Supply chain management by using the electronic assistant

J. Eschenbächer¹⁾, E. Cocquebert²⁾

¹⁾Bremen Institute of Industrial Technology and Applied Work Science at the University of Bremen (BIBA), Hochschulring 20, 28359 Bremen, Germany

Tel: +49 (421) 218-5532

Fax: +49 (421) 218-5610

e-mail: eb@biba.uni-bremen.de

²⁾Universite de Valenciennes -LAMIH-GIL (UMR CNRS n° 8530), Le Mont Houy - BP 311, F-59304 Valenciennes cedex

Tel: +33 (3) 27.14.13.47

Fax: +33 (3) 27.14.12.88

e-mail: etienne.cocquebert@univ-valenciennes.fr

Abstract

The reengineering of supply chains will have a decisive impact for the competitiveness of a company which is actually highlighted by the discussion of the SCOR-model. This will drive a demand for software tools supporting the co-operation between the different members of the supply chain which can e. g. be producers, suppliers and carriers. The electronic assistant represents a first prototypical solution that supports an effective innovation management between the different distributed parties. This demand was proven by case studies conducted in multinational companies of the automotive industry in the Research project AIT Implant.

Keywords

Supply Chain Operations Reference Model (SCOR model) , Information and Communication technology (ICT) , Electronic Assistant (EA) , Supply Chain Management (SCM) , Computer Supported Co-operative Work (CSCW) .

1 INTRODUCTION

The design of supply chains is one of the most discussed topics in both academia and industry. An increasing number of models or tools for SCM makes it even more complicated to find the right solutions for the respective situation. Therefore there is still room for research and development identifying tools and methods for appropriate business processes. The SCOR model is one of most successful approaches that got a wide acceptance from industrial users. Without entering the discussion it is remarkable that many authors (David Blanchard 1998, Hans-Peter Wiendahl et al 1998) promote the SCOR model described by McGrath (1996) or G. Stewart (1997). Therefore one part of this paper will be devoted the SCOR-Model. In order to take benefit in SCM from the latest developments in ICT the companies must conduct some type of re-engineering or change management.

These change management activities must be effectively supported by a ICT. Unfortunately such an integrated system which satisfies all the demands coming up in a distributed change management project does not exist. Therefore it is not astonishing that many co-ordination problems will arise between the SCM partners once somebody started a change project. The electronic assistant represents a first solution satisfying these demands and supports the co-operation between distributed teams. The concept will be highlighted and exemplary applied in a SCM scenario.

2 SUPPLY CHAIN MANAGEMENT

2.1 Introduction in Supply Chain Management

Supply Chain Management describes a modern term to analyse and evaluate the supplier-customer relation mostly based on the use of ICT to improve the business processes (Handfield and Nichols, 1999). Manufacturers and suppliers have to decide if they would like to form close relationships between each other not to have partial solutions. Real benefits can only be attained by sincere commitment from each of the partner to use what is proposed. Each should be willing to invest in the necessary ICT, staff training and above all, be willing to share information and data among the partners (Jagdev and Browne (1998). Sharing of information is central to the optimisation of logistics processes in the Supply Chain. The management of the physical flow of material and information among the nodes of the supply chain come, respectively, under the intensive study of strategic SCM. One of the major interest which industrial companies do is the achievement of lean and efficient Supply Chains.

An interesting aspect of the lean production approach is the role of the supplier in developing and sustaining competitive advantage. These supply chains are based on a small group of key suppliers, sometimes called first tier supplier, who in turn have a team of so called second-tier suppliers. These second tier suppliers then engage subcontractors in what becomes a supply pyramid presented in Figure 3.

Figure 3 Integrated supply chain (Handfield and Nichols 1999)

2.2 Supply Chain Operations Reference Model (SCOR model)

The supply chain council is an initiative which was created in the USA in 1996 (Wiendahl et al, 1998). Meanwhile this initiative is based on the participation of 300 companies. The main objective of this initiative is the definition of optimised standard logistic processes. The result of a first collaboration among 69 major US corporations in 1997, the SCOR model is the first attempt at a cross-industry model of SCM.

Figure 4: The Supply Chain Operations Reference-Model

The model is not, however, a “plug and play” prescription for improving Supply Chains. It is designed as a tool to configure, compare and implement improvements. The SCOR model divides the SCM processes into four areas: Plan, Source, Make, Deliver. The model then breaks down into more specific levels of detail and is presented in Figure 4.

2.3 Identified Problems and demands

In the AIT Implant project was investigated that an integrated infrastructure for an intensive SCM co-operation between all three suppliers, carriers and companies does not exist. All activities have to be co-ordinated with the use of non-integrated, separated tools for videoconferences and application sharing (Computer Supported Co-operative Work), e-mails, data storing and exchange of documents. To overcome these problems and to support an effective Change Management, the business partners need a supporting technical infrastructure. The electronic assistant described in chapter 3 can deliver this technical infrastructure. A first conceptual solution of the use of the electronic assistant is presented in chapter 4.

3 THE CONCEPT OF THE ELECTRONIC ASSISTANT

3.1 Introduction

The concept of the electronic assistant is based on a Generic Change Management Methodology (GENCMM) and the Generic change management process (GENCMP) developed in the AIT Implant project and can be studied in the Deliverables 3.1–5.1. It was created because of the necessity to support the implementation process of innovations by an information management tool. The architecture was defined from the user’s functional requirements (Figure 5).

Figure 5: User requirements for the GENCMM assistant

These are:

- A navigator to go along the GENCM process (GENCMP)

- An access to:
 - Up-to-date supporting information like tutorials, guides, case studies, best practice, etc. via an intranet, extranet or internet access
 - Consultancy services to exchange information with target-users, specialists involved in current study, external consultant, etc., using e-mail, web forum, videoconference, etc.
 - Supporting tools user interface, to take benefit of data about people, models, planning..., previously entered along the GENCM Process, by other supporting tools or by legacy systems, or to realise specific actions like business process modelling and simulation, workload and stress modelling, economical models, spreadsheet capabilities, etc.

Functional architecture

The deduced functional architecture is presented in Figure 6. Thanks to a dedicated user interface, a change management specialist navigates along the GENCM process through the roadmap navigator. From this navigator, he takes benefits from:

- Relevant data to a change project thanks to a direct access to the supporting information component,
- Communication facilities provided by a communication services component to have information exchange with other specialists or target users using e-mail, web forums, videoconference, etc,
- Supporting information of any kind of format (text, web pages, newsgroups, models, files, director plan, etc) thanks to the information access component, but depending on his authorisation to use an intranet, extranet or internet access,
- Supporting tool user interface, taking benefit from data manipulated by other supporting tool because of software communication or by legacy systems thanks to an import/export specific module

Figure 6: Functional requirements

Besides, a change management specialist can also use from his own initiative communication services and information access. With a dedicated user interface, target users also use communication facilities to contribute to a change study using e-mail, web forums, videoconference, etc.

Purpose of the configurator component is to take in charge all configuration actions that are required to use GENCM assistant by change management specialists. It has to dynamically configure:

- ✓ Roadmap navigator component by organising logical succession of activities and tasks according to change project description.
- ✓ Information access component to do a research to identify supporting information and consulting services on the world-wide network (but change management specialists can also request a research from their own initiative).
- ✓ A software communication between roadmap navigator and a supporting tool depending on the supported standard, and to build an inter-operability with already installed supporting tools (this allows data exchange between roadmap navigator and supporting tools and between supporting tools themselves).
- ✓ Working environment by taking in charge all actions that allows a use of GENCM assistant components by specialists on their machine.

Purpose of administrator user interface allows an administrator to associate information to each activity/task of the roadmap navigator and, for each GENCM assistant component, to:

- ✓ Verify their right use,
- ✓ Ensure the software communication between them,
- ✓ Maintain their functioning.
- ✓ Test and verify security accesses ... etc.

This functional architecture is currently developed using Director from Macromedia Inc. to build the user interface, and Dephi from Inprise Corp. to build internal behaviour, knowing this latter is connected to the user interface as COM components.

4 THE USE OF THE ELECTRONIC ASSISTANCE TO SUPPORT SCM

4.1 Objectives for the design of supply chains process elements

One of the essential objectives within SCM is the integration of more advanced ICT to facilitate the co-operation. The necessary identification of the specific transformation processes is described in Figure 4 of the SCOR model (process elements and process chains). The evaluation can be made with different approaches for instance the resource-oriented from Günther Schuh (1995). The objective of a process analysis is the definition of process or value chains that support the definition of standard-logistic processes. This is integrated in the philosophy of the SCOR model.

4.2 The Electronic Assistant to support Supply Chain Management

The EA (GENCMM tool) shall be integrated in Extended Enterprise or supply chain networks to support both co-operative change management activities and real-time business processes. Here is presented a first sketch of a technical framework which describes what kind of extended network the EA is going to support (see Figure 7). Industrial Plants, carriers, suppliers and even consultants can be linked via intra- and extranet solutions in order to improve their co-operation. The change management activities can be co-ordinated much easier than today because an exchange of information will be provided easily by the EA. In Figure 7 the basic technical infrastructure is sketched in a network of companies. With such a framework a better understanding of human factors problems etc. can be achieved.

Figure 7: The AIT implant Electronic Assistant in distributed teams

The co-operation within this distributed information system can support complete business process analysis, improved identification of critical change issues,

Information exchange and better understanding of business processes and human factors problems etc.

5 CONCLUSION

SCM is a very important topic that will drive the development of software tools supporting CSCW substantially. The EA is a first prototypical software tool to conduct change projects in distributed teams. In combination with a network architecture which allows a distributed co-operation the EA can be very effectively used within Supply Chain Management. This is especially true for designing the operative logistic supply chains that can only be effectively created within an intensive co-operation between plants, suppliers and carriers.

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7 BIOGRAPHY

Jens Eschenbächer, born in 1968 graduated as Economist in the end of 1996. In 1997 he was working at CSC Ploenzke AG in Kiedrich. In the beginning of 1998 he joined a PHD-program at the University of Bremen which deals with logistics and globally distributed production. In his research he is concentrating on both European research projects and industry projects in the area of supply chain management. He is working at BIBA (University of Bremen) in the department of Logistics and Globally Distributed Production.

Etienne Cocquebert, born in 1964, has been a computer scientist in LAMIH-GIL since 1989. He has an extensive background in the computer-aided design and manufacturing area, completed by a rich experience in the knowledge management. Involved in several national and European projects, he carried out knowledge extraction and formalisation, development specification, and prototype development in order to build the corresponding feasibility mock-ups.