Perspectives on Innovation in Organizations

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Abstract

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This paper maps out the literature on innovation in organizations in terms of three theoretical perspectives. These are referred to as the individualist perspective, the structuralist perspective, and the interactive process perspective. The perspectives provide the reader with a framework both for organizing this voluminous literature, and for understanding the key theoretical and methodological differences that are evident within this field.

Descriptors: innovation, perspectives, organization theory

Introduction

The word innovation is frequently used to describe an object such as a new microcomputer or a late model car. Despite this tendency to objectify the concept in everyday usage, there is agreement among innovation theorists that an innovation can take on other forms. For instance, Rogers and Shoemaker (1971: 19) argued that an innovation could be an 'idea, practice, or material artifact'. The diverse nature of innovations is also reflected in classification schemes which differentiate between administrative and technical innovations (Kimberly and Evanisko 1981), work organization, and product and process innovations (Whipp and Clark 1986).

Not all ideas, practices or objects are recognized as innovations and it is widely accepted that newness or novelty is a key distinguishing feature. Moreover, some researchers maintain that it is the *perception* of newness that counts, rather than whether the idea or object is new to the world or some other environment. Using this logic, Zaltman et al. (1973: 10) defined innovation as 'any idea, practice, or material artifact perceived to be new by the relevant unit of adoption'. The perception of newness also serves to differentiate innovation from change. Zaltman et al. (1973: 158) have commented that while all innovations imply change, not all change involves innovation as 'not everything that an organization adopts is perceived as new'.

The term 'innovation' is also used to refer to the *process* through which new ideas, objects and practices are created, developed, or reinvented. In its broadest conceptualization, the innovation process typically

embraces periods of design and development, adoption, implementation, and diffusion. Narrower conceptions are frequently encountered in the innovation literature. For instance, models of the product innovation process focus on the initial phase of design and development; diffusion models are concerned with the later stages.

Studies of innovation have focused on different levels of analysis. Much of the early literature focused on the adoption of new ideas and practices by autonomous individuals (Rogers 1962) whereas since the late 1950s there has been growing interest in organizational innovation, i.e. innovation within, and by, organizations (March and Simon 1958; Burns and Stalker 1961; Zaltman et al. 1973). At the same time, economists have examined innovation patterns at the level of industries and national systems (see, for example, Dosi et al. 1988). This paper deals primarily with the *organizational level of analysis* and, as such, it draws on the research literature focusing on innovation in organizations.

Given the increasing size of this literature, it has become important for researchers and students to be able to establish mental models of the domain. The making of such cognitive maps can be greatly assisted by the application of organizing schemes based on topic areas, methodological approaches, and perspectives. Devices which have previously been used to organize the literature on innovation in organizations include the dichotomy of variance research and process research (King 1990) and a distinction between diffusion, determinants and process research (Wolfe 1994). Although these devices provide useful insights, they do not expose underlying theoretical assumptions about the role of individual action or structures. These assumptions will be highlighted in this paper through the delineation and evaluation of three perspectives.

The existence of differing perspectives within the literature on innovation in organizations has been recognized for some time. In an early paper on the innovative organization, Becker and Whisler (1967: 467–468) referred to a 'humanistic approach', used by those wishing to explain innovation behaviour in terms of the personality characteristics of organizational participants, and a 'structural approach' used by those seeking to explain innovative behaviour in terms of structural differences. However, in a later article, Pierce and Delbecq (1977: 34) suggested that there is a third perspective:

'Organizational innovation can thus be seen from *three perspectives*. The deterministic structural model has captured the most attention; i.e. structure and context cause innovation. Alternately, member values and attributes can be cast as the primary rival causal force in determining organizational innovation; i.e., elite values favourable to change best predict organizational innovation. Finally, the relationship between organization and innovation may be interactively influenced by both structure and membership.' [emphasis added]

The same perspectives identified by Pierce and Delbecq (1977) are found in mappings of the organization theory and strategic management

literatures. For example, Pfeffer (1982) categorized the organization theory domain in terms of two levels of analysis and three perspectives on action: the rational action perspective, the situational constraint perspective, and an emergent process perspective. These three perspectives are, in turn, similar to Chaffee's (1985) linear, adaptive and interpretive models of strategy.

The three perspectives on action identified by Pierce and Delbecq (1977) will be used as a framework for organizing the literature of organizational innovation. The three perspectives will be referred to as the individualist perspective, the structuralist perspective, and the interactive process perspective.

The perspectives are introduced in an order that reflects their historical development and relative influence. Thus, we commence with the individualist perspective and follow this with a discussion of the structuralist perspective. Although these two perspectives have dominated the innovation field, they are being challenged by a growing interest in the interactive process perspective. Table 1 provides an overview of the three perspectives.

Table 1
Main Features of
the Three
Perspectives

	Individualist	Structuralist	Interactive process
Basic assumptions	Individuals cause innovation	Innovation determined by structural characteristics	Innovation produced by the interaction of structural influences and the actions of individuals
Conceptualization of an innovation	Static and objectively defined objects or practices	Static and objectively defined objects or practices	Innovations are subject to reinvention and reconfiguration. Innovations are perceived.
Conceptualization of the innovation process	Simple linear, with focus on the adoption stage	Simple linear, with focus on the adoption stage	Complex process
Core concepts	Champion Leaders Entrepreneur	Environment Size Complexity Differentiation Formalization Centralization Strategic type	Shocks Proliferation Innovative capability Context
Research methodology	Cross-sectional survey	Cross-sectional survey	Case studies Case histories
Main authors	Rogers March and Simon	Zaltman et al.	Van de Ven et al.

The Individualist Perspective

An individualist perspective on action assumes that individuals are a major source of change in organizations. The actions of individuals are not seen to be constrained by external factors, instead individuals are perceived to be self-directing agents who are guided by the goals that they set. In addition, this view holds that individuals are rational and make decisions in order to maximize value or utility.

In the organizational innovation literature, the individualist perspective is most clearly expressed in those studies that identify individual-level antecedents of innovation. These antecedents have been defined in terms of individual characteristics and individual-level concepts, such as age, sex, education level, values, personality, goals, creativity, and cognitive style (see Rogers 1962 for an early review; Amabile 1988; Scott and Bruce 1994).

This 'trait approach' assumes that certain individuals have personal qualities which predispose them to innovative behaviour. Although this rather simplistic line of thinking can be found in the literatures on entrepreneurship and leadership, some writers have argued that these personal qualities may be transient, and that other factors may also be involved. For instance, in his definition of the entrepreneur, Schumpeter (1934: 78) is careful to point out that individuals are entrepreneurs only when they carry out 'new combinations' and that it is rare for an individual to remain an entrepreneur throughout his/her active life.

Research on individual-level antecedents has a number of weaknesses when applied to organizations. First, it is based on the assumption that innovative decisions involve a single individual. In organizational settings, this assumption is unlikely to be valid (Van de Ven et al. 1989: 17). Second, individual characteristics may be overshadowed by the effect of organizational roles and organizational position, as Baldridge and Burnham (1975) demonstrated in their study of innovation in schools.

The concept of role is a sort of a 'bridge' between the organizational and the individual level (Baldridge and Burnham 1975: 168). It represents a shift away from the purely individualist perspective outlined above, to one which recognizes that behaviour is socially mediated. Roles are conferred on people; they represent the set of behaviours that others expect a person in a particular position to exhibit. In conforming to roles, individuals are not entirely free and autonomous, instead they are subject to a degree of constraint.

While it is now widely accepted that innovative activity is promoted by champions (Howell and Higgins 1990) who, by definition identify 'with the idea as their own, and with its promotion as a cause, to a degree that goes far beyond the requirements of their job' (Schon 1963: 84), the role of leader has also received some attention. The influence of leaders may be direct, where it is the leader who becomes aware, through their search activities, of new ideas, and who then decides to

introduce them into the organization. On the other hand, leaders can influence the innovation climate indirectly through the setting of goals, by encouraging innovation initiatives from subordinates, and through their decisions with respect to innovation adoption or rejection (Daft 1978; Iwamura and Jog 1991).

While various descriptive studies (Mohr 1969; Kimberly and Evanisko 1981) and prescriptive writings (e.g. Bennis and Nanus 1985) have attempted to relate innovative activity to the characteristics of individual leaders, it has also been suggested that greater attention could be given to the beliefs and values shared by *groups* of élites. In their study of health and welfare organizations, Hage and Dewar (1973: 281) found that the values of an inner élite were more important than those of either the executive director or the entire staff in predicting innovation, although leader values were still significant. In a study of innovation in hospitals, Robertson and Wind (1983) argue that prediction of innovativeness would be improved by focusing on the 'pattern' of cosmopolitanism among members of the decision-making unit.

Saren (1987: 136) has suggested that the focus on champions, leaders, and élites has been rather 'one-sided'. He argues that while innovation researchers have tended to emphasize the role of individuals who promote innovation, it is just as important to understand why other individuals resist innovative activity (see Zaltman et al. 1973: 85–103 for studies on resistance). Saren (1987) is also of the view that the actions of innovative individuals cannot be divorced either from the activities of other individuals or from the organization structure within which they must operate. Similarly, Van de Ven (1986) has argued that there is a tendency within popular management literature and some empirical studies to portray individuals as rational beings who are able to introduce innovations with relative ease. He suggests that a more realistic view is presented by those innovation theorists who emphasize the limited capacity of humans to handle complexity and pay attention to non-routine issues.

The idea that the cognitive capacities of actors may place limits on rationality is of course found in the early work of decision-making theorists such as Simon, March, and Cyert. While these theorists challenge the notion of rational choice, Pfeffer (1982: 6) has argued that much of their work still leaves the basic assumptions of the rational individualist model intact and, as such, it should be regarded as 'a subset of theories of rational choice'. A similar position is taken by Pettigrew (1985: 20), who finds in the work of March and Simon (1958) a tendency to approach organizational processes largely from an individualist perspective. These observations are significant given that in March and Simon (1958) we find the most comprehensive application of the principle of bounded rationality to a theory of innovation.

March and Simon argue that there will be no increase in the rate of innovation as long as the present course of action is considered to be satisfactory. Where a discrepancy between satisfactory and actual

performance, i.e. a 'performance gap' (Downs 1966), is noted, there may be an active search for new alternatives. Although the search process may increase the rate at which opportunities for more satisfactory performance are encountered, whether by accident or design (March and Simon 1958: 183), search activities will usually be limited in scope (March and Simon 1958: 180). Rather than search out all possible alternatives, an individual will usually only identify a few options. If any of these options prove to be a satisfactory solution for the problem at hand the search will terminate.

This 'simple-minded' characteristic of search behaviour also features in the behavioural theory of the firm developed by Cyert and March (1963). This general theory, as the authors themselves suggest, 'is of considerable relevance to the prediction of innovations' (Cyert and March 1963: 278). Furthermore, in the context of the present discussion, it contributes to our understanding of innovation in two important ways. Firstly, Cyert and March (1963: 279) modify the notion that failure induces innovation by predicting that organizations will innovate 'both when successful and when unsuccessful'. This is because successful organizations may have slack resources which can be channelled towards innovative activity. Second, Cyert and March's theory extends the idea of search by linking it explicitly with the concept of 'organizational learning'. Cyert and March assume that organizations learn and that this is evidenced in adaptive behaviour over time at the 'aggregate level' of the organization. While this view of the organization as an aggregate is not without its limitations, Cyert and March (1963: 124) emphasize that organizations may revise their search procedures on the basis of experience.

Empirical support for Cyert, March, and Simon's ideas on problem-oriented search is provided by an extensive study of decision-making in service organizations which found that executives 'prefer to copy the ideas of others or to search for ready-made solutions instead of seeking innovation' (Nutt 1984: 445). These 'satisficing' approaches were the means by which decision-makers created an 'artificial certainty' out of the uncertain conditions which they generally found intolerable.

Conservatism among managers may be fostered by reward systems which closely align individual rewards with organizational outcomes. Under these circumstances, managers will avoid innovating, as failure will generally be recognized to have greater implications for their advancement than would the pursuit of new ideas. Despite this, March (1981) has argued that, within most organizations, some level of innovation will still occur due to mechanisms such as organizational slack, ambiguity, and symbolic action. For instance, managers may follow fads and fashions because these project an image of innovativeness (Abrahamson 1991).

A further development of March and Simon's theory of innovation can be found in Nelson and Winter's (1982) evolutionary theory of eco-

nomic change. This theory examines the assumptions of behaviour at the organizational level and rejects the orthodox economist's view of rational, optimal choice. Instead, Nelson and Winter argue that behaviour in organizations is largely determined by the performance of 'routines' or 'repertoires' (sets of routines). According to Nelson and Winter (1982: 128), innovation involves some change in routine. Nevertheless, it can be argued that Nelson and Winter (1982) employ an individualist approach to innovation because they take the view that routines are based on 'individual skills'. Moreover, Nelson and Winter (1982: 124) use the notion of 'individual skills' as a metaphor to explain collective behaviour. This emphasis on individual skills contrasts with more recent definitions of routine which focus more broadly on systems of shared values and beliefs (see Levitt and March 1988).

An individualist perspective on innovation is also evident in schools of thought within the strategic management field. Five of the ten schools identified by Mintzberg (1990) tend to assume that individuals are the main cause of strategic change and innovation. Proponents of the early 'design school', for instance, saw the strategy formation process as being rooted in the rational and purposive mental processes of the chief executive. This individual was encouraged to assume the role of 'strategist' or 'architect' of strategy, to formulate and implement plans, and thereby bring about innovative activity and other changes in organizational climate and structure. An even stronger emphasis on individual action is a feature of the 'entrepreneurial school' of strategic management (Mintzberg 1990: 137) which attributes innovativeness in strategic formulation to the visionary capacities of an organization's leader.

The Structuralist Perspective

Whereas the individualist perspective seeks to explain innovative behaviour in terms of the characteristics and actions of organizational participants, a structuralist perspective assumes that innovation is determined by organizational characteristics. In the literature on innovation in organizations, the prevalence of the latter view can be attributed to the pervasive influence of structural functionalism and derivative schools of thought such as open systems theory and structural contingency theory. While there is some debate as to how these schools interrelate (see Burrell and Morgan 1979), they all 'share a common deterministic orientation by which organizational behavior is seen to be shaped by a series of impersonal mechanisms that act as external constraints on actors' (Astley and Van de Ven 1983: 248). The approach taken is usually to understand these constraining mechanisms by studying 'the systemic characteristics of organizations which, in turn, are viewed as sub-systems of more inclusive systems (i.e. economy, "society")' (Silverman 1970: 66).

The structuralist perspective presumes that organizations have goals, of which the most important, in the face of environmental change, is survival. The function of the organization, and its sub-systems, is to work towards the achievement of this overall aim. Similarly, the task for managers is to manage (reactively) the relations between an organization and its environment to ensure optimal performance (Astley and Van de Ven 1983).

The disadvantages and advantages of a structuralist perspective have been commented on at length elsewhere (Silverman 1970: 66–67). The main advantage of this perspective is that it overcomes a narrow concern with the organization itself by drawing attention to the interrelation of organization and environment. The main disadvantage is that there is a tendency to treat organizational features as objective realities whose factual character is unchallenged. Moreover, through the practice of reifying organizational features such as technology, strategy, differentiation, and so on, the processes by which organizational structures and patterns are generated and sustained are ignored, or, at best, simple assumptions about action are held to be valid; e.g. individuals are rational and goal-oriented (Benson 1977). While other criticisms have been expressed, these will be dealt with as part of the following overview of organizational features or patterns (e.g. structural variables and strategic types) which have been linked with innovation. Initially, however, attention will be given to some components of the task environment (Duncan 1972), i.e. customers, suppliers, competitors, and government.

Customers contribute to innovation by generating consumer demand (Marquis 1982; Utterback 1982) and by being a source of ideas (Von Hippel 1988; Mantel and Meredith 1986). The contribution of customers to the innovation process will, however, depend on their 'sophistication' and this may differ across industries (Crocombe et al. 1991) and between countries (Parkinson 1984).

While customers are an important source of information, suppliers can be critical both in bringing about an awareness of new ideas (Utterback 1982) and assisting in successful implementation. Ettlie (1986) interviewed users and suppliers of programmable manufacturing innovations and found that the nature of the supplier–user relationship was the factor most frequently cited as accounting for success or failure in system implementation.

Besides 'friendly' relationships with suppliers, 'rivalry' between competitors is also frequently associated with innovative activity (Crocombe et al. 1991). According to Marquis (1982: 43), competitive processes tend to stimulate the minor, but relatively common, 'nuts and bolts' type of innovation. Nevertheless, there may be a limit to the innovative effect of competitive forces. At some point the financial resources in an industry may become depleted, thereby limiting further innovation (Robertson and Gatignon 1987).

The final environmental component to consider here is government.

Although this element does feature in the literature on technological innovation and R&D management (see, for example, the inclusion of government policy in Baker and Sweeney's 1978 innovation model), it is noteworthy that socio-political factors did not feature at all in King's (1990) review of the organizational innovation literature. This situation may be attributable to the widespread use of cross-sectional question-naire surveys in innovation research. This research strategy tends not to show up the indirect and diffuse influence of government policy. Besides the component areas of the environment described above, sev-eral other environmental characteristics have been linked to organiza-tional innovation. These include environmental change and uncertainty, environmental heterogeneity, and communication.

Generally, there is agreement that rapid environmental change — and the uncertainty that this often creates for decision-makers (Duncan 1972) — will stimulate innovation in organizations (Mohr 1969; Zalt-man and Wallendorf 1979; Zaltman et al. 1973; Pierce and Delbecq 1977; Ettlie and Bridges 1987). By contrast, the effect of environmental heterogeneity is less clear. While Baldridge and Burnham (1975) found a positive relationship between environmental heterogeneity and innovation in schools, Robertson and Gatignon (1987) have argued that a high degree of industry heterogeneity might also hinder innovation. Under complex external conditions, communication breaks down due to a lack of common focus, and innovation suffers.

Innovation also appears to be facilitated by extensive communication between an organization and its environment (Saren 1987; Robertson and Gatignon 1987). It has been suggested that the more 'open' and willing an organization is to accept and even seek out new ideas from its external environment, the more innovative it is (Zaltman and Wallen-dorf 1979). Organizations which are innovative are more likely to use a range of information channels including external consultants (Utterback 1982), personal contacts (Myers and Marquis 1969), and boundary spanning individuals (Tushman and Scanlan 1981).

Relationships between innovation and a range of structural variables including size, complexity, differentiation, professionalism, formaliza-tion and centralization have been hypothesized in the literature. As will become apparent from the following discussion of empirical studies, the relationships are complex and often contradictory.

Organization size appears to be positively related to innovation (Mohr 1969; Baldridge and Burnham 1975; Damanpour and Evan 1984; Kimb-erly and Evanisko 1981; Fennell 1984; Damanpour 1992) and there is some evidence that large organizations adopt disproportionately more innovations than smaller organizations (Mansfield 1968). The tendency for large organizations to adopt more innovations has been attributed to critical mass (Baldridge and Burnham 1975) and the availability of slack resources. In addition, the increased problems of co-ordination and control in large organizations may stimulate the adoption of new practices.

It has been argued (Mohr 1969: 121) that 'size itself is not related to innovativeness by logical necessity' and that it is only important in terms of its *indirect* effects on organization structure. Larger size, for example, may affect innovation by promoting increased centralization, differentiation and complexity.

Complexity has been defined in various ways by innovation researchers. Hage and Aiken (1970) suggest that it refers to the level of knowledge and expertise in an organization, whereas Blau and McKinley (1979: 208) consider that it can be 'conceptualized both in terms of how differentiated the structure is and how numerous are the tasks'. Extending on this latter definition one may expect that a highly complex or differentiated structure which consists of a diversity of sub-units will generally require a range of specialists to perform specialized tasks. These specialists are likely to introduce, through their external contacts, information about new ideas into the organization. In addition, the range of different perspectives and opinions that surface among the various occupational specialties may foster the adoption of innovation. This line of argument often supports hypotheses for positive relationships between complexity and innovation (Hage and Dewar 1973; Baldridge and Burnham 1975). However, some researchers have found that structural complexity impedes innovation (Blau and McKinley 1979), while Fennell (1984) found that the impact of complexity depended on the type of innovation. One reason suggested for the adverse effect of complexity is that it brings about conflict which then makes it more difficult for an organization to implement the innovation. Furthermore, specialization can lead to problems of integration, as occurs where functional departments such as marketing, production, and research, pursue their own ends rather than that of the total organization. As integration between departments is generally required for successful innovation (Lawrence and Lorsch 1967), excessive 'segmentation' will inhibit innovation (Kanter 1985).

While the degree of professionalism of organization members is often related to innovation through its use as a measure of complexity (Hage and Aiken 1970; Hage and Dewar 1973), Pierce and Delbecq (1977) have identified professionalism as a distinct structural variable that is likely to be positively related to organizational innovation. Although there is some empirical support for a positive relationship between professionalism and innovation (Hage and Dewar 1973; Evan and Black 1967), there are also instances of studies which have found no relationship (Blau and McKinley 1979; Fennell 1984) or indeed a reverse effect (Corwin 1972). Drazin (1990), in a review of the subject area, has identified the source of the contradiction. He notes that the structuralist perspective tends to assume that professions represent a relatively homogeneous community, consisting of individuals who adhere to a set of collectively shared values and interests. An alternate, more radical view, would emphasize that professions are 'proactive, vested interest groups composed of members primarily concerned with the mainten-

ance of their power and status' (Drazin 1990: 255). Consequently, professionals will tend to resist innovations particularly where these are supported by competing professional groups.

Formalization refers to the degree to which jobs are codified (Hage and Aiken 1970: 43) and, like bureaucracy (Thompson 1965), it is usually predicted to be inversely related to innovation. In their study of welfare organizations, Hage and Aiken (1970: 44–45) found a moderate negative correlation between a job codification measure and programme change. Other empirical studies by Hage and Dewar (1973) and Blau and McKinley (1979) failed to find a significant correlation between formalization measures and innovation.

Centralization has been found to be a much weaker predictor of innovation than complexity or size (Kimberly and Evanisko 1981; Hage and Dewar 1973; Moch and Morse 1977). Hage and Aiken (1970: 38) hypothesized that centralization would vary inversely with the initiation of new programmes on the basis that a concentration of power can stifle the initiation of innovation for at least two reasons. First, people with power can block attempts to introduce change in the organization, particularly where this is likely to threaten their position. Second, a highly centralized organization provides less opportunity for the circulation of ideas and for the emergence of conflict which can stimulate change. These same problems do not appear to have a negative influence on implementation. Instead, Zaltman et al. (1973: 146) argue that 'more strict channels of authority can reduce potential conflict and ambiguity that could impair implementation'.

The foregoing discussion has shown the effects of structural variables such as centralization, complexity and formalization to be contradictory. In an attempt to address this dilemma and build a cumulative knowledge base, innovation researchers have recommended the development of contingency models which control for different types of innovation, types of organization, and/or different stages of the innovation process (Wolfe 1994: 406).

Arguably the best known contingency theory of innovation is that developed by Zaltman et al. (1973). This theory predicts that the effect of structural variables will be contingent upon the two main stages of the innovation process (i.e. initiation and implementation). According to this theory, the gathering and processing of information, which is crucial at the initiation stage, is facilitated by high complexity, low formalization, and low centralization. During the implementation phase, however, higher levels of formalization and centralization, combined with low complexity are likely to facilitate innovation because role conflict and ambiguity are reduced. Consequently, Zaltman et al. (1973) argue that an organization must be able to shift its structure as it moves through the various stages of innovation. An organic structure seems to be required for the initiation of innovations, whereas implementation may be best supported by a mechanistic structure (Zaltman et al. 1973: 155).

Although the innovative effect of strategy is often attributed largely to individual action, there are some studies which present strategy as an objective reality which possesses identifiable and measurable characteristics (see, e.g., Johne 1984; Nicholson et al. 1990). Saren (1987), however, considers it doubtful that strategy itself is a prime determinant of innovation, citing the possible interconnectedness of various determining factors such as structure, environment, and technology as a major impediment to understanding the role of strategy in the innovation process.

Thus far, the individualist and structuralist perspectives have been described. These perspectives have tended to encourage and support research studies which focus predominantly on the identification of key innovation determinants. This focus, in turn, favours the use of research designs involving cross-sectional surveys.

The Interactive Process Perspective

Although the study of organizational innovation has been dominated by a focus on the structural and individual determinants of innovation, interest in research on the innovation process has tended to increase since the publication of critical essays by Downs and Mohr (1976; 1979). Even Everett Rogers has recently called for more research on the innovation process, particularly where this research moves beyond 'a stage-to-stage conception of the innovation process, to a dynamic, continuous conception of change over time' (Van de Ven and Rogers 1988: 638).

The type of *process research* which Van de Ven and Rogers (1988) advocate, involves the description and analysis of temporal sequences of activities which occur in the development and implementation of innovations. Mohr (1982: 38) suggests that the aim of this research should be to explain change in terms of the *probabilistic rearrangement* of discrete states or events over time, rather than to establish 'efficient causes' through the study of variance. More specifically, Mohr (1982: 45–46) states that the resulting process theory should explain 'the pairing or other rearrangement of mutually autonomous objects . . . whose individual courses are determined independently of one another by forces external to the core of the theory'.

In organizational settings, the 'objects' which Mohr refers to will usually be events or states associated with different levels of analysis. For instance, some events and states may relate directly to the purposive actions of individual actors, while others may emanate from external structural influences. However, in attempting to generate theories that will specify the conditions under which these multi-level events will join or separate, there is an implicit need to address the complex, and paradoxical, relationship between action and structure. In particular, attention needs to be given to understanding how action and structure

interrelate. It is this particular requirement which sets the interactive process perspective apart from perspectives of the individualist and structuralist kind. The latter have seen innovation as *either* being caused by individual actions *or* by objective structures.

It should also be noted that a focus on the interconnection of action and structure is distinct from multivariate analysis. While some innovation studies have correlated variables from more than one level of analysis with measures of an organization's innovativeness (see Hage and Dewar 1973; Baldridge and Burnham 1975; Pierce and Delbecq 1977; Kimberly and Evanisko 1981; Meyer and Goes 1988), they have not operationalized the notion of interconnection of action and structure over time. Rather, in these cross-sectional studies, the relative predictive power of discrete independent variables was of greater interest than the understanding of how the various factors impacted on one another.

Although the interconnection of action and structure is a crucial feature of the interactive process perspective, the reconciliation of action and structure in social and organization theory has not been without problems (see Ranson et al. 1980; Giddens 1984). Van de Ven and Poole (1988) suggest that these difficulties might potentially be addressed in four ways. First, the underlying paradox can be addressed by acknowledging the existence of both deterministic and voluntaristic aspects of social systems. For example, the two opposing perspectives on action could be employed separately to provide different 'lenses' through which to view the same phenomenon. Second, action and structure may be reconciled by spelling out the various levels of analysis and clarifying the connections between them. Third, time can be used to relate action and structure. For instance, theories may be developed which link varying levels of interaction between action and structure with different phases in a temporal sequence. Fourth, new theories of the action-structure relationship can be developed and used to inform analysis. An example of such a theory is structuration theory (Giddens 1984).

The first of these approaches, which involves accepting the existence of both deterministic and voluntaristic aspects in the innovation process, is the most basic means of addressing the action-structure paradox and is reflected in most innovation process studies. Some studies, however, do not progress much further from this position. The 'descriptive model of the intra-firm innovation process' described by Knight (1967) illustrates this point. In his article, Knight identifies four different types of innovation and provides a general model of the organizational search process. Then, in a separate section, 'the innovator' is discussed in terms of two important attributes: the desire to innovate and the power to innovate. Although Knight does refer to factors at different levels (i.e. the innovator and the organization), he does not explicitly set out to link them.

By contrast, Normann's (1971) descriptive study of thirteen product development projects demonstrates a more concerted attempt to connect factors from different levels. Normann described the actual processes

involved in product development, and attempted to explain how these were influenced by three organizational subsystems (task, cognitive and political) and basic elements of the external environment.

Normann's research stands out as an early attempt to gain a better understanding of the complexity of the innovation process. In the 1980s, interest in this type of process research increased and several large-scale projects were initiated which not only sought to clarify connections between levels of analysis, but also examined these relationships over time.

A pre-eminent example of this large-scale research is the Minnesota Innovation Research Program which examined fourteen innovations in terms of four central concepts — new ideas, people, transactions and contexts (Schroeder et al. 1986; Van de Ven et al. 1989). As part of this study, Schroeder et al. (1989) analyzed seven innovations (four new product technologies and three new administrative arrangements), and developed an innovation process model based on six key observations. First, innovation processes can be traced to a shock, such as new leadership or impending loss of market share. This notion is closely related to March and Simon's (1958) hypothesis that dissatisfaction with performance stimulates the search for improved conditions, whereas satisfaction suppresses search. Second, the initial idea can proliferate into several ideas as the process ensues. Third, unpredictable setbacks and surprises may occur and these can provide a basis for learning. Fourth, new ideas will coexist with old practices and need to be integrated. Fifth, the organization may be restructured in order to better handle the innovation process. Sixth, while hands-on management occurs throughout the innovation process, the influence of managers positioned between one to four levels above the project team may be critical. King (1992) tested this process model and concluded that it was more reliable than the stage model developed by Zaltman et al. (1973).

While Schroeder et al. (1989) focused on innovations from various industrial sectors ranging from agriculture to military equipment, Walton (1987) developed a comprehensive framework for understanding and managing innovative change on the basis of a detailed study of a single industry — international shipping. Although Walton's primary unit of analysis was national industry, he notes that his theory can be applied to other social systems such as companies and plants.

On the basis of his research, Walton (1987: 28–29) argues that the capacity for innovative change in a social system is influenced by two external forces (environmental trends; and metacompetence) and five basic components (models; economic incentives; values and other social factors; institutions; and individuals with relevant competencies). While each basic component may directly influence the degree of innovative change, Walton stresses that innovative capacity is also determined by their interaction over time. For example, the model or 'vision' which guides the innovation process may be shaped by the particular combination of motivational forces and the competence of individuals who

manage the innovation process. Similarly, exposure to the innovation process may add to the level of competence of participants and influence their attitudes and beliefs toward the innovation.

Besides emphasizing the interaction of influence factors, Walton's framework also acknowledges factors at the level of the individual, the organization, and the environment. Conditions at different levels must be taken into account because an innovation 'may simultaneously be influenced by conditions and policies at the national level, at the industry level, and so forth' (Walton 1987: 25).

Walton (1987: 326) notes that his theoretical framework has marked similarities with the context/content/process framework developed by Pettigrew (1985; 1987) as a means of overcoming faults in theory and research on change such as inadequate emphasis on the effect of the outer context on change, a lack of historical analysis, and a tendency to develop highly linear and rational models of process. Pettigrew argues that change should be analyzed in terms of the continuous interplay between the context (both outer and inner), the content, and the process, of change. Besides this 'processual' and 'contextualist' approach, Pettigrew also argues for a historical method involving longitudinal case studies.

Although Pettigrew has tended to write about strategic change, approaches similar to his own have informed research on 'strategic innovation' and 'work organization innovation'. Whipp and Clark (1986) analyzed product, process, and work organization innovations in the Rover Company using a framework consisting of four elements: a historical dimension, societal comparisons, enterprise structures and processes, and the sector. An emphasis on the 'sector' is also reflected in Child and Smith's (1987) study of Cadbury Ltd, and Starkey and McKinlay's (1988) comparative study of innovations in work organization in four major organizations.

Besides attempting to account for the role of both action and structure in the innovation process, the studies described above illustrate three other important aspects of the interactive process perspective in use. First, there is a widespread rejection of the rational economic model of decision-making (Starkey and McKinlay 1988: 115). Instead, the non-rational aspects of organizational behaviour are deemed to be important and significant. Consistent with this view is the attention which tends to be given to the political context in which innovations are introduced (see Normann 1971; Child and Smith 1987). Second, an emphasis is placed on trying to understand the dynamic nature of the innovation process and the changes that occur to the innovation of interest. In particular, it is now widely accepted that innovations do not remain static during the innovation process, rather, they may be transformed by it (see Walton 1987: 319; Rice and Rogers 1980). Third, the interactive process perspective has major methodological implications. The use of longitudinal case studies is prevalent, as is a focus on induction. Van de Ven et al. (1989: 108), for example, explicitly state that they use a 'grounded theory approach'. A small number of cases usually

provide the empirical data, although some researchers (e.g. Bessant and Grunt 1985) have opted to study relatively large numbers of cases following a sampling logic.

Evaluation of the Perspectives

The three perspectives on innovation in organizations have been reviewed in a sequence that reflects their development over time. Early research was characterized by an individualist approach but this emphasis was later eclipsed by the structuralist perspective. As a result, there was a gradual shift from research which attempted to explain innovative behaviour in terms of the characteristics and actions of individual participants to research which highlighted the structural properties of organizations and environmental components.

This shift can be attributed to a growing interest in structural functionalism and open systems theory among innovation researchers. The rise of the structuralist perspective also coincided with growing advocacy of a positivist epistemology in business research and the increased availability and power of computers for quantitative data analysis. The collection of cross-sectional data using survey instruments became a commonly used technique and this, in turn, reinforced the study of rates of innovation determinants. Empirical research focusing on the innovation process was scarce (Rogers and Agarwala-Rogers 1976).

Throughout this period, the emphasis on individual factors and structures was often largely a matter of relative emphasis, rather than a case of the two perspectives being seen to be totally 'incompatible' (see Ranson et al. 1980) or 'mutually exclusive' (see Astley and Van de Ven 1983). Many researchers in the innovation field seem to have recognized the contribution of individual and structural factors, but limited their focus to one or the other for practical reasons, such as delimiting the scope of their research.

The individualist and structuralist perspectives (when applied in their purist forms) have major disadvantages in that they place undue emphasis on particular causal factors and so may lead to errors of attribution. For instance, a study which uses an individualist perspective will tend to focus on the innovative actions of leaders whilst ignoring important changes in the contexts within which the leaders operate. Similarly, a structuralist approach will fail to acknowledge the contribution of individual factors to innovative activity. In addition to overlooking attribution error, monistic perspectives will inevitably lead to simplistic theorizing of complex phenomena. Explanations which are based on either an individualist or a structuralist perspective cannot adequately analyze the complexity of innovations and innovation processes because only part of the picture is illuminated.

Further limitations stem from the tendency for individualist and structuralist perspectives to be frequently expressed in 'variance research'

studies which test several independent variables for their effect on innovation. Typically, a large number of organizations will be surveyed to determine the effect of variables such as size or élite values on the adoption or implementation of a particular range of innovations. This type of research does offer advantages including the relatively low cost involved in collecting large quantities of data using survey techniques and the potential for making statistical generalizations. However, as Downs and Mohr (1976; 1979) have suggested, theory building in the innovation field using survey instruments has been hampered by a number of factors. These include inconsistencies in the operationalization of key variables (such as innovation and adoption), inadequate control over interaction effects, and problems in the measurement of structural variables.

These theoretical and methodological concerns, together with a growing interest in empirical studies of the innovation process (Van de Ven and Rogers 1988), calls for research to include historical and contextual analyses (Pettigrew 1985), and increased debate about the reconciliation of action and structure (Giddens 1984; Van de Ven and Poole 1988), have encouraged some innovation researchers to synthesize and integrate the individualist and structuralist perspectives. This has resulted in the emergence of a third perspective on innovation in organizations which, in this paper, is referred to as the interactive process perspective. This perspective attempts to account for both individual and structural factors through an analysis of their interconnection.

The use of an interactive process perspective demands a theoretical and methodological reorientation which has its own limitations and challenges. One problem that has been identified is the tendency for researchers to lapse back into the description of uni-directional models (Astley and Van de Ven 1983). Several factors act to encourage these lapses. These include inadequate training, the cognitive limits of the researcher, and linguistic constraints.

Formal research training will probably not have prepared the innovation researcher for the integration task described above. This may mean that those who wish to adopt an interactive process perspective may lack sufficient knowledge as to how to go about conforming to this. The situation appears to be improving, however, and is being aided by a growing literature which provides guidance on perspective mediation (e.g. Van de Ven and Rogers 1988; Hassard 1990) and furnishes examples of successful integration attempts (e.g. Pettigrew 1985).

Even if researchers have access to the necessary technical knowledge and training, they will still be limited by their own cognitive capacities. Researchers can, after all, only process so much information in a given time frame. This factor will ultimately place real limits on their ability to develop holistic and comprehensive theories of innovation and change, or to become the sort of methodological chameleons that Martin (1990) has in mind. One way of overcoming this limitation is to involve pairs or teams of researchers.

Finally, there are linguistic constraints. Sandelands and Drazin (1989) and Hassard (1990) refer to the limiting effect of the words that we use. To this could be added the inherently serial nature of written research outputs, which makes it difficult to account for simultaneous, parallel and circular relationships. 'Thinking in circles' is not enough, researchers who adopt an interactive process perspective will also have to learn to 'write in circles'.

Innovation research that uses an interactive process perspective tends to be coupled with questions about process rather than variance and this often leads to the use of the case study method. This, in itself, may be seen as something of a disadvantage as traditionally the case study method has been viewed as a 'less desirable form of inquiry than either experiments or surveys' (Yin 1989: 21). Much of the reservation surrounding the method stems from the argument that case studies do not allow generalizations to be made. Although this may be true in so far as statistical inference is concerned, case studies do permit generalizations of a theoretical nature, i.e. generalizing from data to theory (Yin 1989: 21).

While the problem of external validity will remain, as will general concerns about the time-consuming nature of case-study research, the method seems to be gaining increased acceptance as a means of generating new insights into complex organizational phenomena. In relation to the study of innovation in organizations, case-study research has the potential to provide fresh understandings and new conceptualizations. Several examples illustrate this point. Van de Ven et al. (1989) have been able to show that ideas tend to proliferate into divergent and parallel ideas during the innovation process. Rice and Rogers (1980) noted that innovations may be changed by their adopters and introduced the concept of reinvention to describe this activity. Similarly, Clark and Staunton (1989) have rejected the conceptualization of innovations as isolated, static objects or practices and instead encourage the analysis of complex innovation configurations and changes in an innovation's features over time.

It is this opportunity for developing new conceptualizations that underpins the recent interest in the interactive process perspective. Moreover, the use of this perspective is likely to increase still further because it, of the three perspectives, would appear to offer more theoretical mileage in the study of phenomena such as new organizational forms and management practices which tend to be highly embedded in social and historical contexts. For instance, if we accept the view that organizations have been able to modify their forms to the extent that they might now be described as 'postmodern' (see Clegg 1990), it is the interactive process perspective that will be best able to explain how and why organizations have made this innovative transition. Against a background of major organizational change, the interactive process perspective is likely to become more prevalent in innovation research.

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