Dow Corning Corporation (A): Business Processes and Information Technology

Introduction
In October 1994, Dick Hazleton, CEO of Dow Corning Corporation, was considering actions that could significantly affect the organization, staffing, and role of the Information Technology (IT) function in the company. Hazleton and other senior managers had agreed it was imperative to introduce major improvements in operational efficiency through a process-centered organization, not only to increase cash flow but to best position the company for long-term competitiveness. They knew instinctively that IT could play a major role in enabling operational changes, but were uncertain of just how that would occur or how it should be organized and managed. Hazleton wanted to move quickly, but knew the success of radical operational and work changes depended on the full support of his Operating Committee of sixteen senior managers and the support of every employee.

Background
Dow Corning Corporation was founded in 1943 as a jointly owned enterprise by The Dow Chemical Company and Corning Incorporated to develop the potential of silicone materials. Dow Corning's principal businesses were silicone materials and polycrystalline silicon. Silicones are chemical compounds based on silicon, an element refined from quartz. Silicone products vary from fluids used for antifoams and lubricants; elastomers used as building sealants, gaskets, and pacemaker leads; and resins applied as protective coatings. The corporation also manufactured high purity polycrystalline silicon, the principal intermediate material for semiconductor chips.

In 1994 Dow Corning had sales of $2.2 billion, approximately 8,300 employees and approximately 45,000 customers worldwide. It operated out of 29 manufacturing facilities on five continents, with greater than 50% of its sales generated outside the United States. The company was headquartered in Midland, Michigan, USA, with regional headquarters in LaHulpe, Belgium and Tokyo, Japan. The firm emphasized eight core values: integrity, customers, employees, safety, technology, quality, environment, and profit. Each year an internal publication reported key metrics on the status of each of these values.

Dow Corning developed, manufactured, and marketed almost 5,000 silicone products and related specialty chemical materials. Seven to eight percent of sales revenues were regularly devoted to research and development, and in 1994, twenty percent of revenues were from products introduced in the last five years. Dow Corning had long competed with large regional and global companies, such as Shin-Etsu in Asia, Rhone Poulenc and Wacker in Europe and the U.S., and GE globally, but newer niche players were increasing the pressure on both quality and price. At the same time, Dow Corning's customers were demanding faster cycle times and greater responsiveness to unique needs. Management perceived both economies of scale and customer responsiveness would be essential in order to remain competitive in the global marketplace.

In 1976 top management introduced a unique multidimensional organizational structure that recognized the diverse demands of business, geographical area, and function. Dow Corning successfully used this structure, which gave most professionals multiple bosses, while other firms were failing in their efforts to establish matrixed reporting relationships. Industry experts credited this structure with providing a major competitive advantage.

The matrix structure allowed Dow Corning to view itself by business group, geographical area, or specific function. It had two business groups: the Core Products Business Group (CPBG) and the Advanced Materials Business Group (AMBG). While the two groups had some overlap, they were distinguished by the CPBG's emphasis on products with established operational excellence and global reach in contrast to the AMBG's product innovation.
orientation and focus on local and regional customer relationships. Geographically, Dow Coming had three areas: Europe, Asia, and the Americas. Functionally, the firm had four key units: Manufacturing and Engineering, Science and Technology, Marketing and Sales, and Administration. The heads of the two business groups, three geographical areas, and eight functions were all company officers.

In its value statement, Dow Corning articulated its commitment to an open and creative culture that recognized employees as the primary source of ideas, actions, and delivery of performance. Dow Corning's consistent growth performance had resulted in a stable work environment that reinforced the loyalty of its employees. Recognizing the value of this stability, the management team was determined to avoid reengineering initiatives driven solely by the need to downsize the organization.

The Breast Implant Crisis
In 1992, arguing that manufacturers had not sufficiently demonstrated the safety of breast implants, the Food and Drug Administration (FDA) restricted the sale of silicone gel-filled breast implants. By that time, Dow Coming, which had been manufacturing implants for almost 30 years, already had discontinued production partly in response to a trickle of lawsuits that attributed various autoimmune diseases to the implants. The FDA action led to a torrent of product liability lawsuits. While the link between silicone implants and connective tissue disease or other illnesses was not supported by scientific evidence, sympathetic juries made multi-million dollar awards to plaintiffs. By early 1994, over 9,000 lawsuits had been filed against Dow Corning, which had been the largest manufacturer of breast implants. Both to reduce uncertainty and to place some limit on the total payout, the major manufacturers in April 1994 agreed to set aside $4.23 billion for women with breast implants, of which Dow Coming committed $2 billion.

Intensifying competition and increasing customer requirements, coupled with breast implant litigation, created a need to meet changing customer expectations and to optimize cash flow. In 1992 and 1993, the firm recorded net operating losses as a result of breast implant-related charges. While breast implants had been a very small part of the firm's revenues (less than one percent), the litigation and publicity were consuming significant human and financial resources. In June 1993, when Richard Hazleton became CEO in addition to his role as president of Dow Coming, he took on a challenging leadership assignment.

Hazleton promised employees and shareholders he would continue an environment of open communication concerning both the breast implant crisis and Dow Corning management. Employees responded to this openness and rallied around Hazleton and the rest of the top management team. They even voluntarily bought six pages of advertising, costing $5,170 in the local Midland Daily News. On these six pages, 2,068 employees signed their names to a statement of support. The message stated:

To: Dow Corning Executive Management
Your Employees are Behind You 100%

Hazleton's continuing commitment to openness extended to the management culture. Charlie Lacefield, Vice President and Executive Director, Manufacturing and Engineering, described the environment:

The culture of the corporation is that it is okay to disagree. Management is comfortable saying "I don't know."

The IT Function at Dow Corning
In 1994, Dow Coming's core IT unit, Systems and Information Management (SIM), had a staff of 120 headed by a director, who reported to the Vice President of Science and Technology. SIM oversaw mainframe transaction processing, which was centralized in Midland, and the global network that enabled it. The unit was also responsible for telecommunications, mainframe e-mail (EBM's PROFS), end-user training, and global systems supporting financial
reporting, procurement and process control. The SW budget had grown from $10 million to $20 million between 1984 and 1994, but as a percentage of sales, the budget had shrunk, representing less than one percent of sales in 1994.

In 1992 SIM management had issued *Dow Coming Information Network Principles* in recognition of the changing business environment and the growth of end-user computing. The principles described how the company would "tend to do computing in the future." Key principles included:

- increasingly decentralized IS decision making;
- faster cycle times;
- greater empowerment;
- working closely through standing committees to develop plans, strategies, policies, priorities, and controls.

Several of the standing committees were comprised of corporate and regional senior managers. These included the Systems Management Board (SMB), European Competitive Computing Board (CCB), Japan-Pacific SMB, and Dow Coming Inter-America (DCIA) SMB. Others were comprised of local IS staff and power users, such as Dow Coming Information Network (DCIN) Leadership Council, DCIN User Council, Science & Technology (S&T) Computing Council, and the Process Information & Control-Technology Center. The committees were expected to provide strategic and technical direction, but Operating Committee members tended not to be involved with them. Some members of the Operating Committee believed they needed to better understand the importance of information management.

*Top management must declare an IS strategy and approach and then say "do it. When we tried to do it by consensus-there were too many chiefs.*

*Process Manager, Personnel Management Process*

The firm’s centralized information systems capability had been an important tool for enabling its multidimensional organizational structure. As such, managers noted that the IS function provided a competitive advantage in the 1970s. Over time, however, individual functions and sites had developed their own IS capability to meet unique or immediate business needs. By the early 1990s, IS functions were fairly evenly divided into three parts: SIM, functional IS staff reporting to functional directors, and IS staff at individual manufacturing facilities. This distribution of IS resources had led to a proliferation of useful, stand-alone systems. The inability to integrate these systems within and across sites hampered efforts to develop disciplined processes in support of globalization:

*When I went to the Midland Plant in 1992, I killed more software projects in the first six months than I had in my whole career. It was becoming an enormously ugly patchwork quilt. I mean the systems wouldn't talk to each other. Nice functionality, but they wouldn't talk to each other.*

*Midland Site Manager*

Top managers were particularly concerned about the lack of global supply chain management. At Dow Corning the supply chain started with understanding customer requirements and ended with satisfying those requirements. Thus, it encompassed order entry, manufacturing, and distribution. In 1991 SW initiated the GOES project (global order entry system) as a first step toward addressing global supply chain management needs. GOES was expected to link orders with manufacturing around the world. The project was very high profile and engaged individuals throughout the company to define requirements and support implementation. By mid-1994 the customer management module had been implemented in most parts of Asia and Inter-America, but the project was well behind schedule and estimated to be at least four years from completion:

*GOES struggled because we tried to put a global team together but everyone had their area perspective of what the requirements should be. It made it very difficult for us to*
In the meantime, Dow Corning had started to investigate the worldwide implementation of SAP, a software package, as an alternative to integrating the existing supply chain processes and systems. Many other chemical companies were implementing it, and there was strong sentiment at Dow Corning that the firm should be buying-not developing-systems of that magnitude.

*SAP would be a fast and effective way to get the global discipline on integrated common systems. It would, if properly implemented, correct for our lack of internal discipline.*

-BPIT Director, Europe

A committee report submitted to Hazleton in the Fall of 1994 noted that SAP would support a process rather than functional, approach to managing the company. The report emphasized that top management commitment and effective communication would be critical to the success of an SAP implementation. The committee also highlighted that SAP would demand a new technology infrastructure and new IT skills.

The push towards SAP accompanied growing management sentiment that SIM had a control mentality and lacked a sense of urgency. Top management felt that the unit had been well-mentality and had capable staff, but that it had been operationally focused and lacked a strategy.

*We were state of the art in IT in the mid-1970s. IT was an enabler of success. Then we got cost conscious and fell behind.*

-Operating Committee Member

Hazleton was convinced that the IT function was critical to enabling global process redesign in the organization. He noted that his goals for IT would be to (1) compress cycle time by getting necessary information into work processes for faster decision making; (2) focus on global shared resources and capability; and (3) provide tools and information to support empowerment. While he understood his goals, he was not sure how to provide the environment for achieving them:

*I've been reading on IT but I'm terrified. It's the one area where I don't feel competent. I sense that we're not getting good value for the money.*

Prior to October 1994, Dow Corning had spent considerable time and resources on identifying the business processes for the corporation. But implementation was only marginally successful due to aging information systems that were aligned with the more traditional functional organization. Information systems capabilities that transcended organizational boundaries and linked the activities of a process-centered organization were an important part of the changes envisioned by Hazleton and his management team.

**Action Steps for Top Management**

To address the issues facing SIM and the entire IT function, the Operating Committee had appointed four of its members as a subcommittee. The "gang of four", as they came to be called, included the three Vice President/Executive Directors for Science and Technology, Manufacturing and Engineering, and Human Resources, and the President for the Inter-American Area. With the Operating Committee's full support, the committee sponsored an assessment of IT and sought recommendations from consultants on the role and organization of the entire function. They particularly were interested in how IT fit into the potential for process change and the impending implementation of SAP.

Dick Hazleton awaited the consultants' report, but was already thinking of options for how the IT function should be organized and what kind of manager should lead it. It seemed to him the time was right for a new era of IT support in the business to begin.
Dow Corning Corporation (B): Reengineering Global Processes

Introduction
In early March 1997, Charlie Lacefield, Vice President & Executive Director of Business Processes and Information Technology at Dow Corning Corporation, was reviewing progress on Project PRIDE (Process Reengineering through Information Delivery Excellence), the corporation's long-term reengineering effort. The recent pilot implementation of SAP software in the United Kingdom had been a small, but important, step in providing the systems foundation for reengineering. The success of the pilot had resulted from intense effort on the part of many people at the pilot sites and the support organization at corporate headquarters. While some members of the global team were hoping to slow down and reflect on what they had learned from the pilot project Lacefield felt it was important to set an ambitious deadline for the next set of implementations.

If you want to sustain the momentum of the change program you have to continue to have milestones out there that are aggressive and challenging. Otherwise, you get to the end of the pilot and it is kind of like everything else is going to be anticlimactic when it is only the beginning. So you need to run a little faster than when you ran the pilot. Learning should allow you to do that.

Background
Dow Corning Corporation, a jointly owned enterprise of The Dow Chemical Company and Coming Incorporated, developed and manufactured silicon and silicone-based products for the global market. The company had a history of consistent growth in sales which reached $2.2 billion in 1994 and $2.5 billion in 1995. As a result of charges to income for current and future settlements of lawsuits related to silicone gel-filled breast implants, however, Dow Corning had recorded operating losses in both years. In May 1995, in an attempt to stem potentially catastrophic impacts of settlements on its financial stability, Dow Corning filed for protection under Chapter 11 of the federal bankruptcy laws.

In addition to the financial uncertainties stemming from the breast implant crisis, Dow Corning was facing increasing global competition. The global competition presented requirements for faster cycle times, lower costs, and greater responsiveness to customer needs. To address these requirements management felt that it was imperative to reengineer the global supply chain. At the heart of the reengineering effort was the implementation of SAP/R3.

Senior management had agreed to the SAP implementation in early 1995 at about the same time that they had introduced three major changes in IT management. First, a new committee, the Process and Information Technology Board, consisting of senior level officers was created and given responsibility for setting the global strategic direction for IT. Second, the IT function was combined with business process efforts to create a new organizational unit called BPIT (Business Processes and Information Technology). Third, Charlie Lacefield, the Vice President of Manufacturing and Engineering, was appointed to the newly created position of Vice President & Executive Director of Business Processes and Information Technology.

The Process and Information Technology Board undertook serious discussions about key processes at Dow Corning and the role of information technology. With the support of Dick Hazleton, the CEO, they proposed that Dow Corning move away from its traditional focus on function and towards a process orientation that recognized the interdependencies of the distributed functions and sites in meeting customer needs. They identified four key operational processes (Customer Focus, Product Delivery, Financial Management, Personnel Management) and four decision-making processes (Direction and Planning, Opportunity Development, Portfolio Management, Portfolio Development) that demanded seamless information flows across sites. By reengineering these eight processes, they believed Dow Corning could radically increase its cost effectiveness and responsiveness.
Hazleton had selected Lacefield to head the IT unit based on the recommendations of consultants, who had indicated that he was viewed as a forward thinking manager and was well-respected by senior managers. Lacefield, who did not have an information technology background, had been a member of the committee which had urged top management to create the new role. He felt that the IT unit had a talented staff who would become critical to the reengineering efforts. Lacefield sought to learn everything he could about information technology through readings and constant communication within and outside Dow Coming. He planned to establish a limited set of strategic priorities for the IT unit and then "cut loose the IT people so that they could do things."

At every opportunity Lacefield used the IT decision-making process to reinforce the integration of business processes and information technology. As a member of the Operating Committee he wanted to ensure that investment of Information Systems (IS) resources was clearly aligned with the business process priorities. Functional computing organizations were reorganized into a two-dimensional federal system with Corporate Information Systems (CIS) providing IT leadership, synergy and conformance across IS units (see Exhibit B-2), while area IS organizations focused on implementing IT solutions, providing localized service, and ensuring an effective interface with users. This modified organization leveraged global systems functionality and infrastructure capabilities, and reduced the reinvention of computer systems that resulted from decentralized efforts.

**Project PRIDE: Organization**

Lacefield made clear that the primary goal of the IT unit was to support Project PRIDE, Dow Coming's long-term reengineering efforts. First, the implementation of SAP/R3 would facilitate implementation of global transaction processes. While this alone would generate benefits, the firm anticipated even more significant benefits from the redesign of Dow Corning's four core operations processes: customer focus, product delivery, financial management, and personnel management. Finally, the reengineering would extend to the four decision-making processes: opportunity development, portfolio management, people development, and direction and planning. The reengineering efforts had an expected duration of about ten years. Benefits would grow and people skills would evolve throughout the process.

Dow Corning management decided to invest in the SAP software because analysis showed the software would enable the company to reengineer its global workflow processes. Contract negotiations focused on the full suite of software, a single worldwide agreement, maximum user seat discount rate, and lowest maintenance cost. Implementation of the software was to include some workflow redesign efforts that would yield visible benefits with delivery of the initial application, recognizing that radical reengineering initiatives, having a longer timeline, should not slow the software implementation.

To ensure that the implementation ultimately would lead to radical change in the firm's key processes, senior management developed a "Top 10" list of reengineering priorities. These radical change opportunities, shown in Exhibit B-4, provided focus for the SAP/R3 implementation. Top management hoped to achieve full SAP implementation and the Top 10 reengineering priorities by 2000.

In June 1995, a global team of forty well-respected operations and IT professionals was assembled from sites all over the world and brought to Midland to learn SAPiR3 and to design global processes. The team was instructed to design workflows around the capabilities of the software rather than solicit requirements based on current Dow Coming practices. This strategy resulted both from the learning of the failed Global Order Entry System project which had become mired in a consensus building process and from the understanding that SAP had attempted to build "best practice" into the software. While many firms implemented only selected modules from the SAP suite, Dow Coming intended to implement the full range of capabilities offered by SAP in order to integrate the sales, production, distribution, finance, and
human resource functions.

The team was divided into smaller teams, each focused on one of the SAP software modules. Each team was to learn the functionality in its area of expertise and to coordinate with the other units to ensure a good fit between their integrated processes. Despite the fact that Dow Coming had no prior SAP/R3 expertise, the team was to receive minimal support from consultants. Ultimately, Dow Coming would have to support SAP in house, both technically and organizationally, so management opted for bringing employees up the learning curve by having them lead the implementation process. The vote of confidence boosted global team members' confidence:

> When Charlie Lacefield moved into his role what he had was a very good group of folks, and what he did was show a lot of confidence in those folks, and it was genuine. The proof that he felt that way was the fact that he didn't outsource this thing to Andersen or Price Waterhouse. And not just Charlie but other management too said, "We're going to let our people do this and we're going to put them in charge of this and we'll use consultants when we need to but we have the expertise to do this." This is proof that management really has confidence in us and that's a very exciting thing.

-Information Architecture Department Manager

**Project PRIDE: SAP Project Management**

While the mission of the global team was clear to all its members, the processes for accomplishing it were not. Team members quickly learned that SAP/R3 was extremely complex and SAP had little documentation, inadequate training, and a limited installation base to provide reference points for learning the software and configuring the system. Most of the team members attended an extensive training session offered by SAP in September 1995, but much of the training was on SAPIR2 and was not directly transferable to R3. They returned to Midland still struggling to understand the methodology for simultaneously learning the software, designing, processes, and configuring the system. They were particularly challenged by the highly integrated nature of the software, which they cited as its greatest strength and its greatest weakness. On the one hand, the small teams had to focus on a fairly narrow functional area in order to understand the software's capability. On the other hand, they had to recognize how their configurations impacted, and were impacted by, other areas, some of which had not yet been explored. They spent much time hands-on with the SAP/R3 software exploring what it could and could not do.

For purposes of maintainability, Dow Coming was committed to minimizing changes to the SAP software. Requests for "mods" had to go through the Process and Information Technology Board because of their implications for software maintenance. In some cases, the Board decided changes were necessary to enable unique Dow Coming work requirements, and in those cases programming changes were made. However, team members who requested such mods were often unsure if the need for a mod resulted from a deficiency in SAPIR3 or from the team's own inability to learn how SAP allowed a particular process to be performed:

> In accounting we decided to value all our transactions in a certain way for management and do it a different way for statutory requirements, and SA-P, to our knowledge, didn't handle that requirement. So we had to put some programming in to convert from one to the other. Well now that we've completely examined our process and we understand what it is we really need to do and what SAP can really do for us, we'll end up with a far superior process and not have to use the changes that we made in SAP.

-Project PRIDE Financial Management Module Team Leader

Team members recognized that SAP did not provide full functionality, particularly for manufacturing. Ultimately, they would need some "bolt-ons" which would interface with SAP/R3 to provide capabilities that SAP had not provided. Growing numbers of vendors were
building "bolt-ons" for capabilities such as bar coding, Electronic Data Interchange (EDI), Production Planning for the Process Industry (PPPI), and form printing. For the earliest implementations, the team intended to minimize bolt-ons to ensure that the core of the system went in successfully, but it meant sacrificing functionality that had existed on Dow Corning systems in the past:

> When we're talking about functionality such as automated data collection (bar-coding), our existing applications helped reduce the number of people necessary to do the tasks. Now if we come back in with less functionality, obviously they're going to add more human resource to support their business. That is a concern.
> -Project PRIDE Workflow Technical Leader

The team struggled constantly to define its methodology and establish a project plan, but the complexity of the software and the integration of the individual pieces made that difficult. Team members noted that prior project experiences did not help them manage this particular project:

> Some folks on my team who come from a rigorous manufacturing background asked, "Where's our project plan?" We're doing a lot of this on faith. I mean how do you put a plan out there and say, "Learn SAP. OK, you've got two weeks to learn that and then you've got two more weeks to learn this." You really can't plan learning or knowledge transfer the way you plan a production schedule.
> -Project PRIDE Product Delivery Module Team Leader

In February, 1996, Lacefield observed that the team was losing momentum as they became overwhelmed by the complexity of the system and its tight integration. He reorganized the team to reduce the number of leaders from eight to four--one for each of the four core operations processes--and brought in a new project manager, Ralph Reed, site manager in Midland. He also set a September 30 deadline for implementation at three pilot sites in the United Kingdom. The tight deadline motivated the team leaders to delegate more decision making to individual team members and concern themselves less with reaching consensus:

> What's the opposite of a good solution? Another good solution! There's lots of different ways to do things. Just pick one and get the momentum behind it and you're going to be successful. I think that's what ended up happening. We picked one, we got buy-in, and I think we've been successful with that.
> -Project PRIDE Product Delivery Module Team Leader

The Transformation of IT at Dow Corning

The repositioning of IT had transformed it from a service unit aligned by business function to an integral part of the business concerned with business process:

> We went from being aligned under a lower level manager to a Vice President that has pushed BPIT. Ever since Charlie Lacefield took over we have dramatically changed as an IT organization. And I think the idea of bringing in SAP was great because it forced us as a company to step up to client server, step up to the infrastructure. We're getting away from doing a lot of programming to doing systems integration. I think it's going to enable us, from an IT perspective, to become more business process oriented, understand that, and open up more doors within the company.
> -Project PRIDE Workflow Technical Leader

The shift to distributed processing that accompanied SAP introduced a new set of challenges. In the past, the central unit could provide for all infrastructure needs from Midland. Distributed processing meant that they would need to localize some services:
Our legacy environment does have multi-language capabilities. Our material safety data sheet, for example, we’re printing in 20 some languages. So we do have a fair bit of expertise, - but what we don't have is a help desk that has individuals who speak other languages, especially Asian languages. So support's a major concern in terms of a global support organization that involves local help desks with local language speaking individuals who have the needed expertise.

-Information Architecture Department Manager

IT management believed that a tightly coordinated infrastructure was needed to make the distributed computing environment work. They addressed infrastructure requirements through eleven competency centers (described in Exhibit B-5), staffed full-time by corporate IT and, on a part-time basis, by IT members of local offices. Leaders of the competency centers met weekly to address cross-functional concerns. Many of the competency center leaders also led efforts supporting Project PRIDE. As they developed the infrastructure to support SAP/R3, they considered the broader needs of Dow Coming. PRIDE was driving IT requirements, and the IT unit was accomplishing its mission to build capabilities that would support future business needs.

A key initiative supporting Project PRIDE was the GWP (Global Workstation Project). Dow Coming signed a leasing arrangement with EBM that would-put a standard desktop unit loaded with Windows 95 and Microsoft applications on every desk. The standard desktop unit would be a key enabler of R3 implementations by ensuring necessary computing power and facilitating troubleshooting:

> GWP is very much the beginning point of implementing SAP in the future, because we want to have a standard base. A user calls the Help Desk and we don't have to ask, "Did you get that at Best Buy or Circuit City?" We know what they've got. If there are problems we simply take a Gold CD and reinstall the software and it should be up and running again. Even remotely.

-Project PRIDE Workflow Technical Leader

The architecture underlying the R3 implementation called for a centralized database despite the distributed processing. This architecture recognized both the limitations of the software and the business requirements of Dow Corning:

> SAP articulated the benefits we would get if we had what they call a single image, a single database. We really felt those benefits were significant. And this was not largely an IT decision. IT was what can we do functionally if we have a single database, like the ability to do credit checks globally without having the complexity of having to do them across separate systems that have separate customer databases and such.

-Information Architecture Department Manager

The biggest technical challenge of R3 implementation was doing backups, database reorganizations, and upgrades. SAP was developed under the assumption that the system could be brought down during operations like these, but downtime was not feasible for a centralized system supporting global operations. So Dow Coming had invested in a hot site that would mirror operations and had developed some creative programming that would keep the two systems in sync during maintenance procedures:

> Today to do an upgrade takes 48 hours and there's no faster way-you buy the fastest hardware, the best people, and still in the best case, it takes 48 hours. That's 48 hours that the system is not available to users.

-Associate IT Consultant
The Pilot Implementation

The pilot implementation delivered all SAP modules, except Human Resources, to approximately eighty employees at three sites involved in the rubber supply chain in the United Kingdom (Barry, Cowbridge, and Manchester). Charlie Lacefield and Ralph Reed worked with top managers in the region to explain the importance of global process reengineering and the role of SAPIR3 in supporting that initiative. Management at all three sites prepared employees for major changes in their processes, although they knew little about the nature of the changes:

"The area manufacturing director, the sales and marketing director in the area, and the financial director, along with the head of IT for Europe got together as a group and spoke with one voice: "We support this, we're going to do this, we're going to do this well, we're going to embrace this, we're going to make it work."

-Project PRIDE Product Delivery Module Team Leader

Approximately 25 members of the global team went to the UK to explain the new processes to employees and to support the implementation process. They arrived around three weeks before implementation, and in some cases, stayed seven weeks to help local staff adapt to the new processes. While the global team had specifically avoided learning "as-is" processes because they were not relevant to determining global best practices, they found that their limited understanding of local processes hampered their ability to explain new processes:

"We didn't know that the person carrying the title of production supervisor was doing procurement, planning, and scheduling. We had no clue what else this person was doing. We didn't know their roles in their previous environment and we were not prepared to tell management these are the jobs that these people are doing, this is how these jobs are evolving with the new work flows. And that has been a bottleneck.

-Project PRIDE Customer Focus Module Team Leader

The pilot met the deadline. By September 30, all modules were up and running (except for Human Resources, which was not scheduled for implementation until most sites were running the initial installation), but to meet the deadline the team had to abandon some of the functionality they had hoped to include. For example, they had wanted to automate authorization notices for large purchases, but they were unable to get that working well. The team decided to hold off on this functionality for later implementation. In some cases, such as recording the movement of goods within a warehouse, the implementation created new work. Yet in spite of these problems, individuals at the pilot sites noted the advantages of having a single global system and were optimistic that benefits at the local sites would accrue over time:

"SAP has advantages. At the moment we're experiencing a lot of disadvantages. We are not realizing productivity gains on a day-to-day basis, but there are control benefits. I think in five years' time, we'll have an integrated, coherent system which will free up staff to make better use of information rather than having to maintain and control the information.

-Chief Accountant, UK Manufacturing Site

For its part, IT's presence at the pilot site was almost invisible by the implementation date. By then, the challenges centered on new workflows, not on technical difficulties. Hardware, software and data were already in place and local power users had accepted responsibility for technical responsibilities, such as loading data tables and maintaining servers and printers:

"We got things in just in the nick of time and it was very stressful. And things were being
tweaked and fixed all the way right up until the day before it went live. An interesting observation, I think, is that the approach that was used with the goal of not allowing the schedule to slip was one of adjusting the scope. But you can’t do that with infrastructure. You can’t say we’re only going to put in 15 workstations instead of 30, and you can’t say we’re going to put in part of the local area network instead of all of it.

-Information Architecture Department Manager

Preparing for Future Implementations

The pilot implementation provided some important learning and Lacefield worked with global team management to formalize as much of that learning as possible and restructure roles as appropriate:

Because of the complexity of this you just cannot believe that you have got all the insights necessary to put the full game plan together. That is one of the reasons that after each major milestone on Project PRIDE we reassess what the next dimensions ought to be. Not that there are major wild changes because if you are out of control then I think you don't have a plan. But adapting a plan from what you learn is very positive.

-Charlie Lacefield

In particular, the implementation had helped clarify the role of the global team. The global team had accepted primary responsibility for working with individuals implementing R3 at the pilot sites. In future implementations, management expects to rely on area teams for implementation support in order to allow the global team to focus on adding functionality and performing multiple implementations. The area teams were critical to the firm's ability to fully implement SAP by 1999 because the global team could not become personally involved in implementations at all the sites:

It became obvious to me very quickly that the only way to do a project is to do it as fast as you can, whether we are building a manufacturing facility or whether we are doing a PRIDE piece. It also became obvious to me that the core global team, as we call it, can’t do it all. There are just not enough hours in the day or enough bodies in those hours. Now that means that we have got to expand our horizons with regard to the number of people who are in the passing judgment mode into the involvement mode. That means we have to accelerate the training.

-Ralph Reed, Manager, Project PRIDE

The model called for three area teams: one each in Europe, Asia, and the Americas. These teams were expected to handle eighty percent of implementation needs, while the global team would provide the remaining support. The European area team had consisted of fourteen persons for the pilot. Once the global team had left the UK, the area team had responsibility for system and workflow support. They quickly learned, however, that they had not been adequately trained to fill that role. Instead, they functioned as mailboxes, where users would submit questions that they would forward on to the global team. Eventually, the area team members were dropped from the loop as both individual users and global team members found it more efficient to communicate directly.

To ensure that area teams were better prepared to support local implementations, management created the PRIDE Academy, which provided extended training for area team members. Initial training took place in Midland, where global team members not only taught existing functionality, but also sought the expertise of area team members on the design of new work processes. After several weeks in Midland, area team members returned to their local sites where they were to test the system prior to implementation. Area team members would return periodically to Midland for additional training and to participate in multiple implementations to accrue learning from their own experiences. The first class, which included twenty-five Asians, thirty-two Americans, and nine Europeans, concluded in early March 1997 and entailed three weeks of intensive training.
Next Steps

As part of the process of redesigning workflows and developing additional functionality, global team members had started interacting more with functional experts throughout the company. These "think tanks" assembled individuals who could envision processes associated with the top ten priorities and who could help define best practices:

*In this way we get experience from outside of PRIDE so it expands our experience base and it also starts to help us communicate and get buy-in for the changes around the organization. These are highly respected people that we pulled into this, respected for their technical abilities, respected for their ability to get things done, to think differently, to think out of the box. In one case, for example, there are 24 people on the team. You can get a lot of mileage out of 24 people going back out into the organization saying, "Listen up here, folks. I just had a hand in developing this process and you're going to see it coming your way in a couple of years."*

-Project PRIDE Financial Management Module Team Leader

While these "think tanks" would provide some insights into the R3 implementation, their more important role was to bridge the initial SAP implementation to the larger reengineering effort. SAP would lead to some changes and greater discipline, but senior management had purposely not attempted to accompany the SAP implementation with radical reengineering:

*If we slow down and wait for the reengineering to catch up with the software we are going to lose momentum and we are going to lose the stability of the team. You can't hold a team together for four or five years. In fact the reengineering piece has got all this human side of it which is changing people's ways of doing things and changing the culture which is a longer process than putting the software in place.*

-Charlie Lacefield

The IT unit turned to issues of scale. Supporting the needs of 100 English-speaking users in three sites was not a problem, but adding sites would create new challenges, such as time-zone functionality, multiple language capabilities, and meeting scalability requirements:

*We have enough hardware easily to handle the 100 users, but no one I've talked with yet has run 3,000 concurrent users on SAP. In fact, no one has run 2,000. No one I've talked to has even run 1,000 yet. So the first question is can we be sure that SAP and the hardware/software will actually scale to what we're expecting it to do. The second issue is availability. That is very difficult to forecast.*

-Associate IT Consultant

IT would be working with the global team to identify and support key bolt-ons. As they moved into sites that had been highly automated, they anticipated some resistance to a system that would reduce automation and demand increased human resources. They wanted to meet key needs as quickly as possible without jeopardizing management's desire to bring on new sites in rapid succession.

The next implementation would take place in Wiesbaden, Germany in April. Lacefield and Reed were working to enlist the commitment of management at the sites to the kinds of changes that were forthcoming. Lacefield had been communicating for over a year with area managers about the need for Dow Coming to function as a global corporation, and he found support conceptually for what they were trying to accomplish. He noted that continued top management commitment was key to his communication efforts:

*The real issue that people ask about is management's staying power. Will we continue to drive at this or somewhere along the line will there be a new flavor of the day? That is management commitment and visibility is absolutely important.*
Management recognized significant risks in attempting a global systems implementation in order to drive reengineered, common processes and increased discipline around those processes, but they believe that these efforts were critical to Dow Coming's long-term competitiveness:

"People might sit back and say, in an academic sense, what if this thing fails. And my view is that it is an irrelevant question because we can't go back. All we have currently is a bunch of old legacy dogs that are going to die. We have got to go forward and we may not be in the exact place where we think we will be but we will be close. And that will be successful to me. We have got to do it. The alternative is nowhere. It has almost ceased to exist. So it has got to succeed and, by and large, people are willing to do whatever it takes to make it so."

-Ralph Reed
Exhibit B-2

Dow Corning
Internal

V. P. &
Executive Director
Business Processes &
Information Technology

Business Processes
&
Information Technology

Global Business
Processes

Customer Focus

Product Delivery

Financial Mgt.

Personnel Mgt.

Opportunity Dev.

Portfolio Mgt.

People Dev.

Direction & Planning

Area
BP/IT

Americas

Asia

Europe

Project P.R.I.D.E.
(SAP)

Project Manager

Tech. Coordinator

Customer Focus Team

Product Delivery Team

Financial Mgt. Team

Personnel Mgt. Team

Quality Mgt. Team

Corporate
Information Systems

Applic. Delivery
& Support.

Applic. Development
Expertise Cir.

Info. Resources

Info. Architecture

Information
Technology Services

User Services

Exhibit B-4
Reengineering Priorities

CUSTOMER DEVELOPMENT
PARAMETRIC APPROVAL
REPLACE BUDGETING
SINGLE TRADING ENTITY
EMPLOYEE DATABASE MANAGEMENT
SUPPLY CHAIN MANAGEMENT
ACTIVITY BASED COST MANAGEMENT
SINGLE DATA SOURCE/COMM ON CALENDAR
CUSTOMER DISTINCTION
SUPPLIER MANAGEMENT
## Information Technology Competency Centers

### L/T COMP. CTR.

|----------|------------------------------------------------|--------------|------------------------------------------|--------------------------|---------|-------------------------------------|------------------------|----------------|-------------------------------------|----------------------------|
| • I/T security policies & standards  
• Business continuity planning  
• User access: applications, networks, platforms; databases | • Ensure computer literacy  
• Coordinate I/T training leaders  
• Maintain listing of I/T subject experts | • Standards for electronic office tools  
• Lotus notes & Internet pilots  
• Improved CS Enterprise Office Sys. | • Decision support, expert and exec. information systems  
• Numerical intensive computing  
• Neural networks  
• Ensure decision support systems standards | • Client/Server (C/S) development & continuous improvement infrastructure  
• Project PRIDE implementation and continuous improvement  
• Legacy systems outsourcing  
• National language support | • Network standards & configuration  
• Voice services | • Hardware standards & configuration: servers; workstations  
• I/T asset management | • Information warehouse strategy & standards  
• Document management capabilities  
• Database management systems  
• Process data repository administration | • Architecture definition, strategy, standards and communication  
• Principles & methodologies for managing new technologies/tools  
• Client/Server infrastructure | • Establish standards & expertise for automated data collection, process control, laboratory information systems; mfg. execution systems | • Define standards for development and adoption  
• Ensure I/T standards awareness | • Define security framework: Project PRIDE, client/server applications, Internet  
• Define and maintain curriculum | • LAN and WAN services | • Define workstation configuration standard  
• Document management solution  
• Global C/S repository strategy  
• Information warehouse strategy  
• Sybase versus Oracle decision  
• Taxonomy framework | • PRIDE technical foundation  
• Client/Server architecture  
• I/T decision making methodology for technologies, tools | • Generic process control & mass balance methodology  
• ADC, MIS, LIMS implementation | • Define standards review/approval process  
• Identify awareness plan |
In February 1999, Charlie Lacefield, Vice President and Executive Director of Business Processes and Information Technology (BPIT) at Dow Corning, reflected on the firm’s recent completion of a massive SAP implementation effort within budget and on schedule. Nonetheless, he observed that the systems implementation was merely the first stage in the firm’s large-scale reengineering effort:

The SAP implementation has resulted in three major changes in Dow Corning. One, we have taken a significant step toward being a fully integrated global company. Two, we have become process-oriented; people realize their interdependence. Three, we have increased our discipline in how we perform our processes. Now we have to accelerate productivity improvement and grow revenue without significantly increasing our employment levels. And we have to attack commercialization—getting product that meets customer needs to market faster and sharing the knowledge to do that better on a global basis, as well as understanding the customers’ service needs as part of the total value of Dow Corning’s offerings.

After thirty-six years at Dow Corning, Lacefield was preparing to retire. He felt he was leaving a company that was in the process of transforming itself.

Background

Dow Corning Corporation, a jointly owned enterprise of the Dow Chemical Company and Corning, Inc., developed and manufactured silicone materials and polycrystalline silicon. In 1998 the company had sales of $2.5 billion and approximately 9000 employees on five continents. Although based in Midland, Michigan, USA, over half of Dow Corning’s sales were generated outside the US, and for two years the company had seen its sales languishing due to a severe financial crisis in Asia. The Asian crisis had arrived on the heels of financial pressures resulting from protracted litigation around breast implants, which had resulted in a filing for Chapter 11 bankruptcy protection in 1995. (Note: In 1999, Dow Corning and the official Committee representing Tort Claimants agreed to a joint plan to resolve product liability claims in the bankruptcy. A confirmation hearing was scheduled for Summer 1999 for the bankruptcy judge to consider confirming the plan and ending the bankruptcy.)

Responding to competitive pressures that demanded both cost effectiveness and customer responsiveness, Dow Corning had decided in early 1995 to embark on Project Pride, a corporate-wide reengineering effort that used SAP to provide the applications infrastructure for greater integration across the firm’s product lines and geographies. In its early discussions about Project Pride, Dow Corning’s senior management team acknowledged that anticipated financial returns from Project Pride would materialize only after the firm undertook major process reengineering. Nonetheless, they decided to focus attention first on implementing SAP rather than on reengineering. They cited three reasons for this implementation-then-reengineering sequence: first, to provide a data and workflow foundation for reengineering, second to minimize later arguments for modifying the software to fit the organization, and third, to bound the limits to change, since the SAP implementation itself would demand some new workflows and roles. Charlie Lacefield explained:

The decision to implement SAP first was a conscious act driven by the desire to make change visible in a very short time frame. I do see the debate of which should come first, ERP implementation or process reengineering, as a chicken or egg discussion which can trap a company into intellectual inactivity as opposed to taking action.

- Charlie Lacefield, Vice President and Executive Director, BPIT
In June 1995, Dow Corning assembled a global team of forty financial, operations, and IT professionals to head up an enterprise-wide SAP implementation. This global team was charged with configuring the software and implementing a single core model in all sites world-wide. Dow Corning Corporation intended to store the SAP-generated data from all its sites in a single database located in Midland.

The system was pilot tested at three UK sites beginning on September 30, 1996. The implementation proved disruptive to business processes at those sites, but useful in helping PRIDE team members identify major issues to be addressed in future implementations. Project leaders assessed the learnings from the pilot to clarify global, area, and local team roles, to define training needs, and to develop a clearer implementation plan. Meanwhile, the global team started to work with a team of process managers who reviewed SAP-induced process changes and began to consider future process designs.

**Rolling out SAP**

Following the pilot, the senior management team established a December 1998 deadline for full implementation of the SAP suite—except for the human resource module, which was not as tightly integrated as the other modules. To help management assess readiness as each site approached cut-over, European leadership developed a schedule of key milestones to support each implementation.

**Milestone A—Implementation scheduled.** The first step in the implementation was the scheduling of sites. The pilot sites had all been part of Dow Corning's rubber business. They were small but represented a broad range of functional requirements, so they gave the firm a basis for learning the unexpected challenges that would accompany implementations. Future implementations were similarly grouped, recognizing the interdependencies of sites that sourced one another or shared distribution and sales facilities.

**Milestone B—Schedule Verified.** For each site the global team's first task was to identify unique legal requirements and how the firm's core model could address them. Thus, each new implementation started with extensive negotiations around local and global processes. If a site had to address a local tax issue or collect data that was not part of the core model, the global team sought ways to accommodate those needs. In most cases, however, the local site adopted global standards. For example, one site asked the global team to extend the core model in order to implement its existing range of customer payment terms:

> They (local management) were talking about all these payment terms that they want to have. We said: "No, we are standardized now with a set of global payment terms. If you want to talk about that [standard payment terms] with the global business process managers, then that is up to you."

—Global Project Coordinator

In the process of the negotiations over legal requirements and global standards, site management worked with the global team to identify change management needs and a detailed activity plan. When site management deemed that these tasks were completed, Milestone B was achieved.

**Milestone C—Implementation Cut-over Date Confirmed.** Training on both the system and on global processes began months before implementation. Area and local team members, later referred to as power users, attended a two or three-week training session at Pride Academy in Midland, where Global Team members shared their insights and expertise. These power users then returned to their sites to train other users. In total, over 500 persons attended Pride Academy, and many then participated in implementations prior to their own to enhance their learning. Trainers found that teaching people how to enter transactions in SAP was not difficult, but teaching them how their processes would change was extremely challenging. Most employees had developed a great deal of expertise in how they were conducting their work:
We were taking away 15 or 20 years worth of experience and expertise that people had in how to get the job done, both in workflow and the system capability that they have, whatever it is. They had become the masters of it.

— Director, Americas BPIT

A critical task in preparing for implementation was cleaning and loading master data. This involved eliminating item numbers that were no longer active, adding data that linked master data to specific workflows, and editing data as it was loaded into SAP. Because master data embodied not only materials but workflows, one data management expert estimated that SAP required ten times more data to operate than the legacy systems had required. Dow Corning developed automated data editing mechanisms for checking data as it was loaded into SAP:

Some companies and some other people have basically just loaded the tables. You have no editing. So when you get ready to use that data, if it's bad data, it doesn't work and you don't know it until you get ready to use it. We knew it when we tried to load it.

—SAP Data Administrator

Despite the caution in preparing the data for implementation, the final loads inevitably revealed some bad data, and last-minute adjustments were necessary:

Some of the data preparation was very sloppy. It was very bad. They just didn't understand.

—Director, BPIT Consulting Services

When site management declared that training and data conversion were complete, the site had passed milestone C. Until that time, site, area, or corporate management could request delays of the scheduled implementation. However, the global team was very committed to its deadlines, and the detailed activity plans tended to keep the sites on schedule. In total, just two sites postponed their implementations to allow more time for these activities.

Milestone D—Stable Site Operation. The week before and after cut-over was one of very long hours and intense learning. Global team members worked with area team members and local power users to help clarify workflows. Global team members usually departed within a week or two of implementation in order to start the process with the next set of sites. This could be unsettling to sites that were not yet comfortable with the new global workflows, but it was representative of the challenge of allocating scarce human resources as Dow Corning attempted to meet deadlines. Occasionally, an appeal from a site manager led to a reallocation of global team resources.

Each implementation experienced moments of euphoria and frustration as successes and problems built upon one another. These were frequently chronicled in email messages to corporate management. (The Annex has excerpts from ongoing reports on the December 1, 1997 implementation in Japan.) Some implementations were clearly more difficult than others. Lacefield attributed the difference to "...whether their database is in reasonable shape; whether they've had the appropriate kinds of training... A lot of it has to do with leadership."

In general, the implementations became progressively smoother over time, because global and area teams were able to leverage their learning. However, the July 1, 1998
implementation at two US sites was particularly rough. Problems included: inconsistent units of measure across related manufacturing and warehousing sites, inaccurate paperwork accompanying orders shipped, and at one plant, inability to accept its customers' customized color selections. These problems were visible to customers and caused great concern among management, as described in the following email message from a customer service manager to project leaders:

The transition and cutover to SAP was supposed to be for the most part transparent to our customers and distributors; but unfortunately it hasn't been and now it is becoming a "major bone of contention" ... WE NEED TO BE ABLE TO FIX THESE ISSUES ASAP and assure our customers/distributors/employees that we are RESOLVING THESE PROBLEMS IN AN EXPEDITED MANNER WITH BOTH WORDS and ACTIONS and that we are "customer friendly" to do business with and they can again rely on Dow Corning Corporation as they could in the past and should expect to in dealing with the industry/market leader, etc!!!

—Email message from Customer Service Manager, August 11, 1998

Corporate management attempted to resolve issues with the troubled implementations by creating a special stabilization team that included reinforcements from Europe who provided additional workflow training. Management also provided IT support to resolve the custom color problem. Largely because of the difficulties with the July 1 US implementations, plant managers in Midland became concerned that the scheduled October 1 implementation at the Midland plant was too ambitious. Midland was by far Dow Corning's most complex site, because it sourced internal as well as external customers. Thirty-five percent of its output was shipped to foreign Dow Corning sites and another 30-40% was shipped to Dow Corning sites in the US. Thus, a disruptive implementation in Midland would have serious implications for the whole company. Concerned about competing for resources that were needed to correct for ongoing problems in the earlier implementations, Midland plant management requested an extension of their October 1, 1998 implementation date. But Lacefield argued emphatically that the real benefits of Project PRIDE could not accrue until the entire company was integrated;

My premise was that once you focus on process orientation, you can't stop the first time something goes bump in the night and say, "Hey, wait a minute, we can't go on." The key to working as a process oriented company is that you have to get the flagship in place so you have everybody on the same database, so we worked toward date driven goals. The fact was we were still struggling with the two sites that had postponed their implementation, yet we needed to move forward with the Midland implementation to maintain our schedule. As it turned out, Midland was a smoother start-up than the two sites that were postponed.

—Charlie Lacefield

Ultimately, Dick Hazleton, Dow Corning's CEO, addressed plant management's concerns by funneling additional resources to Midland rather than delaying the implementation. The Midland implementation took place on October 1, as planned.

As was true in earlier implementations, Midland lost some systems functionality in the conversion to SAP. This resulted in more work for an employee base that was struggling to understand and adopt new processes. And while customers had been warned about the cut-over and most had responded by ordering surplus in advance, Midland management was
determined not to allow the wrinkles of the cut-over to become visible to customers. This created additional resource demands. For example, the quality center staff increased from four to seven people to ensure shipment accuracy while employees ironed out new processes. Four months after implementation the plant manager reported that:

We can continue to make product and ship product to the customers. But it's taking a lot more effort than before [SAP was implemented]. It's taking off-line systems.

-Midland Plant Manager

Sites passed Milestone D when they had achieved performance at about the level at which they were operating prior to implementation. Due both to limited baseline measures and to changes in what was measured, the determination that Milestone D had been achieved was somewhat subjective. But the stabilization period appeared to be getting shorter. The pilot sites had needed almost 18 months to reach stabilization, whereas (with the exception of the two US sites noted above) later implementations usually required only four to six months.

Post-Implementation
Dow Corning, as a corporation, had essentially passed Milestone C by the end of 1998, It had almost 9000 registered SAP users and was supporting as many as 1500 concurrent users in 48 legal entities at 109 locations in 17 countries. Two sites, Argentina and Brazil, had not passed milestone C, due to unique business circumstances that required functionality not available in SAP/R3 version 3.OF (the version used for Dow Corning's initial implementation). These facilities would not be part of the firm's single instance in Midland, until Dow Corning upgraded to version 4.5 sometime in 2000. In addition, management of a joint venture had insisted that customer data available to selected employees should not be accessible by all SAP users; a capability contrary to the data visibility built into the SAP system. Implementation of the joint venture had been delayed while that issue was explored.

Dow Corning management attributed its success in passing Milestone C to very tight scope control. This meant that the global team sometimes had to sacrifice functionality that they would have liked to implement:

Early on in a project, it is essential that you define the scope, that you define the implementation schedule. Then you get the right kind of people with the right kind of skills in the right kind of jobs in the project, and after that it's very simple, you execute.

—Ralph Reed, PRIDE Project Manager

In 1998 top management included on-time implementation at all sites as a goal in the variable compensation performance incentive plan for all U.S. employees. Senior managers felt that this incentive had increased motivation to meet project deadlines, although individual employees indicated that they were not clear as to how much of their variable pay was tied to meeting PRIDE deadlines. Ultimately, the delay in two implementations had a negative effect on the U.S. payouts.

The SAP project came in under its $100 million budget, largely due to very stringent use of consultants. Although Dow Corning had called in consultants to address specific needs, such as configuration of the human resource module, the firm had not hired a systems integrator. Consequently, consulting costs represented less than 10% of the total cost of the project. Management felt that minimizing the number of consultants had resulted in the development of significant SAP expertise within the firm:

It's made individual careers in Dow Corning much more satisfying. I think people are very proud of what they know, what they can do, and what they've done.

—Director European BPIT
Using Dow Corning employees rather than consultants did have a price. It led to an explicit policy to populate the global team with highly-skilled professionals rather than with those employees who could most easily be made available. Dick Hazleton described the impacts:

This policy caused resentment from line managers as their best people were reassigned, with some negative impact on operations. However, an unexpected benefit was that the team members had extremely high personal and professional credibility among their peers, which greatly facilitated acceptance of new workflows.

—Dick Hazleton, CEO

Performance Outcomes of the SAP Implementation

As implementation wound down, Hazleton had shifted his attention from getting SAP in to generating a return on the firm's investment. The case for SAP had been built around the need for an infrastructure to support reengineering, and now that SAP was in, he established aggressive goals for performance improvements. Hazleton expected annual cost reductions of $200 million by 2000, and he anticipated revenue growth to $10 billion by 2010. Individual business unit managers had taken ownership of a specified portion of the annual cost savings. Management intended to tie business unit managers’ 1999 variable compensation to their success in delivering operating cost improvements as well as to their efforts to leverage the SAP platform through process reengineering.

Dow Corning was historically a metrics-based company, and the data provided by new workflows and systems was expected to facilitate the continuing development of global metrics:

We are collecting more information into a single database that gives us the ability to truly have some consistent measurement capability.

—Project PRIDE Production and Scheduling Module Team Leader

On a global basis the operational metric on which management was most focused was customer request date (CRD). This was the percentage of orders that were delivered on their requested dates—neither early nor late. The company’s performance against this measurement had deteriorated as sites installed SAP. By early 1999, CRD performance was improving across the company but still varied widely across sites. At sites that had passed Milestone D, management was also observing improvement in measures such as inventory days of supply, supply chain throughput, and overtime. Dow Corning was working with St. Gallens University in Switzerland and a select group of firms to establish a useful set of metrics around SAP-supported business processes. The company emphasized metrics that focused on cycle time:

If you focus on cycle time there is a belief, and I think substantiated, you'll get everything else you want. You'll get the kind of quality, you'll get the kind of productivity, you'll get the kind of cost, you'll get the kind of customer satisfaction.

—Ralph Reed, PRIDE Project Manager

One visible sign of forthcoming operating efficiencies was consolidation of processes and facilities. Europe had reduced the number of locations that accepted orders from nine or ten down to five and expected to drop down to three. Plants or warehouse facilities closings had been completed or announced in Germany, Australia, Italy, France, the US, and the UK. The financial impact of these consolidations was confounded by other factors, but management believed they augured the ability to do more with less.
Another source of optimism about process improvements built on the SAP infrastructure was the company's experience with modules that had been added to the core model after sites had converted. During the course of the Dow Corning implementation, SAP had made available additional functionality that was considered particularly valuable to Dow Corning, so the global team had implemented plant maintenance, advanced planning optimizer, and data quality modules. Unlike the original implementation, the added functionality tended to go in smoothly and to yield immediate benefits. The following reaction to the plant maintenance module was typical:

I've been in maintenance at Dow Corning for over 22 years and I never really thought I'd see the day when we had the ability to view maintenance data and costs on a global scale, but we do now.

—Email message summarizing status of plant maintenance, December 1, 1998

The ongoing challenge in achieving performance improvements in the short-term was that employees were still learning new processes that were supported by the initial SAP implementation. It would take time to achieve the kinds of performance improvements that would noticeably impact the bottom line:

Because of all the activities that we're doing to get everybody up and running, we haven't been very good at focusing on solving those problems. So we're still doing what we have to do, but it's taking a lot more effort than with the old systems. It's certainly not unexpected from implementing a huge new software system, but something we need to get at.

—Midland Plant Manager

Organizational Impacts of SAP Implementation

In addition to financial measures of operating improvement, management was looking for evidence that employees were adapting well to new processes and roles. A corporate relations administrator noted that the service lapses that often followed an implementation were "extremely frustrating because these problems have occurred despite a great deal of hard work, problem-solving and troubleshooting by a large number of employees in the Americas."

Similarly, a plant manager in Midland, commenting that the implementation had gone well, nonetheless observed that "SAP is like taking a long walk with a pebble in your shoe. You get there but it's uncomfortable."

While the firm attempted to stay focused on performance improvement, the heavy demands on employees' time and psyches required managerial attention as well. The PRIDE Project Manager for Europe was quoted in a company newsletter:

Training people, helping them through the learning process, giving people the chance to express their worries and even offering a shoulder to cry on - it all helped.

—From BPIT WORLDWIDE UPDATE, June 1998

Charlie Lacefield noted that if he could change one thing about the implementation, he would start sooner on change management techniques to prepare employees for the discomfort of the change. Nonetheless, only one person from the global Project PRIDE team and one other person from the IT unit had left the firm during the three-year implementation process. While morale was described as "mixed" at sites that were in implementation, management felt that employees were committed to the change, and given time, would adjust to it:
They're more than willing to accept it, but it's a tremendous learning curve that people go through. It's huge, unimaginable.

—Director Americas BPIT

There were, however, indications that both individual employees and entire sites were starting to learn new processes and appreciate the capabilities that SAP offered. A global team member noted with delight that a resistant scheduler had clearly started to adapt to her new role:

She called and she said, "Can you help me understand what I'm looking at? I've got demand. I'm doing the pegging [i.e., checking production and inventory requirements]. And I peg it all the way back to Seneffe [a distribution site in Belgium] and they don't have any firm demand." So what this is telling me is that she's now looking at her demand on a global basis.

—PRIDE Global Team Member

At the managerial level, data access and reporting mechanisms were still troublesome. Eventually, the wealth of data was expected to provide better information for managerial decisions, but managers said they would need to define decision making processes and apply resources to developing reports and reporting tools:
It isn't that SAP doesn't provide reporting. They have oodles of it, but it's pretty generic and it needs to be tweaked, and it needs to be made to work with our processes.

—Director, BPIT Consulting Services

Similarly, a plant manager in Japan hinted that part of the stabilization process was stabilizing employee attitudes and their approach to their work. He was particularly delighted to see employees working together to solve problems rather than assign blame for them:

Throughout the last one week, I have seen people working very long hours at every floor of Tokyo office. It was so impressive that I saw no emotion, no irritation, no whatever. People talked about problems and issues, but in a very objective way, and seemed to understand where is the cause and how to work it out.

—Email message from plant manager (98-12-03)

**Technology Impacts and Issues**

On January 8, 1999, the mainframe in Europe was shut down. In announcing the shutdown, the Global IT Operations Director noted that "this momentous event" was the result of replacing legacy functionality with SAP, which rendered old systems obsolete.

The firm's new client-server environment was much more powerful but considerably more complex than its old mainframe environment. In addition, the volume of data had grown from one-half terabyte pre-SAP to four terabytes in early 1999, and, as one business unit manager observed, IT had "gone from important to central." Increasingly, the firm could not afford system down-time, and both IT and business managers were engaging in discussions as to the value of ensuring that their hot-site could take over immediately upon failure without any data loss. Initially, the hot-site was used only if the system might be down for several hours. Converting to the hot-site caused a loss of 30-60 minutes' data.

At various times IT had experienced perplexing performance problems. These had resulted from bugs and deficiencies in hardware, database software, and SAP. In one case, there was a delay of 10-15 minutes between the confirmation of a delivery and the printing of a delivery document because the SAP code caused the system to read unnecessary records prior to printing. On another occasion, a faulty disk caused the entire system to go down for several hours twice within a week. And the system was down the better part of two and a half days when a database software bug corrupted the data tables.

Over time, the computing environment at Dow Coming was becoming increasingly reliable. Nonetheless, the large number of vendors whose products had to interact, and the speed at which SAP and supporting technologies changed, created a highly dynamic learning environment for IT professionals:

Everything I ever learned in the last twenty years is in a landfill somewhere.

—Senior BPIT Technologist

Among their many vendors, Dow Coming concentrated especially on its relationship with SAP. Dow Corning was the first company in North America to be certified by SAP in its Customer Competency Center Certification Program. This gave Dow Corning easier access to SAP's developers, and the firm took advantage of this relationship to do some joint development as well as help establish priorities for future releases. Most notably, Dow Corning worked closely with SAP to implement a multiple language capability, so that each site could interact with SAP in its native language, and a label management program that printed out labels in the customer's language. Dow Corning personnel also encouraged SAP to accelerate its efforts to develop an Advanced Planning Optimizer module that supported production scheduling.

The implementation of SAP left Dow Corning more dependent upon information technology, and highlighted the importance of the IT function. Harry Ludgate, who in January 1999 was
named to succeed Charlie Lacefield as CIO, noted that "...the reputation of the IT department and individuals in the organization has gone up significantly as a result of the project."

Looking Ahead
As SAP and accompanying Project PRIDE reengineering efforts sought to reinforce process-orientation, global thinking, and organizational discipline, the firm was adopting a new culture. Dick Hazleton noted that this was not an easy change for employees and would not be easy to sustain:

We are implementing the same system with the same processes at all sites. We need to maintain a discipline to sustain the global processes or we lose much of the value of the system. To a large extent the system imposes most of the discipline, but it is possible to do some things locally that will undermine global processes.

—Dick Hazleton, CEO

Management was anxious to implement process improvements, and they were aware of enormous opportunities to do so, but the firm first had to adopt the discipline that enabled the improvements:

If you ask any level of executive management they would tell you, "We need finite scheduling tools." In fact, we need to maintain data and discipline within ERP before we can ever do this. But we still haven't determined how we hold people responsible and accountable [for the data and discipline].

—PRIDE Global Team Member

Management felt that part of developing the discipline needed to become a global firm was developing the habit of constantly identifying and implementing process improvements. Although the SAP implementation had forced some changes in business processes and many of those changes had some value, most processes were still suboptimal. Management was concerned that employees would find it easier to settle into new habits rather than identify and improve processes:

My major concern is that people will tend to sit back, as opposed to continue to strive for improving things.

—PRIDE Project Manager for Europe

It was clear that process improvement needed to be an organization-wide effort, and management was hoping for constant, significant change:

We spent hours and hours and hours just putting our heads together and working out all the nitty gritty details of what have you got to do to make this so-called nice big step change happen. And it's one thousand things. And almost none of them lie within the power of any one individual.

—Harry Ludgate, incoming Executive Director, BPIT
In February 1999, Hazleton announced a restructuring of Dow Corning to facilitate the transformation of the firm into a proactive customer-driven company working as a process-oriented organization. The new organization was to be a matrix of global Industry Business Units (IBUs) and business process management, combined with functional excellence centers. The Project PRIDE global team would be dispersed, with some members of the team taking jobs as Business Process Stewards who would report to a global process manager and take responsibility for coordinating worldwide process improvements. The new organizational structure disbanded Dow Corning’s longstanding regional structures. As one manager noted, eliminating one axis of Dow Corning’s management matrix simplified organizational decision making:

It will be helpful not to have area structures. There are fewer people who can say no.
—Midland Operating Unit Manager

While the management matrix was simpler, the coordination requirements for a process-oriented, global firm were daunting. Dow Corning could insist on standardized processes globally but also needed to ensure cross-functional communication about existing and potential business processes:

The one constant in SAP is the integration. That integration makes it so you cannot make a decision on your own. We have to learn within this new organization how we are going to communicate with each other to deal with these integration impacts.
—Project PRIDE Global Coordinator

An ongoing challenge within Dow Corning would be to establish priorities for IT to address new process needs. The list of requests for additional functionality was extensive and the organization needed to ensure that priorities were clear on a global basis. Meanwhile, SAP was relentless in issuing new releases with functionality that could be of value. As the first wave of implementations neared completion, however, Hazleton hoped to slow the pace and adopt upgrades with some caution:

The organization is exhausted from constant deadlines and the dual responsibilities of implementing and running the business. So we will wait and assess the upgrade. On average, we will delay 12-18 months after an upgrade becomes available, which will discipline us to focus on the tools we have in place and get good at leveraging them.
—Dick Hazelton, CEO
Annex

Excerpts from email messages chronicling December 1, 1997 implementation results at a plant in Japan

December 1, 1997 Email from global team leader

- Things are tough but we are working through issues as they occur
- People are working hard and long hours
- There has been very good and committed help from Midland (even during very late hours)
- It is great to see the leadership from the Global team members and the cooperation with the Area team members and site team
- The management commitment from the Area and [the site] has been great

Specific areas to talk about
- [The global team's quality expert] arrived on-site to find the Quality data in very bad shape and he has done very well to salvage what he can and communicate direction on how to resolve issues.
- The Global team members are working through global workflows in each area and trying to get the site personnel to understand the discipline of keeping SAP up to date.

December 3, 1997 Email from Asian Area Implementation Manager

Quality
- Data concerns improving daily
- C.O.A. data being reviewed for accuracy and corrections are being made on an as needed basis

Sales
- Invoices have been tested on 2 orders
- First manual invoice run tonight
- Several new orders received and entered yesterday

Production
- MRP was run Monday evening
- MRP and planning process being reviewed with planner
- Production started up again on Tuesday morning
- First production receipts recorded this morning

Procurement
- All current purchase orders have entered
- Procurement should start working off MRP planned purchases

Inventory and Delivery
- 295 deliveries have been created since Monday
- startup workflow problems for shipping materials was the cause of delay for some shipments yesterday, but these will be shipped today.
- These workflow problems have been discussed with the site team and management and a process was agreed to ensure yesterday's and today's shipments will be completed by this evening.
- A build up of shipments from the cutover period has added to the problems and normal amount of shipments are anticipated after today
Other

- The discipline of data maintenance is being understood in some areas and needs to be reinforced in other areas
- Reviews for workflows will be conducted on Thursday

A quote taken from a global team member's daily update "the realisation of change has hit, and is placing people in discomfort zones, but we have not received total resistance - the changes are taking place and will soon be accepted as the way to conduct business."

We can now say we have successfully implemented the SAP workflows at [this site].

December 4, 1997 Email message from PRIDE Project Manager for Asia

Thursday evening a celebration party was held at [site] for the successful implementation of PRIDE. The members of the Global, Area, and Local PRIDE teams, as well as the management of [site] smiled a lot, and seem to all be confident in calling the implementation a success.

A number of hurdles were crossed earlier in the week, and I know that you have been receiving daily status reports. In particular, the team overcame challenges with the form and accuracy of the QA data, some confusion about workflows and SAP operation in the materials flow area, and a volume of business on the first two days of operation that was about 20% above normal (190 orders per day vs. a normal 160). Not all customer shipments were made the first day of operation; on the second day, all shipments were completed by 9pm; on the third day (Thursday) all shipments were made by 7pm. Global and Area team members reported that many people made significant progress on Thursday in their understanding of how the new system and workflows operate. The learning curve is steep, but the lights are turning on! [The plant manager] told me that one of the plant operators said to him, "this new SAP system is very good, and gives us data about our operations that we never had before." Not a bad comment from the plant floor on the third day of operation!