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PURSUING PRODUCTIVITY IMPROVEMENT

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ABSTRACT

This paper examines the results of a concerted effort to move to a more rigorous and scientific basis for managing for improved productivity. The point of departure is a question, in the mouth of the chief executive officer of an organization: "How can we improve productivity?" The hypothesis is framed in terms of two contextual factors and six specific factors. The contextual factors are: create a questioning or learning culture, and develop a "cause-effect vision" to motivate questioning. The specific activities of the organization should be characterized by goals, feedback, participation, experimentation, pressure, and perseverance. The results of twelve audits of South African organizations, involving some 200 interviews and 2000 questionnaires, have been used to test the above hypothesis. The paper presents some of these results to indicate support for aspects of the hypothesis.

OPSOMMING

Hierdie artikel ondersoek die uitslae van 'n doelbewuste poging om 'n meer wetenskaplike grondslag te vind vir die bestuur van produktiwiteitsverbetering. Die uitgangspunt is 'n vraag, uit die mond van die top uitvoerende beampete van 'n organisasie: "Hoe kan ons produktiwiteit verbeter?" Die hipotese word uiteengesit in terme van twee kontekstuele faktore en ses spesifieke faktore. Die kontekstuele faktore is: Skep 'n kultuur van bevraging of leer, en ontwikkel 'n "oorsaak-uitwerking visioen" om bevraging te motiveer. Die spesifieke aktiwiteite van die organisasie moet deur doelwitte, terugvoer, deelname, eksperimentasie, druk, en deursettings-vermoë gekenmerk word. Die uitslae van twaalf auditerings in Suid Afrikaanse organisasies, wat ongeveer 200 onderhoude en 2000 questionnaires behels het, was gebruik om die bestaande hipotese te toets. Hierdie artikel lê voor van hierdie uitslae om ondersteuning vir aspekte van die hipotese te toon.

1. INTRODUCTION

We all have our own pet theories about how to improve productivity. But the pursuit of productivity is too important to leave to pet theories. This paper examines the results of a concerted effort to move to a more rigorous and scientific basis for managing for improved productivity.

The research began formally in 1983. It took as its focus a question posed by a hypothetical Chief Executive Officer: "How can we improve productivity?" The CEO was further assumed to say, "I am well aware of what improved productivity will do for my organization in terms of improved competitiveness and profit margins, so don't give me the basic propaganda of why I should be pursuing productivity improvement. I also don't want a bunch of quick-fix gimmicks, buzzwords, or techniques, like MbO, Quality Circles, Just-in-time, Thriving on chaos, etc. I want a coherent set of principles by which I can manage my business for improved productivity."

So we will not go in depth into "What is productivity?" beyond seeing it as outputs per unit of inputs, nor will we investigate why productivity improvement is important. We will rather concentrate on the CEO's central question: "How can we improve productivity?"

The original expectation was that numerous "recipes" or models directed at the CEO's question would be found and that "key common factors" would be extracted to build up an answer. However the literature was found to be far less advanced than expected, and less coherent. Furthermore, the bulk of the literature tends to reflect a narrower "how to" approach with little evidence of a research base.

Nevertheless, the literature was found to be invaluable in building a fundamental model of the characterising features of highly productive companies. The model will be set out first. Then the main rationale and literature support will be mentioned and finally the field research will be presented.

2. THE MODEL: THE CHARACTERISTICS OF HIGHLY PRODUCTIVE ORGANIZATIONS

It is postulated that the following characteristics are evident in highly productive organizations:

1. A questioning culture exists.
2. A cause-effect vision is promoted.
3. Initiatives are characterized by:
 - * Realistic goals
 - * Clear and helpful feedback
 - * Participation
 - * Experimentation
 - * Pressure
 - * Perseverance

In essence we are postulating that highly productive organizations have a culture of continuous learning (supported by points 1 and 3 above) which is given a "compass" or direction by the cause-effect vision. Two diagrams, shown as Figures 1 and 2 illustrate the model.

Figure 1, the "mining analogy" illustrates that the knowledge necessary to improve productivity is buried as an ore body under a crust of ignorance. Mine shafts labelled goals, feedback, etc pierce the crust of ignorance and tap into the knowledge. The shaft sinking operation is powered by the question "How can we improve productivity?" and the fuel cell of the power station is the cause-effect vision, giving urgency and focus to the questioning.

A corollary to the mining analogy is that the "ore" already brought to the surface becomes the policy and procedures of the company. In other words, the things that we find work, are built into the routines of the organization - but of course will continue to be questioned in the continuing search for better ways to do things. It was Rene Descartes who not only said, "I think, therefore I am.", but also, "I believe, in order to understand."

Figure 2, the logic flow diagram, is more dynamic in its representation. The directive role of the cause-effect vision is much more obvious in this illustration.

3. RATIONALE AND LITERATURE SUPPORT FOR THE MODEL

3.1. The questioning culture

This feature of the model is arrived at by simple deduction. Improving productivity is seen as an open-ended challenge to which there are no generally agreed "how to" prescriptions. It is a complex phenomenon highly integrated with technology, skills, organizational structure, human and industrial relations, etc., and even national politics.

It is not amenable to simple solutions. Organizations thus need continuously to seek improved ways which are technically feasible and organizationally supported.

There has been little explicit literature on this feature. But it is certainly central to the "just-in-time" philosophy. In explaining the essence of the Toyota Total Production System (TTPS), George Davidson of Toyota SA Limited, says "To create thinking people."

Another example from Toyota SA: in 1984 a local employee said to a visiting Japanese engineer, "We understand TTPS and in ten years we will have caught up with you in Toyota Japan." The Japanese, recognizing that the South African had clearly not understood the essence of TTPS, answered, "In ten years time we will be a hundred years ahead."

Learning to learn is what the questioning culture is about. And as we learn to learn, we become more and more effective at solving problems, eliminating performance constraints, etc. It has an avalanche effect, as the Japanese engineer was trying to communicate.

Figure 1 : Mining Analogy

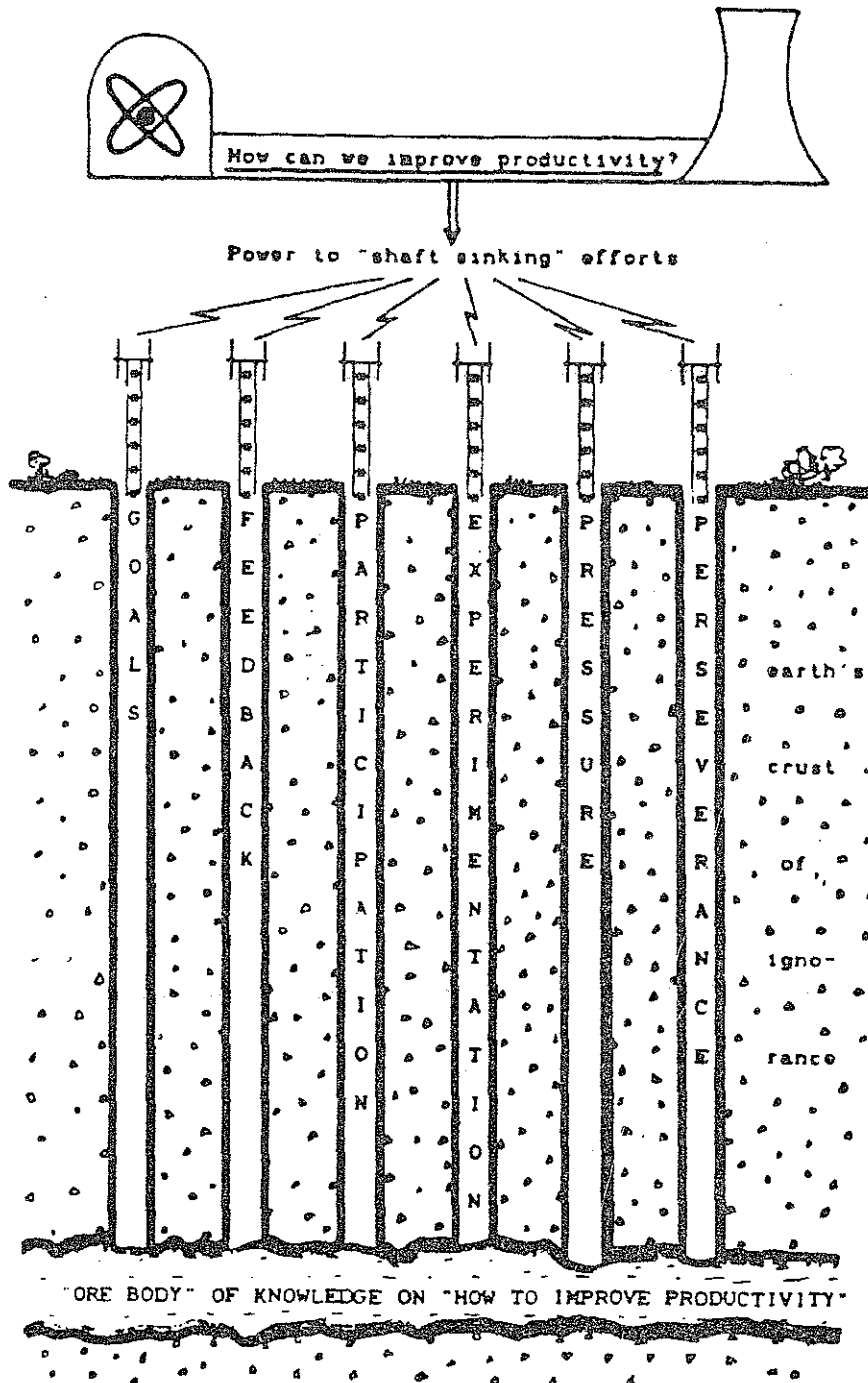
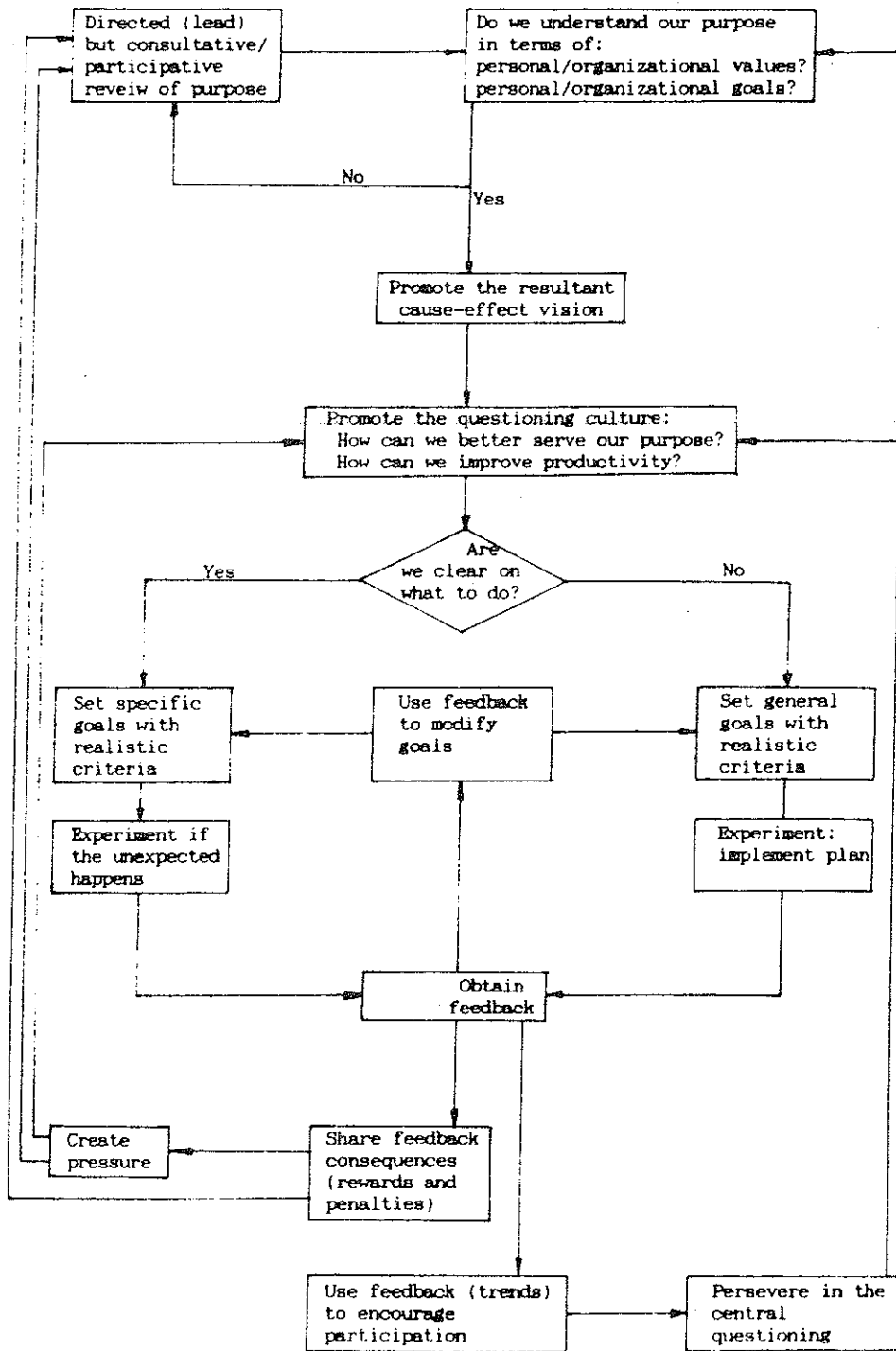


Figure 2 : The logic flow diagram



3.2. The cause-effect vision

This concept too has little explicit support in the literature. One of the sources of the concept for the author was however in Schonberger's description of a key US executive who had a vision of all work stations, whether physically present or not, linked to the production and assembly line in his plant [1]. But the concept as used in this paper is far bigger. It would include the plant's customers, and would link the satisfaction of customer expectations, organizational purpose and individual goals.

In doing this it comes to include the concept of efficiency as developed by Chester Barnard. He held that organizations, being cooperative systems, are efficient in the degree to which organizational goals and individual goals are congruent [2].

The concept of the customer is the key external (altruistic) dimension of the cause-effect vision. It is the concept as set out by Juran: "A customer is anyone who receives or is affected by the product or process. Customers may be external or internal." [3] Tom Peters captures the customer orientation well but falls short by focussing on external customers in calling for "an obsession with responsiveness to customers." [4]

The concept of self-interest is the key internal (egoistic or hedonistic) dimension of the cause-effect vision. It is seen to be at the heart of all motivational theories [5].

So, the cause-effect vision dimension to the model says that highly productive companies are characterized by a thought-through concept which links satisfying the external organizational customers with the achievement of organizational goals, and links the achievement of organizational goals with the achievement of personal goals. The satisfaction of internal customer needs is not essential to this concept, but highly complementary. In essence, the cause-effect vision links the concepts of organizational and individual purpose. In highly productive organizations, the vision is congruent.

3.3. Characteristics of specific initiatives

In the case of goals and feedback, a very considerable body of literature promotes the case for their inclusion in a productivity improvement model. But evidence exists for the other four (participation, experimentation, pressure and perseverance) as well. In the interests of brevity, only the key references will be given here. Those interested in a more comprehensive treatment are referred to a more complete work [6].

3.3.1 Realistic goals

There is widespread support for the positive role goals play in improving performance. "Research strongly supports the effectiveness of goal setting in raising productivity." [7] Furthermore, it is reported that "specific and challenging goals lead to higher (task) performance than easy goals, 'do your best' goals, or no goals." [8]

3.3.2 Feedback

Feedback is the return of information to a person so that at least some of the information is a reflection of the person's performance. The objective of giving a person feedback is that they may self-correct their performance.

Feedback is a complex phenomenon which features prominently in learning theory. The CEO who is asking "How can we improve productivity?" is wanting to learn. In creating a questioning culture, the CEO is trying to encourage an attitude of learning in the enterprise.

What evidence is there that feedback enhances productivity? In a review of the effectiveness of "appraisal and feedback" on productivity, it is reported that "The role of feedback in achieving high performance has long been recognized, and the results of recent research further substantiate its value in raising worker productivity." [9]

3.3.3 Participation

Participation is very broadly defined in this productivity model. It is seen to include participation in decision-making, goal setting, evaluating feedback, and participation in the results (rewards and disbenefits). The first three dimensions involve what is usually known as participative management while the fourth covers payment by results. The concept is applied to both management and workers and includes the perennial "top management commitment."

There is a superficial belief that participation "obviously" results in improving productivity. Typical of examples of this are the "Excellence" publications, sporting such chapter titles as "Productivity through people" and "Involve everyone in everything" [10][11]. But academic researchers are less convinced. Some speak of a "fuzzy picture" [12]. Others exhort "judicious" application of participation [13]. Table 1 shows both the fuzzy picture on one aspect of participation (in decision-making) and the clear picture on another (payment by results).

Table 1: Effectiveness of several motivational methods[14]

<u>Motivational method</u>	<u>No of studies</u>	<u>Average PI</u>	<u>PI range</u>
Unidentified incentive pay plan	7	39%	25 to 27%
Piece-rate pay plan	10	30%	3 to 49%
Job enrichment	13	17%	-1 to 63%
Goal setting	17	16%	2 to 58%
Participation in decision making	16	0,5%	-24 to 47%

NOTE: PI = Productivity Improvement

A respected earlier researcher, Vroom, had a clearer endorsement: "When the entire pattern of results is considered, we find substantial basis for the belief that participation in decision making increases productivity"[15].

3.3.4 Experimentation

To experiment is quite simply to "try in order to find out." This element is present in the model because experimentation is a central element in learning and the building of experience. And continuous learning is what the "questioning culture" calls for. Educators acknowledge the role of the cognitive trial (trial-and-error, deliberately undertaken) in learning [16].

The informality and spontaneity intended in including this factor are best expressed in the "Excellence" publications, in the celebrated "Ready, fire, aim" and "Encourage pilots of everything" [17][18]. Peters also expresses well the need for tolerance of failure if experimentation is truly to flourish, in exhorting "Support Fast Failures"[19].

3.3.5 Pressure

Few people develop a spontaneous interest in becoming more productive. Pressure is seen here as necessary to drive out complacency, to demand attention and to compel action.

What is envisaged in the model is stable, constructive pressure. Goals and feedback are seen to be effective in part because they can contribute to the creation of such pressure [20]. However there is not much explicit literature on the subject of pressure and productivity.

Pressure can be read into Vroom's concept of the "force on a person to perform an act" (in his expectancy-valence theorem) [21]. It is also present in much of the literature on Japan's success [22][23][24]. Not all

of this literature presents a flattering picture of enlightened human factor management practices while showing the pressures [25][26]. The latter reference includes this:

"Among the traditional techniques of human resources management in Japan was the granting of full authority to the Samurai to rectify on the spot, by the sword, any rebellious, insolent, or otherwise unexpected behaviour by peasants or merchants."

3.3.6 Perseverance

Perseverance is "the act or fact of sticking to a purpose or an aim; never giving up in what one has set out to do"[27]. The building of a questioning culture and cause-effect vision take time.

Literature evidence is again implicit rather than explicit. Learning curve theory identifies that repetition breeds competence, including in the achievement of continuous improvements [28]. Evidence from Management by Objectives and Quality Circle implementation studies, supports the need for perseverance [29][30].

4. EVIDENCE FROM THE FIELD RESEARCH

The original field study in this research programme was conducted in 1985 and tabled in 1986 [31]. It has been published as a case study as well [32]. Several other studies have followed, either by the author or under the supervision of the author [33][34][35][36][37][38][39][40][41][42][43]. Two organizations have been audited twice. It is impossible to report on all these studies, involving over 200 interviews and around 2000 questionnaires, in this paper. The key findings regarding the questioning culture, cause-effect vision and the causes of success will be reviewed briefly.

Before reviewing these findings, a word of caution is in order. "Because there are no standard performance measures, it is impossible to make empirical (productivity) comparisons across organizations." [44] It will thus not be attempted. But it is necessary to make tentative observations about apparent relative productivity improvement success if models are to be assessed. These must be seen as tentative and subjective.

4.1 Management philosophy

Interviewees are asked, "What is your management philosophy? What do you try to encourage in the people who work for you?" Answers are coded into categories and noted as a percentage of all responses, as shown in Table 2. High percentages thus indicate a focussed culture. Not all categories are reported here, but in the cases A, B and C, the top five responses are included. Case D is a repeat audit of case C, two years apart, and shows convergence with the proposed model, which is born out by in-company productivity improvement.

Table 2: "I encourage in my people:"

<u>Statement category</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1. A creative and intelligent approach to problem identification and making improvements	27%	-	-	-
2. Encourage experimentation and suggestions		-	-	10%
3. Accept responsibility within own area and within the scope of the goals for your area	11%	26%	18%	22%
4. A sense of belonging and encouragement via positive feedback	14%	17%	11%	16%
5. Sort out interpersonal and personal problems	-	-	10%	3%
6. Have a good flow of information and communications	9%	13%	10%	4%
7. Understand the big picture about your job. Serve the customer	9%	-	-	7%
8. Honesty and integrity	5%	22%	9%	7%

NOTE: In case B, the sample of interviewees was about half the size of the other cases.

The organizations in Table 2 are all considered successful South African organizations. Case A has the clearest reputation for consistent productivity improvement and demonstrates the greatest conformity with the model. The shift from case C to D also supports the validity of the model: the questioning culture and cause-effect vision are most clearly represented by responses 1 and 2, and 7, respectively.

4.2 Causes of success in strategies to improve productivity

Part of the questionnaire used in the research draws on work published by Judson [45]. Judson reported the views of 236 senior US managers with respect to causes of productivity success. There is no suggestion that the managers are drawn from star productivity performers; we shall regard them as simply typical of US experience and thus "average." Table 3 reflects the relative rankings given in the US and in several SA studies. The causes listed reflect the top three US items and some near the bottom in a list of 16 factors.

In this table, cases A and B are follow-up studies one year apart, and C and D two years apart. E might be considered the best productivity performer.

Table 3: Rankings of Judson "causes of success" in productivity

<u>Cause</u>	<u>US</u>	A	B	C	D	E
Capital investments	1	1	1	10	8	11
Top management commitment and involvement	2	5	11	5	2	1
Good financial controls and information systems	3	4	6	8	10	4
Comprehensive, systematic company-wide approach to productivity improvement	12	13	10	9	9	2
Training of the workforce	13	12	9	2	3	3
A loyal, skilled workforce	14	8	5	4	6	6

NOTE:The US respondents were senior managers. The SA respondents were predominantly middle managers and first line supervisors.

The interpretation is as follows. The US results appear to reflect a belief in "purchased" solutions, driven down from the top, and monitored by rigorous controls - something akin to a "parental" approach.

Cases A and B reflect an organization also relying on purchased solutions (it is, in its defence, highly capital intensive and process bound), but one in some distress. Significant management changes took place between audit A and audit B. Individual stress levels rose suddenly as a concerted productivity drive was enforced, unsettling many who had become used to a more complacent way of life.

Cases C and D reflect a productivity and customer-orientation initiative launched by senior management between the two audits. The high regard for training (using the ore body, as per the mining analogy) and the role of the workforce is in stark contrast to that in the US figures. Purchased solutions are not highly regarded despite it being a capital intensive process.

Case E may be interpreted as an organization led by its top management, who have formulated comprehensive productivity improvement plans including a strong commitment to training of the workforce and the measuring of results. Workers are viewed positively and little reliance is placed on purchased solutions. In this organization, the process of improvement is seen as the key to success, not capital investments per se (it too is capital intensive, with direct labour making up some 4% of the final product cost). Taken with other evidence (Case A in Table 2), the best organizations appear to demonstrate a questioning approach to seeking continuous productivity improvement, involving all in this, and offering good feedback (controls) as to actual performance.

5. CONCLUSION

A simple set of principles has been offered in response to the CEO's question: "How can we improve productivity?" The rationale and literature evidence for the principles have been shown. A limited amount of field research has been reviewed. It is submitted that the set of principles cannot be rejected out of hand, and indeed, appear to offer some rational basis for the CEO's pursuit of productivity. The CEO should continue questioning how productivity can be improved, leading by example in creating a questioning culture in aiming to learn new and better ways. The CEO should think through how these better ways translate into meaningful outcomes for individuals who must join the search for better ways. The linkage of organizational goals to individual interests should then be propagated in word and reality as the "cause-effect vision" for the organization, creating the "Why?" for productivity improving efforts. Finally, specific initiatives should be characterised by clear and measurable goals, good feedback, the building of participation, the encouragement of experimentation, the establishment of stable pressure, and perseverance in all these things.

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