The Institute of Information Management and The Glassmeyer/McNamee Center for Digital Strategies

The Electronic Collaboration Study

Case Study Röhm GmbH & Co. KG

Consignment Depot Between

Degussa Business Unit “Röhm” and BASF Coatings AG

Enrico Senger, Hubert Österle

Institute of Information Management,

University of St. Gallen

Institute of Information Management

University of St.Gallen

Glassmeyer/McNamee Center for Digital Strategies

About the "The Electronic Collaboration Study"

The "Electronic Collaboration Study" is a joint project of the Institute of Information Management at the University of St. Gallen (Switzerland) and the Glassmeyer/McNamee Center for Digital Strategies at the Tuck School of Business at Dartmouth College in Hanover, New Hampshire (USA).

Both institutions collect case studies for transinstitutional electronic collaboration. The goal is to put together examples which demonstrate how companies can gain competitive advantages from the use of information technology. The results are recommendations for successful electronic collaboration.

Prof. M. Eric Johnson, PhD, Director of the Glassmeyer/McNamee Center for Digital Strategies, and Prof. Dr. Hubert Österle, Director of the Institute of Information Management and Chief Technology Officer of the "Information Management Group" (IMG), are the principal investigators for the project. They are supported by Prof. Dr. Walter Brenner and Prof. Dr. Elgar Fleisch of the University of St. Gallen, as well as Prof. Hans Brechbühl and Prof. Stephen Powell, PhD of the Tuck School of Business, in attaining the goals of this project.

About the Authors

Dr. Enrico Senger is a scientific researcher with the Institute of Information Management at the University of St. Gallen, Switzerland, e-mail: enrico.senger@unisg.ch

Prof. Dr. Hubert Österle is director of the Institute of Information Management at the University of St. Gallen and President of the Information Management Group (IMG).

Connecting Links

Case Study Data Base:	http://cases.iwi.unisg.ch
Center for Digital Strategies:	http://www.tuck.dartmouth.edu/digitalstrategies
Institute of Information Management:	http://iwi.unisg.ch

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Summary

Röhm produces special plastics, for, among others, the paint industry. In collaboration with BSAF Coatings, Röhm developed an extended Vendor Managed Inventory system that operates a consignment depot, takes on the actual and exact filling of tanks at the customer locations via telemetrics as well as advance forecasts, and passes on quality-related information to designated recipients, and includes the electronic billing of deliveries. The early access to data relevant to the planning process and process simplifications compensated for the additional operating costs. The closer relationship with the customer and their processes, as in the case of L'Oréal, is considered to be the main benefit.

Zusammenfassung

Der Degussa-Geschäftsbereich Röhm stellt Spezialkunststoffe, beispielsweise für die Lackindustrie, her. Zusammen mit BASF Coatings entwickelte Röhm ein erweitertes Vendor Managed Inventory, das neben der Bewirtschaftung eines Konsignationslagers, der aktuellen und exakten Übernahme der Tankfüllungen beim Kunden via Telemetrie, der Übernahme von Vorhersagewerten, der Weitergabe von Qualitätsinformationen zu Chargen auch die elektronische Abrechnung der Lieferungen umfasst. Der frühzeitige Zugriff auf planungsrelevante Daten und Prozessvereinfachungen kompensierten den Mehraufwand für die Lagerbewirtschaft. Der Hauptnutzen wird in der stärkeren Verbindung mit dem Kunden und dessen Prozessen gesehen.

1 Company

Overview. Degussa AG combined its activities in the production of special plastics based on methacrylates at Röhm GmbH & Co. KG in Darmstadt (Germany). Methylmethacrylate is the basic substance for the company's manufacture of 50,000 different products, from raw materials for paint, reactive resins, and pharmapolymers to oil additives and various plexiglass products.

	Röhm GmbH & Co. KG
Founding	1907 as "Röhm & Haas" in Esslingen/Neckar (Germany)
Headquarters	Darmstadt (Germany)
Industry	Chemical industry
Specialization	Methacrylates (i.e., monomers, plexiglass, oil additives, pharmapolymers, reactive resins and paint raw materials)
Company Structure	Belongs to the special plastics branch of the Degussa, consists of 3 business units (special acrylates, methacrylates, plexiglass) 50 sales-and-production locations in Europe, USA, Asia
Homepage	www.roehm.com
Sales	2001: ca. 1 billion EUR
Employees	2001: ca. 4,400
Customers	ca. 10,000 incl. 100 with potential for Vendor Managed Inventory
Collaborative Processes	Supply chain management
Subprocess(es)	Vendor managed inventory
Software Solution	SAP R/3 (Module SD, PP, MM, FI, mySAP SCM (SAP APO CLS), mySAP Workplace, Connector Seeburger)

Table 1-1: Snapshot of Röhm GmbH & Co. KG

Competitive Challenges. A small sector of this array of products is so-called monomers, basic chemical substances serving as raw material for further refined products. Methacrylate monomers are liquid products delivered in tanks or in packaged form, which are processed regularly and in great quantities by customers. These properties make monomers interesting for Vendor Managed Inventory scenarios.

BASF Coatings AG is an important customer for Röhm in the methylacrylate monomers group of products. Among other products, the worldwide company manufactures paint and lacquer for the automobile industry.

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BASF Coatings AG	
Founding	1903, as Glasurit-Werke Max Winkelmann, based in Münster-Hiltrup. 1965, takeover of Glasurit-Werke Max Winkelmann by the then Badische Anilin and Sodafabrik AG, later BASF AG. Starting point of building a paint group within BASF AG
Headquarters	Münster (Germany)
Industry	Chemical industry
Specialization	Lacquers and paints
Company Structure	Part of the BASF-Group with 27 production facilities worldwide
Homepage	http://www.basf-coatings.de
Volume	2001: 2.3 billion EURO (+3%)
Market Share	maintains strong market positions in Europe, North und South America, as well as the Asian Pacific region, with satellite companies in Australia, China, India, Japan and the Philippines, among others
Workforce	ca.10,000

Table 1-2: Snapshot of BASF Coatings AG

The automobile industry demands a high degree of flexibility from its suppliers and exerts strong cost pressure. The suppliers try to react to falling prices and more individualized demands of their customers through implementation of more efficient collaborative processes with their own suppliers. BASF Coatings therefore reorganized its own procurement processes and invited the five core suppliers (Röhm, Bayer, BASF, Hoechst, and Clariant) to collaborate. While these companies appear to be competitors in the market, they are not alternative suppliers for the products delivered to BASF Coatings.

2 Initial Situation

Strategy. Previously Röhm and BASF Coatings maintained a traditional customer-supplier relationship with term orders.

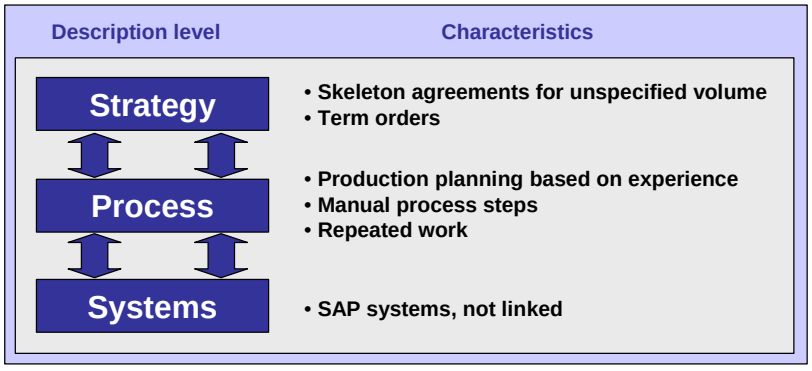


Figure 2-1: Brief Snapshot

Process. At the beginning of each year BASF Coating would communicate a rough, non-binding estimate of needed products. No further information about requirements and consumption was exchanged between the business partners. Beyond these estimates submitted, production planning at Röhm was based primarily on past experience.

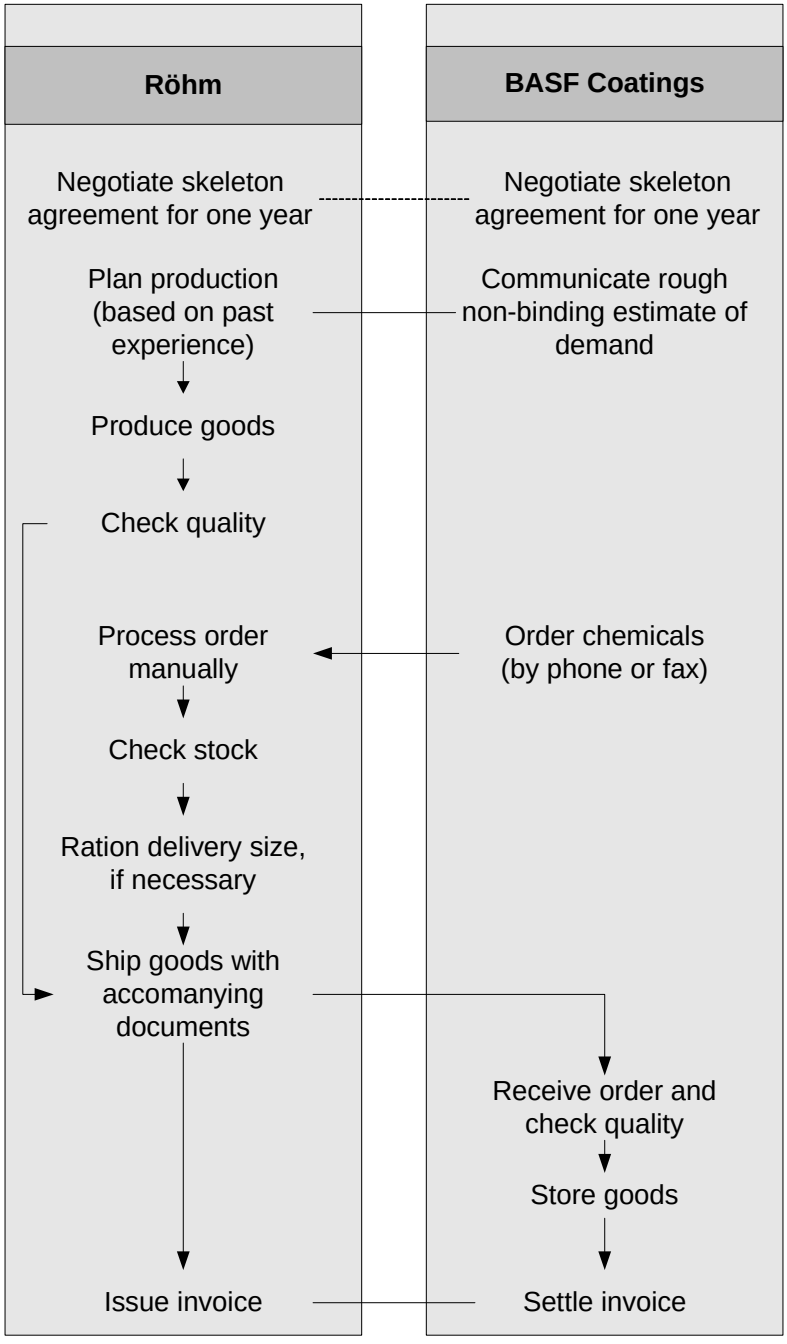


Figure 2-2:Previous Process

BASF Coatings ordered the necessary chemicals via telephone or fax. If sufficient quantities were in stock, Röhm filled the order as requested, otherwise the customer would receive a limited quantity. Delivery note and other accompanying documents like certificates of analysis (CoA) and master safety data sheets were mailed in paper form. BASF Coatings checked each delivery upon receipt for quality standards and then deposited it in their warehouse. A paper-based invoice was generated for each order. Figure 2-2 provides an overview of the process.

Systems. Röhm exchanged order and delivery data with other customers via EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport). But there was no electronic connection with BASF Coatings. Both companies utilized SAP products for their Enterprise Resource Planning (ERP) System. While BASF still used SAP R/2 until June 2002, Röhm ran an SAP R/3 system. Production planning at Röhm was supported by Microsoft Excel and was not coupled with the ERP system.

Pain points. The collaboration between Röhm and BASF Coatings was inefficient. Specifically:

- Röhm had imprecise information about BASF Coatings' requirements. Thus it had no knowledge about stock quantities nor short-term peaks in withdrawals. The delivery plans of the automobile industry subcontractors, which were the basis for requesting the paints 2-4 weeks in advance, were not known to Röhm. Such short-term production of the necessary raw materials for paints is technically and economically impossible. As a result Röhm produced the raw materials to be kept in stock on the basis of rough estimates. Conversely BASF Coatings had no information about Röhm's delivery planning and the status of individual deliveries.
- Although all Röhm's customers have relatively steady requirements, deviations in demand regularly led to rationing of deliveries. For safety's sake both sides therefore created high stock volumes in their warehouses.
- Röhm and BASF performed many steps in the process twice. For example, both checked the quality of the chemicals—Röhm after production, BASF Coatings upon delivery.
- The employees of both companies exchanged information over the phone or on paper and subsequently entered the data manually into the existing systems. This resulted in extended processing time spans.
- The automobile producers' cost pressures forced suppliers like BASF Coatings to reorganize their procurement processes. As a result the cost pressure was passed on within the value chain. Röhm had already defined the optimization of its company

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networks through balancing of capacity between customer orders and resources in real time as its IT vision.

3 Project

Goals. To optimize its procurement process, BASF Coatings initiated a project called PROGRESS (process integrated supply) and invited core suppliers, Röhm among them, to collaborate. At management level both companies agreed to form a strategic partnership with cooperative processes to reduce costs, shorten process and production times, and improve the quality of information and the level of service.

The common project definition grew out of the political will of top management, at first on the business level and later with the cooperation of the IT departments. The analysis of the joint process showed the greatest potential benefits in the realization of consignment depots, a special form of Vendor Managed Inventories (VMI), in which the vendor remains the owner of the stock. Röhm saw this as a chance to intensify its relationship with BASF Coatings. The project was guided by these strategic considerations and driven by close deadlines set by top management. Röhm decided to forgo a detailed profitability study.

Execution. This strategic collaboration was agreed upon in April 2000. Following the project definition phase, the consignment depot scenario was implemented in 2001. The project team included the project leader, Dr. Scholz, and two members from sales and one from production, who invested approximately 20-30 man-days, working part-time. The IT project leader was Edwin Wieland of the Degussa IT subsidiary its.on GmbH.KG.[1] BASF Coatings assigned four additional employees to the consignment depot project.

Improvement of the process presented several technical obstacles. Röhm and BASF Coatings employed different systems. Additionally both sides operated with different master data structures. Thus a chemical at BASF Coatings might have been assigned an article number, while Röhm differentiated between several products according to packaging (e.g., “material not packed”, “material packed”). This required the development of mapping mechanisms. Mapping was made considerably easier by the concentrated know-how in the IT department. Since the staff was also familiar with the master data structures, etc., no time-consuming internal coordination with other departments was necessary.

[1] Beginning January 1, 2002 Degussa combined the information activities of the individual subsidiaries on the IT server its.on GmbH.KG with ca. 750 employees. This did not change responsibilities for the individual projects.

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The professional operation of BASF Coatings' PROGRESS project, supported by EDL Consulting, made quick implementation of the consignment process with Röhm possible. The IT roundtables organized by BASF Coatings with the project leaders of all core suppliers were very helpful. All participants profited from the exchange of experiences with the individual processes ("lessons learned").

Critical Success Factors. Peter Kühn, head of Röhm's IT department responsible for its.on, believes the strong political pressure exerted by top management to be an important success factor. The common will to intensify the collaboration between the companies and to realize synergies was the starting point for defining this VMI project.

It is important that all involved share a common understanding of the issues. Necessary projects can only be realized efficiently, however, if, in addition to a common language, the parties share a common desire for a solution. Those responsible at Röhm and BASF Coatings were determined to quickly realize the potential of the shared benefits of a consignment depot. BASF Coatings also contributed the experiences gained in comparable projects with other suppliers.

VMI projects in particular are marked by a high degree of complexity, and project planning should allow sufficient time for solutions. In Kühn's opinion, however, ideal VMI projects should not exceed a span of twelve months.

4 New Solution

Description level	Characteristics new	Characteristics old
Strategy	• **Consignment depot**	• Skeleton agreements for unspecified volume • Term orders
Process	• **Production planning with forecast data** • **Automated consignment deliveries** • **Automated accounting**	• Production planning based on experience • Manual process steps • Repeated work
Systems	• **Data exchange via XML** • **SAP systems, linked**	• SAP systems, not linked

Figure 4-1: Comparative Snapshot

Strategy. Röhm now maintains consignment depots for BASF Coatings at that (BASF's) company's plants.

Process. Röhm's Methacrylate business unit takes on tank fillings and delivery of tank goods on the basis of data on stock, forecasts, and planned withdrawals submitted by BASF Coatings. BASF Coatings pays for the chemicals via credit (self-billing) as they are

drawn off. Accompanying documents, such as certificates of analysis, will in the future be exchanged by the partners via an electronic platform.

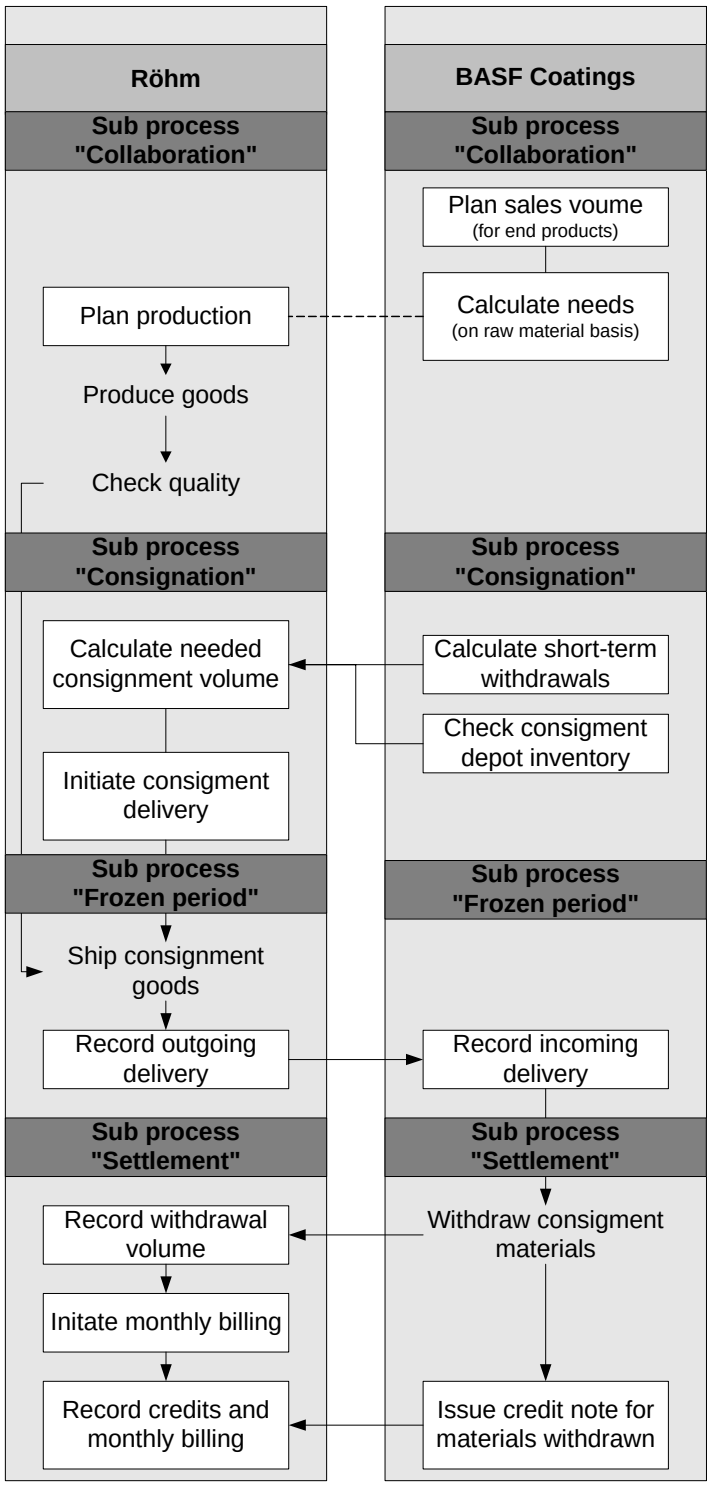


Figure 4-2: New Process

Figure 4-2 provides an overview of the collaborative process implemented. The automated process (recording inventory and withdrawals, determining needed supplies, initiating shipment orders, accounting) lets employees assume more control functions and carry out fewer active steps in the process. The new cooperative process between BASF Coatings and Röhm consists of four subprocesses:

- *Collaboration*. Röhm receives a monthly forecast of the need for chemicals over the next twelve months. On the basis of this information corresponding production volumes and delivery dates are calculated.
- *Consignment.* The actual volumes of the silo tanks (liquids and granulate) are transmitted to Röhm per telemetric measurements on a daily basis. Also transmitted are short-term withdrawals based on approved orders by BASF Coatings. Röhm ensures that there is always sufficient stock in the consignment depots for this purpose. For piece goods, the volumes are reconstructed from BASF Coatings' SAP R/3 inventories. Automatic usage measurements for these products, such as "through chips" attached to palettes, was ruled out because of the costs involved.
- *Frozen Period.* The transit time for the chemicals between Röhm and BASF Coatings defines a period during which no more changes can be made to a scheduled delivery. BASF Coatings now no longer tests the quality of each delivery upon receipt, but conducts random tests on the basis of the analysis certificates now provided online. For insurance purposes the materials are recorded in the systems of BASF Coatings as they arrive at the plant, but they remain Röhm's property. Excepting delivery paperwork, paper-based documents are not used in any of the sub processes.
- *Settlement.* BASF Coatings' withdrawal measurements transmitted daily are recorded correspondingly by Röhm. There is no need for sending invoices, since both partners work with the same withdrawal volumes. Payments by BASF Coatings are now simply reconciled with an internal systems-generated monthly invoice.

Systems. In the framework of the implemented collaborative process both partners use SAP R/3. The SAP APO (Advanced Planning Optimizer) supports the production planning on the basis of rolling 12-months forecasts (so-called monthly tableaux) and the consignment shipments via the withdrawal reports (so-called daily tableaux). The SAP Workplace visualizes the transmitted planning, inventory and withdrawal data and generates electronic accompanying documents (see Figure 4-3).

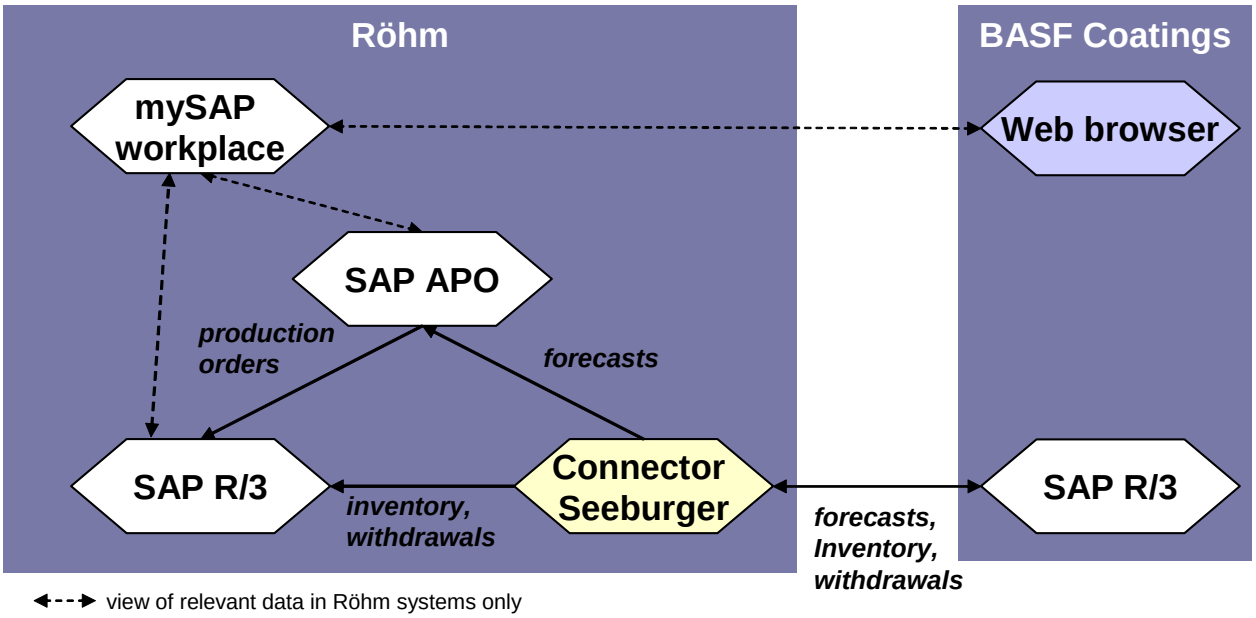


Figure 4-3: System architecture

Forecast, inventory, and withdrawal information are sent in the XML format and accepted and processed by Röhm via the SAP Business Connector or Connector Seeburger (see Seeburger 2003). In this context the partners utilize parts of the standard Chemical Industry Data Exchange (CIDX), built onto XML, which defines processes and exchangeable data for the chemical industry (see CIDX 2003). The derivative employed by Röhm consists only of the field definitions necessary for concrete cases (see Figure 4-4).

```
- <Data>
  - <Datarecord>
      <Date>20010703</Date>
      <Time>020312</Time>
      <ProductNoVendor>99945779</ProductNoVendor>
      <Vendor>RoehmGmbH_ChemischeFabrik____64275_Darmstadt</Vendor>
      <NoVendor>00999500</NoVendor>
      <NoCustomer>56554</NoCustomer>
      <MaterialNoCustomer>RX093129</MaterialNoCustomer>
      <Customer>BASFCoatingsAG;48165_MUENSTER-HILTRUP</Customer>
      <PlantCustomer>01</PlantCustomer>
      <LocationCustomer>E102</LocationCustomer>
      <PlaceCustomer />
      <ActualValue>11620</ActualValue>
      <MeasurementUnit>KG</MeasurementUnit>
      <LastDayConsumption>612,000</LastDayConsumption>
      <ConsumptionDate>20010702</ConsumptionDate>
    </Datarecord>
```

Figure 4-4: Example of an XML message between Röhm and BASF Coatings

The partners based their choice of systems on consistency with the available application landscape of ERP systems based on SAP. Röhm therefore employs SAP APO for production planning; access to information in Röhm's SAP systems is possible via SAP Work-

place. Here the responsible parties proceeded from the assumption of a migration to the successor product SAP Enterprise Portals.

Cost and Benefits. The consignment depot scenario was implemented for one product beginning in January 2001; a second product was added in June 2001. Since October 2001 all Röhm deliveries to BASF Coatings inside Germany are handled through this collaborative process. Further rollouts for the European BASF Coatings plants are in the implementation phase. An extension of these solution elements to other customers is in preparation.

The implementation of the consignment process has led to closer cooperation between Röhm GmbH & Co. KG and the strategically important client BASF Coatings AG. Both partners were able to reduce process cost and throughput times.

Röhm is able to plan its monomer production with greater accuracy and to keep BASF Coatings' consignment depots filled automatically. The electronic exchange of documents has replaced the paper-based exchange. Additionally the new accounting process replaces invoice monitoring. BASF Coatings will not need to tie up capital in safety inventory of monomers in the future, can eliminate the order and quality testing steps, and simplify the settlement process. The partners calculated a joint cost savings volume of 500,000 EURO per year, with order costs alone accounting for 100,000 EURO so far. Table 4-1 provides an overview of the benefit realized.

The newly implemented consignment process involves five Röhm employees directly (two in sales, two in production, and one in accounting). The system was accepted very well by them in the beginning. Since the cooperation with BASF Coatings is of a pilot nature, however, the staff must service two processes. All other customers continue to use term orders. This resulted in the employees' partial use of the old channels (telephone and fax) even for the collaboration with BASF Coatings, until this was strictly forbidden by management. For Röhm the stated potential is therefore most likely only realistic in the medium-to-long term if it succeeds in processing the largest possible share of its sales volume via the consignment scenario.

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Overview VMI-Scenario between Röhm und BASF Coatings		
Expense		
Project		
Timespan	19 months (April 2000 - October 2001)	
Project team - Specialty - IS/IT - BASF Coatings	11 Persons - 4 persons - 3 persons - 4 persons	
Project expense (person/days) - Specialty - IS/IT - BASF Coatings	100-110 p/d without expense at BASF Coatings - 20-30 p/d - 80 p/d - no expense	
Project costs	200,000 EUR	
Hardware and software costs	ca. 50,000 EUR	
Operation	n/a	
Benefit realized through VMI project		
	Röhm	BASF Coatings
STRATEGY		
Customer / Partner		
Infrastructure lock-in	Achieved through consignment depot	---
Organization		
Development of (strategic) IT-knowledge	Achieved through prototypical implementation of a VMI-scenario	---
COLLABORATIVE PROCESS		
Process costs	Joint savings 500,000 EURO, 100,000 of it in order costs	
Speed	Achieved through automation and elimination of process steps	
Quality	Achieved through exchange of planning data	
SYSTEMS		
Synergies with existing systems	Achieved through building on existing SAP infrastructure	---

Table 4-1: Röhm VMI-Project – effort and realized benefits

Planned future developments. The process of realizing comparable VMI scenarios with other customers has already begun. But a simple transfer of the process implemented between Röhm and BASF Coatings is not possible, since the complexity of the process and the customers' varying processes and information systems prerequisites must invariably lead to other process variations. The pilot process and the process methodology can serve as models, however, which could be adopted for the most part, especially in cases where the customers have not yet developed their own ideas about a VMI scenario.

Despite this Peter Kühn and Edwin Wieland look at the future of man-capable markets in the VMI area with a critical eye, since these are unable to support the customer-specific approach of the processes. Even at Röhm a market location was activated in only a few cases, all only involving a simple order/invoice process, in which order faxes and paper-based invoices were replaced by electronic documentation.

5 Conclusion

The example of Röhm Methacrylate illustrates the potential companies can achieve through close, IT-supported cooperation. Röhm and BASF Coating have improved the quality of the process through automated transmission of up-to-date disposition information and reduced capital tied up in inventory. The automated transmission and processing of planning, inventory, and withdrawal data shortens Röhm's response time compared to the hitherto usual telephone order process used by BASF Coatings.

Processes redesign (for instance the transfer of responsibility for the inventory to the supplier, automatic settlement, electronic documentation) leads to a reduction in process costs. The collaborative process between Röhm and BASF Coatings is customized exactly to the specific characteristics of both companies. This enables Röhm to provide additional benefits to BASF Coatings, which other competitors are unable to offer. Concretely this additional benefit manifests itself in the transfer of responsibility for maintaining a sufficient quantity of raw material inventory at the customer's plant.

The realization of a consignment scenario leads to closer cooperation between Degussa's Röhm Methacrylate business unit and BASF Coatings with automated data exchange and customized processes. A connection this close also creates benefits for the supplier, since it raises the customer's expense to change suppliers.

- **The customer, BASF Coatings, carried out similar projects with additional suppliers at the same time.** Since the suppliers were not competing with each other at BASF Coatings, BASF Coatings could organize an exchange of experiences which benefited all projects.
- **The partners did not offset costs and benefits of the project against each other.** Röhm and BASF Coatings did not want to burden their collaboration through offsetting their costs and benefits against each other. The savings potential of the VMI scenario was evaluated for the cooperative relationship as a whole. Each company was responsible for its own expenses in the expectation that these are justified by the benefit gained.

Expert Interview

Kühn, Klaus-Peter, Vice President, head of Applications Group 1, its.on GmbH & Co. KG, Darmstadt, Darmstadt, June 21, 2002.

Wieland, Edwin, Sales, Distribution & Marketing, Applications Group 1, its.on GmbH & Co. KG, Darmstadt, June 21, 2002.