

Twelve steps to heaven: Successfully managing change through developing innovative teams

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In this article we propose that work teams implement many of the innovative changes required to enable organizations to respond appropriately to the external environment. We describe how, using an input–process–output model, we can identify the key elements necessary for developing team innovation. We propose that it is the implementation of ideas rather than their development that is crucial for enabling organizational change. Drawing on theory and relevant research, 12 steps to developing innovative teams are described covering key aspects of the team task, team composition, organizational context, and team processes.

Some of the greatest innovations over the past century have sprung from the creative juices of individuals. Where would the world be today without, say, the invention of controllable, powered flight by the Wright brothers, or the discovery of penicillin by Sir Alexander Fleming? But these are exceptions to the rule. The overwhelming majority of successful innovations come not from individuals striving heroically in a shed, but from team efforts orchestrated systematically by enterprises. And more than anything, what these corporate entrepreneurs have tended to exploit is not so much invention or discovery, but change. (“Innovating”, 2003, p. 3)

The exploitation of change through innovation is achieved largely through the work of teams embedded in organizations. In order to manage and implement change we therefore need to understand how to develop innovative teams. In this article, we review relevant research and offer 12 prescriptions for developing such teams.

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Organizations operate in complex and turbulent environments, and to survive, they have to anticipate and respond to the changing demands created by markets, consumers, shareholders, legal requirements, economy, suppliers, technology and social trends (Paton & McCalman, 2000). They will only survive if they are sufficiently flexible to respond to these constantly changing demands in their environments, and have the ability to redirect, focus and exploit their resources effectively, appropriately, and more quickly than competitors. The demands for change are complex and multifaceted and consequently the responsibility for initiating and implementing appropriate and timely responses can no-longer be seen as the responsibility of senior management, but has to be part of every manager's role (Clarke, 1994). This requires that managers change the way they attend to and interpret the external environment, and that they achieve similar transformations among everyone else in the organization (Wilson, 1992). If the demands for change are to be mastered, and the changes implemented to be sustainable, all members of the organization need to be receptive to, and have the necessary skills and motivation, to take part in the change process, and organizations must empower their employees to make changes at local levels (Senior, 1997). Teamworking offers a powerful strategy for managing organizational change. We propose that developing team innovation will enhance an organization's ability to redirect and focus resources effectively, appropriately and more quickly than its competitors, because it enables all members of the organization to respond to the demands for change, and to make appropriate changes at a local level.

Whether the context is producing TV programmes, managing health and illness in hospitals, developing new products in manufacturing organizations, or providing financial services, the use of work groups as a form of work organization is both ubiquitous and increasing (Guzzo, 1996). Researchers in applied psychology have responded by puzzling over the factors that influence the effectiveness of work groups or teams, from the shop floor through to top management teams (see, for reviews, Cohen & Bailey, 1997; West, 1996; West, Borrill, & Unsworth, 1998). Less research energy has been devoted to answering the question "What factors influence the extent to which teams generate and implement ideas for new and improved products, services and ways of doing things at work?" In this article, we focus only on this question and offer prescriptions for developing innovative work teams. In doing so, we do not consider factors that primarily or exclusively influence team effectiveness, even though they may have some influence on team innovation. Rather, we focus on factors that primarily or exclusively influence team innovation.

Our opening quotation asserts that work teams often develop and implement the changes required to enable organizations to respond appropriately to the external environment. Understanding change in

organizations requires an understanding of the factors that encourage innovation in teams. We review theory and research in order to identify 12 principles that theorists and practitioners can use to understand and promote innovation in teams. First we clarify the concepts of change, innovation, and creativity.

WHAT ARE CHANGE, CREATIVITY, AND INNOVATION?

We can dissipate the confusion amongst researchers about creativity, innovation, and change if we distinguish between them more clearly, in the ways they are defined and operationalized. Creativity is the development of ideas, while innovation is the development *and application* of ideas in practice (e.g., for new and improved products, services or ways of working) (West, 1997, 2002). Creativity is simply a part of the innovation process. Aphoristically, creativity is thinking about new things; innovation (which usually encompasses creativity) is about doing new things (West & Rickards, 1999).

Innovation refers to the introduction and application of new and improved ways of doing things. A fuller, more explicit definition of innovation is “. . . the intentional introduction and application within a job, work team or organization of ideas, processes, products or procedures which are new to that job, work team or organization and which are designed to benefit the job, the work team or the organization” (West & Farr, 1990, p. 9).

Innovation therefore represents a particular category of change—it is intentional, designed to benefit, and new to the unit of adoption. If a change incorporates these three elements, according to the definition, it is innovation; if any is missing, it is not. Creativity usually includes idea generation processes that spawn innovation. Our focus in this article is therefore on the introduction of changes by teams, changes that are intentional, designed to benefit, and are new to the team.

Creativity is likely to be most evident in the early stages of innovation processes or cycles, when those in teams are required to develop or offer ideas in response to a perceived need for innovation. Creative thinking is also likely when they initiate proposals for change and consider their initial implementation. Such considerations will alert team members to possible impracticalities associated with their ideas and to potential negative reactions from stakeholders. Thus, creativity is primarily required at the early stages of the innovation process. As the innovation is adapted to organizational circumstances and stabilized, there is less need for creativity. Of course, it can be argued that creativity is important throughout the innovation process, but in general, the requirements for

creative ideas will be greater at the earlier stages of the innovation process than the later.

Many researchers operationalize innovation and creativity by asking supervisors to rate those they manage in terms of how creative they are (e.g., Zhou, 2003) or how “innovative” they are in coming up with ideas. But there is little precise demarcation regarding the operationalization of both constructs in many empirical research, e.g., measures used in various publications consist of a mix of idea generation and idea implementation (e.g., Oldham & Cummings, 1996; Zhou, 2003), resulting in substantial confusion about the factors predicting creativity and innovation (e.g., divergent thinking versus persistence). Creativity, operationalized as the extent to which employees develop ideas, is very different from the extent to which they implement and sustain changes. The employee who discovered the practical value of Post-It™ notes in 3M came up with the idea as a result of wanting to find a way of marking his hymnal during repeated church services. His creativity resided first in coming up with the idea. He was constrained then, not by technology (the adhesive properties required for the product were already available), but by the resistance and incredulity of others in the organization. His innovation strategy was to provide Post-It™ notes to the secretaries of senior managers, and they in turn began to demand more of the product, so persuading the Marketing and Production departments of the value of the idea. This distinction between creativity and innovation might have limited theoretical import if the factors influencing both team creativity and innovation implementation were identical. But, as we shall see, the effects of some variables, such as external demands and threat, may have different consequences for creativity and innovation.

We therefore propose that creativity should be operationalized as idea generation (and this would include measures of novelty traditionally used in research into brainstorming—see for example, Paulus, 2000) and innovation as the implementation of ideas. Our understanding is also obscured by our tendency to treat “innovation” as a homogenous mass. The team that changes the location of their filing cabinets to improve space usage in the office has innovated. The team that develops a new way of drilling horizontally through the seabed has innovated. One innovation may take 15 minutes, the other 5 years. We believe researchers should make some attempt to rate innovations in terms of three operational dimensions: magnitude, radicalness, and novelty (West & Anderson, 1996). Magnitude is the size or scale of the innovation as judged by an expert in the domain (cf. Amabile, 1983). Radicalness is how much of a change to the status quo the innovation represents—a team introducing team appraisals as opposed to manager to team

member appraisals would be clearly changing the status quo. Filing cabinet changes would be unlikely to change the status quo. Novelty is how new the innovation is (horizontal drilling was highly novel when it was first developed). Operationalizing and analysing innovation in this more precise way will, we believe, help us to understand the phenomenon of team innovation more completely. We propose the use of a model of team innovation, incorporating these considerations of team innovation, to guide our analysis, building on the model of team innovation described by West and Anderson (1996).

A FRAMEWORK FOR RESEARCH ON TEAM INNOVATION

If innovation can be satisfactorily defined and operationalized then what overarching framework can guide research to determine the antecedents of team innovation? In an authoritative review of group performance and intergroup relations, Guzzo and Shea (1992) concluded that the dominant model for conceptualizing group performance is an input–process–output model. This is a static model, incorporating no feedback loops, and represents therefore a simplification of a complex reality (team innovation is likely to influence the team's task, composition, and the organizational context). But it enables us to describe and consider the interactions between factors likely to influence team innovation.

Inputs include knowledge, skills, and abilities of group members; the composition of the team; and aspects of organizational context such as the task and associated objectives, reward systems, information systems, and training resources. Process refers to the interactions among group members, information exchange, patterns of participation in decision making, leadership, social support, and sanctions for group related behaviour. Outputs include the products of the group's performance, but may also include group viability and team member well-being, growth, and satisfaction. In this article we describe research that examines, within this overall framework, the relationships between *inputs*, including aspects of the team task (intrinsically and extrinsically motivating task characteristics); team composition (personality of team members, skill, and demographic diversity); organizational context (rewards, learning and development practices, climate); *team processes*, including norms for innovation, leadership, regulatory focus, reflexivity, intergroup relations, conflict, and dissent; and *outputs*, notably the radicalness, magnitude, novelty, and likely effectiveness of team innovations (see Figure 1). At the end of each of the twelve steps we summarize the practical implications of the research findings and provide prescriptions for managers and applied psychologists.

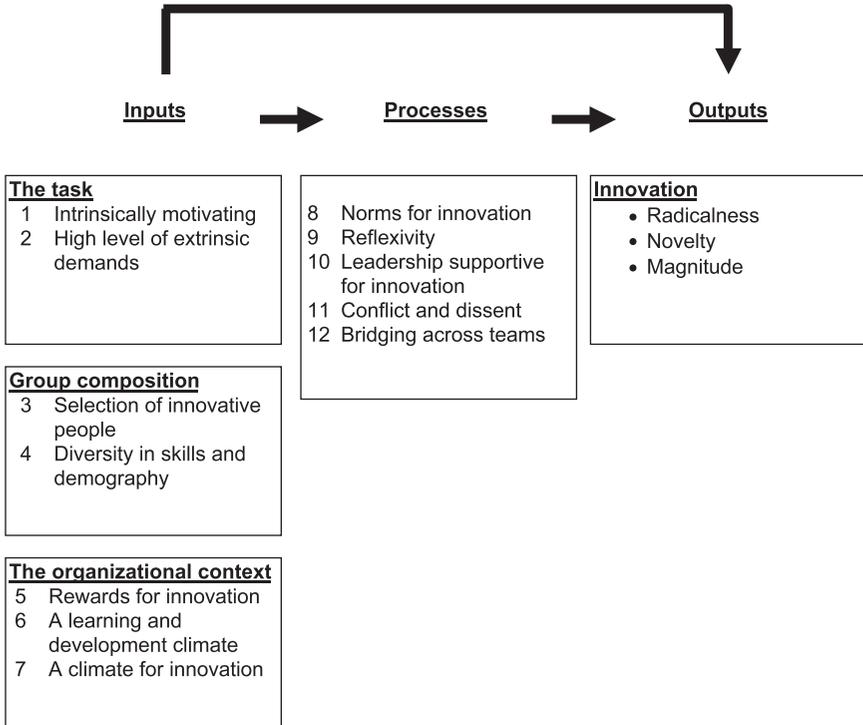


Figure 1. An input–process–output model of team innovation.

Inputs

1. Ensure the team task is intrinsically motivating. Teams are formed to carry out a task and the task is therefore always the starting point for analysing team functioning. The task a group performs is a fundamental influence on the team, influencing its composition, structure, processes, and functioning.

Oldham and Cummings (1996) found that the five core job characteristics (identified by job design theory; see Hackman & Oldham, 1980) predicted individual innovation at work. These characteristics were skill variety and challenge, task identity, task significance, task feedback, and autonomy. Skill variety refers to the degree to which a job requires different activities in order for the work to be carried out and the degree to which the range of skills and talents of the person working within the role is used. Thus, a nurse working with the elderly in their homes may need to use her professional skills of dressing wounds, listening, counselling, being empathic, and

appraising the supports and dangers in the person's home. Task identity is the degree to which the job represents a whole piece of work. It is not simply adding a rubber band to the packaging of a product, but being involved in the manufacture of the product throughout the process, or at least in a meaningful part of the process. Task significance is the impact of task completion upon other people within the organization or in the world at large. Monitoring the effectiveness of an organization's debt collection is less significant than addressing the well-being of elderly people in rural settings, and may therefore evoke less innovation. When people receive feedback on their performance they are more likely to become aware of "performance gaps". Consequently they are more attuned to the need to initiate new ways of working in order to fill the gaps. Of course this also implies they have clear job objectives. Autonomy refers to the freedom, independence and discretion of employees in how they perform the task—determining how to do their work and when to do it. Level of autonomy directly determines the extent to which people are innovative in their work (Bailyn, 1985; Munton & West, 1995; West, 1987).

This analysis is at the level of individual jobs and teams are not simply aggregates of individual jobs, though the design of team members' roles will affect overall team innovation. We also have to consider the team task design. Sociotechnical systems theory (STST) provides a powerful framework for examining the effects of task design upon work group innovation. Sociotechnical systems theorists (Cooper & Foster, 1971; Emery, 1959) argue that autonomous work groups provide a structure through which the demands of the social and technical subsystems of an organization can be jointly optimized. Thus, STST proposes that the technical subsystems of any work unit must be balanced and optimized concurrently with the social subsystem—technological and spatial working conditions must be designed to meet the human demands of the social system. The joint optimization of the two subsystems (and thereby innovation) is more likely when work groups have the following characteristics:

- The team is a relatively independent organizational unit that is responsible for a whole task that requires a variety of skills from team members.
- The tasks of members are related in content so that awareness of a common task is evoked and maintained and members are required to work interdependently.
- There is a "unity of product and organization", i.e., the group has a complete task to perform and group members can "identify with their own product".
- The team has a relatively high level of autonomy in how to carry out its work.

- There are opportunities for learning amongst team members and development possibilities for the task (Ulich & Weber, 1996).

These results suggest in order to encourage innovation in teams we should ensure teams work interdependently on a complete task, which requires a broad range of high level skills; is perceived by team members as significant and can be developed; team members have autonomy in deciding the means to achieve their task goals; and members should have accurate and timely feedback on team performance.

2. *Ensure a high level of external demands.* Generating creative ideas in a work group in organizational settings is relatively easy; implementing new products, processes, or procedures in work organizations is difficult and takes time because of resistance to change, and structural and cultural barriers (West, 2002; West & Richter, in press). The work team faces a huge task in moving from the stage of having an idea to implementing it effectively in an organization. They must overcome the suspicions and objections of a myriad of stakeholders who may be affected by the change. A health care team that wishes to introduce much greater nurse involvement in diagnostic and treatment processes for breast cancer patients may have to overcome organizational inertia including the objections of doctors, professional associations, patients, and managers.

West (1989) conducted a study of 92 community nurses. He found that *work demands* explained more of the variance in individual innovation than any other work role factor. Similarly, in a study of 333 health care workers, Bunce and West (1995) found that 32% of those studied innovated as a response to overwork, procedural difficulties, and interpersonal difficulties at work. Necessity may well be the mother of invention. At the organizational level, research suggests that the lower the market share held by manufacturing organizations, the higher the level of product innovation (West, Patterson, Pillinger, & Nickell, 2000). Moreover, the extent of environmental uncertainty reported by senior managers in these organizations (in relation to suppliers, customers, market demands, and government legislation), is a strong predictor of the degree of innovation in organizational systems, e.g., in people management practices.

Extending this model, we also suggest that other factors may influence whether high demands have a significant positive relationship with innovation. In a study of 100 health care teams, we tested this hypothesis by investigating the moderating role of group processes on the relationship between external demands and levels of team innovation. External demands were operationalized as the severity of health and social problems and levels of deprivation in the community served by each health care team. There was no direct relationship between external demands on teams and their level of

innovation. However, group processes moderated the relationship between external demands and innovation, such that good group processes and high levels of external demands were associated with high levels of team innovation. Well-functioning teams in relatively benign areas did not have a high level of innovation in patient care (West, Utsch, & Dawson, 2003c). Thus, our results suggest that teamwork may have a strong positive influence on team innovation under relatively demanding conditions but a weaker influence when the conditions are less demanding.

While external demands drive change creating the imperative to innovate, the relationship between external demands and creativity is less clear. One position stemming from work demands research asserts that there is an inverted U-shaped relationship between external demands and creativity as would be suggested by the Yerkes–Dodson law (cf. McGrath, 1976). Following this approach, moderate levels of external demands have a positive relationship with creativity, as they are optimally motivating, while extremes of both low and high demands have a negative relationship with creativity. Amabile and colleagues found that R&D projects rated high in creativity had more challenging work environments with less excessive work load pressure in comparison to those projects rated low in creativity (Amabile, Conti, Coon, Lazenby, & Herron, 1996). An alternative view is that external demands impede creativity (West, 2002). Evidence from cognitive psychology suggests that the generation of creative cognitions occurs when individuals feel safe, experience relatively positive affect, and feel free from pressure (Claxton, 1997, 1998).

In summary, we conclude that high levels of external demands are important for innovation implementation, but may also suppress the generation of creative ideas. How can teams deal with this dilemma? West (2002) argues that effective team integration skills will enable the team to respond to external demands by both creating safe environments for idea generation and implementing these ideas as innovations. Such integration skills refer to appropriate team knowledge, skills, and abilities (KSAs; Stevens & Campion, 1994), which, among others, include conflict resolution skills, the utilization of decentralized communication networks to enhance communication, but also goal setting and performance management.

Create conditions within which teams are exposed to high, but not extreme levels of external demands. Enhance team members' integration skills.

3. Select a team of innovative people. To build an innovative team, we must ensure that members are inclined towards innovation. People who are confident of their abilities are more likely to innovate in the workplace. In a study of role innovation among more than 2000 UK managers, Nicholson

and West (1988) found that confidence and motivation to develop knowledge and skills predicted innovation following job change. Tolerance of ambiguity, widely associated with creativity, enables individuals to avoid the problems of getting stuck in mental ruts, and to increase the chances of unusual responses and the discovery of novelty (Barron & Harrington, 1981).

Innovative people also tend to be self-disciplined, with a high degree of drive and motivation, and a concern with achieving excellence (Mumford & Gustafson, 1988). This perseverance against social pressures presumably reduces the dangers of premature abandonment. Innovative people tend to be self-directed, enjoying and requiring freedom in their work (Mumford & Gustafson, 1988). They have a high need for freedom, control, and discretion in the work place and appear to find bureaucratic limitations or the exercise of control by managers frustrating (West, 1987; West & Rushton, 1989). Innovation also requires sufficient knowledge of the field to be able to move it forwards, while not being so conceptually trapped in it that we are unable to conceive of alternative courses (Mumford & Gustafson, 1988).

In future research, we need to distinguish between personality characteristics that may differentially predict team member creativity and team member propensity to implement innovation. Although, Sternberg and Lubart (1996) suggest that the latter have characteristics that are related to both creativity and innovation, with precise operationalization of these concepts, clear distinctions among personality predictors may well emerge. Secondly, we assert there is a need for researchers to examine how individuals' personality characteristics are integrated into team outputs. For example, is it desirable to have a mixture of personality types in order to foster innovation? Or is it preferable to have a small proportion of the team composed of individuals with strong preferences for unconventional approaches?

Select team members therefore who are knowledgeable and confident, with a high tolerance for ambiguity, who are also self-disciplined and persistent.

4. *Select people with diverse skills and demographic backgrounds.* Of the different classification systems for diversity (e.g., Jackson 1992, 1996; Maznevski, 1994) most differentiate between task-oriented diversity in attributes that are relevant to the person's role or task in the organization (e.g., organizational position and specialized knowledge), and those that are simply inherent in the person and "relations-oriented" (e.g., age, gender, ethnicity, social status, and personality) (Maznevski, 1994).

The available evidence supports the conclusion that team task diversity is associated with better quality team decision making (Jackson, 1996). The

most significant study of innovation in teams to date is a UNESCO-sponsored international effort to determine the factors influencing the scientific performance of 1222 research teams (Andrews, 1979; see also Payne, 1990). Diversity was assessed in six areas: projects, interdisciplinary orientations, specialties, funding resources, R&D activities, and professional functions. Overall, diversity accounted for 10% of the variance in scientific recognition, R&D effectiveness, and number of publications (all surrogate indicators of innovation), reinforcing the conclusion from existing research that diversity positively influences team innovation.

Innovation requires diversity of knowledge bases, professional orientations, or disciplinary backgrounds because the integration of diverse perspectives creates the potential for combinations of ideas from different domains. This is likely to produce creative ideas. People with different professional training, skills, experiences, and orientations are likely to have divergent perspectives and this can create conflict. But if this knowledge can be harnessed these teams are also likely to have a greater wealth of knowledge to draw upon than other teams.

Teams that draw upon diverse perspectives may find it relatively easy to implement new ideas, for three reasons. Firstly, such teams may be relatively better able to anticipate potential problems that may emerge as ideas move from initial conception to implementation. Secondly, it is probable that teams whose members have the skills to work with people from diverse background will be adept at networking and dealing with the political agendas that surround innovation implementation. Furthermore, if informational conflict is processed in the interests of effective decision making, the team will undertake a more comprehensive and detailed analysis of problems and more innovative actions will result (De Dreu, 1997; Hoffman & Maier, 1961; Pearce & Ravlin, 1987; Porac & Howard, 1990; Tjosvold, 1985, 1991, 1998). But diversity also demands extra efforts at integration since diversity creates the potential for conflict as much as for creativity (De Dreu, 1997; Pelled, Eisenhardt, & Xin, 1999).

There is some evidence that heterogeneity in relations-oriented diversity is associated with group innovation, including heterogeneity in attitudes (Willems & Clark, 1971), gender, (Wood, 1987), and education (Smith Bannon, Olian, Sims, & Scully, 1994). Empirical research on the effects of demographic diversity on work team outcomes has produced mixed results (Milliken & Martins, 1996). "Sometimes the effect of diversity seems positive, at other times negative, and in other situations, there seems to be no effect at all" (Shaw & Barret-Power, 1998, p. 1307). Where diversity reduces group members' clarity about and commitment to group objectives, levels of participation (interaction, information-sharing, and shared influence over decision making), task orientation (commitment to quality of task performance), and support for new ideas, then it is likely that

innovation attempts will be resisted. The relationship between demographic diversity and innovation may therefore be curvilinear (see also West, 2002). The one study to test this possibility showed a curvilinear relationship between age, gender, and tenure diversity and team innovation, and this was mediated by the task focus of the team. If teams were tightly focused on the task then moderate levels of demographic diversity seemed to promote innovation. Very high or low levels of demographic diversity were associated with low levels of innovation (González-Romá & West, 2003).

Time may be a factor too. Watson, Kumar, and Michaelson (1993) studied culturally homogenous and culturally diverse student teams analysing case studies. They found that the diverse teams performed less well early on. After 17 months of working together, the diverse teams had group processes as effective as the homogenous teams and outperformed them in relation to range of perspectives on the task and number of alternative solutions developed. Thus, when diverse perspectives are discussed, over time the cross-fertilization of different approaches may result in more innovative solutions.

Select team members who have task relevant skills but a diverse range of skills and professional backgrounds; ensure the team has a range of demography (age, gender, tenure in the organization) but ensure the team has clarity about and commitment to group objectives to be tightly focused to get the work done. Give the team sufficient starting time to integrate the diverse perspectives and viewpoints.

5. *Provide organizational rewards for innovation.* The organizational context of teamwork has a significant effect on the team's innovation (Guzzo, 1996; Hackman, 1990). Organizational cultures that resist innovation will of course reduce the likelihood that teams will innovate. One of the most tangible marks of organizational support for innovation is whether employees' attempts to introduce new and improved ways of doing things are rewarded.

Efforts to reward employees for innovative performance should be undertaken with care, since some research suggests that doing so may have a negative impact upon intrinsic motivation. Thus, pay may deflect attention away from the task in hand towards the achievement of an external goal, i.e., higher levels of reward (Amabile, 1983, 1988). This is potentially detrimental to creativity. On the other hand, emerging research evidence suggests that it is possible to design reward systems that do not displace attention from the task towards the reward (Eisenberger & Cameron, 1996), and that it external rewards can encourage both creativity and innovation implementation (Abbey & Dickson, 1983; Eisenberger & Cameron, 1996). In a series of studies, Amabile and colleagues showed that reward perceived

as a bonus, a confirmation of one's competence, or a means of enabling one to do better and more interesting work in the future can stimulate creativity (see Amabile et al., 1996). There is also a body of work examining "gainsharing" as a device for stimulating productivity and innovation that suggests the value of reward for innovation (Cotton, 1996; Heller, Pusic, Strauss, & Wilpert, 1998). Gainsharing is the term used to describe systems used in commercial organizations to involve staff in developing new and more effective means of production. If employees develop ways of increasing production or improving quality they are rewarded with a share of the financial gains of the innovation. Evaluations of "gainsharing" programmes suggest they are effective in increasing innovation, productivity and employee involvement in decision making (Cotton, 1996).

It makes sense to argue that what should be rewarded is not the success of innovation but genuine attempts to innovate. Otherwise it is likely that employees will simply play safe with innovations that are neither radical nor novel (staying within existing paradigms). Furthermore, efforts should be made to reward the team, rather than the individual, for innovative efforts. The limited research that exists exploring the relationship between reward and organizational outcomes suggests that paying team members for performance is only likely to work where account is taken of the need to encourage individuals to work collaboratively rather than competitively (Bloom, 1999; Bloom & Milkovich, 1998). There has, however, been surprisingly little work examining the effects of reward systems on team innovation (or indeed individual innovation in organizations) and this is a gap in understanding which researchers should find relatively easy to fill.

Find ways of rewarding teams that attempt to innovate, even if the innovations don't work out.

6. *Create a learning and development climate in the organization.* For teams to innovate in organizations they must learn, be it from customers, suppliers, training experiences, or any other domain. Learning means changing our understanding and changing understanding is fundamental to innovation. What organizational mechanisms are likely to be effective in engendering the learning required to produce team innovation? Those who study organizational learning emphasize the importance of practices that encourage "outward focus" in order to bring new knowledge into the company (Burgoyne, Pedler, & Boydell, 1999). Exposure to different experiences and points of view makes team members willing to examine their own mental models and to make any necessary adjustments. In addition, the importance for learning and innovation of developing mechanisms to facilitate interaction with the external environment is well documented (Cohen & Levinthal, 1990).

There is a strong theoretical case to suggest that organizations need to adopt appropriate HR practices if they are to develop such outward focus. Recruitment and selection determine whether or not people are employed with the necessary attributes to make a contribution to the knowledge creation process. Induction and training activities shape the psychological contract, potentially enhancing motivation and developing skills as well as the required questioning, sharing, and challenging behaviours. Appraisal and remuneration strategies play a role in clarifying expectations and rewarding effective performance, defined in terms of willingness to learn, take risks, and communicate well. Human resource management (HRM) activity therefore can shape the learning agenda, providing the impetus and incentive for individuals to experience exploratory learning and develop their communication and teamworking skills.

What organizational learning mechanisms are likely to assist in generating this variety of perspectives in teams? Presenting team members with the opportunity to visit customers or suppliers, regardless of their job role, provides stimulation from the external environment and provokes questioning of the appropriateness of organizational practices and goals (McGrath, 1984). Similarly, intraorganizational secondments are likely to be beneficial in challenging thinking and generating the flow of new ideas. Opportunities for team members to learn outside the constraints of their immediate jobs will facilitate the transfer of knowledge internally and enrich individuals' perceptions of the challenges faced by other organizational members (Tsai, 2001).

In a longitudinal study of 22 UK manufacturing companies examining the relationship between people management practices and product and technological innovation, Shipton, West, Dawson, Patterson, and Birdi (2003b) found that practices designed to promote variety of knowledge within the organization, training, induction, and appraisal were all significant predictors of product innovation. The data suggest that people management practices designed to expose individuals to new and different experiences and to develop their skills are associated with high levels of product and technological innovation. Moreover, data presented in this study show that a combination of these people management practices explain variation between companies in product and technological innovation above and beyond the effects of single practices.

By what mechanisms is this effect generated? It is possible that people management presents individuals and teams with the cues necessary to communicate what behaviours are deemed desirable. In other words, perhaps through appraisal, for example, team members are encouraged to exhibit "outward focus" or to disseminate knowledge to others. This is, however, an underresearched area. Further research would be valuable to

test whether HR practices stimulate the creation of a learning climat, which in turn fosters team innovation.

Encourage team innovation by developing sophisticated HRM practices (recruitment, selection, induction, training, and appraisal), and encourage organizational learning via secondments, visits to external organizations, a broad approach to training support, and knowledge management which involves recording and communicating teams' solutions and best practices.

7. *Develop a climate for innovation in the organization.* Amabile's componential model of creativity and innovation (Amabile, 1988, 1997) provides a framework to examine how the organizational environment affects creativity and innovation. She proposes that two general categories of environment—stimulants and obstacles to creativity—affect organizational innovation by influencing expertise, task motivation, and creativity skills. Stimulants refer to organizational and supervisory encouragement, work group support, sufficient resources, and challenging work. Obstacles refer to organizational impediments and workload pressures. In this section we will focus on the relationship between organizational encouragement, obstacles, and team innovation.

Organizational encouragement includes three aspects of the work environment:

- (1) Encouragement of risk taking and idea generation, a valuing of innovation from the highest to the lowest levels of management.
- (2) Fair and supportive evaluation of new ideas.
- (3) Information flow across the organization, participative management, and decision making.

Amabile et al. (1996) describe studies indicating that internal strife, conservatism, and rigid, formal management structures represent obstacles to creativity. The authors suggest that because these factors may be perceived as controlling, their likely negative influence on creativity may evolve from an increase in individual extrinsic motivation (a motivation through external factors but not the task itself) and a corresponding decrease in the intrinsic motivation necessary for creativity. In a study comparing the work environments of (externally rated) highly creative R&D projects against less creative projects, Amabile and colleagues found support for their model and found that high-creativity projects were overall higher on work environment stimulants and lower on obstacles than low-creativity projects (Amabile et al., 1996).

Some of Amabile's stimulants (i.e., organizational and supervisory encouragement, work group support) incorporate facets of a climate of "positive affect". Such positive affect was also suggested by other research at the individual level of analysis to be related to creativity and innovation (Isen & Baron, 1991; Isen, Daubman, & Nowicki, 1987). Similarly, Shipton, Parkes, West, and Patterson (2003a) found that the average level of job satisfaction in manufacturing organizations predicted product innovation a year later, controlling for prior levels of company product innovation and profitability. Thus, we suggest that a climate of positive affectivity within an organization may provide a secure base from which teams can generate both creative ideas and ensure their implementation.

Senior managers should focus on managing the climate or culture of the organization in order to increase employees' experience of positive challenge; organizational encouragement for innovation; support and openness; and to decrease their perceptions of chronic organizational hostility, conservatism, and rigid formal structures. Finally, increasing positive affect by determining and increasing the factors that promote employee satisfaction may well lead to higher levels of team innovation.

Processes

So far we have examined the "inputs" component of the input–process–output model guiding this review. These will affect the processes of the team. The dance of the team comprises the day-to-day finely textured processes determining the level of team innovation, which includes norms, conflict, and leadership. West's (1990) four-factor model (shared objectives, participation, task focus, and support for innovation) has guided some research on team processes and innovation. Rather than review these four factors we focus on the one factor that is most exclusively likely to influence innovation as opposed to team effectiveness more generally—norms for innovation. We also consider five key elements of the team's dance: norms for innovation, reflexivity, leadership, conflict and dissent, and intergroup relations.

8. Establish team norms for innovation. Team norms which encourage risk taking and the improvement of existing practices are likely to provide an environment conducive to innovation. Norms can powerfully shape individual and group behaviour (for reviews, see Brown, 2000; Hackman, 1992) and those supporting innovation will encourage team members to introduce innovations. In a longitudinal study of 27 hospital top management teams, norms supporting innovation were the most powerful predictor of team innovation of any of the group processes or

group composition factors examined (Anderson & West, 1998; West & Anderson, 1996).

A manufacturing organization on the Isle of Wight provides a good example of how innovative team norms may develop from relatively seemingly trivial events. The main production team on the shop floor had complained about the storage of dirty materials, and was given a budget and time off from production to design and build a suitable storage extension for the factory. They completed the task under time and budget, and thereafter began to suggest many more innovations in work processes and structures. The team, as a result of their good experience, developed clear norms for discovering and valuing innovation. In effect, the team was provided with the conditions to be innovative, and once empowered proactively fostered innovative team norms.

Encourage teams to decide to be innovative and both verbally and practically to support team members' ideas for new and improved products, services, or ways of working.

9. *Encourage reflexivity in teams—coach them to stop working.* Our research suggests that a key indicator of innovation in work teams is reflexivity. Team reflexivity is the extent to which team members collectively reflect upon the team's objectives, strategies, and processes as well as their wider objectives, and adapt them accordingly (West, 1996, 2000). There are three central elements to the concept of reflexivity—*reflection, planning, and action or adaptation*. Reflection consists of attention, awareness, monitoring, and evaluation of the object of reflection (West, 2000). Planning is one of the potential consequences of the indeterminacy created by reflection, because, during this indeterminacy, courses of action can be contemplated, intentions formed, plans developed (in more or less detail), and the potential for carrying them out is built up. High reflexivity exists when team planning is characterized by greater detail, inclusiveness of potential problems, hierarchical ordering of plans, and long as well as short range planning (West, 2000). Detailed implementation intentions or plans are likely to lead to innovation implementation (Frese & Zapf, 1993; Gollwitzer, 1996).

In a longitudinal research study involving 19 BBC television education programme production teams (whose work fundamentally requires creativity and innovation) (Carter & West, 1998) reflexivity was a significant predictor of senior managers' ratings of the effectiveness and creativity of the programmes the teams produced. In audio- and videotaping team processes, we have found that innovation is most likely in teams that do reflect on their objectives ("What is it we are trying to achieve here?"), strategies ("I'm not sure we are going about solving the quality problem in production in the right way . . . can we discuss the approach some more?"),

and processes (“I think the way we run these meetings is not useful any more . . . why don’t we try to hold them once a month off site, so that they are less frequent, longer, and more relaxed?”). Moreover, such teams appear to continually renegotiate the way they work to try to improve performance.

Reflexivity requires a degree of safety however, since reflection is likely to reveal gaps between how the team is performing and how it would like to perform. Edmondson’s work helps us to understand the conditions within a team that encourage reflexivity or learning (Edmondson, 1996, 1999). She found major differences between newly formed intensive care nursing teams in their management of medication errors. In some teams, members openly acknowledged and discussed their medication errors and discussed ways to avoid their occurrence. In others, members kept information about errors to themselves. Learning about the causes of these errors, as a team, and devising innovations to prevent future errors were only possible in teams of the former type. Edmondson gives an example of how, in one learning-oriented team, discussion of a recent error led to innovation in equipment. An intravenous medication pump was identified as a source of consistent errors and so was replaced by a different type of pump.

In many cases reflexivity leads to radical change in the status quo and sometimes the creative destruction of existing processes. For example a breast cancer care team we studied opened up its decision-making meetings to a wide range of staff who could watch the team, as in a goldfish bowl, and then provide commentary and feedback to them. These comments were then discussed and reflected upon within the team in order for them to improve working practices.

Teams must take time out to reflect on their objectives, team processes, and outcomes, make plans for change, implement them, and reflect again. This requires they develop a sense of safety that enables them to self-reflectively explore in this way.

10. *Ensure there is clarity of leadership in the team and that the leadership style is appropriate for encouraging innovation.* The team leader has a potent and pervasive influence on team processes and team innovation (Tannenbaum, Salas, & Cannon-Bowers, 1996). The leader brings task expertise, abilities, and attitudes to the team that influence the group design and group norms (Hackman, 1990, 1992, 2002), and, through monitoring, feedback, and coaching, develops the processes, that enables the team to do its work successfully (McIntyre & Salas, 1995) and to innovate.

Mumford, Scott, Gaddis, and Strange (2002) identified three leadership characteristics that stimulate team innovation: domain specific expertise, social and problem-solving skills, and transformational leadership behaviours. We adopt this framework and describe research that relates to these

areas. Over and above these factors, we argue that clarity of team leadership is an important predictor of team innovation.

Kim, Min, and Cha (1999) surveyed 87 R&D teams, in six Korean organizations. Of the six roles examined a leader's technical problem-solving ability (in particular appraisal of problems and identification of new ideas) was significantly correlated with R&D innovation. A leader's technical expertise contributes to the cognitive resources of the teams as well as to team problem-solving capacity (Mumford et al., 2002).

A programme of social psychological research by Maier (1960–1970) examined the link between leadership problem solving and team innovation. Maier (1970) conducted a series of experiments with groups exploring the influence of different leadership behaviours on creativity. The results suggested that the leader should encourage “problem mindedness” in groups on the basis that exploring the problem fully is the best way of eventually generating a rich vein of solution options. The leader can delay a group's criticism of an idea by asking for alternative contributions and can use his or her power to protect individuals with minority views, so that their opinions can be heard (Maier & Solem, 1962). Maier (1970) argued that leaders should delay offering their opinions as long as possible, since propositions from leaders are often given undue weight and tend either to be too hastily accepted, rather than properly evaluated, a finding since replicated in a variety of applied studies. Maier concludes that leaders should function as “the group's central nervous system”: receive information, facilitate communication, relay messages, and integrate responses—in short, integrate the group. The leader must be receptive to information, but not impose solutions. The leader should be aware of group processes; listen in order to understand rather than to appraise or refute; assume responsibility for accurate communication; be sensitive to unexpressed feelings; protect minority views; keep the discussion moving; and develop skills in summarizing (Maier, 1970).

Recent theories of leadership depict two dominant styles: transformational and transactional. We discuss transformational leadership, as research (e.g., Keller, 1992) suggests transformational leadership is a strong predictor of team innovation. These leaders influence group members by encouraging them to transform their views of themselves and their work. They rely on charisma and the ability to conjure inspiring visions of the future (e.g., Bass, 1990; Burns, 1978; House & Shamir, 1993). Such leaders use emotional or ideological appeals to change the behaviour of the group, moving them from self-interest in work values to consideration of the whole group and organization. Inspiration can encourage team members not to be disheartened by setbacks and to invest additional effort to take risks and develop innovative solutions to endemic work problems.

Much of the research on team leadership has focused on the contribution made by a single leader. However, leadership can also be provided by two or more individuals who are either formally appointed to the role, or emerge from within the team. Leadership is important even in self-managed teams, affecting both organizational factors such as acquiring resources for the team, and team member behaviour such as encouraging the team to take control of its own activities (Nygren & Levine, 1996). We propose clarity of team leadership (team members are clear about where the leadership of the team resides) is critical to the role of leadership in fostering team innovation (regardless of whether leadership is shared). Lack of clarity about or conflict over the leadership role will be negatively associated with team innovation. In a test of these propositions, West, Borrill, Dawson, Brodbeck, Shapiro, and Haward (2003a) sampled 3447 respondents from 98 primary health care teams, 113 community mental health teams, and 72 breast cancer care teams. The results revealed that leadership clarity was associated with clear team objectives, high levels of participation, commitment to excellence, and support for innovation. Team processes consistently predicted team innovation across all three samples. Clarity of team leadership predicted innovation in the latter two samples and team processes partially mediated this relationship.

Ensure that leadership in the team is clear to all team members and that there is no conflict over leadership. Listen in order to understand rather than to appraise or refute; assume responsibility for accurate team communication; be sensitive to unexpressed feelings; develop inspiring visions of the possibilities for innovation; keep the discussion moving; and develop problem-solving and technical skills.

11. *Manage conflict constructively and encourage minorities to dissent within teams.* Many scholars argue that the management of competing perspectives is fundamental to the generation of creativity and innovation (Mumford & Gustafson, 1988; Nemeth & Owens, 1996; Tjosvold, 1998). We made reference to this point in step 4 when discussing the need for individuals with diverse skills to be represented in innovative teams. Here, we argue that through dealing effectively with conflicting perspectives, teams are challenged to achieve high levels of performance and innovation. Evidence suggests that this is the case where conflict is task-related (rather than centred around relationships or process issues; see De Dreu, 1997; Jehn, 1997). Task conflict is an awareness of differences in viewpoints and opinions about a task. It includes constructive challenges to the group's performance. Dean Tjosvold and colleagues (Tjosvold, 1982, 1998; Tjosvold & Field, 1983; Tjosvold & Johnson, 1977; Tjosvold, Wedley, & Field, 1986) have presented cogent arguments and strong supportive evidence that such

constructive (task-related) controversy in a co-operative group context improves the quality of decision making and creativity (Tjosvold, 1991). Constructive controversy is characterized by full exploration of opposing opinions and frank analyses of task-related issues. It occurs when decision-makers believe they are in a cooperative group context, where mutually beneficial goals are emphasized, rather than in a competitive context; where decision-makers feel their personal competence is confirmed rather than questioned; and where they perceive processes of mutual influence rather than attempted dominance.

For example, the most effective self-managing teams in a manufacturing plant that Alper and Tjosvold (1993) studied, were those which had compatible goals and promoted constructive controversy. The 544 employees who made up the 59 teams completed a questionnaire, which probed for information about cooperation, competition, and conflict within the teams. Teams were responsible for activities such as work scheduling, house-keeping, safety, purchasing, accident investigation, and quality. Members of teams that promoted interdependent conflict management (people cooperated to work through their differences), compared to teams with win/lose conflict (where team members tended to engage in a power struggle when they had different views and interests), felt confident that they could deal with differences. Such teams were rated as more productive and innovative by their managers. Apparently, because of this success, members of these teams were committed to working as a team.

Another perspective on conflict and innovation comes from minority influence theory. A number of researchers have shown that consistent arguments by a minority group are likely to lead to change in majority views in groups (Maass & Clark, 1984; Nemeth, 1986; Nemeth & Chiles, 1988; Nemeth & Kwan, 1987; Nemeth & Owens, 1996; Nemeth & Wachtler, 1983) (for an account of this research and an assessment of how it relates to group creativity, see the excellent chapter by Nemeth & Nemeth-Brown, 2003).

De Dreu and de Vries (1997) suggest that a homogenous workforce in which minority dissent is suppressed will reduce creativity, innovation, individuality, and independence (see also Nemeth & Staw, 1989). Disagreement about ideas within a group can be beneficial and some researchers even argue that team task or information-related conflict is valuable, whether or not it occurs in a collaborative context, since it can improve decision making and strategic planning (Cosier & Rose, 1977; Mitroff, Barabba, & Kilmann, 1977; Schweiger, Sandberg, & Rechner, 1989). This is because task-related conflict may lead team members to reevaluate the status quo and adapt their objectives, strategies, or processes more appropriately to their situation (Coser, 1970; Nemeth & Staw, 1989; Roloff, 1987; Thomas, 1979). However, de Dreu and Weingart (2003) suggest that high levels of conflict in teams,

regardless of whether the conflict is focused on relationships or task, will inhibit team effectiveness and innovation.

In two studies of newly formed postal work teams and heterogeneous teams in The Netherlands, de Dreu and West (2001) found that minority dissent did indeed predict team innovation (as rated by the teams' supervisors), but only in teams with high levels of participation. High levels of team member interaction, participative decision making, and information sharing provide the conditions for minorities to voice dissent and foster innovation.

Encourage moderate task-related (as distinct from emotional or interpersonal) conflict and minority dissent, along with high levels of participation since this will lead to debate and to consideration of alternative interpretations of information available. This in turn will prompt integrated and creative solutions to work-related problems—to innovation.

12. *Don't just bond...bridge.* Teamworking often provides the basis for collaboration and collective decision making. In turn these bonds enable innovation. The other side of this equation is that team members tend to identify with their group and develop competitive orientations toward other groups. As a consequence team-based organizations are often riven by intergroup competition, hostility, and rivalry, with likely consequent negative impacts on organizational performance overall; in short, intergroup bias.

Early research in social psychology, such as the famous Robbers' Cave study, showed how psychological group identification occurs almost immediately when groups find themselves under conditions of conflicting interest, with dramatic behavioural consequences of strong in-group favouritism and loyalty. However, people also develop group identification with the most minimal social cues, even when groups are totally independent regarding the interests they pursue (Tajfel, 1981; Tajfel & Billig, 1974). The pitfall is that group members tend to discriminate in favour of their own group and against members of out-groups especially when group membership is made salient (Turner, 1985). This isolates the group from diverse and critical input from out-groups. In these conditions, teams may fail to acquire the wealth of knowledge present within an organization and may develop inward looking orientations, stifling growth and innovation.

In a study of 45 new product teams in five high technology companies, Ancona and Caldwell (1992) found that when a work group recruited a new member from another functional area in an organization, communication between the team and that area went up dramatically. This would favour

innovation through the incorporation of diverse ideas and models gleaned from these different functional areas. These findings echo Damanpour's (1996) meta-analytic conclusions that suggested external communication was more important for innovation than internal communication in organizations.

How can teams encourage good intergroup working? A fruitful avenue may be to look at the two main causes of dysfunctional intergroup relations: conflicting interests or goals, and the disruptive dynamics of salient social categorization. One way for the team to improve relationships with other teams would be to make such improvement one of its four or five core work objectives. Teams can also use secondments and set up cross-team work projects. Another strategy is to improve and encourage contact and open communication between teams. Such contacts usually lead to a weakening of perceptions of conflicting goals (Tjosvold, 1998). Open and collaborative communication is a means by which trusting cross-team relationships can be created; such trusting relationships enable conflicts of interest to be managed constructively.

There are many ways for the organization to encourage intergroup working (see West, Tjosvold, & Smith, 2003b), including encouraging teams to downplay the salience of group boundaries by developing a common superordinate identity within the organization; rewarding the maintenance and development of cross-team relationships; and making team boundaries more permeable, e.g., through rotating team members in different teams (see also Katz & Allen, 1988). Research reviewed in step 6 considers what specific aspects of organizational context are most likely to impact upon team innovation. There, however, is much work to be done in organizations by work and organizational psychologists to encourage the application of these strategies to ensure that innovation is maximized.

Encourage different teams to work together, share best practice, develop joint projects, and strive to find a common superordinate identity within the organization in order to encourage the innovation that springs from bridging boundaries. Reward interteam working.

CONCLUSION

The input–process–output model we have described here offers an integrative framework for understanding how to encourage team innovation. Implicitly the structure of this model suggests team processes provide the core driving force for team innovation and that these processes may mediate the relationship between team inputs and innovation. While researchers (e.g., Pelled et al., 1999; Zenger & Lawrence, 1989) have proposed that diversity influences team communication and through these

processes drives innovation, the relationship between other input variables may be considerably more complex. For example the organizational context will have a direct and indirect impact on innovation. A company that supports innovation may be more likely to develop innovative HRM practices, such as novel equal opportunity programmes and/or the selection of employees from a global as opposed to local pool of resources. In turn these practices will determine the demographic diversity of an organization, which will influence team processes and innovation. Further the organizational context may stifle or stimulate different team processes. For example, rewarding innovative teams may encourage norms for innovation and reflexivity but may also promote conflict and competition between teams. Thus, we suggest that there is a need for researchers to examine specific aspects of this model and identify the potential interrelationships between different variables.

Within the model and its steps we propose that certain variables may have a differential impact on innovation and creativity. For example, while external demands promote innovation, the relationship with creativity is much less clear. Some researchers have suggested that external demands have a negative relationship with creativity, whereas others have argued that external demands have an inverted U-shaped relationship with creativity. We suggest this confusion stems from the limited research examining this topic and from differences in the way different studies have defined innovation and creativity. To address this concern, future researchers should provide a more precise demarcation of creativity and innovation.

We draw researchers' attention to the observation that we have relatively little understanding of the organizational context and the influence of rewards on innovation. Furthermore, while much effort has been devoted to understanding how team processes affect innovation, we need to understand more about how leadership behaviours interact with task type to produce high or low levels of innovation. Finally, we are only beginning to understand how interactions between teams may be fruitful sources of innovation or inhibitors of innovation.

Team innovation is vital to the effectiveness of organizations in highly demanding and competitive environments. At the same time, opportunities to develop and implement skills in the workplace and to innovate are central to the satisfaction of team members at work. Work and organizational psychologists can contribute much to translating research into practice and developing teams that enable change, innovation, and the well-being of those who work within them—we hope that facilitating organizations to take the 12 steps we have described in this article will help to take them to a better place as they struggle with the earthly challenges of change.

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