

A Framework for Collaborative Supply Chain: Level 1 – Planning for Redesign

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Abstract

In improving the competitiveness of business organisations in the 21st century, minimising cost and increasing productivity are no longer factors that can promise success. The changes in customer trends which are focusing more on product or service customisation, high quality and short delivery times are additional crucial factors that organisations should be aware of. These factors have direct impact on how the management can make a decision in utilising the capability of its Supply Chain Management (SCM). The intention of the paper is to promote the utilisation of a Knowledge-Based System (KBS) in identifying organisations current position and evaluate the business process of an existing SCM in order to shift its environment and focus to become collaborative SCM. A model for collaborative SCM is currently being developed by the authors and will be used in the next stage of the research.

1. Introduction

Supply Chain Management (SCM) is a management concept that is becoming an important aspect to organisations in today's competitive environment. SCM is a loop that starts and ends with the customer, where through the loop, all materials, finished goods, information and transaction flow between and within the organisation are considered [1]. In the current competitive business environment, management should not only focus on the supply chain between organisations, but also the supply chain within the organisations. Organisations should be more flexible, productive and fast in producing the product due to changes in customers' demand behaviour [2]. The structure of organisation's business processes should be refined in order to improve the effectiveness of information flows. Traditionally, information flows from various departments within the organisational supply chain and through multiple levels before reaching key decision-

makers. The quality of information is affected whilst travelling in the same business process amongst these departments. Due to this situation, the quality of decision is also affected and leading to organisational inefficiency [3]. In order to ensure the high quality information flows within and between the organisation, a strategy to shift the traditional supply chain into collaborative supply chain should be developed. Collaborative supply chain enables the information-sharing environment and is a key driver in improving organisational business processes [4]. This paper will describe the first level of the research framework that includes explanations related to organisation strategy, business process evaluation and the application of the Knowledge-Based System (KBS) to develop a collaborative SCM.

2. The Organisational Strategy

In a rapidly changing contemporary business environment, organisations should plan a strategy that emphasises on flexibility and fast response to customer demand in order to sustain a long-term competitive advantage [5]. The strategic plan should consider the capability level of each functional area before implementing it throughout the organisation. The capability of each functional area in developing its own strategy has a great impact to the competitiveness of the organisation [6]. In the process to implement the collaborative supply chain, some existing strategies in the organisation should be reviewed and appropriate modifications should be done. As an initial stage, management should be fully aware and understand the organisation position in the industry and the trends in the business environment. This is related to factors such as customer demands, product specification and delivery time. In addition, management should also focus on the information that flows within the organisation since this information is used in designing a product in order to comply with the customer specification [7]. More importantly, the quality and quantity of information flow within the organisation decides the level of decision-making effectiveness and efficiency. Based on Figure 1

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below, the information from the top management flows to all functional areas in the organisation in term of strategies, policies and procedures.

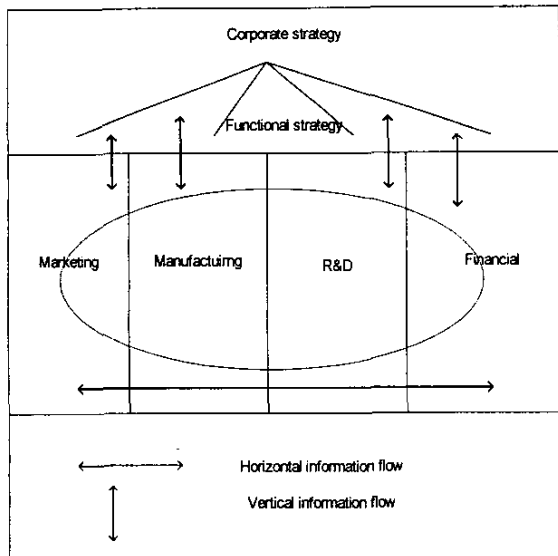


Figure 1. Information flow within organisation

Traditionally, each functional area would develop its own strategies that match with organisation's corporate strategies. All functional areas would then implement their operations based on their own strategy. In this case, many resources are wasted due to business process redundancy and lack of general co-ordination in the functional areas [4]. Furthermore, the reluctant in sharing and exchanging information among the functional areas leads to multiple outcomes that incur time and cost penalties to organisations. In order to minimise this situation, organisations should plan a strategy to develop a collaborative SCM. This strategy should incorporate the nature of the organisation itself, in terms of relation to suppliers, product types, production method, distribution strategy and customer relations. In addition, organisations should also develop a strategy that enables them to be responsive and flexible to any changes in the industry. In this planing stage, all information related to organisations environment, organisations financial, product information and supplier-customer information would be gathered from users through a system. As shown in the Figure 2, this model is used to develop strategies for a collaborative SCM and it is embedded in a Knowledge-Based System (KBS). All functional areas work collaboratively in developing a strategy based on information as mentioned earlier.

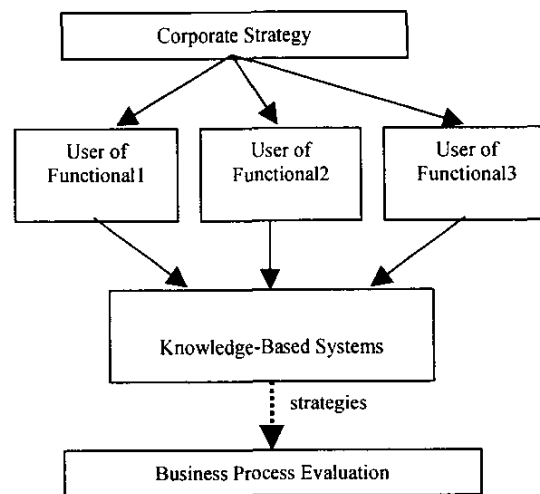


Figure 2. Collaborative strategy development using KBS

Through the KBS, it would identify the current position of organisations by utilising a Gauging Absence of Prerequisites (GAP) analysis [8]. In GAP analysis, the KBS would identify the gap between the prerequisites for the effective organisations supply chain and what currently exists in given organisations. This result is important to the top management in order for them to decide the types of strategies to be developed relating to organisations supply chain. All these strategies would be analysed based on the competitive priorities such as cost, time, quality and flexibility [9] in order to see its suitability with an existing supply chain. Hence, the management could decide whether to redesign the whole supply chain or only on particular business processes in that supply chain. This process is known as business process evaluation stage. The type of KBS used in this research is the rule-based type and utilising an expert system shell software that called Application Manager (AM). In a rule-based system, knowledge is represented and stored in the form of production rules, such as IF, AND, OR, ELSE and THEN. Each rule consists of one or more actions and alternatives. Many KBS utilises rule based knowledge representation due to its explanation facility, modularity and parallel and similar to the process that done by human in solving problem and making decision. In addition, the capability in providing information to users through its explanation facility gives an advantage to this rule based KBS. The example of the rules used is as follows:

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IF      A key component quality is high
AND    Cost per unit is high
AND    There are less than 3 suppliers
AND    They are located >200 miles
THEN   Ensure that purchasing
          strategy is robust
    
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The KBS will check all the conditions that are supplied by users. An interactive session between the KBS and all the users will take place simultaneously. This will give a chance for users to communicate and decide collaboratively before KBS provides the best strategy to implement. Based on these strategies, all functional areas would prepare for the next step in designing a collaborative SCM.

3. Business Process Evaluation

All organisations are a system that is structured by the inter-related business processes which are themselves a set of integrated tasks that are performed in order to achieve business objectives [10]. Improvements or changes to the business process will give an impact to the overall organisation. In order to do certain improvements or changes, management needs a strategy to identify the potential business process before improvement processes take place. In addition, management also needs to oversee the expected outcomes that result from the improvements. In developing a collaborative SCM, some business processes in existing SCM are needed to improve or change. Based on the strategy that is produce through the KBS, management could evaluate the existing business process for improvement. Business process evaluation is a first step that should be done in order to understand the flow of that process and identifying the potential business process for improvement. In this research, the KBS would require the input from users based on three major components that relates to people component, technology component and process component. In people component, variables such as top management dimension, relationship dimension, human resources dimension and quality dimension would be analysed while in technology component, KBS would analyse dimensions such as design capabilities, organisation infrastructure and manufacturing capabilities. In third component that relates to process, analysing process would be done to dimensions such as integration, cost, owner-client and quality. This process is incorporated in the model as shown in Figure 3 below.

Through this model, firstly, the KBS would determine the readiness of organisations in terms of organisation vision and mission before the redesign process is done. This important stage would provide the information that relates to all organisational resources needed for the redesign. Furthermore, for the purpose of evaluation and in order to minimise risks during redesign process, other resources such as people, time, machines, cost and other materials are evaluated. The next stage is to evaluate the performance of each related business process before the prioritising process. This stage uses a technique known as Analytic Hierarchy Process (AHP) [11]. This technique involves three stages; structuring a hierarchy, setting

priority and checking consistency before the best alternative is selected. Based on the result that is produced by the AHP, management is then able to select the business process with the highest priority for redesigning stage, which will be covered in the Level 2 of this research project.

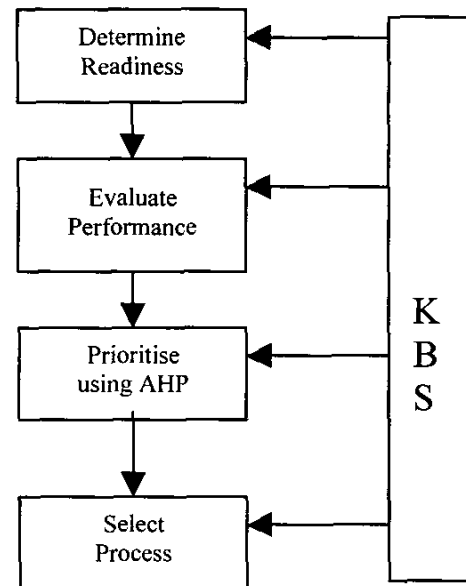


Figure 3: Business Process Evaluation Model

4. Conclusion

In summary, in developing a collaborative SCM, organisations need to prepare a strategy that encompasses several factors such as the trends of customer demands, specification of products, time taken for delivery and also the positions of organisations themselves in the industry. These factors are important in order to eliminate waste in term of cost, time and human resources. Organisations should implement a collaborative strategy development in order to reduce the gap in co-ordinating the functional area's strategies and the whole supply chain. Furthermore, by using collaborative strategy development, the capability to share and exchange information among functional areas is increased and the potential to develop a high quality strategy would also be higher. The first step in developing a collaborative SCM is to evaluate the supply chain business processes that have a potential for redesign. By utilising the business process evaluation model, supported by the KBS and AHP technique, the support to management in selecting the right and highly potential business process for redesign is greatly enhanced.

5. References

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