HELPING YOU TO DEFINE AND UNDERSTAND
YOUR COMPANY'S POSITION ON PRODUCTIVITY . . .

ANALYZING AND SOLVING PRODUCTIVITY PROBLEMS

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Productivity as an organizational and national problem is achieving considerable notoriety both in trade journals and in the popular press. Most of these articles are helpful insofar as they raise the level of awareness that productivity can be a problem. Beyond that, however, few articles provide conceptual tools or models that aid managers or consultants working to change the situation, either to understand the problem at the plant level or clarify courses of action.

Despite this lack of conceptual tools, management concerns about productivity have been translated into programs directed toward its improvement within many major corporations. At the October 1979 conference sponsored by the American Productivity Center, over 30 *Fortune* "500" companies described extensive productivity activities. In these companies aspects of the productivity problem have been recognized and they are being directly addressed.

However, among and within typical corporations there are vastly different levels of awareness and interest in the concepts and issues centrally related to productivity. We believe that it is important for a manager or consultant to 1) know what a company's position is with respect to productivity, 2) understand why the company has adopted its position, and 3) appropriately reflect this perspective and strategies for change back to other managers.

This article is aimed at helping you to define and understand your company's position on productivity. We will discuss some productivity concepts, present a typology of productivity problem causes, and offer some suggestions to incumbents in the organizational development role for producing change.

Defining Your Company's Position

A simple but effective way to assess a company's position on productivity is to gauge it along two dimensions:

- The amount of *activity* focused on productivity improvement. This would include, for example, establishing productivity measures, setting productivity goals, progress reviews, and recognition of successful programs.
- Management's level of *awareness* of productivity concepts.

Status levels for each dimension are shown on a 2x2 matrix in Figure 1 along with notes on decision-making stages that could be associated with each position.

Appropriate roles for the people who are responsible for improving productivity may be broadly defined for each of the positions. For Position I the consultant or manager may primarily be concerned with evaluation. Is the program doing what it was designed to do? What, if any, are the side effects?

Positions II and III suggest the need for management education on productivity concepts. One resource to the change agent responsible for this task is the American Productivity Center.[1] They offer many excellent programs for both individuals and organizations.

If the company is clearly in Posi-

tion IV, some of the following productivity concepts may be helpful to your understanding of the situation.

Productivity Concepts

A manager's interest in productivity will often become alive when you mention that you can differentiate between *profit, productivity,* and *price recovery.* Some useful working definitions are:[2]

Profit = Value Output — Value Input
Productivity = Units Output — Units Input
Price Recovery = Price Output — Price Input

and relating the three directly:

Profit = Productivity X Price Recovery

We can restate these definitions by including a common set of substitutions for their various factors as illustrated in Figure 2.

From these equations it can be seen that profit, productivity, and price recovery, though related, are separable. It is possible for a firm to be highly profitable even if it is not very productive, especially if it has a lot of latitude in its pricing. Wise managers treat the commonly used productivity index, the ratio of output to input, with caution as it may in some cases give a spurious measure which is confounded by the operation of the pricing factor.

An analysis of the above equations can reveal several reasons (which may be internally or externally based) why a firm, even with an awareness of productivity concepts, may not be actively pursuing productivity improvement. For example:

- A company with no competition can be highly profitable though not very productive if it has sufficient latitude in its pricing.
- A company may control sufficient raw material resources such that the price input is low enough to insure profitability.
- Large increases in volume may mask productivity inefficiencies.

The authors feel strongly that the type of analysis shown above can be helpful, but there are some Position IV situations that exist due to preconceived notions about the locale of the cause(s) of the productivity problem and/or the solution set for the problem.[3]

In this case a consultant who is able to describe a typology that is helpful in determining the locale of the problem's cause would be a valued resource. The model shown in Figure 3 is useful in that it helps one to consider all possible intra-organizational locales of the cause.[4]

While working with clients on productivity issues, the writers have determined that a major problem encountered in the enhancement of productivity is that of policy makers' attribution of productivity problems to the wrong cause. Our findings are that many productivity problem solvers let their analysis be governed by their own pet notions or theories about where the cause of the productivity problem lies. Examples of such unsubstantiated and unverified causal attributions are the following:

Example 1: "The work ethic is gone. People just don't care like they used to." (The cause of the problem is seen to reside in the employees.)

Example 2: "Our planning data was wrong and that left us overmanned. It's difficult to cut back." (The cause of the problem is seen to reside in the technology, systems, and procedures.)

Example 3: "The productivity

Figure 1.
SCHEMA FOR DEFINING A COMPANY'S POSITION ON PRODUCTIVITY

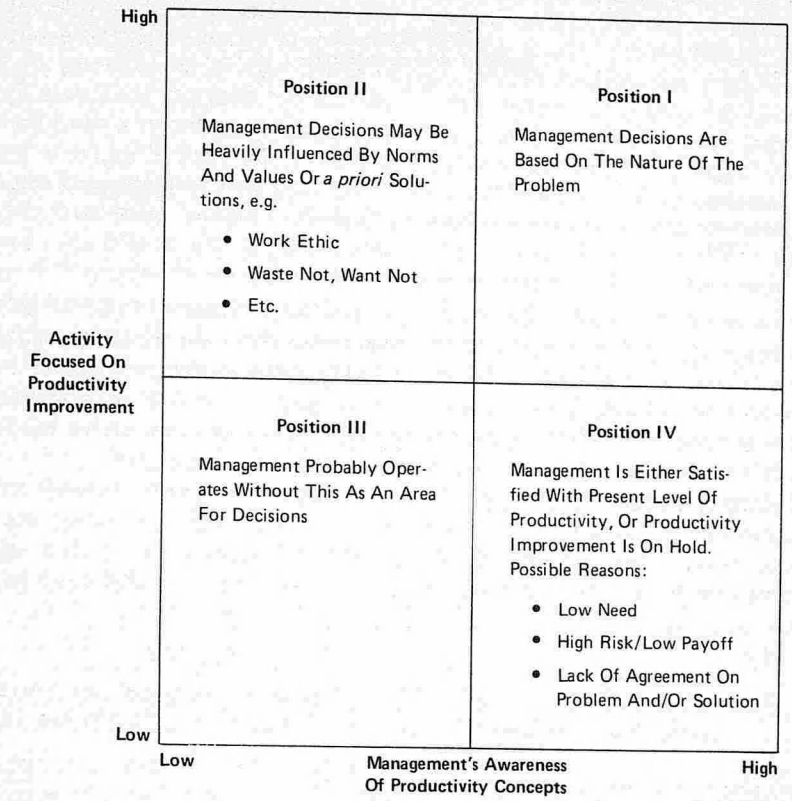


Figure 2.

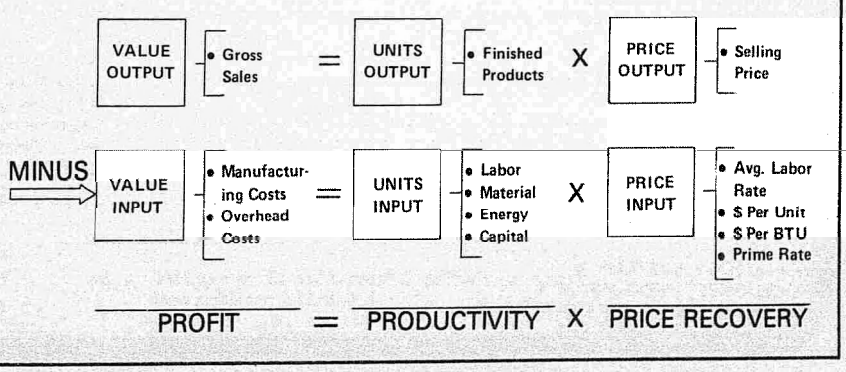
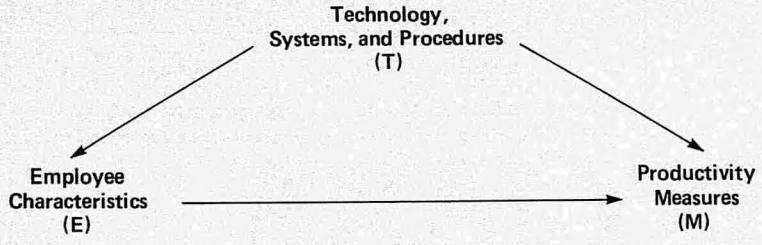


Figure 3.

POSSIBLE INTRAORGANIZATIONAL LOCALES OF THE CAUSE OF A PRODUCTIVITY PROBLEM



here is really not bad. The numbers they use to compare us with do not take into account the differences between the different generations of products." (The cause of the problem is seen to reside in the productivity measures.)

Our work indicates that reliance on such overworked rules of thumb leads to the design or purchase of productivity improvement programs which could be almost guaranteed to be ineffective simply because, analysis of the productivity problem is based on cliche rather than empirical evidence.

Perhaps the most valued role the consultant can play is to help a group of managers do a thorough diagnostic study of the operation without assuming that any one of these problem locales (illustrated in Figure 3) can be the only source of the productivity problem, or that the contribution of any locale can be summed up in a cliche.

From your knowledge of systems dynamics models you may expect that if one element of the typology triplet (e.g., productivity measures) is initially the apparent source of the problem, changes in that element may or may not impact the equilibrium of the other two elements. Thus, major systems change often will require continued review of all possible problem locales.

Figure 3 depicts element (T), technology, systems, and procedures as the major determinant in the system, directly influencing both (E), employee characteristics,

Figure 4.

PROBLEM CAUSE/SOLUTION SET DETERMINATION MATRIX SOURCES AND TYPES OF STATEMENTS USED TO SUPPORT INFERENCE CONCERNING PROBLEM CAUSE AND/OR SOLUTION SET

POSSIBLE PROBLEM/CAUSE SOLUTION SET ELEMENTS	THEORY	DATA	PRIOR RESEARCH	BORROWED TECHNOLOGY	ASSUMPTION
TECHNOLOGY, SYSTEMS, & PROCEDURES (T)					
• Goals	"Well According To This Theory Of Goal Setting . . ."				
• Planning					
• Compensation					
• Recruitment		"Look At These Figures Concerning Turnover . . ."			
• Etc.					
EMPLOYEE CHARACTERISTICS (E)					
• Employees' Attitude Skill			There Was A Study That Related Attitude To . . ."		
• Managers' Leadership Risk Taking					"Well I Believe That Supervision Should . . ."
• Etc.					
PRODUCTIVITY MEASURES (M)					
• Capital				"Well Here Is How They Are Measuring ROI In Division . . ."	
• Material					
• Labor, Exempt					
• Labor, Non-Exempt					
• Energy					
TECHNOLOGY, SYSTEMS & PROCEDURES * EMPLOYEE CHARACTERISTICS [(T) * (E)]					
TECHNOLOGY, SYSTEMS, & PROCEDURES * PRODUCTIVITY MEASURES [(T) * (M)]			"Our Last Compensation Study Showed A Disturbing Correlation Between Pay And Performance Levels . . ."		
EMPLOYEE CHARACTERISTICS * PRODUCTIVITY MEASURES [(E) * (M)]					
TECHNOLOGY, SYSTEMS, & PROCEDURES * PRODUCTIVITY MEASURES * EMPLOYEE CHARACTERISTICS [(T) * (M) * (E)]					

and (M), productivity measures. The influence of (T) on (M) can also work through the variable (E). We suggest that it is appropriate for each of the elements in the typology triplet to be considered in the positions of relative influence in the diagram.

A Typology of Solution Sets

Any program improvement steps undertaken to solve productivity problems will be constrained to the types of problem locales already identified in the prior step. Thus, solutions to productivity problems must be considered from the same three perspectives: employees, technology, systems, and procedures, and measures if they are going to be helpful.

The table in Figure 4 is a problem cause/solution set determination matrix for examining productivity problems. Possible locales of the cause and possible solution sets are primarily seen as either (T) technology, systems, and procedures, (E) employee characteristics, (M) productivity measures, or one of the four possible combinations of (T), (E), and (M). Justification for the ruling in or selection of one or more problem causes as the main cause and ruling in or selecting one or more solutions as the best bet is often presented in the form of statements of various types, derived from a number of commonly used sources. Some example statements are included in Figure 4.

Much of this model's strength comes from its utility in both forming a hypothesis concerning the problem cause(s) and the definition of the solution set for program activities. The principle weakness of many company productivity efforts is the attempt to impose a narrowly-targeted solution to a productivity problem which, if thoroughly analyzed, would be seen as really complex. A narrowly-targeted solution will only work to reduce a problem when the cause has been accurately identified. When attempting to solve productivity problems, it is also helpful to list out the possible cause and solution set elements against the methods of argument by which you would infer the inclusion (or exclusion) of elements in the set. This approach provides a more rational framework for analysis of competing arguments. This can be easily accomplished using the format outlined in Figure 4.

To follow an example through the matrix, consider as a working hypothesis that "planning," one of the elements under organization systems and procedures, is a possible cause of the plant's productivity problem and hence can be identified as one part of the set of elements to be focused on in the "solution" to the problem. What would your rationale be for determining that the planning was or was not one of the best bets in the list of problem causes and in the solution set? Is the determination being based on theory, data, . . . ? This process will help you to avoid the tendency to work on the wrong causes of the problem or adopt unverifiable hypotheses.

Figures 5A and 5B provide an overview of how the model can be applied to clarify the basis for an element's inclusion or exclusion as it is considered as a problem cause

Figure 5A.

THEORY OF THE PROBLEM CAUSE	POSSIBLE LOCALES OF THE CAUSE	JUDGMENT	TYPE OF ARGUMENT USED TO SUPPORT JUDGMENT
(From Example 2) Our Planning Data Was Wrong	Consideration 1 • Technology, Systems, And Procedures	Ruled In As Most Probable Cause	Data
	e.g., The Models We Use For Sales Forecasting Are Not Sensitive Enough To Changes In Discretionary Income.		
	Consideration 2 • Employee Characteristics	Ruled Out	Assumption
	e.g., Someone Used The Wrong Model		
	Consideration 3 • Productivity Measures	Ruled Out	Borrowed Technology
	e.g., We Expect A Higher Degree Of Accuracy Than Can Be Delivered With Today's Technology.		e.g., The Model Has Worked Well In Division "Y"

Figure 5B.

MOST PROBABLE CAUSE	POSSIBLE SOLUTION SET	JUDGMENT	TYPE OF ARGUMENT USED TO SUPPORT JUDGMENT
(From Figure 4A) [Consideration 1] The Models Used In Sales Forecasting Are Not Sensitive Enough To Changes In Discretionary Income.	Consideration 1 • Technology, Systems, And Procedures	Ruled In As Best Bet For The Solution	Data
	e.g., Let's Improve The Planning By Increasing The Frequency Of Projection.		
	Consideration 2 • Employee Characteristics	Ruled Out	Assumption
	• e.g., Let's Hire A Specialist In Strategic Planning, We Need Better Models.		
	Consideration 3 • Productivity Measures	Ruled Out	Data
	e.g., Our Planning Data Base Could Be Developed More Accurately.		

or as part of the solution set.

In this paper we have described some concepts of productivity and its relationship to profitability and price recovery. In addition, key steps to be taken in the productivity problem solving process have been outlines. These steps suggest that while trying to understand your company's position on productivity, it may be necessary to consider factors external as well as internal to your company. While trying to determine the internal causes of your company's productivity problem, expect that even if one cause is initially apparent, other contributing factors may soon become visible. And finally, while trying to mobilize a group of managers to improve your plant's productivity, expect that each manager will be acting on his or her own deeply held convictions about the "real" cause and the "best" solutions. Hopefully, some of the concepts provided will help you in developing a framework to guide the interplay leading to the effective solution of productivity problems.

REFERENCES

1. American Productivity Center, 123 North Post Oak Lane, Houston, TX 77024, (713) 681-4020.
2. *Ibid.* Unpublished.
3. Shaw, P.F., and Johnson, T.J., *A Policy Fact Book: Leadership and Management in Equal Opportunity/Race Relations,* Chief of Naval Education and Training, 1977.
4. Shaw, P.F., and Johnson, T.J., *Programmatic Consequences of the Causal Attribution of Discrimination in Organizations: A Case Study.* Technical Report 5, Educational Research Laboratory, Boston University, Presented at the Meetings of the American Educational Research Association, San Francisco, April 1979.

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