

PROMOTING INNOVATION THROUGH ORGANIZATION DESIGN

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ABSTRACT

We live in challenging times--involving new problems and opportunities that require new responses. Personal and organizational creativity and innovation are clearly necessary to meet such challenges. After the meanings of "creative" and "innovative" behavior are clarified, aspects of organization structures and designs which foster these outcomes are examined. Studies of work environments and their relationship to creative production are described. Given this background information, the major focus becomes ways that value management (VM) approaches can provide the necessary attributes for promoting creativity and innovation. Major structural elements include information flow, diversity, available resources, formalization and centralization. Ways that value engineering (VE) can increase organizational innovativeness are discussed.

INTRODUCTION

In past years, I have focused on personal, group and task attributes associated with collaborative and creative problem solving. This paper examines another important set of variables required to sustain and increase the creative performance of an organization. These are exogenous variables--factors outside the individual that affect his or her behavior. The influence of such factors can be individual, group-level or organizational in scope. Although the personal aspects cannot be totally separated from the others, I will focus on those facets that are most clearly related to the organization overall--its structures and processes.

IMPORTANCE

The constructs of creativity and innovation are difficult to study--much less, to manipulate systematically. They are murky, ill-defined and slippery at best. There are no neat formulae to express how to achieve Y amount of progress by putting X amount of creative inputs in. Perhaps most unsettling is that creative behavior, by its very nature, implies change when most of the time we prefer stability and regularity. We want to be able to predict outcomes and have them obtain in our relationships with people and things. We want experts to say expert things and mothers to behave in "motherly" ways. We want the lights to go on when we flick the switch up, and off when we flick the switch down. Nonetheless, the level of research, writing and practical consideration of creativity has nearly reached the level of obsession. Teachers, managers, architects, Boy Scout leaders--everyone seems concerned about increasing creative ability. How can we account for the immense world-wide interest and activity in this area?

Pragmatically, the reason is simple--survival. We are constantly confronted with the need to depart from "the ways we've always done it" to adapt to changes within and without our institutions. On the philosophical level, it may be as Goethe implied when he stated "I did not make my songs, they made me". That is, creative behavior is part of our intrinsic nature and a natural part of our quest for self-actualization. For both pragmatic and personal reasons, it is necessary to continue to increase our understanding of creative behavior as well as our attempts to provide conditions that foster it.

SOME DEFINITIONS

In spite of the perceived importance of organizational creativity and innovation, the literature is spotty and less than conclusive. Much of the literature is largely non-empirical and concerned with "prescriptions" for effective climates. The empirical research generally focuses on individual traits and attributes or descriptions of practical techniques thought to increase intra-group creativity. Throughout the literature, the terms "creativity" and "innovation" are frequently used interchangeably with little or no attention to specifying defining attributes of each. To focus our thinking to improve the probability of behaving in creative and innovative manners, it is necessary to differentiate these two concepts.

Carl Rogers defined creativity as "the emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and the materials, events, people or circumstances of his life on the other."¹ Examples of creative behavior as Rogers defined it include composing a symphony, developing a new psychological theory, designing new torpedo housing or creating new formations within one's own personality structure.

Innovation has been defined in many different ways throughout the literature. For the present paper, we will use Kimberly's conceptualization:

"...innovation is the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit role performance, the group, the organization or the wider society."²

This definition emphasizes intentionality, benefits and application. The anticipated benefits are not restricted, as in many conceptions, to economic outcomes. Although the profit motive may be a strong stimulus for the felt need for innovation; other outcomes such as personal growth, increased satisfaction, improved group cohesiveness or better interpersonal communication are other possible benefits worthy of recognition. This definition also allows for applications to benefit greater society whether or not the benefits would accrue to "bottom-line" profits for the organization. Finally, Kimberly's definition allows consideration of a variety of applications that impact on members of a work group, organization or wider society.

Using these definitions, it is clear that the two concepts differ. Uniqueness, a critical attribute in Rogers' definition of creativity, is not necessarily central to innovation. What may be an innovational approach in one setting may be relatively common in others. The application and intentional elements of innovation are not inherent in creative acts as Rogers defines them.

TYPES OF INNOVATION

Damanpour and Evan distinguish between technical and administrative innovation: "Technical innovations are defined as innovations that occur in the technical systems of an organization and are directly related to the primary work activity of the organization. A technical innovation can be the implementation of an idea for a new product or a new service, or the introduction of new elements in an organization's production process or service operation. Administrative innovations are defined as those that occur in the social system of an

organization. An administrative innovation can be the implementation of a new way to recruit personnel, allocate resources, and structure tasks, authority and rewards. It comprises innovations in organizational structure and the management of people.³

Nicholson has identified role innovation as "the initiation of changes in task objectives, methods, materials, scheduling and in the interpersonal relationships integral to role performance"³. People who are moving into newly created jobs may be considered implicitly innovative in their role performance. Since one-third to one-half of managerial job moves are to newly created roles, this category of innovation has high potential importance. Such role innovations include new departures for the individual initiating them as well as changes carried over by the individual from one situation to the other. While the "developed" type of innovation is closest to the image most people have of the overall concept, it may be that even greater results will be obtained from the "conversion" type.

Value Engineering (VE) activity, with heterogeneous team membership, is an especially good vehicle for innovation carry-over.

The type of innovational opportunity most available in any given setting is a function of the company and the stage of development of the products and services provided. When an industry is in its early stages of development, most of the innovative activity focuses on the products themselves and the incorporation of rapid technological advance. Present exemplars of this type of innovative activity include financial planning companies and personal computer firms. Mature industries with older, more stable technologies require innovations centering around cost-savings and performance improvement. This type of innovation is currently emphasized in "smokestack" industries as steel mills and automobiles.

Availability of resources is another factor that strongly affects the nature of innovative activity. Kanter suggests: "In resource-rich environments, when working capital, expert staff and hungry customers are all abundant, emphasis is likely to be placed on potential breakthroughs in technology and extensive research and development activities because the company can afford them. But even when resources are in short supply, potential innovators need not—and do not—give up. In resource-lean times, the domain for innovation simply shifts to managerial procedure and organizational practice—as in the design of new ways to engage employees in solving problems."⁵

For society's economic health, a variety of innovations are necessary. In recent years, the effects of economic globalization along with changes in government regulations, workforce characteristics and technology have catalyzed increased awareness of the need to be competitive. Unfortunately this increased concern generally led to programs developed under the rubric of productivity.

Although there is great variation in the way "productivity" is defined, the most common approaches entail simple mechanistic input/output product cost. Such efficiency concerns frequently lead to doing wrong things cheaper. As Peter Drucker has pointed out, effectiveness—doing right things—is a very different perspective. Enlightened organizational leaders are aware of the need for greater concern about the capacity to identify and satisfy customer needs rather than to continue refining inappropriate products and services. Limitations to such customer-orientation abound. Focus on short-term profit, risk-averse decision making and protection of sunk costs proactively interfere with innovative behavior. Further, innovation in the past—during the entrepreneurial economic era—was overwhelmingly derived in small enterprises. Large bureaucratic organizations typically subordinate people to regulations and routines. Thus, one of the major questions today is whether large complex organizations will be able to mobilize the resources necessary to provide sufficient innovation to maintain competitiveness in the world economy. People are the most important resource for this endeavor. All people at all levels, in all departments and functions, must have the security and power to take risks to develop and implement new approaches to the solution of organizational problems.

ORGANIZATIONAL FACILITATORS AND BARRIERS

After an extensive review of literature on innovation at the organizational level, Downs and Mohr concluded that "...perhaps the most alarming characteristic of the body of empirical study of innovation is the extreme variance among its findings, what we call instability. Factors found to be important in one study are found to be considerably less important, not important at all, or even inversely important in another study."⁶ The lack of consistent patterns of results is generally attributed to two major factors. First, as discussed earlier, specification and operationalization of dependent and independent variables have been inconsistent and inadequate. Secondly, even though the present conclusions in this area are clearly of interest to those concerned with applying knowledge, they lack cross-validation and integration into some broader theory of organizational innovation. Even with these limitations, examination of innovation in our organizations is necessary to provide better understanding of how we can manipulate our work environments to make them more conducive to innovative behavior.

Characteristics and processes in organizations that have been thought to impede innovation have received extensive attention in the literature. In a 1987 study conducted by Basadur, a sample of engineers and scientists from private industry identified the following barriers to creative behavior:

1. limited time available to spend on being innovative,
2. overmanagement by immediate supervisor,
3. limited or invisible incentives to be creative,
4. inadequate upward communication of ideas via pyramidal hierarchy,
5. inadequate downward communication from upper management on research and marketing strategies,
6. physical environment not conducive to innovation,
7. inadequate contact with outside technical activities via meetings and publishing,
8. organization structure not optimum for innovation,
9. lack of technical critique by peer experts,
10. low risk-taking by management,
11. lack of support for use of creativity /innovation processes and training.⁷

The specific factors identified by the scientists and engineers in Basadur's sample relate well to the general factors typically identified in the literature regarding facilitative organizational environments—communication, available resources, motivation and organization structure. Even though much of the preliminary data are inconsistent and need extensive refinement and further verification; there are presently a number of factors viewed as most facilitating.

Communication issues include diversity and clarification. Heterogeneity of perspectives and alternatives provides the opportunity for increased divergence in problem finding and problem solving. Provision of a wide array of information generally results from frequent contact with diverse colleagues and is enhanced by participation in extra-organizational professional activities, lower specialization and formalization of tasks or positions, and high participation in organizational decision-making. Clarifying information regarding organizational missions and needs enhances convergence in problem finding and problem solving. The availability of such information is related to clear delineation of missions and goals, open communication across functions and job classifications, and the opportunity to receive instrumental and supportive feedback from colleagues.

Necessary available resources include time, finances and skill pool. Appropriate time pressures permit sufficient time for divergent thought (as in problem finding and speculation of alternatives), while they also encourage sufficient convergence in selection and implementation activities. Adequate uncommitted financial resources help members respond more quickly to new opportunities, do more reflection and research, experience less fear of failure and more risk-taking, and reduce dysfunctional competition for resources and the hostility such competition can engender.

Organizational reward processes have a marked effect on member behavior. The probability of innovation is increased when employees feel that rewards are fair and contingent on performance and/or ability to perform.⁸ Nonetheless, Kanter suggests that reward systems should not be overly payoff-centered (post-hoc, backward focused).⁹ Investment-centered systems represent a "bet" on capacity to do the job. Such future-oriented systems provide seed capital and opportunities to grow and stretch one's competence. The most important summative reward, under such investment-oriented systems, is to be in line for bigger and better projects in the future. Such considerations are consistent with Amabile's evidence that employees are more likely to be creative and innovative when their motivation is driven intrinsically rather than based on such external issues as pay or punishment.¹⁰

Major structural barriers include stratification, formalization, centralization and differentiation. Stratification refers to the distribution of rewards, status and power within the organization. Pre-occupation with status differences creates uncertainty, constricts communication, reduces willingness to take risks and diverts energy from creative production. Formalization refers to the emphasis on following rules and procedures. Prescribed ways of behaving, if they specify convergence and conformity, strongly reduce willingness to develop and support novel approaches. Centralization refers to concentration of power and authority which reduce participation among the majority of organization members. Reduced involvement inevitably reduces the critical mass of resources available for creative problem solving. Interestingly, however, some research has shown high centralization was positively related to adoption and implementation. The final structural consideration, differentiation, is generally defined in terms of the variability by occupation or disciplines that exists within the organization. To provide for adequate diversity of perspectives and cross-fertilization, a reasonably high measure of differentiation is required.

DESIGNING ORGANIZATIONS FOR CREATIVITY AND INNOVATION

Appropriate organizational designs are a function of the external environment, the nature of the task and the personnel involved. As our economic system evolved from entrepreneurial to bureaucratic, the nature of our organizations changed as well. Fred Taylor's scientific management principles improved the effectiveness of our organizations. Unquestionably, the changes related to specialization and division of labor were in great measure responsible for the leading position of American industry. At present however, maintenance of bureaucratic, segmentalist, rigid structures inhibits necessary change. In 1985, Drucker asserted that principles of innovation must be developed and practiced in ways similar to the way management became a "science" in Taylor's era: "...Innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or different service. It is capable of being presented as a discipline, capable of being learned, capable of being practiced. Entrepreneurs need to search purposefully for the sources of innovation, the changes and their symptoms that indicate opportunities for successful innovation. And they need to know and to apply the principles of successful innovation."¹¹

We have come to a point in history that our organizations must be renewed by organizing for innovation as well as for efficiency. Lawrence and Dyer contend: "Although organizations can get by for a time being only efficient or only innovative, over the long term there must be a simultaneous achievement of both efficiency and innovation."¹² Unfortunately, it is much easier to design organizations for efficiency than for innovation. It is much simpler to continue the types of control patterns and routines that have worked in the past than it is to consider creating novel approaches to work. Further, Peters and Austin suggest: "The course of innovation is highly uncertain. Moreover, it is always messy, unpredictable, and very much affected by the determined ("irrational"?) champions, and that is the important point. It's important, because we must learn to design organizations that take into account, explicitly, the irreducible sloppiness of the process and take advantage of it, rather than systems and organizations that

attempt to fight it"¹³.

ORGANIZATIONAL RENEWAL

We are just beginning to learn how to restructure our organizations to serve both efficiency and innovation. Organizations with alternative structures and new managerial philosophies are helping to counteract the resistance to change engendered by segmented bureaucratic designs. Kanter has described many of the problems of resistant systems: "Only the minimum number of exchanges takes place at the boundaries of segments; each slice is assumed to stand or fall rather independently of any other anyway, so why should they need to cooperate? Segmentalism assumes that problems can be solved when they are carved into pieces and the pieces assigned to specialists who work in isolation. Even innovation itself can become a specialty in segmentalist systems ---something given to the R & D department to take care of so that no one else has to worry about it."¹⁴

Thus segmentalist, bureaucratized organizations provide little motivation to deal with larger issues, little resource support since the resources are also segmented, and minimal transfer of knowledge developed from one segment to another. In newer, more open "integrative" models, subproblems are aggregated into larger problems. This creates unified effort and greater resource availability more conducive to the development of insight that leads to innovative solutions.

Integrative, open models are characterized by flat designs with short chains of command, organized in diagonal slices composed of mixed functions and highly diffused influence.

Matrix structures represent initial movement away from the more segmentalized traditional bureaucratic organizations to the open models we need to develop.

As our institutions evolve, new forms of leadership are required. Three sets of skills are needed for effective management in the integrative environments that stimulate innovation. These include "power skills" to influence others to invest their time, talents and information in solving new kinds of problems in new kinds of ways. Inter-personal management skills are required to deal with the problems associated with increased participation and group interaction. Finally, skill in the management of change is needed to provide for transfer and generalization of innovative ideas.

In 1985, Basadur, Graen and Scandura demonstrated the positive effects of returning to a supportive "home base", populated by co-workers, superiors and subordinates who have similar behaviors (had undergone similar training and experience). Organizations identified as more adaptable were found to have higher levels of "rational trust"--the extent to which higher management was viewed as "practicing what they preach". The researchers concluded that simply supporting new attitudes and skills was not sufficient--superiors must also model the valued behavior.¹⁵

Reconstruction of our institutions also requires changes in recruiting and reward systems. While technical skills will still be important, new members must also have demonstrated ability to collaborate with others. Additionally team collaboration must be rewarded, and reinforcement of intra-organizational competitive behavior must be eliminated. Identified facilitators of innovation--clear goals; alignment of all members of the organization around these goals; an empowering environment where there is ample opportunity for growth, and where personnel at all levels are involved in developing and managing the organization; an egalitarian climate which is visibly pro-innovation; and delegation and decentralization with a stress on performance--must increasingly characterize our designs.

CONCLUSION

The concept of equifinality from systems research is applicable to the issues we've been discussing. Basically, equifinality refers to the notion that "there is more than one way to skin a cat". There are several ways to design organizations to gain productive, creative and innovative results. In this paper, I have tried to provide an understanding of the broad design

elements which seem most appropriate as well as those that are apparently dysfunctional. The process of refining our theories of effective organizational designs and the improvement of management practice are both necessary and valid pursuits. They must be conducted simultaneously and in a closely connected manner.

It should be clear to those familiar with the tenets of VM that the attributes of the newer, integrative organizations needed for innovative action are very much like the attributes of the value disciplines. The open communication, clear process, use of both convergent and divergent thinking, heterogeneous population, and collaborative action that characterize value activity must also characterize the organizations in which such activity occurs. Indeed, value programs should serve as exemplars of such designs. Unfortunately, many practitioners still view value engineering activity as a "training program". Our work must begin long before the training begins and continue long after it ends. Our job is to help our managerial clients learn how to make the new skills and values stick, to last back in their everyday practice—to transform the daily attitudes, behaviors and thinking of the whole organization.

Training effects and mechanisms must be more carefully studied and documented. A great deal of information must be gathered regarding the effects of training in creative problem solving across different types of businesses and industries, different organization designs, different functions and levels, and different occupational groups. Such issues as relative preference for parts and stages of creative process across populations (nationally and internationally) should be carefully studied. More explicit documentation of recommended and implemented innovations should include an examination of specific attributes of these alternatives compared with those not selected.

It would be very helpful to know the relative impact of such attributes as compatibility, complexity, relative advantage, trialability, and observability as they are involved in projects of hardware, software, systems and business planning. The list of important issues to be examined includes all major elements of our practice and the institutions in which we practice. These are not simply "interesting notions that could be researched". These are questions and concerns we must address; not only to continue development of our discipline (if that's what it is), not only to increase our personal and organizational professionalism, but to remain competitive in the global economy. The opportunities are too great to ignore; the needs too urgent to be left unattended; the abilities of our personnel too valuable to be underused; and the outcomes too important to be left to chance.

REFERENCES

1. Rogers, C. (1954). "Toward a theory of creativity" A Review of General Semantics, 11: p. 249
2. Kimberly, J. R. (1981). "Managerial innovation" in Nystrom, R. & Starbuck, W. (Eds.), *Handbook of Organizational Design*, Oxford University Press, Oxford, p. 273.
3. Damanpour, F. & Evan, W. (1984). "Organizational innovation and performance: The problem of organizational lag" *Administrative Science Quarterly*, 29: p. 394.
4. Nicholson, N. (1984). "A theory of work role transitions" *Administrative Science Quarterly*, 29: p. 173.
5. Kanter, R. M. (1983). *The Change Masters* NY: Simon & Schuster. p. 33.
6. Downs, G. W. & Mohr, L. (1976). "Conceptual issues in the study of innovation" *Administrative Science Quarterly*, 21: p. 700.
7. Basadur, M. (1987). "Needed research in creativity for business and industrial applications" in Isaksen, S. (Ed.) *Frontiers of Creativity Research: Beyond the Basics*. NY: Bearly Limited, p. 411.
8. Abbey, A. & Dickson, J. (1983). "R & D work climate and innovation in semi-conductors." *Academy of Management Journal*, 26, 362-368.
9. Kanter, R. M. (1983). *op. cit.*
10. Amabile, T. (1983). *The Social Psychology of Creativity*. NY: Springer-Verlag.
11. Drucker, P.E. (1985). *Innovation and Entrepreneurship: Practices and Principles*. N.Y.: Harper & Row. p. 19.12. Lawrence, P.R. & Dyer, D. (1983). *Renewing American Industry: Organizations for Efficiency and Innovation*. N. Y.: The Free Press. p. 267.
13. Peters, T. & Austin, N. (1985). *A Passion for Excellence: The Leadership Difference*. N.Y.: Random House. p. 155.
14. Kanter, R. M. (1983). *op. cit.*, p.28.
15. Basadur, M. et al (1985). "Improving attitudes towards creative problem solving among engineers", McMaster University Research Paper, Series 237.