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ADAPTIVE BUSINESS NETWORKS: A STRATEGY FOR MASTERING CHANGE AND EFFICIENCY IN MANUFACTURING

Business strategy has reached a turning point in which two opposing forces must be reconciled. At one end of the spectrum is the need for efficient operations of the stable processes in a company. At the opposite end is the need for instant adaptation to rapidly changing business conditions. Efficiency without adaptability means solving yesterday's business challenges at the lowest possible cost. Adaptability without efficiency allows a quick reaction, but with an inflated cost structure.

Companies in today's competitive environment, especially in the pressure cooker known as the manufacturing industry, want a clear path forward that will increase both efficiency and adaptability, and result in a larger share of wallet for their business. Having long been successful in improving efficiency, SAP is now taking its 30 years of business and IT experience and applying it to increasing adaptability. The result is the adaptive business network, a concept created through hundreds of discussions with customers and years of research by SAP.

Using the adaptive business network as a strategy, your company can accomplish a number of goals:

- Lock in a stream of future business by improving your ability to develop and introduce new products that meet the needs of your customers.
- Respond faster and more effectively to changing demand and supply chain signals through increased visibility into your suppliers' processes.
- Understand how and when to shape customer demand through a better understanding of your capacity and that of suppliers.
- Optimize profit during order fulfillment by carefully distributing products across the most attractive channels.
- Create new streams of revenue through services that extend the customer relationship after the sale.

The adaptive business network is neither an existing nor a new software product. It cannot be purchased. The adaptive business network cannot be implemented by just one company. It is not a program for the internal change of one business. Instead, it is a program for the reorganization and synchronization of many businesses through real-time collaborative processes, executed in concert to drive value for all participants.

The adaptive business network is a concept that leaders in most industries have already grasped: To succeed in winning the battle for the customer, companies must work closely with partners. They must optimize what they do well. They must outsource what others can do better. They must bring partners closer and closer, into every process. And they must provide suppliers with far more information and receive better performance in return.

WHAT IS AN ADAPTIVE BUSINESS NETWORK?

Examples of early forms of the adaptive business network are easy to find at innovative companies. Hewlett-Packard uses the structure to orchestrate production of PCs and printers in a broad network, but then acts as a partner and supplier in networks organized by other companies to distribute those products. Companies like Molex build components for other companies, but do so by coordinating the actions of a huge network of suppliers that participate in design, planning, and order management. Companies like Freescale are able to implement an available-to-promise (ATP) system that allows sales staff to instantly provide definitive responses to customer inquiries and capture more business.

The ideal of the adaptive business network is a seamless integration of the planning and execution needed for efficient, stable processes and the ability to sense and respond as required for adaptability. Information flows back and forth as the entire network of companies responds in real time to customer demand. The structure of the adaptive business network is defined by the following characteristics:

The adaptive business network is **demand-driven** – Customer signals flow to every company in the network, triggering responses – sometimes manual, sometimes automatic – that keep products flowing at the right rate and minimize the trauma of disruptions.

The adaptive business network works in **real time** – Data from real-world-awareness techniques like radio frequency identification (RFID), combined with well-crafted metrics and models of performance, keep the lights on in the network and make for better decisions (see sidebar).

Real World Awareness

Increasing the automated collection of information is a crucial part of building an adaptive business network, as explained in Claus Heinrich's book, *RFID and Beyond: Growing Your Business Through Real World Awareness* (John Wiley & Sons, Inc., 2005). To create automated relationships between companies of the sort required by adaptive business networks, the scope of information about the state of all areas of the network must be available. Real world awareness refers to the general case demonstrated by specific techniques such as RFID, global positioning system (GPS), mobile applications, and other methods of sensing information about the real world and providing data to computer systems.

The construction of systems for real world awareness differs from company to company, so a turnkey solution that meets every need is impossible. Helping to bridge this gap, SAP provides the SAP® Auto-ID Infrastructure component, a data collection and enhancement tool kit that receives data from many different data collection devices, like RFID readers and shop floor devices; cleans the data; aggregates it; and links it with the appropriate objects in transactional systems.

The adaptive business network is **collaborative** – Pervasive collaboration across all boundaries allows companies to focus on their strengths and find partners to do the rest. Processes for design, order management, sourcing, and service delivery that used to exist inside the boundaries of a single company are now executed across many companies that are fed by information and insight gathered from every corner of the network.

The adaptive business network **leverages standards** – Widespread use of both industry and technology standards is vital to establishing flexible communication across systems, divisional silos, and company boundaries at the lowest possible cost.

The adaptive business network is **built for change** – Business relationships, processes, and supporting technology are all constructed to evolve rapidly to meet market needs and increase a company's share of wallet.

The adaptive business network is **friendly to innovation** – Companies that use the adaptive business network strategy become experts at creating and optimizing business relationships and processes, and supporting IT infrastructure. This unleashes the floodgates of creativity by making many more ideas possible.

Origins

The concept of the adaptive business network developed over several years as the effect of the Internet on the structure of the manufacturing industry came into focus. The concept, which boils down the patterns of change in distribution, supply chain, design, sales and marketing, and other areas, was first formally identified by Claus Heinrich in his book, *Adapt or Die: Transforming Your Supply Chain into an Adaptive Business Network* (John Wiley & Sons, Inc., 2003). Defined simply, an adaptive business network is an integrated, flexible network of companies focused on a customer need that responds in real time to changes in the state of the network.

The adaptive business network involves a three-phase process that is executed over and over at all levels of every business: planning and execution, which are the foundations of efficiency; sensing and responding, which enable adaptability; and learning.

The first phase is the planning and execution cycle in which companies use the best information available to create a game plan for putting the network to work to serve customer needs. The planning and execution phase focuses on what is known, stable processes and recurring calendar cycles.

But no plan survives unchanged after contact with the marketplace. In the second phase, companies in an adaptive business network then employ methods of sensing and responding to provide the adaptability to optimize performance and to quickly react to unexpected challenges. The result is a network that is both efficient and adaptable.

In the third phase, companies use what they have learned about how the network operates and adjust the network to run better and faster. Figure 1 shows the relationship of these concepts.

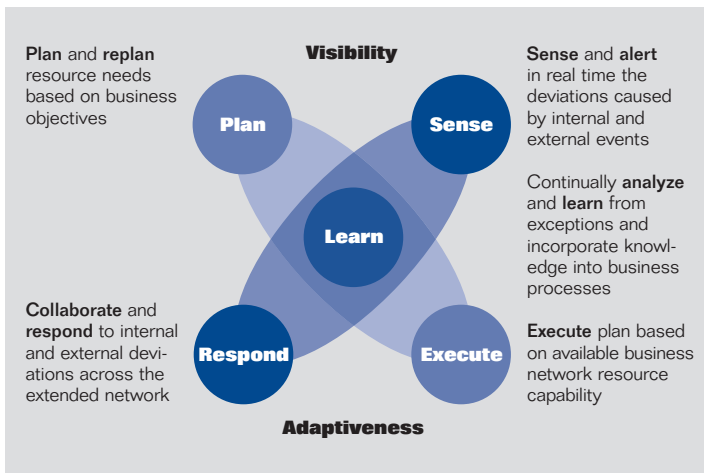


Figure 1: Partner Interaction in the Adaptive Business Network

SAP offers solutions to handle enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM), product life-cycle management (PLM), supplier relationship management (SRM), and more, to provide a foundation for planning and efficient execution of stable processes. But a new area of automation has emerged – an arena of fluid and rapidly changing processes for design collaboration; managing of partners, assets, and services; tracking behavior; and serving the needs of customers. These adaptive business processes and many others draw on the services and capabilities of transactional applications, as well as the services and processes from external partners or legacy systems.

Most current responses to the strategic challenges of the manufacturing industry focus on efficiency or adaptability, but not both. Lean manufacturing and Six Sigma help companies squeeze waste and variation out of their processes. Concepts like the on-demand enterprise, the demand-driven supply network, and

the real-time enterprise stress increasing adaptability without explaining how efficiency will be maintained. In supporting the adaptive business network strategy, SAP® software achieves adaptability without sacrificing efficiency.

How does SAP accomplish this? It does so by building on its earlier successes. mySAP™ Business Suite solutions, which have led the way in automating planning and execution through transactional applications, can support the ability to sense, respond, and learn required in today’s business environment. A bit later we will see how the Enterprise Services Architecture blueprint and the SAP NetWeaver™ platform are instrumental in making mySAP Business Suite solutions more adaptable while maintaining their efficiency.

Roles

There are two modes of participation in an adaptive business network: coordinator and partner. While most companies will be partners, many firms will find themselves playing both roles. Companies that prepare to participate in an adaptive business network will be able to say yes to new opportunities and new revenue, while less prepared companies will have to say no.

In the partner role, businesses frequently face companies larger than themselves that seek to integrate operations more tightly than ever before. These large customers ask for – and sometimes demand – investments in IT to comply with standards, increase automation and collaboration, as well as other concessions. To succeed, a company must be able to participate in the networked processes that large partners are encouraging. If the coordinator of the network wants tighter collaboration in design, asks to include a partner’s warehouses and work in process in an order management system, or wants to support a very high-touch outsourcing configuration, the partner must be able to support the new relationship.

A company can gain share of wallet by being the easiest partner to work with. Such a company will have the lowest integration costs and the tightest collaboration, provide the most information, respond with the greatest accuracy, and reconfigure fastest when processes change or emergency conditions arise. With these capabilities, a partner company can support relationships with more networks than its less-skilled competitors can.

From the coordinator point of view, having increased power to support relationships with partners means being able to support more partners and to extend automation, collaboration, and visibility to the deepest extent possible. The power to support many relationships means that the coordinator can choose the right partner for the right task and also have a claim on the largest possible capacity.

Benefits

The adaptive business network is an ideal model that shows how to improve every aspect of modern business relationships. Not only can the concept improve the efficiency and adaptability of hundreds of companies working together, but it can also improve one relationship between two companies. A company that has methodically prepared to participate in an adaptive business network is able to use its power to create win-win relationships with partners and suppliers that provide better products and services to customers and reap huge rewards. The benefits include the ability to do the following:

- Become a truly demand-driven organization that responds quickly to customer signals
- Say yes to the high visibility, process integration, and adaptability required by business partners
- Gain efficiency and reduce waste from increased visibility into the processes and operational state of both partners and suppliers
- Create and support new relationships faster than ever before
- Accelerate product design

- Reduce the time to market, time to volume, and time to value for new products
- Detect and exploit new revenue opportunities
- Paint a much more accurate picture of customers and more adeptly respond to their needs
- Leverage service as a value-added benefit and a profitable competitive differentiator
- Maximize return on production assets by minimizing downtime, improving equipment reliability and throughput, and extending the life of assets
- Increase the capital allocated to core value-creating activities, while outsourcing other processes
- Improve productivity overall

The adaptive business network provides the foundation for increasing performance in product leadership, customer intimacy, and operational efficiency – the elements for success in the manufacturing industry.

WHAT IS DRIVING THE NEED?

Today, manufacturers are living in a turbulent economic environment – a result of the shift in the market after the downturn of the last few years. Every dimension of business requires greater speed and efficiency. The ability to efficiently plan execution and then to sense and respond based on real-time signals is fast becoming a significant competitive advantage due to the following factors:

Networked economy – New channels and more demanding customers have led to a proliferation of new products, which are more mass-customized. The reality is that every company lives within many business networks and can play different roles in each. In many cases, channel masters – such as Wal-Mart and the U.S. Department of Defense – are mandating changes based on their business needs. This has forced companies to seek different ways to meet these demands. Partnerships are formed to create win-win situations in which collaboration and the sharing of information are critical success factors.

Increased pace of innovation – The velocity of change in customer needs and trends makes innovation a key competitive differentiator to achieving profitable growth. The best-performing companies integrate innovation into the core of their business processes and focus on time to volume as well as time to market.

Global operational competitiveness – To stay competitive, businesses need to be faster, leaner, and more productive than ever before. In a business climate demanding that you respond to constant business changes and customer and shareholder requirements, companies are increasingly focusing on core competencies and partnering to fill in the gaps.

Compliance – Governments and other regulators are pressing for compliance with a multitude of regulations, such as Sarbanes-Oxley and U.S. Food and Drug Administration requirements for improved tracking and drug pedigree information.

All of this results in a pressing need to reach beyond supply-driven efficiency. The preferred business model is fast becoming a pull- or demand-driven environment and the ultimate source of demand is the customer. To sum all this up – companies must anticipate customers' requirements and improve responsiveness to their demands by bringing high-quality, value-added products to market faster than the competition.

HOW DO I GET THERE? EVOLUTION, NOT REVOLUTION

You can begin a journey to the adaptive business network with something as simple as a couple of Web pages that allow suppliers to increase visibility into your processes and let you see into theirs. And you may continue working at it for five years and still not be finished. The adaptive business network is an ideal that we can always move closer to.

The adaptive business network is a business concept, not a software product. You have to start with a vision for your company's future and define the structure and processes accordingly. Each company will have its own road map to achieve that vision. Senior management must support the fundamental changes in the way that your company does business.

The best strategy is: Evolve don't replace. Take small steps not big ones. Learn from experience. Don't change everything at once. SAP believes in this evolutionary vision that builds upon our past industry and solution leadership. This vision provides the guiding light for SAP development in the manufacturing industries.

The foundation for success in moving closer to the adaptive business network is a clear vision of how to make progress along many different dimensions at once. Transactional systems must improve, business relationships must be reconstructed, and new processes oriented toward sensing and responding must be designed, implemented, and supported. One way to think of the implementation of an adaptive business network is as a continuous cycle of build, execute, and adapt.

To **build** an adaptive business network, a company reexamines its enterprise applications for ERP, CRM, and SCM that are already in place, and rethinks how they might be enhanced to make existing processes more effective or to build new ones. You should consider using new forms of applications, like composite applications, and increase use of industry standards like STAR, Odette, Edifact, and ANSI X.12 for automotive; ISO S95 for manufacturing; RosettaNet for high tech; and CIDX for chemicals.

To **execute**, a company refines its business process steps to maximize the potential of the network that is unfolding. For example, it is during execution that concepts of lean manufacturing and Six Sigma are applied to squeeze efficiencies out of the processes that are currently serving the needs of the company. (See sidebar.)

To **adapt**, a company fine-tunes its network to create a lasting competitive edge for its participants. The increased availability of data from real-world-awareness techniques and the supple form of composite applications that work across the boundaries of existing transactional systems provide you with both the knowledge of how to improve business operations and the ability to change. This is where Enterprise Services Architecture and SAP NetWeaver really shine and show how technology can be an enabler instead of a roadblock.

This cycle of build, execute, and adapt is repeated over and over as a company moves closer to the ideal of the adaptive business network. With each cycle, a company becomes more adaptable and moves through four stages of growth, from operational excellence, to integrated processes, to increased collaboration across all boundaries, and finally to a state of adaptability in which well-planned processes can be quickly changed to respond to disruptions or to take advantage of opportunities.

Staying Lean Means Becoming Flexible

What is the difference between the adaptive business network and concepts like lean manufacturing and Six Sigma, which have enabled huge gains in productivity and efficiency in manufacturing and other industries?

The difference is in the goal that each concept reaches for. Lean manufacturing seeks to eliminate various categories of waste and reduce inventory. Six Sigma helps companies systematically identify and eliminate unwanted sources of variation in business processes. Both of these techniques aim at optimizing stable processes. But that goal is no longer good enough. Now companies must be able to take the waste and variation of processes that are dynamic and adapt them to match business conditions.

The challenge that the adaptive business network meets is to allow companies to stay lean and hold onto the reductions in errors achieved through Six Sigma methods. The synchronization of business processes and support from technology in the adaptive business network achieves this goal through adaptability that allows companies to become lean and stay lean, and to reduce errors and keep them out.

BUSINESS RELATIONSHIPS

Implementing an adaptive business network means rethinking, redesigning, and renegotiating the business relationships between participants. Business relationships cannot be rigid, they must be designed to evolve. The companies in an adaptive business network must have clear shared objectives that allow the network to work for the benefit of all participants. Some attempts at networks have failed, because they favored the coordinator too much and squeezed partners into an unhealthy state of weakness.

Business practices must be designed to meet the shared objectives including policies, procedures, and service-level agreements that describe the responsibilities of each participant, the information-sharing process, and the flow of processes from one participant to the next.

The business arrangements of an adaptive business network are designed to adapt according to shared governance of the network. The contractual arrangements of any adaptive business network must be able to evolve based on mutual agreement of the participants. If they cannot, then the network cannot change with the times.

ADAPTIVE BUSINESS PROCESSES

The processes for sensing, responding, learning, and supporting cross-company relationships bring a new form of IT to most companies. Transactional solutions for ERP, CRM, SCM, PLM, and SRM are the foundation. That's because stable business processes are executed in these solutions, which contain the operational and financial state of the company.

With SAP software, the processes for sensing and responding are integrated into transactional solutions, which rely on Enterprise Services Architecture and SAP NetWeaver to access and recombine these solutions to meet the needs of the dynamic processes at the core of the adaptive business network.

What are these processes? They are the adaptive business processes, shown in Figure 2, that reach out from the center of the company toward partners, suppliers, and customers, providing visibility, sending and receiving important information, coordinating activity, providing early warnings, and enabling the adaptive business network to actually reconcile the need for maintaining efficiency while increasing adaptability.

SAP supports these adaptive business processes by extending transactional solutions, using business content to implement processes that move across them, and providing new functionality in the form of composite applications. Here is a summary of some of the most important areas that SAP is focusing on in order to increase your ability to sense and respond.

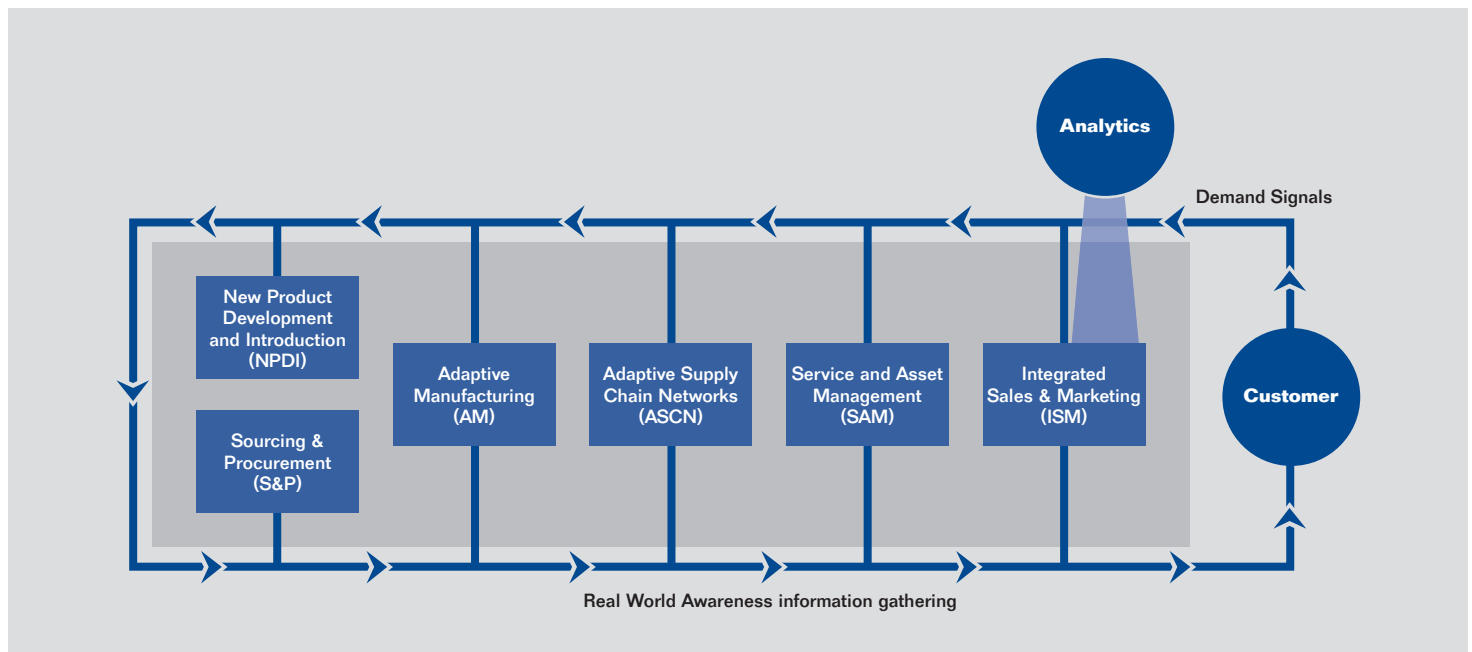


Figure 2: Adaptive Business Processes

New Product Development and Introduction

The increased pace of global competition has made it imperative for companies to improve their ability to develop new products and bring them to market quickly. Improved execution of the entire new product development and introduction (NPDI) process, from market opportunity to product launch, is essential to drive future growth and profitability. Without this ability, ultimately nothing else matters. SAP supports the NPDI process with integrated software that allows companies to respond in a fast and adaptive manner to the needs of their customers.

Challenges include these issues:

- Products must be brought to market at a faster pace than ever before.
- Point solutions focus on a portion of the problem but do not work well together or with your ERP backbone.
- Informal processes managed with spreadsheets and shared folders limit collaboration by making information difficult to find and reuse.

The adaptive business process involves these solutions:

- The product development process is extended to include the voice of the customer and idea management, as well as improved portfolio and program management across multiple business areas.
- Designing the adaptive supply chain becomes part of the product design process.
- Globalization is incorporated from the initial planning stages.
- An integrated solution provides one version of the truth.

The results include these situations:

- Improved ability to detect and exploit new revenue opportunities
- Better decision making through sharing of up-to-date portfolio- and project-status information
- Lowering of time and cost to market through more efficient use of available resources
- Improved ability to serve diverse customer needs

For example, Kimberly-Clark is responding to the market situation of shortening product life cycles in this way. “Cost leadership does not sustain competitive advantage – continuous innovation does,” says Cheryl A. Perkins, senior vice president and chief technical officer, Kimberly-Clark. “In response to shortening product life cycles, Kimberly-Clark is collaborating with SAP to introduce improved capabilities for idea and portfolio management, which will increase speed to market for strategically important new products.”

Integrated Sales and Marketing

Integrated sales and marketing in an adaptive business network must accelerate and support business processes that require collaboration and information flow across traditional boundaries. In the past, functional roles were clearly defined. Marketers focused on creating demand and the sales staff closed the deals. Now the lines are starting to blur. Sales and marketing are starting to share responsibility for delivering on volume and increasing profitability, two tasks that formerly were distinct. The adaptive business process for integrated sales and marketing provides the support for this new world of shared responsibility, closer collaboration, and tighter integration with partners and customers.

Challenges include these issues:

- The journey from lead generation (demand generation) to lead closure (booked order) requires a streamlined and collaborative process between sales and marketing, and often includes engineering and manufacturing, particularly in “engineer-to-run” industries like automotive.
- More and more, partners and other third parties are tightly integrated in the process of manufacturing and selling goods and services.
- As the process flows from demand generation, to inquiry, from inquiry to prospect, and from prospect to customer, responsibility moves from department to department and from the company to partners and back. Providing accurate information about the customer and order status can become problematic.
- An intimate portrait of each customer and aggregate data about customer behavior requires visibility, access, and efficient flow of information from all distributed repositories to a master database.

The adaptive business process involves these solutions:

- Increased collaboration and visibility allows you to make decisions based on facts rather than on incomplete information.
- Better information is available from many different sources, such as supply chain and financial systems.
- You can manage the entire sales, design, and marketing process from demand generation to fulfillment and settlement with complete visibility to all users.
- A collaborative framework brings partners into the centralized planning, maintenance, tracking, and evaluation of all activities between the company, customer, agency, agent, consumer, broker, and more.

The results include these situations:

- Executives, managers, and operating staff can get all the information needed to identify the future value potential of a customer, driving more-effective and targeted customer interactions.
- You can manage customer expectations across all customer touch points throughout the customer life cycle and drive product innovation based on exceptional customer intimacy.

For example, the lines between marketing, sales, and even service are blurred today, because customers and prospects can access information about your products and services through both new (Web-based) and traditional (in person, traditional marketing, and call center) channels. And customers and prospects expect that regardless of the channel or department they interact with, they will have the same experience. Companies like Brother International enable their call center agents to cross-sell additional products, qualify leads for their sales force, and capture information about future product ideas. They identify customers that need a new product or require software upgrades in advance. By integrating sales and marketing, companies like Brother International can maximize the customer experience during each call, increasing sales, revenue growth, and customer loyalty.

Adaptive Supply Chain Networks

In order to meet the challenges of today’s rapidly changing market dynamics, traditional linear supply chains, with their sequential processes, must be transformed into virtual communities, or networks. These networks allow all participants – such as customers, suppliers, logistics providers, and so on – to sense changes in demand and supply conditions as they occur and share the critical knowledge needed to respond intelligently. The result is an adaptive supply chain network that is not only demand driven, but can also leverage its assets to influence demand where appropriate.

The challenge includes changing demand patterns and global competitiveness, which have created the need for improved supply chain visibility and require the ability to respond in real time to demand signals.

The adaptive business process involved enables you to sense and respond in real time to changes in supply and demand with the necessary changes to products, promotions, production, and distribution.

The results at a company include the following situations. First, a company can synchronize supply to demand to enable these capabilities:

- Increase demand accuracy and order fulfillment
- Manage variability in demand to support lean practices across the supply chain
- Reduce inventory levels and increase inventory turns across the network
- Increase profitability and productivity

Then a company can also sense and respond with an adaptive fulfillment network to enable these benefits:

- Timelier planning, logistics, and transportation are lower in overall cost.
- Order, product, and execution tracking are improved.
- Customer satisfaction is increased.
- Network-wide visibility, collaboration, and analytics enables the following results
 - More efficient and collaborative suppliers
 - Shorter cash-to-cash cycle times
 - Integrated supply networks through common analytics

For example, companies like Procter & Gamble (P&G) have realized that increasingly accurate and timely information coming from retailers about inventory levels and product sales required a new approach to managing inventory. Working with SAP, P&G developed an entirely new approach called responsive replenishment, which uses algorithms specifically designed to take advantage of daily and even intraday data that is replacing weekly levels for reference. The responsive replenishment system now enables companies to optimize the replenishment process to improve customer satisfaction, lower inventory levels, and minimize stock-out conditions.

Adaptive Manufacturing

One of the key engines of flexibility inside an adaptive business network is adaptive manufacturing. The struggle in manufacturing up until recent times was to find a way to reduce the cost of producing products in long production runs. But in the modern environment, the cost of carrying the inventory produced by those long runs has exceeded the benefits of the economies of scale. While the solution to this problem ultimately involves every aspect of the adaptive business network, adaptive manufacturing addresses the challenging problem: How can a manufacturing facility produce products at high efficiency in the shorter runs needed to react to real-time demand signals?

Challenges include these issues:

- Competitive pressures, customer requirements, global sourcing, and commoditization are forcing companies to lower their manufacturing costs.
- Manufacturing nodes are being pushed out to distant locations, leading to a loss of visibility and control.
- Velocity is critical. Time to market, time to volume, and time to scale are the keys to success.

- Companies must manage the hybrids of make-to-stock, manufacture-to-order, and configure-to-order processes to balance costs and still fulfill customer needs.
- Stringent regulations are driving the need for quality, genealogy tracking, and compliance capabilities.
- Production personnel lack the mission-critical decision support they need to respond to exceptions and meet targets.

The adaptive business process involves these solutions:

- Manufacturing operations are improved through an **integrated ERP solution for managing manufacturing** with workflows that enable closed-loop operations.
- Manufacturing integration is streamlined by a **manufacturing integration platform** to connect manufacturing processes with enterprise and supply chain processes.
- Manufacturing intelligence dashboards provide **role-specific, configurable** decision support to production personnel, so they can deliver on their performance goals.

The result – adaptive manufacturing enables companies to run manufacturing at the speed of business and deliver superior performance through visibility and responsiveness. Adaptive manufacturing increases a company’s ability to do these activities:

- Plan, schedule, execute, and monitor production operations
- Document, track, monitor, and analyze quality and performance
- Plan, schedule, and execute maintenance operations
- Sense and respond rapidly to machine, material, labor, and quality exceptions
- Ensure compliance with regulations, as well as with health and safety standards

For example: Rexam is the largest beverage-can manufacturer in the world, with 27 plants in the Americas alone, as well as plants in Germany, China, Italy, and Russia, and other places. Rexam significantly revamped its business model by integrating shop floor operations with its business systems. This involved automating manual and labor-intensive processes and providing portal access to customers and suppliers on production schedules with valid up-to-date information. This allowed Rexam to postpone manufacturing, reduce inventory levels, and improve customer responsiveness. Integration of business processes with shop floor production has improved internal visibility, reduced inventory, and enhanced customer service. Inventory has been decreased, including a 25% reduction in the five-ton aluminum coils from which cans are made. In addition, order handling capabilities were improved by 75%, and all paperwork involved in planning, producing, and shipping cans was eliminated. Improved customer service was accomplished through visibility into the manufacturing process. Now doing business with Rexam is easier and customer retention has improved.

Sourcing and Procurement

In the adaptive business network, supplier relationships skyrocket in importance. Efficient and precise outsourcing is a key capability of an adaptive business network. In an adaptive business network, suppliers are no longer limited to simply providing commodity parts from a catalog. They are frequently full participants and even leaders in the larger parts of the design process and play a crucial role in enabling innovation as a way of creating competitive advantage and new market opportunities.

Challenges include these issues:

- Supporting more supplier relationships than ever before
- Integrating suppliers more tightly into processes, such as identifying a work in process or allowing available-to-promise queries to use detailed information from supplier systems
- Including suppliers in the design process
- Reacting quickly to unexpected disruptions in suppliers' operations

The adaptive business process involves these solutions:

- Provides a fully integrated solution for evaluating, engaging, and collaborating with suppliers
- Reaches into all the transactional systems in a company including those for ERP, SCM, and PLM, to integrate supplier information and provide visibility where needed
- Uses collaborative portals to allow suppliers to become more deeply involved in the design, planning, and fulfillment loop
- Allows access to a supplier network created by SAP that includes more than 15,000 suppliers worldwide

The results include the following situations:

- Suppliers become closer participants in the process of deciding which parts to build internally and which to buy.
- Product design becomes a matter of designing the product and the supply chain at the same time.

For example, when a company receives a call from a customer about placing a large order, if it can be filled by a certain date, streamlined collaboration and visibility into suppliers' processes can make the difference between getting the order and having it slip away to a competitor. In the ideal process, the capacity of a company's factories and the ability of suppliers to provide the needed components can be checked while the customer is on the phone, instead of having to wait while inquiries to suppliers are sent and answered.

Service and Asset Management

Companies have been seeking to add more visibility, collaboration, and adaptability to their maintenance and repair processes in order to combat the rising cost of maintaining and repairing both large and small assets, such as office equipment, medical devices, test and measurement equipment, consumer electronics, heating and air conditioning systems, transportation equipment, plant production equipment, oil and gas production equipment, facilities, buildings, and so on. To solve the entire problem, an integrated solution must also address how maintenance services are delivered and how spare parts are managed. SAP Service and Asset Management is a complete solution that not only uses adaptive processes to save money but also opens the doors to new revenue streams by expanding the scope of service offerings.

Challenges include these issues:

- Costs of maintaining assets are steadily rising, and complexity of assets and maintenance processes has increased dramatically.
- Traditional planning and scheduling processes lack the flexibility to maintain assets and provide service at the greatest efficiency.
- Lean manufacturing principles place great emphasis on minimizing the variability that comes from equipment that is prone to failure or unable to hold tolerances consistent with quality requirements.
- The information required in order to optimize maintenance and service processes resides in many distributed systems.
- Real-world-awareness techniques such as RFID and intelligent device management (IDM) promise dramatic savings and opportunities to extend and improve service delivery.

The adaptive business process includes these characteristics:

- Processes for asset management, parts management, and service delivery are integrated and optimized based on relevant information from transactional systems.
- Service and asset management processes are more adaptive and able to react to problems and opportunities, to increase efficiency through proactive, rather than reactive, maintenance.
- Third-party service providers are easily incorporated into processes.
- Processes are built-in to take advantage of real world awareness and to extend services to increase revenue.

The results include these situations:

- Increased productivity, efficiency, and utilization; reduced asset maintenance cost; increased asset life cycles; as well as optimized scheduling
- Well-managed service delivery will become a competitive differentiator.
- New revenue streams are based on extended service offerings and real-world-awareness technologies.
- Consolidated and integrated views are available of all service, maintenance, and repair operations.

For example, Nova Chemicals has increased production asset runtime, reduced downtime, and eliminated unplanned outages of mission-critical production systems, saving \$22 million in the process. Improved visibility into service and asset management processes allows on-the-fly adjustments to planned activities, provides the opportunity to accelerate scheduled maintenance to forestall unexpected failures, and allows the company to bring in third-party service providers when needed to balance resource constraints.

Business Performance Analytics

All adaptive business processes rely on rapid analysis of data that describe network processes. SAP® Business Intelligence, a component of SAP NetWeaver™, has advanced analytic functionality, making it the circulatory system that moves information through the adaptive business network. SAP Business Intelligence provides the dashboard that brings all the information together in one place and makes sense of it. Business performance analytics help improve and contextualize the raw data provided through real world awareness to provide both a short- and long-term memory for the network. Analytics can help a network respond to events by providing people with the information they need through dashboards, or by feeding information to event-driven processes. SAP Business Intelligence provides analytics that empower participants in the network with the right information, delivered at the right time, so that they can make the right responses.

While the processes that increase the ability to sense and respond may be exciting, the entire effort falls apart without tightly synchronized support from IT. Every generation of technology that is in place at a company will participate in the adaptive business network. SAP is preparing all of its products and technology to help companies succeed in the world of the adaptive business network.

SAP PRODUCTS AND TECHNOLOGY FOR THE ADAPTIVE WORLD

A commitment to creating an open platform drives SAP's product development. All SAP software and services are designed not only to be best-of-breed in their own right, but to also be extensible, based on standards and configurable technology. Because of this architecture, customers can make great strides toward the adaptive business network with their existing installed base of SAP products and technology, much of which can provide visibility, integration, and support for flexible processes.

In creating the ability to sense and respond, the adaptive business network concept builds on SAP's latest vision and supporting technology. The blueprint is Enterprise Services Architecture; the form is composite applications. SAP NetWeaver provides the glue that allows traditional transactional applications for ERP, CRM, SCM, and other purposes, from SAP as well as third-party vendors, to participate in this new world.

The preceding discussion should make clear that achieving an adaptive business network is a long-term proposition that will require sustained effort. SAP is the leading provider of solutions that are built to support an adaptive business network.

Support for the sense-and-respond processes inside an adaptive business network is one type of solution that SAP provides. But it is important to recognize that at an architectural level, SAP has been applying significant design and implementation work for many years.

SAP software has stood the test of time in hundreds of industries and for thousands of customers across the globe, because the company focuses on architecture, stays close to its customers, and works hard to evolve its software to meet their needs. Disruptive innovations have reshaped technology, but SAP has absorbed them into its strategy and products.

Enterprise Services Architecture and SAP NetWeaver

SAP NetWeaver is the technical foundation for Enterprise Services Architecture, the blueprint for solutions based on Web services, including mySAP Business Suite solutions. With this foundation, mySAP Business Suite solutions will not only continue to support transactional applications, but also participate in the more flexible and fast-moving world of the adaptive business network. With its integration capabilities and advanced functionality for creating composite applications from enterprise services, SAP NetWeaver has the flexibility and responsiveness required for the adaptive business network.

Enterprise services provide the form of the solution at a level that brings IT and business onto the same playing field. Enterprise services are the form that business executives can describe and IT can build.

But while most technology vendors boast that they can easily create Web services, SAP can also provide substance in the form of implemented enterprise services that are built on top of mySAP Business Suite solutions and powered by SAP NetWeaver.

All of this serves to create a powerful business platform that can be quickly adapted to meet the needs of the adaptive business network, while also integrating with specialized point solutions or homegrown systems.

Implementing an adaptive business network will draw on SAP software, including: the SAP Business Intelligence and SAP Enterprise Portal components, the SAP Business Process Management service, and the SAP Exchange Infrastructure and SAP Master Data Management components.

FROM VISION TO REALITY: SEIZING THE DAY

The power of technology is a tide that has lifted all boats. The key to survival may no longer be the size of a boat, or how fast it can move, but the pace at which a boat can transform itself during a race. Successful companies will leverage their current investment and combine solutions from many vendors into an adaptable infrastructure.

To achieve this transformation requires a comprehensive vision and detailed plan stretching over several years. Companies will succeed or fail not based primarily on their own strengths and weaknesses, but based instead on how effectively they coordinate and synchronize the activities of large groups of partners of all sorts to achieve their goals.

With SAP as a partner, manufacturing firms will be able to manage the rapid change and increasing complexity of the current business environment. The adaptive business network provides an integrated vision for organizing business relationships, processes, and supporting technology into a flexible and responsive form that can meet the challenges of today and prepare for those of tomorrow.

If your business is an island unto itself, a self-contained unit that deals directly with customers and uses only abundant commodity supplies, an adaptive business network may not apply. For everyone else, those whose fortunes will rise or fall based on how well they work as a partner, supplier, or coordinator of a network, taking steps toward an adaptive business network is a vital concern.

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