., 2001). These processes can be seen as different activities that enables organisation to generate knowledge (Pinho et al 2012). There exist different classifications of KM processes in literature (Spender 1996; Wiig 1997b; 1999; Gold et al 2001; Wong and Aspinwall 2004; Park 2006; Lawson 2003; Supyuenyong et al 2009; Lee et al 2006; Gharakhani and Mousakhani 2012; Pinho et al 2012). These different classifications are argued to mean the same thing but different terminologies adopted by different researchers (Bergeron 2003). For the purpose of this paper however, the authors' adopt the classification of Pinho et al (2012) which consist of acquisition, creation, sharing and transfer. This is because this classification aligns the current research of exploring the role of supply chain managers as knowledge acquisitors and the categorization by Pinho et al (2012) offers a simplified and explanatory view.

Global competition has harnessed the need for organisation to acquire and transfer knowledge across borders (Yang 2013; Bhosale and Kant 2016) for gaining competitive advantage (Holsapple et al 2015). This is so for supply chain managers with complex activities to manage, ranging from short product life cycles, product variety, globalization of business, increased outsourcing and continuous advance in information technology. Therefore, this paper seek to make contribution to knowledge by broadening our understanding on the role of supply chain managers as knowledge acquisitors and also to engage our thinking towards the

idea of passive and active knowledge acquisition. The next section therefore explores knowledge acquisition as part of knowledge processes.

3.4   Knowledge Acquisition

Acquiring relevant knowledge enables the supply chain to obtain critical knowledge to support its survival and competitiveness (Rusly et al., 2015). Almuiet and Salim (2013) point out that there is a growing awareness on the importance of knowledge acquisition activities in organisations. The acquisition of knowledge has been conceptualised and described in different ways. For example, Agarwal and Tanniru (1990) describe knowledge acquisition as the process of obtaining experience and expertise from a knowledge expert to solve a particular problem. Similarly, He et al., (2012) describe knowledge acquisition as the process of locating and engaging knowledge via direct or indirect interaction with a knowledge source. Knowledge acquisition can occur through collaboration, consulting, informal interaction with knowledge experts, training and other knowledge developments activities. Thus, the acquisition of knowledge focuses on identifying and seeking new knowledge and recognizing existing knowledge (Rusly et al., 2015).

Knowledge acquisition in supply chain could be new knowledge or already existing knowledge within the supply chain (He et al., 2012). Knowledge can be acquired from different sources − customers, suppliers, retailers and partners (Alumuiet and Salim, 2013), and through various activities (Haapalainen and Makiranta 2013). Supply chain trends to explore various sources and activities for acquiring knowledge and this can be due to their complex business environment where they operate (Almuiet and Salim, 2013) The next section seeks to explore the concept of knowledge acquisition in supply chain.

3.5   Supply Chain Knowledge Acquisition

The ability to acquire and use knowledge within and across organisational boundaries for supply chain performance has challenged managers for quite some time (Danskin et al., 2005; Roy and Therin, 2007). Supply chains have to acquire and create knowledge continuously to maintain their competitive advantages in a dynamic environment (Chen et al., 2012). Desouza et al., (2003) are of the opinion that supply chains must be properly connected to enable the flow of knowledge for acquisition

This section seeks to explore the concept of knowledge acquisition in supply chain. The acquisition of knowledge is regarded critical in the complex and dynamic environment of a

supply chain (Samuel et al, 2011). Likewise, Kant and Singh (2011) are of the opinion that supply chains depends mostly on knowledge. Hence, the acquisition of knowledge across the supply chain is important to ensure its success, to help expand supply chain knowledge base and provide huge potential to create and retain greater value within supply chains (Chow et al., 2007), while also helping supply chain better utilize and exploit their intangible assets (Sambasian et al., 2009).

Knowledge acquisition can be seen as an organisational (supply chain) function, an individual (supply chain managers) function as well as a group function (Liao et al., 2009). Knowledge acquisition as an organisational function includes extracting, interpreting and transferring knowledge within the organisation to improve existing organisational knowledge (Liao et al., 2011; Pacharapha and Ractham, 2012). In addition, it can be in terms of organisation taking advantage of available employee's knowledge and transforming it to be used by the organisation (Cook and Brown, 1999).

A supply chain is described as a logistics network consisting of all the stages involved from production to the final delivery of the end product (Sambasivan et al 2009; Yu et al 2010). These stages they identified as order processing, inventory control, purchasing, manufacturing and distribution. In the same perspective, Wangphanich et al., (2010) describe supply chain as a chain of activities encompassing the flow of goods and services from the acquisition of raw materials to delivering the end product to the end users. These activities perform processing of raw materials, transforming the raw materials into intermediate and finished products and finally, distribution of finished product to end users. While Sidola et al., (2012) sees it as an interconnected network of different entities majorly consisting of suppliers, manufactures, distributors and retailers. A complete SC as described by Harland (1996) is a chain of activities involving raw material producers, material fabricators, component parts producer, manufacturers, distributors, retailers and finally consumers. These chains of activities are what Schoenherr et al., (2014) summed up as plan, source, make and deliver.

Essex et al., (2016) argues that the success of a supply chain depends on the calibre of the supply chain manager to champion change within the supply chain. Considering the dynamic nature of the supply chain environment, supply chain managers are constantly facing new challenges (Bhosale and Kant 2016). It is a well known fact that one of the main challenges facing supply chain managers is the ability to balance demand with supply while at the same

time trying to avoid excess stock or low stock (Ryu et al., 2009; Naslund and Hulthen, 2012; Kembro and Naslund, 2014). There is therefore a need for them to update their knowledge on a regular basis. That is, to engage in knowledge acquisition for effective market response. By engaging in knowledge acquisition, supply chain managers are able to cope in a turbulent business environment by being able to balance demand with supply through acquiring relevant knowledge to make informed decision and making a more accurate forecast. The section below considers those activities engaged in by managers for knowledge acquisition.

3.6   Knowledge Acquisition Activities

As previously stated in the introduction section, there has been no study that explicitly studied how supply chain personnel acquire knowledge. This section therefore provides review of literature on knowledge acquisition activities of managers. Knowledge acquisition in supply chain could be new knowledge or already existing knowledge within the supply chain (Mkhize, 2015). Knowledge can be acquired from different sources – customers, importers, suppliers, retailers and partners (Almuiet and Salim, 2013). In addition, SC tends to explore various activities for acquiring knowledge (Haapalainen and Makiranta 2013) and this can be due to the complex business environment where they operate.

Assimakopoulos and Yan (2006) explored sources of KA for Chinese software engineers, they adopted participant observation and interviews for their data collection and discovered the software engineers that were observed used personal efforts as first point of call by checking the codes, testing assumptions and looking up text book before turning to colleagues within the organisation or local communities of practices. Similarly, Motwani (2006) also explored KA behaviour of Indian service managers and US. The aim was to determine the external business environment knowledge acquisition. Quantitative research approach was adopted consisting of questionnaire. It was discovered that US managers consult internal documents first, follow by their supervisors and then peers, while the Indian counterparts consults personal subscription first, follow by superior and then internal documents.

The authors identified some knowledge acquisition activities from literature - personal subscription to professional magazines, company library, company database, superiors, subordinates, peers, internal documents (forecast data, sales information, demand information, production information, inventory information), consultants, communities of practices, attending meetings, contracting with other organisation, formal education,

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experimentation, imitation, attending workshops, internet and self directed learning are all types of knowledge acquisition activities identified in the literature (Assimakopoulos and Yan, 2006; Motwani, 2006; Pacharapha and Ractham, 2012; Almuiet and Salim, 2013) In section 3.7, the authors explore the passive and active knowledge acquisition activities, then categorises the knowledge acquisition activities into passive or active knowledge.

3.7 Passive and Active Knowledge Activities

Gaines (2004) defines passive knowledge as knowledge acquired but not used, while active knowledge is seen as knowledge acquired and used for problem solving. However, in this paper, the authors conceptualise passive knowledge activity as a waiting process. In the case of supply chain managers, it means supply chain managers waiting for knowledge to be shared by other members of the supply chain. While active knowledge acquisition refers to a conscious effort of the supply chain manager scanning within the supply chain and outside the supply chain environment for available knowledge that can be used for gaining competitive advantage (Kruschke, 2008).

In this paper, the authors described a traditional supply chain as a push or passive system, where the supply chain is fed with useful up to date knowledge. A passive acquisition activity is seen as receiving information that is voluntarily shared in the supply chain. While active or pull knowledge acquisition as the knowledge oriented supply chain actively looking for streams of information that can be acted on and use as knowledge for better informed forecast and performance improvement. From the authors' conceptualization of active knowledge acquisition and passive knowledge acquisition, we categorized the knowledge acquisition activities presented in section 3.6 to be either active, passive or both as show in figure 3 below.

Active Knowledge Acquisition	Both Active and Passive	Passive Knowledge Acquisition
Personal subscription to professional magazines	attending meetings	internal documents -
company library	attending workshops	forecast data
company database		sales information
superiors		demand information
subordinates		production information
peers		inventory information
consultants		
communities of practices		
contracting with other organisation		
formal education		
experimentation		
imitation		
internet and self directed learning		

Figure 3. Passive and Active Knowledge categorization.

4. Conclusion

Supply chains depend on the ability to acquire knowledge in order to gain competitive advantage (Mkhize, 2015). The passive collection of information is not enough to gain competitive advantage in a dynamic business environment where most supply chains operate (Erden et al., 2008). Therefore, supply chain managers are required to do more than passively collect information, but move to the level of active knowledge acquisition (Mkhize, 2015).

This paper makes a contribution to knowledge by conceptualizing supply chain knowledge acquisition practices as either active or passive. The concept of active and passive knowledge acquisition arises from the knowledge management literature. However, this notion is not a concept that is explicitly recognized within the supply chain literature. The authors proposed that utilizing these concepts to explore supply chain management is one that can lead to new insight within the field. We suggest that active knowledge acquisition can attain and sustain competitive advantage in supply chain.

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