Collaborative Value Chain Management Over the Internet

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Introduction

This paper will discuss the current state of Supply Chain Management, and its future evolution into a dramatically different business process enabled by Internet-based Collaboration. We will also define Collaborative Planning itself so as to clarify how it differs from Enterprise Resource Planning and Supply Chain Planning.

As companies strive to achieve strategic competitive advantage, they continually turn to new technology as an enabler. As the five-year waves of the various Continuous Replenishment strategies subside over industry many companies are asking "What Next?" Is Supply Chain exhausted? Have we reached a stalemate, an impasse? This paper will argue that the "next wave" is already upon us and companies are beginning to turn to the Internet for it.

Over the last twenty-odd years the majority of a company's focus has centered on "the physical movement and accounting of goods". This is otherwise known as Enterprise Resource Planning, or ERP. This phenomenon is as a result of the groundwork in the late sixties and through the seventies on Material Requirements Planning (MRP) and later Manufacturing Resource Planning (MRP II). These business processes, innovative for their time, focused on an organization's internal ability first to schedule materials in time for production and then later on synchronizing the production schedule across the whole company with respect to aggregate financial and capacity planning. As the computer age in the industrialized West evolved to compete against the "customer is king" onslaught from the East in terms of Just in Time (JIT) and Total Quality Control (TQC), so ERP was born.

Enterprise Resource Planning is the foundation or the nervous system of the enterprise. It is the basic transaction-processing environment on which an organization operates. The ultimate in ERP "vision" is a large multinational organization with distributed companies all integrated into a single ERP backbone. This provides enterprise-level visibility into the "physical movement and accounting of goods." Traditional activities include customer order processing, purchasing, manufacturing, and the financial suite of applications. These are all "execution" oriented activities - which is another way to describe ERP.

In the early nineties the phrase Supply Chain Management (SCM) came into vogue. The original concept of SCM was the "elimination and removal of barriers between trading partners" in order to facilitate the synchronization of information between them. However, this new movement appeared to capture the imagination of senior executives and showed that ERP was in fact incomplete. Since ERP remained principally focused on the organization, the suppliers of ERP tools decided to "own" the concept of SCM in order to leverage the vision it offered - and to extend the life of ERP tools by appearing to offer such solutions. Unfortunately the very underlying

tools in ERP did little to address the "elimination of the barriers between trading partners" since all the tools were focused on the internals of the organization.

So over the last 20 or so years most organizations have spent many millions of dollars implementing and re-implementing ERP systems. Today ERP is the most prevalent software tool deployed. It is used successfully to standardize on the financial and transactional processing needs of the organization. The epitome of ERP is SAP - another 3-letter acronym. SAP is the largest, most successful ERP tool provider ever.

But what companies have not focused on much is the information flow between and across trading partners. ERP is internally focused and ensures all departments talk the same language. But what about our customers or suppliers? What ensures they all parties talk the same language there? ERP does not cross boundaries so it cannot help - and so we come to Advanced Planning and Scheduling, or APS. Another acronym we know, but APS tools providers represent those smaller vendors who have been focused on the planning component of an organization. ERP is synonymous with execution, and APS is synonymous with planning - the provision for the materials and processes in order meet the needs of the customer when it arrives. In other words, the anticipation of the customer's needs and consequently the anticipated needs of one's own organization - and also our supplier base. Planning, or APS therefore typically includes such activities as Demand Forecasting. By forecasting a customer's demand accurately, an organization can take steps to go beyond simple ERP-focused asset efficiencies and move to exploiting asset effectiveness. ERP is all about efficiency; APS is all about effectiveness.

Even though ERP is an evolved and still evolving process it is focused on transactions. Each and every company today still responds to the same transaction as they always have: a customer order. We have certainly optimized the communication of the Customer Order - we perhaps might use Electronic Data Interchange, or EDI to share the data with our suppliers. But the nature of the transaction has not changed very much over the years.

If one looks at Dell Online or Amazon.com one can appreciate the value of using the Internet to extend the ERP processes. In both cases the transaction is the same as it always was - customers placing orders. Using the Internet means that the orders are placed more quickly and "at one's leisure" but the transaction itself is still the same - a customer order. For Dell and Amazon, these processes are strategic in importance as they offer to these respective companies an ability to compete on a different level to their competitors. However, because the technology is not in itself a barrier, and the reengineering of the processes is minimal because the "nature of the transaction" has not changed, all of their competitors will replicate the process in a very short time. Therefore the on line order processing fad of today will be short lived. Inside 18 months most companies could deploy the technology. It is in truth a tactical advantage at best. What does change the nature of the transaction between trading partners is "collaboration".

As ERP stole the hot new thing in the early nineties (SCM) so too will the newly painted ERP/SCM vendors will steel the hot new thing called "collaboration." Even today we can see in the majority of industry press the words supply chain and collaboration in every story. If you need financial systems, order processing or manufacturing systems all of a sudden you are buying into the collaborative movement. Unfortunately, simply putting these activities over the Internet does not

"change the nature of the relationship between trading partners" and this is the qualification to determine true collaboration as opposed to some fancy marketing hype.

What is also important to realize is that collaboration is not only dedicated to trading partners. Once upon a time the concept of "one number planning" was conceived to represent the objective of synchronizing all the facets of an organization in order to focus their efforts in a similar direction. We can all remember the days when each department had objectives and it was assumed that if all departments met their objectives so too would the organization. However, through painful experience we learned that this was not the case - the sum of the parts did indeed bring down the whole. One number planning was an ideal to ensure all priorities and objectives were reconciled inside the company, so that manufacturing, distribution, finance, sales and marketing all were "operating from the same hymn book." So collaboration is as important inside the four walls of the enterprise as it is beyond the four walls. Indeed, many would argue that before one attempts to collaborate with one's trading partners one ought to ensure the successful and complete collaboration inside them!

The Pioneers of Collaborative Planning

From January through April 1996 Heineken USA, a distributor of Heineken and other European brands in the USA, ran a project with a view to strategically "changing the nature of the processes between ourselves and our trading partners." In fact Heineken USA did not know it but by April 1996, in working with Logility, Inc., they had pioneered the world's first use of the Internet for true collaboration.

Beer is shipped over from the European factories (yes, using an ERP system to "physically move and account for the beer") and delivered to over 450 customers in the US. Heineken actually runs a Continuous Replenishment processes whereby they forecast both the longer term demands of the customer as well as determine the optimal delivery of beer to them in order to assure an agreed upon level of customer service. What is unique in this "world's first" implementation is that, by November 1996, Heineken was allowing their customers to log onto their own system, via a secure Internet connection, to review, revise, approve and execute long term forecasts, orders and delivery schedules. Never before had such a change occur in the "nature of the transaction between customer and supplier." The customers no longer order beer from Heineken - they "collaborate on a replenishment schedule."

Heineken suggests a forecast to the distributor. After the distributor reviews, revises and approves the forecast, that forecast is used to generate a replenishment schedule. Each distributor can then view and revise this replenishment schedule in advance of execution - hence this is a planning, or APS processes. It uses the Internet and is therefore real-time and global in nature. And all this back in 1996!

Another more public story also began in the middle 1996 - although in its infancy it was originally EDI based (batch) and in pilot mode only. Wal-Mart and Warner Lambert, in conjunction with Benchmarking Partners, a consulting firm, piloted an EDI-based collaborative process for the Listerine product line. By November the pilot had proved successful and Benchmarking Partners were redesigning the technology base to utilize the power of the Internet; the pilot had been batch oriented and the

users desired more of a real-time environment. A prototype using the Internet was unveiled to the public in November of 1996.

Clearly, with Wal-Mart involved this initiative took on more of the semblance on an industry movement - which was initially known as CFAR, or Collaborative Forecasting and Replenishment. However, the first pilot only focused on forecasting and not on the order placement or replenishment - despite its name. So early in 1997 the name was changed, the focus shifted, and so CPFR was born - Collaborative Planning, Forecasting and Replenishment.

As this CPFR movement began to take shape other companies, keen to secure strategic advantage, also undertook pilots of their own. Eastman Chemical Company was in fact the world's second company to implement such a process and Genencor, another chemicals company, the third. Recently, several other companies in the automotive segment have adopted the technology. Subaru of America is implementing a CPFR-type business process early next year and a tire manufacturer and distributor went live during late summer 1998.

Another milestone on the evolution of collaboration was the recent publication of the first standards aimed at collaboration between trading partners. The VICS (Voluntary Interindustry Commerce Standards) organization published a voluntary guideline handbook that describes the process activities, responsibilities and deployment options. This is important, as this is the first standard that any company has to draw upon when designing their own collaborative processes.

As the earliest CPFR user, Heineken has published some astounding benefits. Since inception, the process has generated more then a 50% reduction in cycle time - from determining the customer need to delivery and satisfaction of the need. All of the cycle time reduction has come about due to the replacement of order processing by a collaborative forecasting and replenishment scheduling system. This fits the true definition of "a change in the nature of the relationship between trading partners."

Some of the other benefits that Heineken have cited include better inventory utilization, as the ERP systems are synchronized with their customer needs like never before. The collaborative processes itself is self-regulating - giving visibility to Heineken USA management to sensitive changes in the market. Due to the innovative nature of Heineken's efforts and those of Logility who actually built the tool, both companies were awarded the Gartner Group Information Week Internet Electronic Commerce award in the spring 1997. Both companies are proud to have pioneered the implementation of collaboration.

As Heineken is the world's first CPFR implementation, so Eastman Chemical is the world's largest - today with over 400 people worldwide "collaborating." Eastman implemented in the USA in June of 1997 a collaborative business process for their Business Unit Managers, and during the summer and fall months of 1998, world wide with their operational sales representatives. And many of these people do not have English as their first language!

Eastman Chemical Company - The World's Largest Collaborative Planning Implementation - A Case Study

The Company and Markets

Eastman Chemical Company is a leading global manufacturer and distributor of chemicals, fibers and plastics. The markets served by Eastman are extremely wide ranging, from food, medical and beverage packaging to adhesives, cosmetics, inks, paints, filters and agricultural and photographic chemicals. There are about 16,000 people in the company and Eastman operates in over 30 countries. 1997 revenue figures exceeded $4.7 billion. Headquartered in Kingsport, Tennessee, Eastman is a spin-off from Eastman Kodak several years ago.

The organization for Demand Forecasting is made of a complex network of relationships between 8 business organizations, 80 Business Unit Managers and 350 or so sales people worldwide. Forecasting is done at the critical level of granularity - that of item / location or SKU, at the Customer level. Eastman has 40,000 SKU's across the customer base.

The Customer and their Characteristics

The customer that Eastman serves has changed dramatically over recent years. Today the customer demand is more fickle, demanding and sensitive. Customer service is critical in the business, and while overall the customer demand has brought intense pressure on the supply operations in terms of cost containment and reduction. What has confused the situation is that customers are also more demanding in their demand! Not only price and service, but also the other entire ancillary and consequential processes and activities that round out the complete relationship are now critical for customer / supplier success. This has caused Eastman to embark on a continuous improvement program that started several years ago with the adoption of SAP as the standard for the enterprise transaction backbone.

Global and economic pressures have become a standard component in strategic planning. In years gone by this was but a headline item that had little impact - today this could be the difference between profitability and failure. Competitors from all over the world have moved into the markets that Eastman serve, in many cases as specialists in small niches. Consequently Eastman continuously has to monitor competitor activity as plants and competitors come online. Decisions to source and supply materials is now a global decision impacted by a multitude of factors - many of them outside the organization's ability to control.

Several years ago profit building was a sustainable goal for its own purpose. Now effective cost management in a dynamic global economic framework means that decisions are far complex than they ever were. The assumptions used to build the business are no longer valid. Advanced decision support tools were therefore identified as critical component to aid the Enterprise Resource Planning (ERP) tool.

Another factor influenced the timing and method employed by Eastman to implement a continuous improvement process. Even though the chemicals industry had undergone massive change, so too had the technology environment that provided Eastman the tools it needed to manage the business. SAP, the major software provider had reengineered the enterprise business model from that of a centralized

mainframe model to a distributed and scaleable client/server model, known as R/3. Eastman was, at the time, the largest SAP R/2 customer and is today in the midst of an upgrade program to R/3

The Project and its History

In the middle of 1996 Eastman realized that the use of advanced Decision Support tools were needed to supplement the enterprise backbone tool set, R/2 and later R/3. The most important of the decision support tools was Demand Forecasting. Forecasting was critical to Eastman's success. Since anticipation of customer demand was the key to competitive advantage and superior customer service, Eastman needed to forecast. Until this time however, forecasting was a very traditional process. Eastman used a legacy system that had gone through so many updates that users were confused of the functionality and often questioned the systems outputs. Eastman realized that another Band-Aid on the legacy system would not deliver the competitive advantage sought.

Forecasting at Eastman

Individual parties within the company developed their own forecast - to meet their own needs. This was not seen as wrong in the company eyes as no one group or person "owned" the forecast anyway. So the process itself was fragmented. Due to this issue the process was also elongated, filled with much wasted time and duplicated effort. Each group would utilize their own methods to generate forecasts. Since they were never reconciled, the high-level budget plans designed by senior management were never related to operational production and distribution plans. Consequently it was seen in 1996 that management of the organization was not as effective as it could have been. Asset utilization and return on investment were not directly related to operational efficiencies. Eastman concluded that by synchronizing and reconciling the forecasting needs of the disparate groups in the company, the high level budget plans could then be used to drive production and hence customer service. This was known in general terms as "one number planning."

Eastman contracted with Professor Tom Mentzer from the University of Tennessee to do a Forecast Benchmark. This illuminating process identified the weaknesses identified above - along with a series of steps that could be implemented to improve the situation. One of the components was the setting up a central forecasting group at Eastman who would "own" the forecast process. Another key component was the adoption of a sophisticated Advanced Planning and Scheduling software package to enable the delivery of a "one number planning" forecast. However, what made this requirement all the more unique in today's market was the need for this one number tool to support a distributed and worldwide user community. The use of such a tool would enhance Eastman's lack of quantitative analysis. Up until this point much of the forecasting at Eastman had been qualitative in nature. While appearing to be visionary these forecasts were not very accurate, to say the least. The use of a sophisticated tool would bring some science and more reliability to the whole process and free up business managers to focus on strategy development.

Software Selection

At the conclusion of the Benchmark Study, Eastman initiated a Software Selection process. Using a methodical approach Eastman developed a series of key drivers that would need satisfying by whatever software that would be used. All the major software vendors for Advanced Planning and Scheduling tools were reviewed - including SAP. The most important feature at the head of the selection criteria was "Ease of use." Such a phrase has almost passed into the history books for software selection, but from Eastman's viewpoint there were unique and very demanding pressures. The plan called for a phased roll out of the tool - commencing with North America for annual budget planning by Business Unit Managers and then later by Sales Representative on a worldwide basis. In the second phase, many of the 350 Sales people were in countries and the majority did not have English as their first language. Because of this the tool to be used would have to go beyond ”ease of use” and be "the easiest to use." In December 1996 Logility, Inc. was selected as the software vendor to partner with Eastman for a "collaborative demand forecasting" project.

During December Eastman took delivery of the product set from Logility that would support both the internal one number planning process and the distributed, worldwide process. Demand Planning (DP) is the forecasting application Logility provides for determining the optimal forecast for both long and short range needs. Demand Chain Voyager™ (DCV) is the award-winning product provided by Logility for remote, light local and distributed users. DCV looks likes a spreadsheet metaphor with several features that support secured access to the database of forecasts that is generated by Demand Planning.

In January 1997 Eastman began implementation of the DP module. This would support internal one number planning. Each group within the company could now maintain their own view of the data but behind the scenes the DP module would reconcile all the different plans and ensure synchronization across all products and customers. With DP live, they rolled out the DCV product to their Business Unit Managers in North America. By August 1997 this was live. DCV enabled the Business Unit Managers to input to the system the high level strategic annual forecasts that eventually would drive the operational daily distribution and production oriented forecasts. From August onwards the budgeting processes was now hooked into the Demand Forecasting process at Eastman. One of the original goals of the initial project had been achieved.

The requirements of this project were numerous. In general they included:

- Need more accurate forecasts
- Need to develop SKU demand forecasts generated from bottom-up
- Need tool to support timely input from global sales force
- Need quantitative analysis of historical data
- Need tool compatible with SAP R/3

The tool Logility provided to Eastman supported all of these requirements.

As the project continued the Sales Representatives began to take in interest on the process that was now "Internet-based, real time and global supporting." With the North American managers hooked into the forecasting process via the Internet, there appeared the opportunity to continue the roll out across the globe. In the short term

until this point had been reached, the distributed users had been using spreadsheets to communicate forecasts to headquarters.

Eastman is at this point in the middle of the second phase whereby the Voyager product is being rolled out worldwide to replace the spreadsheet process. About 250 Sales Representatives are at this moment deployed with Voyager for real-time, global, secure Internet-based collaborative forecasting. The whole process now enables a user, anywhere in the world, to update Eastman in an impending change in the market. Such changes communicated real-time to headquarters, can now be used immediately to determine the impact on the organization. Never before has such competitive advantage been deployed.

The additional benefits of the initial phase were numerous, and will be further heightened by the second phase, which should be complete early next year. Even though the first phase only concentrated on a forecast number that represented the annual budget plan, the process itself proved to be extremely useful. More importantly the implementation itself became a catalyst of change. Each of the Supply or Value Chain processes is now under scrutiny. If the company could synchronize and collaborate as effectively for all the people in the company as Eastman had done so well in forecasting, then the benefits would be company-wide.

The benefits achieved and expected include:

- Reduced cycle time
- Increased productivity and confidence
- Reduced costs
- Competitive advantage
- Anticipated accuracy improvement
- Basis for improved planning
- Expected annual supply chain savings in range of 2-4% of total company revenue ($100-$200M)

The "anticipated accuracy improvement" is a reflection of the fact that only annual forecasting is today "live." Eastman has already seen an improvement in the year to date accuracy of this number, and anticipates documented proof of the error reduction at the conclusion of the fiscal planning year. The annual cost reduction was part of the return on investment forecasted by the initiation of the project. As Eastman continues the roll out of Voyager across the organization these figures remain achievable. Management is confident that these figures will be achieved.

Eastman Chemical is evaluating further opportunities at this time, including the use of more of the tools from Logility. To further improve the forecast accuracy of Demand Planning, the use of causal forecasting should add even more value to the automatic generation of the "one number" before it is reviewed by the all the stakeholders in the company.

Another opportunity awaits Eastman at this time. The Voyager product from Logility has already been deployed in an environment where a supplier or manufacturer actually collaborates on the forecast with their customers. Heineken USA was the world's first user of such a tool for this purpose. The CPFR industry movement (www.cpfr.org) is today the best example of how to effect such a transformation. Eastman is looking onto the possibility to implementing such a process. This would afford the most strategic of relationships with key customers - around the world.

The most interesting area of research in Eastman at this time is the realization that the metrics used historically to manage the business are redundant. Since forecast error is so critical to the level of inventory and hence production that is incurred is so central to business health, so forecast accuracy should be public, visible and agreed upon in terms of form and function. However, staff remuneration policies and bonuses typically focus on the symptom of the measure - that of inventory or service level. Eastman has come to the most advanced of realizations, that the measurement and payment schemes used by most companies today need to be questioned and revised in light of the new tools and techniques employed.

Eastman looks to the millenium with some success behind them and some fascinating decisions ahead of them. Being only the second company in the world to deploy a strategic competitive vision, that of "collaborative extended one-number planning" means that Eastman is a leader in this area. Eastman cannot look to another company to determine its next move. As Eastman continues to pioneer Value Chain Management, you can bet that forecasting will remain central to their success formula.

The World's First, World's Only, World's Largest

Logility is the provider of the tool used by Heineken USA and Eastman. The product itself is called Demand Chain Voyager and Supply Chain Voyager. Demand Chain Voyager, or DCV, supports collaborative forecasting per the VICS standards, and Supply Chain Voyager supports the collaborative order placement per the standards and goes further to collaborative on the physical replenishment order at dispatch time, which is not yet in the standards.

DCV is the world's first packaged application to support CPFR. Released in early 1997, it has gone through rapid technology upgrades and today represents the most frequently used tool for collaborating with your trading partners. It is live today in at least four companies for both internal (intranet) and external (extranet) collaboration.

DCV supports multi-level forecasting - for customer / product or Stock Keeping Unit (SKU) forecasting up to brand, category or division forecasting. Multiple units of measure are supported which means that all interested parties collaborating can actually speak their own language and get the system to do the translating. For example, the finance team can work in margin (in whatever currency they chose) at company level, as the logistics function as well as the customer can operate in pallets or units at location level. And they can feel confident that all the numbers are reconciled and synchronized.

SCV supports customer replenishment or Vendor Managed Inventory (VMI) processes. EDI might be used to move the large amount of Point of Sale (POS) or transaction data required to support the automated generation of a customer replenishment order, and SCV allows key customers or users access to the proposed schedule - with the ability to review and revise the shipments.

Both DCV and SCV provide for a wide range of simulation and what-if capabilities. Also, an off-line feature ensures that you do not need to maintain an Internet connection to work with the tool. You can break the connection, travel, use the

application in the browser on your laptop, and later synchronize the data at the next opportunity you get to hook up to the Internet. Also, with these systems the maintenance of the software is effectively eliminated - delivering Microsoft's vision of zero cost of ownership. The software installs itself via the Internet and monitors for upgrades automatically.

Both DCV and SCV employ what Logility calls the Self Evident Environment™, or SEE. SEE provides for the most intuitive and friendly desktop environment possible. The example given by Eastman demonstrates "ease of use" like no amount of marketing collateral can. When deploying worldwide to people who do not all speak the same language, one can imagine the hurdles encountered. A windows environment does not, in and of itself, provide ease of use. And to further the point, you may have heard of EnjoySAP - a new initiative at last month's SAP User Group where SAP executive designers assured ERP users that SAP would be more enjoyable to use. The good news is that large, ERP vendors are copying numerous innovations being undertaken by the smaller APS vendors.

Whither Collaborative Planning

Some people think that collaborative planning, or more precisely the Internet, will destroy EDI. We say not. They are different technologies that do not necessarily overlap. For example, when a company is thinking about implementing Vendor Managed Inventory, and they want to share gigabytes of information between trading partners, the question is purely economic. Which technology provides the best value for money? EDI is designed effectively to transfer large volumes of static, typically transactional data, between computers. The Internet was not designed for that - but it could do it. The Internet was originally designed for college professors and scientists to collaborate on small amounts of information (in comparison) in real-time, directly. Which is the definition of collaboration: changing the nature of the transaction between trading partners.

We believe that collaboration, as expressed in this paper will continue to be adopted over the next 3 years. It will become the standard, the "industry best practice" as the next wave in Value Chain Management. For once the technology is here and now and we are not waiting for the "next release." For once the technology required is not overly expensive. What is expensive and what is costly is the thought required to reengineer one's organization and one's relationships with customers and suppliers. The benefits however are tremendous. For a short period, as only a few companies in each segment adopt this technology, the benefits are simply strategic. Collaborative planning is the only way in which a company can, at long last, trade inventory and lead-time for information.