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Revisited**

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THE NEW PLANT REVOLUTION REVISITED

Two decades ago, a few American companies began building a new kind of manufacturing facility. These new plants emphasized a high level of participative management and utilized a number of new management practices. Procter and Gamble was the first company to build one of these plants; but within a few years, Mead, TRW, Sherwin Williams, Cummins Engine, General Foods and other companies followed it. In an Organizational Dynamics article that I wrote in 1978, I described this as a "new plant revolution". It was a revolution in the sense that it represented one of the first systematic installations of participative management by American businesses and promised to change the way American industry managed their manufacturing facilities.

In most respects the revolution has succeeded. Ideas which were seen as radical and revolutionary in the early 1970s are now standard operating procedures in many large organizations. In a very real sense the revolution overthrew the traditional management paradigm about how manufacturing facilities should be managed and replaced it with a new one. This has led to a number of significant developments. First, many new plants have been started with a participative management model. Secondly, many non manufacturing situations have used the participative management model that was pioneered in new plants. Finally, many of the plants have been used in other situations because they have proven to be valuable management practices by themselves.

Characteristics Of The New Plants

In my 1978 article, I outlined a number of specific practices that make up the new plant model. A review of them will help to establish what the approach looks like and point out the degree to which these practices have spread to other organizational settings.

Selection

The selection process in the new participative plant model places a great deal of emphasis on acquainting applicants with the nature of the jobs they are expected to fill and the nature of the management style that will be used. This puts people in a position to self-select themselves into or out of the participative environment. In new plants a great deal of the selection process is handled by production employees. They interview and interact with the job applicants and ultimately make the decision as to who will join them as employees.

The selection process is often a long one, with applicants asked to do the actual work of the

organization for a period of time before they are finally hired. They are also often asked to join the organization a considerable time before startup so that they can be involved in determining personnel policies and establishing various work procedures and methods. Finally, they are typically sent to an existing plant so that they can get a good sense of how the technology operates. I know of no systematic data on how selection practices in the United States have changed in the last twenty years. There is some evidence, however, that there is increasing use of some of the practices that are part of the new plant approach. For example, many of the Japanese owned plants that have been established in the United States have emphasized selection. This, in combination with the success of the new participative plants that have been started in the last twenty years, appears to have caused the selection approaches of many U.S. organizations to change. Indeed, even if an organization is not planning on using a highly participative management approach, they probably are spending more time today on the selection process, getting more peer input, and putting more emphasis on giving a realistic job preview.

Plant Physical Layout

New plants are notable for the degree to which they have an egalitarian physical work place. Employees and managers tend to park in the same parking lots, enter through the same doors, eat in the same cafeterias, and in some cases, the managers have minimal offices or no offices. This practice too has been adopted by organizations who are not necessarily using a high involvement or participative management model. For example, the new Japanese owned plants that are built in the United States have used this approach to facilitate open communication and to see that no artificial or symbolic barriers are placed between management and the workers. Other organizations have adopted it for the same reasons.

Job Design

In the new plant approach, employees are given jobs that are challenging, involve doing a whole piece of work and controlling how the work is carried out. Typically, this has meant creating relatively self-managing work teams that are responsible for the production of a whole product. They are self-managing in a sense that they make decisions about who performs which tasks on a given day, they set their own production goals and are also often responsible for quality control, purchasing, and the control of absenteeism and employee behavior. Team members are expected to learn all of the jobs that fall within the work area of the group.

Self-managing work teams have become more popular. Still, most studies suggest that a relatively

small percentage of the work force (less than 10%) operates in them. What has become extremely popular is the use of quality circles or problem solving teams. Studies suggest that over 50% of large corporations use them. Interestingly, they typically are not used in new participative plants.

The explanation for the greater popularity of quality circles seems to be relatively simple. Self-managing work teams appear to be too radical an idea for most existing organizations. Quality circles and problem solving teams on the other hand, represent a small step toward participative management. They can be quickly and easily installed on a widespread basis and they do not change the way work is done. This is not to say, however, that they will necessarily always be the dominant approach to problem solving and participation. If current trends continue, self-managing work teams may well continue to grow in popularity and ultimately be as common or more common than problem solving groups and quality circles.

Pay System

Most new participative plants take a different approach to establishing base pay levels. Instead of using a job evaluation approach, they evaluate the skills of individuals and pay them based on the number and kind of skills they have. Typically everyone starts at the same salary, and as they learn more, they are paid more. This approach to pay has come to be known as skill based and is becoming increasingly popular. It tends to have two main advantages. It creates a flexible, highly trained work force, and it promotes the development of effective work teams because individuals understand and know how to do all the work that is the responsibility of the work team.

Although skill based pay is spreading, and certainly is practiced in a number of organizations that don't use all elements of the new participative plant model, its application is still limited. Studies tend to suggest that it covers less than 20% of the workforce. A major reason for this is that it is expensive to set up and to maintain and has its biggest payoff in situations where participative management is practiced. It combines quite effectively with participative management, because it helps insure that individuals have the capability to make decisions and to become more self-managing. In the absence of a fairly high level of employee involvement there is a danger of investing more in developing the skills of the work force than can be justified by what the work force is asked to do.

Organization Structure

One of the most striking features of the new plants is their structure. These plants are characterized by very flat structures and extremely wide spans of control. Typically the traditional foreman's role is

eliminated completely and multiple work teams report to an area manager. In most plants, there are only two levels of supervision, although in some of the larger ones there may be three. A flat structure is important to the new plant model because it helps assure that work teams will have the autonomy to manage themselves. It also, of course, leads to considerable cost savings because it eliminates a number of relatively highly paid managerial jobs.

New plants are also typically characterized by relatively lean staff groups. Many of the skills and duties of the staff are built into the work teams. Work team members are given responsibility for areas such as quality, selection, inventory and production scheduling that typically are done by staff groups.

New plants clearly were ahead of the times in adopting the flat, lean organization structure model. Recently many U.S. corporations have moved to adopt this approach. Company after company is eliminating layers of management and reducing the size of its staff support groups. This of course does not mean that they will be as successful in doing this as the new plants have been or that they are adopting a participative management approach. In many respects it works well in the new plants because it is one piece of a total participative management model. In the case of many of the reductions that have gone on recently, organizations are simply cutting expenses. They are not replacing the managers who have been eliminated with better work systems or new management styles. Nevertheless, it probably is fair to say that the new plants have demonstrated to many organizations that in fact organizations can operate quite effectively with relatively flat structures and relatively lean staff groups. As such they have helped stimulate organizations to rethink their approaches to organization structure.

Training

All the new participative plants place a heavy emphasis on training, career planning, and personal growth. This is usually backed up with extensive in-plant training programs and strong encouragement for employees to take off the job training. The idea of a widespread commitment to training and work force development is gaining popularity in a number of U.S. organizations. Corporations like Motorola and IBM for example, have committed to at least one week of training every year for all their employees. Again, an idea which is central to the new plant model seems to have spread beyond the new plant environment. Nevertheless, it would be premature to say that in this case, the idea or practice has gained widespread acceptance. Training is still seen as a luxury in many organizations and does not get the attention that it receives in new participative plants.

Management Style

The central organizing theme of the new plants management style is pushing decisions to the lowest possible level. The idea of pushing decisions down clearly has grown in popularity since the new participative plants were first created. Most organizations have not gone as far as the new plants have in implementing participative management behaviors. Many still rely on traditional hierarchies to make decisions and look upon employees as simply pairs of hands to execute the orders of others. Nevertheless, the success and popularity of the new plant model probably has contributed to a general movement toward pushing decisions downward, just as it contributed to the general flattening of organizations.

Conclusion

Overall, it is fair to say that pieces of the new plant model have spread to other organizations and some of them in fact have become accepted as good practices in their own right. Some of this undoubtedly reflects their successful use in new plants. Practices such as self managing teams have gained much of their credibility as a result of their use in new participative plants. They also have been further developed and refined as a result of their use in new plants. Other practices such as flat organizations and intensive selection process probably owe their growing popularity to a number of factors.

Spread Of New Plant Model

There is little question that the decade of the 1980s saw the adoption of the new plant model by many manufacturing organizations. Unfortunately, there are no solid data on just how many companies have built plants that use the new plant model. A good guess however is that the number has grown to at least 300 to 500. It is also a good guess that Procter and Gamble is the most frequent implementer of this model. Since it first used it in the late 1960s, every new plant it has built has been based on it; giving it a total of over 15 new participative plants.

Some industries seem to be particularly high adopters of the new plant model. Chemical, food and paper companies have adopted it on a widespread basis. There are some technological reasons which may account for this. These are process production industries, and as a result, need high levels of coordination among employees in order to operate the production process effectively. Because they are capital intensive, it also is critical that the plants be kept running and that they run efficiently. This takes knowledge and expertise to accomplish, simply working "harder" and "faster" is not enough. Thus, they can gain a competitive advantage by having a work force that can problem solve, coordinate their behavior and manage

the production process themselves. Finally, because they are capital intensive labor costs are not a critical part of their cost structure.

The new plant model has also been applied to some service situations. In the airline industry for example, the now merged People Express, had many of the elements of it, and America West Airline uses much of the thinking that underlies the new plant model. Financial service companies also have been increasingly adopting it. For example, AT&T has used it in two of their financial service units. Similarly, a number of insurance companies have adopted it in units that do claims processing.

Converting old plants to the new plant model has proven to be a difficult challenge. Indeed, few conversions were tried until the 1980s and most organizations who have tried it report slow going. There are many reasons why old plants are difficult to convert to the new plant model. Among the most important reasons are the deeply entrenched control oriented cultures which are in place, the fact that the managers and employees were selected and socialized to work in a non participative setting and the physical layout of the facilities often prevents teams from forming. Nevertheless, conversions are happening with increasing frequency in such companies as Mead, Procter and Gamble, General Mills, TRW and Eaton and a number of other companies. Each of them has successfully converted a number of their older facilities.

Not surprisingly the organizations which have been most successful in converting their older facilities are typically the ones that were the early adopters of the new plant model. There appears to be two reasons for this. First, they saw first hand the advantages of the new plant model and therefore, feel a particular urgency in getting it transferred to their older locations. Secondly, they have greater knowledge of how to make it work than other companies and thus have a competitive advantage in undertaking the difficult task of converting old plants. Procter and Gamble provides a classic example here. For a number of years they existed as a dual plant company that they had a number of successful participative new plants, but no conversions of their old plants. In the 1980s they set out to systematically change all of their existing facilities to the new plant model. When asked why they did this, the typical response is "to get the advantages that we get from our new operations."

Overall, when they start a new facility, whether it be a production facility or service location, increasingly organizations are deciding to use the new plant model. It has gone from being a revolutionary set of ideas to standard operating procedure in many organizations. Many of the practices that are part of it have been developed and are much more mature technologies than they were when new participative plants were first developed. The new plant approach is supported by an extensive network of consultants and networks of adopters who meet regularly to exchange learnings and further develop the model. Thus it

seems well established as a management approach and is not so much revolutionary as it is standard operating procedure.

Long-Term Effectiveness

It is appropriate at this time to look at the new plant model and ask how has it stood the test of time. Are there weaknesses in it that have appeared as these plants have matured? Are there things that could have been done better or that need remedial attention? During the years since I wrote my 1978 article, I have had the opportunity to visit, study and consult with a number of new plants. My overall reaction to these visits has been one of great admiration. Virtually every plant has thrived and continues to be managed in a very participative way. Even the Gaines Dog Food plant in Topeka, Kansas, which is often cited as an example of a "problem" participative plant still is operating effectively and in a participative manner. Stories of the problems in this successful plant have been grossly over stated and generally inaccurate. Despite the fact that the plant has changed plant managers and been sold several times, it remains a impressive, participatively managed organization.

Although the new participative plants I have visited have been and continue to be successful, it does not mean that they are without problems. Indeed there are some problems that seem to trouble all or most of them. A review of these "generic" effectiveness issues will serve to point out some of the weak parts of the model, as well as to suggest how the new plant approach can be improved.

Managing Change

Many of the new plants have been built in industries that have relatively stable manufacturing processes. Chemical, paper and food processing operations are very capital intensive, and typically, do not undergo frequent radical technological change. Nevertheless, change does occur in their manufacturing technologies and in their products. This can require quite substantial organizational change. For example, the original Gaines plant virtually doubled in size when they added a canned dog food plant to their original dry dog food plant. This raised a number of interesting issues about how separate to make the new facility, whether or not to transfer employees into the new plant and what kind of boundaries to create between the original plant and the new plant. Similarly, in a very successful Digital plant I consulted with, a new technology required that teams be restructured and many new skills developed by the work force. In a Johnson and Johnson plant I consulted with, the entire packaging operation had to be redesigned as a result of the Tylenol poisoning tragedy.

In some ways new plants are better situated than most plants to handle substantial organizational change. They have a culture of learning new skills, participating in decision making and focusing on organizational performance. In some other ways, however, they are not particularly well positioned for change. A tremendous amount of investment is made in building the team structure and technical skills that make them operate effectively in a steady state condition. Work teams tend to develop a high level of cohesiveness and the pay system tends to reinforce and reward individuals for learning specific skills. If change demands abandoning a substantial amount of the team structure and obsoleting a large number of skills, in essence, a tremendous investment in organization and skill building has to be liquidated. Thus, unless the change process is managed with great care and participation, it may be feared by teams which will be broken up and by individuals whose valued and financially rewarded skills will become obsolete.

Missing in most new plants is a vehicle for monitoring the ongoing effectiveness of the organization and its structure. This at times can lead to new plants failing to redesign themselves and operating in obsolescent and perhaps counter productive ways. A potential solution to this is the development of an ongoing organizational assessment capability that constantly surfaces issues of organizational effectiveness and renewal. In the absence of this type of activity, new plants like all organizations run the risk of becoming stagnant and complacent. Indeed, new plants may run a greater risk of becoming complacent because, as noted earlier, they tend to be relatively effective when compared to existing plants. Thus, if they are not regularly evaluated and assessed for potential improvements, they can become self-satisfied and not continue to improve and develop.

Team Effectiveness

Central to the effective functioning of all new participative plants is the effectiveness of self-managing work teams. They represent the basic building block upon which the entire organization and its effectiveness rests. Literally, every new plant that I have seen reports that some teams are not as effective as they "should be". It is of course inevitable that there will be variance in team performance, some teams simply tend to come together and perform better than others.

Most of the new plants I have visited report underestimating the amount of investment that is required in order to build and maintain effective teams. Specifically they underestimate the amount of training and meeting time that is required. Finally, they have in many cases assumed that teams will move faster to make certain kinds of decisions (e.g., discipline and reward system decisions) than in fact most teams are capable of doing. Not only have they found that building an effective team can take years, they

have found that the job in a real sense is never done. Teams need constant monitoring, reviewing and, in many cases, renewal. Finally, in some cases, teams simply never seem to reach an adequate level of performance effectiveness. In some cases the only solution is to disband the team and start all over again.

Overall, team effectiveness remains a critical issue in every new plant that I visit. This is hardly surprising given the number of important functions that they are supposed to perform and the difficulty of building and maintaining effective team performance. Although a considerable amount of research has been done to help identify what makes for effective teams and how they can be developed, a great deal still needs to be learned. Building and maintaining effective teams remains an inexact science, indeed, it is probably more art than science. Thus, team effectiveness remains an important limitation of the new plant model. It requires that a considerable amount of effort and time be put into developing teams and ultimately it means that the organization is only going to be as effective as its ability to build, develop and maintain teams.

PAY SYSTEMS

Skill based pay systems have an important limitation. After a period of time, individuals learn all the skills that are available and they "top out". This usually leads to requests from individuals to learn more and go beyond their now "topped out" pay rate. In many new plants this happens somewhere in the vicinity of two to four years after the plant has opened. It also usually coincides with the time at which the plant has reached an operating level that is stable, and in most cases, better than the operating performance level of comparable traditionally managed plants. This of course raises the issue of who is benefiting from the high levels of economic performance that the plant has obtained.

One obvious fix for the reward issues in a new plant is to add a gainsharing plan. I have worked with a number of plants to develop one and I have heard of a number of others that have done it as well. In general, gain sharing works extremely well in new plants. The conditions that are required for successful gain sharing plans are in place, and as a result, it is easy to start one. It has the affect of getting the organization's performance moving again. It also helps answer the equity concerns of the employees, because it lets them share in some of the economic performance gains of the organization.

In some new participative plants gain sharing has been put in at the time the plant started up. The results have been mixed. Establishing gain sharing at the beginning requires excellent knowledge of the plants learning curve in order to create a realistic pay out formula. In most cases, this simply proves to be an impossibly difficult thing to do. Although the company may have considerable experience with the particular manufacturing technologies they are using in the plant, there are always issues which prevent a perfectly

programmed and predictable startup. Thus, as a general rule, it makes sense to delay the use of gain sharing plans until the plant has reached a relatively stable and understandable performance level.

A possible solution to the problem of individuals topping out on a skill based pay system is to add more skills to the mix that is available. This can include allowing employees to do more knowledge work and to get involved in strategic decision making. In my experience this is rarely done in new plants. Instead, individuals simply top out and stay at that level. Opinions differ about whether this produces a "real problem" or not. Data that Gerald Ledford and I have collected from new plants suggest that even topped out individuals are relatively satisfied with their pay, although they still would like to make more. In essence, they seem to realize that they are better off and more highly paid than they would be in a traditional plant and thus, accept their situation as a reasonable one. This is not to say, however, that they wouldn't like to learn and earn more. Indeed, if the organization could be designed to give them more learning opportunities they would be more than willing to take advantage of them.

One of the reasons why learning opportunities for many employees are limited in new plants concerns their structure. Typically, they are only concerned with manufacturing and are not closely tied to other parts of the business such as marketing, sales, product development and research. This means that the involvement of individuals in the total business process is substantially limited. The only way to change this is to either change the physical location of plants so that they are co-located with divisional offices and other functions, or to encourage career moves that allow manufacturing individuals to spend time in other parts of the business. A small move in this direction is to create task forces and project teams which deal with cross functional issues. A more substantial move is to rotate individuals.

Overall, the creation of plants as stand alone manufacturing entities limits the ultimate evolution of participative management. It makes it difficult for individuals to progress in their skills to the point where they can be involved in the complete business process.

Role Of Managers

Perhaps the most difficult and ambiguous role in participative organizations is that of the manager. It requires individuals to exercise a considerable amount of leadership and to move away from traditional managerial control type behaviors. Several articles have been written pointing out that many supervisors and managers do not thrive in the new plant environment. They find the role ambiguous, difficult to comprehend and one for which they are not trained. This creates a continuous need for management training, development and selection.

The new plant design in effect creates two classes of employees, production employees and everyone else. The production employees are paid on a skill based pay plan and are treated in a radically different way than they would be in a traditional plant. The same cannot be said for the managers. In many cases they are still paid on a traditional job based system and their career ultimately may take them back into a traditional work environment at another location. As a result, their commitment to learning the skills that are required to operate in the new plant environment may be low and they can become a significant obstacle to making the new plant operate effectively.

There is no obvious, easy solution to the problem of selecting and developing managers for new participative plants. As long as the participative management style is seen as something that is done in only a small part of an organization, the managers will always be caught in the middle. Because they are caught in the middle, some of them will tend to be only partly committed to what goes on in the new plant and as a result, be a "problem" in the new plant environment.

The ultimate solution to the problem of developing and rewarding managers for the right participative behaviors lies in creating organizations that manage all their functions and areas in a highly participative manner. This is the only way to assure that managers will get consistent support for managing in a participative manner. Short of this, the problem can be worked on in new participative plants. Efforts can be made to clarify the role of managers, some modifications can be made to the pay system to encourage individuals to take more of a horizontal skill building approach to their development. In addition, careful selection can help identify those individuals who will be the best managers in the new plant environment.

The New Plant In The Future

Now that there are a substantial number of new participative plants, they are generally acknowledged to be effective and knowledge about how to create them is readily available they are likely to continue to proliferate. The conversions of old plants to the participative model is likely to grow simply because there are so many of them that need improvement. In addition, many of the practices that are used in them are likely to continue to proliferate.

It would be dangerous and overly limiting, however, to assume that the new plant model represents the best that can be done at this point in time. Indeed, thinking now needs to turn to developing a next generation management model, one that can be applied to the new plants of the 1990s. There are enough problems with the new participative plant model to suggest that a better, more effective design can be

developed. What was revolutionary in 1960 is no longer revolutionary, or perhaps, even, good enough in some cases. The world competitive scene has changed dramatically in the last twenty years. New technologies have been developed that have significant implications for how work organizations can be and should be structured. Thus, we are at a point where it is time to move on and to start developing a new model that capitalizes on the advances in information technology and quality management as well as the knowledge that has come from using the new plant model.

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