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**Center for
Effective
Organizations**

**New Organization Forms
for Competitiveness**

**CEO Publication
G 89-3 (146)**

**Jay R. Galbraith
Center for Effective Organizations**

November 1993

**Center for Effective Organizations - School of Business Administration
University of Southern California - Los Angeles, CA 90089-1421 (213)740-9814**

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Abstract

The Center Project on Organizing in 1990's is examining what manufacturing firms are doing to change their organizations to become more competitive in the 1990's. The data reported here was collected on traveling seminar conducted by the Center for executives from FIAT. The seminar visited Hewlett-Packard, Sun Microsystems, McDonnell Douglas, TRW and Rockwell. The organizations that are described here are the flexible business unit, the network organization, the global product organization, the green field site and some trends in corporate structures. Most of the changes are in response to attempts to restore cost and quality competitiveness. Increasingly new organization is for developing new revenue sources.

New Organization Forms for Competitiveness

The Center for Effective Organizations has been studying the organizational practices of western manufacturing firms for several years. The purpose is to discover the forms of organization that will be used to be competitive in the 1990's. The framework for the study has been described in an earlier paper (Galbraith, 1988). As a part of this study, the Center recently escorted a group of managers from FIAT on a traveling seminar to visit several other sponsor companies. The question addressed in the visits was "What new forms of organization are you adopting to remain competitive or to restore competitiveness for the 1990's?" For example, "What are you doing to become more flexible and responsive to customers? What are you doing to bring technology and products to market faster?"

This paper is a report of the findings of that visit. The first section is a brief overview of the driving forces that are bringing about the changes in strategy and organization. Then the framework and observations of the strategic and organizational changes are presented.

The Business Environment

The reasons for the changes that were observed at the companies were the new level of global competition and changes in the nature of today's workforce. All of the firms were experiencing a more intense level of competition, especially from Pacific Rim countries. California is particularly sensitive to this source of competition. Some of the business units of the companies visited had experienced declines in profitability or

actual losses as a result. Usually the arrival of a new manager at the business unit was associated with the beginning of the change process.

A couple of the businesses were responding to growth opportunities provided by the technologies being used in the new competitive environment. Growth and global volume were the stimulants for change at these units.

Another factor often cited was the change in the work force. The new workers were less tolerant of the traditional hierarchical work methods. They were better educated and had higher expectations than previous generations. As a result, they were more capable of, and more interested in, making professional contributions to their work.

The forces of global competition and better educated work forces are consistent with each other. As companies create more flexible, decentralized organizations, workers are usually receptive to their enhanced role. (For an explanation from those who are not receptive, see Parker and Slaughter, 1988). In many other cases, the forces of global competition in the new environment are not mutually reinforcing but conflicting. The conflicts lead to trade-offs in the design of tomorrow's organizations.

Strategies for Becoming Competitive

The strategies that companies are adopting to become more competitive follow the three-stage cycle explained in Galbraith (1988). The cycle is illustrated in the table below. The first column simply lists the forces in the new global competition.

First, the firms act strategically so as to recover competitiveness in their core businesses. These actions usually center on reducing costs and increasing quality. Second, the firms extend these businesses on a global basis. Usually driven by a need for world scale, companies adopt integrated strategies for conducting their business across countries. And finally, the priority shifts to developing new revenue sources. As the core businesses generate more cash than can economically be reinvested in them, the firms seek new developmental opportunities. The pressures on costs, quality and globalization are still present, but the priority for development is higher.

A majority of the businesses that were observed fell into the recovery category. The instrument division and PC division at Hewlett-Packard, the MD-80 program at McDonnell Douglas, the Operations Group at TRW, and the plastic panel division and semiconductor division at Rockwell all were engaged in restoring cost and quality competitiveness.

The recovery steps that were observed were all long-term actions. None of the companies were closing plants or laying off workers. These actions are usually the initial steps which eventually give way to longer term corrections. The long-term actions were consolidations, integration and responsiveness, vertical disaggregation and employee involvement.

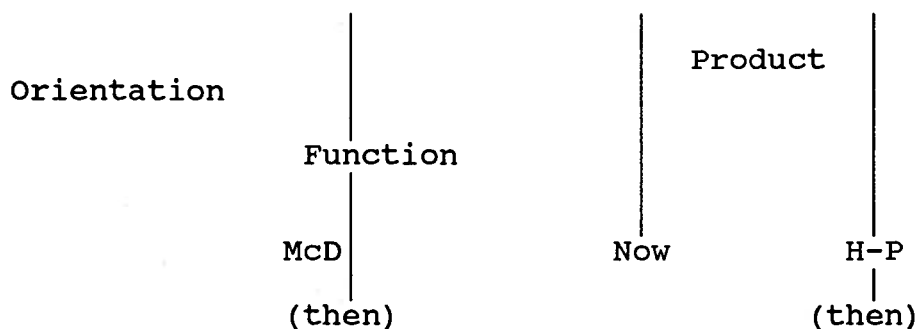
The instrument division at Hewlett-Packard provided the clearest example of the consolidation strategy. In many areas of manufacturing, Hewlett-Packard had overly fragmented its activities. Multiple and incompatible facilities reduced scale economies, prevented load balancing and limited the opportunity

for specialists in the area. Throughout Hewlett-Packard, we were informed of examples of consolidating and standardizing in Research & Development and in expensive manufacturing functions like semiconductor and printed circuit board fabrication. Usually the consolidation took place when a new product was introduced or a new investment was made.

Every organization was increasing its responsiveness and responding on an integrated basis. The plastics division at Rockwell was quoting lead times of 12 months delivery of new automobile panels which required about 18 months or more previously. TRW Operations Group had a 20-20 program. That is, they were targeting 20% cost reduction and elimination of 20 weeks flow time on a new project. Virtually every firm was attempting to reduce time to market, respond more quickly to quality problems, respond more quickly to customer requests and respond more quickly to vendor issues.

In addition to being more responsive, the companies were trying to respond on an integrated, multi-functional basis. That is, engineering, manufacturing, purchasing and other functions, not just sales, were responding to customer requests and quality issues. All firms were attempting to bring marketing, quality and manufacturing into the product design process at its beginning. At Rockwell, this integrated process was called simultaneous engineering. At TRW and Hewlett-Packard, it was called concurrent design. All were trying to design products from the beginning which were easier to manufacture, easier to maintain, of higher quality and contained what the customer wanted.

McDonnell Douglas and TRW were actually fragmenting functions to get better integration and faster time to market. McDonnell Douglas, as contrasted with Hewlett-Packard, was too functional. McDonnell Douglas added new programs such as the MD11 and C17. It was moving from a three to a four program division. They were also doubling in size. On this basis they could segment programs and not lose much in scale economies when compared to the integration achieved through dedication. So while Hewlett-Packard was consolidating, McDonnell Douglas was breaking out portions of functions and dedicating them to the MD-80 project. The figure below shows the changes:



Both McDonnell Douglas and Hewlett-Packard are moving to a balance between product management and functional management.

TRW made a trade-off decision. By forming self-contained project manufacturing units, its costs per day went up. They had to duplicate some activities for each project. But the integration led to fewer days and fewer design changes. Total costs and total flow time were reduced. TRW was not a volume manufacturer. They produced one or a few expensive units for a single customer.

None of the companies were actively pursuing a policy of vertical disaggregation. They reviewed make or buy decisions,

but most activities were continued. It is the start-ups that perform far fewer activities and pursue less vertical integration. Indeed, at Hewlett-Packard's personal computer division, which started its renewal program at a new site in 1983, purchased materials were 80% of the cost of goods sold. Many sales went through dealers and channels other than Hewlett-Packard's sales force.

Almost all the companies were forming tighter, longer and more open relationships with customers and suppliers. Through tighter and more open relations, intermediate activities such as in-coming inspections were eliminated, and costs were saved and often shared. More information was shared between vendor and customer. Attempts were made to use computer-aided-design and to use the same software systems. So even if there was little elimination of or outsourcing of activities, all companies were forming fewer, longer term, exclusive relationships between vendors and customers in order to reduce costs, increase quality, reduce inventories and respond faster with shorter cycle times.

Every company was launching a program of employee involvement. Usually the company recognized that it had downsized, reduced cycle times, increased quality and so on, but still needed more reductions. Competitors had also improved. The answer was continuous improvement by drawing upon the resources of all employees.

Some attempts were relatively recent. McDonnell Douglas was building in involvement around "natural work groups." They were bargaining with the United Auto Workers Union to begin a NUMMI (the GM-Toyota joint venture) style participation around teams.

TRW on the other hand had 17 teams participating in an involvement program which began in 1985. The programs varied, but all used extensive communication of the business unit strategy, goals and plans to all employees. The involvement took place in work teams and was usually accompanied by training in group problem solving and open communication. Until recently, most involvement took place at new plants where management and employees were selected for involvement. These programs were involving existing workers and existing management.

In summary, all of the companies were actively recovering the competitiveness of their businesses. The major effort was taking place through attempts to integrate functions more tightly yet respond more quickly. The increased responsiveness was needed in order to get products to market faster, reduce cycle times, design manufacturable products, design in quality and respond more quickly and effectively to customer issues. These efforts at responsive integration were called simultaneous engineering and concurrent design among others. The next most popular strategy was employee involvement. The companies wanted to empower employees in order to achieve continuous improvement. There was some use of consolidation and tighter relationships with outside suppliers and customers.

Global Businesses

Several of the companies were extending their activities across countries to form global business units. Allen-Bradley division of Rockwell and the personal computer division of Hewlett-Packard were actively designing universal products which could easily be modified to fit local requirements. Sun

Microsystems was beginning the process as more value added activities were planned for Europe and the Far East.

The personal computer division was striving for volume world-wide and common parts. Vendors could be common for all manufacturing sites and volume discounts obtained. Allen-Bradley was being driven by changes in its business and its customers. Its business was moving from sales of factory automation hardware to large scale factory systems to global customers. Centralized buying by large customers for large systems requires that the business be run as an integrated global business.

Sun Microsystems was also expanding globally to get volume to pay for its large investments in R & D. It was expanding by forming alliances with local companies who would add value with application software, local sales and service. These alliances allowed Sun to grow without having to build its own sales and service organizations.

Development

The majority of the businesses that were visited were recovering their cost and quality competitiveness. Three of them could be considered as operating in a development mode. Sun Microsystems, Allen-Bradley and, to some extent, the personal computer division of Hewlett-Packard. The global players were also the developers.

Sun is the obvious business in a development mode. It was started five years ago and has grown 100% per year the past two years. It is now a \$2 billion dollar company. Sun has capitalized on the increased computing power of micro-processors.

They put work stations on engineers' desks which are as powerful as mainframes at a fraction of their cost. But Sun's real advantage is that they have changed the "rules of the game" in the computer business. They follow an open systems philosophy. That is, they use a Unix operating system which does not lock a customer to a computer vendor. The customers like open systems. Sun is growing as a result. Indeed, they must grow so that when IBM and DEC adapt to the new rules of the game, Sun is of a comparable size to compete with them. Sun has chosen alliances as its method of rapid growth. It has more than 250 arrangements with original equipment manufacturers (OEM's) and value added resellers (VAR's) to distribute their products. Thus, they have 250 sales forces in addition to their own.

Allen-Bradley is a developmental business which was acquired by Rockwell. Allen-Bradley is a major competitor in factory automation, which is a market growing at 15-20% per year. Rockwell adds its capital, provides some proprietary technologies, gives access to some state-of-the-art internal markets, and provides access to the government market. All of these factors add to Allen-Bradley's growth potential in the growing market.

The Hewlett-Packard personal computer division started as a recovery effort. It was not cost competitive at supplying low-end PC's and terminals for Hewlett-Packard products. In order to be competitive, it needed greater volume. Therefore it expanded by providing products for IBM, DEC and ASCII markets in addition to internal Hewlett-Packard markets. The added volume of these markets on a global basis permitted volume purchases of

components and investment in automated equipment. The success of the venture so far has provided Hewlett-Packard with a new source of revenue and development.

In summary, the businesses that were visited fit very nicely into the Recovery to Development framework. Most businesses were actively in a recovery mode. Three of them were pursuing development and global expansion. The organization forms being adopted by them were a direct result of these strategies.

Organizations for Competitiveness

The organizations that were adopted also followed from the Recovery to Development framework. The companies were actively pursuing matrix-type organizations, network organization and green field start-ups. In addition, they were trying to make their organizations more flexible and more participative.

The Flexible Business Unit

All of the organizations had created business units that were functional organizations. These functional organizations consolidate specialists and expensive equipment. They minimize the number of managers and specialists that are needed. The functional organization is therefore an efficient form and helps minimize costs.

The problem with the functional organization has always been its inflexibility. There is only one person at the top to coordinate cross-functional issues. The centralized functional approach was sufficient if one product line was produced in a stable environment. But in today's competitive environment, the classic functional organization is too slow and inflexible. On occasion, as TRW illustrated, some fragmentation into product or

project dedicated units can decrease total costs and increase flexibility, while raising slightly the duplication costs. But for automated activities, functional specialists and functional managers, the self-contained product unit is too expensive. Hewlett-Packard has discovered this fact in manufacturing, R & D and its systems oriented computer business.

Instead, companies are making their functional organizations more flexible. The flexible business unit organization was achieved through a sequence of actions which constitute a complete and consistent package.

1. Decentralization of decisions to the shop floor when possible.
2. Co-location of multiple functions on the shop floor.
3. Orientation around teams at all levels of the organization.
4. Reduction of levels of organization to reduce time to reach the top team.
5. Emphasis on cross-functional teams at the managerial levels.
6. An explicit planned program for renewing the organization, including training and communication to all levels.

The decentralization was taking place through employee involvement to the factory floor and through cross-functional teams and program managers at the managerial level. Employee involvement always took place by forming teams at the floor level. Resources were provided to them by adding engineers and other support functions during meeting times. At TRW and

McDonnell Douglas, the other functions were all co-located so that informal interactions could easily take place as well.

McDonnell Douglas was also forming teams around major sections of the aircraft. These teams, called natural work groups, included all functions such as engineering, quality, manufacturing engineering, production control, assembly and so on. Then in order to facilitate cross-functional processes, each function itself was reorganized into major sections of the aircraft plus some of the traditional specialities of the function. The next steps are to have each natural work group prepare a business plan for reducing costs, increasing quality, reducing cycle time, capital investments, budgets and so on. These plans will include each function's contribution and will lead to compatible cross-functional goals. The reorganized functional units will be held accountable for these goals. An information system for tracking these goals and plans is under design. In this way, cross-functional cooperation will be more easily obtained.

At Hewlett-Packard, training and selection were being used to increase cross-functional cooperation on teams. At one time, 75% of the management was working on teams. These teams were designed around several product lines, across two sites for common product lines and by major purchased items. At the PC division, management was being selected on the basis of a manager's ability to be a team player. They also invested heavily in training all employees in group problem solving, open communication and management of conflict. Outside consultants were used extensively in this process.

All of the companies were searching for managers to play product manager and program manager roles. That is, for new products and major programs, more full-time cross-functional coordination was needed. These program managers were to coordinate products across functions, but had no authority. Therefore, selection and development of people with influencing skills was necessary. The most difficult selection was when the program manager also had a global role of coordinating products across subsidiaries. Allen-Bradley, Hewlett-Packard and Sun were searching for ways to grow these people.

TRW had the classic matrix organization that is described in text books. They have been using it for years quite successfully. They believe the keys to a successful matrix are to grow managers by having them work on both functional and project sides of the company. Then they maintain open communication and manage conflict as an expected natural consequence of the matrix. Everyone understands this situation before projects begin.

Most companies had several types of teams. On the shop floor and at manager levels, there were product or project teams for integrating engineering manufacturing, marketing, quality and some other functions. But increasingly, companies were forming customer teams when there are a few large customers. McDonnell Douglas and Rockwell were forming them. McDonnell Douglas was trying to respond to customized customer requests. Rockwell was as well, but also had quality teams focusing on customer quality issues. Hewlett-Packard also had teams for purchased subsystems. These were cross-functional and interacted with the vendors.

When these team approaches were working after a while, the companies were discovering that they did not need as many managers. TRW was discovering this as a problem and was phasing out managers overtime. Hewlett-Packard was discovering that managers were also a problem. They were using training to help managers lead teams and to get them to empower and support employees vs. control them. The selection criteria for managers and promotions were including people skills more than technical skills.

Almost every company was introducing teams and change as part of a renewal program. The program usually started with a new manager to run the division. Then the manager and the top team spent several months working the mission and strategy for the division. During this time, the top group became a team. Then the team-building process, the new strategy and the new goals were taken to the next levels. Eventually all employees, including hourly and union employees, were included in the process. All companies were showing improvement as a result. They saw the teams as part of a process of continuous improvement.

Network Organization

The network organization arises when companies use extensive outside contracting for activities. Previously companies vertically integrated and performed activities themselves to get control of the entire supply chain. A hierarchical chain of command managed these vertically integrated activities. As companies now concentrate only on those activities at which they excel and buy the rest, a flexible network of relationships among

independent firms has replaced the hierarchy of superior-subordinate relations. Coordination must still be achieved and the relations must be managed. The trend that was observed was that the firms were establishing fewer, longer term relations. There was more sharing of information and a great deal of day-to-day contact.

The companies were all managing these outside relations. Teams were formed around vendors and customers. Customers were increasingly being included in the team meetings. Both the companies and the customers were placing their people at the other company's site. Companies were working to make each other's management processes more compatible and flexible. They were adopting compatible CAD/CAM systems and cost systems.

Several companies were working to eliminate paper work between them and intermediate processing activities such as inventories and inspections. All parties were benefiting from the shorter cycle times. Rockwell was adopting incentive schemes. One plan was to share cost savings with the team that created the savings. Then they were sharing savings with customers and vendors. Their intent was to build long-term trusting relationships which benefit both parties.

McDonnell Douglas had formed teams around customers and created departments for its large customers like Delta and American. Since each aircraft is custom designed, they created a cross-functional team for each plane and incorporated customer representation. McDonnell Douglas was working toward linking customer teams with internal shop floor teams based on sections of the aircraft. At Hewlett-Packard's Roseville division cross-

functional commodity teams were created for cathode ray tubes, printed circuit boards and so on. Since 80% of cost of goods sold was purchased material they wanted to get effective relations with suppliers and volume purchases. In order to get volume purchases, the teams worked toward communality across product lines and manufacturing sites. Through cross representation on product teams and a Steering Committee, they were integrating the commodity teams with the product teams. In these ways, the external relations were linked to the internal coordination processes.

Sun Microsystems had extensive relationships with OEM's and VAR's. Part of the skill of their management was negotiating these relations to get the sales growth and yet keep all these vendors from competing with each other and with Sun's own sales force. The control for the downstream sale was called "vectoring." It required extensive market segmentation knowledge and an understanding of distribution arrangements in various countries and markets. The OEM or VAR was then allowed to sell and service only in the agreed upon market. The legal function was also active in arranging the agreements. Indeed, the legal function had become part of the top management team and legal action was becoming part of corporate strategy. As more companies move into development strategies the network organization will become more important.

Green Field Start-ups

Many changes in organizations are introduced when companies start up a new plant, a new product line or a new division. The General Motors Saturn program is the best known of these start-

ups. The logic is that change is introduced more easily when starting fresh than when changing an existing organization. There will be fewer entrenched interests to work against change. Then, after an experiment has proved itself as a start-up, the results can be transferred to other existing sites more easily.

There were two instances of start-up activities. Both were attempts at new development. First, Sun itself is an example of a start-up. It is a five-year-old company that started fresh. Its practices are specifically designed for today's environment of rapid introduction of new products. The engineers at Sun have considerable skill and autonomy. There is a shared business model and product philosophy. The engineers can rapidly design new products in this context while working with sophisticated customers. Their time to market beats all competitors.

When Sun was interested in attacking a new market for educational institutions, they formed a new division. Initially, they thought of forming a new company. The company idea was rejected because Sun technology would be used and existing Sun resources drawn upon when starting up. However, the group of twelve people was called a division. They were given the autonomy and authority to spend that a larger division would have. The freedom, autonomy, pursuit of a new market and an opportunity to work with one of Sun's technical geniuses provided the motivation for the start-up.

The other example was Hewlett-Packard's PC division. All of Hewlett-Packard is dedicated to high technology, high performance, high margin, differentiated products. The PC division is to make low end, low cost products such as low end

PC's and terminals. These products are commodities that anyone can make. The challenge is to be the low-cost producer. By starting fresh at a new, low-cost site, Hewlett-Packard built a division that is very different from the rest of H-P. They had to do everything differently, and they succeeded. They succeeded in part by making a fresh start at a low cost site and choosing people, practices and rewards that fit a low-cost business. This differentiation is best accomplished at a new site separated from the rest of the company.

Corporate Structure

The majority of the time during the seminar was spent discussing business units or divisions. At Hewlett-Packard and Rockwell some of the corporate structural changes were discussed. These changes also fit into the framework provided in the earlier paper.

Hewlett-Packard had always been known for creating many small \$100 million divisions and following a strategy of related diversification. Like other related diversifiers its growth had been internal. Rockwell on the other hand had been classed as an unrelated diversifier (conglomerate) and had grown primarily by acquisition. Both companies exhibited trends that are typical of the Mixed Structure Corporation. The mixed structure is arising as related diversifiers like Hewlett-Packard and Procter & Gamble experience growing differences among their here-to-fore related divisions. Procter & Gamble is also growing by acquisition. The conglomerates like Rockwell and TRW are moving to the mixed structure by reducing diversity (selling off less related divisions) and by working for value added to the businesses from

the corporation.

Hewlett-Packard is dividing its businesses into two clusters which is the emerging sign of the mixed structure. One cluster of divisions is the instrument cluster. These are the original Hewlett-Packard businesses and tend to be high performance driven, stand alone product divisions. The other cluster is the computer divisions and world-wide sales. The computer business is becoming more of a systems and software business. It is more centralized and is being differentiated from the other Hewlett-Packard divisions as a result.

Rockwell has sold a number of businesses and reduced its diversity. It has a number of clusters of divisions as well. Their clusters are aerospace, electronics, Allen-Bradley, automotive and graphics. Rockwell, like TRW, has always worked to add value to businesses by transferring technology between divisions. They have a system of cross divisional councils of engineers for doing this. More recently they have identified markets and customers that are served by divisions across clusters. They are attempting to sell jointly to these customers and markets. There is a trend toward systems integration at the corporate level to sell and integrate all the divisions' products to large common customers.

More recently Rockwell has convened a task force of officers who examined all the corporate processes to remove barriers and add incentives for cross divisional work. They are examining the bonus system, the capital appropriations process, the patent process, and so on. All aspects of corporate processes are being examined. The basic thrust is to achieve value added to

businesses from other businesses in the company.

Both corporations exhibit different approaches to the mixed organizations. Hewlett-Packard is still highly related and Rockwell less related. But both have moved to the cluster structure with value added from the corporation.

Summary

The traveling seminar visited several sponsor companies on the west coast. In response to the question, "What are you doing organizationally to remain competitive?" several conclusions were drawn.

1. The companies were actively using organization as a tool to remain competitive.
2. Their efforts were part of an overall planned renewal program. Although the companies were using fashionable techniques (House of Quality, JIT, Continuous Improvement) the organizing activities were driven by business issues and guided by an agreed-upon mission.
3. The entire business unit was involved in the change process. The mission was communicated to all employees.
4. Most of the efforts were aimed at making organizations faster moving and more integrated when movement took place. Teams were extensively used. Teams were formed on the shop floor and across divisions.
5. All companies were employing product, program or project management. They were all changing selection criteria to find those individuals.
6. After a period of sometimes dramatic changes, the renewal process evolves into continuous improvement.

The search for constant, small change was based on employee involvement throughout the entire company. The transition was from innovation to "minnovation" (mini-innovation).

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