

# **Cultural evolution and improved innovative capacity**

*Lemon, M. and Parminder Singh Sahota*

International Ecotechnology Research Centre,  
Cranfield University.

Cranfield Bedford MK43 0AL

Tel: +44 (0) 1234 754981 Fax: +44 (0) 1234 750163 E-mail: [m.lemon@cranfield.ac.uk](mailto:m.lemon@cranfield.ac.uk)

## **1. ABSTRACT**

Organisations and their managers have to tread a fine line between rigidity and chaos the positioning along which is determined by the activities undertaken at different stages of the project cycle and organisational development. Such a positioning is also dependent upon a knowledge base that is flexible, continuously replenished and embedded in all aspects of an organisation's culture. Initially, this can only be achieved through improved and explicit learning, however, as the capability to learn from the internal and external environment in a structured way develops, and flexibility is built into the system, the need for such structure will diminish and learning will start to self-organise. This paper examines the key drivers and barriers to the generation and assimilation of knowledge as a process of continuous renewal within Research and Development in a telecommunications environment. A number of cultural archetypes are derived from these indicators and the movement between them is used to suggest a form of cultural evolution that is dependent upon the creation of adaptive innovative capacity or slack.

## **2. INTRODUCTION**

Cultural evolution supported by effective learning requires us to recognise knowledge as a fundamental 'resource' within the modern industrial economy. The rapid changes that this economy has caused and responded to (exemplified by the Internet) has been managed at an organisational level through two radically different approaches (Seely Brown and Duguid, 2000). The mechanistic metaphor conjured up by re-engineering approaches assumes the ability to predict and control through the use of explicit knowledge within a highly structured and co-ordinated environment. It is essentially a top down approach in which the 'fat' is replaced by the 'lean'. Alternatively, a more emergent approach exemplified by the less deterministic (e.g. IT as tool rather than fix) aspects of knowledge management recognises and responds to uncertainty in a more spontaneous and grounded (bottom up) manner. This is driven by tacit knowledge and retains and generates some 'fat' – resources that do not have immediate or obvious utility - as the basis of adaptive capacity. While this paper will argue that these approaches are not mutually exclusive, there may be a need for high levels of control at certain times and excessive levels of spare capacity can be expensive and disruptive, it will suggest that as organisations become more attuned to the knowledge that they possess even the more structured and orchestrated aspects of their activities will be undertaken in conditions of trust and operational autonomy.

A considerable amount of work has been undertaken into what constitutes knowledge, where it is derived from and how it can be effectively nurtured, transferred and assimilated (Major and Cordey-Hayes, 2000). Knowledge is a renewable resource that is dynamic and inseparable from past, current and potential action and the failure to consider it as such raises the threat of a non-sustainable future. Furthermore, cultural evolution involves the individual learning of behaviours and the transmission of these across an organisation and to subsequent members. Patterns of organisational behaviour

are therefore copied and modified through learning processes. Programmed knowledge as traditional instruction is often assumed to provide solutions and explanations. It can also be considered as linear in nature and built upon an obsession with facts and solutions as they are conveyed by experts. The complexity of the modern organisational environment demands a radical departure from this view. For organisational cultures to evolve they must be able to respond to conditions of uncertainty generated by the multiple perceptions and systemic interactions that constitute context (Senge, 1990; Eden and Ackerman, 1998).

Culture is a form of lived experience. It is not mechanistic but includes distinctive capacities and incapacities that are built into, and derived from, the attitudes and approaches of organisational members. Similarly, corporate culture is not something that can be imposed on a social setting; it develops during the course of social interaction and is therefore a self-organising reality that is shaped and reshaped as an organisation learns about itself and its environment. The importing and imposing of new behaviours without due consideration of organisational context can lead for instance to the failure of innovative change programs (e.g. business process re-engineering, value stream reinvention improvement and continuous process improvement). As discussed above these movements offered new mindsets and values for business, backed by a detailed “language” and protocol (rules) through which organisational members could begin to think, talk, and act in a new way. Their implicit aims were to create a cultural revolution that would replace the old way of life with a new focus on customer and quality driven business logic.

Advocates of TQM and other systemic change initiatives traditionally concentrated on tangible practices and organisational structures (artifacts) with little direct attention being paid to the values, beliefs, and underlying assumptions that supported or impeded these new behaviours. For example the top-down nature of re-engineering was considered demotivating by people used to working by consensus. Alternatively, companies who focused on quarterly results often found it difficult to extend their vision to re-engineering’s longer horizons. Organisations and managers who were wary of conflict were uncomfortable challenging long-established rules and procedures (Detert, 2000).

This paper commences with an expression of concern about how culture as a concept can be interpreted, and as a determinant of knowledge creation and innovative potential, can be managed. The need to ground culture and organisational learning is then discussed in the context of how they might affect the ability of a company to innovate. A number of indicators of innovative capacity, identified in semi-structured interviews with telecommunications researchers, are then presented. Finally, a set of generic cultural archetypes, derived from these indicators, are introduced and discussed.

### **3. CULTURE - SOME INITIAL CONCERNS.**

Two initial concerns can be linked to the concept of culture as a conceptual device for management. Firstly, it can appear all encompassing and secondly it does not readily lend itself to measurement. At worst these can appear to make the concept meaningless, and at best difficult to translate into a form that is useful for practical management purposes. Two interpretations of culture can reinforce these problems. If we attempt to make sense of, or recreate, homogeneous cultures that represent the whole organisation we are likely to be constrained to the relevant, but cosmetic (logos, liveries, stylized or choreographed interface with the public etc.). Secondly, and linked to this, is the depiction and creation of culture through the pursuit of strategic objectives that may be conveyed by a form of mission statement (increase the value of the company to the

shareholders, encourage organisational diversity, identify and remove the barriers to communication, pursue customer satisfaction etc.). If literally translated, or translatable, into action these would result in a standardized culture that is imposed or envisioned from the top. The irony here is that strategic objectives such as flexibility, diversity etc. can, at lower levels, become encapsulated in rules and procedures with counter productive results. What is measured is often compliance with the mechanisms of implementation rather than the intended impact of the strategy. For example time restrictions on call service personnel to ensure turnover and customer satisfaction can result in the dissatisfaction of the customer and de-motivation of the operative. The negative effects of shortening waiting lists in the health system and achieving educational targets by schools are also well documented examples of this dilemma. One reason for such a failure might be the existence of clearly defined and inflexible performance measures, below certain levels in a hierarchy, that restrict the necessary freedom to pursue more abstract goals.

This sceptical introduction to the value of culture as an operational concept can be moderated by a couple of related observations. Firstly, an acceptance of cultural pluralism is key to our understanding of organisations, and central to how, when and where we can intervene. Secondly this link between cultural understanding and appropriate intervention cannot be achieved from the top – down without a corresponding, iterative and meaningful dialogue from the bottom – up. Much of the literature on organisational culture, particularly that which is management oriented, focuses upon the role played by senior executives and their role in 'shaping' culture.

#### **4. THE ORGANIC METAPHOR**

One derivation of culture lies with pre-industrial agriculture and the tilling of the land (Morgan, 1987). This was not restricted to bio-physical cycles or processes but extended to the knowledge, ideology, values, laws and day-to-day ritual that defined, and were defined by, agricultural production. It suggests the need for ethnographic observation to capture the subtleties of culture as a set of beliefs and related activities that have become increasingly associated with variety and difference. In our modern, or 'post-modern', world organisations are becoming ever more important determinants of western culture. What we wear, when we wear it, what timetables we adhere to, where we live etc. are all tied to the rules and mores of our working life and the organisation associated with it. An apparently 'homogeneous' industrial culture is however (re)defined by the context within which it is situated. We need to look for difference even when groups are apparently 'singing from the same hymn sheet'. This point is particularly relevant when we attempt to identify specific indicators of culture. For example, while integrity and trust are likely to be universally accepted, they might also have very different meanings to different actors at different times. Under certain contexts trust between workers might well engender some concern in their line managers. Does this trust represent good team working and / or a co-ordinated attempt to circumvent the system (Mars, 1994)?

Dickens (1992) and Latour (1993) among others question the separation of human culture from nature. All humans are actors but not all actors are human is a neat encapsulation of the argument that the physical and natural are part of culture. Organisational culture is not only manifest through the perceptions, beliefs, norms, actions, relationships and behaviours of humans but through the 'hardware' and structures that constitute its physical and institutional presence (Law, 1994). Culture shapes the character of an organisation and organisational culture therefore requires closer scrutiny. In empirical work a common approach has been to identify the artifacts of a culture, such as the

unique symbols, heroes, rites and rituals, myths, ceremonies, and sagas of an organisation, and then to explore, to a greater or lesser extent, the deeper meanings of these artifacts (Deal and Kennedy, 1982; Hofstede, 1991; Martin, 1992; Trice and Beyer, 1984; Wuthnow and Witten, 1988).

In summary, culture can be perceived as the "social glue that " binds the organisation (Golden, 1992; Smircich, 1983). It can also result in a meaningless and static 'blanket' identity and definition to be cast over the whole, or parts, of an organisation. To make it useful we must focus upon multiple cultures – meaning, norms and values – within and between organisations, their sub-groups and the environment in which they operate. We will now consider some of the factors that might help us focus in this way.

## **5. ORGANISATIONAL LEARNING - THE PERCEPTUAL AND THE POSSIBLE**

A number of further points can be raised about the exploration of cultural issues. The same process or phenomenon is invariably subject to multiple interpretations. There is no 'objective reality', if an event is perceived as real it is real in its consequences. In other words behaviour is tied to the world as it is perceived (Green and Lemon, 1996). The latter point is important in a cultural sense because the 'world view' that underpins organisational behaviour may not coincide with that of the individuals or groups carrying out that behaviour. This will be particularly prevalent under conditions of high control and low autonomy. By extension the interpretation of a process or phenomenon varies not only between organisations, individuals and groups, but may well change through time with the acquisition of new knowledge. This brings us back to the organic metaphor and warns us against interpreting cultures as static and manipulated – waiting to be done do. Cultures adapt and change in response to their environment and in so doing they alter that environment and thereby themselves. Again this is not restricted to the relationship between an homogeneous 'big culture' view of a company and the environment within which it functions but is determined by the range of heterogeneous 'small cultures' that operate within it and interact in various ways, internally, and with the outside. Staff may have specific characteristics that provide them with a common identity over and above the organisation they work for (e.g. automomotive workers, rail enthusiasts who are also railway employees). Alternatively, non-work related interest groups can emerge within an organisation (e.g. arts and sports enthusiasts). Communities of practice and communities of interest seldom conform to organisational boundaries. However, they often have a significant influence on the culture(s) of an organisation and its capacity for change.

For organisations, with an average life span of forty years, and declining, organisational learning has become essential for survival (De Geus, 1988). It has also been suggested as the only sustainable source of competitive advantage (Senge, 1990) and the single most important quality that can be developed and traded. Individual learning cannot alone resolve relationships either at the personal, team, or organisational level. Equally even the very best organisations cannot resolve the intractable issues of communities and societies. The idea of a "learning organisation" is a recognition of, and response to, the limits of individual learning. Although it can and does occur accidentally, organisations cannot afford to rely on learning through chance (Dixon, 1994). Organisational learning is only effective when it results in behavioural change, " there can be no learning without action and no action without learning" (Revens, 1998). Adaptation is, therefore achieved only through learning and learning can only emerge from adaptation. Organisational learning cannot occur solely through the acquisition of new-programmed knowledge, no matter how important that knowledge might be. It is a long-term initiative that involves

sound managerial practice and processes that requires an organisation to be skilled at creating, acquiring and transferring knowledge and the capability to modify its culture to reflect the related skills and ideas. The key to a learning organisation is the empowerment of employees to make decisions based on the knowledge and skills that they acquire and this necessitates trust (Newell and Swan, 2000).

## **6. GROUNDING CULTURE: INDICATORS OF INNOVATIVE CAPACITY**

The following section draws upon primary data collected from a total of twenty-two semi-structured interviews with active researchers and managers (team leaders) in six research teams within a large telecommunications company. The analysis of the data was discussed and refined through five feedback workshops with representatives of the original sample. The organisation wished to appropriate the full benefits of its research and improve the fit between the aims of those employees who commissioned the research to meet corporate and revenue objectives and the researchers who carried out the work. Concern was also expressed about how the research process as a whole was fed back into the organisation resulting in inadequate organisational learning. The following key indicators of innovative capacity and the cultural dimensions based upon them were derived from data collected in response to a broad question about how research needs were defined, projects structured and results diffused and assimilated.

### **6.1 Team make-up**

The complicated nature of most projects required the pulling together of a range of skills. Even when individual expertise necessitated working in isolation or through small groups that expertise had to 'fit' the project and the other members of the project had to see how different contributions fitted together. In consequence team working was considered to be fundamental, and the balance of a project / group team important in determining innovative capacity. The adoption of matrix structures (i.e. where individuals were members of both work groups and project teams) was one factor that appeared to influence the (in)ability to innovate and explore.

*Some rules come from the project and some from line management and this can lead to conflict.*

The skills balance within teams varied and was determined largely by the technological emphasis of the work. Where there was a focus upon the solving of technical problems rather than the transfer, use or management of technology there appeared to be less expertise in social and human processes.

*Technical expertise is the key to the work but it is important to work as a team and have communication and presentation skills.*

It is likely however that this expertise would be brought in at the development / transfer phases of a project. These are increasingly defining, and potentially restricting, the parameters of technological innovation by targeting the transfer of a research generated product into the market place – albeit when that market is within the organisation. Other teams that are interested in the organisational and structural characteristics of the companies activities will obviously be oriented more towards social / human science expertise. While the disciplinary balance of the team does not, of itself, indicate innovative capability the ability to appreciate how different competences complement each other may well do so. This suggests a number of factors that were raised in the interviews. For example there is invariably a need for 'mavericks' who can think 'outside of the box'. Similarly the ability to link skills sets in such a way that something new emerges is itself a skill and is key to the creative capability of a team. Such integrative

skills need to be both recognised within the team and underpinned by experience of other disciplines and industrial contexts. Each of these examples could be seen as the incorporation of ‘slack’ or redundancy in the workings of a team. In the first case the ‘hit’ rate might be infrequent and in the latter case the value of a systemic and integrative approach is often not readily measurable.

*There are some people who are all-rounders and can be slotted into most things.*

*There are rampant individualists who upset the team. (as a leader I) Would expect them to contribute to the team and not just to themselves. What matters is working as a team.*

The willingness to share expertise combined with a preparedness and ability to ask and receive (see the following text box) is an important feature of innovative capacity – as is the communication necessary to identify and locate that expertise.

*(1) Actor A: aware of own knowledge potential – willing to share – Actor B: aware of the potential value of A’s knowledge – willing and able to assimilate*

*(2) Actor B: aware of A’s knowledge potential – willing and able to ask – Actor A: willing and able to share – Actor B: able to assimilate*

There was a noticeable variation in the way research teams acquire and retain the personnel they feel are appropriate to their tasks. The majority of teams in the sample had a stable workforce with mobility occurring between research projects or more broadly within the company. However, one team with specific technical expertise tended to lose personnel to the market place because they could command higher salaries outside. This team was much more pro-active in bringing in specific skills and unlike the other teams would concentrate less on the internal advertising of posts and more on the international labour market with the associated contractual issues (work permits etc.).

## **6.2 Cognitive and leadership style**

We have already introduced the potential role for mavericks. There is evidence of incremental and methodical attitudes to research and others that are perceived to describe the approaches taken by ‘fliers’ and risk takers. The ‘shape’ of a team is obviously influenced considerably by the style and perception of the team leader. There were examples of the whole team being actively involved in the selection of new members and this was felt to improve the fit of the team and to encourage shared responsibility. Team leaders, therefore, may have a ‘vision’ of the technical and social mix that is potentially the most innovative. This requires an appreciation of how individual characteristics complement each other and, of course, how they might conflict.

An important function of the team leaders was the desire to ‘protect’ their team from those aspects of project management that could constrain ‘creativity’ and productivity. Administrative and financial minutia were ‘fielded’ by the team managers.

*Team leaders can have more of a pastoral role alongside the provision of technical support and helping with relationships inside and outside of the group.*

*We need to separate the creative from the managerial.*

The ability to meet project targets was considered to have a significant influence on innovative capacity. For example *capping as the result of overspend* can prevent the continuation or expansion of the project. The ability to balance these skills relating to project management with a strategic vision was felt to be a key management skill.

*The group leader needs a strategy over two to three years and the ability to monitor progress week by week.*

The need for consistency and clarity of approach in leadership was also raised as an important factor and the confidence generated by this, combined with the necessary reciprocal trust, was felt to provide the 'space' within which the team could take risks and innovate.

*The team know where they are going and that there is group consensus about this ... within the 'rules' the team are expected to take risks and 'out of the box' thinking is encouraged.*

There was, however, a pragmatic acceptance of the need to ensure that project targets were met and this impacted upon the innovative capability of the team in terms of when they could explore and create and when they needed to deliver. Project leaders may draw upon an *intuitive feel and be prepared to be less of an expert than their team*. This again highlighted the importance of trust and a *reliance on those below for technical guidance*.

### **6.3 Time scale and creativity**

A distinction was often made between individual projects and the longer term 'programmes' within which they were located. These programmes might not be formally defined but may indicate the strategic path for a team. The pursuit of this longer term 'strategy' was felt to result in a different form of innovation to that which is more clearly bounded and short term. For the latter there are cyclical constraints upon the ability to innovate – annual budgets, product delivery periods, corporate constraints on expenditure etc. In terms of the project cycles there are also periods when more exploratory and creative work can be undertaken and others when consolidation and delivery take priority.

*At the start of a project there is more freedom and interchangeability among the team. As it develops, increased specialisation restricts this freedom.*

It is of course also possible for process innovations in these areas however, corporate restrictions e.g. on expenditure, can obviously affect the ability of teams to scan and network by removing budgets for travel, consultancy, literature etc. This extends to the prevailing culture attached to research and development and the relationship between the agencies responsible for them.

*Previously research led to development. It is now a more macho environment where if something is not invented locally then there is no interest.*

*There is little feedback from the developers. We are looking at things that they are not interested in yet.*

### **6.4 Scanning and broadening the innovative base of a group**

Scanning contributes to innovative capability by expanding the potential knowledge base of the company. Networking and scanning occur both within the organisation (formal access to the literature, research fellows, internal communities of interest etc), and outside of it (access to the literature through personal interest, conferences and exhibitions, university and consultancy based research etc.). It is also dependent upon adequate funding (e.g. of IT, travel) and access (to other departments and levels of authority). In other words effective scanning requires freedom and resources in conjunction with a feel for what is useful and an appreciation of where that knowledge might reside. The relationship between scanning and assimilation is important. Scanning requires a strategy and a procedure for assimilating what is relevant and useful. This highlights the difficult balance that needs to be struck between the pragmatic considerations of time, resources

and information overload and the establishment of slack as adaptive or innovative potential.

### **6.5 Home / remote working**

The move towards increased home-working is an attempt to provide a more flexible working environment and in so doing reduce the amount of office space required. This was felt to be a productive way to work when specific tasks required completion. Some concern was expressed when the home worker possessed skills that could not be readily communicated electronically, or more particularly where they were a catalyst for new ideas or perceived as essential for the group to innovate collectively. Non-verbal communication is recognised as a significant factor in face to face communication, it is obviously even more important when working relations take place at a distance. The 'larger' culture of an organisation, based upon the cost and efficiency benefits of distance working and other working arrangements, obviously generates a very different set of 'local' cultures among teams that have varying levels of face to face interaction. Distance working within a team also requires considerable trust on the part of team members, both in terms of the potential for the home worker to feel isolated and vulnerable when things are not progressing smoothly, and for the office based members to generate this through the establishment of an apparently tight and exclusive unit.

*Because I am a bit of a Maverick and work a lot on my own I feel cut off from the everyday running of the lab.*

### **6.6 Office layout**

Formal (project meetings, personal development etc.) and informal meetings (external leisure activities, coffee breaks, corridor chats) are significant influences upon innovative capacity. The physical layout of the working environment can affect the quality and frequency of those meetings in a number of ways. For example:

- through the accessibility of meeting rooms – including the procedures required to obtain them;
- through the provision, and use of, informal venues for social interaction (coffee areas etc.);
- through the location of personnel in such a way that communication is encouraged but not disruptive.

This latter balance is particularly evident when applied to 'open plan' formats where it is possible to bounce ideas between people, to locate sources of information or expertise and to interfere with the perceived productivity of others operating in the same space. The response to these issues is determined by the individuals concerned (will they interact? are they easily disturbed?) and the procedures that are in place to encourage social interaction.

### **6.7 Level of social interaction**

It has been seen that the amount of social interaction can be influenced by working practice (e.g. home working) and the layout of the work-space (e.g. open plan, symbols of hierarchy and status – more space, better chair etc.). These factors are themselves determined by high level managerial decisions about office layout and line management style. For example team managers may encourage brain-storming sessions on a regular basis and problem solving ones as and when they are required.

Other aspects of social interaction are largely determined by the position of individuals in the life cycle. For example young single personnel are more likely to socialise together in an informal and unstructured way (drinks, meals etc.) and form communities of interest from within the company (e.g. new recruits network emerging from the induction programme).

*Five of the group are married with kids. The rest are young single and mobile and socialise within and across groups.*

They are also more likely to communicate and interact with similar individuals and groups from other employment (e.g. area graduates e-mail network). Alternatively, of course personnel with family commitments are likely to be less flexible in terms of the time they spend interacting socially with their peers from work. One respondent felt that contacts were established in formal and informal contexts as the result of a combination of *networking and serendipity*.

## **6.8 Measures of success**

While performance is seen to be measured by results – patents, publications, completion times, customer feedback etc. it is difficult to establish where and when the benefits are accrued and whether these can be related to innovative practice. Indeed, if performance is measured through the ability to match objectives with deliverables it is conceivable that the objectives will be restricted to the achievable with the potential of, and need for, innovation being correspondingly reduced. The setting of conservative and achievable targets can be seen as a politically astute way of meeting those targets and ensuring continuity of funding. A reasoning that is not unheard of within academic circles. This also highlights the paradox discussed above whereby the pursuit of performance measures and attainment of targets can drive the R and D process at the expense of the underlying aims of the process. If publications or patents are a measure then the danger of quantity overshadowing quality must be recognised as must the fact that much innovative research is not guaranteed to result in either and certainly not within a finite (short term) time frame.

## **7. CULTURAL ARCHETYPES**

Six broad cultural dimensions were derived from the indicators of innovative capacity introduced above and the interview data upon which they were based. These have then been incorporated into a set of archetypes that provide an abstract representation of the different cultural stages of innovation.

The cultural dimensions were as follows:

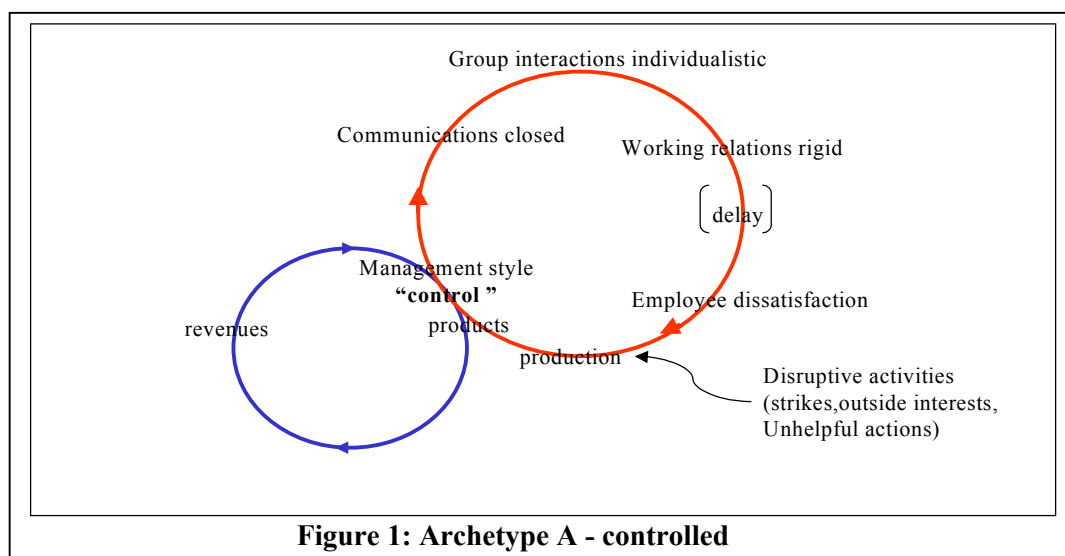
- *Degrees of freedom*: risk taking and the sense of ownership (autonomy) over the work task.
- *Group interaction*: the level of formal and informal interaction within a research team.
- *Communications*: the degree to which communications were (un)hindered, levels of feedback from management.
- *Balance*: the sense of security within the workplace (job security, career development opportunities and financial rewards).
- *Working relations*: management style and the type of interpersonal relationships developed as a result (e.g. trust, empowerment).

- *Time*: from short to long term perceptions of the research and development process.

There is some similarity between these dimensions and the principles that underpin aspects of cultural theory. Namely the relationship between the amount of autonomy allowed to a worker and the extent to which collaboration takes place within teams (Douglas, 1994). While these are predominantly social dimensions it must be remembered that they are in large part determined by the structural and environmental characteristics of the workplace. For example office layout, distance working and policies relating to them will affect social interaction, and accountancy cycles will have a marked impact upon how time is related to specific research and development activities. By mapping these six dimensions against the research teams it was possible to derive the provisional cultural archetypes - controlled, fuzzy, inspiring and cultivated.

**7.1 Cultural archetype A “controlled”:** (*short time focus, closed communications; rigid working relations; individualistic; position vulnerable; extreme time pressures – cost cutting; rule based; creativity discouraged*).

Taylorism both advanced and froze management thinking with its ‘scientific approach’ that was task focused and subjected the worker and organisation to a mechanistic interpretation. The principles of Taylor’s scientific management attempts to codify worker experience and skills into objective scientific knowledge. This style of management can result in creative abilities being directed towards the disruption of innovation. The requirement to ‘drive out fear’ is a critical step toward bringing innovation to the workplace, however the formal innovation in this cultural style is largely product-oriented, contained and inward focused. Mintzberg (1979) refers to this as “sealing off the operating core from disruptive environmental influences”. Innovation in this context may well ease individual and collective work tasks with a potential benefit for the company however at best these benefits are unlikely to be recognized as a product of innovative practice and at worst the innovative behaviour may be penalized for stepping outside of accepted practice. An alternative scenario within this archetype might be the focusing of innovative capability towards behaviours that circumvent accepted practice for the benefit of the individual and or group rather than the organisation as a whole.



**Figure 1: Archetype A - controlled**

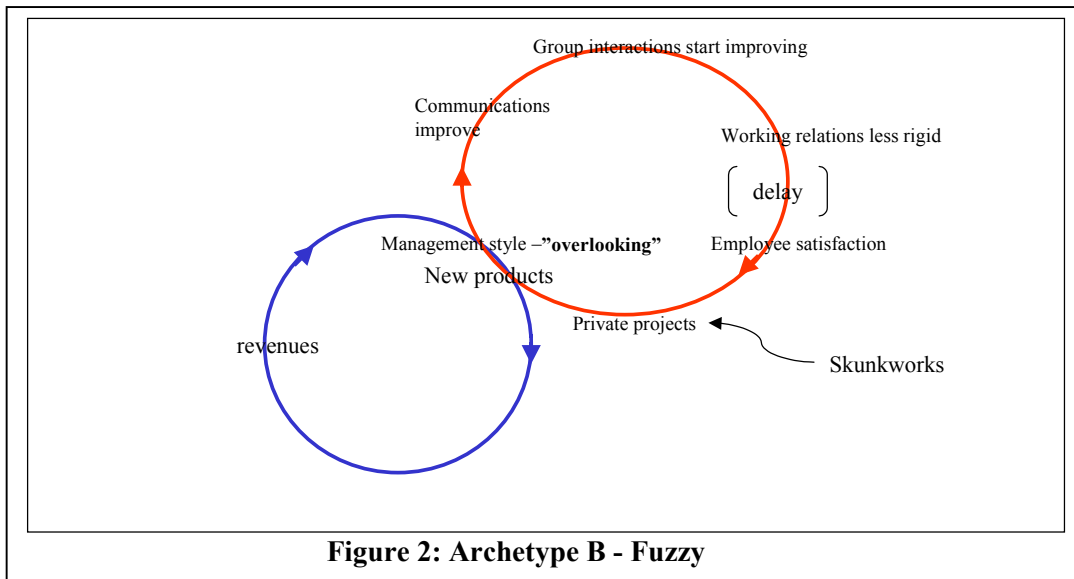
The knowledge within this archetype is “encoded” and not held by individuals thereby reducing the dependence of the organisation on those individuals. Knowledge is held by

the organisational structures that are responsible for forming the rules and processes. There is a separation of the knowledge that is required for carrying out the operations of the organisation from its generation and renewal. Knowledge is therefore scattered and fragmented at an operational level and is only consolidated at management level. The abstraction of individual's experience and knowledge into encoded knowledge also facilitates centralization and control in organisations (Lam 2000). Organisational structure and the management information systems become the knowledge itself (Bonara and Revang 1993.). The encoded knowledge is inevitably simplified and selective and fails to capture and preserve the tacit skills and judgement of individuals. This inflexible archetype has difficulties with spontaneous change and is not effective in the creation of new knowledge. This is in large part due to the limited use of tacit knowledge.

**7.2 Cultural archetype “B” – fuzzy:** *(Long term focus on the big issues; closed communication; individualistic; protected; rigid working relations; rule based; creativity discouraged).*

When a ‘fuzzy’ approach is adopted towards innovation the basic culture allows creativity but provides limited assistance or direction with the task. This can have a significant effect on the innovation process with the existence of unofficial projects where people are allowed to work on their ‘pet’ ideas. The “skunk-works” model popularized by Peters and Waterman (1982) is an example of a fuzzy archetype that allows individuals to work on projects in their own time or outside the main research activity of the group or organisation. Skunk-works, and indeed most innovation within this archetype seem to work largely through intrinsic motivation. As Kohn (1995) has shown, promised reward is neither a motivator nor a guarantee of innovative success. The improvised style of the typical skunk-works seems to be an important ingredient for creativity. For such private projects to work, the domain of innovation needs to be aligned to the skills and interests of the people working on them. Although the “fuzzy” archetype allows a higher degree of autonomy to individuals, its structures are still bureaucratic. Controls remain in place and co-ordination is achieved “by design and by standards that predetermine what is to be done” (Mintzberg 1979).

The nature of the ‘fuzzy’ archetype makes it unlikely however that the organisation will learn from the process even if it does succeed in developing the products of such innovation. Embrained knowledge provides the competence that forms the basis of internal work rules, job descriptions and status. The knowledge structure is individualistic, functionally segmented and hierarchical and individual experts have a higher degree of autonomy and discretion in the application and acquisition of knowledge within their own specialist areas. The sharing and dissemination of knowledge across boundaries is however limited (Lam 2000) with the uncertainty in problem solving remaining contained within specialist boundaries. Mintzberg (1979) refers to this process as “pigeonholing” whereby the organisation assigns specialist tasks to individuals and groups and loses the capability to work outside of those specialist areas.

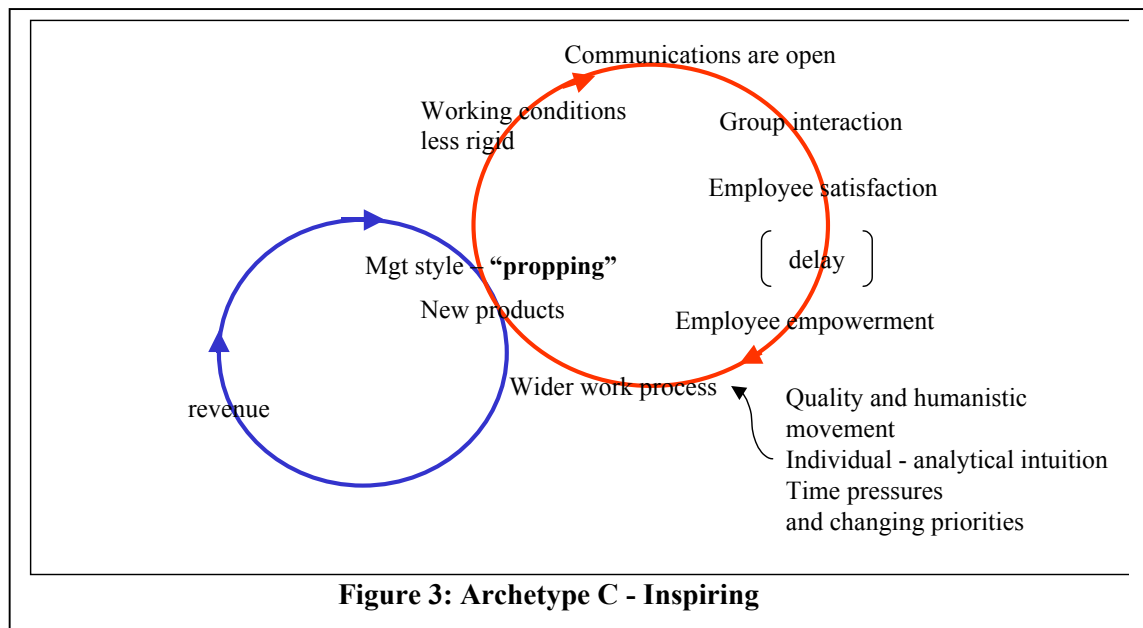


**Figure 2: Archetype B - Fuzzy**

The key knowledge agents are the trained experts who apply an existing body of abstract knowledge in a consistent and 'logical' manner. This restricts the use of tacit knowledge and judgement skills for dealing with uncertainty in problem solving (Lam, 2000). While formal expert knowledge entails "perceptual filters" (Starbuck 1992) there is a lack of shared perspective and this inhibits both the transfer of non-routine tacit knowledge in day-to-day work and the interaction and sharing of knowledge with "non" experts (Lam 2000). This lack of co-ordination creates problems for the innovation process with organisational learning being limited by the existing levels of formally acquired specialist knowledge and the restricted use of tacit knowledge (Mintzberg 1979).

**7.3 Cultural archetype "C" - inspiring:** (*Short time horizons; individual responsibility and autonomy; open communications and group interaction; informal relations with management; protected positions*).

Within an 'inspiring' R and D culture skills that support creativity are actively sought as the innovation worldview has expanded from a product focus towards multiple work processes. There is less standardization than in the controlled model of innovation and the organisation is more responsive to new ideas and open to alternative ways of working. Individuals have greater autonomy and more discretion in how they undertake their work and there is a more enthusiastic approach to experimentation and interactive problem solving. The concept of Total Quality Management triggered many such efforts to move from a 'controlled' to an 'inspiring' style of innovation. This often followed an analytic approach with quality being measured, root causes identified and innovative solutions found in response to the underlying problem. The primary tool underpinning this model has been brainstorming which can be less efficient than individual critical thinking because it encourages an organisation to focus on the less difficult of their problems rather than those that are more complex and long term and in need of a more creative approach.

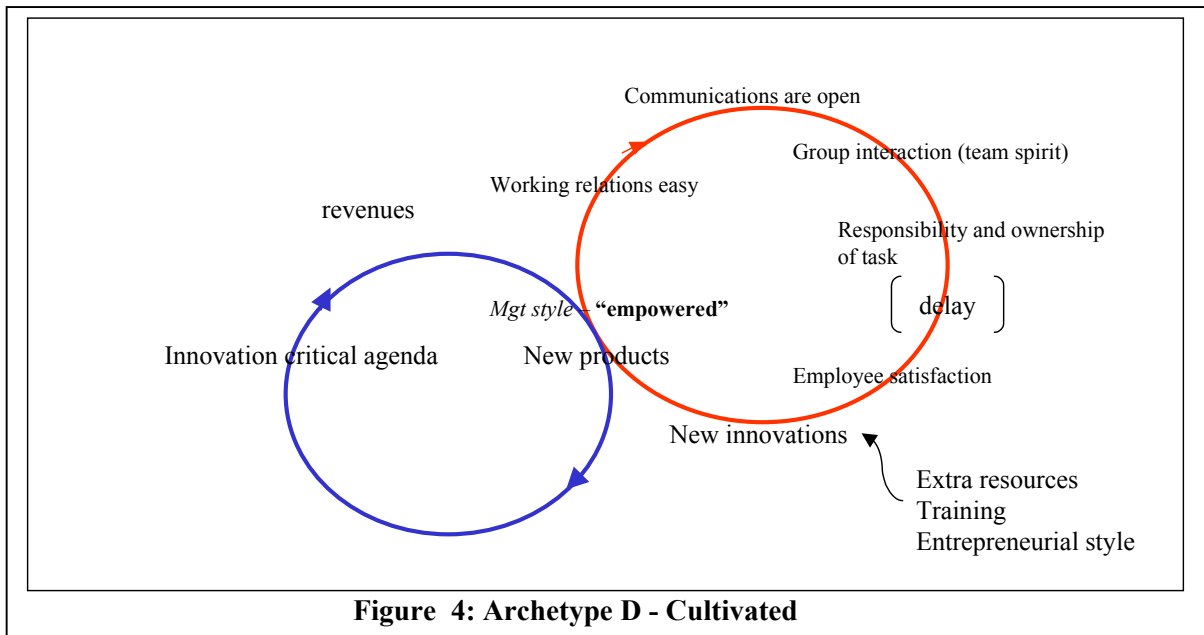


This is a fundamental shift from away from a focus on re-engineering and could be perceived as a retrogressive step with intrinsic motivation being replaced by an extrinsic reward system for improvements made. The linking of compensation to savings can be expensive and result in a focus on immediate reward rather than longer-term and whole company benefits. This archetype draws on the formal knowledge of an organisation's members alongside the embodied practical problem solving skills of external experts. Greater tacit knowledge is generated through experimentation and problem solving. This supports the concept of "know – how" companies, in which technical and managerial expertise are integrated, and points to the broad-based and varied nature of knowledge required by the organisation (Sveiby and Lloyds 1987).

The capacity to react to changing situations is a key characteristic of this cultural archetype in which the knowledge structure is individualistic but collaborative. Lam (2000) refers to the importance of embodied skills and "know – how" competencies. The idea of "knowledge intensive firms" emphasizes the significance of "esoteric expertise" over commonplace, readily accessible, knowledge and illustrates the idiosyncratic nature of the knowledge base (Starbuck 1992). Learning occurs as experts of diverse fields jointly solve problems. This is similar to the process identified by Leonard-Barton (1995) where knowledge building takes place through individuals with diverse signature skills working together on the solution of a problem. Through experimentation and prototyping the organisation is able to extend its existing capabilities and to build new ones for the future. As these competencies are embodied in an organisation they also cease to be exclusive. Starbuck (1992) refers to the "porous boundaries" of knowledge intensive firms and suggests that they find it hard to retain unique expertise.

**7.4 Cultural archetype "D" – cultivated:** *(focus on the big issues over a long time frames; high levels of autonomy and low levels of risk aversion; empowering management style; secure working environment).*

The 'cultivated' cultural archetype incorporates innovation as a critical process in its own right with a focus on the long-term and the whole organisation rather than the group responsible for carrying out the work. This over-rides the restrictive cost centered approach that might predominate in other models. In order to increase creative and innovative competences people are trained on a range of tools and techniques, either to stimulate general creative thinking or for specific use within creative problem solving. In



many ways the transition from the inspiring to cultivated archetypes is not as difficult as previous transitions because it requires limited cultural change although increased creativity may require more open communication and trust than was previously the case. It is important to note that this ‘empowered’ style of innovation is also capable of undertaking some directed and product oriented work because of the relationships and trust that are built into the team. The controlled archetype, by comparison, is likely to be incapable of undertaking work that is creative, relatively unstructured and grounded in competence (skills) and relationship forms of reciprocal trust (Newell and Swan, 2000). Within the cultivated archetype knowledge is embedded within the operating routines. There is a shared culture and a strong interaction between the different types of knowledge. This is similar to *knowledge conversion* (Nonaka and Takeuchi 1995) where the organisation produces new knowledge and creative insight by moving between the personal, tacit knowledge of individuals and the shared explicit knowledge which the organisation needs to develop new products and innovations.

## 8. CONCLUSIONS

The purpose of this paper has been to address some fundamental questions about how organisations can increase their capacity to innovate and learn through a process of cultural evolution. All organisations are capable of learning, albeit through the acquisition of explicit rather than tacit knowledge. Those that learn more effectively (i.e. in terms of responding to the external environment) are better equipped to survive while those that fail to learn are more likely to disappear (Nevis, et.al., 1995). Management needs to take strategic action and make specific interventions to ensure that learning occurs (Shaw and Perkins, 1991). This requires an understanding of the internal strategic drivers including a clear mission and vision, leadership, experimentation, transfer of knowledge and teamwork and cooperation (Stata, 1989; Goh, 1998). Although presented as separate dimensions these building blocks are interdependent and mutually supportive conditions in a learning organisation

The paper has argued the need to move away from a focus on the behavioural and physical artifacts of culture alone to an approach that links them with the values, beliefs, and underlying assumptions that support or impede these behaviours. It is the different configurations of these factors that determine the multiple cultures within which

innovation can take place and the need to understand these different contexts is key to managing the process. Culture is contextual and dynamic and managerial judgement must be used to relate the insights about cultural phenomena to the contexts in which change is desired and to identify appropriate instruments and implementation mechanisms to facilitate it. Attempts to “impose” an archetypal culture, even one that has succeeded elsewhere, without understanding the underlying characteristics of the “resident” culture are likely to fail. The creation of a particular corporate culture is not just about inventing new slogans and logos or acquiring a new leader it is about recognising, influencing and responding to collective mindsets. The challenge of cultural change is significant because it involves the creation of shared systems of meanings that are accepted, internalized and acted on at every level of the organisation. They are organised through core meanings that people own and share and it is this quality that allows them to be flexible and adaptive.

In conclusion, a number of points need to be emphasized. Firstly, culture is not homogeneous or static. Multiple cultures co-exist and are continuously modified by their changing environment while affecting the form that those changes might take. Secondly, in order to progress our understanding of culture it is necessary to have an improved appreciation of the temporal, spatial and organisational scales at which businesses operate. Thirdly, formal and informal processes of information transfer, and the networks that facilitate and constrain those processes, are key to the ability of an organisation to innovate and adapt. Fourthly, the successful movement from one cultural archetype to the next cannot be forced but should be a natural progression based upon the ability of an organisation to learn from, and adapt to, its environment. This is a key determinant of innovation and should be continuous and aligned to the various indicators for creating flexibility or slack (trust, empowerment, variation in working relations, open communications etc.).

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