

the ROI *Report*

CASE STUDIES ANALYZING THE RETURN ON INVESTMENT OF INFORMATION TECHNOLOGY FOR SENIOR EXECUTIVES

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EXECUTIVE SUMMARY

SAP R/3 Supports Renaissance of Owens Corning, Delivers 89% ROI.

With \$5 billion in sales for 1998, Owens Corning has significantly expanded from the fledgling corporation conceived in 1938. In that first year, Owens Corning introduced fiberglass insulation and furnace filters. Today, the company produces myriad products from its glass fiber legacy ranging from foam and mineral wool insulation to roofing and exterior systems, as well as high-performance composites.

Charting a smooth course, however, has not always been easy. In 1986, Wickes Companies, Inc. attempted a hostile takeover of Owens Corning. While this attempt proved unsuccessful, Owens Corning paid a heavy price. The company was faced with long term debt of \$1.6 billion and shareholder's equity of negative \$1 billion. With a focus on managing cash flow, company leadership throttled back investment, thus stagnating sales for seven years. Without the cash to invest in new processes and machinery, Owens Corning's annual productivity improvement fell to zero. Compounding these problems was a sales and distribution organization that was out of step with the changing dynamics of the marketplace.

1993 was a watershed year for Owens Corning when Glen Hiner, the new CEO, recognized its significant challenges and began the transformation of the company. Hiner quickly set an ambitious agenda for the year 2000, which included growing the business from \$3 billion to \$5 billion in revenue, increasing productivity six percent per year, growing earnings twice as fast as revenue growth. Hiner recognized that to achieve these objectives fundamental changes were required in the way business was conducted at Owens Corning. In addition, the information systems, built around products and resulting in a hodge-podge of 200 legacy systems, could not meet evolving distribution demands. Furthermore, the system did not support a sales and service

(Continued on page 2)

EXECUTIVE SUMMARY

(Continued from cover)

organization that was shifting towards selling solutions instead of products.

Owens Corning's turnaround strategies made it clear that an information system based on access to real-time information across multi-national and multi-lingual business units was crucial to the company's long-term success. After a rigorous evaluation and selection process, SAP emerged as the clear partner in Owens Corning's re-engineering efforts. In 1995, the company embarked on a very aggressive 100-week global business process redesign and legacy systems replacement effort. Owens Corning reports that it has already achieved over \$50 million in annual cost savings from inventory reductions, reduced logistics and finance costs as well as improvements in customer service. *The ROI Report* estimates an internal rate of return on Owens Corning's investment in SAP R/3 to generate an ROI of 89%.

Introduction and Company Profile

The Owens Corning Fiberglas Corporation was formed in 1938 as an equal-partner venture between the Owens-Illinois Glass Company of Toledo, Ohio, and Corning Glass Works of Corning, New York. In its first year, the fledgling company introduced fiberglass insulation and furnace filters manufactured in a converted glass bottle plant in Newark, Ohio. In the 1940s, the company developed glass fiber materials as reinforcements for plastics, creating the glass fiber industry. Glass fibers were the mainstay of the Owens Corning business for the next three decades.

In the late 1970s, as part of its global expansion and continued strategy of innovation leadership, Owens Corning bought a large roofing and industrial asphalt manufacturer and replaced the shingles' organic underlayment with more durable fiberglass mat. Soon most of the residential roofing industry converted to this improved product and Owens Corning emerged as the nation's leading producer of asphalt shingles, a position still held today. Owens Corning PINK Fiberglas® insulation was introduced in 1956, followed by the introduction of the Pink Panther advertising campaign in 1980. In 1987, Owens Corning made legal history by becoming the first company to trademark a color, in this case, PINK.

At the end of 1998, the company had approximately 20,000 employees in more than 30 countries, and sales of \$5 billion. Building on the company's leadership position and brand strength in the glass fiber and roofing industries, Owens Corning has recently diversified into complementary material markets such as foam and mineral wool insulation, vinyl siding and accessories, cast stone products and rainwear (i.e., gutters and downspouts). In most instances, Owens Corning is the leader in these newly entered arenas. In 1996, the word Fiberglas was dropped from the corporate name to reflect the transition from a glass fiber company to a broad-based materials company.

The company operates in two major market segments—Building Materials and Composite Systems. The products offered by the two segments are shown in Figure 2. In 1997, Building Materials accounted for about 75 percent of total company revenues with the rest coming from Composite Systems.

The Building Materials segment at Owens Corning is divided into three main businesses—Exterior Systems, Roofing Systems and Insulating Systems—which provide high-performance solutions for residential, commercial and industrial markets around the world. In the residential market, Owens Corning holds the leading market share in all three product areas. In the commercial/industrial market, Owens Corning is a leading supplier of insulation and specialty asphalt.



Owens Corning is the world's leading producer of glass fiber materials used in composites, which are fabricated material systems made up of two or more components (e.g. plastic resin and glass fiber) to replace traditional materials such as aluminum, wood and steel. Composites Systems operates in North America, Europe and Latin America with affiliates and licensees around the world, including a growing presence in Asia Pacific. The growth of substituting traditional materials has been driven by composite materials' many advantages over traditional materials, such as lower assembly and lifecycle costs, lighter weight, higher strength, greater stability, corrosion resistance, advantageous electrical properties and enhanced design flexibility. Depending upon the end-use application, the raw materials for composites move through different manufacturing process chains, ultimately finding their way to consumers through myriad markets worldwide.

The primary end-use markets for Owens Corning's glass fiber materials are automotive, building construction, electrical/electronics, infrastructure and consumer recreation. Overall, approximately 65 percent of production is sold directly to external customers, who are predominantly plastics and roofing companies. Twenty percent is used internally for roofing and large-diameter pipe products and the remaining fifteen percent is sold to specialized industrial distributors, who re-sell to the plastics industry.

Fig. 1

OWENS CORNING AT A GLANCE

Sales

\$5 billion in 1998

Number of employees

20,000 in 1998

Operations:

103 plants in 30 countries

Products:

Building Materials Systems Business

Insulating and acoustic systems including glass wool fibers formed into thermal and acoustical insulation, and extruded and expanded polystyrene insulation. Roofing systems including roofing shingles and asphalt materials. Exterior systems including vinyl and metal siding and accessories, cast stone building products, and branded housewrap, windows and doors.

Composites Systems Business

Glass fiber rovings, mats and veils, strand and reinforcement products, yarns, glass reinforced plastic pipe for end-uses in building construction, automotive, electronics, telecommunications, and consumer markets.

Key Executives:

Glen H. Hiner, Chairman of the Board and Chief Executive Officer

Michael D. Radcliff, Senior Vice President, System Thinking Information Group

J. Thurston Roach, Chief Financial Officer

Robert C. Lonergan, Senior Vice President Strategic Resources

Maura J. Abeln, Senior Vice President, General Counsel and Secretary

David L. Johns, Vice President and Chief Information Officer

Building Materials Systems Business

Domenico Cecere, Senior Vice President and President, North America Building Materials Systems Business

Rhonda L. Brooks, Vice President and President, Roofing Systems Business

David T. Brown, Vice President and President, Insulating Systems Business

Richard D. Lantz, Vice President and President, System Thinking Sales and Distribution Business

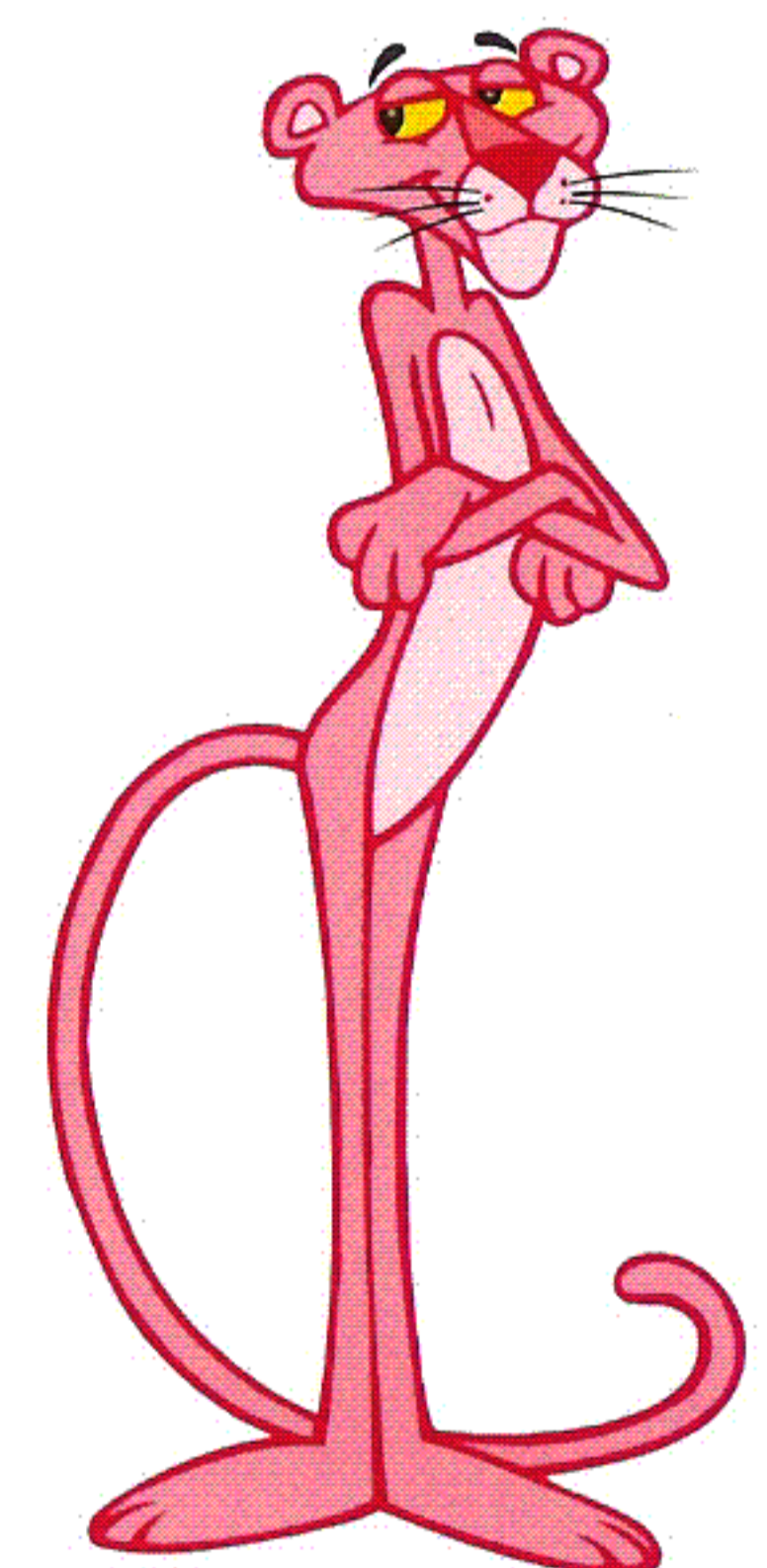
Michael H. Thaman, Vice President and President, Exterior Systems Business

Carl B. Hedlund, Vice President and President, International Building Materials Systems Business

Composites Systems Business

Heinz-J. Otto, Vice President and President, Composite Systems Business

Jean-François Santicoli, Vice President and President, Engineered Pipe Systems



Source: Owens Corning

In essence what we wanted to do was create the company that would put us out of business.

Business Challenges

CEO Glen Hiner joined Owens Corning in 1992 after a 35 year career at General Electric. When he accepted the job, Hiner was running GE's plastics business, leading it from \$750 million to \$5 billion in annual sales over a thirteen year span. With a desire to run his own show, Hiner was willing to take on the daunting task of revitalizing Owens Corning, a mature company with stagnant sales, zero productivity growth, obsolete sales practices and an information system that reflected the fragmented and outmoded business processes it was designed to support.

A 1986 hostile raid by Wickes Companies, Inc. had forced Owens Corning into a drastic re-capitalization that set the tone of the company for years to come. The brutal takeover battle left the company with long term debt of \$1.6 billion and shareholder's equity of negative \$1 billion. With a focus on managing cash flow, company leadership throttled back investment, thus stagnating sales for the next seven years. Hiner states,



CEO Glen Hiner.

"The old culture had a very clear vision—raise cash to reduce debt." Productivity also suffered from this scrimp-and-save mindset. Without the cash to invest in new processes and machinery, Owens Corning's annual productivity improvement fell to zero. In an industry where productivity determines success, Owens Corning was quickly losing ground to competitors.

Another problem Hiner inherited was a sales and distribution organization that was out of step with the changing dynamics of the marketplace. Owens Corning was focused on materials, but customers were asking for more than just products: they were seeking one-stop solutions for their projects. Organized by product line, the sales and distribution organization was incapable of easily offering big box retailers like Home Depot or Lowes a multiplicity of products that could in turn be sold to consumers as a solution. Says David Johns, VP and CIO, "You could have a four car wreck in a customer's parking lot, all of them driven by an Owens Corning salesperson."

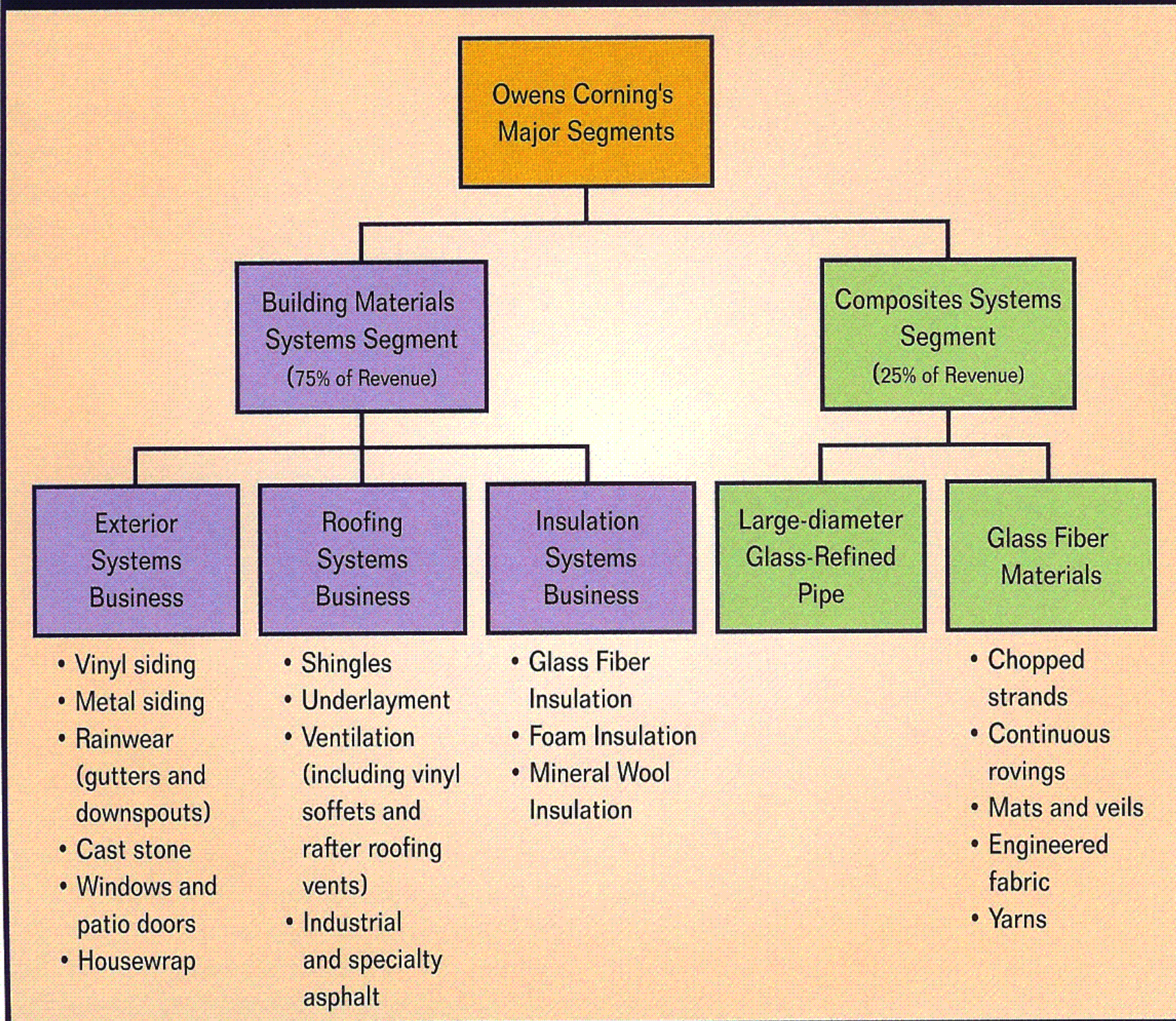
The information system, like the sales and distribution organization, had been built around products. The result was a hodge-podge of 200 legacy systems, each dedicated to a narrow task or set of tasks. Owens Corning, spending \$35 million per year to maintain the legacy system, was beginning to realize the systems were quickly becoming irrelevant to the business. The system could not accommodate big box retailers who needed suppliers with a sufficiently sophisticated logistics capability to efficiently manage their own inventory. Additionally, the system did not support a sales and service organization shifting towards selling solutions instead of products.

Growth Strategy

In 1993, Hiner launched an assault on Owens Corning's business challenges, attacking on multiple fronts. Hiner quickly set an ambitious agenda for the year 2000 which included, among other objectives, growing the business from \$3 billion to \$5 billion in revenue, increasing productivity

Fig. 2

OWENS CORNING OPERATES IN TWO MAJOR SEGMENTS – BUILDING MATERIALS AND COMPOSITES SYSTEMS



Source: Owens Corning

Building Materials accounted for 75 percent of total company revenues in 1997.

6% per year, growing earnings twice as fast as revenue growth. Said David Johns, "In essence what we wanted to do was create the company that would put us out of business."

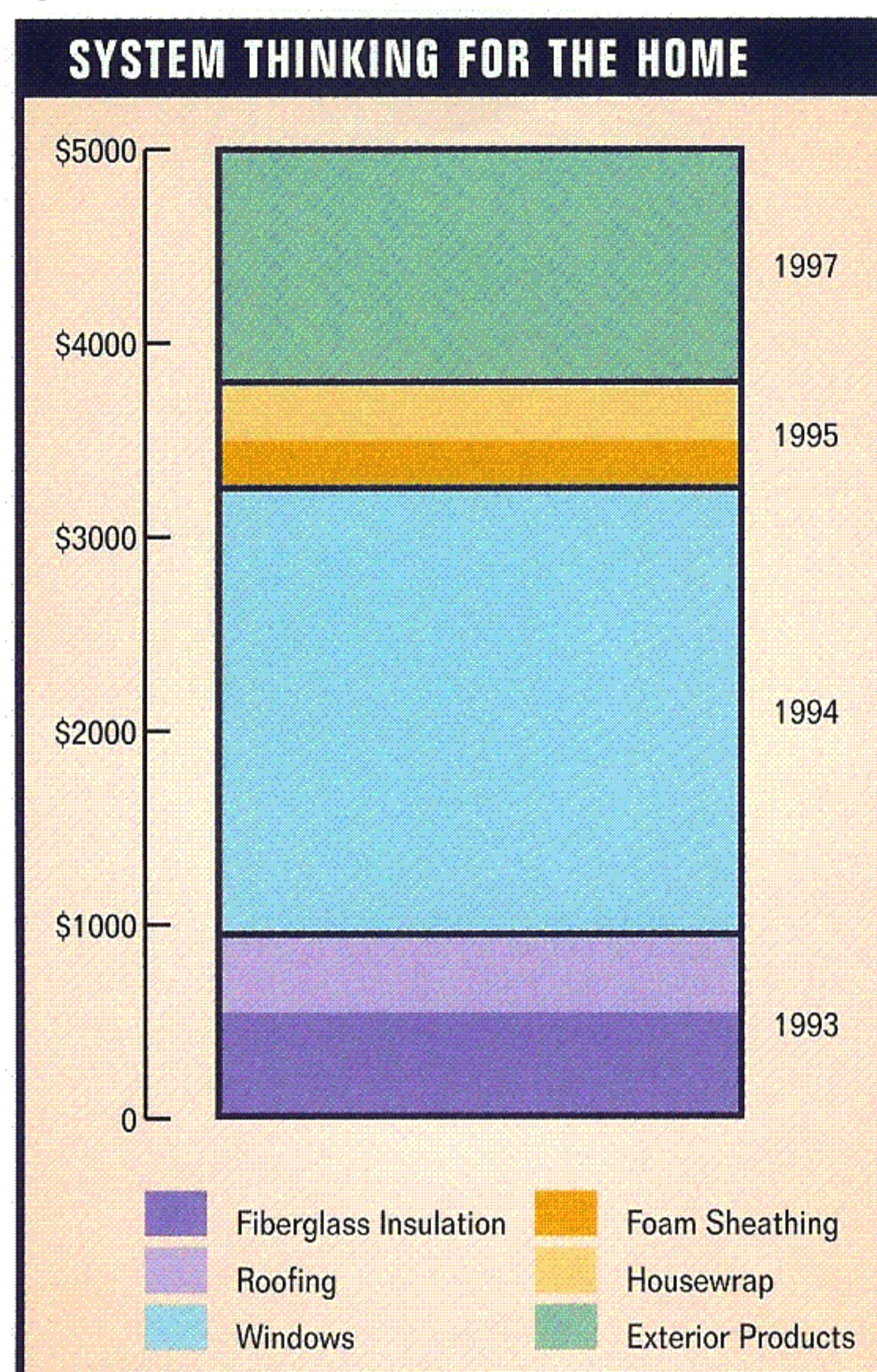
Hiner's growth agenda contained three strategic elements. First, leverage the Owens Corning brand which has a lead of seven to one in unaided brand awareness over its nearest insulation competitor. To Owens Corning that meant migrating into new products and services that were logical extensions of what they already did. Hiner said, "Our brand is a key element in advancing our winning spirit...our brand is the tool to differentiate our products, systems and services from all oth-

ers." Second, grow through aggressive acquisitions and diversify into fast-growing markets. Owens Corning needed to fill in its product lines so that it could supply more of what was needed to build a house. In 1993, the company estimated that its average potential take per home before filling out its product line was about \$1,000. Seventeen acquisitions later, the company is now able to supply \$5,000 of building materials, as shown in Figure 3.

The third and final element of Hiner's strategy was to adopt a System Thinking™ mindset. Although not introduced formally until 1997, a growth strategy built on this concept signaled a

“System Thinking is our primary means of leveraging value and elevating our brand.”

Fig. 3



Source: Owens Corning

Owens Corning's material opportunity per home has grown as a result of its acquisitions.

move away from an individual product mentality, and toward a focus on the complete needs of the user of the products. Hiner stated, "System Thinking is our primary means of leveraging value and elevating our brand."

An example of System Thinking in Building Materials is a program for distributors and do-it-yourself focused home centers. The objective of the program, called Category Management, is to improve consumer knowledge, merchandising, display and inventory levels by working with channel partners. In a test market trial of the program, stores that have participated in the Category Management program have experienced double-digit sales growth in many Owens Corning product lines.

The concept of System Thinking is also being applied successfully in Composites Materials. A manufacturing customer trying to replace wood with composites on a large order for utility poles came to Owens Corning requesting a price decrease on glass fibers. Instead of simply cutting the price, a cross-functional team brought together by Owens Corning worked on improving the process and lowering costs throughout the supply and production system. The resulting change in the customer's manufacturing system increased throughput and reduced the amount of material needed.

According to Hiner, "System Thinking reflects what we understand about how elements of a system fit together and perform better than anyone else. We produce shingles, but we offer roofing systems, including not only accessories, but also a warranty. This concept creates value in the minds of those who purchase our products, systems, and services."

With a strategy in place to address growth, Hiner set his sights on improving productivity by 6 percent per year. Key goals were to reduce working capital by slashing inventories; maximize the use of manufacturing and warehouse facilities by implementing an integrated forecasting, production and inventory planning process; and reduce logistics costs by optimizing the way they moved material from one location to another.

As part of the new strategy, Owens Corning's senior executives adopted a new Global Enterprise Process Model approach as shown in Figure 4. "We knew that in order to be successful as a business, we needed to move from a functional way of working to a process orientation," says Radcliff. "This would allow us to focus on our customers and target specific outcomes."

While the successful implementation of business strategies was crucial to Owens Corning's turnaround, considerations regarding the corporate culture had to be addressed as well. Before Hiner's arrival, the established culture was centralized, complacent and internally focused with a North American perspective rather than a global

one. A strategy was developed based upon a new set of core values: customer satisfaction, individual dignity and shareholder value. The new corporate culture pushed the decision making down to line management which in turn sparked a strong sense of empowerment throughout the company. With this additional decision making, however, also came accountability. Owens Corning established a set of metrics known as "outcomes" that measured the effectiveness of the strategies used to achieve specific business objectives based on customer focus, process capabilities and productivity.

Owens Corning recognized that business processes that are paced by paper were usually slow and inefficient. Therefore, in addition to the operational goals outlined below, a key objective of Advantage 2000 was to achieve an 100 percent paper-free environment on internal transactions and 50 percent on external transactions by 1997.

The most striking symbol of the renewal of the 59-year-old company is the gleaming new corporate headquarters on the banks on the Maumee River. Costing \$100 million to build, its bright, open and efficient spaces promote the company's culture of openness, teamwork, diversity and technology intensiveness.

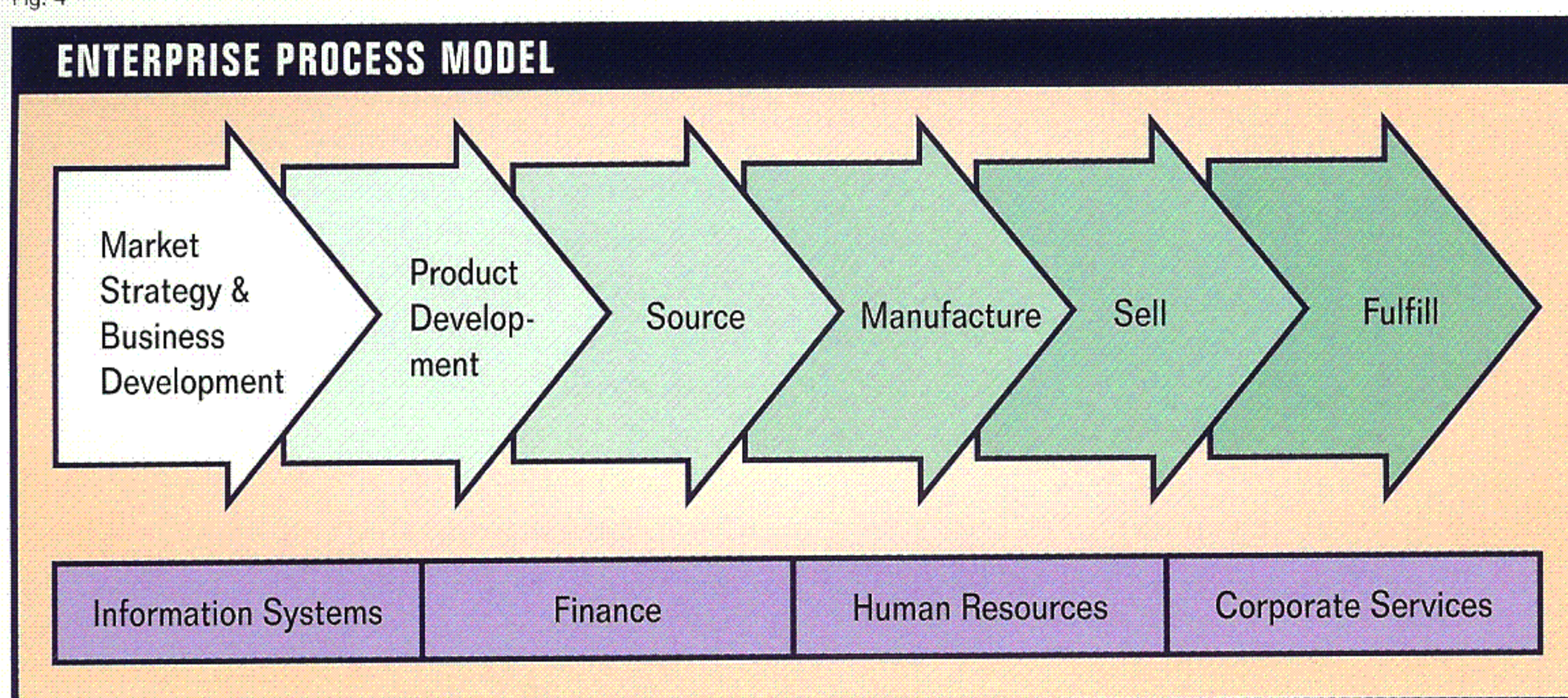
IT Implications of Growth Strategy

The implications of Hiner's agenda on information systems were considerable. The system needed to be able to support sales of solutions and systems (as opposed to individual products); accommodate a flexible logistics capability to serve increasingly demanding retailers; support easy access to consistent global data; and allow easy integration of future acquisitions.

A critical component of the implementation of the strategic initiatives was a re-engineering and technology effort, known as Advantage 2000, designed to help Owens Corning reach the aggressive business goals it had established. Pairing simple, common, global processes with state-of-the-art technology, Advantage 2000 was intended to provide Owens Corning with world-class operating systems and capabilities. This was an enormous undertaking given the entrenched corporate culture that continued to prevail. Business units were managed as stand alone silos with a product-centric approach. The Advantage 2000 Project facilitated the shift from this model of disparate parts to one of uniformity across business lines that would share common global processes and information.

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Fig. 4



Source: Owens Corning

Owens Corning adopted a new global enterprise process model that emphasized a process-based approach to the business.

The Advantage 2000 project would support the three core values in the following ways: Contribute to customer satisfaction by enabling worldwide product availability, real-time pricing, commitments to delivery dates, and accurate order status at anytime; enhance individual

dignity for employees through the availability of real-time information at the fingertips of anyone in the company who needed it anywhere; and increase shareholder value through productivity enhancements, improving the quality of pre-tax earnings by more than one percent of sales.

Fig. 5



Source: Owens Corning

Owens Corning combined benchmarking information with performance metrics to set world-class outcomes.

Reengineering the IT Organization

When Michael Radcliff joined the company in May 1994 as CIO, his key challenge was to transform the IS organization so that it was aligned with the business transformation initiatives. "We realized that the IS organization didn't have the capabilities needed to manage a large project that required a partnership with the business, nor did they have the requisite client server skills," stated Radcliff. "We knew we had to radically change the IS organization, but didn't know what it would look like or how to get there."

Prior to Radcliff's arrival, approximately 90% of the IS budget was directed at legacy system support rather than new development. In addition, the rest of the organization assumed that IS would build systems to support whatever new processes were being developed by three separate re-engineering efforts. Radcliff became concerned that this approach would lead to a sub-optimized solution for the corporation. "There was no integration across the reengineering teams and it was becoming obvious that the systems for the separate reengineering efforts would lead to silo solutions," stated Radcliff. A major hurdle was to re-orient the teams towards global, company-wide core processes that could be supported by an enterprise-level systems solution.

Radcliff began the redesign of the IS organization during a two-day retreat with the IS management team. In that retreat, he shared his vision for the IS organization which supported CEO Hiner's vision for a new Owens Corning workplace. As Radcliff worked with the world headquarters' planning group over the next six

Advantage 2000 pairs simple, common, global processes with state-of-the-art technology.

months, his idea for a high performance IS organization was shaped and revised. By early 1995, the new organization began to crystallize.

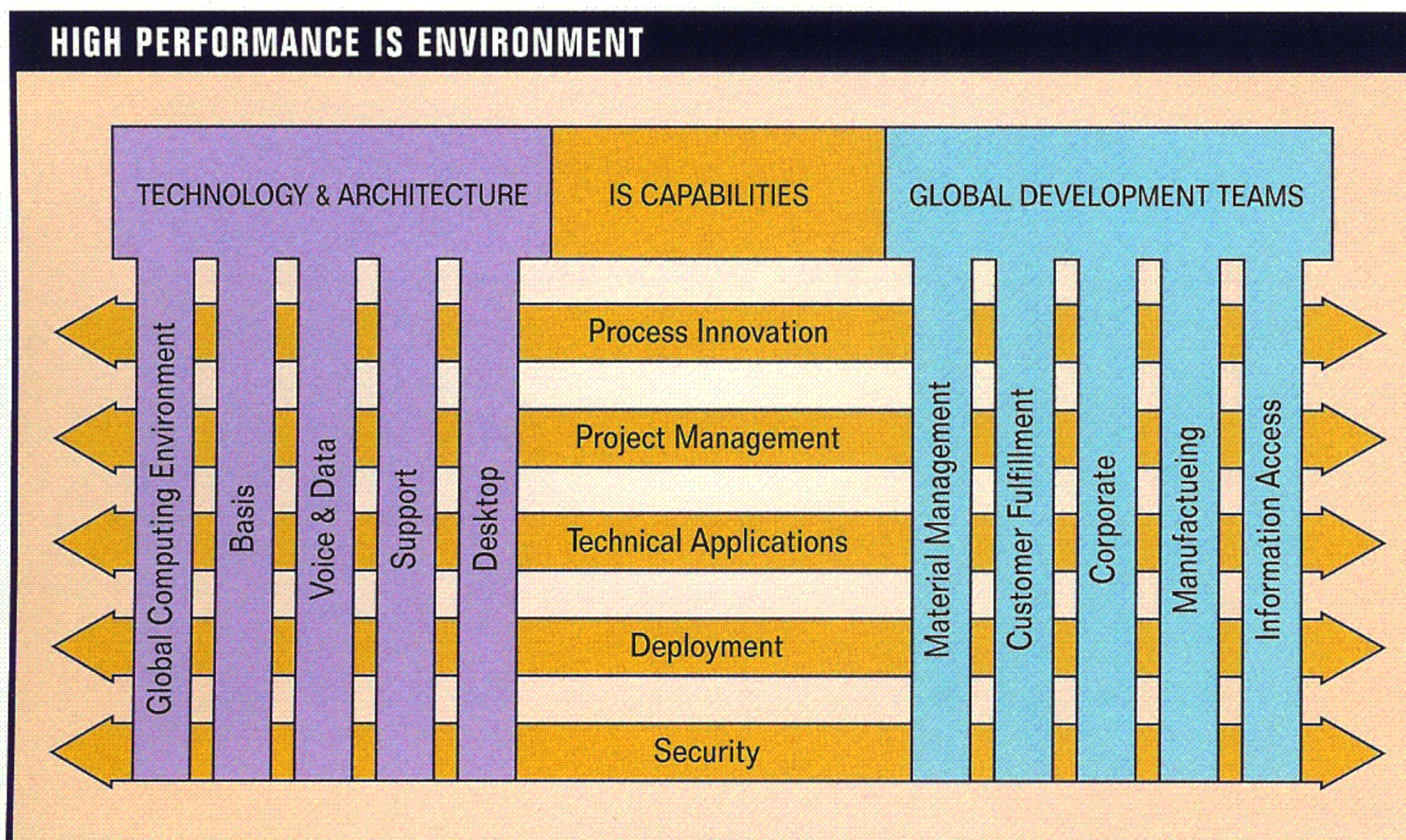
A key part of Radcliff's strategy for reengineering IS was to search for an outsourcing partner to provide legacy systems operation and support. The outsourcing of Owens Corning's legacy system was considered critical for three reasons. First, it would allow the IS organization to focus on acquiring the systems integration and project management skills needed for the Advantage 2000 megaproject. Second, outsourcing the legacy systems sent a clear signal to the organization that the old systems were "ships to be burned" as the new systems came on-line. Third, it moved the company from fixed cost to variable cost funding of the legacy systems maintenance. This enabled Owens Corning to redirect a total of \$60 million in maintenance costs to fund the Advantage 2000 project. In January 1995, network and data "commodity" operations, along with more than 200 legacy systems, were outsourced. The outsourcing included the transfer of about 50 IS personnel from Owens Corning.

The IS organization was being transformed into a matrixed, team-based, high-performance environment with three primary components. First, cross-functional Global Development Teams of IS and business employees were made responsible for delivering "products" which essentially combine processes and systems. Second, the Technology and Architecture Group, some of which is outsourced, was responsible for the global computing environment including voice, data, technology support and desktop needs. Third, the IS Capabilities Group was given the responsibility for providing standard processes, project management, technical applications, deployment and security for the Technology & Architecture Group and the development teams.

"Unlike conventional IS organizations, the High Performance Environment depicts how people are organized to do work," says David Johns. "Organization charts generally do not depict how work flows. Even though most IS organizations do projects, these projects are not usually depicted on an IS organization chart."

The new IT system needed to support sales of solutions and systems.

Fig. 6



Source: Owens Corning

The IS organization is a matrixed, team-based organization with three components.

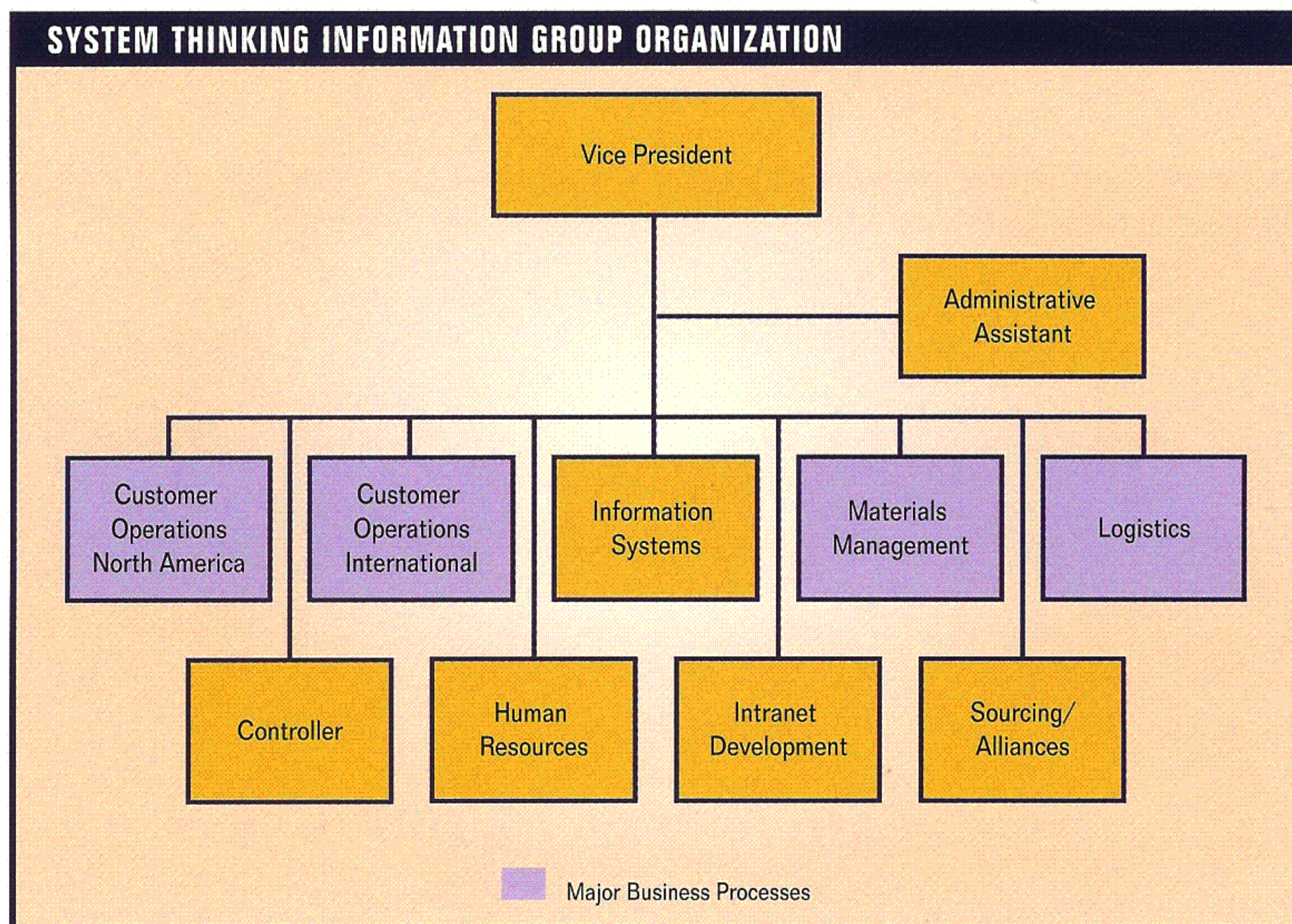
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Although the new IS group was now configured to support the enterprise process model, Owens Corning quickly realized that their overall organization was not set up to deliver optimum business outcomes. In order to achieve the business goals, a new organization was formed, called the System Thinking Information Group, which was given the joint responsibility (with the business units) of delivering results by maximizing major business processes, resource allocation and technology. This organization was made responsible for operating the key processes and working with each business unit to translate their global and business unit strategies into the day-to-day execution of the process.

As shown in Figure 7, the System Thinking Information Group is organized around three major business processes. The Customer Operation Group is responsible for the process that begins

with an order and ends with cash receipt. The Materials Management Group includes forecasting, production and inventory deployment plan development. The Logistics Group is responsible for the process that manages material from the distribution center to shipment and receipt by the customer. Radcliff, reflecting on the new organization, said, "This organization not only enables us to drive towards our agreed upon outcomes, it also provides numerous other benefits as well. We think it is the best way to deliver System Thinking to the customer. The organization provides a platform for repeatable solutions, quicker resolution of problems, as well as consistent training, certification and performance management. By centralizing process accountability, we are able to leverage the collective learning and expertise of the people who are operating in the system on a regular basis and provide specialized leadership in process and technology."

Fig. 7



Source: Owens Corning

Choosing SAP R/3

After senior executives reached consensus on the global process model, a search was executed to identify and select an off-the-shelf enterprise-level system solution to support common business processes and decision making on real-time information across multi-national and multi-lingual business units. Early on in the process, Radcliff advocated an open systems solution based on state-of-the-art client server technologies and quickly gained support for this approach. Inherent in this model was the transition to a UNIX operating environment and relational database technologies. Additionally, a common desktop technology solution was implemented throughout the organization, replacing older machines and the multiple platforms, while simultaneously providing training to a large number of business users.

Owens Corning followed a two-phased approach for the evaluation and selection of their software solution. In the first phase, potential solutions were evaluated according to functional, technical and commercial criteria. "At the beginning of the selection process, I challenged the team to find the best solution by telling them they could have any software solution they wanted except SAP. I wanted to make sure we considered all of the possibilities. Based on the evaluation criteria, two solutions made it to the second phase—Oracle and SAP. Radcliff and his team asked the suppliers to configure the system as it would exist in a re-engineered Owens Corning environment. "Once we had the systems configured, we invited the businesses to come in and kick the tires" said Radcliff. "In the end, we could not find anything better than SAP R/3."

SAP R/3 Implementation

In April, 1995 Owens Corning embarked on a very aggressive 100-week implementation schedule for business process redesign and legacy systems replacement with a SAP global client server solution. "We chose the 'big bang' approach



Michael D. Radcliff, SVP System Thinking Information Group.

to implementing SAP – this increased the likelihood of continuous support by the key senior business executives before project completion," reported David Johns. "The rationale was that the pain would be the same to achieve integration, whether an aggressive schedule was followed or not. In addition, the 100-week schedule also helped IS and business managers have an end in sight."

The scope included:

- ▶ SD – Sales, customer information and order management
- ▶ PP – Production planning and plant maintenance
- ▶ Logistics, warehousing and inventory management
- ▶ MM – Materials management
- ▶ FI/CO – Accounting and financial analysis

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We knew that, in order to be successful, we had to strive for a quality solution and avoid the perfection mentality.

The project was organized as shown in Figure 8. A Presidents Council, comprising the business unit presidents, who had never worked together before, was established to address deployment issues and manage cross-process changes. In addition, this group was responsible for articulating Advantage 2000 outcomes. The Process Executive Council was responsible for aligning global process strategies and operating procedures, setting priorities, establishing resource requirements and resolving issues that affected multiple businesses or regions.

Cross-functional project teams of IS and business employees formed the Global Development Teams and were responsible for directing project activities, including process development, technology application, deployment and training. The IS and business members of each team were physically co-located at Owens Corning's Toledo, Ohio headquarters. Owens Corning found that the logistics of managing these global teams extremely challenging. "Non-U.S. team members typically spent three weeks at Owens Corning headquarters and one week in their home country to gather

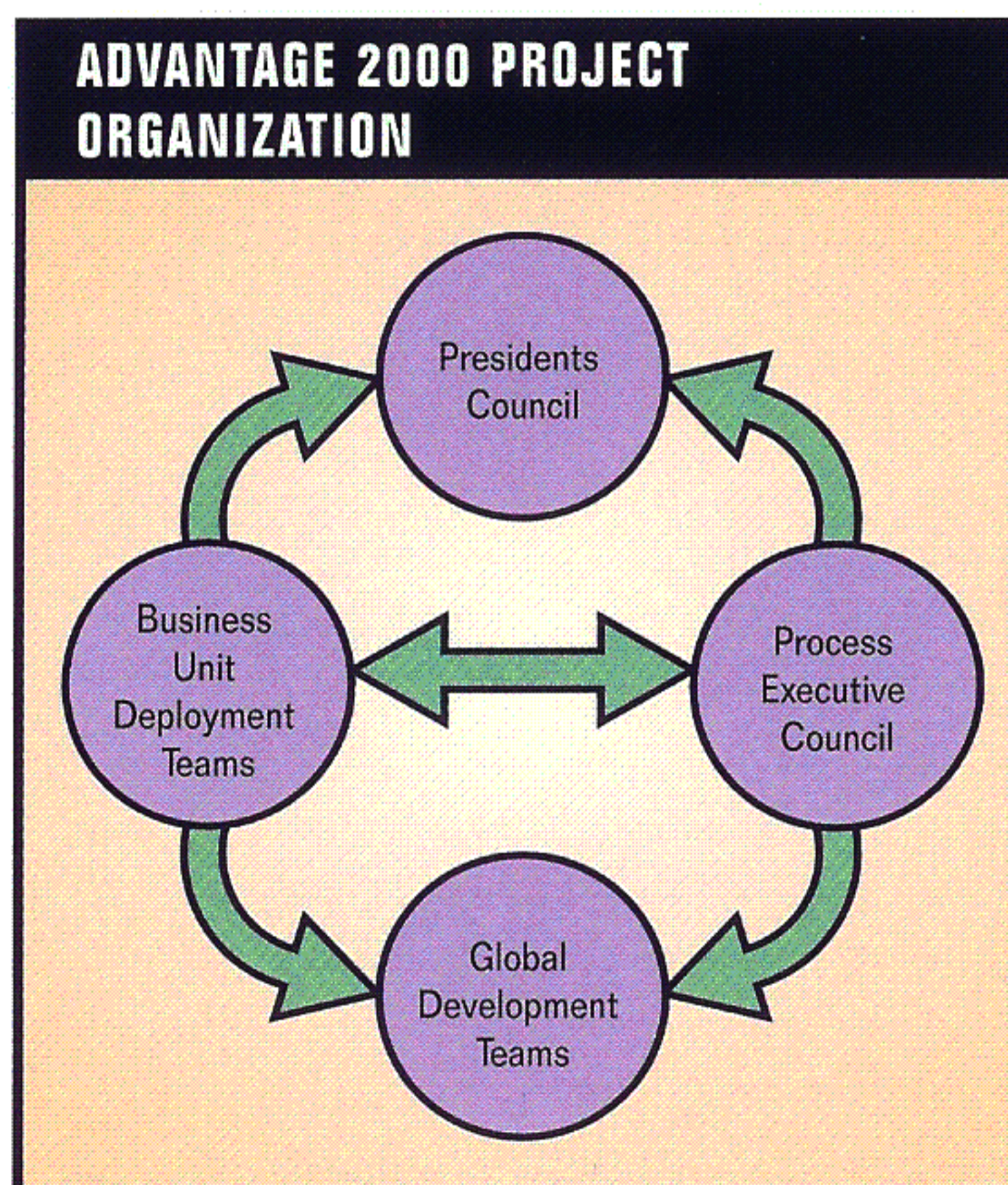
requirements and continue their design work. However, in their one week away, they would get pulled into their old job responsibility and could not spend as much time on project-related work as we had initially planned," said Johns.

The Business Unit Deployment Teams were responsible for developing the deployment plan and addressing change management, communications and training issues.

Owens Corning management demonstrated their commitment to project team members by offering two special financial incentives at the time of the project launch – year-end bonuses (15% or higher) and project completion bonus in the form of stock options (20% of employee's annual salary or higher). In addition, team members knew that, at the completion of the project, they would be extremely valuable to the business because they would be creating the new way of working at Owens Corning.

For Owens Corning, the overriding goal was not to perfect the functionality of the system but to develop processes that work well enough to install quickly. "We knew that, in order to be successful, we had to strive for a quality solution and avoid the perfection mentality. Reengineering projects were time-boxed into a 60-day period. Through this approach, we could get eighty percent of the solution in twenty percent of the time – we called this 'good enough' reengineering," says Radcliff. "We also created an environment where team members could make as many mistakes as they needed in order to capitalize on what was learned." Four new product "releases" were planned over the initial 100-week project schedule, each growing in scope until the final release, which encompassed the entire company as shown in Figure 9. The release plan was designed to take advantage of organizational learning from early implementations. The early releases were intended to provide team learning, confirm the global process model and build confidence and momentum with "early wins". In addition, they served as pilots for change management and end-user training, as well as a test-bed for project team processes.

Fig. 8



Source: Owens Corning

An organization structure was established that ensured the design teams and business units shared a unifying focus on business outcomes.

OWENS CORNING'S NEW HEADQUARTERS



The new world headquarters in downtown Toledo has been a physical symbol of Owens Corning's abandonment of its old hierarchical culture for the Year 2000 workplace.

Release 1 targeted a single corporate function (finance), which was one of the original re-engineering projects. Domenico Cecere, former CFO, now Senior VP and President North America Building Materials Systems, says SAP is not just about bringing 5,000 new PCs into Owens Corning. "We had 400 people in our finance organization that operated decentrally out of our North American plants. We realized that in order to achieve our goal of 'simple, common, global' operations, we needed to radically change the way we did a number of processes, including finance. If we had taken our old processes and tried to use SAP, we never would have gotten any savings. You can't get the efficiency if all you do is implement new hardware and software and do business the old way." One of the first changes was to take 30 different ways of doing payroll and payables out of what Cecere called the "fiefdoms" of the North American factories and handling it with \$7-an-hour help out of a central shared services location in Charleston, West Virginia. The initial results: Owens Corning was unable to pay its factory vendors for a time because the system crashed. "It was very disruptive," said Cecere. "To the point where plant managers were calling, saying, 'You're going to prevent me from being able to manufacture because my vendors won't deliver because you haven't paid the bills.'" Cecere credits top management with helping middle managers work through the snags. Six months later, not only had that situation been resolved, Cecere reported positive feedback from U.S. plant managers.

Release 2 included other corporate functions as well as a full set of functional implementations using version 2.2 of SAP R/3 for a major business unit outside of the U.S. (Building Materials in the U.K.). Release 3 implemented the infrastructure required to support the R/3 implementation in over 100 locations, including wide area networks, local area networks, desktop hardware and software, and significant user training.

Release 4 involved the exploitation of SAP R/3's multi-national and multi-lingual capabilities and the implementation of a new version (3.0), impacting 142 locations with more than 10,000 end-users. In the early waves of deployment, the decision was made to extend the time between waves from thirty to sixty days for better preparation of the business workforce. As part of the release 4 implementation, Owens Corning consolidated 17 separate customer-service operations into a single service center. Subsequent to implementation, the project staff discovered that the cycle time for entering a customer order was between 18 and 93 seconds per transaction, far exceeding the company's acceptable time limit of 10 seconds. After sampling data and analyzing results, the team discovered a complex pricing algorithm that was devouring precious processing time. With the problem solved, transaction cycle times currently average only four to six seconds.

Owens Corning's goal was to minimize the customization of SAP. So, in order to offer addi-

We also created an environment where team members could make as many mistakes as they needed in order to capitalize on what was learned.

tional functionality to support the business, a number of bolt-ons were implemented to enhance SAP as shown in Figure 11. For example, Owens Corning used a tax calculation module to handle special tax requirements and a forecasting tool to assist in sales projections.

At its peak, a total of 250 employees were assigned full-time to the Advantage 2000 project, including approximately 120 IS employees, 115 business personnel, and 12 fulltime HR personnel under an Advantage 2000 Director. In addition, approximately 30% of the IS resources were from external vendors. Owens Corning considered themselves the systems integrator during

the development phases and Deloitte/ICS the experts, who were phased out by Fall 1996.

The Global Development Team was divided into five different process groups, each with representation from the local business units, IS and business people from across Owens Corning. Councils made up of representatives from all the teams ensured that each specific process meshed with the rest of the system. "Integration was the biggest advantage—as well as the biggest headache—of SAP," says David Johns. "If you do one thing in the finance team, it affects everything else you do, so keeping the integration coordination across teams is really difficult."

You can't get the efficiency if all you do is implement new hardware and software and do business the old way.

Fig. 9

ADVANTAGE 2000 DEVELOPMENT AND DEPLOYMENT SCHEDULE						
ADVANTAGE 2000	1995	1996	1997	1998	1999	
Project Start						SAP Ver. 2.2e
Release 1						
►Corporate Finance Consolidation		1 Location, 1 Country				
Release 2						SAP Ver. 3.0d
►Building Materials UK, Fabrication Plants, Shared Services, Science & Technology Center		15 Locations, 2 Countries				
Release 3			120 Locations Worldwide			
Release 4						SAP Ver. 3.1h
►Software Upgrade			16 Locations, 2 Countries			
►Roofing & Asphalt; Centralized Customer Service			32 Locations, 1 Country			
►NA Insulation			20 Locations, 2 Countries			
►Birkeland Norway Composites Plant			1 Locations, 1 Country			
►Hong Kong Customer Service			1 Location, 1 Country			SAP Ver. 3.1h
►Jackson Tenn. Composites Plant			1 Location, 1 Country			
Software Upgrade			All Locations			
Hardware Platform Conversion						
►Database Server						
►Application Server						SAP Ver. 3.1h
Composites Europe & Vise			5 locations, 3 Countries			
Composites NA & Foam NA			8 Locations, 2 Countries			
European PolyFoam			3 locations, 3 Countries			

Source: Owens Corning

Owens Corning chose to develop SAP R/3 over an aggressive timeframe to maintain momentum and focus.

Fig. 10

"THE SERIES OF ONES"

- ▶ 1 General Ledger
- ▶ 1 Common Set of Measurements
- ▶ 1 Day Close
- ▶ 1 System per Global Process
- ▶ 1 Customer Database
- ▶ 1 Vendor Database
- ▶ 1 Product Database
- ▶ 1 Format for All Financials
- ▶ 1 On-Line Financial Report
- ▶ 1 Streamlined Chart of Accounts

Source: Owens Corning

Cecere's goal was to make Owens Corning's finance organization world-class by adopting "a series of ones" as the rallying cry.

Communications

Owens Corning committed significant resources to timely, periodic and consistent communications during the development and deployment of Advantage 2000. In addition to articles in Owens Corning World and features on OCTV videos, a comprehensive range of communications vehicles were used:

- ▶ Quick Reference Cards – Pocket-size fold-outs with all of the basic facts on Advantage 2000 at a glance, the most asked questions about Advantage 2000, a glossary with definitions of the most-used terms and "buzz words" relative to Advantage 2000 and expected outcomes.
- ▶ Brochure – An eight page brochure which overviews the definitions, objectives, strategies, and details on the Advantage 2000 initiative.
- ▶ Video – An overview video explaining the initiative and featuring comments from CEO Glen Hiner and a number of business presidents.
- ▶ Leader's Guide – A step-by-step checklist for planning and conducting a meeting to announce the Advantage 2000 initiative to a specific group.

- ▶ Presentation – A visual presentation to describe and explain Owens Corning's unique approach to managing for the future with Advantage 2000.

Another key component of Owens Corning's communication strategy was to use the Intranet which greeted employees with "Welcome to Fiberspace" when they logged on to find out what's been accomplished from the weekly newsletter, published electronically. The site also served as a communication forum for project team status reports; a reference library with links to suppliers, support resources, and other sites; and a home base for various bulletin boards.

Employees' pride of ownership of Advantage 2000 was evident everywhere within Owens Corning's headquarters. Signs, progress charts, and even hallway conversations often centered on what was happening with the initiative.

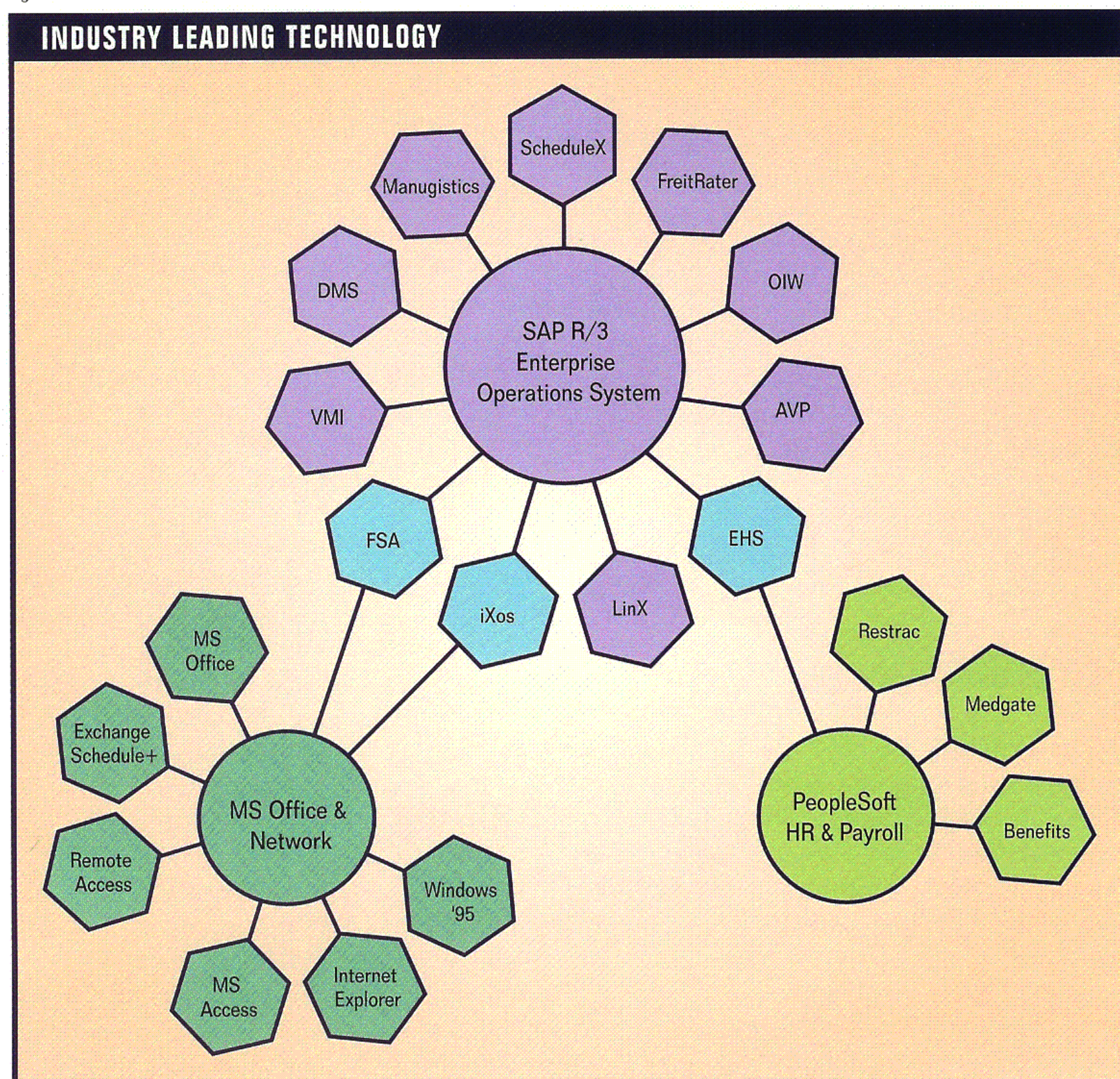
Training

The biggest challenge for Owens Corning staff was assimilating the magnitude of changes with the newly redesigned business processes, roles, and technology in a short time. About 10,000 people within Owens Corning were involved in the reengineering effort and many were using new information technology. "Just about everybody's role in the organization has changed, and that demands people to learn new skills," reported Radcliff. "We initially underestimated the amount (and nature) of training that would be required to make the change." During the first releases, Owens Corning focused on classroom training as the key skill transfer mechanism. "We quickly discovered that employees needed more individualized training and coaching. To do this, we developed a buddy training program so that employees had a partner who understood the new way of working. These buddies offered hands-on experience with the system prior to formal training covering, for example, order entry, pricing or transportation management." The key to Owens Corning success in managing the change was in the ability of employ-

Cecere's goal was to make Owens Corning's finance organization world-class by adopting "a series of ones" as the rallying cry.

“Integration was the biggest advantage—as well as the biggest headache—of SAP.”

Fig. 11



Source: Owens Corning

Owens Corning minimized customization by integrating SAP R/3 with other leading application packages.

ees to help each other through the process. Radcliff continues, “We’ve had to learn a lot of new things quickly, to make a lot of mistakes quickly and to become competent in a short amount of time.”

The training program consisted of a number of elements. First, users were required to know Owens Corning overall business, its products and organization structure. Then, in preparation for the formal SAP training, they had to get familiar with the SAP system through the buddy program. They also reviewed videos that showed how other parts of Owens Corning had implemented new

processes and systems. Subsequent to the SAP training, users would again work with their buddies and attend specific workshops. At the completion of this comprehensive training program, users would be certified in the use of SAP and its impact on Owens Corning’s business processes.

Owens Corning is reporting success with their certification program. In the latest implementations, there has been a 100% certification rate. “We now have a much better understanding of how employees best learn to master the new technology and redesigned processes. It was very

difficult to foresee this when we got started since the impact of the changes was not well understood," says Johns.

Despite the new technologies that had to be mastered, outside trainers were only brought in for initial training. Their role was to jump start each process and work with selected "champions" who could master both technology and business issues quickly. Once comfortable with the new technology, the champions took over the job of training others. "These individuals needed to become trainers, teachers, coaches and spiritual guides," says Radcliff.

Owens Corning found that they were creating a new set of skills and a much more literate workforce. This included not only technology literacy, but also the deep understanding of how the business processes in the company work.

Implementation Costs

Owens Corning reported that the total cost of the Advantage 2000 implementation, excluding the cost of installing the infrastructure consisting of workstations to run SAP, PCs and the network, will be approximately \$140 million. Design, development and conversion costs totaled \$100 million, while training and deployment costs were \$40 million. Owens Corning replaced existing hardware costs with new hardware, and therefore did not incur incremental expenses for the new hardware infrastructure. These totals represent the actual cumulative costs for 1995, 1996, 1997, 1998 and the estimated investment in 1999.

The costs include:

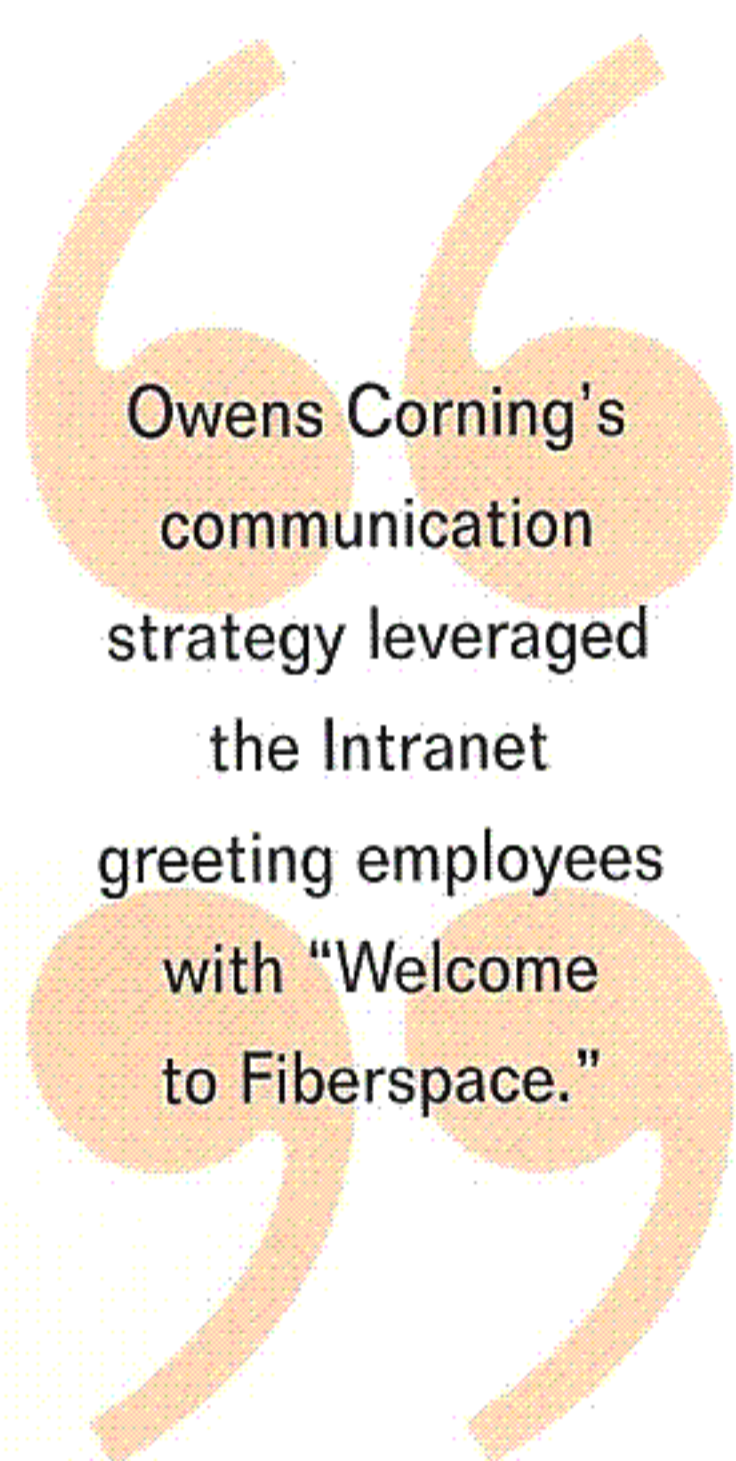
- ▶ Software: Software and licenses for SAP R/3 and bolt-ons;
- ▶ Process redesign: Business unit, IS and SAP consultant time for process redesign;
- ▶ Development: IS, SAP consultant and technical contractor development time for coding, configuration and testing of the new system;
- ▶ Data Conversion: Costs to outside vendors to develop programs to convert data from the legacy systems to the new system;
- ▶ Training and change management: Training module development, training materials, incremental training PCs, internal communication materials and change management resources; and
- ▶ Deployment: IS, business unit and technical contractor time to install and debug the new system in each location.

These costs are substantially more than the \$59 million that Owens Corning had initially estimated. This is due to the increase in scope due to the 17 acquisitions (and \$1.6 billion in revenue) it has made since the project was initially launched as well as an underestimation of the training, data conversion and reengineering costs. Owens Corning estimates that the training and change management costs more than tripled from the original budget, due in part to the jump in the number



VP and CIO David Johns.

We underestimated the amount of training that would be required to make the change.



Owens Corning's communication strategy leveraged the Intranet greeting employees with "Welcome to Fiberspace."

of employees that needed to be trained from 7,500 to 12,000, as well as an underestimation of the magnitude of changes that Advantage 2000 required. "The easy part is putting in the technology—the difficulty is in the changes in employees' jobs and the pace at which the organization can accept change," says Johns. Data conversion is considered a portion of the development costs and accounted for 6% of the project costs, or \$7.7 million.

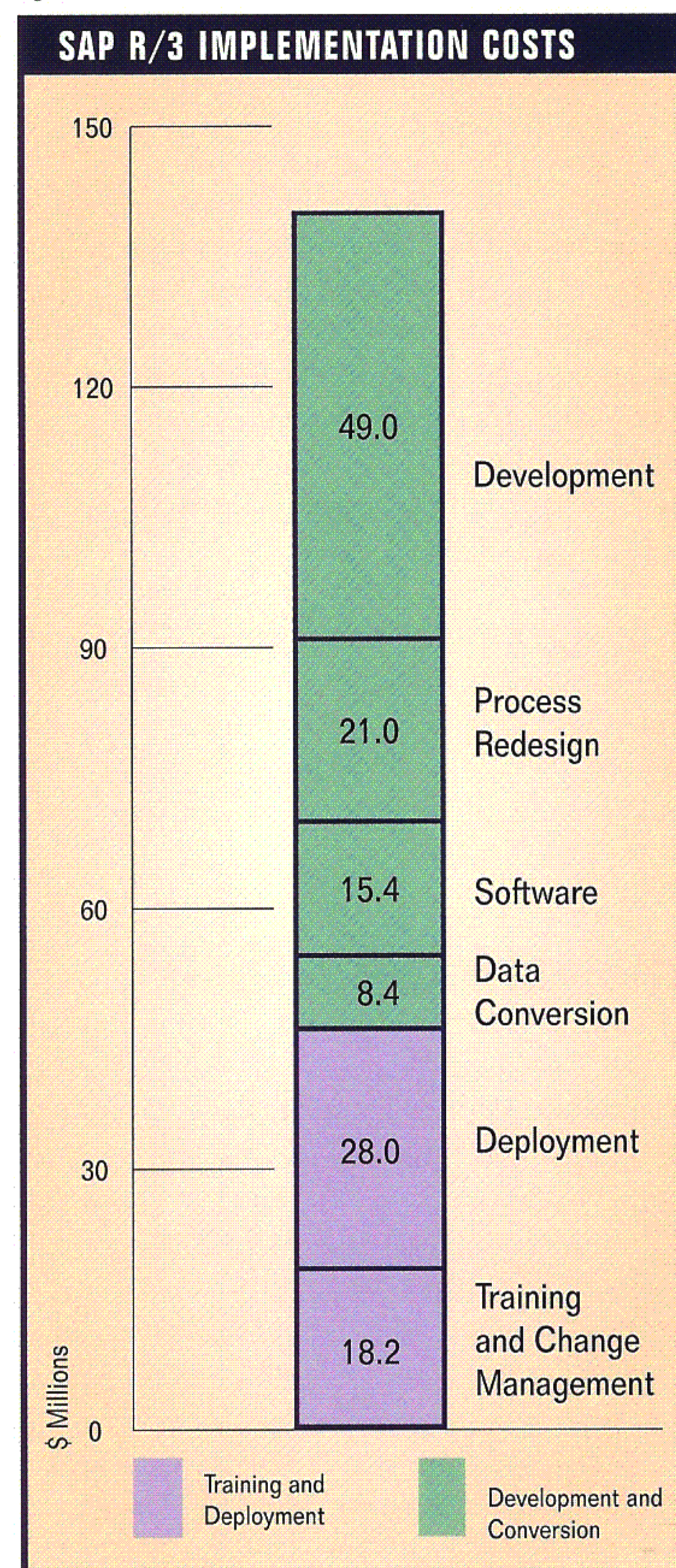
Owens Corning had five different data standardization teams who focused on the data needed for a major business process being re-engineered around SAP. This effort took much longer than expected. "Data standardization and conversion was a highly manual process, and, in many applications, the data either did not exist or was so unreliable that it would produce erroneous results," says David Lepow, a Global Development Leader of the Advantage 2000 project. "In some cases, it was so bad we had to go back and re-create legacy data from scratch."

Furthermore, additional cost was required for bolt-ons and customization to cover functionality that was initially assumed to be included in SAP, but was not available at the time of the implementation.

Leveraging Information Creates Significant Operating Benefits

When fully deployed in 1999, Advantage 2000 will integrate all of Owens Corning's employees and customers, giving them direct and timely access to information that will help them make better, more timely business decisions. The new system has resulted in greater productivity and reduced costs throughout the value chain, from suppliers to consumers. Advantage 2000 supports company-wide System Thinking goals such as providing customers a single-source supplier for a broad range of needs, enhancing the company's

Fig. 12



Source: Owens Corning

Training and deployment costs were approximately 33% of the total SAP R/3 implementation costs.

total service capabilities, integrating all businesses and regions, and providing greater access to real-time information.

In addition, full deployment of SAP will provide the added benefit of avoiding the cost to convert the company's legacy systems for the Year 2000.

CUSTOMER SERVICE

Benefits to customers include fewer service calls, improved on-time delivery and greater accuracy. Customers are able to complete their orders and receive immediate confirmation on one call, even when ordering a variety of products from different facilities. For example, through SAP's available to promise module, Owens Corning has a single point of contact for all product lines. "With our old system, we didn't know what inventory we had in stock," says Radcliff. "We would have to check around and get back to the customer. With SAP we can see what inventory is available, when it will be produced, and who is the lowest-cost carrier. We can commit to the customer before we hang up the phone. That used to take multiple steps; now it takes one phone call." In addition, Owens Corning has been able to improve customer service by shipping product that is in short supply in the U.S. from Europe by gaining visibility into global inventory information.

FINANCE

Owens Corning reports that it has achieved significant savings and efficiencies in the finance area. The accounting center in Charleston, along with the consolidation of plant accounting in Toledo are saving \$4 million annually. In addition, Owens Corning has cut its budgeting process from four to two months, can now close its books in 4 days versus 18, and has created a single financial report for its global divisions. "The system has



Domenico Cecere, former CFO, now Senior Vice President and President North America Building Materials Systems.

moved us forward," Cecere said. "It used to take four accountants to close books at one plant. We now have one accountant to close four plants."

Accounts payable has implemented a simple credit card payment system to settle the annual 100,000 transactions worth less than \$1,000 each. This has eliminated purchase orders, invoices and checks, thereby cutting the cost of processing a small account payable from over \$75 to just \$5 per

The easy part is putting in the technology – the difficulty is the pace at which the organization can accept change.

Fig. 13

CUSTOMER SATISFACTION SCORECARD

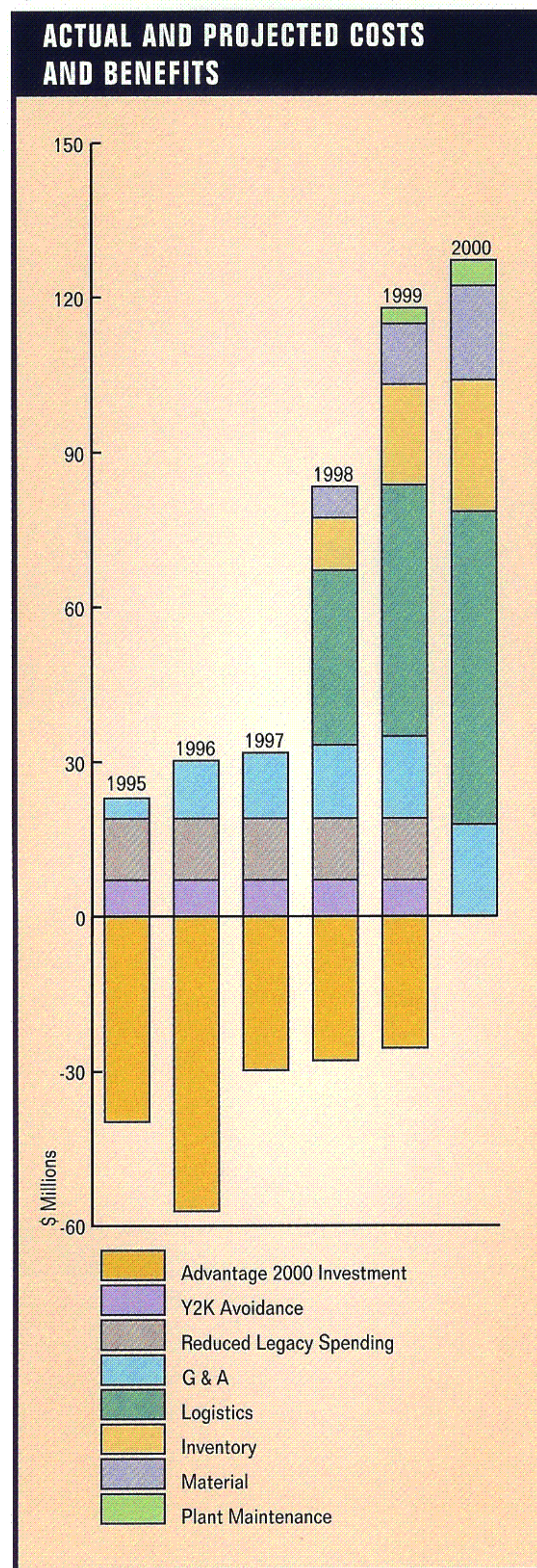
Metric	Owens Corning Satisfaction Index (%)	Other Suppliers Satisfaction Index (%)
Customer Service Representatives	98	91
Ordering and Status	86	83
Product Availability and Delivery	89	88
Invoicing and Adjustments	92	84
Overall Rating	91	86

Source: Owens Corning

Advantage 2000 benefits have already had a significant impact on Owens Corning's customer service levels.

The first thing I do in the morning is review our operational performance.

Fig. 14.



Owens Corning expects to achieve an 89% return on investment from Advantage 2000.

transaction. The travel and expense team set up a similar program.

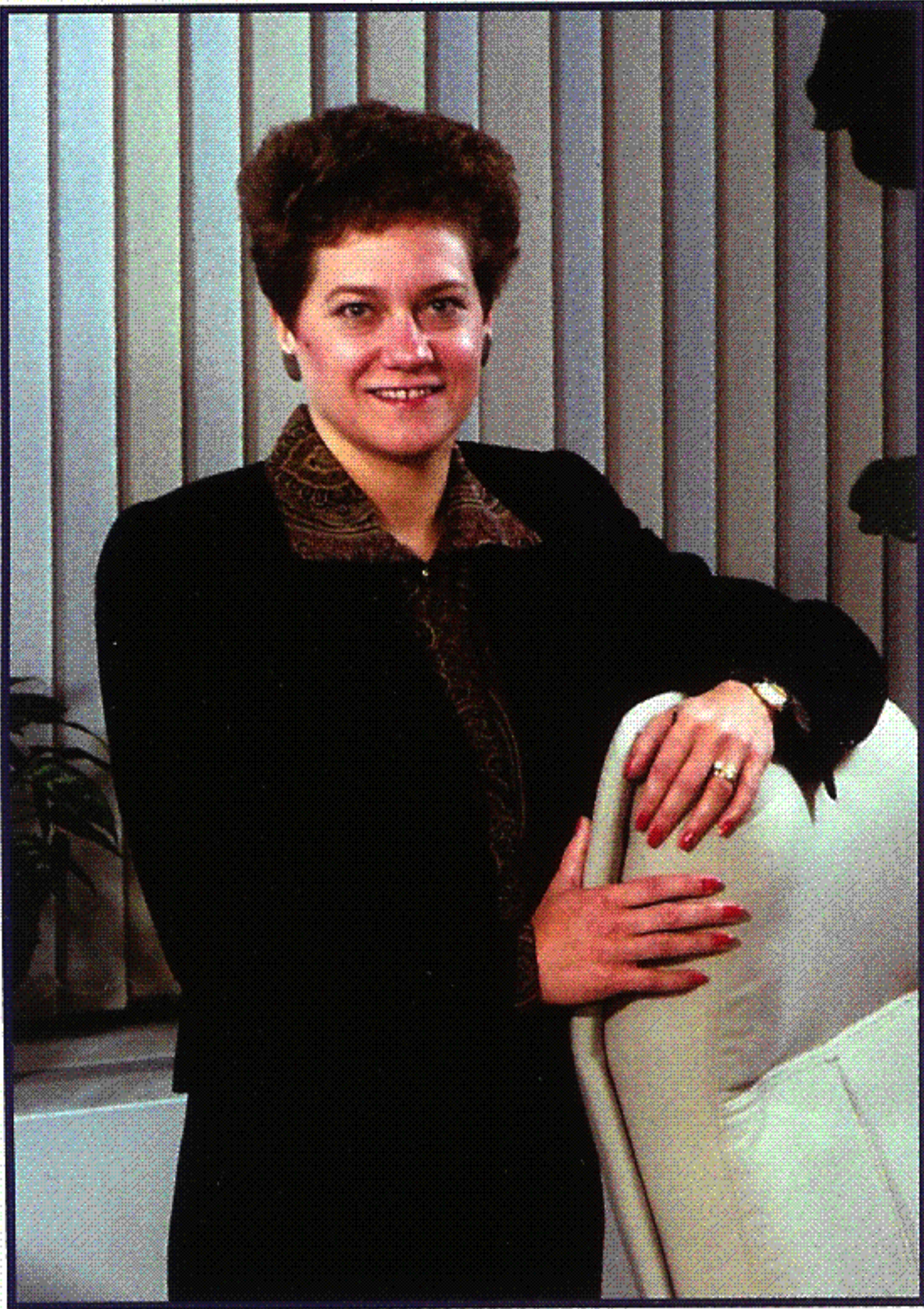
Cecere has the necessary daily information to assess the company's performance at the click of a mouse. "The first thing I do in the morning is review our operational performance—if I see that a plant is not performing as well as the other plants, I am able to drill down into the plant data and, if necessary, send an e-mail to the plant manager to take corrective action." With consistent, up-to-the-minute information available to key decision makers, Owens Corning is able to ensure that necessary actions are taken to continuously improve business performance.

LOGISTICS

The technologies available in Advantage 2000 form a common platform offering seamless access to real-time information across Owens Corning's global organization. This includes manufacturing facilities' production schedules, warehouse stock, pricing, and transportation information. Owens Corning has been able to cut its logistics costs by one-percentage-point from multi-order consolidation, fewer warehouses and lower freight costs—having a common system enables dispersed locations to collaborate on transportation contracts and negotiate better prices with carriers. Annual logistics savings to date are \$35 million.

INVENTORY

Owens Corning expects to increase inventory turns by 50% and reduce working capital by \$100 - \$150 million by providing more accurate information about product demand and inventory. This, in turn, will drive investment decisions and result in a more efficient supply chain, tighter control of inventory levels and significantly reduce Owens Corning's need for warehouse space. "We are essentially replacing assets with information," says Radcliff, "our just-in-time inventory system has already allowed us to increase inventory turns by 45% yielding a \$45 million reduction in working capital costs in some of our business units that are on the new system."



Meg Ressler, Director, Customer Operations North America

MATERIAL COSTS

Advantage 2000 assists Owens Corning's global sourcing efforts to secure the lowest prices, ensure adequate supply of materials and reduce raw material inventories. Armed with information about its global purchasing habits across all businesses, Owens Corning can bundle its material requirements and negotiate national and global contracts. An expected one-percentage-point improvement in the cost of raw material acquisition will result from this global aggregate purchasing power.

PLANT MAINTENANCE

Advantage 2000 has allowed Owens Corning to reduce plant maintenance costs resulting from reliability-oriented processes and the information tools to support it. "We have already reduced changeover times by 5% by having access to better information," reported David Lepow, Global Development Leader. "For example, our forecast accuracy has improved from 70 percent prior

to the system to 90 percent; we have seen a reduction in our plant maintenance costs as a result." Owens Corning is expecting to save \$5 million annually for plant maintenance.

INFORMATION SYSTEMS

Prior to Advantage 2000, Owens Corning spent 2.4% of revenue on IS, compared with a 2% industry average. IS spending is expected to decline to 1.9% in 1998, and by mid-1999, when the Advantage 2000 rollout is completed, IS costs will be an industry-leading 1.7% of revenue resulting from selective outsourcing, standard client server architecture, Internet protocols, and off-the-shelf software that need only be configured.

ROI

The ROI Report has calculated the internal rate of return on the investment of \$140 million to generate an ROI of 89%.

The SAP R/3 enabled benefits were determined by first calculating the annual gains in operating profit and savings achieved in the more productive utilization of invested capital in inventory. This was then projected forward based on estimated savings and forecasts by Owens Corning and its competitors by Wall Street securities analysts. The actual costs, by year, of implementing the Advantage 2000 project were provided by Owens Corning. These costs were offset by the \$30 million to \$40 million cost avoidance from not having to "fix" their Y2K problem and \$60 million in legacy development efforts that were reallocated due to the implementation of SAP R/3. *The ROI Report* made reasonable estimates regarding the portion of the savings attributable to the SAP R/3 system as an enabler of the gains.

“We are essentially replacing assets with information.”

The Future

Owens Corning leadership continues to see SAP as a key part of the future vision, positioning them as one of the easiest companies to do business with. Hiner states: "Electronic commerce will seal the deal with customers. They ought to be online with us, ought to know our inventory, ought to know when something is shipped, ought to be able to pay electronically, so we can give them multiple products in a way that looks like one product." Meg Ressler, Director, Customer Operations North America, envisions how technology can dramatically change customer service, "Ultimately, we would like to bring the plants to the Customer Service Reps—they should be able see a tour of the plant and interact with the plants, not just through numbers on a screen, but by actually seeing the plant in operation so they are able to make better decisions on behalf of our customers."

Shorter-term plans include:

- ▶ Corporate rollout of SAP to the entire company by the middle of 1999, including the remaining:
 - Composites Europe and Vise in December 1998,
 - Composites North America and Foam North America in February 1999,
 - European PolyFoam in June 1999.
- ▶ Convert to SAP's version 4.5 in 2000;
- ▶ Implement advanced planning and scheduling modules;
- ▶ Continue to deploy a data warehouse solution as a pilot program to assess requirements in order to implement a fully functional data warehouse in 1999.

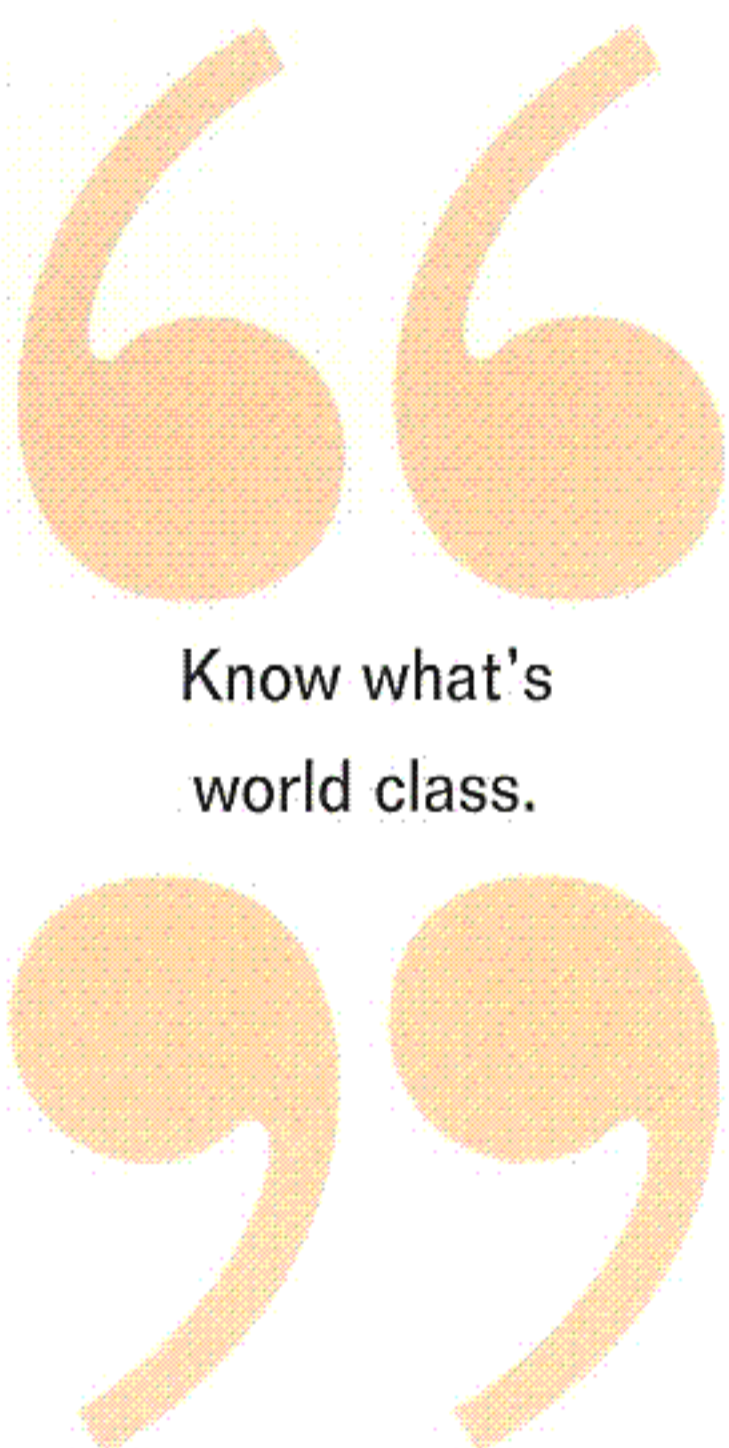
Lessons Learned

1. Design around the enterprise supply-chain. Break down the functional organizational structure and take a process-based approach to implementing SAP. Assign responsibility for the key processes in the supply chain to senior executives from day one. "Although we organized the design teams around the global supply chain from the start of the project, we did not appoint business leaders of each of the key processes until we were two years into the project," says Johns. "We would have been more effective if we had senior operating executives in our company with responsibility for the key processes from the beginning."

2. Benchmark ... know what's world class. In order to achieve the break-through results of an enterprise-wide system, develop outcomes based on "world-class" performance from both inside and outside your industry.

3. Focus on quantifiable business outcomes. Owens Corning executives set targets as one of their first activities for the Advantage 2000 project. Project teams were accountable to the process executives for achieving these outcomes. "We had specific goals for growth, productivity, globalization, employment and other criteria," says Radcliff. "We would have spent \$140 million for nothing if we didn't focus on specific goals."

4. Insist on a full-time team—getting the right people is essential. Implementing dramatic business changes together with an enterprise-wide system on a global basis is extremely challenging. A full-time team comprising individuals who are respected by their colleagues and can lead the company through the change process is therefore essential. "We did not always get the right people on the teams - we discovered that, because we could not define how the implementation would impact the business over time, it was very difficult to identify the types of people that would be needed on the teams," says Johns. "We also could have done a better job at managing the resources (especially those from outside the U.S.) to ensure we had them 100% dedicated to the project."



Know what's
world class.

5. Start small, implement early, embrace mistakes. Owens Corning started with a limited number of financial applications to make sure the basic system worked as expected. Then, they deployed all functionality in the smaller, self-contained businesses in Europe. "We knew that to get the senior leadership's commitment to SAP, we needed to have a few early wins," says Radcliff, "In addition, we knew that we would not get everything right the first time. So we measured success not only by the bottom-line benefits for the company, but through our learning from one implementation to the next."

6. Compress the schedule and do not plan time to admire problems—force decisions. SAP offers so many different options and taxes so many resources in the company that it is easy to get bogged down. "A project like this can take as long to implement as you want it to," says Johns. "We found that tough scheduling seemed to be the only reliable way to control the implementation." In addition, top management kept the heat on under the project by putting a controller on the reengineering team to keep an eye on project costs. This ensured that if any division wanted to deviate from the plan, they would need to find a way to pay for those changes.

7. Quality of legacy data is worse than you think. Data cleanup took much longer than Owens Corning had anticipated. "SAP forces you to have all your data current and in sync at the front end," says Radcliff. "Customer numbers have to mean the same thing everywhere in the organization. We understood that when we started our project, but we had no idea how much work it would be." David Lepow continued, "We'd recommend starting even before the system project formally gets going. We did that and we were still working on it right up until the moment we went live on SAP."

8. You will underestimate the learning curve. Dedicate sufficient time and resources to ensure that the organization is ready to accept the changes in their daily work processes. Commit full-time resources to the training and communications effort to gain the organization's awareness of the

changes, create enthusiasm for the future and gain individual's commitment to the changes. Owens Corning recommends three specific strategies to ensure a smooth transition:

- ▶ Conduct training ahead of the implementation;
- ▶ Certify users in the use of the new process and system; and
- ▶ Train users on the whole process, not just specific transactions.

9. Do not launch the assault without air cover. Senior leadership support ensured that the implementation maintained momentum through the inevitable ups and downs. The CEO, CFO, division presidents, senior executive staff and Board of Directors were involved from the start through SAP demonstrations and presentations. Johns stated, "We went through a difficult period in 1997—if we did not have the high levels of commitment and support from our executives through that period, we would have stopped the implementation."

10. Attitude...makes the difference! Owens Corning openly recognized the changes that would be required of its employees as well as its processes. Company leaders talked openly about problems—which means they were addressed quickly—and there was no time to point fingers. "For the first time, we had true co-leadership of a systems project," says Johns. "Owens Corning will never do another project like this without co-leadership from the business and IS."

“Force decisions—
do not plan time to
admire problems.”

About The ROI Report

This publication is a periodic report on the implementation of enterprise-wide client server applications such as R/3 from SAP R/3. *The ROI Report* is written for senior managers of Fortune 1000 organizations around the world. The report is published by Hill | Holliday, a Boston based communications consultancy that combines rigorous business analysis and marketing expertise with powerful creative and integrated communications across all media to build brands, create customer relationships and drive sales. SAP supported the development of this edition of *The ROI Report*.

ROI Methodology

The ROI Report interviewed Owens Corning executives, managers, and users about their implementation of SAP R/3. In addition, Owens Corning's internal financial reports, planning documents, and other materials were reviewed. A literature search also was conducted to obtain additional information and to identify key issues.

The ROI calculation was based on a model which evaluated the projected impact and benefits. Working capital carrying costs were analyzed and valued at the estimated inventory carrying costs and Owens Corning's cost of capital. Financial projections for future years were based upon *The ROI Report's* analysis of internal company documents and comparative industry analyses.

The investment analysis included the estimated cost of both external and internal Owens Corning implementation expenses. The ROI was calculated by determining the Internal Rate of Return (IRR) using the time-value-basis of money. The IRR method was chosen because it is felt to be the most conservative approach.

About The Authors

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For More Information

The telephone number for *The ROI Report* is 800-283-1SAP. The electronic mail address is SAP.COM. We look forward to hearing and reading your comments on how we can make *The ROI Report* more valuable to you.