

E-Supply Chain Management

- Results Of An Empirical Study

Global Supply Chain Management

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Abstract

All the activities occurring along the value chain which serve to integrate and control the flow of goods, services, information and payments can be referred to as Supply Chain Management (SCM). Our understanding of the term also takes into consideration the relations between different companies and the connections between internal business processes. Together with KPMG we conducted an empirical study of the current situation and developmental trends. The following points show the main targets of the investigation:

- The change from linear supply chain to supply networks
- The role of strategy, organisation and personnel as factors contributing to the success of SCM
- The relation between electronic commerce and SCM.

1 Introductory Remarks

More and more, it is appropriate to regard the supply chain as a production network formed of successive customer-supplier links and proceeding through a number of value-added steps to ensure that either a product or a service reaches the end customer. The most comprehensive example is when the chain starts in the raw material still to be won from the earth and ends with the delivery of goods manufactured from it. Thus, electronic Supply Chain Management (eSCM) is a group term that can be applied when Internet solutions are successfully applied to the management of the flow of all materials, information and finances along the value-added chain.

In the future it is very probable that the use of e-business solutions in the supply chain will continue to grow (Braßler 2001). However, it is not yet possible to come to a conclusion either as to which applications have already come to be seen as potentially useful by German industrialists, or as to the degree of dependence on such which already exists within industrial firms.

The aim of the work here reported is, therefore, to assess the status quo and current trends for eSCM in the German industrial scene. The following were the questions to which the research sought an answer:

- Is there any eSCM awareness already?
- Are the resources in place to underpin the development - technology, staffing, administration?
- In what particular form are the potential benefits of eSCM being exploited?

- Which e-business solutions are companies already attempting to use, now and in the near future?
- To what extent are individual companies already integrated into the value-added chains that extend from company-internal to company-external?
- In how far have linear supply chains already been replaced by network structures?
- To what degree is e-business assisting in the integration of the supply chain?

To pursue the answers to these questions, an empirical study was set up as a joint project with KPMG Consulting (Bischof 2001). The next section describes how it was carried out.

2 Design And Conduct Of The Study

Equipment manufacture, the automotive industry (vehicle manufacturers and suppliers), high tech companies, makers of consumer goods were taken as the four industrial branches best representing German industry as a whole. Indeed, as they cover the vast majority of German industrial activity, the research outcomes can be interpreted as general trends.

The size of the sample, taken randomly from all four branches, was 988 enterprises. The database for the sampling was provided by the address lists of both KPMG and the Dept. of Production and Operations Management of Ilmenau Technical University. The top 100 companies in Germany were added where necessary to this list. The questionnaire was directed to the company's top management in every case: the Managing Director, the Supply Chain Manager, the Logistics or Purchasing Manager, and/or the Head of Administration.

The number of companies, 988, lent itself to the methodology of an anonymous questionnaire. It was felt that the breadth of the address lists used would mean that data obtained by this method provided a truly representative picture of a cross-section of German industry. The use of personal or telephone interviews was considered in the early stages but dismissed as being too time-consuming and expensive.

The questionnaire was divided into main sections to address the current position and electronic supply chain management:

- a) Strategy (what is the strategic stance of the company vis à vis e-business?)
- b) Processes and Systems (what form do communications and processes take, internally and with outside companies?)
- c) Organisation and staffing (in what way are staff and administrative systems geared to the demands of the supply chain?)

In hopes of improving the participation level (and also of raising the chance of filling in later any possible gaps in the information received on the subject of eSCM), a letter was sent two weeks beforehand, explaining that the survey was imminent. This initial contact served the further purpose of clarifying whether the appropriate person was being addressed.

Of the 988 questionnaires, 29 were returned fully completed by the companies in question. 67 companies gave their reasons for not being able to take part in the survey. 892 companies gave absolutely no response. To raise the survey's factual outcomes, a first further enquiry was sent two months after the despatch of the questionnaires. In addition, a random selection of non-responding companies was made: 30 to receive an email, 100 to receive a telephone call, in each case asking for the reasons behind the non-response and attempting to convince

them of the value of the research. This contact succeeded in gaining the support of 1 (one) company of those telephoned and of 1 (one) company of those emailed. As this personal follow-up was so unexpectedly unproductive, no further attempt was made, and it remained a one-off. One last attempt to increase participation was made with a further postal request. 250 letters were sent, again requesting support and explaining the scientific background to the research. Ten more companies participated in response.

<i>Companies addressed</i>	988
<i>Questionnaires completed</i>	27 (2,7 %)
<i>Reasons for refusing given</i>	67 (6,78 %)
<i>No response</i>	892 (90,28%)
<i>Email follow-up</i>	30
<i>Telephone follow-up</i>	100
<i>Additional questionnaires completed after email and tel. Requests</i>	2
<i>Postal follow-up with further plea</i>	250
<i>Additional questionnaires completed after postal plea</i>	10
<i>Total no. of companies responding</i>	39 (3,9 %)
<i>Total no. of usable questionnaires</i>	38 (3,8 %)

The number (39) of completed and returned questionnaires from 988 companies (a response rate of 3.9 %) was far below the rate expected. This is chiefly explained by the fact that the survey insisted on addressing top management. The time required for completion was thus a genuine hurdle. Other reasons for the low response may be:

The ever-increasing number of questionnaires addressed to companies has the effect of reducing such firms' willingness to take part in research surveys.

- The size of the sample left little scope for using personal contact as a means of preparing the companies for the survey or of assisting in completion of the forms.
- Medium-sized companies are particularly unlikely to have the information available on which to base their answers to the questions.
- There is consciousness of the implications of eSCM but other tasks have priority, causing the thinking on the issues to be postponed.
- Global players are so intricately interlinked that it is not fully possible to view the German market as a separate entity.
- In some instances, the companies are pursuing the possibilities of eSCM and are not prepared to disclose information before everything is in place.
- As SCM is viewed as a competitive advantage on the industrial scene, there is considerable reluctance to divulge information.
- There is a basic reluctance to give information to third parties.
- The research is being conducted not purely by an academic establishment but jointly with commercial consultants.

3 Results Of The Empirical Investigation (Bischof 2001)

3.1 Strategy

An attempt was made to clarify the strategic thinking on the subject of e-business and supply chain management by achieving answers to the following questions by the empirical method.

- What goals have the companies set themselves with their e-business strategies?
- Have the companies developed and formulated a supply chain strategy ?
- What is the importance set on electronic communication ?
- How are characteristic figures for costs and services used in monitoring the supply chain ?
- What business activities are being conducted electronically by the companies?

The setting of e-business strategic goals has the primary purpose of finding the best solutions to the problems arising in supply chain management. Secondly, by doing business electronically, 75 % of the companies are actively pursuing growth.

The responding companies see optimisation of the supply chain as a field where electronic business can improve lead times ("very important" for 62 %) and general flexibility ("very important" for 58 %). In addition, all fields of industry expect this form of business to have a positive effect on the keeping of deadlines and delivery dates and on feedback from the customers times ("very important" and "important" for more than 90 %). In respect of remote control maintenance or servicing, electronic commercial solutions are seen as "unimportant" or "of secondary concern".

Only two thirds of the responding companies have formulated a supply chain strategy from start to finish. It is noticeable that 100 % of the automotive and high-tech companies have developed a strategy, while the other branches of industry can only show an explicit supply chain strategy in 30 - 50 % of cases. In contrast, however, all companies show awareness of the demands of process-oriented activity, for 76 % of them have organised their entire production and distribution strategy according to the "pull principle".

This orientation to the customer, expressed in the pull strategy, is also reflected in the attitude to electronic communication. Almost 60 % of the companies make contact with customers via the Internet. However, this is less the case in respect of partners in earlier positions in the value-added chain, where the figure is 35 %. The figures show very clear discrepancy between the relation to value-added-chain partners before and after the company in question.

A basic precondition necessary for any improvement of supply chain performance is its measurability. If monitoring is only possible in individual functional areas, it is not feasible fully to exploit the performance potential throughout the company, because it can be neither recognised nor evaluated. To achieve an integrated view including all the value-added stages, one needs an appropriate monitoring system to enable the entire supply chain and, indeed, the company performance to be constantly improved. In many areas of industry there are still significant gaps in this respect. Only 25 % of the companies are monitoring figures related to the supply chain.

There are a number of electronic commercial activities used by the companies to address the challenges cited. They tend to focus their e-business on client co-ordination and plans driven by logistical requirements.

Within the last two years, 28 % of companies have started to change their strategic thinking so as to accommodate electronic methods for their own business activities; 41 % are planning to do this in the next two years. It is clear from these figures that about two thirds of the companies are addressing the challenges of e-business. There is, regrettably, another third which has still not taken up the subject.

3.2 Processes And Systems

For electronic supply chain management to be successful, the crux is whether a company has created processes to cover its entire business and is implementing them by means of an appropriate IT arrangement. By looking at the systems in use in the individual fields of industry, one can see how attention to the various value-added-chain partners is integrated into the planning and also what is the relationship regarding information systems and their content between those partners.

The systems employed in the company will set the degree to which the supply chain management can be carried out by computer. Thus, in effect, the use of appropriate systems can be taken as an indicator of the level of supply chain integration.

The potential inherent in planning with APS systems that take account of flow and of capacity bottlenecks is already made use of by 67 % of the car manufacturers responding and 40 % of the high-tech companies. Only 10 % of the consumer goods manufacturers use APS systems. When one recognises that this branch of industry is still frequently using MRP planning methods, one suspects that the consumer goods industry is still at early stage in supply chain integration compared with other branches.

On their side, the car manufacturers endeavour to make use of the whole spectrum of computer technology for their purposes, leading the rest of industry in many respects. For example, it is in their branch that Customer Relationship Management systems (CRM) and Product Lifecycle Management systems (PLM) are most frequently found as specialised types of supplier and customer integration system (CRM, 100 %; PLM, 68 %).

It is surprising that 11 % of companies taken across all industry still rely on simple MRP systems to manage the supply chain. Such systems will do no more than plan the materials requirements. They are to be found in companies supplying parts to the car manufacturers and in the consumer goods field. In contrast, ERP systems exist at a level of 80 %, considerably higher than the industrial average, throughout the automotive and high-tech and equipment manufacturing companies.

One important task for eSCM is the co-ordination of planning processes throughout the stages of the value-added chain. It is noticeable that in all fields of industry the relevant co-operation with partners is mainly oriented towards the customer.

To permit a comparison of the level of co-ordination with the suppliers in question, the categories "joint planning", "consulted in planning", "taken account of in planning" and "not taken account of in planning" were distinguished. It became quite clear that joint planning is very unusual in all fields of industry. However, 60 % of companies in the high-tech field consult suppliers when planning. The opposite is true of consumer goods and equipment manufacturers, who show extremely little integration. 40 % of consumer goods companies, and even 50 % of equipment manufacturers, take no account whatsoever of suppliers in their planning.

The behaviour of the various business partners in respect of information management is another clue to supply-chain integration. The question as to which particular information is regularly exchanged between the units in the value-added chain is thus central.

High-tech industry is noticeably open in this respect as compared with other branches. 45 % of these companies make their production plans available to their suppliers and 20 % of them also pass this information on to their customers.

The survey shows that data on demand or information about the progress of orders is willingly given; the figures are 83 % and 76 % respectively. In contrast, fewer than half the companies share information about the degrees of service with their business partners.

3.3 Organisation And Staffing

One of the greatest challenges to eSCM is the creation of an organised system to co-ordinate all the tasks related to the supply chain. For this it is essential to reject types of administration based purely on function and to turn to a responsibilities model geared to the process. With this in mind one is amazed to find that there are still almost two thirds of companies who on their own admission see their organisation as structured by function. These companies thus still face a fundamental organisational change. All companies do seem, however, to be aware of the necessity for networking across functions and in 70 % of cases they are using specialised teams to meet this need by co-ordination.

To date, supply chain thinking has been hardly at all institutionalised in the shape of a separate administrative unit. The leaders in this field are the automotive and high-tech industries, a fifth of whom have organised their SCM responsibilities into self-managing units. The other branches of industry are still content with very little institutionalised co-ordination.

Although formalised supply chain organisation as a separate area of responsibility is rare, 64 % of companies say they set objectives jointly and conduct regular meetings to ensure these are fulfilled. Thus it is clear that companies see competitive advantage in the fulfilment of SCM tasks, as they do in the establishment of teams co-ordinating the tasks across functions. Despite this, there has not yet been any consistent, radical alteration of the form of organisation.

Observation and monitoring of the relevant characteristic figures are necessary to keep a check on the performance potential of the SCM philosophy. Three quarters of the companies have so far formally set certain levels of performance as criteria for success, which are used not only to monitor and improve a supply chain management but also to motivate workers. 80 % of the companies measuring characteristic figures for their supply chain make use of them for staff appraisal and reward.

4. Summary And Conclusions

The empirical results lead to the conclusion that most companies are conscious of the tasks necessary to eSCM and have laid some technical and administrative foundations for them. However, a wide range of further activity is necessary before the full potential of eSCM can be realised. In the next two years, there will be a further increase in electronic methods of purchase and in the selling of products and services through the Internet; it is not, however, to be expected in the near future that the supply chain will be subject to comprehensive integration permitting simultaneous planning steps to take place.

References

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