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ABSTRACT

Distinctive attributes of creative individuals and resources required for creative work are analyzed. The knowledge thus gleaned is used for illustrating how creativity is shaped significantly by its organizational context, in particular, by leadership, organizational structure, and reward system.

THE SHAPING OF CREATIVITY IN ORGANIZATIONS

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INTRODUCTION

"Japan challenges America's reputation for creativity and innovation, avers a writer in *Time*" (Rudolph, 1988). "Japan assaults the last U. S. bastion: Its lead in innovation," warns a *Wall Street Journal* news editor (Wysocki, 1988). What such statements highlight is the fact that in today's intensely competitive business environment creativity and innovation are becoming key factors in an organization's continuing survival. The importance of one of these factors, *innovation*, has been widely recognized, and management researchers and practitioners are contributing to a growing body of knowledge on management of innovation (see, for example: Gronhaug & Kaufmann, 1988; Hage, 1988; Katz, 1988; Tushman & Moore, 1988; Urabe, Child & Kagano, 1988; and Van de Ven, Angle & Poole, 1988). The second factor, *creativity*, however, has largely remained neglected in management and organizational studies. This is both surprising and troubling for two reasons. First, *creativity* stands for the best possible contributions an individual can make (cf. Perkins, 1981, and Bailin, 1988). Second, *creativity* is the most essential element in the process of innovation (cf. Amabile, 1988), as should be clear from the definitions of *creativity* and *innovation* that reflect a fair degree of consensus among scholars: *creativity is the production of novel and useful ideas*, and *innovation is the successful implementation of creative ideas*. Therefore, it is imperative for

organizational behavior researchers to begin inquiries into the phenomenon of creativity with a view of making its effective management a reality. This paper is one such inquiry in which the individual characteristics associated with creativity and the resources required for creative work are identified for the purpose of exploring the unique sets of demands an organization would have to satisfy for nurturing creativity.

Creativity in Organizational Settings

Creativity has been defined above as "the production of novel and useful ideas." Novelty means that there is a significant degree of originality or newness in the idea, but not that it is totally unrelated to existing knowledge or awareness. Usefulness of the idea means either that it advances theoretical or practical knowledge of importance in a given domain, or that it is capable of being implemented as a useful process or being translated into a valued product. Next, we can also clarify what is meant by a creative individual. A creative individual is someone whose work output exhibits creativity often, if not always. Thus, the creativity we would like to understand is a record of sustained creative productivity in terms of recognizable and recognized achievements over a long period of time.

The most common approach for studying creativity has been to study creative individuals, and the most active students of creativity have been the psychologists interested in the intrapersonal determinants of creativity. However, creativity as expressed in formal work-related behavior that takes place in organizational settings involves a high degree of interdependence between the creative individual and the work environment. Several recent investigators have taken note of the importance of organizational influences in shaping creative performance (see,

Amabile 1983 & 1988; Harrington, 1988; Kono, 1988; Sethia, 1987, 1989a & 1989b; and Von Glinow & Kerr, 1985). The present analysis of the phenomenon of creativity in organizations takes an approach that illuminates the relationship between special personal attributes of the creative individual, the resource demands of creative work, and the major facets of the organizational work-setting that influence creative behavior and creative work.

INDIVIDUAL CHARACTERISTICS AND CREATIVITY

Creativity originates in the individual. Therefore, it is important to understand the key individual characteristics that have a bearing on creativity. A number of studies have focused on these characteristics. In the context of business organizations, of particular interest are the examinations of the creativity related characteristics of scientists, technologists and inventors. Earlier works of relevance here include studies by Roe (1952), Eiduson (1962), Rossman (1964), and several investigations reported in a volume edited by Taylor (1963). More recent contributions in this area are the studies by Amabile and Gryskiewicz (1988; also see, Amabile, 1988), Hosking (1986), and Simon-ton (1988); and reviews by Mansfield and Busse (1981), and Barron and Harrington (1981). The characteristics identified in these and other studies fall into two broad - and somewhat overlapping - categories: *cognitive abilities*, and *personality disposition*.

Cognitive Abilities and Styles for Creativity

Cognitive or mental abilities are important in creativity because "creativity is 'thinking writ large,'" (Simon, 1988: 13). In a very general sense, the three most basic elements in the cognitive facet of creativity are: a certain level of intelligence, relevant knowledge or expertise, and special cognitive styles or patterns of thinking.

Intelligence. Both research evidence and practical experience indicate that creative individuals are noticeably more intelligent than average, and high IQ is especially important in scientific and technical fields (Barron & Harrington, 1981; Mansfield & Busse, 1981). A minimum IQ level of around 120 is commonly considered by researchers an "entry requirement" in such fields. However, within any particular field, there are no systematic differences in the intelligence levels of more highly creative individuals and comparatively less creative individuals.

Knowledge. Simon (1988) places considerable emphasis on "extensive background knowledge in relevant and potentially relevant areas," (p. 14) and regards expertness as the prerequisite to creativity (p. 16). His reasoning is that creativity arises from new insights, and "[t]he ability to achieve sudden insights into situations by recognizing familiar features in them depends on having stored a great deal of knowledge -- knowledge about the familiar patterns that can be recognized and knowledge of the cues for recognition," (p. 15). Amabile (1988), Bailin (1988), and Mumford and Gustafson (1988) also have stressed the importance of knowledge in creativity.

Cognitive Styles. Style in the present context refers to "recurrent patterns in the way a person approaches problems, and more generally, processes information" (Perkins, 1981: 270). Mumford and Gustafson (1988) emphasize an *integrative* style for creativity: "the individual's ability to integrate, reorganize, or restructure existing understandings may play an important role in generating major [creative] contributions or new schemata of use in solving a variety of problems" (p. 30). According to Amabile (1988), a *set-breaking* style is important for creativity: "The cognitive-perceptual style most conducive to creativity appears to be characterized by a facility in understanding complexities and an ability to break mental set during problem solving" (p. 131).

In addition to the integrative and set-breaking styles, also important for creativity is the "imaginative" element in thinking. While at times imaginative thinking is viewed as a synonym for creativity, it is more useful to consider three specific facets of it that have relatively well-defined relationships to creativity (cf. Sethia, 1989a). These are discussed below.

Problem Sensing. Sensing problems others have failed to notice and asking questions others have ignored, often marks the beginnings of a creative contribution. According to Zuckerman (1977), one of the prime criteria of "scientific taste" is a sense for the important problems. Mansfield and Busse (1981) found sensitivity in the selection of research problems as a primary factor in differentiating more highly creative scientists from less creative scientists.

Use of Imagery. Visual and other sensory images play an important role in the process of creativity. Gruber (1978), who has done some of the most insightful work in this area, has proposed the notion of *image of wide scope*, where the image "functions as a schema capable of assimilating to itself a wide range of perceptions, actions, ideas" (p. 135). Many creative scientists have relied a great deal on imagery in their work (cf. Gruber, 1978, and Perkins, 1981).

Aesthetic Sensibilities. Aesthetics is concerned with qualities such as elegance and congruity in forms or metaphors used in concepts and models. Bailing (1988) notes, "sensibilities are centrally involved in science in the form of aesthetic criteria which affect theory choice. Scientists frequently maintain that when other considerations are of equal weight, aesthetic considerations such as simplicity, elegance, unity and beauty play a decisive role" (p. 56).

Personality and Motivation for Creativity

Certain personality characteristics of the individual facilitate the process of creativity as well as the translation of new ideas into actions or other useful outcomes (cf. Mumford and Gustafson, 1988). The cumulative research findings to date suggest the following to be the more widely shared personality characteristics of creative individuals (cf. Sethia, 1989a).

Perseverance, High Energy, Hard Work. Creative individuals show a great tenacity of purpose and an almost fanatic commitment to work. They approach the task on hand with high energy, and persist in it in spite of the obstacles they may face. They are able to withstand frustrations without getting discouraged, and have the capacity to accept delayed gratification. In Rossman's (1964) study of 710 inventors perseverance was by far the most frequently mentioned characteristic associated with their success.

Curiosity, Inquisitiveness. Creative persons have high level of curiosity and wide-ranging interests. They exhibit a strong urge to understand and speculate about what interests them. This is part of the reason that they find problems and ask questions that most others may neglect. To Austin (1978), curiosity stands foremost among the decisive traits for creativity. He even ventures, "If we allow that necessity is the mother of invention, then curiosity is surely the father" (p. 108).

Tolerance of Ambiguity and Complexity. Creative individuals are comfortable with ambiguities not only in the cognitive domain (incomplete information, fuzzy facts, and discrepant results), but also at a more concrete and practical level - complexity, uncertainty and unpredictability of events and outcomes. This quality also translates into personal flexibility and openness to experience. Perkins (1988) asserts

that in creative work "significant boundaries get crossed," and therefore, the creative person needs, among other qualities, "toughness in tolerating the ambiguity that inevitably appears when boundaries are challenged" (p. 379).

Autonomy, Independence of Judgment. Creative individuals do not like outside influences to interfere with their work. Their thinking is non-conformist, and they do not depend on social approval in making their decisions. A related trait is of valuing and cherishing originality. Mansfield and Busse (1981) found that virtually all investigations of highly creative professionals have stressed their valuing of autonomy.

Risk Taking. Willingness to take risks is a common quality in creative individuals. Problems and methods in creative work involve treading on grounds untrodden before, and pose considerable risks of failure. Even when one's efforts are successful, acceptance and recognition may be long in coming. Risk taking, therefore, is unavoidable in a creative enterprise. Briggs (1988) notes that willingness to take risks is high on the list psychologists make of characteristics required for creativity.

The above behavioral propensities of creative individuals are sustained by two other personality attributes: intrinsic motivation, and a strongly positive self-image.

Intrinsic Motivation. Creative individuals show a strong intrinsic motivation for doing what they do - a satisfaction derived from their involvement with the processes of attacking challenging problems, developing new perspectives, and finding innovative solutions. In a study of R & D scientists by Amabile and Grysiewicz (1988), self-motivation was rated as the single most important personal quality that enhanced

creativity. Almost all investigators who have studied motivation for creativity have noted the supremacy of intrinsic motivation in creative endeavors. Yet, it is worth bearing in mind that this is essentially a matter of relative importance. Creative people are not "above" or "beyond" extrinsic motivation - it remains a driving force for them, as long as it complements but does not overshadow or impair intrinsic motivation (cf. Amabile, 1988, and Sethia, 1989a).

Positive Self-Image. A high self-esteem, or what Gruber (1986) calls "a feeling of specialness," is a frequently noticed trait in creative people, and to the extent that it is grounded in reality, it is functional for them. It underscores their self-confidence and their high aspirations, and it equips them to face up to the risks and uncertainties of their work.

To summarize the ways in which individual characteristics influence creativity, it is possible to identify certain *meta-characteristics* which apply to these characteristics. First, no characteristic is too important in isolation; what really matters is several of them coming together in a constellation. Second, in a given constellation, various constituent characteristics have to interact so that they may complement, catalyze, reinforce, or balance one another. Third, and last, some characteristics may be more important than others in a given domain, while some in general appear to be more potent than others as determinants of creativity. For example, personality and motivation seem to matter more than cognitive abilities and styles. Perkins (1988) suggests that to generalize, "one might say that creativity is more a matter of values and personality than of particular ways of deploying abilities, and more a matter of ways of deploying abilities than of having particular mental abilities" (p. 379). And Amabile (1988) spe-

cifically stresses the importance of motivation by arguing that no amount of skills in the domain or in creative thinking methods can make up for the lack of motivation, while strong motivation - particularly, intrinsic motivation - to some extent can offset skill deficiencies.

The preceding observations about the significance of personality and motivational factors are especially noteworthy, because creativity is often viewed as being almost exclusively dependent on mental prowess and thinking styles. According to a *Business Week* cover story, every year nearly 20,000 executives might be undergoing some kind of creativity training, and practically all this training is concerned with "mental gymnastics" (Smith, 1985). However, without suitable personality and motivational orientation no feats of mental or intellectual dexterity will go very far. And that is only while looking at the individual. The making of creative achievement necessarily goes beyond the individual, as will be seen below.

RESOURCE DEMANDS OF CREATIVE WORK

In popular romantic view, creativity may stand for the flash-of-lightening type of insights occurring to gifted geniuses ensconced in splendid isolation. But in real life, creativity is a time consuming, long-drawn struggle, into which many less than heroic individuals drawn, and these individuals succeed only by relying on a variety of external resources (cf. Amabile, 1988; Harrington, 1988; and Kono, 1988; and Sethia, 1989b). Creative work critically depends on a variety of human and material resources, and time.

Human Resources

Creativity in scientific and technical fields almost invariably involves a great deal of interaction and interdependence with professional colleagues and supporting staff. This can take the form of active

collaboration, mentor/apprentice relationship, providing/taking assistance, or extending/receiving informal cooperation. The reasons for such interdependence are three-fold. First, as noted above, creativity is based on knowledge - knowledge in great amounts and knowledge of considerable breadth. Access to the latest knowledge in one's own field and the current developments in related disciplines is speeded up by association with other researchers. Secondly, exposure to new ways of thinking, or awareness of problems uncovered by and puzzling others, can stimulate one's own creativity. Finally, the sheer amount of work that goes into achieving a significant breakthrough often necessitates reliance on collaborators or other supporting staff. Allen (1977), Tushman (1979), Garvey (1979), and Kraut, Galegher and Egidio (1987-88), have studied a variety of R & D projects and scientific enterprises, and on that basis stressed the role of collaboration and communication in promoting innovation, and by implication, also creativity. In a study of Nobel laureates, Zuckerman (1977) found that nearly two-thirds of the 286 laureates named between 1901 and 1972 were honored for work they did collaboratively.

Material Resources

Three types of material resources are required for creativity: physical resources, information resources, and communication resources. Physical resources include facilities, equipment and supplies. Information resources include library collections and data bases (cf. O'Connor, 1987). Communication resources include media such as electronic mail, teleconferencing, computer-conferencing, and various document search and retrieval systems (cf. Allen & Hauptman, 1987; Stefik & Brown, 1988; and Zuboff, 1988). These media can facilitate the creative process by promoting interaction among a diverse set of professionals.

Time

An organizationally-controlled resource as important to creativity as human and material resources is time. Gruber and Davis (1988) report: "Perhaps the single most reliable finding in our studies is that creative work takes a long time" (p. 265). Amabile and Gryskiewicz (1988) in their R & D study found that one of the frequently mentioned environmental factor that promoted creativity was "sufficient time" - time to think creatively about the problem, to explore different perspectives rather than having to impose an already-determined approach.

Fellow professionals who are accessible readily for interaction, technical knowledge sources that can be drawn upon easily, and time horizons that permit immersion in recalcitrant problems are essential for the dynamics of creativity to unfold.

THE ORGANIZATIONAL CONTEXT OF CREATIVITY

Amabile (1988) points out that "individual creativity can be powerfully influenced by elements of the organization" (p. 150). The discussion above has shown that creative individuals have certain distinctive characteristics and creative work makes special resource demands, and thus, the extent to which an organization is able to satisfy the needs of such individuals and meet the demands of their work will inevitably bear upon the level of creativity likely in that organization. Moreover, the organizational influence on creativity has yet another basis. Goals and priorities of the organization tend to dictate if creativity is desirable in the first place, and if there are opportunities for people to be creative. Therefore, creative achievement in the organizational world is shaped as much by organizational forces as it is by individual talent and motivation. This point is explicated here by examining the roles of three key components of organizational context: leadership, organizational structure, and reward system.

Leadership

Kono (1988) notes: "Management stipulates the corporate philosophy which encourages creativity, makes decisions on the product-market strategy, and distributes the resources necessary for creative activity" (p. 109). Vision and strategic goals of the top leadership not only determine the permissible and desirable behaviors, but also define the purposive and productive behaviors. If an organization is not interested in anything radically new or different, creativity will serve no purpose there, and it will not be seen as a productive effort. But if the leadership values creativity and is enthusiastic about new ideas, it will provide the needed challenge and opportunities for people to be creative. The roles of Edwin Land at Polaroid and Steven Jobs at Apple in inspiring creativity are a part of the modern management folklore (cf. Sethia, 1987). Leaders who themselves are highly creative can greatly promote creativity by being influential mentors and role models, as studies by Zuckerman (1977) and Amabile (1988) have shown. Turning to the creativity-related individual characteristics, the leadership vision and values, which get reflected in the culture of the organization (cf. Sethia, 1987), have significant implications for these. Pursuit of knowledge, modes of thinking, and sensing of non-obvious problems are shaped by what is prized in an organization. And so are perseverance, inquisitiveness, risk-taking and intrinsic motivation.

The availability of resources for creative work too is greatly influenced by leadership decisions. Selection and allocation of personnel, budgets for material resources, time horizons and scheduling, and training and development opportunities constitute the essential support system for creativity, and they all are subject to management priorities.

Organizational Structure

Structure, control systems, and policies and procedures are concrete indicators of how welcome is creativity in an organization, and they are the most decisive factors in making creativity possible in the organization. Structures and procedures are generally designed to promote predictability and conformity, both of which are essentially antithetical to creativity. At the individual level, creativity needs an environment that is harmonious with the needs of creative people and makes them feel productive. As highly intelligent individuals with highly specialized knowledge, who think in idiosyncratic ways and may feel possessed by problems only they can perceive, creators require a great deal of freedom and flexibility. This requirement is also related to their personality and motivational disposition: a strong desire for autonomy, independence of judgment, a high degree of self-confidence, and a tendency to persevere in chosen goals even against heavy odds. Freedom is important because the progress and the outcomes of creativity involve considerable unpredictability and frequent setbacks - and consequently, the primary responsibility do decide the problem to be attacked and the way of attacking is best left with the individual. In the same context, flexibility is important for maintaining a delicate balance between creative freedom and purposeful constraints. Managing creativity often involves shaping order out of chaos that is a frequent concomitant of creativity. Many creative ideas are born of spontaneity, serendipity, or even "bootlegging." Their potential benefits can be reaped only by unplanned-for innovations, which might seriously disrupt the organization's best-laid plans, at least in the short run.

With respect to the resources needed for creativity, organizational structure strongly affects the basic availability as well as the ease

of accessibility of resources. Resources - both physical and human - often have to be shared by several individuals or work units, and the structure determines the likelihood and the convenience of such sharing. A particularly crucial type of sharing involves information and expert knowledge. Formal and informal organizational structures have a great impact on information flows and communication patterns in the organization, which in turn have a significant bearing on the nature, speed and timing of the information exposure of the individual, and thus, on the way in which creative ideas are generated and tested.

Reward System

Many organizations may claim to be interested in creativity, and some of them might even *demand* creativity from their employees, but the key question is how many of these organizations properly reward creativity. Kerr (1975) in a classic article on reward systems reminds us pointedly about the susceptibility of organizations to "*the folly of hoping for A, while rewarding B.*" Hoping for creativity is not enough, it is necessary to reward creativity. Therefore, the reward system of the organization has to be attuned to the needs of creative people and the nature of creative work. The term reward system refers to *the rewards available an the organization and the criteria according to which members can qualify to receive these awards* (Sethia & Von Glinow, 1985). Rewarding creativity means offering appropriate rewards for its fruits - outcomes with visible payoff for the organization, and also for the actions and behaviors that bring about these fruits. This is an important issue because creativity is a highly uncertainty-ridden endeavor in which the action-outcome link is often tortuous and long drawn. Hence, first we need to know if creative outcomes are valued and rewarded, or spurned and frowned upon. Assuming that creative outcomes

are rewarded, it becomes important to ensure that needs of creative individuals are fulfilled, and creative behavior is rewarded. This means that application of intelligence, search for new knowledge, and original thinking are encouraged, and problem finding is appreciated as much as problem solving. Typical behaviors that deserve to be rewarded and reinforced are persistence, independence, and risk taking. From a motivational perspective, it is critical to remember that the mainspring of creativity is intrinsic motivation. This means that a reward system that places severe external constraints or over-emphasizes extrinsic rewards can easily undermine creativity.

Finally, sharing of resources and knowledge, cooperation and collaboration, and mentoring are all affected by the reward system. In an organization where individual achievement is the sole arbiter of rewards, people will be inclined to hoard resources and hide information, and not only refrain from helping others but will even shun any help offered to them. Such an environment can be hardly conducive to creativity.

To sum up, leadership, organizational structure, and reward system directly circumscribe the scope of creative activities and encourage or discourage the individual pursuit of creativity by prioritizing task goals, controlling resources, determining freedom and flexibility and defining the motivational climate. Needless to say, the particular organizational factors examined here, and the nature of their impact on creativity as described here are illustrative rather than exhaustive or definitive. Considerable innovative research in various fields of organizational studies is needed to identify all the major dimensions of organizational context that can enhance or hinder creativity, and to establish their potency in this respect.

CONCLUSION

In this paper an attempt has been made to identify the major individual characteristics associated with creativity, highlight the resource demands of creative work and illustrate how creativity is influenced by the organizational context. Leadership vision and strategies inspire and catalyze creative behavior. Organizational structures and procedures enable and augment creativity. Reward system sustains the creative spirit. Creativity may originate in the individual, but it flourishes only when it is nurtured and supported by the organization.

Zuckerman (1977) in her study of Nobel laureates observes: "Scientists have frequently noted, almost always in reflections of the "golden" days of one or another laboratory or institute ... that people did especially good work in these places, better than they would otherwise have done, and sometimes better than they ever did later on" (p. 172). She refers to such settings as "evocative" environments. A pressing need of today is to develop a definitive understanding of what constitutes "evocative" environments for creativity, and then apply this understanding in redesigning old organizations and designing new organizations, because creativity, both as the highest level of individual contribution and as the fountainhead of innovation, holds the key to continuing vitality of an organization .

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