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Beyond Lean: Overcoming Resistance to Innovation to Improve Productivity

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Abstract

The importance of innovation to the continued success of organizations is illustrated by the many examples of direct and indirect support for innovation. Indeed, the UK Government views innovation as one of the main drivers of improved UK productivity. This paper provides an overview of research in the global automotive industry that is being undertaken to understand and overcome the barriers to innovation that is evident in organizations. It reviews the literature surrounding resistance to innovation, looks at the potential influence of organizational culture and climate, and identifies areas where intervention may help overcome organizational barriers to innovation and foster productivity improvement. The paper will also focus on what elements of the innovation process can be measured and review the instruments that are currently available

for the task. The innovation literature is broad but cannot be construed as comprehensive in this particular area of interest, thus the paper culminates with a summary of further opportunities for research.

Introduction

To understand and overcome resistance to innovation there is a need to make explicit the various forms in which it is manifest. However, in order so to do there is also a need to understand what constitutes innovation to serve as a platform from which to investigate resistance alongside other of the concepts explored in this research work. The literature on innovation, including its causes and consequences, has developed over the last half century and extends across many academic fields. Recent decades have seen the creation of new journals and associations, an ever-increasing number of publications and the emergence of numerous cross-discipline research centres, all with a focus on innovation. While it would not be possible to summarize all that has been written about innovation within this paper, King's introduction (1990) and Fagerberg's overview (2006) provide a useful guide to the literature.

Defining innovation is neither easy nor clear cut as it means different things to different people. Sometimes confused with invention, often used interchangeably with creativity, innovation has different types, comes in different forms, has different associated theories and is defined differently in the literature (Rickards and Moger 1988; Nystrom 1990; Vrakking 1990). Zaltman et al (1973) conceive innovation as "an idea, practice, or material artefact perceived to be new by the relevant adoption unit", which is further exemplified by Damanpour (1991), Daft (1986), and Damanpour and Evan (1994). From West and Farr's (1989) comprehensive definition, innovations are "new and different ideas, processes, products or procedures". West and Farr (1990) also describe innovation as a cycle with four stages, comprising recognition, initiation,

implementation and stabilization, although the innovation process is now more generally agreed to consist of two components, creativity and implementation, which may or may not occur at the same time (von Stamm 2003). Thus, innovation can be described as the process of implementing an idea or invention that, while it cannot occur without an initial creative act, may be carried out a long time after idea creation, and potentially by different actors. For the purposes of this paper, innovation is defined as the process of bringing new and improved products and processes to market; developing, adopting and adapting manufacturing processes to enhance productivity and product quality; developing, adopting and adapting business practices to enhance the performance of the firm.

Understanding Innovation

There is general agreement on innovation comprising the two components of creativity and implementation, although the same cannot be said for what constitutes innovation type. Depending on the context, innovation can be classified as product or process, where product innovation is essentially about change in the product or services that an organization offers, while process innovation involves change in the technology and supply of the product or service, or in its distribution (Tidd, Bessant et al. 2001). Utterback and Abernathy's (1975) dynamic model of the innovation life cycle reflects the interactive nature of product and process – change to either one may impact on the other. It relates the process of innovation with the degree of incremental or radical technical change and shows how product innovation precedes improvement in the process innovation.

Innovation can be further classified as incremental or radical depending on whether the innovation is an improvement to an existing product or process, or totally new, where *new* can mean new to the market, to the industry or simply new to an organization. Thus, innovation may

stem from ideas generated within the organization (endogenous innovation) or transferred in to the organization from elsewhere (exogenous innovation), possibly with adaptation to fit the new context: it is upon exogenous innovation that the case study organization wishes to focus.

Incremental or continuous innovations evolve from the iterative nature of the process of innovation, and provide new features, benefits, or improvements to the existing technology in the existing market. Radical or discontinuous innovations result in a new market infrastructure, causing discontinuity on a world, industry or market level and creating a previously unrecognized demand by the consumer (Garcia and Calantone 2002). Where a company may be concerned with organizing for innovation, careful assessment of the required type of innovation will need to be undertaken.

Innovation can also be considered at the level of the individual, however, or at the level of the working group or the organization (King and Anderson 1990). West & Farr (1990) distinguish between innovation at the individual, group and organizational levels, and suggest that by 1990 there was little research dealing with innovation in working groups. King and Anderson (1990) do address this, albeit through discussion on leadership, cohesiveness, group longevity, group composition and group structure. Extant literature has tended to concentrate on the individual level, with not enough attention given to the work group (King and Anderson 1990) or organizational level (Fagerberg 2006).

Understanding about the development of innovation has evolved through five generations from simple linear sequences to more complex network models. The first three generations were concerned with innovation sources and the latter two with the process of innovation. Activity focused models tend not to take account of innovation in the organizational environment where boundary spanning is typical and there are high levels of integration. Rothwell's fifth generation model is that of a continuous innovation process system based on integrated systems and

extensive networking leading to increasing flexibility and customized responses. He describes the main benefit of this model as "one in which electronic information processing and the more traditional informal face-to-face human contact operate in a complementary manner" (Rothwell 1994, 2002). Organizational mastering of the fifth generation toolkit is as much about understanding what motivates people to innovate as it is about developing technological strategies, the former being a key focus of the current research.

Interaction with customers and suppliers, and through professional and social networks, for example, brings about contact with people and ideas that may challenge the accepted way of thinking about things (see for example the research on the importance of "weak ties" to innovation: (Granovetter 1973; Granovetter 1982; Bryson and Daniels 1998). What is unclear, and thus worthy of further investigation, is how this might fit with the concept of a psychological contract, which sets the dynamics for the relationship between an employer and an employee (Rousseau 1995). Distinguishable from the formal written contract of employment, it represents the mutual beliefs, perceptions, and informal obligations inherent in the relationship and defines the detailed practicality of the work to be done (Conway and Briner 2005; Wikipedia contributors 2006). How then does the psychological contract fit with the proposition that innovation is a function of the relationship of person with organization, the context in which they operate, and their predisposition to be creative? The psychological contract is a constantly changing set of expectations that, although unwritten, can be a significant determinant of behaviour in organizations. Perceptions of violation can have lasting effects on trust, with a concomitant impact upon innovation (c.f. Robinson and Rousseau 1994; Miranda and Kavan 2005; Patterson, West et al. 2005).

Barriers and Enablers to Innovation

In its recognition of a number of levels, the resistance literature is similar to much that has been written on other aspects of innovation. Resistance to innovation is seen to manifest itself in the form of different barriers: technology and market, strategic and structural, social and cultural (Bond and Houston 2003). It is also identified as occurring at the level of the individual, the workgroup/team and the organization. Resistance to innovation and change may be attributable to any one factor or to the combination of a number of different factors. However, while a clear distinction has been defined between creativity and innovation earlier in the paper, the distinction becomes more blurred in the literature on barriers and enablers to innovation. It is therefore helpful to also include reference to some of the literature on creativity.

Research on individual innovation reviews a range of blocks to creativity that challenge a person's beliefs and values, self-image and the perceptual ability to recognize opportunities and threats (King 1990). Perceptions of future job security can affect cooperation when implementing change (Zwick 2002), rigid management structures can have significant negative impact on innovation (Amabile, Conti et al. 1996), with high care atmospheres favouring knowledge creation and transfer (Kratzer, Leenders et al. 2005; Zarraga and Bonache 2005). Indeed, extant research supports the notion that "creative cognitions occur when individuals are free from pressure, feel safe, and experience relatively positive effect" (West, Sacramento et al. 1990). Important factors for innovation at the level of the team or working group have been suggested to include leadership and cohesiveness, together with group longevity, composition and structure.

At the level of organizational innovation, resistance can be based on selective perception and the social systems factors of vested interests, rejection of outsiders, misunderstandings, incompatibility of innovation with organization structure, and lack of top level support. A major

source of resistance is regarded by many as being at the level of middle management, where vested interests and issues of motivation may be rife (Barnes, Bessant et al. 2001; Terziovski, Fitzpatrick et al. 2003). Further issues with the potential to inhibit innovation include project based working patterns, lack of technology, and lack of time, resources and staff. Indeed, this last point features alongside five other barriers to innovation that have been identified recently (Loewe and Dominiquini 2006). In terms of the propensity to be innovative, an organization's culture may also have a detrimental effect. In a mature organization, the mechanisms that initially enabled success often inhibit the firm's innovation capability (Dougherty and Cohen 1995; Leifer, McDermott et al. 2000).

Measuring Innovation

Innovation, resistance to innovation and the barriers to and enablers of innovation can take many different forms, thus it is only to be expected that the measurement of innovation is not trivial. Traditional indicators of innovation incorporate measures that look at inputs to the innovation process: R&D expenditure, for example, and outputs such as patents. Given that only a proportion of innovating firms conduct formal R&D and, hence, are able to distinguish between it and other expenditure, such indicators have significant problems, while the use of patents varies greatly from firm to firm and between different industries.

In the context of this paper, it is of more interest to focus on the organization and its capacity to innovate, rather than on the innovations generated by the organization. Our focus here is on firm or organizational innovativeness, which has been defined as the propensity for a firm to innovate or develop new products (Garcia and Calantone 2002, after Ettlie, Bridges et al. 1984); or the propensity for a firm to adopt innovations (Garcia and Calantone 2002, after Damanpour 1991; Rogers 1995). While most studies just take one point in time, Subramanian (1996) believes that

measures of innovativeness should include a temporal aspect. The same can also be said for the measurement of organizational culture and climate.

Culture and Climate

Organizational culture can be described as that which comprises the attitudes, experiences, beliefs and values of an organization. It lends itself relatively easily to explanation and has been defined as "the specific collection of values and norms that are shared by people and groups in an organization and that control the way they interact with each other and with stakeholders outside the organization" (Hill and Jones 2004). In contrast, the concept of organizational climate proves hard to define. While there are several approaches to the concept of climate, two have received substantial support in the literature. The *cognitive schema* approach views the concept of climate as an individual perception, while the second approach emphasizes the importance of *shared perceptions* (Anderson and West 1998; Mathisen and Einarsen 2004). In a review of instruments for measuring climate, Mathisen and Einarsen (2004) assess the effectiveness of five such instruments and report support for two: the KEYS instrument (Amabile, Conti et al. 1996), and Anderson and West's (1998) Team Climate Inventory (TCI), both of which will be used in the current research.

The literature on organizational culture provides a number of instruments and models for its assessment, with the Organizational Culture Assessment Instrument (OCAI) of Cameron and Quinn (1999) chosen as the most appropriate. Based on competing values and resulting in one of four culture types, the OCAI assesses how things are and identifies how people would like to see it change. It exhibits strong evidence of reliability & validity, is relatively easy to administer, includes support for the analysis of findings and provides guidelines for further activities, which makes it eminently suitable for application in the current research work.

The TCI is used at the individual level and then aggregated to team level and lends itself well to the current investigation. The KEYS instrument measures perceptions on the four different levels of group, organization, individual and supervisory and the results will map on to and enhance organizational assessment on continuous improvement. The OCAI displays current and desired positions for organizational culture, reflecting the temporal aspect desirous by Subramanian and with the potential for further application after a period of time.

Case Study Organization

Since early 2001, Company A has been a major partner in a series of projects with Loughborough University that have been investigating the role of work-based relationships and their impact on performance. A large organization in the manufacturing industry, Company A has been instrumental in shaping the development of an innovative methodology that explores the quality and strength of internal and external client relationships, and was the first organization to apply the methodology in the UK (Morton, Brookes et al. 2006). Loughborough University is currently involved in a high profile joint-venture with four other universities and the Advanced Institute of Management (AIM) in the UK. In partnership with Company A, part of Loughborough University's contribution to this project is to learn from and with key players in the innovation system, and through that interaction to improve knowledge about the system and how it operates. The analysis is taking place at the organization and production system levels, enabling detailed understanding of industry mechanisms and allowing ideas to be tested in their context of application.

Over the last decade Company A has implemented a lean strategy and reduced the workforce to a quarter of its pre-1990s size. This has been achieved through natural wastage, voluntary redundancy and system improvements without loss to the level of production: output now is no

different to what it was in the 1980s. The remit of the current research project is to investigate the influences that promote and inhibit innovation in such a climate. The performance improvement work that is taking place at the case study organization is of considerable interest to industry and academia per se, and to this research in particular. Its improvement plan is using well-tried and tested methods of contemporary supply team management and will provide valuable research opportunities; access to historical and current data; and to research subjects.

Providing access to subjects for research purposes has cost implications for participating organizations in terms of both time and money and Company A, therefore, has its own agenda for participation. It is unlikely that this research would gain the level of organizational support necessary to carry out the research without the potential for accrual of benefits to the organization in terms of the opportunity for the organization to be in the forefront of activity in this field, and the ability for the organization to address some of its own concerns and issues. Thus, the main question for Company A is how to be far more effective in learning from external sources.

The ability of an organization to innovate and improve is related to its ability to learn (Montes, Moreno et al. 2005; Lemon and Sahota 2004; Reissner 2005). For much of the literature concerning this subject, the focus is on knowledge management and how organizations can utilize the knowledge of their own employees and learn from past projects (Hargadon 2002; Brockman and Morgan 2003; Wang and Ahmed 2004). However, the main focus on organizational learning in the current research is the ability of the case study company to learn from other organizations. This process is influenced by the "receptivity" or "absorptive capacity" (c.f. Mangematin and Nesta 1999; Cohen and Levinthal 1990; Caloghirou, Kastelli et al. 2004) of the organization towards new knowledge, and relies on both good linkages with external knowledge sources and a pluralist and participative culture with the organization

(Vickers and Cordey-Hayes 1999). Organizations are also more willing to adopt knowledge-intensive innovations if they have high organizational learning capacity (Teo, Wang et al. 2006). Simonin (2004) found that learning from international strategic alliance partners was greater when there was intent to learn, but was inhibited by tacitness of knowledge and partner protectiveness. Furthermore, a lean organization may not allow for much "idea time"(Anderson and West, 1998). Nevertheless, Company A is committed to full participation in the current investigations and will provide the necessary access for completion of the planned research activities.

Research Methodology

Given the complex nature of manufacturing organizations undergoing change, a case study approach is highly appropriate as it is thought to overcome the bias inherent in a single method approach (Gill and Johnson 1991). It is particularly useful when the research phenomenon is not easily distinguishable from its context (Yin 1993). It also helps to isolate individuals and organizations to study their situation in greater detail, affording an accurate understanding of the experiences, perceptions and interactions between those involved in product development and the way this affects its success. Moreover, given that Yin stresses that the importance of case study research is to generalise to theory and not to the wider population (Yin 2003), case studies also provide detailed, rich and often anecdotal accounts of complex events and situations.

A hybrid research methodology strategy is being used to gain an in-depth evaluation of the experiences of the collaborating partner. The research process will use structured and semi-structured surveys, individual face-to-face interviews, and interactive evaluation and discussion. Cameron and Quinn's seminal work comprises a comprehensive set of tools and procedures for the diagnosis and change of organizational culture, which will be administered alongside the

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KEYS and TCI instruments for measuring climate. The aim is to use these innovation and psychometric inventories and measurements in order to identify and relate the determinants of barriers and enablers to innovation, and to provide advice on how firms can be more effective in, for example, learning from external sources. In association with extant research within the organization, resultant findings will be analysed and used to develop a framework of interventions for maximising innovative potential and thence to disseminate through national/international conferences and journal papers, and through collaboration with academic colleagues and senior managers from different industrial sectors.

Summary and Further Research

Initial interviews and the first stage of the OCAI have only recently been administered at Company A, with analysis and further work to be undertaken in the near future and reported upon in subsequent publications. Application of the KEYS and TCI instruments are planned for spring 2007, with key findings being the subject of later reports.

The review of the literature in this paper gives an indication of the breadth and complexity of potential resistance to innovation within organizations. In seeking to understand and overcome resistance to foster productivity improvement, examination has been undertaken into the motivational issues; the barriers and enablers of innovation; the culture and the climate within the organization; and the capacity of the individual, the group and the organization to learn. While the innovation literature is broad, it cannot be construed as comprehensive in this particular area of interest and there remain many gaps to be addressed. The opportunities for further research include investigating the relationship between a *creative* climate and a *learning* climate; investigation of the mechanisms of innovation at the workgroup level (King and Anderson 1990); relating psychological contract to innovation and learning; and identifying the

determinants of learning from other organizations (Vickers and Cordey-Hayes 1999), particularly in relation to absorptive capacity (Mangematin and Nesta 1999; Cohen and Levinthal 1990; Caloghirou, Kastelli et al. 2004) and participative safety (Anderson and West 1998).

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