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**Center for
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New Forms of Organization III

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Abstract

The Center for Effective Organizations and Fiat have conducted a series of travelling seminars. This part of the series focused on organization forms for competitive renewal. This paper is a progress report on the third seminar. Companies visited were Dupont-Europe, Daimler-Benz, BMW, Volvo, SKF, Atlas Copco and Skaltek. The framework for the series was presented in working paper G89-3 (146).

New Forms of Organization III

The Center for Effective Organizations and Fiat conducted their third traveling seminar devoted to the topic of "New Forms of Organization." The difference between this seminar and the previous ones is that the seminar examined organizations in Europe as opposed to the United States. The seminar visited Dupont-Europe, Daimler-Benz, BMW, Volvo, Skaltek, Atlas Copco and SKF. This paper is a report on the findings of that seminar. The report is organized by company. Each section will report the findings and learnings from the visit to that company.

Dupont

The Dupont company, like all other Western enterprises, has been conducting a process of renewal. They went through a process to determine what aspects of their organization they wanted to keep and which aspects they wanted to change. They decided that there were five features of their organization that they wanted to keep. The first was their emphasis on ethics and safety and a concern for the environment. This concern for ethics and safety, along with their concern for the individual, the second aspect to be kept, derive from their history of making gun powder. There was always a great emphasis on safety and handling explosives and concern for individuals and families who may have been hurt in accidents. Dupont itself is also a family owned business. Parts of the company have always been an extension of the Dupont family. A third aspect to be kept was their commitment to research and development. Dupont has always been a company to add value through research and development. The fourth aspect is sound, financial management. Dupont was always known for the Dupont financial formula. This formula was part of the teachings of every business school. And finally, they are going to keep their focus on industrial and institutional customers.

The features of their organization that they wish to change were first to adopt a more external focus. They want to change their mind set from one of focusing on a business as a product to focusing on a business as a market. They also want to change from focusing on chemicals and materials to focusing to a greater extent on value added products and systems. Some of this change is motivated by a desire to move to more value added products, as opposed to commodity products, which are produced more cheaply by countries with lower labor and capital costs. Another feature that they wish to change, is to move from management pyramids to business teams and delegated responsibility. The last aspect to be changed is to move from a domestic to a global company.

Dupont is typical of many global enterprises in that they are trying to achieve an external focus. This is because of the shift in power among the stakeholders in these companies. The customer is acquiring increasing power. The owners of the companies are also acquiring an increasing amount of influence. And as companies find that they are no longer self-sufficient, there is a search for external partners. The focus on customers, owners, and partners is driving the organization to a more external versus an internal focus. Dupont has achieved this external focus by reorganizing its profit centers. Previously, Dupont was organized by product lines. They have recently changed to create eight market based profit centers. They still have four product departments. The product departments are petroleum products, coal, petrochemical, and paints and pigments. Their new market departments are automotive, agriculture, electronics, fibers, medical and imaging systems. They also have one profit center which is international. The international unit and the

other profit centers operate in a matrix form of organization. The market based profit center organization used by Dupont is indicative of a trend throughout most of Western enterprise. More and more companies are changing from product based profit centers to market or industry or customer based profit centers. The intent is always to acquire a customer focus. The change is being driven by moves to systems integration, systems sales, sourcing decisions and increasing amounts of customer power. More companies are also trying to gain a larger share of the business from their larger customers.

Another change made by Dupont is in the increasing numbers of alliances and joint ventures. In 1983, Dupont-Europe had about two joint ventures. In 1984 they formed 60 joint ventures and alliances. They have been forming 60 alliances each year since that time.

Other organization changes in addition to forming market focused profit centers at Dupont have been the change in contracting for staff services. Each staff unit negotiates each year with the profit centers for services and cost of services to be provided. The contract is jointly signed by both the staff unit and the profit center manager. They have also increased the number of business teams that have been formed. These business teams are often product based teams that cut across the market focused profit centers. The manufacturing activities and research and development activities still take place on a product basis. The product units in manufacturing and research and development are usually located in the market profit center that uses the greatest amount of that product. However, 30 to 50 percent of the sales of the product units will often be obtained from other market units. So there is a lot of cross profit center coordination that must take place through these business teams.

Dupont is also participating in another organization trend. They are moving towards the distributed organization. That is, they are locating the heads of business units and profit centers in the country or location where the leadership of that business is being established. For example, in the U.S., the automotive business is located in Detroit. Dupont's corporate headquarters is in Wilmington, Delaware. Several other leaders of businesses are being moved to the country that has the strongest and most competitive market.

Along with the changes in organization have come changes in the human resources policies. The primary change has been a move to the recognition of team contribution. That is, rewards are now increasingly given for team effort. People are promoted based upon their skills in managing and contributing to team effort. One's ability to function as a team player is increasingly used as performance evaluation. Also, Dupont is focusing on reducing barriers across functions. They are increasingly valuing trust and openness and communications across functions. These team and interpersonal skills are essential for the successful function of the business teams.

Last, there is increasing importance of diversity and global experience. That is, they have 32 nationalities working at their European headquarters. Increasingly, language and cross-cultural skills are also being valued more highly by Dupont. The coming worldwide skills shortages are forcing them to acquire talent from whatever nationality has that particular talent.

In summary, Dupont has been following the trends that have been observed in other manufacturing firms in their response to the forces of global competition. Dupont has been trying to achieve an external focus and a global focus. They have adopted market focused profit and loss centers as a basis for their organization. They have substantially increased the number of alliances. They have continued this approach to internationalization. They are increasing the number of managers from other nationalities and generally increasing the diversity of their management population. Like Digital Equipment, Dupont has been adopting a distributed organization. That is, they are distributing the headquarters functions

to countries that have the market strength for a particular business. They are increasing the use of teams at different levels of the organization. And finally, they are adopting human resources policies that support the above organization changes.

Daimler-Benz

Daimler-Benz is exhibiting many of the attributes of today's neoconglomerate organization. It is diversifying through acquisition. The acquisitions have created three and soon to be four general business areas for Daimler-Benz. The first current business area is Mercedes Benz, which is devoted to cars and trucks and was the original car business for Daimler. The second area is electronics, which is managed by AEG, their acquisition in the electronics area. The third, is being called Deutsche Aerospace. In this third business area are the acquisitions of Dornier, MTU, the electronic systems from AEG which are devoted to Aerospace, and finally, MBB, the recently acquired firm that has the air bus connection. These acquisitions were intended to give a balance to the pattern of earnings for Daimler Benz and to acquire technologies that are being used increasingly in the automotive world. Daimler has been fashioning a holding company organization in order to manage these diverse businesses. At the holding company there are about 600 people. They perform the usual corporate functions of planning, human resources, finance, external affairs, legal and, for Daimler, increasingly, technology. Each of the three business areas then supervises the business units that are part of its area. A fourth business area is just emerging. This new area is devoted to services. In this new area will be financial services such as leasing of cars and trucks, and the management of their telephone or mobilephone network. As is typical of these conglomerate-type organizations, the structure is centered around these four business areas. The business areas vary in size. They are created because of relatedness within the cluster itself.

The main corporate focus at Daimler-Benz is now on technology. They have identified several areas of technology which are common to all three business areas. These are advanced materials, microelectronics, CAD/CAM and robotics. Projects that have an impact on more than one business area are then classified in the strategic planning process as a top or medium priority. Top priority items then receive a project manager from the strategic planning group at corporate. The project team is staffed by representatives from within each of the business units. Also a steering committee of business executives and corporate executives monitor the progress of these individual projects. In addition to the five top priority projects, there are 12 medium priority projects that are also monitored by steering committees and have cross divisional project teams. Daimler has also centralized the research and development function. Development projects still take place in individual businesses. But increasingly, research areas with multiple business impacts are centralized. These research projects are funded from the individual business units. About 90 percent of the projects get this type of funding from the businesses. Ten percent of the projects are financed solely through corporate. These are projects for new technologies and/or new product technology areas.

Thus, Daimler-Benz believes that sharing technologies across individual businesses is the main value added that these businesses receive from being a member of the Daimler-Benz family. They believe that they must acquire these technologies in order to create an advantage. If they only bought these technologies from Bosch, then they would not have an advantage. The same advantage would go to BMW or Volvo or any other customer that uses Bosch as its supplier.

Daimler-Benz has been experiencing its share of problems as a result of the diversification. They apparently acquired too much which is too new, too fast. The timing

of the acquisitions was not always controllable by Daimler-Benz. Many of the companies that were purchased were brought to them by the government and offered to them at favorable acquisition prices. But the problems of integrating these acquisitions and managing them and turning around the troubled ones has proven problematic for Daimler Benz. They had little experience at managing diverse businesses. They do not own one hundred percent of some of these new businesses. Then minority shareholders are often in conflict with them. They are unable to consolidate redundant areas as a result. In addition, the Japanese and BMW have taken the opportunity to aggressively pursue market share in the luxury end of the car market. Daimler is experiencing some difficulty in the luxury end of the market place where they have always been the dominant force.

Another feature is that Daimler comes from Swabia in Germany, which is one of the most provincial areas within the German economy. As a result, they have had some difficulty acquiring a global point of view. At the moment, the organization group in the strategic planning area is working to continue the design of new management systems and is working out a philosophy of management to be used in managing the new holding company. They are also talking with GE about ways to manage diverse businesses and to manage programs and services that cut across the various business areas.

In summary, Daimler-Benz is typical of companies like Rockwell and TRW, which were visited in earlier seminars, in that Daimler has focused on four business areas of diversification. They are fashioning a small corporate holding company structure through which to manage these diverse enterprises. Daimler-Benz is also looking for ways to manage the similarities across the businesses in areas of technology. They are actively pursuing areas such as new materials and microelectronics to be managed across the business areas. Corporate takes an active role in attempting to add value to the businesses through the management of technology. In this way, Daimler is also very similar to General Motors in attempting to manage technology across businesses and to increase the technological content of the automotive business.

BMW

The trip to BMW revealed three major areas of new organization thinking. The first were the changes in manufacturing. BMW is typical of many western manufacturing firms, in that they were reducing the number of levels in the hierarchy, increasing the qualifications of the managers that are remaining and decentralizing decision making to these managers. The second area of interest was in addressing the skill shortage issue. BMW is implementing a policy of personnel marketing in order to attract the qualified people to their organization. The third area in which BMW was truly outstanding was in the integration of functions. They are employing a very large number of programs and implementing a number of changes to increase the amount of coordination across functions and to decrease the barriers to this coordination. The next section will provide a few remarks concerning the BMW organization. Then each of these three areas of change will be addressed.

BMW is a single business, functional organization. 98% of their revenue comes from their automotive sector. BMW generates about \$12-13 billion in sales. Their export proportions have increased from 30% in 1970 to 66% in 1987. All work is done in Germany with no plans for moving out of Germany. They have three manufacturing plants which are all within 120 kilometers of Munich. The three component plants are located there as well. Their sales take place through sales companies which are wholly owned subsidiaries in large countries including that of Japan.

BMW has been active in reorganizing their manufacturing function. In 1986, they found that they had a large growth in overhead, too much hierarchy and poor line and staff relationships. Several organization projects have been aimed at reducing these problems. One of the changes was to reduce the number of managers above the foreman level in the Munich plant. They have gone from 375 to 272 managers, approximately a 20% reduction. They have also removed two levels of organization. They have gone from seven to five levels between the foreman and the plant manager.

Along with the change in structure has been an increase in the qualifications of the people who remain. They have increased the amount of training of managers, and have increased the number of engineers that are in the support functions of maintenance and production planning. Between 1983 and 1988 they went from 15% to 55% of the foreman that have a Technician's Certificate. The increased qualification of people has permitted them to widen the spans of control at the foreman level and at other levels of the hierarchy. Each work group also has a point of contact that is referred to in the German language as a "speaker."

They have also attempted to remove overlaps between the line organization and support functions such as maintenance, quality, industrial engineering and logistics. One of the steps that they have employed is to move some of the lower skilled tasks in these areas into the line organization. These increased tasks for the line organization have been facilitated by the increase in qualifications of the line management people. They are also employing quality circles as mechanisms by which to address the quality and maintenance issues in the individual work groups. As a result the work groups are more self-contained and have acquired more responsibility. Also, there is a greater use of project management on the higher level activities such as maintenance and industrial engineering. Project managers and project teams are aimed at reducing the boundaries between the line and staff organization on individual projects.

BMW is actively working on the personnel policies of the future. They see that employee involvement and creativity are keys to being competitive. They believe that the quality of employees will be a distinguishing factor in the market place. The problem is that the demographics may prevent the implementation of new technologies. Therefore, the lack of trained staff may very well be a limiting factor for them. As a result, they are taking actions on three different fronts.

The first change that they are making is to provide work experiences that are going to be attractive to people. They are trying to provide opportunity, team work, open communications, and more self responsibility to the people in their organization. They are moving to total task structures with the incorporation of various support functions into these structures. The description of the changes in manufacturing that were related above, are typical of this trend. The movement to these kinds of structures increases and changes the demands on our leaders. To meet these changes, BMW is increasing the amount of social training they are providing to their managers.

The second change that BMW is making is to change the kinds of people that they are hiring into their work force. They are now trying to use more women, more elderly, retired people who are still skilled and able to work. They now have two women who are one level removed from their top management committee level.

The last change is the one that was referred to earlier as the adoption of a personnel marketing program. They are taking a number of actions to attract people earlier in the various school systems that have fed employees to them. For example, they are systematically going out into the universities to speak and attract professors to work at BMW and to offer them summer jobs. BMW is also speaking to and offering summer jobs

to students prior to their graduation. Other programs are addressing technician level people. The attempt is to market the company as a place to work with the same level of effort as the products are marketed to their customers.

The third organization area is the one concerned with the integration of functions within the business. It is this third area at which BMW company seems to excel. The company is organized by functions. There is a director for engineering, for finance, for purchasing and logistics, personnel, for manufacturing, and for sales and marketing. All of these report to an office of the chairman. Collectively these roles constitute the management committee. Like most functional organizations, BMW works through a network of committees which are multi-functional in nature. There is a committee for investments, one for product development, one for diversification, and one for scheduling which is the coordination of the release of their new car models. Each of these committees is chaired by a member of the managing committee. For product development, there are also subcommittees for individual products. There is one for the 700 series, the 500 series, the 300 series, the coupe, and so forth. Each of these teams exists for four to five years. They exist for three months after the launch of the new series. Each of these teams is chaired by a full-time project manager. The project manager comes from engineering or from manufacturing. Sometimes there is a change after three years from the engineering function to the manufacturing function as the source of the project manager.

It is at this point that several of the personnel policy changes are supporting the extensive use of teams. One of these changes is the implementation of their leader training program. The leader training program emphasizes three areas. The first is communication, particularly between a boss and an employee. The second is in group process. They focus on how to run groups and how to manage groups. The third is an emphasis on conceptual thinking. This third part will be referred to later when talking about management by processes.

The other change has been the upgrading of members of support groups. In order to integrate all functions around the dominant engineering and manufacturing functions, increasing numbers of engineers have been hired into and transferred into all of the other support functions. All of the support functions can then begin to participate as equals in these team-based decision processes. This change is similar to the ones observed at Hewlett-Packard, where engineering managers and engineers were transferred into and hired directly into the manufacturing engineering function. The upgrading of engineering activities in other functions permits them to enter the engineering design process much earlier. The upgrading of the other functions is thus essential to the adoption of simultaneous engineering policies which are intended to reduce time to market, reduce engineering changes, create more manufacturable and less costly designs and to promote quality to be designed into the product from the very beginning.

Another key policy is the rotational career policy that has been adopted for some time at BMW. The policy states that after showing managerial ability, a candidate must rotate to another function before being promoted. It says that managers cannot be promoted unless they have spent time outside of their department at the same level. They must have experience in two departments at each level. It says that in order to be promoted to level three you must have worked in two different functions at level two. In order to be promoted to level four you must have worked in two functions at level three and so forth. The policy also states that a person is to remain in a job at a particular level for three to five years. In this manner all of the managers at all levels of the organization have had rather extensive crossfunctional experience prior to participating on the teams.

Another outstanding example of cross-functional coordination is the prototype factory. The prototype factory is a little factory of about 1,000 people currently. It is situated between research and development and manufacturing. The manager of the prototype factory comes from the manufacturing engineering function, but reports to the director of R&D while he is in that position. Previously, R&D conducted their own test vehicle building program. Then, the manufacturing function began to build the first 200 prototypes. Now, all of these activities are placed within the prototype factory and performed in one physical place. All of the functions are then brought together in the single building for a new car development program. For example, all of the functional people working on the series 500 automobile are physically brought into the factory and remain there while the first 200 cars are being built. The attempt is to get rid of the organizational boundaries between the functions. All of the design, purchasing, logistics, manufacturing, manufacturing engineering, management information systems and so on, who are associated with the program, are brought into the prototype factory. They do the test vehicle building. They develop the manufacturing methods. They design the manufacturing equipment. They develop the manufacturing procedures and so forth.

They create a mockup of the car. Initially, they manufacture plastic parts to test for fit and cohesion and to generate the final design specifications. They actually have a miniature assembly line. Around it are the manufacturing methods departments, the tool shops, the scheduling departments, the training functions and so forth. They have numerically controlled machines and robots that are situated in the factory. In short, they have recreated all of the conditions in the new facility. Investment in the facility sounds expensive, but it is not. Before the implementation of the prototype facility, R&D had its own facility and manufacturing engineering had its own facility. Their experience so far has been that the prototype factory is extremely effective. They have saved three months of flow time on the last series to emerge from the factory. However, they believe that the real benefit is in better designs that are less costly to produce, are higher quality and will require fewer subsequent changes.

BMW is also emphasizing the use of processes that cut across the functions as ways to increase coordination. The conceptual training that was described earlier is intended to provide managers with an ability to think abstractly and get above the details of their own department. They are looking at integrating policies and systems in order to facilitate the coordination. They actually have a program called process management. Here they try to look at a decision at one point in the process and to determine what the impact will be on other activities in that process. It is at this point that the organization department becomes useful. The organization department at BMW is staffed with about 100 people. About ten people are working on the organization of the future. About 30 to 40 of them are examining the effect of locations in communications such as those in the prototype factory. Another 30 to 40 are working on reorganization studies and finally about 30 are working on the various office automation projects that are connected with management processes that are being discussed above.

These systems are also being used to cut development time and to raise the quality standards and increase the amount of manufacturable designs that are produced. The computer-aided systems are being used as the focus for increasing the coordination across units. They describe the computer-aided processes as being a Trojan horse. The organization will simply not be the same after its implementation. They see the simultaneous change in job profiles, organization processes and organization structures. The organization processes are more tightly linked by interdisciplinary groups. These processes are being permanently and constantly reviewed by the organization department and by cross-functional teams

themselves. The structure is seen as evolving towards more decentralized, flatter structures and heavier reliance on interdisciplinary missions.

The computer-aided design process is one that they are currently using as a model. They are attempting to integrate the computer-aided design with the prior computer-aided styling process. Next, they will integrate computer-aided design with computer-aided engineering, computer-aided manufacturing, their material requirements planning program and finally, with the various financial and cost oriented programs. These integrated processes are also intended to shorten the development time, raise the quality standards from the very beginning, lead to lowcost manufacturable designs, using fewer parts and leading to fewer engineering changes.

In summary, the use of teams and committees, project managers, rotational careers, prototype factories, leader training, the upgrading of support groups, the focus on management by process, the use of the organization department, all combine to create a high priority on coordination across functions. In the long run, this may also lead to a decrease in emphasis on the functional organization itself. Increasingly, BMW is relying on cross-functional processes, interdisciplinary groups and cross-functional teams as the primary means of running their business. Most of the organizational activities are oriented towards the lateral organization, as opposed to the vertical organization. This emphasis on integration was the key learning that was acquired from this particular visit. The personnel marketing and the changes to the levels of the organization were also interesting features that were learned by the group at BMW.

Atlas Copco

The Atlas Copco Company is located in Sweden. It has sales of around \$2 billion, with 19,000 employees worldwide. Atlas Copco works through various geographic organizations where they have 43 manufacturing units in 17 different countries. In other countries they have established sales companies, and in the smaller countries they operate through 85 independent distributors. Their business is divided into three main areas. The first is the manufacturing of compressors. This business is about a Billion dollars in revenue. The second business, with about three-quarters of a billion dollars in volume, is the design and manufacturing of equipment for the construction and mining industries. The third business, which is about half a billion dollars in revenue, is the industrial machinery and equipment industry.

Atlas Copco built the sales companies during the 1950s. Increasingly, they are seeing that in order to be close to the customer, they cannot use distributors. Their business needs a quick service response and a formation of a relationship to their customer. Initially, most of their business was in Europe. Currently, that forms about 50 percent of their sales volume. About 92 percent of their sales take place outside of Sweden in 17 main countries. Currently they are moving more to North America. The reason is that the U.S. is the location of their top competitors. In order to be effective in Europe, they find that they must also be effective in North America.

The next areas that they are focusing on is in the Pacific Rim. These are the markets that are growing more rapidly than the mature markets in Europe and the U.S. They are trying to get into Japan by setting up relationships and finding partners. Similarly, they are focusing on Korea and China. They are avoiding joint ventures in China, largely because it is not clear what the rules are going to be. They are using licenses and service agreements, instead, to establish their relationships with the Chinese. Earlier they had built plants in Brazil and India, and export from these plants.

The changes in organization to support this strategic thrust has been to decentralize the corporate headquarters and shift decision making power to the product divisions and business units. The second feature of the organization that has changed is the decline in influence of the geographies and sales companies. The decision making authority is increasingly given to the business units on a global basis. Each of these changes will be discussed individually.

The decentralization has been marked by a reduction in the number of people at the headquarters in Stockholm. The number of people at the headquarters has been reduced from 180 to 80 people. Most of these individuals have been moved to the division and business unit levels in the organization. The business units are then being extended globally, and fashion individual strategies for their particular niche market. Each business unit is differentiating itself so as to be effective in its particular market versus its unique set of competitors.

In this way, Atlas Copco follows the model which predicts that companies first restore competitiveness to its core business and second, extends those core businesses on a global basis. This sequence is in fact what Atlas Copco has done. It has concentrated on its core business, improved the competitiveness of its core business, increased the number of acquisitions and therefore sales volume in its core business, and as a result, reduced the overall level of administrative costs.

The role of the corporation is to be something more than just a holding company. They are an internal bank. They are the bankers that invest in the portfolio of businesses that make up the company. But they also are the orchestrators of flows of money so as to capitalize on various tax policies of different countries. They also are designers of incentive systems for the various parts of the organization. For example, the measure of performance for a sales company is the operating net income of the sales company, plus the gross profit of those sales at the the division factory, divided by the costs of administration and sales at the sales company, plus the estimated interest on the working capital that the sales company uses. This measure incents the sales company to increase its sales and to decrease its expenses, but also to increase the sale of products which are most profitable to the factory or product division.

The division managers also facilitate cross-divisional and cross-business unit ventures of various kinds. First, there is the sharing of customer information. Then there is the management of joint R&D projects. These R&D projects are another example of the distributed organization. That is, the projects are not performed by a central R&D facility. They are performed by the business units themselves who are creating products for a customer. But the lead division or business unit in satisfying its customer, is to create technologies that can be used to satisfy other customers for other business units. The business unit in question, therefore, takes the lead and becomes the lead division in generating particular technologies. In turn, these divisions become dependent on others for other technologies where other divisions are in fact the lead the division. Another place of cooperation is joint purchasing. The business units negotiate purchasing contracts for the entire company which are drawn upon by the individual business units as they need the items that have been contracted. Thus, the company can use its overall buying leverage. Then there are times in particular countries where there are cross-product projects or ventures which are facilitated by the geographic or divisional structure outside of the individual business units. Each of these types of cooperation takes place primarily through the division managers. Three division managers work in Stockholm for the corporation and not for the divisions or business units themselves. Their compensation depends upon their looking on the welfare of the entire corporation.

The other advantage of Atlas Copco is its access to a population of general managers. The multiple sales companies, and multiple business units give managers multiple opportunities to manage P&L statements. This gives them the opportunity to develop general managers at an early stage in their career. They feel that they are able to teach these general managers a financial orientation very early in their career. They take the top 250 people in groups of 25 for one week somewhere in the world each year. The financial orientation is taught by the management and the controller at their times of review, and during these one week management development opportunities. Each of these general managers must have experience in at least two functions. They must have experience in sales/marketing as one function, or manufacturing, or R&D. They get this orientation quite early in their careers. So the value of being part of the Atlas Copco community is the access that one gets to this well-trained, well-developed population of general managers who know how to manage a business unit from a financial P&L point of view and an Atlas Copco view.

The other set of organization changes are those that are strengthening the individual business units and managing them on a global basis rather than a country by country basis. These changes appear to be a direct response to the use of speed of response and just-in-time inventory policies. For example, in the industrial tools business they are moving from 36 to 18 months as the time needed to develop new products. They are moving from a functional organization to project teams that include all functions as well as customers. They try to locate all of these people in the same place. In order to react rapidly across functions, the functional organizations themselves are being reduced in influence. They also are extending the rapid delivery concept to all of Europe. If a customer in Germany orders at 1 p.m., he will receive delivery the next day by 11 a.m. The tool must be assembled and delivered in that time period. In order to do this, the company is moving from seven to two plants. They are instituting a pull system, which is very much like the just-in-time model of Toyota's manufacturing system. This eliminates the need for a sales forecast from the sales company. It takes the lead time for most orders from 16 to 2-3 weeks. The inventory that was 55 percent of sales is now 18 percent. The inventory before was held at the warehouse in Sweden and at a warehouse at a sales company. Now the link is directly between the customer and the plant inventory. This is the source of the substantial reductions in inventory, decrease in delivery time and substantial reductions in cost.

The effect inside the business unit is to decrease the power of the functions. Everyone in the business unit is to support the material flow. They are thinking of breaking up the functional organizations and organizing around a flow organization. They are eliminating offices and trying to locate everyone in the same open office environment. Purchasing and planning people all sit on the shop floor. This is their policy to be implemented on the next factory.

With no flexibility in inventory, they must have extreme flexibility in the factory. They have decreased the number of job categories from 50 to ten. The people must move from machining to assembly and back. People move according to the product mix. People have been trained to run three different kinds of milling machines and to be able to work in assembly. The result is that the policy takes an enormous amount of training investment. It also means that the company sees people as the real asset of the organization itself.

The other result of the move to speed of response and just-in-time inventory has been to increase the need to coordinate the sales and distribution activities of the field with the factory. The result has been a decrease in the influence of the large sales companies in Europe and the United States. Instead, each business unit has its own sales force which is tied directly into the business units' manufacturing, marketing and product development

functions. The need to closely tie all of the functions together, into a single, global business, results in a diminished role for the individual country managers. The country managers are still strong in the smaller countries where the business units do not have a sufficient amount of volume to justify separate sales forces. In the smallest countries, the distributors are used as opposed to sales companies, as they have even lower volumes. But in countries with large volumes, the trend is to tie the sales distribution functions in that country more closely with the other functions at the factory and at the product development function. These organization changes are a direct result of the use of the rapid response and just-in-time policies for manufacturing and delivery.

These changes that have been described above are what Atlas Copco sees as necessary for a mature company to compete in the global competitive marketplace. They see that they must have the best perceived service and delivery, the lowest cost in terms of value per dollars spent, and must be seen to be the most innovative in terms of constant improvement of products. Organizationally, this has meant a decentralization from headquarters to the individual business units. Each of these business units has then differentiated itself in order to be effective in its unique marketplace. These changes are best applied to companies competing in niche markets, as opposed to the overall volume producers. Each of these business units then cooperates with the others on an as-needed basis in purchasing, product development, and in the development of general managers. In each country there is some sharing of customer knowledge and distribution across the individual business units. The other change has been the reduction in the strength of the geographic managers and sales companies. The sales distribution and service functions in the countries have been more directly tied to the manufacturing and product development functions located elsewhere. In short, the business units have become global business units and have fashioned strategies and organizations which cut across individual sales companies.

Skaltek

Skaltek was perhaps the most interesting of the companies that were visited on the traveling seminar. Skaltek was a startup company which began in 1974. Therefore, many of the policies that they use have stood the test of time. Skaltek is interesting because it gives a glimpse of the future. Many large organizations will be adopting many of the features of the Skaltek organization. The large organizations will not adopt all of these features, nor will they adopt the extreme forms to which Skaltek has taken these features. But by seeing the extreme, the picture of the future is painted quite clearly. In this section the Skaltek business is initially described. Then the features of their organization that are particularly instructive are identified.

Skaltek is a company that designs machines that are purchased by cable manufacturers in order to wrap the cable into spools which are then sent to the cable manufacturer's customer. The business idea which was successful for Skaltek was to design a machine which produced a wrapping of cable which significantly pleased the cable manufacturer's customer; that is, Skaltek found a way to please the customer's customer. They found a way to create a machine and a packaging of the cable which eliminated the need to have to have a wooden spool around which the cable was wrapped. The key to discovering this was the experience of the founder who worked for a cable manufacturer and then left to start his own company. Part of the key to Skaltek's success has been its intimate knowledge of the customer and of the customer's problems. They continually try to anticipate the customer's need and design features into their machines which incorporate these problems.

Skaltek is essentially a design, assembly, test and service business. It consists of about 80 people all of whom do the design, assembly, test and service. Some people do specialize to some degree in particular areas, but all are expected to have customer contact, sell machines, do some designing, order the parts, assemble the parts, do some of the testing and to be on call and service the machine when the customer requires it. The business is essentially a "know-how" business. It is based upon human resources that are responsible, motivated and free to act in a business-like manner. It is these features that makes Skaltek a window on the future.

One of the features of the Skaltek organization which is typical of a current trend is the decline of the functions. In most organizations, the trend is towards greater cross-functional activities and coordination and less within function, coordination and hierarchical activities. At Skaltek there are no functions per se. There is no departmental structure. People gather around projects. Projects are new designs of machines and orders for machines that are initiated by a customer. All of the necessary human resources are gathered into project teams. When the project or order is completed, the people simply move to a new project or a new order. There are daily meetings of the 80 people in the cafeteria. It is during these meetings that individual orders are reviewed and cross-order leveling of the work force is accomplished.

There are some permanent or relatively permanent divisions of labor. Some people are hired as designers. They are electrical engineers who do the designing of the equipment. However, each of these designers is expected to work on the shop floor doing assembly and ordering and servicing work. Each of the designers also has customer contact. There is no sales force. There are a few very large customers with whom the company has relationships. The selling is done through direct contact between the designer and the customer. In addition, there are some administrative personnel; two of them are from members of the family. The founders wife handles the personnel matters while his son handles the computer and data processing activities. There is also a permanent bookkeeper. Initially, they hired a qualified accountant to play the role of bookkeeper. When this person left, people within the company suggested someone from the shop floor could replace the accountant. This person was someone who was quite good with numbers and accounting. For five years now this person has been playing the role as accountant. So there is some division of labor that takes place on a relatively permanent basis. Some people are better at some things than others. People gravitate to these natural skill areas. But everyone, in general, is assumed to be multi-skilled and to take responsibility for numerous tasks outside of their own particular specialty.

The lack of a sales force and the multi-skilling is evident in the policy about taking orders and telephone calls. There is no receptionist. Telephone calls are answered by whoever is available to answer the telephone. That person is to then take responsibility for the call. The call could be from a customer asking for service. It could be from a customer asking for an order. It could be from a prospective employee asking about employment information. It could be a vendor calling about a delivery issue. Whatever the nature of the call, the person answering the call is to take responsibility for completion of the activity that is requested by the caller. If it is a customer requesting an order, the person taking the call takes the responsibility for the order and for the project that results. That person gathers designers and assemblers and initiates the project. The person continues with the project in the position of a project leader until a decision is made within the company to continue or to substitute someone else as a project leader.

The other feature of Skaltek that is also indicative of trends in general, is the decline of the hierarchy. At Skaltek there is no hierarchy. There are no titles. There are no managerial

jobs per se. Even the president and the founder is not to play a managerial role. The founder is still quite active, doing designing and customer contact work. The founder initially made decisions about salary increases, but found that people began to try to please him. People began to withhold information and to posture themselves when he was around. To eliminate this, the founder has adopted a policy of selecting ten or twelve people each year whose task it is to decide upon the salary increases and performance evaluations of all of the people in the company. In this way, people do not know who to please. As a result, they must try to please everyone.

In general, the hierarchy is in fact declining in most companies. The flattening of the pyramid and the rising education levels of the work force are reducing the degree to which authority is the primary activator of behavior in organizations. As a substitute, the pressure from peers and group members and direct demands from customers are being substituted as the basis for social control in these companies. At Skaltek, the customer has direct access to the people who do the work on their machine. On each machine is a panel which contains the photographs and signatures of the people who designed and assembled the machine. On each major subsystem in the machine, the person who assembled it has signed the subsystem and affixed his or her photograph saying "I am responsible" and attaching their telephone number for a call if the subsystem does not work appropriately. The founder believes that this is why artists do good work. They sign their name to everyone piece of work which can be identified with them.

Another feature of Skaltek is the widespread availability of information to all people in the company. The founder's philosophy is that if you give all of the information that the president has to all of the employees, you do not need a president. The belief is that if people have access to the information and feel responsible and free to act on it, they will do so. As a result, everything is visible in the company. A lot of the visibility is in the computer systems. The designs of the product and a lot of the procedures and steps for assembling them are placed in a computer system to which people have access. In some sense the computer systems are key to providing the glue and the memory which holds the organization together. If someone receives the customer order on the telephone, they make a commitment to the customer for price and delivery and staffing. All of this information is available to everyone. It is also reviewed in the company meetings. The offices themselves are of an open office style. Everyone can see almost everyone. So the people are working in a fishbowl, so to speak. It is through this means that a lot of the control over the people's work actually takes place through the peer process and of everyone knowing what is taking place. The key role of the computer system and the data base is also an interesting trend. These observations are also similar to what was seen as Digital and at Hewlett-Packard. They were using their own computer systems to network laterally across the organization. Skaltek has tried to take this about as far as you can. All of the people in the company are completely informed about orders, profits, cash on hand, margins, wages. It is a completely open system.

Another feature of the Skaltek organization is its limit to just doing the design and assembly, test and service activities. They product none of the parts. They act only as an integrator of this process. As a result, they do not enter into any capital intensive operations of producing parts and components. They do enter an assembly activity, but the assembly is more one of fitting together subsystems which are purchased. Therefore, Skaltek acts very much as a network organization. That is they only do those things at which they are the best. They are the best at designing the overall subsystems and at servicing the customer. They give very good service, they design to a very high level of quality, and they design to incorporate features that are seen as desirable by the customer and, more importantly, by the

customer's customer. They are designing the packages that the customer's customer sees and uses.

The Skaltek organization is also indicative of the type of advantage that western companies are seeking to acquire. This advantage is in the design of the human organization. The advantage that the company has is its ability to attract high talented, motivated people, and then to give them the responsibility and freedom to use their skills in service of the customer. As such, they have designed a highly motivating atmosphere which taps the human resources of the company in a knowledge-based business. The company adds value by designing in its know-how of the technology and of the customer's problem. This is their primary advantage over other customers.

In summary, Skaltek is a relatively small organization with an extreme set of policies which create its human organization. In many ways this cannot be duplicated easily by other companies. On the other hand, each of their policies is an indicator of a trend which currently being used by almost all organizations in all cultures. These were identified as the decline of the functions (which Skaltek has eliminated completely), the reduction of hierarchy (which Skaltek has also eliminated completely), the use of information systems and data bases to become completely available and visible to everyone in the organization, the use of information systems to act as a memory and a repository of ideas which are generated by a number of people and the use of the network form of organization. Skaltek was also seen to be the human organization as competitive advantage. The founder claims that his secret lies in a drive to find a corporate form that is better than all others. The corporate form he chooses is the one that releases the energy of talented people in service of the customer.

Volvo

Volvo is a good example of a company that is pursuing a niche strategy. Most Swedish companies cannot compete on cost alone. They are located far from the markets and distribution costs are on the increase. In addition there is a small domestic market within Sweden. Therefore, most Swedish companies are pursuing close-to-the-customer niche strategies so that they can charge a higher price and not have to compete solely on a cost basis.

Volvo's organization within Sweden is a good example of the current trend towards organizing by customer. Within Sweden, Volvo is trying to align as many activities from the dealer through to the factory on a direct customer basis. Then the customer contact is being pushed to as low a point in the organization as possible. This trend of customer alignment as deeply as possible, as low as possible and as close to the point of action is possible is a trend for companies pursuing these niche types of strategies. The reorganizations are taking place at selected dealers and at dealers that are building new physical facilities. When a dealer constructs a new facility, a number of changes are attempted. The first change is to change from a functional form of organization to self-managing work teams that are dedicated to groups of customers. That is, instead of organizing by the service unit by parts, by workshops, by mechanical areas, the mechanics are clustered in groups of from four to seven. This group becomes a self-managing work team with no first line supervisor. They rotate the role of receptionist. Each of these self-managing work teams is then located in a garage where the customer can enter directly. These customers can then work directly with the mechanics that will work on their car. The idea is to dedicate the mechanics to a group of very good customers. This form of organization can be very inefficient if it is used for all customers. But for the very profitable customers, it can be utilized quite effectively.

The customer is encouraged to call directly to the work group and arrange an appointment. The attempt is to have customers arrive anytime during the day when the mechanics are available. The idea is to establish a continuous relationship between the customer, the car and the group of mechanics. Experience so far, shows that this is increasing the level of quality that is given to the customer. A little later the mechanics begin to sell additional accessories to the customer, having known this person and the car over a period of time.

The next step is then to establish relationships between dealers and factories. As an experiment, a couple of dealers are being assigned on a dedicated basis to factories within Sweden. Here, again the attempt is to establish a linkage between the customer, the service centers, the sales organization and with the factory that manufactures the car. In this way, Volvo is moving towards a direct manufacturing system. In several other factories, this direct connection between the customer and the manufacturing shop floor personnel was even more pronounced.

The connection between factories and dealers is taken to its greatest extreme at the new Uddevalla factory. At this new factory, self-managing work teams of about ten people assemble a whole car, four at a time. These groups do the entire task and operate without first line supervision. The attempt is also to take these ten person teams and to begin to dedicate them to dealers and service areas. At this point, they can establish a direct relationship between shop floor teams, mechanics that repair cars and the customers who own these cars.

The next step in this process is to integrate the various groups that have customer contact by use of a common data base. The common data base requires the establishment of integrated information systems across dealers, across the Swedish sales organization and the factories. At the moment, this is difficult because these various units have built information systems using various types of computers and software. But the long run plan is to have all of these units operating from the same information system. There will be two kinds of data bases that are created. One will be for the individual car. The data on costs from the factory and data from use of the car through purchases at dealers will generate a total cost of owning the car. In addition, there is an attempt to accumulate a data base for customers. Customer purchases will be recorded and the total customer experience will be accumulated and made available to the work groups on the shop floor and in the dealership. In this way the total costs of owning a car can be accumulated. The strategy that Volvo is pursuing is one of a "total car experience." That is, they are not just trying to sell a car. They are trying to establish a relationship with a customer. In this way they try to minimize the cost of owning a car. Total costs of owning the car include the purchase price, the resale price, repairs and warranty costs to the car, the cost of owning insurance, the cost of buying a new car again, and so forth. In this way Volvo is moving from a transaction approach of selling cars to a relationship between the customer and the organization. The data base allows Volvo to determine who are the best and most profitable customers from their point of view. The data base also is available to be used by the personnel on the shop floor and in the maintenance areas of the dealers. These data bases are available to convey data on the customer and on the car. They also are available for giving instructions as to how to proceed with particular repairs and particular kinds of transactions with these individual customers. A lot of the expertise that was given by first line supervisors can be obtained through the data base that is provided for self-managing work teams. The establishment of a total customer experience also opens the opportunity for other kinds of relationships with the customer and for partnering with other groups to provide products and services to that customer. For example, Volvo owns an insurance company and a

finance company. Both of these companies attempt to sell automotive insurance to the customer and to finance the car purchase. Volvo also has a credit card that is made available to these good customers. Any transactions for buying parts and petrol give this customer a discount and give Volvo a history of the purchases made by these individual customers. This is one more input into the total car experience that is used by Volvo. They are also joint venturing with SAS on the use of the Diners Club card in Scandinavia. Again, a history of purchases made by people who travel with SAS and who rent from Hertz, which is owned by Volvo, is recorded. The individuals who spent a lot of money is tracked and these people become a source of direct mail advertising.

In this way, Volvo has moved the penetration of the individual customer as far back into the organization as possible. They have aligned multiple functions around a common set of customers. Then these functions are held together by the common customer interest and by a common data base, which accumulates both car and customer experience data. The total car strategy is conveyed to the work force that is the point of action of delivering on this individual strategy. So in summary, Volvo has moved the point of customer contact as deep into the organization and down as far into the organization as is possible. They would like direct contact between customers and people who are doing the work. In this way the self-managing work teams are managed by customer contact, rather than supervisory contact. The role of the supervisor is therefore transformed into one of a helper or counselor to work groups that are trying to satisfy the individual customer. The manager's other task becomes one of working the interfaces between autonomous work groups that are working for different sets of customers with different sets of needs.

SKF

SKF is a company that is dominated by the manufacturing of bearings. It also has been making its own steel and drawing upon the steel to make drills and cutting tools which have formed some other businesses. The primary bearing business, however, has been decentralized into a bearing industries division, a bearing services and after market division and a specialty bearings division, which manufacturers bearings for jet engines, for example.

SKF has always been an international company. It began building factories outside of Sweden between 1911 and 1917. It has established internationality as the keystone of the SKF group. Currently, they are acting like ICI and some other companies in that they are trying to establish currency zones in their company. They conceive of an Americas area or zone in which the trading will be dollars, a Deutsche mark zone for Europe, Africa and the Middle East and a yen block zone that will include Asia and the Far East. They believe that what is sold in a zone, must be made in a zone. Thus, they are trying to become supply independent in those particular zones. Two reasons are given for this change: one is the establishment or possible establishment of trade blocks, which will be protectionist. And a second reason is to insulate themselves from currency changes that take place across the zones. Several recent trends in organization are illustrated by the changes taking place at SKF. The first is the emphasis upon the service portion of the business. As companies move from downsizing to development, they usually emphasize the service portion of a manufacturing business. In SKF's case, more value added is going to the service side of the business and represents an opportunity for growth. SKF generally knows more about lubricating the bearings than the operator of the equipment or the company that manufacturers the lubricants. They have developed a number of lubricating programs which are then sold to the end user of the equipment. They have developed information about mounting and remounting bearings on shafts. They have developed a rework and

regrind of old bearings for roughly 75 percent of the new bearing price. They have developed monitoring equipment for gauging the condition of the bearings and predicting when they will break and require replacement. They have software programs for preventive maintenance that are sold to these end users as well. So a number of service programs and products are being developed and sold to the end user rather than the OEM.

In order to make the service business successful, the service business has been separated from the manufacturing business and made into a stand alone profit center. In this way, the service business is able to establish its own way of working. The service business needs to differentiate itself from the manufacturing unit. They have broken out this separate unit in order to establish a service culture as opposed to a manufacturing culture. They have a strategy which is based upon the idea of trouble free operation. They are establishing the trouble free operation business idea along with a service culture and a total cost selling approach to the customer. It is also the attempt to establish a relationship with the customer as opposed to a series of sales transactions.

The movement towards a bearing industries division and a bearing services division, is leading to worldwide business units as opposed to countries as a basic building block for SKF. They are moving, as they have for the past 15 years, away from country kings. The changes taking place within the bearing industries division, gives the best example of the changes that have taken place.

About 15 years ago, SKF was organized by countries. Each country produced all products for that country. Then in, order to be competitive with the Japanese, and achieve economies of scale in manufacturing, SKF began a program of rationalization. They began to establish product centers in each country. These product centers then supplied all countries. This specialization by product achieved scale in the product line and created an interdependent sales network across all of the countries. In this way, SKF is following the trend towards the distributed organization. That is, rather than centralizing the headquarters functions within Sweden, they are distributing these functions to all of the individual countries. Each country sells to its own country market, but also produces a limited product line for all of Europe. Each country then has a Pan-European mission. In this way, SKF has moved from a collection of autonomous countries to a network of interdependent countries.

The reduction in autonomy for the individual countries was accomplished by giving each country a Pan-European, and often, a global mission to replace the loss of independence. They also gained the economies of scale that were needed in order to increase the volumes produced at any one site. They also established a neutral coordinating group in Belgium. Belgium was a country that had no independent manufacturing facilities. Therefore, they were a neutral site that would coordinate the scheduling of all of the plants and all of the markets. This scheduling was accomplished by a worldwide network of IBM computers and satellites. This form of telecommunications system allows the tracking of all products at all sites. This formal information system is augmented by an informal information system. The informal system is obtained by having people from the individual countries rotate through the Brussels coordinating unit. Usually two people from each country on two year assignments are in the Brussels coordinating unit. This allows them to bring local knowledge of their country to be pooled with the global knowledge of the entire network. As these graduates leave the coordinating unit in Brussels, they also take with them the network of friendships and contacts that were established while working there.

SKF also illustrates one of the other current trends in manufacturing organization in that it is reorganizing other parts of its business around individual markets or customers. In

the case of SKF, they are focusing their sales and services, customer education, sections around the automotive business and the machinery business. They are trying to align as many functions as possible on a customer basis. As is usual, the engineering and manufacturing functions cannot be organized very easily on a customer basis. These functions are best organized on a product basis. As a result, the typical country organization for SKF has a front end/back end structure. The front end of the business is the functions of sales, customer service, applications software and marketing. They are organized on a geographic and/or a customer or market basis. The back end of the business usually consists of the functions of manufacturing, engineering, purchasing, quality and so forth. These are organized on a product basis. The key management issues in this form of organization are the establishment of processes which link the front and the back end together. For example, the new product development process is usually a very key activity. The process of forecasting and scheduling the plants is another key management process. Many organizations are experiencing this same kind of reorganization. On numerous occasions during the traveling seminars, this form of organization has appeared.

In summary, SKF is exhibiting many of the trends of manufacturing organizations in relatively mature industries. That is, it is emphasizing its service components of the business by separating the service into a separate profit center. This allows the service culture to be built in this unit and to be separated from the manufacturing culture that gave birth to the service unit in the beginning. In this way, SKF is typical of companies moving from a recovery to a development mode of operation. The manufacturing portion of the business also illustrates the moves from independent countries to a global business that works across countries. SKF has established a distributed organization by moving product responsibilities to product centers in various countries. The product center in a country then has a Pan-European or a global responsibility. The part of the business that is not organized by product is increasingly being organized by customer groups. For SKF this meant focusing on the auto and machinery market segments. The market oriented front end of the business and the product oriented back end of the business gives SKF a typical structure of manufacturing companies. Like other companies, SKF is currently struggling with the establishment of processes that link the front with the back end of the business.