CHAPTER 5 Building the Innovative Organization

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LEARNING OBJECTIVES

After this chapter you should be able to:

- Understand how the leadership and organization of innovation is much more than a set of processes, tools and techniques and the successful practice of innovation demands the interaction and integration of three different levels of management, individual, collective and climate.
- At the personal or individual level, understand how different leadership and creative styles influence the ability to identify, assess and develop new ideas and concepts.
- At the collective or social level, identify how teams, groups and processes each contribute to successful innovation behaviours and outcomes.
- At the context or climate level, assess how different factors can support or hinder innovation and entrepreneurship.

'Innovation has nothing to do with how many R&D dollars you have . . . it's not about money. It's about the people you have, how you're led, and how much you get it'.

— Kirkpatrick, D., The second coming of Apple. Fortune, 1998. 138, 90 [1].

'*People are our greatest asset*'. This phrase – or variations on it – has become one of the clichés of management presentations, mission statements and annual reports throughout the world. Along with concepts such as 'empowerment' and 'team working', it expresses a view of people being at the creative heart of the enterprise. But very often the reader of such words – and particularly those 'people' about whom they are written – may have a more cynical view, seeing organizations still operating as if people were part of the problem rather than the key to its solution.

In the field of innovation, this theme is of central importance. It is clear from a wealth of psychological research that every human being comes with the capability to find and solve complex problems, and where such creative behaviour can be harnessed among a group of people with differing skills and perspectives extraordinary things can be achieved. We can easily think of examples. At the individual level, innovation has always been about exceptional characters who combine energy, enthusiasm and creative insight to invent and carry forward new concepts, such as James Dyson, with his alternative approaches to domestic appliance design; Spence Silver, the 3M chemist who discovered the non-sticky adhesive behind 'Post-it' notes; and Shawn Fanning, the young programmer who wrote the Napster software and almost single-handedly shook the foundations of the music industry.

However, innovation is much more than individual creativity or talent, and is increasingly about teamwork and the creative combination of different disciplines and perspectives. Whether it is in designing a new car in half the usual time; bringing a new computer game to market; establishing new ways of delivering old services such as banking, insurance or travel services; or putting men and women routinely into space; the success comes from people working together in high-performance teams.

This effect, when multiplied across the organization, can yield surprising results. In his work on US companies, Jeffrey Pfeffer notes the strong correlation between proactive people management practices and the performance of firms in a variety of sectors [2]. A comprehensive review for the UK Chartered Institute of Personnel and Development suggested that '. . . more than 30 studies carried out in the UK and US since the early 1990s leave no room to doubt that there is a correlation between people management and business performance, that the relationship is positive, and that it is cumulative: the more and the more effective the practices, the better the result' [3]. Similar studies confirm the pattern in German firms [4]. In a knowledge economy where creativity is at a premium, people really are the most important assets which a firm possesses. The management challenge is how to go about building the kind of organizations in which such innovative behaviour can flourish.

This chapter deals with the creation and maintenance of an innovative organizational context, one whose structure and underlying culture – that is, the pattern of values and beliefs – support innovation. It is easy to find prescriptions for innovative organizations that highlight the need to eliminate stifling bureaucracy, unhelpful structures, brick walls blocking communication and other factors stopping the flow of good ideas. However, we must be careful not to fall into the chaos trap – not all innovation works in organic, loose, informal environments, or 'skunk works' – and these types of organization can sometimes act against the interests of successful innovation. We need to determine appropriate organization – that is, the most suitable organization given the operating contingencies. Too little order and structure may be as bad as too much.

Table 5.1 Components of the Innovative Organization

Component	Key Features	Example References
Shared vision, leadership and the will to innovate	Clearly articulated and shared sense of purpose Stretching strategic intent 'Top management commitment'	[5–8]
Appropriate structure	Organization design that enables creativity, learning, and inter-action. Not always a loose 'skunk works' model; key issue is finding appropriate balance between 'organic and mechanistic' options for particular contingencies	[9–15]
Key individuals	Promoters, champions, gatekeepers and other roles that energize or facilitate innovation	[9,16,17]
Effective team working	Appropriate use of teams (at local, cross-functional and inter-organizational level) to solve problems. Requires investment in team selection and building	[18–20]
High-involvement innovation	Participation in organization-wide continuous improvement activity	[21,22]
Creative climate	Positive approach to creative ideas, supported by relevant motivation systems	[7,8,23,24]
External focus	Internal and external customer orientation. Extensive networking	[25–27]

Equally, 'innovative organization' implies more than a structure or process; it is an integrated set of components that work together to create and reinforce the kind of environment that enables innovation to flourish. Studies of innovative organizations have been extensive, although many can be criticized for taking a narrow view, or for placing too much emphasis on a single prescription like 'team working' or loose structures'. Nevertheless, it is possible to draw out from these a set of components that appear linked with success; these are outlined in Table 5.1 and explored in the subsequent discussion.

5.1 SHARED VISION, LEADERSHIP AND THE WILL TO INNOVATE

Innovation is essentially about learning and change and is often disruptive, risky and costly. So, as **Case Study 5.1** shows, it is not surprising that individuals and organizations develop many different cognitive, behavioural and structural ways of reinforcing the status quo. Innovation requires energy to overcome this inertia and the determination to change the order of things. We see this in the case of individual inventors who champion their ideas against the odds, in entrepreneurs who build businesses through risk-taking behaviour, and in organizations that manage to challenge the accepted rules of the game.

The converse is also true – the 'not-invented-here' problem, in which an organization fails to see the potential in a new idea, or decides that it does not fit with its current pattern of business. In other cases, the need for a change is perceived, but the strength or saliency of the threat is underestimated. For example, during the 1980s, General Motors found it difficult to appreciate and interpret the information about Japanese competition, preferring to believe that their access in US markets was due to unfair trade policies rather than recognizing the fundamental need for process innovation, which the 'lean manufacturing' approach that was pioneered in Japan was bringing to the car industry [28]. Christensen, in his studies of hard drives [29], and Tripsas and Gravetti, in their analysis of the problems Polaroid faced in making the transition to digital imaging, provide powerful evidence to show the difficulties faced by the established firms in interpreting the signals associated with a new and potentially disruptive technology [30].

CASE STUDY 5.1 Missing the Boat

On March 10, 1875, Alexander Graham Bell called to his assistant, 'Mr Watson, come here, I want you' – the surprising aspect of the exchange was that it was the world's first telephone conversation. Excited by their discovery, they demonstrated their idea to senior executives at Western Union.

The written reply, a few days later, suggested that 'after careful consideration of your invention, which is a very interesting novelty, we have come to the conclusion that it has no commercial possibilities . . . we see no future for an electrical toy . . .' Within four years of the invention, there were 50,000 telephones in the United States and within 20 years there were 5 million. In the same time, the company which Bell formed, American Telephone and Telegraph (ATT), grew to become the largest corporation in the United States, with a stock worth $1000 per share. The original patent (number 174455) became the single most valuable patent in history.

Source: Based on Bryson, B., *Made in America*. 1994, London: Minerva.

This is also where the concept of 'core rigidities' becomes important [31]. As we discussed in Chapter 4, we see core competencies as a source of strength within the organization, but the downside is that the shared mindset, which is being highly competent in doing certain things, can also block the organization from changing its behaviour. Thus, ideas that challenge the status quo face an uphill struggle to gain acceptance; innovation requires considerable energy and enthusiasm to overcome barriers of this kind. One of the concerns in successful innovative organizations is finding ways to ensure that individuals with good ideas are able to progress them without having to leave the organization to do so [9]. Chapter 12 discusses the theme of 'intrapreneurship' in more detail.

Changing mindset and refocusing organizational energies require the articulation of a new vision, and there are many cases where this kind of leadership is credited with starting or turning round organizations. Examples include Bill Gates (Microsoft), Steve Jobs (Pixar/Apple) [10], Jeff Bezos (Amazon), Elon Musk (Tesla) and Andy Grove (Intel) [11]. While we must be careful of vacuous expressions of 'mission' and 'vision', it is also clear that in cases like these there has been a clear sense of, and commitment to, shared organizational purpose arising from such leadership.

'Top management commitment' is a common prescription associated with successful innovation; the challenge is to translate the concept into reality by finding mechanisms that demonstrate and reinforce the sense of management involvement, commitment, enthusiasm and support. In particular, there needs to be a long-term commitment to major projects, as opposed to seeking short-term returns. Since much of innovation is about uncertainty, it follows that returns may not emerge quickly and that there will be a need for 'patient money'. This may not always be easy to provide, especially when demands for shorter term gains by shareholders must be reconciled with long-term technology development plans. One way of dealing with this problem is to focus not only on returns on investment, but also on other considerations such as future market penetration and growth or the strategic benefits. **Research Note 5.1** and **Case Study 5.2** provide examples of such leadership.

A part of this pattern is also the acceptance of risk by the top management. Innovation is inherently uncertain and will inevitably involve failures as well as successes. Thus, successful management requires that the organization be prepared to take risks and to accept failure as an opportunity for learning and development. This is not to say that unnecessary risks should be taken – rather, as Robert Cooper suggests, the inherent uncertainty in innovation should be reduced where possible by collecting information and conducting research [12].

We should not confuse leadership and commitment with always being the active change agent. In many cases, innovation happens despite the senior management within an organization,

RESEARCH NOTE 5.1 Innovation Leadership and Climate

Organizations have traditionally conceived of leadership as a heroic attribute, appointing a few 'real' leaders to high-level senior positions in order to get them through difficult times. However, many observers and researchers are becoming cynical about this approach and are beginning to think about the need to recognize and utilize a wider range of leadership practices. Leadership needs to be conceived of as something that happens across functions and levels. New concepts and frameworks are needed in order to embrace this more inclusive approach to leadership.

For example, there is a great deal of writing about the fundamental difference between leadership and management. This literature abounds and has generally promoted the argument that leaders have vision and think creatively ('doing different'), while managers are merely drones and focus only on doing things better. This distinction has led to a general devaluation of management. Emerging work on styles of creativity and management suggests that it is useful to keep preference distinct from capacity. Creativity is present when doing things both differently and better. This means that leadership and management may be two constructs on a continuum, rather than two opposing characteristics.

Our particular emphasis is on resolving the unnecessary and unproductive distinction that is made between leadership and management. When it comes to innovation and transformation, organizations need both sets of skills. We develop a model of innovation leadership that builds on past work, but adds some recent perspectives from the fields of change and innovation management, and personality and social psychology. This multidimensional view of leadership raises the issue of context as an important factor, beyond concern for task and people. This approach suggests the need for a third factor in assessing leadership behaviour, in addition to the traditional concerns for task and people. Therefore, we integrate three dimensions of leadership: concern for task, concern for people and concern for change.

One of the most important roles that leaders play within organizational settings is to create the climate for innovation. We identify the critical dimensions of the climate for innovation and suggest how leaders might nurture these in a context for innovation.

Source: Isaksen, S. and J. Tidd, *Meeting the innovation challenge: Leadership for transformation and growth*. 2006, Chichester: John Wiley & Sons, Ltd.

CASE STUDY 5.2 The Vision Thing – How Leadership Contributes to Transformational Change

Elon Musk is a serial technology entrepreneur and visionary, but contrary to popular belief he did not create PayPal or Tesla Motors. He was born in South Africa and later obtained Canadian and American citizenship. He earned two bachelor degrees, in Physics and then Economics. After graduation, he started a PhD in Physics at Stanford, but dropped out after a few weeks.

At the age of 24, he cofounded Zip2, an online city guide. He sold the company four years later to Compaq for US $341 million, receiving 7% of the sale. He used $10 million of the proceeds to start X.com, an online financial payments service, which a year later merged with Confinity, a money transfer company which included the PayPal service. However, Musk was rejected as CEO of the new company in 2000 after disagreements over the technology strategy, but he remained on the board and retained 11.7% of the shares. In 2002, PayPal was sold to eBay for US$1.5 billion in stock, and Musk received US$165 million.

Using US$100 million of his windfall, in 2002, Musk founded Space Exploration Technologies, or SpaceX. SpaceX designs, manufactures and launches rockets and focuses on lower costs and greater reusability than competing services. It focuses commercial satellite contracts and cargo missions for NASA, but has longer-term aspirations for space travel and colonization. It has billions of dollars worth of forward contracts, but it is a privately owned company and has yet to declare any profits.

Tesla Motors was founded in 2003, and Musk made investments in the company and joined the board in 2004. However, it wasn't until the company struggled in the financial crisis of 2008 that Tesla took a more significant financial and management position, owning 22% of the company and becoming CEO. The company currently offers three electric vehicles: the premium-priced Model S coupe, introduced in 2012, the Model X SUV launched in 2015, and the more

affordable and mass-market Model 3 sedan, available from 2017. As a result, by 2020 Tesla was achieving annual car sales of almost 200,000, but with annual losses in excess of $1 billion. The success of the company will depend upon the sales and profitability of the more mass-market Model 3. In an effort to develop the market and infrastructure for electric and self-driving cars, Tesla made all its patents freely available. Musk has also funded the development of the HyperLoop transportation system, which aims to provide faster-than-airline speed long-distance travel.

and success emerges as a result of guerrilla tactics rather than a frontal assault on the problem. Much has been made of the dramatic turnaround in IBM's fortunes under the leadership of Lou Gerstner who took the ailing giant firm from a crisis position to one of leadership in the IT services field and an acknowledged pioneer of e-business. But closer analysis reveals that the entry into e-business was the result of a bottom-up team initiative led by a programmer named Dave Grossman. It was his frustration with the lack of response from his line managers that eventually led to the establishment of a broad coalition of people within the company who were able to bring the idea into practice and establish IBM as a major e-business leader. The message for senior management is as much about leading by creating space and support within the organization, as it is about direct involvement.

The contributions that the leaders make to the performance of their organizations can be significant. Upper echelons theory argues that decisions and choices by top management have an influence on the performance of an organization (positive or negative!) through their assessment of the environment, strategic decision making and support for innovation. The results of different studies vary, but the reviews of research on leadership and performance suggest that the leadership directly influences around 15% of the differences found in the performance of businesses and contributes around an additional 35% through the choice of business strategy [13]. Therefore, both direct and indirect leadership can account for half of the variance in performance observed across organizations. At higher levels of management, the problems to be solved are more likely to be ill-defined, demanding leaders to conceptualize more.

Researchers have identified a long list of characteristics that might have something to do with being effective in certain situations, which typically include the following traits [14]:

- bright, alert and intelligent
- seek responsibility and take charge
- skilful in their task domain
- administratively and socially competent
- energetic, active and resilient
- good communicators

Although this list may describe some characteristics of some leaders in certain situations, measures of these traits yield highly inconsistent relationships with being a good leader [15]. In short, there is no brief and universal list of enduring traits that all good leaders must possess under all conditions.

Studies in different contexts identify not only the technical expertise of leadership influencing group performance but also broader cognitive ability, such as creative problem-solving and information-processing skills. For example, studies of groups facing novel, ill-defined problems confirm that both expertise and cognitive-processing skills are key components of creative leadership and are both associated with effective performance of creative groups [32]. Moreover, this combination of expertise and cognitive capacity is critical for the evaluation of others' ideas. A study of scientists found that they most valued their leader's inputs at the early stages of a new project, when they were formulating their ideas, and defining the problems, and later at the stage where they needed feedback and insights into the implications of their work. Therefore, a key

role of creative leadership in such environments is to provide feedback and evaluation, rather than to simply generate ideas [33]. This evaluative role is critical, but is typically seen as not being conducive to creativity and innovation, where the conventional advice is to suspend judgement to foster idea generation. Also, it suggests that the conventional linear view that evaluation follows idea generation may be wrong. Evaluation by creative leadership may precede idea generation and conceptual combination. **Research Note 5.2** identifies the contribution of diversity in senior management teams.

RESEARCH NOTE 5.2 Top Team Diversity

Upper echelon theory argues idiosyncrasies of top management teams (TMTs) will influence strategic choices. This study examined the influences of TMT diversity on innovation and firm performance. They measure task-oriented TMT diversity by the heterogeneity of educational background, functional background, industrial background, organization background and board tenure.

Empirically, they show that TMT diversity has a strong impact on the strategic choice of firms to focus on innovation fields, and that such focus then drives new product portfolio innovativeness and firm performance. However, they do not find a direct relationship between TMT diversity and new product portfolio innovativeness and firm performance. Instead, TMT diversity translates to relevant firm outcomes via strategic choices related to innovation management.

The model indicates that while TMT diversity directly affects a firm's innovation strategy, it is only indirectly related to new product portfolio innovativeness and firm performance. The results also show that a firm's focus on innovation fields significantly increases the innovativeness of a firm's new product portfolio. The mediating model, which starts with task-related TMT diversity, is able to explain a firm's strategic choice to specify innovation fields by 38%, to establish innovation fields by 52%, a firm's new product portfolio innovativeness by 36%, and a firm's performance by 32%.

Source: Based on Talkea, K., S. Salomob, and K. Rost, How top management team diversity affects innovativeness and performance via the strategic choice to focus on innovation fields. *Research Policy*, 2010. **39**(7), 907–18.

The quality and nature of the leader–member exchange (LMX) has also been found to influence the creativity of subordinates [34]. A study of 238 knowledge workers from 26 project teams in high-technology firms identified not only a number of positive aspects of LMX, including monitoring, clarifying and consulting, but also found that the frequency of negative LMX was as high as the positive, around a third of respondents reporting these [35]. Therefore, LMX can either enhance or undermine subordinates' sense of competence and self-determination. However, the analysis of exchanges perceived to be negative and positive revealed that it was typically how something was done rather than what was done, which suggests that task and relationship behaviours in leadership support and LMX are intimately intertwined, and that negative behaviours can have a disproportionate negative influence. **Research Note 5.3** shows how LMX contributes to individual innovation performance.

RESEARCH NOTE 5.3 Leader–Member Exchange (LMX)

A survey of 166 R&D team members, 43 team leaders, and 10 department managers in five Swedish industrial organizations measured the influence of LMX on innovation performance. The quality and style of team leadership, conceptualized by LMX theory, did not directly influence individual member innovation. Instead, LMX had a mediating effect through the promotion of the personal initiative of team members. High organizational support strengthened this relationship.

Source: Based on Denti, L. and S. Hemlin, Modelling the link between LMX and individual innovation in R&D. *International Journal of Innovation Management*, 2016. **20**(3), 1650038.

Intellectual stimulation by leaders has a stronger effect on the organizational performance under conditions of perceived uncertainty. Intellectual stimulation includes behaviours that increase others' awareness of and interest in problems and develops their propensity and ability to tackle problems in new ways. It is also associated with the commitment to an organization [36]. Stratified system theory (SST) focuses on the cognitive aspects of leadership and argues that conceptual capacity is associated with superior performance in strategic decision making where there is a need to integrate complex information and think abstractly in order to assess the environment. It is also likely to demand a combination of these problem-solving capabilities and social skills, as leaders will depend upon others to identify and implement solutions [37]. This suggests that under conditions of environmental uncertainty, the contribution of leadership is not simply, or even primarily, to inspire or build confidence, but rather to help solve problems and make appropriate strategic decisions.

Rafferty and Griffin propose other sub-dimensions to the concept of transformational leadership that may have a greater influence on creativity and innovation, including articulating a vision and inspirational communication [36]. They define a vision as 'the expression of an idealized picture of the future based around organizational values', and inspirational communication as 'the expression of positive and encouraging messages about the organization, and statements that build motivation and confidence'. They found that the expression of a vision has a negative effect on followers' confidence, unless accompanied with inspirational communication. Mission awareness increases the probability of success of R&D projects, but the effects are stronger at the earlier stages: in the planning and conceptual stage, mission awareness explained two-thirds of the subsequent project success [38]. Leadership clarity is associated with clear team objectives, high levels of participation, commitment to excellence and support for innovation [39].

The creative leader needs to be much more than simply provide a passive, supportive role to encourage creative followers. Perceptual measures of leaders' performance suggest that in a research environment the perception of a leader's technical skill is the single best predictor of research group performance, explaining around half of innovation performance [40]. Studies confirm that the type of project moderates the relationships between leadership style and project success, and show that transformational leadership is a stronger predictor of success in more exploratory and radical projects, rather than in more exploitative development projects [41]. This strongly suggests that certain qualities of transformational leadership may be most appropriate under conditions of high complexity, uncertainty or novelty, whereas a transactional style has a positive effect in an administrative context, but a negative effect in a research context [42]. **Research Note 5.4** reviews the research on the components of innovation leadership and identifies the most significant characteristics needed. In contrast, **Research Note 5.5** discusses how some of the less positive leader characteristics contribute to innovation outcomes.

RESEARCH NOTE 5.4 Leadership for Innovation

A review of twenty-seven empirical studies of the relationships between leadership and innovation investigated when and how leadership influences innovation, that is, the moderating and mediating variables.

Moderating variables, the contingency factors related to *when* leaders may influence innovation, included a supportive culture for innovation and where organizational structures are less formal and centralized. Teams that are heterogeneous and work on complex tasks have the highest capability for innovation, and such teams require supportive and non-controlling leadership that includes them in decision making. Finally, leaders can promote innovative behaviour among employees who have low organizational self-esteem and low self-presentation.

Mediating variables, or *how* leaders stimulate innovation, include the stimulation of innovation on the individual level by influencing creative self-efficacy. Moreover, leaders may also stimulate innovation by introducing norms that encourage team reflection processes, for example, by means of debates, open communication and divergent thinking.

The authors conclude from their review that there are six factors which the leaders should focus on:

- Upper management should establish an innovation policy that is promoted throughout the organization. It is necessary that the organization have its leaders communicate to employees that innovative behaviour will be rewarded.
- When forming teams, some heterogeneity is necessary to promote innovation. However, if the team is too heterogeneous, tensions may arise; when heterogeneity is too low, more directive leadership is required to promote team reflection, for example, by encouraging discussion and disagreement.
- Leaders should promote a team climate of emotional safety, respect and joy through emotional support and shared decision making.
- Individuals and teams have autonomy and space for idea generation and creative problem solving.
- Time limits for idea creation and problem solutions should be set, particularly in the implementation phases.
- Finally, team leaders, who have the expertise, should engage closely in the evaluation of innovative activities.

Source: Based on Denti, L. and S. Hemlin, Leadership and innovation in organizations: A systematic review of factors that mediate or moderate the relationship, *International Journal of Innovation Management*, 2012. **16**(3), 1240007.

RESEARCH NOTE 5.5 Leadership 'Dark' Personality Traits for Innovation

Most studies of innovation leadership focus on the influence of positive personality traits, such as empathy or inspiration, but Strobl et al. examined the effects of less attractive, so-called 'dark' attributes. They studied how traditionally negative leadership traits influenced the innovative behaviour of subordinates, focussing on three factors: narcissism, Machiavellianism and psychopathy, and the interaction and moderation of these traits with professional will and humility.

Their findings were mixed, with the three 'dark' traits having negative and positive influences on innovation. Both narcissism and psychopathy were positively associated with professional will, but professional will had no significant direct influence on subordinate innovation behaviour. Leader humility was found to be the strongest predictor of subordinate innovation behaviour, but neither narcissism nor psychopathy influenced humility. Surprisingly, high levels of narcissism were not necessarily associated with lower humility, and both traits were found to co-exist, suggesting this can be a learned behaviour. The interaction of humility and professional will provided the strongest effect on innovation.

Source: Based on Strobl, A., J. Niedermair, K. Matzler, and T. Mussner (2019), Triggering subordinate innovation behaviour: The influence of leaders' dark personality traits, *International Journal of Innovation Management*, **23**(5), 1950045.

5.2 APPROPRIATE ORGANIZATIONAL STRUCTURE

No matter how well developed the systems are for defining and developing innovative products and processes, they are unlikely to succeed unless the surrounding organizational context is favourable. Achieving this is not easy, and it involves creating the organizational structures and processes that enable technological change to thrive. For example, rigid hierarchical organizations in which there is a little integration between functions and where communication tends to be top-down and one-way in character are unlikely to be very supportive to smooth information flows and cross-functional cooperation recognized as being important factors for success.

Much of the innovation research recognizes that the organizational structures are influenced by the nature of tasks to be performed within the organization. In essence, the less programmed and more uncertain the tasks, the greater the need for flexibility around the structuring of relationships [43]. For example, activities such as production, order processing and

purchasing are characterized by decision making that is subject to little variation, which is why these are more commonly automated. But others require judgement and insight and vary considerably from day to day – and these include those decisions associated with innovation. Activities of this kind are unlikely to lend themselves to routine, structured and formalized relationships, but instead require flexibility and extensive interaction. Several researchers have noted this difference between what have been termed 'programmed' and 'non-programmed' decisions and argued that the greater the level of nonprogrammed decision making, the more the organization needs a loose and flexible structure [44].

Considerable work was done on this problem by researchers Tom Burns and George Stalker, who outlined the characteristics of what they termed 'organic' and 'mechanistic' organizations [45]. The former are essentially environments suited to conditions of rapid change while the latter are more suited to stable conditions – although these represent poles on an ideal spectrum they do provide useful design guidelines about organizations for effective innovation. Other studies include those of Rosabeth Moss-Kanter [46] and Hesselbein et al. [5].

The relevance of Burns and Stalker's model can be seen in an increasing number of cases where organizations have restructured to become less mechanistic. For example, General Electric in the United States underwent a painful but ultimately successful transformation, moving away from a rigid and mechanistic structure to a looser and decentralized form [11]. ABB, the Swiss–Swedish engineering group, developed a particular approach to their global business based on operating as a federation of small businesses, each of which retained much of the organic character of small firms [6]. Other examples of radical changes in structure include the Brazilian white goods firm Semco and the Danish hearing aid company Oticon [47]. But again, we need to be careful – what works under one set of circumstances may diminish in value under others. Related to this work has been another strand that looks at the relationship between different environments and organizational form. Once again, the evidence suggests that the higher the uncertainty and complexity in the environment, the greater the need for flexible structures and processes to deal with it [48]. This partly explains why some fast-growing sectors, for example, electronics or biotechnology, are often associated with more organic organizational forms, whereas mature industries often involve more mechanistic arrangements.

One important study in this connection was that originally carried out by Lawrence and Lorsch looking at product innovation. Their work showed that innovation success in mature industries such as food packaging and growing sectors such as plastics depended on having structures that were sufficiently differentiated (in terms of internal specialist groups) to meet the needs of a diverse marketplace. But success also depended on having the ability to link these specialist groups together effectively to be better able to respond quickly to market signals; they reviewed several variants on coordination mechanisms, some of which were more or less effective than others. Better coordination was associated with more flexible structures capable of rapid response [49].

We can see clear application of this principle in the current efforts to reduce 'time to market' in a range of businesses [50]. Rapid product innovation and improved customer responsiveness are being achieved through extensive organizational change programs involving parallel working, early involvement of different functional specialists, closer market links and user involvement and through the development of team working and other organizational aids to coordination.

Another strand of work, which has had a strong influence on the way we think about organizational design, was that originated by Joan Woodward associated with the nature of the industrial processes being carried out [51]. Her studies suggested that structures varied between industries with a relatively high degree of discretion (such as small batch manufacturing) through to those involving mass production where more hierarchical and heavily structured forms prevailed. Other variables and combinations, which have been studied for their influence

on structure, include size, age, and company strategy [52]. In the 1970s, the extensive debate on organizational structure began to resolve itself into a 'contingency' model. In essence this view argues that there is no single 'best' structure, but that successful organizations tend to be those which develop the most suitable 'fit' between structure and operating contingencies.

The Canadian writer Henry Mintzberg drew much of the work on structure together and proposed a series of archetypes that provide templates for the basic structural configurations into which firms are likely to fall [53]. These categories – and their implications for innovation management – are summarized in **Table 5.2**. **Case Study 5.3** gives an example of the importance of organizational structure and the need to find appropriate models.

Table 5.2 Mintzberg's Structural Archetypes

Organization Archetype	Key Features	Innovation Implications
Simple structure	Centralized organic type – centrally controlled but can respond quickly to changes in the environment. Usually small and often directly controlled by one person. Designed and controlled in the mind of the individual with whom decision-making authority rests. Strengths are speed of response and clarity of purpose. Weaknesses are the vulnerability to individual misjudgement or prejudice and resource limits on growth	Small start-ups in high technology – 'garage businesses' – are often simple structures. Strengths are in energy, enthusiasm and entrepreneurial flair – simple structure innovating firms are often highly creative. Weaknesses are in long-term stability and growth and overdependence on key people who may not always be moving in the right business direction
Machine bureaucracy	Centralized mechanistic organization controlled centrally by systems. A structure designed like a complex machine with people seen as cogs in the machine. Design stresses the function of the whole and specialization of the parts to the point where they are easily and quickly interchangeable. Their success comes from developing effective systems that simplify tasks and routinize behaviour. Strengths of such systems are the ability to handle complex integrated processes like vehicle assembly. Weaknesses are the potential for alienation of individuals and the build-up of rigidities in inflexible systems	Machine bureaucracies depend on specialists for innovation, and this is channelled into the overall design of the system. Examples include fast food (McDonald's), mass production (Ford) and large-scale retailing (Tesco), in each of which there is considerable innovation, but concentrated on specialists and impacting at the system level. Strengths of machine bureaucracies are their stability and their focus of technical skills on designing the systems for complex tasks. Weaknesses are their rigidities and inflexibility in the face of rapid change and the limits on innovation arising from non-specialists
Divisionalized form	Decentralized organic form designed to adapt to local environmental challenges. Typically associated with larger organizations, this model involves specialization into semi-independent units. Examples would be strategic business units or operating divisions. Strengths of such a form are the ability to attack particular niches (regional, market, product, etc.) while drawing on central support. Weaknesses are the internal frictions between divisions and the centre	Innovation here often follows a 'core and periphery' model in which R&D of interest to the generic nature is carried out in central facilities while more applied and specific work is carried out within the divisions. Strengths of this model include the ability to concentrate on developing competency in specific niches and to mobilize and share knowledge gained across the rest of the organization. Weaknesses include the 'centrifugal pull' away from central R&D towards applied local efforts and the friction and competition between divisions that inhibits sharing of knowledge
Professional bureaucracy	Decentralized mechanistic form, with power located with individuals but coordination via standards. This kind of organization is characterized by relatively high levels of professional skills and is typified by specialist teams in consultancies, hospitals or legal firms. Control is largely achieved through consensus on standards ('professionalism'), and individuals possess a high degree of autonomy. Strengths of such an organization include high levels of professional skill and the ability to bring teams together	This kind of structure typifies design and innovation consulting activity within and outside organizations. The formal R&D, IT or engineering groups would be good examples of this, where technical and specialist excellence is valued. Strengths of this model are in technical ability and professional standards. Weaknesses include difficulty of managing individuals with high autonomy and knowledge power

Table 5.2 Mintzberg's Structural Archetypes (*continued*)

Organization Archetype	Key Features	Innovation Implications
Adhocracy	Project type of organization designed to deal with instability and complexity. Adhocracies are not always long-lived, but offer a high degree of flexibility. Team based, not only with high levels of individual skill but also the ability to work together. Internal rules and structure are minimal and subordinate to getting the job done. Strengths of the model are its ability to cope with high levels of uncertainty and its creativity. Weaknesses include the inability to work together effectively due to unresolved conflicts and a lack of control due to lack of formal structures or standards	This is the form most commonly associated with innovative project teams – for example, in new product development or major process change. The NASA project organization was one of the most effective adhocracies in the program to land a man on the moon; significantly the organization changed its structure almost once a year during the 10-year program, to ensure it was able to respond to the changing and uncertain nature of the project. Strengths of adhocracies are the high levels of creativity and flexibility – the 'skunk works' model advocated in the literature. Weaknesses include lack of control and over commitment to the project at the expense of the wider organization
Mission oriented	Emergent model associated with shared common values. This kind of organization is held together by members sharing a common and often altruistic purpose – for example, in voluntary and charity organizations. Strengths are high commitment and the ability of individuals to take initiatives without reference to others because of shared views about the overall goal. Weaknesses include lack of control and formal sanctions	Mission-driven innovation can be highly successful, but requires energy and a clearly articulated sense of purpose. Aspects of total quality management and other value-driven organizational principles are associated with such organizations, with a quest for continuous improvement driven from within rather than in response to external stimulus. Strengths lie in the clear sense of common purpose and the empowerment of individuals to take initiatives in that direction. Weaknesses lie in over-dependence on key visionaries to provide clear purpose and lack of 'buy-in' to the corporate mission

CASE STUDY 5.3 The Emergence of Mass Production

Perhaps, the most significant area in which there is a change of perspective is in the role of human resources. Early models of organization were strongly influenced by the work of Frederick Taylor and his principles of 'scientific management'. These ideas – used extensively in the development of mass production industries such as automobile manufacture – essentially saw the organization problem as one that required the use of analytical methods to arrive at the 'best' way of carrying out the organization's tasks. This led to an essentially mechanistic model in which people were often seen as cogs in a bigger machine, with clearly defined limits to what they should and shouldn't do. The image presented by Charlie Chaplin in *Modern Times* was only slightly exaggerated; in the car industry, the average task cycle for most of the workers was less than two minutes.

The advantages of this system for the mass production of a small range of goods were clear: productivity could increase four-fold or more with the adoption of this approach. For example, Ford's first assembly line, installed in 1913 for flywheel assembly, saw the assembly time fall from 20 man-minutes to five, and by 1914 three lines were being used in the chassis department to reduce the assembly time from around 12 hours to less than two. However, the limitations of the system lay in its ability to change and in the capacity for innovation. Also, by effectively restricting innovation to a few specialists, the potential contributions of the wider workforce were limited in terms of problem-solving, process improvement and product development.

The experience of Ford and others highlights the point that there is no single 'best' kind of organization; the key is to ensure congruence between underlying values and beliefs and the organization that enables innovative routines to flourish. For example, while the 'skunk works' model may be appropriate to US product development organizations, it may be inappropriate in Japan where a more disciplined and structured form is needed. Equally some successful innovative organizations are based on team working whereas others are built around key individuals – in both cases reflecting underlying beliefs about how innovation works in those particular organizations. Similarly, successful innovation can take place within strongly bureaucratic organizations just as well as in those in which there is a much looser structure – providing that there is underlying congruence between these structures and the innovative behavioural routines.

Therefore, a key challenge for managing innovation is one of *fit* – of getting the most appropriate structural form for the particular circumstances. The increasing importance of innovation and the consequent experience of high levels of change across the organization have begun to pose a challenge for organizational structures normally configured for stability. Thus, traditional machine bureaucracies – typified by the car assembly factory – are becoming more hybrid in nature, tending towards what might be termed a 'machine adhocracy' with creativity and flexibility (within limits) being actively encouraged. The case of 'lean production' with its emphasis on team working, participation in problem solving, flexible cells and flattening of hierarchies is a good example, where there is significant loosening of the original model to enhance innovativeness [54].

5.3 KEY INDIVIDUALS

Another important element is the presence of key enabling figures. Such key figures or champions have been associated with many famous innovations – for example, the development of Pilkington's float glass process or Edwin Land and the Polaroid photographic system [55]. **Case Study 5.4** gives another example of the role of key individuals, James Dyson. One clear example of such individual contribution comes, of course, from start-up entrepreneurs who

CASE STUDY 5.4 Bags of Ideas – The Case of James Dyson

In October 2000, the air inside Court 58 of the Royal Courts of Justice in London rang with terms such as 'bagless dust collection', 'cyclone technology', 'triple vortex' and 'dual cyclone' as one of the most bitter of patent battles in recent years was brought to a conclusion. On one side was Hoover, a multinational firm with the eponymous vacuum suction sweeper at the heart of a consumer appliance empire. On the other side, a lone inventor – James Dyson – who had pioneered a new approach to the humble task of house cleaning and then seen his efforts threatened by an apparent imitation by Hoover. Eventually, the court ruled in Dyson's favour.

This represented the culmination of a long and difficult journey that Dyson travelled in bringing his ideas to a wary marketplace. It began in 1979 when Dyson was using, ironically, a Hoover Junior vacuum cleaner to dust the house. He was struck by the inefficiency of a system, which effectively reduced its capability to suck the more it was used since the bag became clogged with dust. He tried various improvements such as a finer mesh filter bag, but the results were not promising. The breakthrough came with the idea of using industrial cyclone technology applied in a new way – to the problem of domestic cleaners.

Dyson was already an inventor with some track record and one of his products was a wheelbarrow that used a ball instead of a front wheel. In order to spray the black dust paint in a powder coating plant, a cyclone was installed – a well-established engineering solution to the problem of dust extraction. Essentially, a mini-tornado is created within a shell and the air in the vortex moves so fast that the particles of dust are forced to the edge where they can be collected while clean air moves to the centre. Dyson began to ask why the principle could not be applied in vacuum cleaners – and soon found out. His early experiments – with the Hoover – were not entirely successful but eventually he applied for a patent in 1980 for a vacuum cleaning appliance using cyclone technology.

It took another four years and 5127 prototypes and even then he could not patent the application of a single cyclone since that would only represent an improvement on an existing and proven technology. He had to develop a dual cyclone system that used the first to separate out large items of domestic refuse – cigarette ends, dog hairs, cornflakes, and so on – and the second to pick up the finer dust particles. But having proved the technology, he found a distinct cold shoulder on the part of the existing vacuum cleaner industry represented by firms such as Hoover, Philips and Electrolux. In typical examples of the 'not-invented-here' effect, they remained committed to the idea of vacuum cleaners using bags and were unhappy with bagless technology. (This is not entirely surprising since suppliers such as Electrolux make a significant income on selling the replacement bags for its vacuum cleaners.)

Eventually, Dyson began the hard work of raising the funds to start his own business – and it gradually paid off. Launched in 1993 – 14 years after the initial idea – Dyson now runs a design-driven business worth around £530 million and has a number of product variants in its vacuum cleaner range; other products under development aim to reexamine domestic

appliances such as washing machines and dishwashers to try and bring similar new ideas into play. The basic dual cyclone cleaner was one of the products identified by the UK Design Council as one of its 'millennium products'.

Perhaps, the greatest accolade though is the fact that the vacuum cleaner giants such as Hoover eventually saw the potential and began developing their own versions. Dyson has once again shown the role of the individual champion in innovation – and that success depends on more than just a good idea. Edison's famous comment, that is, '1% inspiration and 99% perspiration', seems an apt motto here!

Source: Based on Dyson, J., *Against the odds*. 1997, London: Orion.

demonstrate considerable abilities not only around recognizing opportunities but also in configuring networks and finding resources to enable them to take those ideas forward.

There are, in fact, several roles that key figures can play, which have a bearing on the outcome of a project. First, there is the source of critical technical knowledge – often the inventor or team leader responsible for an invention. They will have the breadth of understanding of the technology behind the innovation and the ability to solve the many development problems likely to emerge in the long haul from laboratory or drawing board to full scale. The contribution here is not only of technical knowledge, but it also involves inspiration when technological problems appear insoluble, and motivation and commitment is low.

Influential though such technical champions might be, they may not be able to help an innovation progress unaided through the organization. Not all problems are technical in nature; other issues such as procuring resources or convincing sceptical or hostile critics elsewhere in the organization may need to be dealt with. Here our second key role emerges – that of organizational sponsor.

Typically, this person has power and influence and can influence decision making at higher levels, providing space, time and resource, and in this way, many of the obstacles to an innovation's progress can be removed or the path at least smoothed. Such sponsors do not necessarily need to have a detailed technical knowledge of the innovation (although this is clearly an asset), but they do need to believe in its potential.

Recent exploration of the product development process has highlighted the important role played by the team members, and specifically the project team leader. There are close parallels to the champion model: influential roles range from what Clark and Fujimoto call 'heavyweight' project managers who are deeply involved and have the organizational power to make sure things come together, through to the 'lightweight' project manager whose involvement is more distant. Research on Japanese product development highlights the importance of the *shusha* or team leader; in some companies (such as Honda), the *shusha* is empowered to override even the decisions and views of the chief executive [56]! The important message here is to match the choice of project manager type to the requirements of the situation – and not to use the 'sledgehammer' of a heavyweight manager for a simple task.

Key roles are not just on the technical and project management side: studies of innovation, from the pioneering Project SAPPHO to many replications, have also highlighted the importance of the 'business innovator', someone who could represent and bring to bear the broader market or user perspective [16].

Although innovation history is full of examples where such key individuals – acting alone or in tandem – have had a marked influence on success, we should not forget that there is a downside as well. Negative champions – project assassins – can also be identified, whose influence on the outcome of an innovation project is also significant but in the direction of killing it off. For example, there may be internal political reasons why some parts of an organization do not wish for a particular innovation to progress – and through placing someone on the project team or through lobbying at the board level or in other ways a number of obstacles can be placed in its way. Equally, the technical champion may not always be prepared to let go of their pet idea, even if the

rest of the organization has decided that it is not a sensible direction in which to progress. Their ability to mobilize support and enthusiasm and to surmount obstacles within the organization can sometimes lead to wrong directions being pursued, or the continued chasing up what many in the organization see as a blind alley.

One other type of key individual is that of the 'technological gatekeeper'. Innovation is about information and, as we saw earlier, success is strongly associated with good information flow and communication. Research has shown that such networking is often enabled by key individuals within the organization's informal structure who act as 'gatekeepers' – collecting information from various sources and passing it on to the relevant people who will be best able or most interested to use it. Thomas Allen, working at MIT, made a detailed study of the behaviour of engineers during the large-scale technological developments surrounding the Apollo rocket program. His studies highlighted the importance of informal communications in successful innovation and drew particular attention to gatekeepers – who were not always in formal information management positions but who were well connected in the informal social structure of the organization – as key players in the process [17].

This role is becoming of increasing importance in the field of knowledge management where there is growing recognition that enabling effective sharing and communication of valuable knowledge resources is not simply something that can be accomplished by advanced IT and clever software – there is a strong interpersonal element [57]. Such approaches become particularly important in distributed or virtual teams where 'managing knowledge spaces' and the flows across them are of significance [58]. **Research Note 5.6** identifies different individual roles in promoting innovation within organizations.

RESEARCH NOTE 5.6 Individual Innovator Roles

An empirical study of 190 R&D employees of international firms from four different countries identified personal characteristics associated with different roles people can take over the course of an innovation project. These roles were: expert, power, process, or relationship promoter as well as champion. These personal characteristics exhibit a distinctive pattern of personal characteristics for each role:

Expert promoter is primarily characterized by a high integrated regulation, which is more significant than even intrinsic motivation. A strong affective occupational commitment definitely distinguishes the expert promoter from the other innovator roles. In addition, the expert promoter displays a strong sense of altruism that reflects his role as an information hub. He is also characterized by a high need for autonomy in his daily work, which he needs to come up with alternative innovation concepts.

Power promoter can be primarily characterized by a high need for autonomy, which is in line with the role specification of enforcing his decisions without justifying it to others. Thus, he supports an innovation project with resources and protection against opponents. The influence of affective occupational commitment on the role of the power promoter is strongly negative, which reflects the power promoters' task to strategically lead an entire organization or department without getting lost in technical details.

Process promoter is primarily characterized by high altruism, which reflects his position as a mediator between all involved persons facilitating contacts as well as providing knowledge about the innovation processes to other persons. In addition, he displays a strong integrated regulation that proves him valuing his work as an intermediary. He doesn't have tangible goals like a researcher who can show the complete product at the end of his work, but capitalizes his motivation from helping others and pushing forward the innovation project. This characteristic is also reflected in his higher organizational commitment.

Relationship promoter has a need for autonomy in order to foster his relationships, which he is pursuing due to the satisfaction he takes from interacting with other people and bringing together the necessary parties for successful innovation endeavours. The absence of any organizational and almost all occupational commitment supports the proposition that the relationship promoter puts interpersonal relationships first, feeling more committed to the persons in his network than the organization and the specific occupation he is practicing.

Champion is primarily characterized by a high need for autonomy, which he depends on to comprehensively support the innovation endeavour. His enthusiasm for the innovation is reflected by his strong intrinsic motivation, which cannot be

created externally but rather through the internally felt excitement of working on the innovation. His very high need for independence is also reflected in the negative regression coefficient of external regulation. In line with this is our finding that the champion displays no affective occupational commitment. He is more an intrapreneur and a role model. Although he is striving for autonomy and against too bureaucratic regulation, he also shows a significantly higher organizational commitment and a significantly higher altruism in supporting others.

Source: Mansfeld, M.N., K. Hölzle, and H.G. Gemünden, Personal characteristics of innovators. *International Journal of Innovation Management*, **14**(6), 1129–47. © 2010 Imperial College Press.

5.4 HIGH INVOLVEMENT IN INNOVATION

Innovation is often seen as the province of specialists in R&D, marketing, design or IT, but the underlying creative skills and problem-solving abilities are possessed by almost everyone. If mechanisms can be found to focus such abilities on a regular basis across the entire company, the resulting innovative potential is significant. Although each individual may only be able to develop limited, incremental innovations, the sum of these efforts can have far-reaching impacts.

A good illustration of this is the 'quality miracle', which was worked by the Japanese manufacturing industry in the postwar years, and which owed much to what they term *kaizen* – continuous improvement. Firms such as Toyota and Matsushita receive millions of suggestions for improvements every year from their employees – and the vast majority of these are implemented [59]. Individual case studies confirm this pattern in a number of countries. As one UK manager put it, 'Our operating costs are reducing year on year due to improved efficiencies. We have seen a 35% reduction in costs within two and a half years by improving quality. There are an average of 21 ideas per employee today compared to none in 1990. Our people have accomplished this'. **Case Study 5.5** provides another example of high-involvement innovation.

CASE STUDY 5.5 High Involvement in Innovation

At first sight, XYZ systems does not appear to be anyone's idea of a 'world-class' manufacturing outfit. Set in a small town in the Midlands with a predominantly agricultural industry, XYZ employs around 30 people producing gauges and other measuring devices for the forecourts of filling stations. Its products are used to monitor and measure levels and other parameters in the big fuel tanks underneath the stations, and on the tankers which deliver to them. Despite its small size (although it is part of a larger but decentralized group), XYZ has managed to command around 80% of the European market. Its processes are competitive against even large manufacturers; its delivery and service level the envy of the industry. It has a fistful of awards for its quality and yet manages to do this across a wide range of products some dating back 30 years, which still need service and repair. XYZ uses technologies from complex electronics and remote sensing right down to basics – they still make a wooden measuring stick, for example.

Its success can be gauged not only from profitability figures but also from the many awards received, and continue to receive, as one of the best factories in the United Kingdom.

Yet, if you go through the doors of XYZ, you would have to look hard for the physical evidence of how the company achieved this enviable position. This is not a highly automated business – it would not be appropriate. Nor is it laid out in modern facilities; instead they have clearly made much of their existing environment and organized it and themselves to the best effect.

Where does the difference lie? Fundamentally in the approach taken with the workforce. This is an organization where training matters – investment is well above the average and everyone receives a significant training input, not only in their own particular skills area but also across a wide range of tasks and skills. One consequence of this is that the workforce is very flexible; having been trained to carry out most of the operations, and they can quickly move to where they are most needed. The payment system encourages such cooperation, with its simple structure and emphasis on payment for skill, quality and team working. The strategic targets are clear and simple and are discussed with everyone before being broken down into a series of small manageable improvement projects

in a process of policy deployment. All around the works there are copies of the 'bowling chart', which sets out simply – like a tenpin bowling score sheet – the tasks to be worked on as improvement projects and how they could contribute to the overall strategic aims of the business. And if they achieve or exceed those strategic targets – then everyone gains thorough a profit sharing and employee ownership scheme.

Being a small firm, there is little in the way of hierarchy, but the sense of team working is heightened by active leadership and encouragement to discuss and explore issues together – and it doesn't hurt that the director of operations practises a form of MBWA – management by walking about!

Perhaps, the real secret lies in the way in which people feel enabled to find and solve problems, often experimenting with different solutions and frequently failing – but at least learning and sharing that information for others to build on. Walking round the factory, it is clear that this place isn't standing still – while a major investment in new machines is not an everyday thing, little improvement projects – *kaizens* as they call them – are everywhere. More significant is the fact that the director of operations is often surprised by what he finds people doing – he has not got a detailed idea of which projects people are working on and what they are doing. But if you ask him if this worries him the answer is clear – and challenging. 'No, it doesn't bother me that I don't know in detail what's going on. They all know the strategy, and they all have a clear idea of what we have to do (via the "bowling charts"). They've all been trained, and they know how to run improvement projects and they work as a team. And I trust them . . .'

Although high-involvement schemes of this kind received considerable publicity in the late twentieth century, associated with total quality management and lean production, they are not a new concept. For example, Denny's Shipyard in Dumbarton, Scotland, had a system that asked workers (and rewarded them for) 'any change by which work is rendered either superior in quality or more economical in cost' – back in 1871. John Patterson, founder of the National Cash Register Company in the USA, started a suggestion and reward scheme aimed at harnessing what he called 'the hundred-headed brain' around 1894.

Since much of such employees' involvement in innovation focuses on incremental changes, it is tempting to see its effects as marginal. Studies show, however, that when taken over an extended period, it is a significant factor in the strategic development of the organization [60].

Underpinning such continuous incremental innovation are higher levels of participation in innovation. For example:

- In the field of quality management, it became clear that major advantages could accrue from better and more consistent quality in products and services. Crosby's work on quality costs suggested the scale of the potential savings (typically 20–40% of total sales revenue), and the experience of many Japanese manufacturers during the postwar period provide convincing arguments in favour of this approach [61].
- The concept of 'lean thinking' has diffused widely during the past 20 years and is now applied in manufacturing and services as diverse as chemicals production, hospital management and supermarket retailing [62]. It originally emerged from detailed studies of assembly plants in the car industry, which highlighted significant differences between the best and the average plants along a range of dimensions, including productivity, quality and time. Efforts to identify the source of these significant advantages revealed that the major differences lay not in higher levels of capital investment or more modern equipment, but in the ways in which production was organized and managed. The authors of the study concluded:
- . . . our findings were eye-opening. The Japanese plants require one-half the effort of the American luxury-car plants, half the effort of the best European plant, a quarter of the effort of the average European plant and one-sixth the effort of the worst European luxury car producer. At the same time, the Japanese plant greatly exceeds the quality level of all plants except one in Europe – and this European plant required four times the effort of the Japanese plant to assemble a comparable product . . .
- Central to this alternative model was an emphasis on team working and participation in innovation.

- The principles underlying 'lean thinking' had originated in experiences with what were loosely called 'Japanese manufacturing techniques' [63]. This bundle of approaches (which included umbrella ideas like 'just-in-time' and specific techniques like poke yoke) were credited with having helped Japanese manufacturers gain significant competitive edge in sectors as diverse as electronics, motor vehicles and steel making [64]. Underpinning these techniques was a philosophy that stressed high levels of employee involvement in the innovation process, particularly through sustained incremental problem solving – *kaizen*.

The transferability of such ideas between locations and into different application areas has also been extensively researched. It is clear from these studies that the principles of 'lean' manufacturing can be extended into supply and distribution chains into product development and R&D and into service activities and operations [65]. Nor is there any particular barrier in terms of national culture: high-involvement approaches to innovation have been successfully transplanted to a number of different locations. **Case Study 5.6** charts the adoption of high-involvement innovation in different organizations.

CASE STUDY 5.6 Diffusion of High-involvement Innovation

How far has this approach diffused? Why do organizations choose to develop it? What benefits do they receive? And what barriers prevent them moving further along the road towards high involvement?

Questions like these provided the motivation for a large survey carried out in a number of European countries and replicated in Australia during the late 1990s. It was one of the fruits of a cooperative research network, which was established to share experiences and diffuse good practice in the area of high-involvement innovation. The survey involved over 1000 organizations in a total of seven countries and provides a useful map of the take-up and experience with high-involvement innovation. (The survey only covered manufacturing although follow-up work is looking at services as well.) Some of the key findings were as follows:

- Overall around 80% of organizations were aware of the concept and its relevance, but its actual implementation, particularly in more developed forms, involved around half of the firms.
- The average number of years that the firms had been working with high-involvement innovation on a systematic basis was 3.8, supporting the view that this is not a 'quick fix' but something to be undertaken as a major strategic commitment. Indeed, those firms that were classified as 'CI innovators' – operating well-developed high-involvement systems – had been working on this development for an average of nearly seven years.
- High involvement is still something of a misnomer for many firms, with the bulk of efforts concentrated on shop-floor activities as opposed to other parts of the organization. There is a clear link between the level of maturity and development of high involvement here – the 'CI innovators' group was much more likely to have spread the practices across the organization as a whole.
- Motives for making the journey down this road vary widely but cluster particularly around the themes of quality improvement, cost reduction and productivity improvement.
- In terms of the outcome of high-involvement innovation, there is a clear evidence of significant activity, with an average per capita rate of suggestions of 43 per year of which around half were actually implemented. This is a difficult figure since it reflects differences in measurement and definition but it does support the view that there is significant potential in workforces across a wide geographical range – it is not simply a Japanese phenomenon. Firms in the sample also reported indirect benefits arising from this including improved morale and motivation and a more positive attitude towards change.
- What these suggestions can do to improve the performance is, of course, the critical question and the evidence from the survey suggests that key strategic targets were being impacted upon.
- On average, improvements of around 15% were reported in process areas such as quality, delivery, manufacturing lead time, and overall productivity, and there was also an average of 8% improvement in the area of product cost. Of significance is the correlation between performance improvements reported and the maturity of the firm in terms of high-involvement behaviour. The 'CI innovators' – those which had made most progress towards establishing high involvement as 'the way we do things around here' were also the group with the largest reported gains – averaging between 19% and 21% in the above process areas.

Performance Areas (% Change)	UK	SE	N	NL	FI	DK	Australia	Average Across Sample (*n* = 754 Responses)
Productivity improvement	19	15	20	14	15	12	16	15
Quality improvement	17	14	17	9	15	15	19	16
Delivery performance improvement	22	12	18	16	18	13	15	16
Lead time reduction	25	16	24	19	14	5	12	15
Product cost reduction	9	9	15	10	8	5	7	8

- Almost all high-involvement innovation activities take place on an 'inline' basis – that is, as part of the normal working pattern rather than as a voluntary 'offline' activity. Most of this activity takes place in some form of group work although around a third of the activity is on an individual basis.
- To support this, there is a widespread use of tools and techniques, particularly those linked to problem finding and solving, that around 80% of the sample reported using. Beyond this, there is an extensive use of tools for quality management, process mapping and idea generation, although more specialized techniques such as statistical process control or quality function deployment are less widespread. Perhaps, more significant is the fact that even with the case of general problem-finding and problem-solving tools, only one-third of the staff had been formally trained in their use.

Source: Based on Boer et al., *CI changes: From suggestion box to the learning*. 1999, Aldershot: Ashgate.

Specific examples include the Siemens Standard Drives (SSD) suggestion scheme that generates ideas that save the company about £750,000 a year. The electrical engineering giant receives about 4000 ideas per year, of which approximately 75% are implemented. Pharmaceutical company Pfizer's scheme generates savings of around £250,000, and the Chessington World of Adventures' ideas scheme saves around £50,000. Much depends on firm size, of course – for example, the BMW Mini plant managed savings close to £10m at its plant in Cowley which they attribute to employee involvement.

Similar data can be found in other countries – for example, a study conducted by the Employee Involvement Association in the United States suggested that companies can expect to save close to £200 annually per employee by implementing a suggestion system. Ideas America report around 6000 schemes operating. In Germany, specific company savings reported by Zentrums Ideen management include (2010 figures) Deutsche Post DHL €220m, Siemens €189m and Volkswagen €94m. Importantly, the benefits are not confined to large firms – among SMEs were Takata Petri €6.3m, Herbier Antriebstechnik €3.1m and Mitsubishi Polyester Film €1.8m. In a survey of 164 German and Austrian firms representing 1.5m workers, they found around 20% (326,000) workers involved and contributing just under 1 million ideas. Of these, two-thirds were implemented producing savings of €1.086bn. The investment needed to generate these was of the order of €109m giving an impressive rate of return. **Table 5.3** summarizes these achievements.

For example, survey data from across Europe suggest that the majority of larger organizations have begun its implementation. Another major survey involving over 1000 organizations in a total of seven countries provides a useful map of the take-up and experience with high-involvement innovation in manufacturing. Overall, around 80% of organizations were aware of the concept and its relevance, but its actual implementation, particularly in more developed forms involved, around half of the firms [66]. The average number of years that the firms had been working with high-involvement innovation on a systematic basis was 3.8, supporting the view that this is not a 'quick fix' but something to be undertaken as a major strategic commitment. Indeed, those firms that were classified as 'CI innovators' – operating well-developed high-involvement systems – had been working on this development for an average of nearly seven years. **Research Note 5.7** identifies four enabling factors to support employee-led innovation.

Table 5.3 High-involvement Innovation in German and Austrian Companies

Key Characteristics	
Ideas/100 workers	62
Participation rate	21%
Implementation rate (of ideas)	69%
Savings per worker (€)	622
Investment per worker (€)	69
Investment to realize each implemented idea (€)	175
Savings per implemented idea (€)	1540
Ideas per worker per year	Average of 6, as high as 21

Source: Adapted from Zentrums Ideenmanagement, 2011.

RESEARCH NOTE 5.7 Employee-led Innovation

In a study of a wide range of UK organizations in which employees at all levels were regularly contributing creative ideas Julian Birkinshaw and Lisa Duke identified four key sets of enabling factors [28]:

- Time-Out – to give employees the space in their working day for creative thought
- Expansive Roles – to help employees move beyond the confines of their assigned job
- Competitions – to stimulate action and to get the creative juices flowing
- Open Forums – to give employees a sense of direction and to foster collaboration.

Source: Birkinshaw, J. and L. Duke, Employee-led innovation. *Business Strategy Review*, 2013. **24**(2), 46–50.

Growing recognition of the potential has moved the management question away from whether or not to try out employee involvement to one of 'how to make it happen?' The difficulty is less about getting started than about keeping it going long enough to make a real difference. Many organizations have experience in starting the process – getting an initial surge of ideas and enthusiasm during a 'honeymoon' period – and then seeing it gradually ebb away until there is little or no HII activity. A quick 'sheep dip' of training plus a bit of enthusiastic arm waving from the managing director isn't likely to do much in the way of fundamentally changing 'the way we do things around here' – the underlying culture – of the organization.

5.5 A ROADMAP FOR THE JOURNEY

Research on implementing HII suggests that there are a number of stages in this journey, progressing in terms of the development of systems and capability to involve people and also in terms of the bottom-line benefits. Each of these takes time to move through, and there is no guarantee that organizations will progress to the next level. Moving on means having to find ways of overcoming the particular obstacles associated with different stages, as shown in **Figure 5.1**.

The first stage – level 1 – is what we might call 'unconscious HII'. There is little, if any, HII activity going on, and when it does happen it is essentially random in nature and occasional in frequency. People do help to solve problems from time to time, but there is no formal attempt to

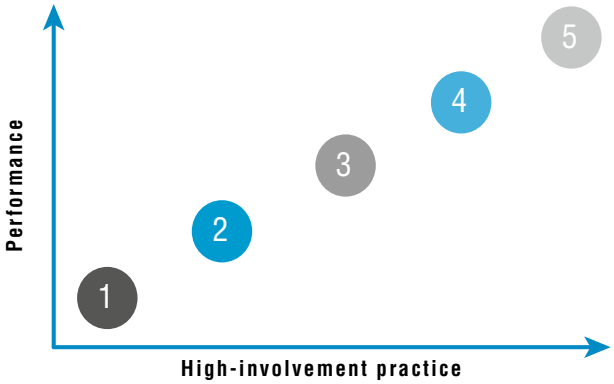

FIGURE 5.1 The five-stage high-involvement innovation model

mobilize or build on this activity. Not surprisingly, there is less impact associated with this kind of change.

Level 2 represents an organization's first serious attempts to mobilize HII. It involves setting up a formal process for finding and solving problems in a structured and systematic way – and training and encouraging people to use it. Supporting this will be some form of reward/recognition arrangement to motivate and encourage continued participation. Ideas will be managed through some form of system for processing and progressing as many as possible and handling those that cannot be implemented. Underpinning the whole setup will be an infrastructure of appropriate mechanisms (teams, task forces or whatever), facilitators and some form of steering group to enable HII to take place and to monitor and adjust its operation over time. None of this can happen without top management support and commitment of resources to back that up. In order to maintain progress, there is a need to move to the next level of HII – concerned with strategic focus and systematic improvement.

Level 3 involves coupling the HII habit to the strategic goals of the organization such that all the various local-level improvement activities of teams and individuals can be aligned. Two key behaviours need to be added to the basic suite – those of strategy deployment and of monitoring and measuring. Strategy (or policy) deployment involves communicating the overall strategy of the organization and breaking it down into manageable objectives towards which HII activities in different areas can be targeted. Linked to this is the need to learn to monitor and measure the performance of a process and use this to drive the continuous improvement cycle. Level 3 activity represents the point at which HII makes a significant impact on the bottom line – for example, in reducing throughput times, scrap rates, excess inventory and so on. The majority of 'success stories' in HII can be found at this level – but it is not the end of the journey.

One of the limits of level 3 HII is that the direction of activity is still largely set by management and within prescribed limits. Activities may take place at different levels, from individuals through small groups to cross-functional teams, but they are still largely responsive and steered externally. The move to level 4 introduces a new element – that of 'empowerment' of individuals and groups to experiment and innovate on their own initiative.

Level 5 is a notional end point for the journey – a condition where everyone is fully involved in experimenting and improving things, in sharing knowledge and in creating an active learning organization. **Table 5.4** illustrates the key elements in each stage. In the end, the task is one of building a shared set of values that bind people in the organization together and enable them to participate in its development. **Case Study 5.7** provides an example of an organization developing through these different stages.

Table 5.4 Stages in the Evolution of HII Capability

Stage of Development	Typical Characteristics
1. 'Natural'/background HII	Problem-solving random
	No formal efforts or structure
	Occasional bursts punctuated by inactivity and nonparticipation
	Dominant mode of problem solving is by specialists
	Short-term benefits
	No strategic impact
2. Structured HII	Formal attempts to create and sustain HII
	Use of a formal problem-solving process
	Use of participation
	Training in basic HII tools
	Structured idea management system
	Recognition system
	Often parallel system to operations
3. Goal-oriented HII	All of the above, plus formal deployment of strategic goals
	Monitoring and measurement of HII against these goals
	Inline system
4. Proactive/empowered HII	All of the above, plus responsibility for mechanisms, timing and so on, devolved to problem-solving unit
	Internally directed rather than externally directed HII
	High levels of experimentation
5. Full HII capability – the learning organization	HII as the dominant way of life
	Automatic capture and sharing of learning
	Everyone actively involved in innovation process
	Incremental and radical innovation

CASE STUDY 5.7 Creating High-involvement Innovation Conditions

Dutton Engineering does not, at first sight, seem to be a likely candidate for world class. A small firm with 28 employees, specializing in steel cases for electronic equipment, it ought to be among the ranks of hand-to-mouth metal-bashers of the kind you can find all round the world. Yet Dutton has been doubling its turnover, sales per employee have doubled in an eight-year period, rejects are down from 10% to 0.7%, and over 99% of deliveries are made within 24 hours – compared to only 60% being achieved within one week a few years ago. This transformation has not come overnight – the process started in 1989 – but it has clearly been successful and Dutton is now held up as an example to others of how typical small engineering firms can change.

At the heart of the transformation that Ken Lewis, the original founder and architect of the change, has set in train is a commitment to improvements through people. The workforce is organized into four teams who manage themselves, setting work schedules, dealing with their own customers, costing their own orders and even setting their pay! The company has moved from traditional weekly pay to a system of 'annualized hours', where they contract to work for 1770 hours in year – and tailor this flexibly to the needs of the business with its peaks and troughs of activity. There is a high level of contribution to problem solving, encouraged by a simple reward system that pays £5–15 for bright ideas, and by a bonus scheme whereby 20% of profits are shared.

Source: Based on Lewis, K. and S. Lytton, *How to transform your company*. 2000, London: Management Books.

5.6 EFFECTIVE TEAM WORKING

'*It takes five years to develop a new car in this country. Heck, we won World War 2 in four years . . .*' In the late 1980s, Ross Perot's critical comment on the state of the United States car industry captured some of the frustration with existing ways of designing and building cars. In the years that followed, significant strides were made in reducing the development cycle, with Ford and Chrysler succeeding in dramatically reducing time and improving quality. Much of the advantage was gained through extensive team working; as Lew Varaldi, project manager of Ford's Team Taurus project put it, '*. . . it's amazing the dedication and commitment you get from people . . . we will never go back to the old ways because we know so much about what they can bring to the party . . .*' [67].

Experiments indicate that teams have more to offer than individuals in terms of both fluency of idea generation and in flexibility of solutions developed. Focusing this potential on innovation tasks is the prime driver for the trend towards high levels of team working – in project teams, in cross-functional and inter-organizational problem-solving groups and in cells and work groups where the focus is on incremental, adaptive innovation.

Many use the terms 'group' and 'team' interchangeably. In general, the word 'group' refers to an assemblage of people who may just be near to each other. Groups can be a number of people who are regarded as some sort of entity or are classed together on account of any sort of similarity. In contrast, a team means a combination of individuals who come together or who have been brought together for a common purpose or goal in their organization. A team is a group that must collaborate in their professional work in some enterprise or on some assignment and share accountability or responsibility for obtaining results. There are a variety of ways to differentiate working groups from teams.

Considerable work has been done on the characteristics of high-performance project teams for innovative tasks, and the main findings are that such teams rarely happen by accident [68]. Holti, Neumann, and Standing provide a useful summary of the key factors involved in developing team working [69]. Although there is considerable current emphasis on team working, we should remember that teams are not always the answer. In particular, there are dangers in putting nominal teams together where unresolved conflicts, personality clashes, lack of effective group processes, and other factors can diminish their effectiveness. Tranfield et al. look at the issue of team working in different contexts and highlight the importance of selecting and building the appropriate team for the task and the context [70].

Teams are increasingly being used as a mechanism for bridging boundaries within the organization – and indeed, in dealing with inter-organizational issues. Cross-functional teams can bring together the different knowledge sets needed for tasks such as product development or process improvement – but they also represent a forum where often deep-rooted differences in perspectives can be resolved [71]. But, as we indicated above, building such teams is a major strategic task – they will not happen by accident, and they will require additional efforts to ensure that the implicit conflicts of values and beliefs are resolved effectively.

Self-managed teams working within a defined area of autonomy can be very effective, for example, Honeywell's defence avionics factory reported a dramatic improvement in on-time delivery – from below 40% in the 1980s to 99% in 1996 – to the implementation of self-managing teams [72]. In the Netherlands, one of the most successful bus companies is Vancom Zuid-Limburg, used self-managing teams to both reduce costs and improve customer satisfaction ratings, and one manager now supervises over 40 drivers, compared to the industry average ratio of 1:8. Drivers are also encouraged to participate in problem finding and problem solving in areas such as maintenance, customer service and planning [73]. Key elements in effective high-performance team working include:

- clearly defined tasks and objectives
- effective team leadership

- good balance of team roles and match to individual behavioural style
- effective conflict resolution mechanisms within the group
- continuing liaison with external organization.

Teams typically go through four stages of development, popularly known as 'forming, storming, norming, and performing' [74]. That is, they are put together and then go through a phase of resolving internal differences and conflicts around leadership, objectives and so on. Emerging from this process is a commitment to shared values and norms governing the way the team will work, and it is only after this stage that teams can move on to effective performance of their task.

Central to team performance is the composition of the team itself, with good matching between the role requirements of the group and the behavioural preferences of the individuals involved. Belbin's work has been influential here in providing an approach to team role matching, as discussed in **Research Note 5.8**. He classifies people into a number of preferred role types – for example, 'the plant' (someone who is a source of new ideas), 'the resource investigator', 'the shaper', and the 'completer/finisher'. Research has shown that the most effective teams are those with diversity in background, ability and behavioural style. In one noted experiment, highly talented but similar people in 'Apollo' teams consistently performed less than the mixed, average groups [20].

RESEARCH NOTE 5.8 Team Roles According to Belbin

Belbin is a popular framework for developing teams. It proposes nine key team roles and argues that most individuals are only comfortable in two or three different roles:

- Coordinator – identifies talent and delegates effectively, but can be perceived as free loading and manipulative.
- Team worker – cooperative, but can be indecisive.
- Resource investigator – develops contacts, but can be too optimistic.
- Plant – creative problem solver, but can lack detail.
- Specialist – deep knowledge and experience, but can be too narrow.
- Shaper – highly driven, but can be insensitive and become aggressive.
- Implementer – practical and pragmatic, but can be inflexible.
- Monitor evaluator – strategic focus, but can be overly critical.
- Completer finisher – polishes and perfects outcomes, but prone to pessimism.

Source: Belbin, R.M., *Team roles at work*. 2nd ed., 2010.

With increased emphasis on cross-boundary and dispersed team activity, a series of new challenges are emerging. In the extreme case, a product development team might begin work in London, pass on to their US counterparts later in the day who in turn pass on to their far Eastern colleagues – effectively allowing a 24-hour nonstop development activity. This makes for higher productivity potential – but only if the issues around managing dispersed and virtual teams can be resolved. Similarly, the concept of sharing knowledge across boundaries depends on enabling structures and mechanisms [75].

Many people who have attempted to use groups for problem solving find out that using groups is not always easy, pleasurable or effective. **Table 5.5** summarizes some of the positive and negative aspects of using groups for innovation. **Research Note 5.9** identifies the most effective teamwork practices for radical innovation.

Table 5.5 Potential Assets and Liabilities of Using Teams

Potential Assets of Using a Team	Potential Liabilities of Using a Team
Greater availability of knowledge and information	Social pressure towards uniform thought limits contributions and increases conformity
More opportunities for cross-fertilization; increasing the likelihood of building and improving upon ideas of others	Group think: groups converge on options, which seem to have greatest agreement, regardless of quality
Wider range of experiences and perspectives upon which to draw	Dominant individuals influence and exhibit an unequal amount of impact upon outcomes
Participation and involvement in problem solving increases understanding, acceptance, commitment and ownership of outcomes	Individuals are less accountable in groups allowing groups to make riskier decisions
More opportunities for group development; increasing cohesion, communication and companionship	Conflicting individual biases may cause unproductive levels of competition; leading to 'winners' and 'losers'

Source: S. Isaksen and J. Tidd, *Meeting the innovation challenge*. 2006, Chichester: John Wiley & Sons, Ltd.

RESEARCH NOTE 5.9 Teamwork for Radical Innovation

A survey of 1207 firms aimed to identify how different organizational practices contributed to innovation performance. It examined the influences of 12 common practices, including cross-functional teams, team incentives, quality circles and ISO 9000 quality standards, on successful new product development. The study found significant differences in the effects of different practices, depending upon the novelty of the development project. For instance, both quality circles and ISO 9000 were associated with the successful development of incremental new products, but both practices had a significant negative influence on the success of radical new products. This is consistent with other research on new product development, which we will discuss further in Chapter 9. However, the use of teams and team incentives were found to have a positive effect on both incremental and radical new product development. This suggests that great care needs to be taken when applying so-called universal best practices, as their effects often depend on the nature of the project.

Source: Based on Prester, J. and M.G. Bozac, Are innovative organizational concepts enough for fostering innovation? *International Journal of Innovation Management*, 2012. **16**(1), 1–23.

Our own work on high-performance teams suggests, consistent with previous research, a number of characteristics that promote effective teamwork [76]:

- *A clear, common and elevating goal.* Having a clear and elevating goal means having understanding, mutual agreement and identification with respect to the primary task a group faces. Active teamwork towards common goals happens when members of a group share a common vision of the desired future state. Creative teams have clear and common goals. The goals were not only clear and compelling but also open and challenging. Less creative teams have conflicting agendas, different missions and no agreement on the end result. The tasks for the least creative teams were tightly constrained, considered routine and were overly structured.
- *Results-driven structure.* Individuals within high-performing teams feel productive when their efforts take place with a minimum of grief. Open communication, clear coordination of tasks, clear roles and accountabilities, monitoring performance, providing feedback, fact-based judgement, efficiency and strong impartial management combine to create a results-driven structure.

- *Competent team members.* Competent teams are composed of capable and conscientious members. Members must possess essential skills and abilities, a strong desire to contribute, be capable of collaborating effectively and have a sense of responsible idealism. They must have knowledge in the domain surrounding the task (or some other domain that may be relevant) as well as with the process of working together. Creative teams recognize the diverse strengths and talents and use them accordingly.
- *Unified commitment.* Having a shared commitment relates to the way the individual members of the group respond. Effective teams have an organizational unity: members display mutual support, dedication and faithfulness to the shared purpose and vision, and a productive degree of self-sacrifice to reach organizational goals. Team members enjoy contributing and celebrating their accomplishments.
- *Collaborative climate.* Productive teamwork does not just happen. It requires a climate that supports cooperation and collaboration. This kind of situation is characterized by mutual trust, in which everyone feels comfortable discussing ideas, offering suggestions, and willing to consider multiple approaches.
- *Standards of excellence.* Effective teams establish clear standards of excellence. They embrace individual commitment, motivation, self-esteem, individual performance and constant improvement. Members of teams develop a clear and explicit understanding of the norms upon which they will rely.
- *External support and recognition.* Team members need resources, rewards, recognition, popularity and social success. Being liked and admired as individuals and respected for belonging and contributing to a team is often helpful in maintaining the high level of personal energy required for sustained performance. With the increasing use of cross-functional and inter-departmental teams within larger complex organizations, teams must be able to obtain approval and encouragement.
- *Principled leadership.* Leadership is important for teamwork. Whether it is a formally appointed leader or leadership of the emergent kind, the people who exert influence and encourage the accomplishment of important things usually follow some basic principles. Leaders provide clear guidance, support and encouragement, and keep everyone working together and moving forward. Leaders also work to obtain support and resources from within and outside the group.
- *Appropriate use of the team.* Teamwork is encouraged when the tasks and situations really call for that kind of activity. Sometimes the team itself must set clear boundaries on when and why it should be deployed. One of the easiest ways to destroy a productive team is to overuse it or use it when it is not appropriate to do so.
- *Participation in decision making.* One of the best ways to encourage teamwork is to engage the members of the team in the process of identifying the challenges and opportunities for improvement, generating ideas and transforming ideas into action. Participation in the process of problem solving and decision making actually builds teamwork and improves the likelihood of acceptance and implementation.
- *Team spirit.* Effective teams know-how to have a good time, release tension and relax their need for control. The focus at times is on developing friendship, engaging in tasks for mutual pleasure and recreation. This internal team climate extends beyond the need for a collaborative climate. Creative teams have the ability to work together without major conflicts in personalities. There is a high degree of respect for the contributions of others. Less creative teams are characterized by animosity, jealousy and political posturing.

- *Embracing appropriate change.* Teams often face the challenges of organizing and defining tasks. In order for teams to remain productive, they must learn how to make necessary changes to procedures. When there is a fundamental change in how the team must operate, different values and preferences may need to be accommodated.

There are also many challenges to the effective management of teams. We have all seen teams that have 'gone wrong'. **Research Note 5.10** shows how the dominance of a single cognitive approach to team innovation can be counterproductive. As a team develops, there are certain aspects or guidelines that might be helpful to keep them on track. Hackman has identified a number of themes relevant to those who design, lead and facilitate teams. In examining a variety of organizational work groups, he found some seemingly small factors that if overlooked in the management of teams will have large implications that tend to destroy the capability of a team to function. These small and often hidden tripwires to major problems include:

- **Group versus team** One of the mistakes that is often made when managing teams is to call the group a team, but to actually treat it as nothing more than a loose collection of individuals. This is similar to making it a team 'because I said so'. It is important to be very clear about the underlying goal and reward structure. People are often asked to perform tasks as a team,

RESEARCH NOTE 5.10 Team-Member Cognitive Styles

This study examined the influences of team members' different cognitive styles on innovation project performance, specifically proportions of team composition with members with three cognitive styles: creativity, conformity to rule and group, and attention to detail. Using data on 20 R&D teams (331 participants) and 21 manufacturing teams (137 participants), they found that including creative and conformist members on a team enhanced team radical innovation, whereas including attentive-to-detail members hindered it. Creative members enhanced task conflict and hindered team adherence to standards. In contrast, conformists reduced task conflict and enhanced team adherence to standards. However, although creative members enhanced task conflict and conformist members hindered it, task conflict did not explain radical innovation.

They found that the ideal team composition for radical innovation was 22% creative, 16% conformists and 11% attention-to-detail members. In most of the innovative teams, the levels of potency and team adherence to standards were lower than the average, but the level of task conflict was average. Team potency mediated the effect of the cognitive styles on innovation. Team potency refers to team members' generalized belief about the capabilities of their team for achieving tasks. Potency has a nonlinear relationship with team innovation. Low levels indicate a lack of confidence in the team's capabilities, whereas high levels are associated with the project progress but team satisfaction with mediocre outcomes. Teams dominated by creative members had higher task conflict and lower potency and adherence to standards, but did not have higher than average levels of innovation. Teams dominated by attentive-to-detail members and conformists had the highest levels of potency, but the lowest innovative performance.

Team members who only focus on details and adhere to stringent standards may hold the team back from taking risks and from improvising to innovate. As Douglas Bowman, a former visual designer at Google, explained:

'When a company is filled with engineers, it turns to engineering to solve problems. Reduce each decision to a simple logic problem. Remove all subjectivity and just look at the data . . . . [For example] a team at Google couldn't decide between two blues, so they're testing 41 shades between each blue to see which one performs better. I had a recent debate over whether a border should be 3, 4 or 5 pixels wide, and was asked to prove my case . . . . That data eventually becomes a crutch for every decision, paralyzing the company and preventing it from making any daring design decisions'. (Bowman, 2009, Why designer Doug Bowman quit Google. **http://stopdesign.com/archive/2009/03/20/goodbye-google.html***)*

Source: Based on Miron-Spektor, E., M. Erez, and E. Naveh, The effect of conformist and attention-to-detail members on team innovation. *Academy of Management Journal*, 2011. **54**(4), 740–60.

but then have all evaluation of performance based on an individual level. This situation sends conflicting messages and may negatively affect the team performance.

- **Ends versus means** Managing the source of authority for groups is a delicate balance. Just how much authority can you assign to the team to work out its own issues and challenges? Those who convene teams often 'over manage' them by specifying the results as well as how the team should obtain them. The end, direction or outer limit constraints ought to be specified, but the means to get there ought to be within the authority and responsibility of the group.
- **Structured freedom** It is a major mistake to assemble a group of people and merely tell them in general and unclear terms what needs to be accomplished and then let them work out their own details. At times, the belief is that if teams are to be creative, they ought not be given any structure. It turns out that most groups would find a little structure quite enabling, if it were the right kind. Teams generally need a well-defined task. They need to be composed of an appropriately small number to be manageable but large enough to be diverse. They need clear limits as to the team's authority and responsibility, and they need sufficient freedom to take initiative and make good use of their diversity. It's about striking the right kind of balance between structure, authority and boundaries – and freedom, autonomy and initiative.
- **Support structures and systems** Often challenging team objectives are set, but the organization fails to provide adequate support in order to make the objectives a reality. In general, high-performing teams need a reward system that recognizes and reinforces excellent team performance. They also need access to good quality and adequate information, as well as training in team-relevant tools and skills. Good team performance is also dependent on having an adequate level of material and financial resources to get the job done. Calling a group a team does not mean that they will automatically obtain all the support needed to accomplish the task.
- **Assumed competence** Technical skills, domain-relevant expertise, and experience and abilities often explain why someone has been included within a group, but these are rarely the only competencies individuals need for effective team performance. Members will undoubtedly require explicit coaching on skills needed to work well in a team.

Research Note 5.11 reveals some of the challenges of multicultural development teams.

RESEARCH NOTE 5.11 Multicultural Teams

Multicultural teams are seen as a potential source of creativity and innovativeness, but also present challenges in cognition, communication and behaviour. This longitudinal study tracked five innovation teams over two years.

Cross-cultural teams were found to have a high potential for creativity, but were confronted with difficulties arising from different working and communication styles. Advantages included broader and more diverse information and knowledge. Teams adapt quickly to surface-level differences in culture, such as communication styles, but more fundamentally, differences of power-distance between team leaders and team members induced conflicts that deeply impact the innovation process, in particular, reducing motivation and cohesion.

Source: Based on Bouncken, R., A. Brem, and S. Kraus, Multi-cultural teams as a source for creativity and innovation: The role of cultural diversity on team performance. *International Journal of Innovation Management*, 2016. **20**(1), 1650012.

5.7 CREATIVE CLIMATE

'Microsoft's only factory asset is the human imagination'.

– Bill Gates

Many great inventions came about as the result of lucky accidental discoveries – for example, Velcro fasteners, the adhesive behind 'Post-it' notes or the principle of float glass manufacturing. But as Louis Pasteur observed, 'chance favours the prepared mind' and we can usefully deploy our understanding of the creative process to help set up the conditions within which such 'accidents' can take place.

Two important features of creativity are relevant in doing this. The first is to recognize that creativity is an attribute that everyone possesses – but their preferred style of expressing it varies widely [77]. Some people are comfortable with ideas that challenge the whole way in which the universe works, while others prefer smaller increments of change – ideas about how to improve the jobs they do or their working environment in small incremental steps. (This explains in part why so many 'creative' people – artists, composers and scientists – are also seen as 'difficult' or living outside the conventions of acceptable behaviour.) This has major implications for how we manage creativity within the organization: innovation, as we have seen, involves bringing something new into widespread use, not just inventing it. While the initial flash may require a significant creative leap, much of the rest of the process will involve hundreds of small problem-finding and problem-solving exercises – each of which needs creative input. And though the former may need the skills or inspiration of a particular individual, the latter require the input of many different people over a sustained period of time. Developing the light bulb or the Post-it note or any successful innovation is actually the story of the combined creative endeavours of many individuals. **Case Study 5.8** discusses the approach of Google.

CASE STUDY 5.8 Organizational Climate for Innovation at Google

Google appears to have learned a few lessons from other innovative organizations, such as 3M. Technical employees are expected to spend 20% of their time on projects other than their core job, and similarly managers are required to spend 20% of their time on projects outside the core business, and 10% to completely new products and businesses. This effort devoted to new, noncore business is not evenly allocated weekly or monthly, but when possible or necessary. These are contractual obligations, reinforced by performance reviews and peer pressure, and integral to the 25 different measures of and targets for employees. The ideas progress through a formal qualification process that includes prototyping, pilots and tests with actual users. The assessment of new ideas and projects is highly data driven and aggressively empirical, reflecting the IT basis of the firm, and is based on rigorous experimentation within 300 employee user panels, segments of Google's 132 million users, and trusted third parties. The approach is essentially evolutionary in the sense that many ideas are encouraged; most fail but some are successful, depending on the market response. The generation and market testing of many alternatives, and tolerance of (rapid) failure, are central to the process. In this way, the company claims to generate around 100 new products each year, including hits such as Gmail, AdSense and Google News.

However, we need to be careful to untangle the cause and the effect and determine how much of this is transferable to other companies and contexts. Google's success to date is predicated on dominating the global demand for search engine services through an unprecedented investment in technology infrastructure – estimated at over a million computers. Its business model is based upon 'ubiquity first, revenues later', and is still reliant on search-based advertising. The revenues generated in this way have allowed it to hire the best and to provide the space and motivation to innovate. Despite this, it is estimated to have only 120 or so product offerings, and the most recent blockbusters have all been acquisitions: YouTube for video content; DoubleClick for web advertising; and Keyhole for mapping (now Google Earth). In this respect, it looks more like Microsoft than 3M.

Source: Based on Iyer B. and T.H. Davenport, Reverse engineering Google's innovation machine. *Harvard Business Review*, April, 58–68, 2008.

Organizational culture is a complex concept, but it basically equates to the pattern of shared values, beliefs and agreed norms that shape the behaviour – in other words, it is 'the way we do things round here' in any organization. Schein suggests that culture can be understood in terms of three linked levels, with the deepest and most inaccessible being what each individual believes about the world – the 'taken for granted' assumptions. These shape individual actions and the collective and socially negotiated version of these behaviours defines the dominant set of norms and values for the group. Finally, behaviour in line with these norms creates a set of artefacts – structures, processes, symbols, etc. – which reinforce the pattern [78].

Given this model, it is almost impossible for management to directly change culture, but it can intervene at the level of artefacts – by changing structures or processes – and by providing models and reinforcing preferred styles of behaviour.

The effect of these is to create and reinforce the behavioural norms that inhibit creativity and lead to a culture lacking in innovation. It follows from this that developing an innovative climate is not a simple matter since it consists of a complex web of behaviours and artefacts. And changing this culture is not likely to happen quickly or as a result of single initiatives (such as restructuring or mass training in a new technique).

Instead, building a creative climate involves systematic development of organizational structures, communication policies and procedures, reward and recognition systems, training policy, accounting and measurement systems and deployment of strategy.

The design of effective reward systems is particularly important. Many organizations have reward systems that reflect the performance of repeated tasks rather than encourage the development of new ideas. Progress is associated with 'doing things by the book' rather than challenging and changing things. By contrast, innovative organizations look for ways to reward creative behaviour and to encourage its emergence. Examples of reward systems include the establishment of a 'dual ladder' that enables technologically innovative staff to progress within the organization without the necessity to move across management posts [79].

Research Note 5.12 examines the relative contributions of leadership and culture on new product development success. **View 5.1** provides insights on organizational innovation from a leading innovation consultancy.

RESEARCH NOTE 5.12 Leadership versus Culture

Corporate culture and leadership behaviour both may drive firm innovativeness, independently or in combination. An innovation-oriented corporate culture reflects the values, norms and artefacts shared by a large set of organizational members, whereas in contrast, executive leadership behaviour attempts to direct innovations from the top.

This study examined the relative influence of top executives' transformational leadership and innovation-oriented corporate culture on new product frequency. Based upon paired data from 136 top executives and 414 subordinates, the results showed that an innovation-oriented corporate culture is significantly more effective in enhancing the frequency of new product introductions than top executives' transformational leadership.

Source: Based on Stock, R.M. and N.L. Schnarr, Exploring the product innovation outcomes of corporate culture and executive leadership. *International Journal of Innovation*, 2016. **20**(1), 1650009.

VIEW 5.1 CREATING INNOVATION ENERGY

Innovation – it's the corporate world's latest plaything. But it's more than a buzzword. It's commercially critical; it helps organizations to grow during boom times and can help companies to stay alive in tough times. In the twenty-first century, it's not an overstatement to say that in most commercial sectors, to stand still is to die. That's why almost every organization accepts the business imperative to innovate.

So why do some succeed while others fail? What organizational characteristics set the winners apart from the losers? Is innovation a matter of luck or size?

At ?What *If*! We've spent 16 years working on thousands of innovation projects with some of the largest and most successful organizations across the globe. We've rolled our sleeves up and worked late into the night on incremental innovation projects and market changing initiatives. We've met companies that are brilliant at innovation and others that, no matter how hard they try, just can't make it work. We've had a unique and privileged perspective on innovation having worked across so many sectors and in so many countries.

The good news is that there is a clear pattern that determines if your organization has the DNA to spawn innovation; the bad news is that there is no business concept that describes this pattern, this 'magic key'. In fact it's worse than that – traditional business concepts, as basic as strategy, thinking things through carefully – can often do more harm than good. Innovation is as much about trying things out, deliberating, not being too careful. Our collective brains don't have the computing power to use conventional strategic approaches to get to the answer.

So what is this 'pattern' behind successful innovation? We call it *Innovation Energy*. In a nutshell, it's the confluence of three forces: an individual's attitude, a group's behavioural dynamic and the support an organization provides. There is a sweet spot that some organizations either stumble upon or deliberately seek out, this sweet spot is best understood as more of a social or human science than a business concept. At its heart, innovation is all about people.

'It's all about people'. That's a great sound bite and we've all heard it a million times before. We all know that it's people, not processes that make things happen. But while most companies are pretty good at constructing processes, they are often shockingly bad at getting the most out of the human energy. How often have you heard leaders say, 'Our greatest asset is our people'? Yet those same leaders coop their 'greatest assets' in gray office blocks, suppress them with corporate stuffiness, and bury them with hundreds of emails a day. But work doesn't have to sap energy. It can create it. Innovation Energy is the force generated when a group of people work together with the right attitude and behaviours in an organization structured to help make things happen.

Energy doesn't just happen. Think about what gets you fired up – your favourite football team, playing with your children and having a cause to fight for. Life without the right stimulus leaves you sluggish and lethargic. It's the same in business, except multiplied by the amount of people. Put 50 colleagues together and the difference between collective inertia and collective energy is immense. You either charge each other up or bring each other down. So that energy needs managing – more than any other resource. It makes the difference between innovation success or failure.

There are three elements of the equation. So let's break down the *attitude*, *behaviours,* and *structures* needed to manage Innovation Energy.

Attitude

The plain fact is that innovation requires us to think very nimbly about our jobs, about what we do with our time. Innovation by its very nature is both threatening and exhilarating. Not everyone in an organization skips into work with a nimble mindset – we all know that cynics lurk in every department and in every team. Innovation teams need a majority of people with the right attitude, and others need to be at least 'neutral'.

Our experience within large corporations is that money rarely motivates or affects 'attitude'. Most of the people we have met who can make a difference to their company's innovation profile are at heart motivated by wanting to do something good, to leave a mark and to be recognized as a key part of a team. It's simple, obvious stuff but look more deeply and the job of management is to answer the question: Why should my people care so much that they'll work through the night, argue against the grain, stick their heads above the parapet? The only reason is that they like what the body corporate is 'going for'. It feels good and they feel good being part of it. This is why issues of vision and purpose are so central to innovation. They provide the lifeblood of Innovation Energy.

But just how do you get people fired up about a company's bold vision? Well, a crisis will do it. If everyone truly understands what will happen if nothing changes, if the burning platform is made real, then that can be the catalyst that galvanizes people behind the need to innovate.

In the early 1990s, the Norwegian media company Schibsted recognized that being a traditional newspaper company would not be sustainable over time, so they decided to adopt quite a Darwinian approach to innovation declaring 'It is not the strongest of the species that survive, nor the most intelligent but the one most responsive to change'. The company invested heavily in new media, making a conscious effort to see themselves as a media company rather than a newspaper company. In the process, they effectively cannibalized their old business

model to make way for a new one. In 2007, the company was one of the most successful media companies in Scandinavia making over £1 billion in revenue. And, more critically, by 2009, nearly 60% of their earnings are projected to come from their online businesses.

But ambition isn't enough. Companies need to engage their people on a personal level. This means making sure that each individual in the organization has their own 'Ah ha!' moment.

At ?What *If*! We see this all the time, and the power of converting someone from a 'So what' mentality to a 'So that's why we're doing this!' realization is amazing. This often happens when senior management are connected with real people, that is, their consumers. Put a managing director whose company has been making the same inhalers, the same way, for 20 years face to face with a frustrated asthmatic, too embarrassed to use his 'puffers' in front of his children and the revelations are electrifying.

Companies that are really successful at innovating are the ones that manage to tap into people's innate desire to be part of something bigger, a common purpose.

This purpose is always explicit and often disarmingly simple. The people at IKEA aren't in business to sell flatpack furniture they are working towards providing 'A Better Everyday Life for Many People'. While over at Apple, Steve Jobs' challenge to his team is to create and sell products 'so good you'll want to lick them'. These companies have managed to engage and unify everyone from the boardroom to the shop floor behind their common purpose: they make coming to work worthwhile.

Behaviours

Behaviour beats process every day of the week. Every single interaction we have sets up a powerful and lasting expectation of just what a conversation or meeting is going to be like in the future. Without realizing it, we're all hard wired before we go into a meeting room – with some folks we'll take risks, with others we'll hold back. So breaking established behaviour patterns is an incredibly powerful force. For this reason, companies need to be very prescriptive, sometimes more than feels comfortable, about how they want their people to behave around innovation.

Many of the learnt behaviours that have helped us succeed at work are actually opposite to innovation behaviours. We need to suspend judgement and replace it with what we call *greenhousing* – building ideas collaboratively. We need to suspend the number of heavy PowerPoint charts and replace with real consumer experiences as they grapple with our crudely made prototypes.

The most useful innovation behaviours are *freshness* (trying new stuff out), *greenhousing* (building an idea through collaboration), *realness* (quickly making an idea into the form a customer will buy it as), *bravery* (guts to disagree) and *signalling* (helping a group navigate between creative and analytical behaviour). Let's dwell on this last behaviour. We have found that it's essential to have at least one person with sufficient emotional intelligence to be able to comment on the dynamics of the group. We call this 'signalling' and it's a real art. This is what it sounds like – 'guys, let's step back a bit, we're drilling so deep into the economics of the idea that we're killing it'. Without this behaviour, the line between analysis and creativity becomes blurred and innovation collapses.

The problem is that many organizations fall into the trap of prescribing behaviour using a series of bland and ultimately meaningless value statements. 'Integrity', 'Passion', 'Customer First' shout the posters in reception, but they don't translate into action. We have come across many CEOs who are prisoners of a zealous values campaign – trapped with a random set of words that they cannot in their heart support but dare not in public deny. Their silence is deafening.

Innovation needs what's okay and what's not okay to be very clearly articulated, and the most effective way to do this is by telling stories.

Curt Carlson of the Stanford Research Institute (SRI) in California has a hard-hitting story: he asks whether you'd dive into a pool with a single poo in it. The answer is clearly no, it doesn't matter how big the pool is, if someone has left just one small nasty thing in it no one is going to jump in! The story is a crude but an effective way of reminding his people that cynicism is innovation's biggest enemy. All it takes is one raised eyebrow or dismissive sneer to kill a budding idea. This story gets repeated time and again and it sends a clear message about a specific behaviour that will not be tolerated within the organization. Everyone at SRI knows that it is not OK to behave, however subtly, in an undermining way.

Other companies use stories to celebrate good behaviour. The best stories are ones that specifically identify a person, relate their actions, detail the pay-off and then explain the 'so what' – what exactly it was that made the person's action special and noteworthy.

At Xilinx, one of the leading players in the global semiconductor industry, the chairman Wim Roelandts shares a story about a team within the organization who worked for months on a project that in the end did not deliver the desired results. Upon the failure of the project, Roelandts very publicly assigned the team involved to work on another high-profile project. As he explains, 'As a technology company, the projects that are most likely to fail are the most difficult projects, so if you only reward successful projects no one will ever want to take on the difficult ones. You have to reward failure and genuinely believe that if people learn from their mistakes, then failure is a good thing'.

These types of stories are motivational and are easily understood by everyone in the organization. Storytelling is much more powerful than any mission statement or set of values listed on a credo card or posters with value statements

that attempt to brighten our corridors. If used effectively, stories help turn behaviours into habits. Once this happens the organization begins to create its own sustainable source of energy that is almost impossible for any competitor to steal or replicate.

Structures: Organizational Support for Innovation

Innovation Energy is not just a matter of harnessing the right attitude and the right behaviour, it's vital that the organization supports and directs innovation. The most innovative companies are organized like a river, with a clear path that flows much faster than one full of obstacles and tributaries. They have simple and focused structures and processes (that can be broken) that are there to free people, not to get in the way.

There are many ways to block and unblock the river: rewards, resources, communication, flexible process, environment and leadership. Let's look at the last two.

The physical environment of a business has a major influence on energy. Working space provides a great opportunity to create the right energy for your organization, but it's also a potential bear trap just waiting to kill energy dead in its tracks. Too often it is the buildings policy of a business rather than any strategic goal that dictates their structure! Many organizations are housed in gray, generic office blocks with rows of uniform desks and dividers; but what we've found is that people who work in gray, generic and uniform offices tend to come up with gray, generic and uniform ideas. The companies that have created energizing spaces that bring their brands to life and their people together reap the biggest rewards.

When designing their new headquarters in Emeryville, California, the film studio Pixar started from the inside out to ensure a cross-pollination of ideas among the diverse specialities that work within the company. The key to ensuring cross-pollination in the large aircraft hangar-like space is the 'heart' of the building – the large, open centre space where the left brain (techies) and the right brain (creatives) of the company can bump into one another even though they are housed in separate areas. To force people into the shared space, the 'heart' houses the mailroom, cafeteria, games room and screening room. This very clever use of space breaks down barriers and prevents people from only fraternizing with the people in their immediate teams.

However, creative structures and clever buildings will count for very little if the organization does not have the right type of leadership. The leadership of a company is absolutely essential to that organization's ability to innovate. The leaders need to have the ambition, share in the purpose and role model the desired behaviours: it is up to them to keep the Innovation Energy flowing.

The best leaders have focus and crucially enable their people to focus. Too many times, we have seen companies trying to focus on too many things and, as a result, getting very little success with any of them. It's rather like having too many planes in the air but not enough runways to land them all. The planes are the ideas and the runways are the commercial abilities of a company to make those ideas happen. By its very nature, innovation needs a lot of white space around it, it needs a lot of unscheduled time because you just never know where an idea is going or how much time you need to put behind it; so if your diary is absolutely jam-packed with things to do you'll never be able to innovate and never be able to be truly creative.

Behind most stories of great new innovations, you will find a story about focus, and innovative leaders are those leaders who cut the number of planes in the air and simply focus on landing very few, but critical things.

Innovative leaders are also very honest about their strengths and limitations and they are unafraid to make any gaps in their strengths public. Some people are born enthusiasts – they are brilliant at emphasizing the positive and cheering people on. Others make great taskmasters – they do not shirk from giving people bad news or telling people something isn't good enough. A team or company run solely by enthusiasts might be an inspiring place to work but chances are it won't be commercially successful. And companies or teams run solely by taskmasters might deliver results but will ultimately be an exhausting place to work. It is important to find the balance between the two types of leadership and the only way to do this is to be honest about your skills and limitations. If you're not prepared to be open about what you're not very good at you don't allow anyone with complementary skills to step in and fill the gaps.

Great leadership is as much about honesty and humility as it is about focus and inspiration.

The Innovation Energy Sweet Spot

Innovation Energy is the power behind productive change. It can mean the difference between innovating successfully or running out of steam. Innovation Energy can be generated, harnessed and managed by engendering the right attitude, behaviours and structures within your organization. It can turn fading companies into powerhouses of industry. Get it right and you create a stimulating, productive, fun place to work. You'll attract and recruit talented people – bright sparks that will add to the energy and make success all the more likely.

Innovation Energy – It's powerful stuff!

Matt Kingdon, **www.whatifinnovation.com.** Matt is chairman and chief enthusiast of ?What *If*! an innovation consultancy he cofounded in 1992.

Climate versus Culture Climate is defined as the recurring patterns of behaviour, attitudes and feelings that characterize life in the organization. These are the objectively shared perceptions that characterize life within a defined work unit or in the larger organization. Climate is distinct from culture in that it is more observable at a surface level within the organization and more amenable to change and improvement efforts. Culture refers to the deeper and more enduring values, norms and beliefs within the organization.

The two terms, culture and climate, have been used interchangeably by many writers, researchers and practitioners. We have found that the following distinctions may help those who are concerned with effecting change and transformation in organizations:

- *Different levels of analysis.* Culture is a rather broad and inclusive concept. Climate can be seen as falling under the more general concept of culture. If your aim is to understand culture, then you need to look at the entire organization as a unit of analysis. If your focus is on climate, then you can use individuals and their shared perceptions of groups, divisions, or other levels of analysis. Climate is recursive or scalable.
- *Different disciplines are involved.* Culture is within the domain of anthropology and climate falls within the domain of social psychology. The fact that the concepts come from different disciplines means that different methods and tools are used to study them.
- *Normative versus descriptive.* Cultural dimensions have remained relatively descriptive, meaning that one set of values or hidden assumptions were neither better nor worse than another. This is because there is no universally held notion or definition of the best society. Climate is often more normative in that we are more often looking for environments that are not just different, but better for certain things. For example, we can examine different kinds of climates and compare the results against other measures or outcomes such as innovation, motivation, growth and so on.
- *More easily observable and influenced.* Climate is distinct from culture in that it is more observable at a surface level within the organization and more amenable to change and improvement efforts.

What is needed is a practical set of levers for change that leaders can exert direct and deliberate influence over.

Climate and culture are different: traditionally, studies of organizational culture are more qualitative, whereas research on organizational climate is more quantitative, but a multidimensional approach helps to integrate the benefits of each perspective.

Research indicates that organizations exhibit larger differences in practices than values, for example, the levels of uncertainty avoidance.

Table 5.6 summarizes some research of how climate influences innovation. Many dimensions of climate have been shown to influence innovation and entrepreneurship, but here we discuss six of the most critical factors.

Table 5.6 Climate Factors Influencing Innovation

Climate Factor	Most Innovative (Score)	Least Innovative (Score)	Difference
Trust and openness	253	88	165
Challenge and involvement	260	100	160
Support and space for ideas	218	70	148
Conflict and debate	231	83	148
Risk-taking	210	65	145
Freedom	202	110	92

Source: Derived from Isaksen S. and J. Tidd, *Meeting the innovation challenge*. 2006, Chichester: John Wiley & Sons, Ltd.

Trust and Openness The trust and openness dimension refers to the emotional safety in relationships. These relationships are considered safe when people are seen as both competent and sharing a common set of values. When there is a strong level of trust, everyone in the organization dares to put forward ideas and opinions. Initiatives can be taken without fear of reprisals and ridicule in case of failure. The communication is open and straightforward. Where trust is missing, count on high expenses for mistakes that may result. People are also afraid of being exploited and robbed of their good ideas.

When trust and openness are too low, you may see people hoarding resources (i.e., information, software, materials, etc.). There may also be a lack of feedback on new ideas for fear of having concepts stolen. Management may not distribute the resources fairly among individuals or departments. However, trust can bind and blind. If trust and openness are too high, relationships may be so strong that time and resources at work are often spent on personal issues. It may also lead to a lack of questioning each other that, in turn, may lead to mistakes or less productive outcomes. Cliques may form where there are isolated 'pockets' of high trust. In this case, it may help to develop forums for interdepartmental and intergroup exchange of information and ideas. **Research Note 5.13** identifies some factors that influence knowledge sharing in teams.

RESEARCH NOTE 5.13 Team-Member Exchange and Knowledge Sharing

This study aimed to identify the relationships between team-member exchange (TMX), affective commitment and knowledge sharing in R&D project teams. The study was based upon a survey of 301 individual members of 52 R&D project teams, from different companies in Taiwan.

At the work unit level, work unit TMX increases the intention to share knowledge through increasing group members' team commitment, but does not directly affect the team performance. At the team level, they found that the quality of TMX is related to increased intention among team members to share knowledge and to increased commitment to the team. Finally, knowledge sharing at the team level is then associated with higher project performance. However, they find that TMX differentiation moderates the TMX–team performance relationship, and that greater work unit TMX may not have a positive influence on team performance if there is a high variation of exchange working relationships among team members. In other words, the uniformity of working relationships that team members have with their peers influences the effects of work unit TMX on the team performance.

Source: Based on Liu, Y., R.T. Keller, and H-A. Shih, The impact of team-member exchange, differentiation, team commitment, and knowledge sharing on R&D project team performance. *R&D Management*, 2011. **41**(3), 274–87.

Trust is partly the result of individuals' own personality and experience, but can also be influenced by the organizational climate. For example, we know that the nature of rewards can affect some components of trust. Individual competitive rewards tend to reduce information sharing and raise suspicions of others' motives, whereas group or cooperative rewards are more likely to promote information sharing and reduce suspicions of motives. Trust is also associated with employees having some degree of role autonomy. Role autonomy is the amount of discretion that employees have in interpreting and executing their jobs. Defining roles too narrowly constrains the decision-making latitude. Role autonomy can also be influenced by the degree to which organizational socialization encourages employees to internalize collective goals and values, for example, a so-called 'clan' culture focuses on developing shared values, beliefs, and goals among members of an organization so that appropriate behaviours are reinforced and rewarded, rather than specifying task-related behaviours or outcomes. This approach is most appropriate when tasks are difficult to anticipate or codify, and it is difficult to assess the performance. Individual characteristics will also influence role autonomy, including the level of experience, competence and power accumulated over time working for the organization.

Challenge and Involvement Challenge and involvement are the degree to which people are involved in daily operations, long-term goals and visions. High levels of challenge and involvement mean that people are intrinsically motivated and committed to making contributions to the success of the organization. The climate has a dynamic, electric and inspiring quality. People find joy and meaningfulness in their work, and therefore they invest much energy. In the opposite situation, people are not engaged, and feelings of alienation and indifference are present. The common sentiment and attitude is apathy and lack of interest in work and interaction is both dull and listless.

If challenge and involvement are too low, you may see that people are apathetic about their work, are not generally interested in professional development or are frustrated about the future of the organization. One of the ways to improve the situation might be to get people involved in interpreting the vision, mission, purpose and goals of the organization for themselves and their work teams.

On the other hand, if the challenge and involvement are too high, you may observe that people are showing signs of 'burn out', they are unable to meet project goals and objectives, or they spend 'too many' long hours at work. One of the reasons for this is that the work goals are too much of a stretch. A way to improve the situation is to examine and clarify strategic priorities.

Leaders who focus on work challenge and expertise rather than formal authority result in climates that are more likely to be assessed by members as being innovative and high performance. Studies suggest that output controls such as specific goals, recognition and rewards have a positive association with innovation. A balance must be maintained between creating a climate in which subordinates feel supported and empowered, with the need to provide goals and influence the direction and agenda. Leaders who provide feedback that is high on developmental potential, for example, provide useful information for subordinates to improve, learn and develop and results in higher levels of creativity.

Intellectual stimulation is one of the most underdeveloped components of leadership and includes behaviours that increase others' awareness of and interest in problems and develops their propensity and ability to tackle problems in new ways. Intellectual stimulation by leaders can have a profound effect on organizational performance under conditions of perceived uncertainty and is also associated with commitment to an organization. **Case Study 5.9** discusses how an organization strengthened its low levels of challenge and involvement.

CASE STUDY 5.9 Increasing Challenge and Involvement in an Electrical Engineering Division

The organization was a division of a large, global electrical power and product supply company headquartered in France. The division was located in the South East of the United States and had 92 employees. Its focus was to help clients automate their processes, particularly within the automotive, pharmaceutical, microelectronics and food and beverage industries. For example, this division would make the robots that put cars together in the automotive industry or provide public filtration systems.

When this division was merged with the parent company, it was losing about $8 million a year. A new general manager was bought in to turn the division around and make it profitable quickly.

An assessment of the organization's climate identified that it was strongest on the debate dimension but was very close to the stagnated norms when it came to challenge and involvement, playfulness and humour, and conflict. The quantitative and qualitative assessment results were consistent with their own impressions that the division could be characterized as conflict driven, uncommitted to producing results and people were generally despondent. The leadership decided, after some debate, that they should target challenge and involvement, which was consistent with their strategic emphasis on a global initiative on employee commitment. It was clear to them that they also needed to soften the climate and drive a warmer, more embracing, communicative and exuberant climate.

The management team reestablished training and development and encouraged employees to engage in both personal and business-related skills development. They also provided mandatory safety training for all employees. They committed to increase the communication by holding monthly all-employee meetings, sharing quarterly reviews

on performance and using cross-functional strategy review sessions. They implemented mandatory 'skip level' meetings to allow more direct interaction between senior managers and all levels of employees. The general manager held 15-minute meetings will all employees at least once a year. All employee suggestions and recommendations were invited and feedback and recognition were immediately given. A new monthly recognition and rewards program was launched across the division for both managers and employees that was based on peer nomination. The management team formed employee review teams to challenge and craft the statements in the hopes of encouraging more ownership and involvement in the overall strategic direction of the business.

In 18 months, the division showed a $7 million turnaround, and in 2003 won a worldwide innovation award. The general manager was promoted to a national position.

Source: Isaksen, S. and J. Tidd, *Meeting the innovation challenge.* 2006, Chichester: John Wiley & Sons, Ltd.

Support and Space for Ideas Idea time is the amount of time people can (and do) use for elaborating new ideas. In the high idea-time situation, possibilities exist to discuss and test impulses and fresh suggestions that are not planned or included in the task assignment and people tend to use these possibilities. When idea time is low, every minute is booked and specified. The time pressure makes thinking outside the instructions and planned routines impossible. Research confirms that individuals under time pressure are significantly less likely to be creative.

If there is insufficient time and space for generating new ideas, you may observe that people are only concerned with their current projects and tasks. They may exhibit an unhealthy level of stress. People see professional development and training as hindrances to their ability to complete daily tasks and projects. You may also see that management avoids new ideas because they will take time away from the completion of day-to-day projects and schedules. Conversely, if there is too much time and space for new ideas, you may observe that people are showing signs of boredom, that decisions are made through a slow, almost bureaucratic, process because there are too many ideas to evaluate, or the management of new ideas becomes such a task that short-term tasks and projects are not adequately completed.

This suggests that there is an optimum amount of time and space to promote creativity and innovation. The concept of organizational slack was developed to identify the difference between resources currently needed and the total resources available to an organization. When there is little environmental uncertainty or need for change, and the focus is simply on productivity; too much organizational slack represents a static inefficiency. However, when innovation and change are needed, slack can act as a dynamic shock absorber and allows scope for experimentation. This process tends to be self-reinforcing due to positive feedback between the environment and organization.

When successful, an organization generates more slack, which provides greater resource (people, time, money) for longer term, significant innovation; however, when an organization is less successful, or suffers a fall in performance, it tends to search for immediate and specific problems and their solution, which tends to reduce the slack necessary for longer term innovation and growth.

The research confirms that an appropriate level of organizational slack is associated with superior performance over the longer term. For high-performance organizations, the relationship between organizational slack and performance is an inverted 'U' shape or curvilinear: too little slack, for example, being too lean or too focused, does not allow sufficient time or resource for innovation, but too much slack provides little incentive or direction to innovation. However, for low-performance organizations any slack is simply absorbed, and therefore simply represents an inefficiency rather than an opportunity for innovation and growth. Managers too often view time as a constraint or measure of outcomes, rather than as a variable to influence, which can both trigger and facilitate innovation and change. By providing some, but limited, time and resources, individuals and groups can minimize the rigidity that comes from work overload and the laxness that stems from too much slack.

The message for senior management is as much about leading through creating space and support within the organization as it is about direct involvement.

Conflict and Debate A conflict in an organization refers to the presence of personal, interpersonal or emotional tensions. Although conflict is a negative dimension, all organizations have some level of personal tension.

Conflicts can occur over tasks, processes or relationships. Task conflicts focus on disagreements about the goals and content of work, the 'what?' needs to be done and 'why?' Process conflicts are around 'how?' to achieve a task, means and methods. Relationship or affective conflicts are more emotional and are characterized by hostility and anger. In general, some tasks and process conflicts are constructive, helping to avoid groupthink and to consider more diverse opinions and alternative strategies. However, task and process conflicts have only a positive effect on performance in a climate of openness and collaborative communication; otherwise, it can degenerate into relationship conflict or avoidance. Relationship conflict is generally energy sapping and destructive, as emotional disagreements create anxiety and hostility.

If the level of conflict is too high, groups and individuals dislike or hate each other and the climate can be characterized by 'warfare'. Plots and traps are common in the life of the organization. There is gossip and backbiting going on. You may observe gossiping at water coolers (including character assassination), information hoarding, open aggression or people lying or exaggerating about their real needs. In these cases, you may need to take initiative to engender cooperation among key individuals or departments.

If conflict is too low, you may see that individuals lack any outward signs of motivation or are not interested in their tasks. Meetings are more about 'tell' and not consensus. Deadlines may not be met. It could be that too many ineffective people are entrenched in an overly hierarchical structure. It may be necessary to restructure and identify leaders who possess the kinds of skills that are desired by the organization.

So the goal is not necessarily to minimize conflict and maximize consensus, but to maintain a level of constructive conflict consistent with the need for diversity and a range of different preferences and styles of creative problem solving. Group members with similar creative preferences and problem-solving styles are likely to be more harmonious but much less effective than those with mixed preferences and styles. So if the level of conflict is constructive, people behave in a more matured manner. They have psychological insight and exercise more control over their impulses and emotions.

Debate focuses on issues and ideas (as opposed to conflict that focuses on people and their relationships). Debate involves the productive use and respect for diversity of perspectives and points of view. Debate involves encounters, exchanges or clashes among viewpoints, ideas and differing experiences and knowledge. Many voices are heard, and people are keen on putting forward their ideas. Where debates are missing, people follow authoritarian patterns without questioning. When the score on the debate dimension is too low, you may see constant moaning and complaining about the way things are, rather than how the individual can improve the situation. Rather than open debate, you may see more infrequent and quiet one-on-one conversation in hallways.

However, if there is too much debate, you are likely to see more talk than implementation. Individuals will speak with little or no regard for the impact of their statements. The focus on conversation and debate becomes more on individualistic goals than on cooperative and consensus-based action. One reason for this may be too much diversity or people holding very different value systems. In these situations, it may be helpful to hold structured or facilitated discussions and affirm commonly held values. **Research Note 5.14** explores how different types of diversity can encourage or hinder innovation. **Case Study 5.10** shows how a

RESEARCH NOTE 5.14 Organizational Diversity and Innovation

This study investigated the relation between employee diversity and innovation, in terms of gender, age, ethnicity and education, based on a survey sample of 1648 firms. The econometric analysis reveals a positive relation between diversity in education and gender on the likelihood of introducing an innovation. For education, there is a positive relation between employing several highly educated workers that are diverse in their educational background and the likelihood to innovate, but interestingly no such effect using the share of highly educated employees, suggesting that diversity of education is more important. For gender, the sweet spot appears to be 60–70% of the same gender, rather than equality or dominance of either. In addition, the logistic regression reveals a positive relationship between an open culture towards diversity and innovative performance. However, they find that the age diversity has a negative effect on innovation, although average age has no effect, and ethnic diversity has no significant effect on a firm's likelihood to innovate.

Source: Based on Østergaard, C.R., B. Timmermans, and K. Kristinsson, Does a different view create something new? The effect of employee diversity on innovation. *Research Policy*, 2011. **40**(3), 500–9.

CASE STUDY 5.10 Developing a Creative Climate in a Medical Technology Company

A Finnish-based global health care organization had 55,000 employees and $50 billion revenue. Its mission was to develop, manufacture and market products for anaesthesia and critical care.

The senior management team of one division conducted an assessment and found that they had been doing well on quality and operational excellence initiatives in manufacturing and had improved their sales and marketing results, but were still concerned that there were many other areas on which they could improve, in particular, creativity and innovation.

'We held a workshop with the senior team to present the results and engage them to determine what they needed to do to improve their business. We met with the CEO prior to the workshop to highlight the overall results and share the department comparisons. She was not surprised by the results but was very interested to see that some of the departments had different results'.

During the workshop, the team targeted challenge and involvement, freedom, idea time and idea support as critical dimensions to improve to enable them to meet their strategic objectives. The organization was facing increasing competition in its markets and significant advances in technology. Although a major progress had been made in the manufacturing area, they needed to improve their product development and marketing efforts by broadening involvement internally and cross-functionally and externally by obtaining deep consumer insight. The main strategy they settled upon was to 'jump start' their innovation in new product development for life support.

Key personnel in new product development and marketing were provided training in creative problem solving, and follow-up projects were launched to apply the learning to existing and new projects.

One project was a major investment in reengineering their main product line. Clinicians were challenged with the current design of the equipment. The initial decision was to redesign the placement of critical control valves used during surgery. The project leader decided to use a number of tools to go out and clarify the problem with the end users, involving project team members from research and development as well as marketing. The result was a redefinition of the challenge and the decision to save the millions of dollars involved in the reengineering effort and instead develop a new tactile tool to help the clinicians' problem of having their hands full. Since the professionals in the research and development lab were also directly involved in obtaining and interpreting the consumer insight data, they understood the needs of the end users and displayed an unusually high degree of energy and commitment to the project.

'We also observed a much greater amount of cross-functional and informal working across departments. Some human resource personnel were replaced and new forms of reward and recognition were developed. Not only was there more consumer insight research going on, but there were more and closer partnerships created with clinicians and end users of the products. During this period of time, the CEO tracked revenue growth and profitability of the division and reported double-digit growth'.

Source: Isaksen, S. and J. Tidd, *Meeting the innovation challenge*. 2006, Chichester: John Wiley & Sons, Ltd.

medical devices company promoted greater cross-functional working and user insights to help develop new products.

Risk-taking Tolerance of uncertainty and ambiguity constitute risk-taking. In a high risk-taking climate, bold new initiatives can be taken even when the outcomes are unknown. People feel that they can 'take a gamble' on some of their ideas. People will often 'go out on a limb' and be first to put an idea forward.

In a risk-avoiding climate, there is a cautious, hesitant mentality. People try to be on the 'safe side'. They setup committees and they cover themselves in many ways before making a decision. If risk-taking is too low, employees offer few new ideas or few ideas that are well outside of what is considered safe or ordinary. In risk-avoiding organizations people complain about boring, low-energy jobs and are frustrated by a long, tedious process used to get ideas to action.

Conversely, if there is too much risk-taking, you will see that people are confused. There are too many ideas floating around, but few are sanctioned. People are frustrated because nothing is getting done. There are many loners doing their own thing in the organization and no evidence of teamwork. These conditions can be caused by individuals not feeling they need a consensus or buy-in from others on their team in their department or organization. A remedy might include some team building and improving the reward system to encourage cooperation rather than individualism or competition.

Research on new product and service development has identified a broad range of strategies for dealing with risk. Both individual characteristics and organizational climate influence perceptions of risk and propensities to avoid, accept or seek risks. Formal techniques such as failure mode and effects analysis (FMEA), potential problem analysis (PPA) and fault tree analysis (FTA) have a role, but the broader signals and support from the organizational climate are more important than the specific tools or methods used.

Freedom Freedom is described as the independence in behaviour exerted by the people in the organization. In a climate with much freedom, people are given autonomy to define much of their own work. They are able to exercise discretion in their day-to-day activities. They take the initiative to acquire and share information and make plans and decisions about their work. In a climate with little freedom, people work within strict guidelines and roles. They carry out their work in prescribed ways with a little room to redefine their tasks.

If there is not enough freedom, people demonstrate very little initiative for suggesting new and better ways of doing things. They may spend a great deal of time and energy obtaining permission and gaining support (internally and externally) or perform all their work 'by the book' and focus too much on the exact requirements of what they are told to do. One of the many reasons could be that the leadership practices are very authoritarian or overly bureaucratic. It might be helpful to initiate a leadership improvement initiative including training, 360° feedback with coaching, skills of managing up, etc.

If there is too much freedom, you may observe people going off in their own independent directions. They have an unbalanced concern weighted towards themselves rather than the work group or organization. People may do things that demonstrate little or no concern for important policies/procedures, performing tasks differently and independently redefining how they are done each time. **Research Note 5.15** compares how more formal organizational routines and everyday practices contribute to innovation.

RESEARCH NOTE 5.15 Routines for Organizing Innovation

Nelson and Winter's (1982) concept of routines, as regular and predictable behavioural patterns, is central to evolutionary economics and studies of innovation. By definition, such routines

- are regular and predictable
- are collective, social, and tacit
- guide cognition, behaviour and performance
- promise to bridge (economic and cognition) theory and (management and organizational) practices
- like the 'the way we do things around here'.

In his review of the research, Becker (2005) suggested that the term 'recurrent interaction patterns' might provide a more precise term for organizational routines, understood as behavioural regularities. He argues that in practice routines can:

- enable coordination
- provide a degree of stability in behaviour
- enable tasks to be executed subconsciously, economizing on limited cognitive resources
- bind knowledge, including tacit knowledge.

However, in practice (and in management research), routines are very difficult to observe, measure or manage. For these reasons, we focus less on the routines themselves, or individual cognition, and more on their influence in collective practice and on performance. Based upon the real-time observation of product and project development in two contrasting organizations, it was found that routines play three limited but important roles: as prior and authoritative representations of action, such as standard templates, handbooks and processes; as part of a system of authority, specifications and conformance, such as formal decision points and criteria; and as a template for mandatory post hoc representations of performed actions and their outcomes, such as audits and benchmarks (Hales and Tidd, 2008). Routines did not directly influence or prescribe actions or behaviours, but rather local instances of work practice and the knowledge shared in mundane interactions. Hales and Tidd believe that these are more relevant and realistic than the abstraction of routines found in much of the innovation and economics literature.

Sources: Based on Hales, M. and J. Tidd, The practice of routines and representations in design and development. *Industrial and Corporate Change*, 2009. **18**(4), 551–574; Becker, M.C., Organizational routines – a review of the literature. *Industrial and Corporate Change*, 2005. **13**, 643–77; and Nelson, R.R. and S. Winter, *An Evolutionary Theory of Economic Change*, 1982. Harvard University Press, Boston, MA.

5.8 BOUNDARY-SPANNING

A recurring theme in this book is the extent to which innovation has become an open process involving richer networks across and between organizations. This highlights a long-established characteristic of successful innovating organizations – an orientation that is essentially open to new stimuli from outside [80].

Developing a sense of external orientation – for example, towards key customers or sources of major technological developments – and ensuring that this pervades organizational thinking at all levels are of considerable importance in building an innovative organization. For example, by developing a widespread awareness of customers – both internal and external – quality and innovation can be significantly improved. This approach contrasts sharply with the traditional model in which there was no provision for feedback or mutual adjustment [81]. Of course, not all industries have the same degree of customer involvement – and in many the dominant focus is more on technology. This does not mean that the customer focus is an irrelevant concept: the issue here is one of building relationships that enable clear and regular communication, providing inputs for problem solving and shared innovation [82].

But the idea of extending involvement goes far beyond customers and end users. Open innovation requires building such relationships with an extended cast of characters, including suppliers, collaborators, competitors, regulators and multiple other players [83].

All of the earlier discussions presume that the organization in question is a single entity, a group of people are organized in a particular fashion towards some form of collective purpose. But increasingly we are seeing the individual enterprise becoming linked with others in some

form of collective – a supply chain, an industrial cluster, a cooperative learning club or a product development consortium. Studies exploring this aspect of interfirm behaviour include learning in shared product development projects , in complex product system configuration [84], in technology fusion [85], in strategic alliances [86], in regional small-firm clusters [87], in sector consortia [88], in 'topic networks [89]' and in industry associations [90].

Consider some examples:

- Studies of 'collective efficiency' have explored the phenomenon of clustering in a number of different contexts [91]. From this work, it is clear that the model is not just confined to parts of Italy, Spain and Germany, but diffused around the world – and it is extremely effective under certain conditions. For example, one town (Sialkot) in Pakistan plays a dominant role in the world market for specialist surgical instruments made of stainless steel. From a core group of 300 small firms, supported by 1500 even smaller suppliers, 90% of production (1996) was exported and took a 20% share of the world market, second only to Germany. In another case, the Sinos valley in Brazil contains around 500 small-firm manufacturers of specialized, high-quality leather shoes. Between 1970 and 1990, their share of the world market rose from 0.3% to 12.5% and in 2006 they exported some 70% of the total production. In each case, the gains are seen as resulting from close interdependence in a cooperative network.
- Similarly, there has been much discussion about the merits of technological collaboration, especially in the context of complex product systems development [92]. Innovation networks of this kind offer significant advantages in terms of assembling different knowledge sets and reducing the time and costs of development – but are again often difficult to implement [93].
- Much has been written on the importance of developing cooperative rather than adversarial supply chain relationships [94]. But it is becoming increasingly clear that the kind of 'collective efficiency' described earlier can operate in this context and contribute not only to improved process efficiency (higher quality, faster speed of response, etc.) but also to shared product development. The case of Toyota is a good illustration of this – the firm has continued to stay ahead despite increasing catch-up efforts on the part of Western firms and the consolidation of the industry. Much of this competitive edge can be attributed to its ability to create and maintain a high-performance knowledge-sharing network [95].
- Networking represents a powerful solution to the resource problem – no longer is it necessary to have all the resources for innovation (particularly those involving specialized knowledge) under one roof provided you know where to obtain them and how to link up with them. The emergence of powerful information and communication technologies has further facilitated the move towards 'open innovation' and 'virtual organizations' that are increasingly a feature of the business landscape [96]. Studies of learning behaviour in supply chains suggest considerable potential – one of the most notable examples being the case of the *kyoryokukai* (supplier associations) of Japanese manufacturers in the second half of the twentieth century [97]. Imai, in describing the product development in Japanese manufacturers, observes: '[Japanese firms exhibit] an almost fanatical devotion towards learning – both within organizational membership and with outside members of the inter-organizational network [98]'. Lamming [27] identifies such learning as a key feature of lean supply, linking it with innovation in supply relationships. Marsh and Shaw describe collaborative learning experiences in the wine industry including elements of supply chain learning (SCL), while the AFFA study reports on other experiences in the agricultural and food sector in Australia [99]. In the case studies of SCL in the Dutch and the UK food industries, the construction sector and aerospace provided further examples of different modes of SCL organization [100]. Humphrey et al. describe SCL emergence in a developing country context (India) [101].

However, as discussed in Chapter 6, obtaining the benefits of networking is not an automatic process, and requires considerable efforts in the area of coordination. Effective networks have

what systems theorists call 'emergent properties,' – that is, the whole is greater than the sum of the parts. But the risk is high that simply throwing together a group of enterprises will lead to suboptimal performance with the whole being considerably less than the sum of the parts due to friction, poor communications, persistent conflicts over resources, or objectives, and so on.

A research on inter-organizational networking suggests that a number of core processes need managing in a network, effectively treating it as if it were a particular form of organization [102]. For example, a network with no clear routes for resolving conflicts is likely to be less effective than the one which has a clear and accepted set of norms – a 'network culture' – which can handle the inevitable conflicts that emerge.

Building and operating networks can be facilitated by a variety of enabling inputs, for example, the use of advanced information and communication technologies may have a marked impact on the effectiveness with which information processing takes place. In particular, the research highlights a number of enabling elements that help to build and sustain effective networks, which include:

- *Key individuals* – creating and sustaining networks depend on putting energy into their formation and operation. Studies of successful networks identify the role of key figures as champions and sponsors, providing leadership and direction, particularly in the tasks of bringing people together and giving a system-level sense of purpose [103]. Increasingly, the role of 'network broker' is being played by individuals and agencies concerned with helping create networks on a regional or sectoral basis.
- *Facilitation* – another important element is providing support to the process of networking but not necessarily acting as members of the network. Several studies indicate that such a neutral and catalytic role can help, particularly in the setup stages and in dealing with core operating processes like conflict resolution.
- *Key organizational roles* – mirroring these individual roles are those played by key organizations – for example, a regional development agency organizing a cluster or a business association bringing together a sectoral network. Gereffi and others talk about the concept of network governance and identify the important roles played by key institutions such as major customers in buyer-driven supply chains [104]. Equally their absence can often limit the effectiveness of a network, for example, in research on supply-chain learning, the absence of a key governor limited the extent to which inter-organizational innovation could take place [105].

Case Study 5.11 shows how the company 3M has consistently developed and reinforced innovative behaviours and outcomes through a range of organizational practices and policies.

CASE STUDY 5.11 Building an Innovative Organization – The Case of 3M

3M is a well-known organization employing around 70,000 people in around 200 countries across the world. Its $15 billion of annual sales come from a diverse product range involving around 50,000 items serving multiple markets but building on core technical strengths, some of which like coatings can be traced back to the company's foundation. The company has been around for just over 100 years and during that period has established a clear reputation as a major innovator. Significantly, the company paints a consistent picture in interviews and in publications – innovation success is a consequence of creating the culture in which it can take place – it becomes 'the way we do things around here' in a very real sense. This philosophy is borne out in many anecdotes and case histories – the key to their success has been to create the conditions in which innovation can arise from any one of a number of directions, including lucky accidents, and there is a deliberate attempt to avoid putting too much structure in place since this would constrain innovation.

Elements in this complex web include:

- Recognition and reward – throughout the company, there are various schemes that acknowledge innovative activity, for example, the Innovator's Award that recognizes effort rather than achievement.

- Reinforcement of core values – innovation is respected, for example, there is a 'hall of fame' whose members are elected on the basis of their innovative achievements.
- Sustaining 'circulation' – movement and combination of people from different perspectives to allow for creative combinations – a key issue in such a large and dispersed organization.
- Allocating 'slack' and permission to play – allowing employees to spend a proportion of their time in curiosity-driven activities which may lead nowhere but which have sometimes given them breakthrough products.
- Patience – acceptance of the need for 'stumbling in motion' as innovative ideas evolve and take shape. Breakthroughs like Post-its and 'Scotchgard' were not overnight successes but took two to three years to 'cook' before they emerged as viable prospects to put into the formal system.
- Acceptance of mistakes and encouragement of risk-taking – a famous quote from a former CEO is often cited in this connection: 'Mistakes will be made, but if a person is essentially right, the mistakes he or she makes are not as serious, in the long run, as the mistakes management will make if it's dictatorial and undertakes to tell those under its authority exactly how they must do their job . . . Management that is destructively critical when mistakes are made kills initiative, and it is essential that we have many people with initiative if we are to continue to grow'.
- Encouraging 'bootlegging' – giving employees a sense of empowerment and turning a blind eye to creative ways which staff come up with to get around the system – acts as a counter to rigid bureaucratic procedures.
- Policy of hiring innovators – recruitment approach is looking for people with innovator tendencies and characteristics.
- Recognition of the power of association – deliberate attempts not to separate out different functions but to bring them together in teams and other groupings.
- Encouraging broad perspectives – for example, in developing their overhead projector business it was close links with users developed by getting technical development staff to make sales calls that made the product so user friendly and therefore successful.
- Strong culture – dating back to 1951 of encouraging informal meetings and workshops in a series of groups, committees, etc., under the structural heading of the Technology Forum – established 'to encourage free and active interchange of information and cross-fertilization of ideas'. This is a voluntary activity although the company commits support resources – it enables a company-wide 'college' with fluid interchange of perspectives and ideas.
- Recruiting volunteers – particularly in trying to open up new fields; involvement of customers and other out-siders as part of a development team is encouraged since it mixes perspectives.

SUMMARY

- The organization of innovation is much more than a set of processes, tools and techniques, and the successful practice of innovation demands the interaction and integration of three different levels of management: individual, collective and climate.
- At the personal or individual level, the key is to match the leadership styles with the task requirement and type of teams. General leadership requirements for innovative projects include expertise and experience relevant to the project, articulating a vision and inspirational communication, intellectual stimulation and quality of LMX.
- At the collective or social level, there is no universal best practice, but successful teams require clear, common and elevating goals; unified commitment; cross-functional expertise; collaborative climate; external support; and recognition and participation in decision making.
- At the context or climate level, there is no 'best innovation culture', but innovation is promoted or hindered by a number of factors, including trust and openness, challenge and involvement, support and space for ideas, conflict and debate, risk-taking and freedom.

FURTHER READING

The field of organizational behaviour is widely discussed and there are some good basic texts, such as D. Buchanan and A. Huczynski, *Organizational Behaviour* (9th edition, Pearson, 2016), which provides an excellent synthesis of the main issues, with a good balance of managerial and more critical social science approaches. Specific issues surrounding the development of innovative organizations are well treated by R. Leifer et al., *Radical Innovation* (Harvard Business School Press, 2000), and R. Kanter, *World Class* (Simon & Schuster, 1996). We address the relationships between leadership,

innovation and organizational renewal more fully in our book *Meeting the Innovation Challenge: Leadership for Transformation and Growth*, by Scott Isaksen and Joe Tidd (John Wiley & Sons, Ltd., 2006).

Many books and articles look at specific aspects, for example: the development of creative climates, Lynda Gratton, *Hot Spots: Why Some Companies Buzz with Energy and Innovation, and Others Don't* (Prentice Hall, 2007); on *Innovative Teams (20-Minute Manager Series)*, Harvard Business Review (2015); or continuous improvement, John Bessant's *High-Involvement Innovation* (John Wiley & Sons, Ltd., 2003). R. Katz, *The Human Side of Managing Technological Innovation* (Oxford University Press, 2003) is an excellent collection of readings, and A.H. Van de Ven, D. Polley, H.L. Angle, and M.S. Poole, *The Innovation Journey* (Oxford University Press, 2008) provides a comprehensive review of a seminal study in the field, and includes a discussion of individual, group and organizational issues. The theme of creativity and the skills associated with it at individual, group and organizational level is discussed in detail in John Bessant and Ina Goller's book '*Creativity for Innovation Management*' (Routledge, 2017).

There are numerous books on innovative leaders and companies, mostly about Steve Jobs and Apple, but most lack balance and any critical insights. Good case studies of innovative organizations include E. Gundling, *The 3M Way to Innovation: Balancing People and Profit* (Kodansha International, 2000), M. Graham and A. T. Shuldiner, *Corning and the Craft of Innovation* (Oxford University Press, 2001), Eric Schmidt, *How Google Works* (John Murray, 2014), and J. Song and K. Lee, *The Samsung Way: Transformational Management Strategies from the World Leader in Innovation and Design* (McGraw-Hill, 2014).

The 'beyond boundaries' issue of networking is covered by several writers, most following the popular notion of 'open innovation'. The notion was most popularized by Henry Chesbrough in *Open Innovation* (Harvard Business School Press, 2003), and has since spawned many similar discussions, but for more serious and critical reviews of the evidence and research can be found in *Open Innovation: Researching a New Paradigm* (edited by H. Chesbrough, W. Vanhaverbeke, and J. West, Oxford University Press, 2008), and *Open Innovation Management, Research and Practice* (edited by Joe Tidd, Imperial College Press, 2014).

OTHER RESOURCES

A number of additional resources including downloadable case studies, audio and video material dealing with themes raised in the chapter can be found at locations listed below.

Resource type	Details	Access
Video/audio	Piers Ibbotson, former direction of the Royal Shakespeare Company talks about innovation leadership	https://johnbessant.org/resources/media-resources/the-innovators-media-library/
Case studies	• More detail on the emergence of mass production can be found in the case study of Model T Ford • The Cerulean case looks in more detail at the challenges of creating a climate for radical innovation • The Liberty Global and Lufthansa Systems cases look at attempts to build a high involvement culture using collaboration platforms • The Philips Lighting case highlights the organizational challenges of changing the degree and direction of innovation strategy.	All at https://johnbessant.org/case-studies/
Tools	Tools to support the creation of an innovative organization include: • Change management • Continuous improvement toolkit • High involvement maturity model • Process mapping • Team building	All at https://johnbessant.org/tools-for-innovation-and-entrepreneurship/

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