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Research in the Innovation Management Area: Lessons from Quality Management

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Abstract

Innovation has emerged as a 'hot' research topic in the management field. Currently, considerable research effort is being applied to developing better understanding of how it can be effectively developed within organisations. However, recent trends in the literature suggest that there is a lack of convergence of ideas and that the knowledge in the area is still in a relatively 'untidy' state. This is despite an excellent foundational literature base. In this paper, the role of research is investigated. An analogous approach is taken whereby some research shortcomings in the area of quality management are examined to demonstrate how similar problems have arisen in the innovation management area, and ways in which researchers in the area can avoid these pitfalls. These, hopefully, will be taken into consideration in future innovation management studies, and will result in increased quality and more credible research findings.

Key words: innovation management; quality management; ontology; epistemology; research methodology.

Introduction

The management area of innovation is currently receiving tremendous attention. This attention is coming from a wide group of interested parties, including private industry, policymakers and academia. These groups regard innovation as a key strategic variable for gaining sustainable competitive advantage. But, as this interest has grown, it has become obvious that many issues relating to the concept remain unexplored and unresolved (Frambach and Schillewaert, 2002). Notwithstanding the excellent quality of the foundational literature, for example Schumpeter (1934), extensive research contributions in the area have not provided substantive solutions to contemporary practical issues such as: difficulties of implementing innovation in organisations (Klein and Sorra, 1996); resolving ontological arguments (Cooper, 1998); or, assessing effects of contextual contingencies on innovation (Van de Ven, 1986; Damanpour, 1996).

The academic community has intensified research efforts in order to address these types of gaps in knowledge. However, if recent literature in the area is taken as an indicator, it would appear that there is still little convergence on many issues. For example, Cooper highlights the practice of researchers not clarifying the specific aspects of innovation that they are addressing in their research. Similarly other researchers (e.g., Van de Ven (1986) and Damanpour (1996)) have highlighted the general lack of clarity on how contextual factors such as firm size and organisational structure affect ability of organisations to innovate. While such an 'untidy' state of existence is explicable as a Kuhnian (Kuhn, 1970) pre-paradigm, we contend that it is possible to hasten the speed such that the field is able to mature into a self-sustaining paradigm. We intend to focus on the research efforts in the area, and contend that by addressing these research issues, can assist in the speed at which there is knowledge consolidation.

The aim of this paper is to identify research shortcomings in innovation management and suggest ways in which these could be overcome. A predominantly theoretical approach is avoided, for excellent contributions already exist in this respect (see, for example, Alverson and Deetz (2000)). Instead, an analogous approach is adopted. The field of quality management is taken as an example because it provides a good case of what could happen in the innovation management area. Quality and innovation management have had strong parallels in their development. The intensity of academic treatment of the two areas has a slight time lag favouring quality management, and this is the window of opportunity taken advantage of in this paper. By becoming aware of the specific problems in quality management research and their consequences, it is hoped that researchers in innovation management would be able to avoid repeating them.

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In support of the aim of the paper, it is not our intention to provide exhaustive critical reviews of the two bodies of literature. Such a task will be an onerous, voluminous and ultimately unnecessary because excellent reviews already exist (see, for example, Souza and Voss (2002), and Gopalakrishnan and Damanpour (1997) in quality and innovation management areas respectively). For the purpose of this paper, a select sample of pertinent literature that support the arguments made is included in the review.

The next section traces the historical developments of both quality and innovation management areas. This is followed by descriptions of shortcomings in research in quality management and the implications of these for research in the innovation management area. The paper concludes by predicting the various scenarios that could emerge based on past experiences from the quality management area, depending on choices researchers in innovation management make.

Parallels in the Development of Quality and Innovation Management Areas

The quality management and innovation management literatures have had similar historical developments. The foundational literature in quality management appeared in the 1930s with the publication of Walter Shewhart's (1931) work. In this work, Shewhart provided management with both a role in the quality decision and a rationale for addressing quality. As for innovation management, the more significant early literature also appeared (in English) in the 1930s with the publication of Joseph Schumpeter's (1934) work. Schumpeter articulated the case for innovation for the business firm and society as a whole.

For organisations in the west, these groundbreaking early contributions lay dormant for much of the post-WWII years. Organisations found little reason to improve the quality of their products and services, or become systematic in innovation because there was little competition and ever-increasing demand. However, it was in the 1960s and 1970s when companies from Japan (and in the 1980s and early 1990s when companies from other newly industrialised countries) captured large slices of market share in many important industries, that Western companies started to pay serious attention to quality and innovation. Hence, industry's recent interest in both quality and innovation management has been driven by competitive imperatives.

Ideas on quality and innovation management were provided to industry mainly by groups of influential management consultants in their respective areas. These consultants, bestowed with the title of 'guru' later provided mass appeal for the concepts. For quality management, these included W Edwards Deming, Joseph Juran and Philip Crosby. In the case of innovation management, the gurus included Peter Drucker and Rosabeth Kanter. While there appears to have been some instances of mixed messages being promoted by these gurus (particularly in the quality management area), one of their most significant achievements was that they brought to the attention of the upper echelons of industry the importance of these two concepts to the competitiveness of organisations.

Policymakers responded to this interest in the areas in three main ways: conducting public inquiries; developing government policies; and providing funding for special programs to encourage the diffusion of these concepts. In Australia, for example, quality management saw: the Foley Report (1987), which assessed the quality-related infrastructure in the country; various policies of all levels of government that made, *inter alia*, accreditation to quality management standards compulsory for their suppliers; and provision of funds to industry for implementation of quality management related programs, for example, the Department of Industry's Ausindustry program. Innovation has had similar government response. Again, in Australia, there were the National Innovation Summit and the Chief Scientist's Report on Innovation (2000). This was followed by the government's policy statement 'Backing Australia's Ability' (2002), which included a programmed expenditure of $3 billion over several years for special programs aimed at encouraging innovation in industry. Governments' involvements have had substantial influence on the spread of the two areas.

Academic interest in both areas in the period after the publication of the foundational literature was initially slow and has generally lagged practitioners' interests. It was in the 1980s that interest in quality management gained momentum and reaching a peak in the 1990s. This interest now appears to have matured, and could be in decline (Foley et al., 1997). All throughout, it failed

to capture the interest of mainstream academia (Baba, 1999). Funding for research in the area have been relatively low (with the notable exception of the special US National Science Foundation managed $12 million program in the 1990s (Dean Jr, 1998)). As for teaching, business schools have treated the area in a fad-like manner, having either included it prematurely without adequate development, or have been slow to incorporate it in their curriculum (Baba, 1999). Many have removed it from their courses after just a few years. As for innovation management, while it is currently attracting interest, there is a possibility that academia could treat the area as it has quality management.

From the above discussion, it can be seen that there are many points of similarities between quality and innovation management fields as they have developed over time. For the innovation area to develop and 'solidify' its conceptual, theoretical and empirical bases, it would be helpful to examine where quality management, an area that appeared to have similar potential ten to fifteen years ago but is now not that highly regarded, went wrong.

Shortcomings of Research in Quality Management and Their Implications for Innovation Management

While the current malaise surrounding quality management as a field can be attributed to the actions (and inactions) of almost all stakeholders, this paper will concentrate on the role played by the research community. Similar to the position taken by Dean Jr (1998) and Foley et al. (1997), we contend in this paper that the general 'untidiness' of the research effort has contributed to the lack of convergence and under-development of the area, and the consequent hesitation in acceptance by mainstream management research and practitioner communities. The paper focuses on ontological, epistemological and methodological issues. Specifically, the issues addressed are: lack of clarity of definitions; lack of epistemological and methodological plurality and balance; narrow and superficial focus on issues; lack of empirical validity; lack of credible measurements; and, confusion caused by contextual variables. Recent literature in innovation management suggests that many of these shortcomings are being repeated. For researchers in innovation management to avoid these shortcomings, lessons need to be drawn.

Lack of Clarity of Definitions

A shortcoming that quality management researchers have not satisfactorily addressed relates to ontological problems, specifically the definitions of the terms 'quality' and 'quality management'. At the initial stages of research in the area, there was considerable debate about the term quality. A multiplicity of definitions, sometimes contradictory, competed for ascendency (Seawright and Young, 1996). David Garvin's (1988) seminal ontological contribution provided clarification of the term. Garvin classified all the definitions into five broad groups and also identified a number of dimensions of the construct. However, subsequent research appears to have largely failed to incorporate this clarification (Foley et al., 1997). Compounding this situation is the even greater lack of consensus on the definition of the broader concept of quality management. Quality management is defined and interpreted differently, depending on specific experiences and understanding of the authors (Martinez-Lorente et al., 1998). Moreover, a large number of interventions, some not related to quality management, are included under its banner (Hackman and Wageman, 1995; Xu, 1999). These problems have caused confusion, led to disagreements within the area, frustrations on the part of practitioners, difficulties in understanding, and doubts about the veracity and efficacy of the concepts related to quality management (Watson and Korukonda, 1995; Martinez-Lorente et al., 1998).

There is some evidence in the literature that a similar pattern exists in the innovation management area (see Trott (2002) for a review). To avoid this, greater consensus needs to be developed on the ontological aspects of the term 'innovation'. While there is recognition that innovation is a multi-dimensional and multi-definitional construct similar to quality, there does not appear to be universal agreement on the specific nature of these dimensions and definitions (Subramanian and Nilakanta, 1996; Cooper, 1998). Authors continue to develop seemingly new dimensions and definitions, leading to a proliferation of ideas that have many commonalities, but

also possess contradictions. An attempt towards ontological consolidation would assist the area in its development and maturation. While there has been some progress in this area (Cooper, 1998), the rate is slow. Researchers in innovation management can assist in this process by intensifying the search for, and then agreeing on a common set of dimensions and definitions. They also need to clearly articulate the specific dimensions and definitions they are addressing in their studies. These actions would accelerate understanding and acceptance of the concept and avoid unproductive debate, as has happened with quality management.

Lack of Epistemological and Methodological Plurality and Balance

Another issue that has affected quality management is the epistemological and methodological shortcomings of research studies in the area. Examination of research literature shows biases exist along the lines of methodological alternatives, paradigmatic stances and data analysis techniques. Using Wacker's (1998) classification of research methodologies, the methodological approaches used are mostly 'analytical conceptual' (with descriptive styles being very popular and critical discursive reviews from the social, organisational and psychological perspectives, for example Xu (1999), being relatively rare), and 'empirical statistical' and 'empirical case studies'. Little research has been published that uses the other methodologies from Wacker's classification, that is, 'analytical mathematical', 'analytical statistical', and 'empirical conceptual' studies. As for paradigmatic stances, literature is dominated by studies that are based on the positivist tradition, with little interest being shown in other approaches such as critical management theory (Alverson and Deetz, 2000), post-modernist (Linstead, 1993), anti-positivist and pragmatist approaches (Wicks and Freeman, 1998). The choice of data analysis techniques is also limited, with subjective methods used for case studies, and simple, linear and single-variable methods, such as analysis of variance and regression model analysis, used for statistical data analysis. More advanced methods that assess multiple relationships, such as structural equation modelling and multi-level analysis, are only slowly being used. Lack of epistemological and methodological diversity and failure to effectively triangulate varying approaches appear to have alienated researchers and undermined confidence in the outputs of research in the area.

The implication of this for innovation management is that researchers need to strengthen the epistemological and methodological bases of studies they design. Currently, the design of research studies in the area appears to have similar epistemological and methodological orientations to that of quality management studies. Methodologies used are mainly analytical conceptual, and empirical statistical and case study designs in nature, paradigmatic stances are skewed towards positivism, and simple, single variable statistical analysis methods dominate. If possible, the focus should be expanded to include more mathematical and statistical analytical approaches, whilst the empirical approaches should include more experimental studies. The paradigmatic stances should not be focused on positivism alone, but be expanded to include approaches such as critical management research, post-modernism, pragmatism and other methodologies. Studies that are based on the positivism paradigm need to have improved rigour. With statistical analysis of data, advanced methods that take account of complexity of issues need to be more extensively used. Individual epistemological and methodological issues highlighted above do not have to be pursued in isolation. Instead, as far as possible, studies should attempt to triangulate these approaches to bring about greater depth and richness to the research findings.

Narrow and Superficial Focus on Issues

Another concern relates to the rather narrow superficial treatment of issues relating to quality management. Several authors have complained that the area is too narrowly described, dominated by the operations management discipline, comprised of narrow intellectual bases and fails to adequately refer to the rich body of knowledge from the social and organisational psychology areas (Wilkinson and Willmott, 1995; Foley et al., 1997). As a result, it is plagued with problems such as unresolved paradoxes, morality and ethical problems (especially the treatment of workers in contemporary work context), underestimation of the magnitude of change required when being implemented, difficulties in imitating quality management, and presentation as a non-falsifiable concept (Almaraz, 1994; Powell, 1995; Thompson, 1998; Rothschild and Ollilainen,

1999). All these factors have contributed to quality management coming across as lightweight, under-developed and an immature body of knowledge.

If innovation is to be presented as a well-grounded area of study with a strong intellectual base and avoid a similar fate as quality management, it needs to draw upon the existing rich intellectual bases developed in other areas. This will require researchers to refer to the literature from social and organisational psychology, change management and other relevant areas. If researchers fail to acknowledge the rich debates that may have taken place in other fields of research, then this could contribute to the area's narrow definition and investigation, and its eventual under-development.

Lack of Empirical Validity

Despite many serious attempts, it has not yet been clearly shown that quality management practices lead to improvements in performance, particularly financial performance (Sousa and Voss, 2002). This is despite the possibility that publication bias could exist that favours the publication of studies that show positive results. Numerous studies provide inconclusive results. Some of these studies show positive relationships (Powell, 1995; Easton and Jarrell, 1998). Other studies show insignificant relationships (Adam, 1994; Kannan, et al., 1999). Others still, claim that quality management practices have had deleterious effects on the performance of some organisations (Cunningham and Ho, 1996; Sterman, et al., 1997). As a result, the relationships are complex and, often, contradictory. Reasons that could explain this situation include the one-off and cross-sectional nature of most studies. These make claims about causal links between quality management practices and organisational performance difficult to accept. Also, the weak theoretical bases for many of the claims undermine confidence at generalisation of findings from these studies. Hence doubts about efficacy of quality management persist.

Similar to quality management, there are numerous studies that have examined the relationship between innovation and performance (see Damanpour and Gopalakrishnan (2001) for a summary of empirical studies in the area). However, the overall relationship still remains largely unclear (Subramanian and Nilakanta, 1996). To resolve this situation, substantial effort will need to be made to demonstrate the nature of the link between innovation management practices and organisational performance, in order to attract the serious and long-term attention of organisations. This will require more than one-off, cross-sectional studies. Longitudinal studies based on well-developed theoretical models will be required to provide credibility for the findings. Meta-analytic studies that consolidate disparate research findings would also be useful.

Lack of Credible Measurements

Similar to the experiences of many other areas in the social sciences, measurement of concepts related to quality management has been a problematic issue. Although a number of measurement instruments have been developed (Saraph et al., 1989; Flynn et al., 1994; Ahire et al., 1996), they all appear to have weaknesses of varying magnitudes. None of the published instruments fully reflects the current state of knowledge in the area. In terms of the psychometric properties of these instruments, there are uncertainties about their reliability and validity. Except for Saraph et al.'s instrument, none of the others appear to have been validated in independent studies. Finally, these instruments have been validated by using data from the US and, in one instance, from Japan (Flynn et al., 1994). None of these pre-existing instruments have been used in studies with domains from outside of these areas. As a result, it is unclear if these instruments are suited for studies in other locations. These measurement difficulties have created doubts about whether information gathered from organisations truly reflects the actual quality management practices in organisations.

Measurement of innovation, especially the 'soft' management factors, needs to be improved. While some measurement instruments already exist, for example, Subramanian and Nilakanta (1996), Amabile (1988), Damanpour and Evan (1984), like quality management measurement instruments, these have certain deficiencies. Researchers need to refine these instruments so that they have better psychometric properties. This will require large datasets for testing of reliability and validity. The instruments would need repeated independent assessments to show uni-

versal applicability. Once this is achieved, then all researchers should use it for their research purposes. This will accelerate confidence and credibility about the data that are collected by using these instruments, and this, in turn, will lead to more credible findings.

Confusion Caused by Contextual Variables

A final issue that quality management research has not adequately considered is the effect of contextual variables on its success. Proponents claim that the principles of quality management are generic and universally applicable (Bohoris, 1995; Ghobadian and Hong, 1996; Johnson, 1997; Hoyle, 1998). But traditional management researchers have regarded management interventions such as quality management as being highly contingent on factors such as political, economic, social and cultural conditions that permeate along national, regional, organisational and individual lines (Shenkar and Glinow, 1994; Mann and Kehoe, 1995; Castle, 1996). Debate on this issue is yet to be resolved.

Researchers in innovation management need to resolve the effect of contextual variables on its success. Some researchers present innovation as a generally positive phenomenon that is universally relevant and unaffected by contextual factors (Klein and Sorra, 1996). But, as has been shown for quality management, this is not necessarily true. Contextual and contingency factors that include national and organisational culture, political and economic conditions, as well as differences in business operations affect the success of innovation initiatives (Yetton et al., 1999; Drejer, 2002). Researchers therefore need to resolve the impact of contextual variables on ability of organisations to innovate.

Conclusion

Innovation is an exciting and promising research area. There is strong indication that the area will receive even greater levels of research interest than currently is the case, in the forthcoming years. This paper has identified six research shortcomings related to ontological, epistemological and methodological issues in quality management, an area that has many similarities to innovation management. From the research that is being published in innovation management, it appears that some of these shortcomings in the quality management literature are being repeated. This paper has made suggestions for avoiding these shortcomings. If researchers draw and apply the lessons and experiences from areas such as quality management, then innovation management has better chance to converge quickly and emerge as an area with substantial intellectual bases and become a strong contributor to knowledge and practice. Failure to heed the lessons, on the other hand, can lead to a lot of resources being wasted, research capital being spent on unproductive debate, and result in futile exercise in reinventing the wheel. It is necessary to shorten the learning curve and quickly demonstrate the efficacy and veracity of innovation management as a body of knowledge worthy of scholarship and practice; this paper provides some pointers on how to achieve this status.

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