Available for free online at https://ojs.hh.se/

Journal of Intelligence Studies in Business 2 (2012) 42-50

Competiveness from Contextualisation of Supply Chain Knowledge

Gabriela López[1], Steve Eldridge[2], Salomón Montejano[1], Patricia Silva[1]

[1]Human Resources Department, Production and Quality, Universidad Autónoma de Aguascalientes, Aguascalientes, México

[2]Operations Management and Logistics Department, Manchester Business School, Manchester, UK
gabynvest@yahoo.com.mx

Received June 3, revised form 10 September, accepted 22 September 2012

ABSTRACT: This paper provides a discussion about the need of a continuous contextualisation of knowledge practices in organisations. Also, a proposal of a knowledge representation to contextualize and diagnose supply chain knowledge is presented. The proposed knowledge representation is a codification to incorporate context in a way that some form of diagnosis of supply chain practices can be carried out, which could reveal possible favourable and unfavourable effects of practices in a supply chain. In addition, this paper has been constructed in Excel® as a prototype, with the aim of being used in workplaces to support decisions making in SMEs supply chains. For this investigation, a number of best practices have been analysed. Also, focus groups and individual interviews to operations managers, from global, small and medium enterprises, have been carried out. Subsequently, it has been possible to integrate the proposed coding representation to enable a contextualisation and diagnosis of supply chain knowledge.

KEYWORDS: Knowledge management, supply chain, competitiveness, contextualisation, diagnosis

1. Literature review

1.1 Supply chain nature and competitiveness

An effective implementation of knowledge management is required by supply chains in order to remain competitive. Supply chains are strategic frameworks to ensure customer value, relationships, resources optimization, and practices integration. Through this investigation, inadequacies for an efficient knowledge management cycle, in supply chains, have been identified. Such identified inadequacies avoid completion of the knowledge cycle in supply chains. Mainly, there is a lack of contextualisation and structure for supply chain knowledge (SCK). Consequently, organisations are not gaining the benefits from self-learning, adoption of best practices, which are elements, incorporated in an effective knowledge management implementation. Along supply chains there are two relevant flows: information and materials. Information is the raw material of knowledge, which requires contextualisation in order to become executable; an important difference between knowledge and information. Knowledge in supply chains can be in the form of best practices, however to consider these as cures for everyone is a mistake, instead these can work in different contexts. An integrated and collaborative supply chain (SC) of an organization offers full potentials to become competitive (Hoek, 2006). The nature of supply chains is to integrate key business

processes like: materials sourcing, inventory management, routes to market, forecasting, production programming and physical distribution in companies. Lambert and Cooper (2000) define a "supply chain as operations from end user through original suppliers who provide products, services, and information that add value for customers and other stakeholders".

Today, there is a competition among supply chains meeting customer needs and to facing globalization, complexity, relationships and change. "Meeting customer needs better than the competence is a source of competitive advantage" (Grant, Lambert, Stock, and Ellram, 2006). For this reason, supply chains are urged to *continuously improve their practices*.

In complex business conditions higher levels of integration may be required and appropriate supply chain practices may be adopted. "A supply chain must be connected, in communication and collaboration to improve efficiency in its practices" (Desouza and Chattaraj, 2003). Integration of practices implies planning and controlling all operations so they can fit together as 'a unified whole' (Barki and Pinsonneault, 2005). Integration of all practices in a supply chain requires what Trent (2008) state an "end-to-end perspective" which is to look across the whole supply chain processes; from planning to delivery (Stewart, 1997).

1.2 Best practices

Laugen et al. (2005) state that "continuous improvement of best practices in all areas of the organization will lead to superior performance capability, leading to increased competitiveness". Best practices are one of the types of external and internal knowledge that can be used in the supply chain. Therefore, the discovery and adoption of best practices knowledge offer a full potential to become competitive.

In the literature, best practices focus on supply chains factors, among others, on information sharing, time, value, suppliers' reduction. Information sharing is important for supply chains, especially about markets, for example, demand-driven supply chain concepts and quick response (QR) logistics, under the umbrella of 'just-in-time'. Also, best practices integrate information about e-fulfilment within lean (Trent, 2008) and agile manufacturing philosophies, target the collection and sharing of key information. Best practices also indicate outstanding performance for the supply chains in terms of time, for example, reengineering of processes, Single Minute Exchange Dice (SMED), resources optimisation and bottlenecks elimination. Addition of value is another important factor described in best practices, which include advance planning systems, benchmarking, optimisation methods and value chain.

Best practices also describe success factors such as organisations alliances (Ahumada-Tello, Zárate Cornejo, López, and Alberto Perusquia Velasco, 2012), cross-functional teams, partnerships and outstanding information systems like Enterprise Data Interchange (EDI), Enterprise Resource Planning (ERP), barcodes, Collaborative Planning and Forecasting Replenishment (CPFR), Efficient Customer Response (ECR), mass customisation. The reduction of supplier base is another factor on which best practices have been focused. Other best practices include outsourcing and supplier strategies and external (vertical) integration strategies from upstream suppliers and downstream customers. These aim organisations to focus on core processes, which have a more differential advantage. The rest of the processes are outsourced, including practices such as subcontracting manufacturing, transport, and warehousing and inventory control services. In general best practices dictate a need of supply chains for a holistic or end-to-end perspective (Trent, 2008), which is related to the integration of practices, another main characteristic of supply chains purpose.

However, it can also be dangerous if possible unfavourable effects are not considered (Section 1.5) from best practices. This is also because the term "best practice is rather relative, not an absolute standard" (Ungan, 2004). Best practices are knowledge artefacts originated from experiences describing a full process but only describes successes but no failures (Weber, Aha, and Becerra- Fernandez, 2001) and it is important to recognise and measure such possible unfavourable effects. Similarly, compatibility, has been identified by Ungan (2004) as one of the main elements impacting the implementation of best practices suggesting better understanding and mapping of practices leading to better implementation. This represents a full cycle of improvement too, which is needs to be well recognised and systematic in organisations processes, and can be reinforced by the knowledge management processes.

1.3 Knowledge management

According to Hult and Ketchen (2005) "knowledge management appears to be an intangible creator of superior performance in the supply chain by matching knowledge elements, such as, memory, learning capacity, use and access knowledge with the supply chain strategy". An effective knowledge management focuses on enhancing the learning process through processes of the knowledge

management cycle (Figure 1).

The four main processes of knowledge management are described as follows:

- *Discovery* of knowledge, which is the process of acquiring knowledge
- *Capture* of knowledge, referring to maintain knowledge from the main elements (people, entities) of an organisation
- *Sharing* knowledge is the activity of knowledge collaboration
- *Application* of knowledge is the process of become knowledge executable (Becerra, et al., 2004)

Figure 1: Processes of the knowledge management cycle (Becerra, et al., 2004)

These processes of knowledge management are similar to the learning processes (Kresbach-Gnath, 2003), which are focused on the vision of the organisation:

- *Identification* of knowledge (analysis of current environment and situation of company)
- *Diffusion* of knowledge (employees participation, training, communication)
- *Integration* and modification of knowledge (leadership, cooperation, workshops)
- *Action* of knowledge (strategy, projects).

1.4 Structure for supply chain knowledge

No pre-existing structure to represent supply chain knowledge (SCK) was identified that could accommodate the knowledge contained in best practices. The lack of structure for best practices knowledge represents a barrier making it explicit to capture knowledge. Thus, the construction of a structure for supply chain knowledge taking best practices as a main source is recognised as highly desirable. There is a need to structure knowledge in order to enable integration and processing of supply chain knowledge, for example, converting implicit knowledge into explicit knowledge, in other words, being able to capture, to record knowledge (2nd process shown in Figure 1). There is a need of a structure of compatible supply chain knowledge. Becerra et al. (2004) stated that "knowledge needs to be structured and captured in order to be applied or actionable" (4th process of the KM cycle).

Unstructured information might overwhelm practitioners who instead of transferring key concepts and creating learning environment and reflexion (1st process of the KM cycle), focus on mini projects with no available time to convert information into knowledge. In consequence, the understanding, implementation and integration of practices are affected. Today's managers seem overloaded with unstructured knowledge that grow rapidly and massively, which in consequence affects sharing key concepts to their employees, making complex a conversion of information into knowledge and continuous understanding of practices. It is important that organisations recognise that information is the raw material of knowledge. "A large piece of the organisation's knowledge asset is unused each day without a mechanism to capture and convert it into articulated to adopt new practices and for knowledge" (Radding, 1998). There is a need of a possible structure to move towards a way to capture, making more sense out of the endless and unstructured knowledge and information that progressively accumulates. However, in the literature review, knowledge engineering attempts to help humans in their jobs by trying to make knowledge explicit, by representing knowledge especially within a machine. Best practices can remain as information if not contextualised and applied, as will be discussed next.

1.5 Contextualisation for supply chain knowledge

Continuous improvement of practices is necessary to become competitive, for better decision making

and for deliberate strategies, which is part of "strategic learning" (Axelsson, et al., 2005). At the same time, it is important to recognise and measure opportunities (i.e. best practices) in order to positively impact organizations competitiveness (Grant, et al., 2006). There is a need to contextualise best practices knowledge continually, the nature of knowledge is timeless different from information which is "limited timeliness" (Radding, 1998). "The efficacy for any practice can only be determined in the context of a particular firm's strategic and environmental contingencies" (Huselid, 1995). To start quantifying this kind of contextualisation is important, which means being aware of practices impacts in alternative contexts. Bessant (2003) suggests, for example, a regular revision and assessment of practices for their successful implementations.

Best practices only describe the processes but not its suitability or consequences if they were adopted in different contexts. Lindvall (2003) stated that "knowledge must be captured, stored and organized according to the context of each company in order for it to be useful as well as efficiently disseminated". The term "best practice is rather relative, not an absolute standard" (Ungan, 2004), who also identified three weaknesses in best practices:

- They do not provide reasons why they are considered best
- They only rarely link the practices investigated to company performance
- They are considered generic, best for all companies'.

Best practices frequently do not specify nor clarify the context in which best practices are suitable to be adopted. At present, the unfavourable consequences of best practices do not seem to be systematically recorded and do not specify with evidence contexts in which they could work. It is important to manage best practices knowledge to avoid ambiguity about their possible effects, acknowledging its compatibility with a specific supply chain context.
By revealing the possible unfavourable consequences the discovery of knowledge may be enabled. To start quantifying these kind of interrelationships is relevant, "it is important to recognize best practices as specific to certain situations" (Swan, Newell, and Robertson, 1999). The less knowledge about supply chain practices is contextualised; fewer benefits are obtained from its adoption, in consequence and more assumptions are required involving more risk. In fact, if practitioners do not identify beforehand the possible impacts of a best practice, unfavourable impacts may be created when it is adopted. In summary, the process of discovering supply chain knowledge is restricted by the lack of quantified, context-specific details provided by the best practices knowledge.

When adopting practices, these may develop different capabilities that might or might not be suitable for different sectors. In the literature, most of the examples of best practices (described in Section 1.2) were related only to certain sectors, such as the automotive and food sectors. For instance, quick response logistics was originally created in and for the fashion and apparel sector (Christopher, 1992). When adopting practices, a practitioner should be aware of other sensible aspects not commonly revealed in currently disseminated best practices. For example, ERP systems usually considered best practice involves high interdependencies that could affect multiple business functions and organisations simultaneously when adopted. For instance, it would be interesting to know which best practices are suitable to develop specific capabilities, as an example:

- How flexibility capability can be improved with computer-based automation and real-time process control (Tracey, Vonderembse, and Lim, 1999).
- How innovation capability can be inhibited with licence controls (Thomas Choi, 2004)
- How time reduction can be improved with specific distribution methods (Hult and Ketchen, 2005)

Quantification of the appropriateness of a practice on a given supply chain context seems to be required, so it can be adjusted accordingly. In other words, there is a need of continual awareness of what practices are suitable to what specific contexts (i.e. sectors). Supply chains need to ensure that the implementation of best practices is carried out in a way that is suitable to their business context. Currently there is no articulation of the possible context-specific conditions of a supply chain. Thus, best practices knowledge should be moderated and contextually-specific, so as to allow the creation and control of knowledge.

2. Methodology

From the previous sections, it was identified a number of weaknesses in the knowledge artefact best practices. There is a need to contextualise best practices in supply chains, but also to recognise failure experiences. Such inadequacies impede the successful implementation of the knowledge management processes (Section 1.3), consequently

a continual learning of supply chains in this new era of competition among supply chains. Therefore, the methodology of this project was adapted and focused on answering the following research question: how to structure and contextualise supply chain knowledge? Basically, in this case, knowledge is defined as applied information about practices along the supply chain. Two main research cycles were carried out to structure and contextualise supply chain knowledge. The first research cycle of the project both theoretical and practitioners view were explored in order to investigate possible forms to structure supply chain knowledge. This cycle includes focus group, diagramming and coding best practices in matrices. A tentative structure was constructed, which is presented in the results section 3. The purpose of the second research cycle was to address the contextualising knowledge in the supply chain domain. The methods used include coding, interviews and focus groups. The result was a diagnosis presented in Section 3.

Some of the methods used in this research were the exploration of literature, observation (best practices dissemination), focus groups, diagramming, coding, construction of matrices and individual interviews for validation. Some explored techniques, which were integrated in this proposal contextualisation in Excel® included: knowledge engineering (knowledge representation), best practices content, foresight methodologies. Later, diagramming content best practices helped to design the proposed structure (presented in Section 3) and contextualisation in the form of diagnosis, which was evaluated in focus groups. The focus groups were integrated by significant professionals on operations management. Coding was used to quantify practices content as will be shown in section 3. Various matrices representing the knowledge base were followed by the diagnosis population. And finally, a validation stage was carried out presenting drafts of the constructed contextualisation in focus groups and by populating the knowledge base. The proposed structure and contextualisation is presented in the following section of results.

3. Results

By the end of the research cycles described in section 2, a structure that allows a contextualisation of supply chain knowledge was possible to be constructed, which is in the form of diagnosis that reports eight types of effects (Figure 2).

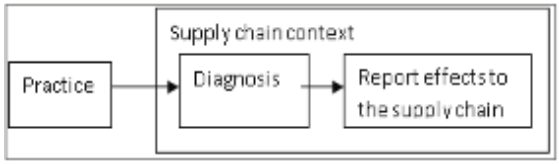

Figure 2: Contextualisation of a practice through a structure and diagnosis

The proposed structure, in the area of knowledge engineering, as Adeli (1990) defines is considered a "representation mapping medium" of knowledge. In the proposed structure, a practice is defined as a full process of a successful experience, but more important, in this project, also describes failure experiences. The context of a supply chain is codified by Stakeholder, Sector, Indicator of performance and area (SIA). This proposed structure of practices allows linkage to suitable and unsuitable entities conditions or effects of a specific supply chain context. The proposed structure represents three main elements:

- *Entities*. Individual, Tool, Environment, and Method (ITEM) and its *suitability* to a specific supply chain context
- *Conditions* (qualitative and quantitative)
- *Relationships* (impedes, stimulates other entities conditions)

The SIA coding aims to link every condition of a practice element (ITEM) to the context of a specific supply chain. This way, it is possible to know practices even stakeholder, and to offer a possibility to evaluate and integrate supply chain knowledge. These relationships were quantified, represented based on texts about best practices. Texts written by experts, who describe a number of relationships (effects) among specific elements and its conditions in practices of a specific supply chain; this is specific areas, sectors, in other words, specific supply chain context. Moreover, experts describe a quantification of these relationships or effects in two main types: favourable (stimulate) and unfavourable (impede) impacts on other elements and its conditions in practices. Therefore, the proposed quantification and contextualisation intends to provide a template to give order and to allow an organic grow of such important knowledge about best practices in supply chains. A supply chain expert, based on this structure, can grow the knowledge base by coding the structure elements. During the diagnosis process (see Figure 4) coded practices are compared to those defined by a user or member of a specific supply chain context, and then possible effects (favourable or unfavourable) are displayed (Figure 4).

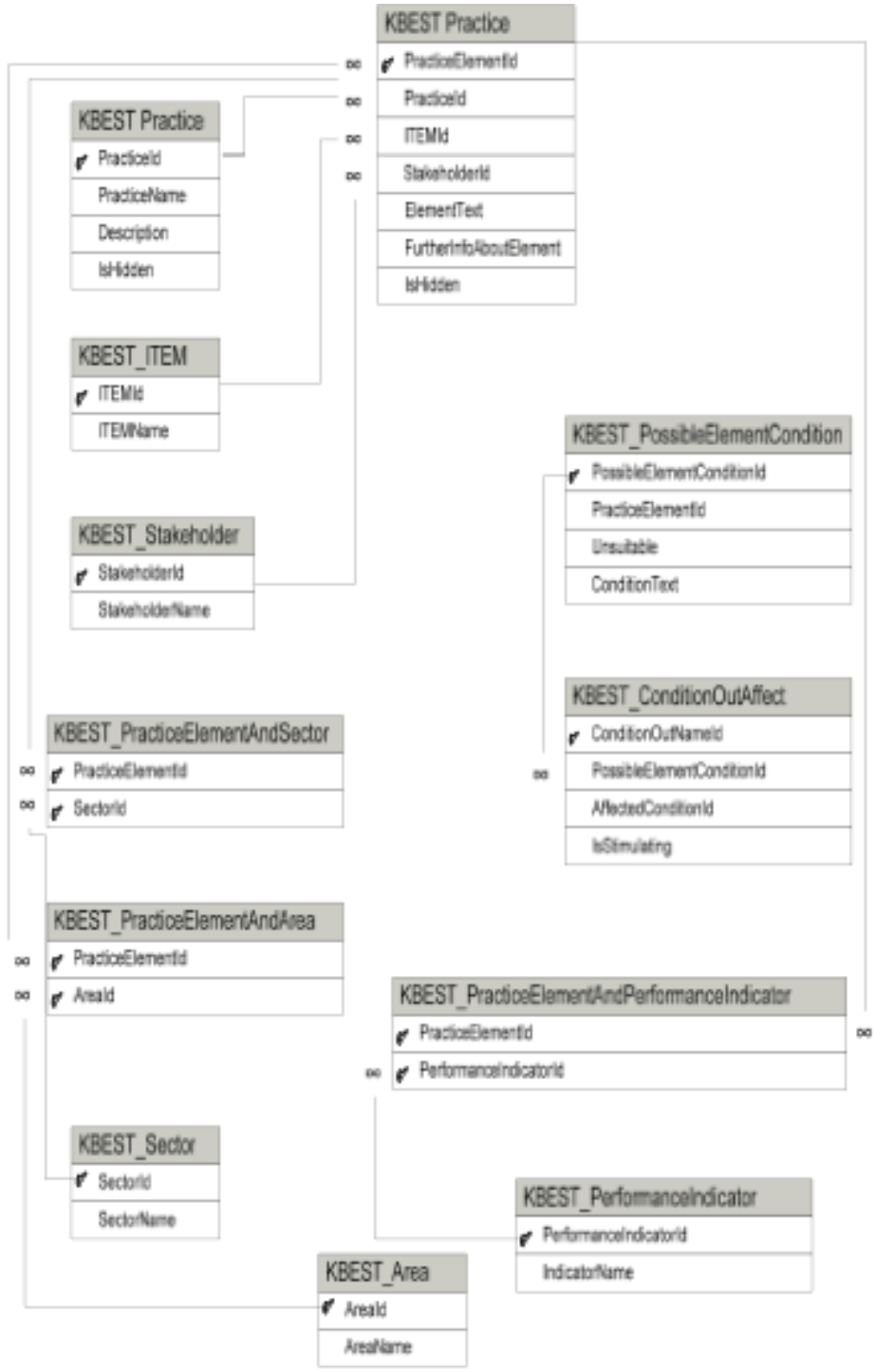

Figure 3: Entity relationship diagram of the structure for supply chain knowledge

The proposed contextualisation process presented in Figure 3 allows a continual contextualisation of supply chain knowledge and the evaluation or diagnosis (Figure 4) of internal practices configurations and those along the supply chain. This diagnosis is able to quantify supply chain knowledge, such as, entities, attributes and relationships (Figure 5). The diagnosis follows what Van der Vaart and Van Donk (2002) recommended, firstly, to measure the relationships among practices; and secondly, the practices against the overall supply chain' performance. The diagnosis quantifies practices' effects among internal practices and those along the supply chain, which allows an effective knowledge management and decision making.

Figure 4: Logic of the diagnosis constructed based on the proposed structured and contextualisation

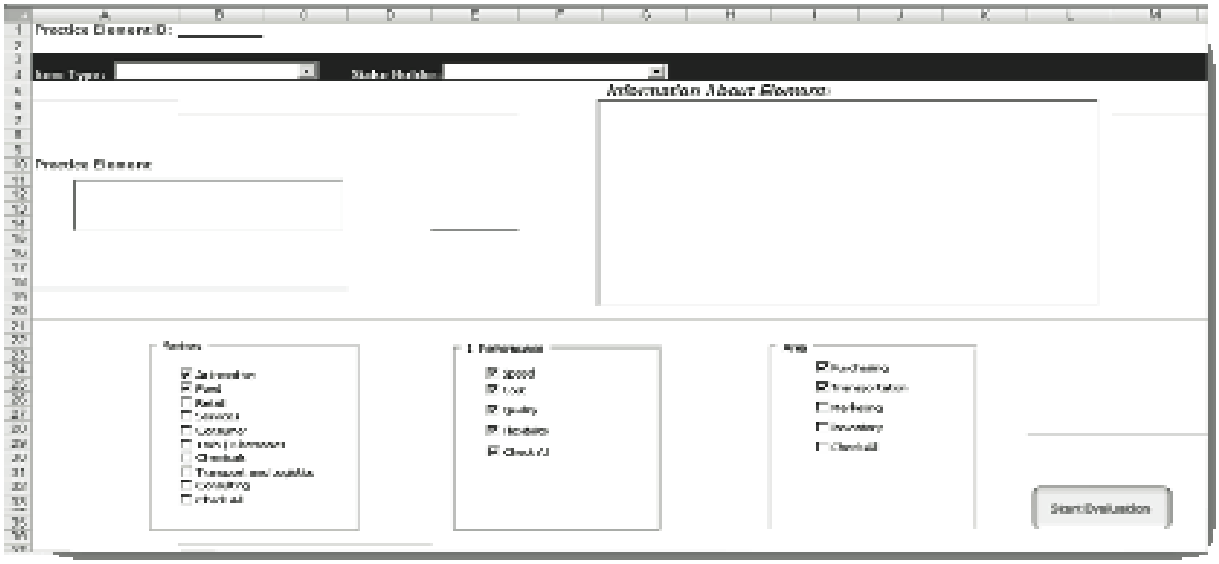

Figure 5: Section in Excel® for coding supply chain knowledge

4. Discussion

In the literature review, there was not identified an existing quantification of the possible effects of practices in specific supply chain contexts. Besides, best practices are important knowledge artefacts that do not report failure experiences. The proposed structure was focused on solving the need of providing order to the massive information about best practices that can be generated. Besides, such structure allowed creating a diagnosis for specific stakeholders and sector. Continually extending and evaluating knowledge it can be possible to support the learning process or knowledge management in supply chains. This way supply chains can focus on their own business, understanding and moderating their own practices. This is by adapting practices to what seems to be the most appropriate for current context. Practices can be modified according to the business style and operating environment of a supply chain.

There are limitations in this study, for example, the qualitative perspective of the methodology, and specifically the way relationships can be introduced into the system which depends on the expert' subjectivity about what a best practice is. However, to minimize this problem, in future it is intended to include a monitoring (moderation module) activity, where various experts can review the quantified, structured information before it is used by practitioners of a specific supply chain.

Also, in the future it is intended to introduce a technology that allows a direct capture of knowledge, into the proposed structure, directly while the expert is writing.

For supply chains a way to become competitive is to focus on their practices as significant knowledge artefacts that require contextualisation to specific supply chain configurations. Supply chains must be attentive of the potential weaknesses of practices of specific supply chain contexts in order to become competitive. Through this work it was possible to provide a structure and contextualisation of supply chain knowledge, which aim to support an effective implementation of knowledge management in supply chains. This way to supply chains can obtain the benefits from adopting best practices, implement continuous supply chain learning, integrate operations and therefore, develop a deliberate strategy to become competitive.

5. Conclusion

This research work proposes a structure to supply chain knowledge, which enables the four processes of the knowledge management cycle. The proposed structure aims to take into account specific supply chain contexts. This contextualisation can help supply chains to moderate the adoption of best practices.

This proposal of contextualisation supports the report of unfavourable effects (failure experiences) from practices. The way to report such effects is possible with a diagnosis process, which based on the proposed structure helps to contextualise and visualise the possible effects, in this case, 8 types of effects (worst, best, barrier, cure, hidden benefit, hidden cure, bad side effect, barrier side effect). The objective of this work was to make available a contextualisation to supply chain members, for that a diagnosis based on a structure and contextualisation has been constructed in Excel®. The proposal helps to implement an easy and c*ontinual* evaluation and contextualisation of own practices, not only those internal but practices of the whole supply chain. Also, to support the integration of practices, this consequently supports supply chain learning. Additionally, a continual contextualisation helps to revamp the creation of an end-to-end perspective in supply chain, which is relevant in this new era of competition among supply chains.

6. Further research

There are other needs to be covered in order to fully implement knowledge management in organisations, for example: deep change in culture, such as open conversations, good personal relationships, (Ahmadi and Shirzade, 2011), organizational structure and work values.

References

Adeli, H. (1990). *Knowledge Engineering*. Ohio, US: McGraw-Hill.

Ahmadi, F., and Shirzade, J. (2011). Identify factor that impact on develop of knowledge Management in Automobile Industry. [Article]. *Interdisciplinary Journal of Contemporary Research in Business, 2*(10), 327-340.

Ahumada-Tello, E., Zárate Cornejo, R. E., López, I. P., and Alberto Perusquia Velasco, J. M. (2012). Modelo de Competitividad Basado en el Conocimiento: El Caso de las Pymes Del Sector De Tecnologías De Información Enbaja California. (Spanish). [Article]. *Productivity Model Based On Knowledge- The Case of the Information Tecnology Pymes In Baja California. (English), 5*(4), 13-27.

Barki, H., and Pinsonneault, A. (2005). A model of organizational integration, implementation effort, and performance. *Organization science, 16*(2), 165-179.

Bessant, J., Kaplinsky, R., and Lamming, R. (2003). Putting supply chain learning into

practice. *International Journal of Operations and Production Management, 23*(2), 167.
Christopher, M. (1992). *Logistics and Supply Chain Management* (2nd ed.). London.
Desouza, K., and Chattaraj, A. (2003). Supply chain perspectives to knowledge management: research propositions. *Journal of Knowledge Management 7*(3), 129-138.
Grant, D., Lambert, D., Stock, J., and Ellram, L. (2006). *Fundamentals of Logistics Management*: Mc Graw Hill.
Hoek, R. I. (2006). *Agile Supply Chain*. Bradford: Emerald Group Publishing Ltd.
Hult, T., and Ketchen, D. (2005). Knowledge as a strategic resource in supply chains. *Journal of operations management, 24*, 458-475.
Huselid, M. (1995). The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Financial Performance. *The Academy of Management Journal, 38*(3), 635-672
Lambert, D. M., and Cooper, M. C. (2000). Issues in Supply Chain Management. *Industrial Marketing Management, 29*(1), 65-83.
Radding, A. (1998). *Knowledge Management: Succeeding in the Information-Based Economy* (1st ed. Vol. 1). South Carolina: Computer Technology Research Corporation.
Stewart, G. (1997). Supply-chain operations reference model (SCOR): the first cross-industry framework for integrated supply-chain management. *Logistics Information Management, 10*(2).
Swan, J., Newell, S., and Robertson, M. (1999). The illusion of 'best practice' in information systems for operations management. *European Journal of Information Systems, 8*(4), 284.
Thomas Choi, J. B., Norbert Wank. (2004). Intellectual property management: a knowledge supply chain perspective. *Business Horizon, 47*(1), 37-44.
Tracey, M., Vonderembse, M. A., and Lim, J.-S. (1999). Manufacturing technology and strategy formulation: keys to enhancing competitiveness and improving performance. *Journal of Operations Management, 17*(4), 411- 428.
Trent, R. J. (2008). *End-to-end lean management. A guide to complete supply chain improvement*. U.S.A.: J. Ross.
Ungan, M. (2004). Factors affecting the adoption of manufacturing best practices. *Benchmarking: An International Journal, 11*(5), 504 - 520.
Weber, R., Aha, D. W., and Becerra-Fernandez, I. (2001). Intelligent lessons learned systems. *Expert Systems with Applications, 20*(1), 17-34.