myOpenFactory

Günther Schuh[1] (2), Achim Kampker[1], Claus Narr[1],
Till Potente[1], Philipp Attig[1]
[1]*Rheinisch Westfälische Technische Hochschule Aachen,*
Laboratory for Machine Tools and Production Engineering (WZL), Germany
G.Schuh@wzl.rwth-aachen.de

Shorter delivery times and higher delivery reliability force engineering companies to integrate their order processing with all other business partners. Today´s ERP systems do not have the ability to exchange data from one cooperation partner to another in a flexibly automated way. That is why today´s inter-company order processing is still done manually by telephone and fax. With a totally integrated order management, there are possible cost savings of up to 50% in order processing. Furthermore, it helps companies to optimise their logistic and delivery processes.
myOpenFactory provides an industry wide inter-company order processing technology. The developed IT-platform founds on service oriented architecture, allowing all platform functions to be executed by the connected ERP systems via web services. The described technical compatibility has been realised in cooperation with a group of leading suppliers of ERP software. Furthermore a standardised data model secures an interface free flow of information. Commercialising the myOpenFactory platform, a new internet business model has been developed – the myOpenFactory cooperative society.

1. INTRODUCTION

Today's companies have to cope with shortened delivery times and an increasing demand in flexibility (Jones, 2005). The inter-company order management is one key process of SME (Small and Medium Enterprises) companies where this changing lead to an increasing need for enterprise application integration (EAI) to decrease the resulting costs and process time. But especially the SME companies cannot use an enterprise integrating technology linking their ERP system with partners, customers and suppliers, yet (Voegele, 2001). Acceptable supply chain management (SCM) solutions have not been developed in this sector because of the huge amount of n to n relations between individual ERP systems of the value chain (Bretzke, 2005).

2. ORDER MANAGEMENT IN SUPPLY CHAINS

Supply chain management (SCM) became an independent function for most inter-company information management services in large companies. The inter-company

processes are implemented as IT-services like SCM-, B2B- or E-commerce-systems to support and control product- and information-streams in the supply chain. By implementing SCM solutions companies are able to decrease stock and delivery times.
In engineering companies, where over 85% are SME companies, the supply chain structure is totally different from common SCM users (SME-Definitions, 2003). The decreasing real net output ratio inevitably leads to growing cooperation between suppliers, customers and partner companies.

Thus engineering companies face different problems in the supply chain management than the automotive industry for example. They are not organized in long-term supplier networks but connected in small and fluently changing networks that can be described as highly dynamic (Schuh, 1998). The stronger market position of component suppliers hinders the engineering companies to force the participation in these systems (see figure 1) and leads to venturous investment in SCM systems.

Even though the need for SCM solutions in the engineering sector is well known less than 10% of the companies have implemented such systems (Hieber, 2002).

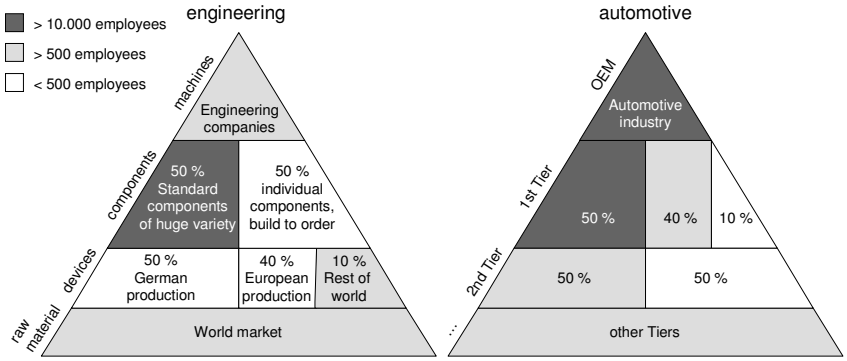

Figure 1 – comparison of supplier structure in segments of engineering and automotive (Schuh, 2006)

The reason is that in this environment existing SCM systems do not provide any sufficient solution approaches to manage orders between supply chain partners. Today's SCM systems have not achieved the demanded flexibility in the order process (Schwindt, 2004). They presuppose consistently integrated partners which is only in parts grantable for SME companies since the needed information is not available or rather the company is not willing to share it (Hieber, 2001). In result different grades of accessibility to internal information have to be provided by the SCM system. This can be electronic data of order processes to suppliers or even complete capacity information to partner companies (Kenneth, 2006).

By default of a sufficient supply chain solution most companies limit the use of ERP software to support only in-plant business processes. The flexible integration of all in-plant processes results into a decreasing interface problem between cooperating companies. The missing supply chain matching of internal business processes like order management implicates more and more inefficiencies. The basic

concept of ERP solutions, to focus on single-company-systems, avoids systematically a flexible integration of suppliers and customers.

Consequently the inter-company communication bases mainly on conventional techniques like telephone fax or mail. The impact of electronic communication via direct use of SCM systems or electronic market places is subordinate.

The main problem in inter-company order management is not the purchasing itself but the communication and the transfer of information. Thus a SCM solution for the engineering sector must not only concentrate on the data model but also need to focus on technology and a business model to be successful.

3. OPEN INTERFACE FOR INTEGRATED NETWORK COOPERATIONS

To make enterprise integration technologies also available for plant and machinery companies it is necessary to modularise the supporting IT-Systems the same way products are modularised for a long time. While the potential benefits of modularisation have been realised by the developers of ERP software (e.g. SAP) the benefits of transferring these principles to the inter-company sector have been underestimated until now. The modularisation enables the integration of new functions not only including modules provided by the supplier of the proprietary system but also of external providers. The use of external components combined with a concentration on key competences causes decreasing implementation costs and less internal product variety. In this way it becomes easier to integrate new components into the existing system. By satisfying the customers need the market suppression decreases as well. To take profit of these potential benefits it is necessary that suppliers of business software (SCM and ERP) achieve the following objectives:

- Modularization of applications with standardised interfaces
- Variety management of modules and interfaces as new domain of software development
- Differentiation by specialisation
- Active collaboration of software developers, research organisations and customers of software products to define interface standards

For software suppliers it is according to this most important to provide and participate in open interface solutions. Concurrently this business model protects the intellectual property rights of software solutions.

3.1 The interfaces define the system architecture

Flexible business processes need flexible and adaptable IT-structures. The fragmented ERP systems landscape implicates that the interfaces define the system architecture. The monolithic applications need to be split in modules that interact via interface. The applications themselves are hidden and protected in the modules and can only interact via interface.

Figure 3 shows the actual situation within the ERP landscape with n to n relations between ERP systems and individual interfaces. This solution is very inflexible because a change of one ERP system affects all interfaces to partners,

suppliers and customers. Enterprises without ERP system cannot access these systems for an integrated order processing (Kaluza, 1999).

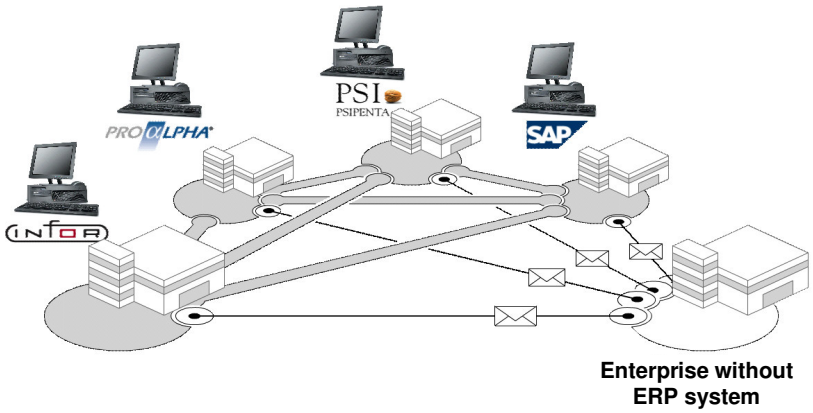

Figure 3 – status quo of the System integration with point-to-point structures (Schuh, 2006)

A technical solution of the demanded principles is the adoption of service-oriented architecture (SOA) for inter-company order management.

A service-oriented architecture enables the integration of new services like order management in existing proprietary software solutions. This combination is realized by linking all participating services without exceeding efforts. Proprietary ERP solutions can continue to exist by encapsulate there functionality in services. The use of service-oriented architectures does not only ensure a high protection of investment but also a maximum of flexibility. New partners can be easily included in this network by linking their ERP system.

3.2 Stability of Interfaces

The reliability and stability of the interfaces becomes the most important issue in a fragmented software landscape. To achieve this reliability the interface needs to be standardized, open and flexible. Open means on the one hand that the interface must be open to the public and on the other hand that the interface should not be tailored to a specific provider or developer. To fulfill these requirement research organizations, developers and users must work together and define standards. Intelligent standards are both permanent and flexible. This can be realized following Pareto's law by defining 80% of the negotiated contents as fix (must-have) and 20% as variable fields (may-have).

Not only has the user benefited from this modularization but also the ERP system provider. The developers ambition to provide full scale function software for the customer becomes more and more difficult. The providers cannot develop and maintain any functionality for any user wishes.

4. myOpenFactory

myOpenFactory provides an enterprise integration technology for inter-company order processes whose unique selling proposition base on the following aspects:

- Data Model: A standardised data model developed and accepted in cooperation by leading suppliers of ERP software, users and research organisations.
- Software technology: The myOpenFactory architecture enables especially SME companies to integrate their ERP system by one single interface.
- Business model: A cooperative society leads to a win-win situation for all participating ERP suppliers.

4.1 Data model

myOpenFactory is an example of a successful definition of an inter-company interface and communicates via existing ERP systems or a web based platform called "cockpit". It uses XML, WSDL and internet, and it is a manufacturer and industry neutral standard, which is appropriate to frequently changing suppliers and customers and by that is suitable for the medium sized engineering companies particularly. myOpenFactory has build up an improved data model comparable to existing standards, shown in figure 4 and guarantees that the data model is permanently advanced meeting the market needs.

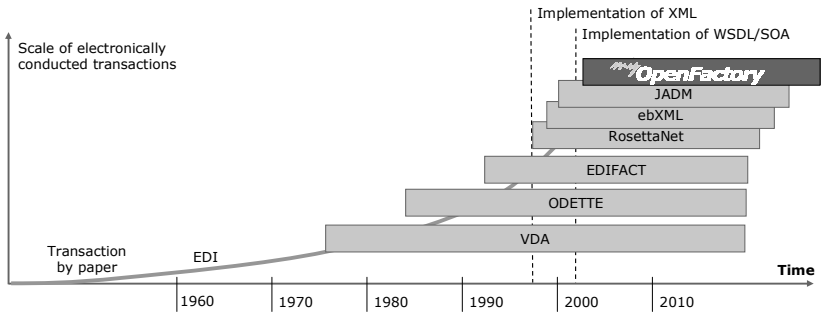

Figure 4 – other Standards compared to myOpenFactory

Through the broad specification of the myOpenFactory consortiums (ERP suppliers, users and research organisations) on the one hand a manufacturer-neutral data model is provided, on the other hand the market needs can be addressed more accurately.
myOpenFactory aims at the needs of small and medium-sized enterprises. The standardisation is limited to basic contents, which constitute about 80% of applications. Additional contents can be mapped within the standard over characteristics, which can be bilaterally agreed upon between the cooperation partners.

4.2 The myOpenFactory architecture

myOpenFactory is not limited to develop and publish a data model, but also takes part actively to provide the users a software infrastructure for interaction. Thus goes the idea of myOpenFactory beyond other standardisation initiatives. The provided infrastructure includes the myOpenFactory platform that acts as message distributions centre (see figure 5), a converter for ERP systems and execution functions in the ERP systems. The converter must be provided by the suppliers of ERP systems who only have to implement a single converter for their systems once based on the described data model. This guarantees access to all available functions via the ERP system. Therefore the used platform has been developed in cooperation with leading suppliers of ERP systems like Infor, PSIpenta etc.

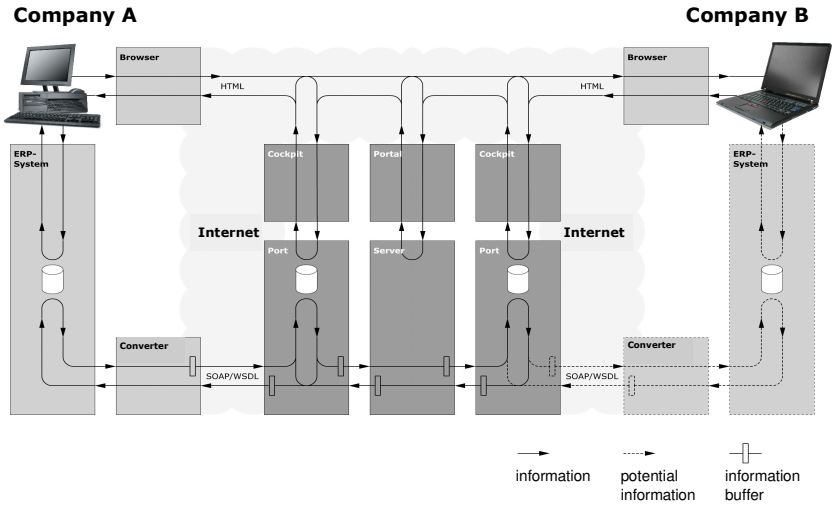

Figure 5 – myOpenFactory platform

The myOpenFactory architecture provides three steps of integration for the users. The first and easiest step of integration is the “cockpit”. All users can access the myOpenFactory platform via this web based cockpit similar to email web-clients. Via this cockpit all functions and communication are available. All messages of one transaction are displayed in a tree structure to observe the current status easily.

In the next step the data and part of the functions can be transferred in an existing proprietary ERP solution. The cockpit only operates as user interface for inter-company transactions.

In the third step Companies using ERP software are able to integrate myOpenFactory completely in there existing solutions. The above described ERP providers will support a graphical user interface as an integrated standard application with the next release. In this case the developed cockpit only acts as a control feature.

Besides communication and order processing there are further functions in the myOpenFactory platform available:

- Status based order monitoring
- Gradual detailing and customisation of sub-orders
- Archival storage of transactions
- Configurable updating of supplier master data
- Administration of different grades of intimacy
- Network wide supplier benchmarking (coming soon)
- Time schedule for project coordination (coming soon)

Through these described features there are technical advantages of myOpenFactory arising. A transparent integration in existing ERP systems is possible. A message can be send through the ERP system only by pushing a single button. Other internal software functions and processes need not to be changed. A general openness for all ERP systems is assured by the low complexity of the used data model.

4.3 Business Model: cooperative society and transaction based payment model

The myOpenFactory platform should not be regarded as an additional software module, rather more as a service enclosing security, availability and reliability of inter-company order processing. All functions can be accessed by the company wide ERP systems.

On this reason the necessary interface functions have to be provided by the involved ERP suppliers, whereas the technical and informational compatibility are ensured by the myOpenFactory cooperative society including these suppliers. The cooperative society provides a reduction of investment, because the platform is once only developed centrally. Existing ERP systems and proprietary development can be further used.

The variety of used ERP systems demands a cooperative business model that enables the same variety of ERP providers to participate. The construct of a cooperative society seems to be ideal-typically suitable therefore. It implies the opportunity of an open structure with a scalable number of members (Köppen, 2006). Thereof the cooperative develops economic advantages. It takes place by rationalization and improvement of the market position of its members. The aim of this cooperative society is thereby the promotion of their members.

The myOpenFactory society provides the operation of the order platform (internet technology and software) and the usage and development of the myOpenFactory standard. These functions represent the range cooperatively usable for all members of the cooperative society, which offers each member the technical basis for an ERP to ERP integration and guarantees at the same time data and process-technical compatibility to all other systems represented in the cooperative. The realization of the ERP internal functions for inter-company order processing is proprietary task of the individual ERP provider.

On the customer side the implementation investment is minimal since no additional software needs to be purchased because of the platform and the ERP system converters provided by ERP developers. Further more the running costs of

myOpenFactory are based on a transaction based payment model. Each enterprise only pays for the send transactions, e.g. order masseges.

With the concept of myOpenFactory an individual and special position in the market is reached, which really considers the demands of enterprises for an interface-free and flexible integration in relation to current integration solutions.

5. CONCLUSION

Enterprise integration technologies help companies to communicate and interact with other companies, consumers and suppliers. The multiplicity of interfaces in inter-company order processing is still a great barrier in attempts of overall enterprise integration (Voegele, 2001; Hieber, 2001). Many software incompatibilities have been overcome by the definition of certain data-standards but attempts to standardise ERP interfaces couldn't become widely accepted (Goldfarb, 1998). The German BMBF funded project "OpenFactory" has developed a standardised interface for inter-company order processing and communication independent to common ERP solutions. All groups of interests are to take part in the further development of this open interface.
myOpenFactory creates new business options in the ERP market, which enables each ERP supplier to link their ERP systems in the heterogeneous ERP world.

In cooperation with leading suppliers of ERP software a market segment focussing inter-company order processing is opened which was not addressable for a wide range of industries yet.

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