**The Socio-Political Antecedents of Technical Innovation**

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**Abstract:** The paper reports on a management initiative within an iconic global high-tech company to facilitate technical innovation within two teams (situated in different global locations of the company) that had been unable to produce any form of technical innovation over a period of several years. Experimenting with an action research strategy, this initiative had the practical goal of generating technical innovation and the research goal of gaining insight into the social dynamics that may facilitate such innovation. The two-year process delivered novel insights into the circumstances that enabled these teams to deliver four company-lauded technical innovations. The principal finding of the research - that *social innovation is an antecedent of technical innovation* – highlights the importance of alternative research methodologies (to that of the dominant research approach involved in R&D facilities) in addressing the politics of innovation within large organisations.

**Key Words:** technical innovation; leadership practices; action research; social innovation.

# Introduction

Innovation is a widely lauded competitive strategy in current times and, as technology increasingly shapes and supports organisational strategy, technical innovation, in particular, is a prized achievement. However, even in global high-tech organisations, technical innovation is difficult to achieve. Huge sums of money are invested annually in Research and Development (R&D) facilities in large global corporations with many unable to realise the value of that investment (Henderson, 2006). Underpinning such failure, appears to be our inadequate understanding of the antecedents and dynamics of innovation

There appear to be several reasons for this lack of understanding. Firstly, the political nature of innovation is seldom acknowledged. Innovation by definition, changes the *status quo* and, thus, impacts the (often powerful) personal and social interests vested in the *status quo*. Whilst rhetorically endorsing the strategic intent to innovate (who would be against innovation?) those with such interests will resist it with all the power they have. Thus, in many organisations the rhetoric of innovation substitutes for its practice.

Secondly, the inability to address these politics effectively can also be a consequence of the positivist assumptions that underpin the efforts of the R&D function in most organisations. Traditional research in technical domains, as a consequence of embedded ontological and epistemological assumptions that do not allow for the differentiation of social and natural

reality, rarely attempts to understand the political (power) dynamics that underpin the social reality of a particular organisation.

In order to address the political dimension of innovation, the research outlined in this paper adopted an action research methodology – a choice compatible with the nature of the research question and with our ontological and epistemological assumptions. This action research sought to achieve technical innovation outcomes within an iconic global high-tech organisation (hereafter referred to as ABC Corp) and to document, and make transparent, the social dynamics - in particular, social practices that may be deemed ‘leadership-in-action’ - that facilitated any technical innovation achieved through this process.

# The Politics of Innovation

Social realities are political in nature in that they are constructed according to the interests of the most powerful stakeholders (Berger and Luckmann, 1966). These interests are seldom made explicit and generally, through various tactics, are mystified in ways that give these realities the appearance of inevitability (Stanley, 1978; Williams, 1977). The politics of these social constructions, however, become a significant factor in turbulent environments where, as articulated by Schumpeter (1942, p.84), disruptive forces strike ‘not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives’.

Schumpeter’s ‘waves of creative destruction’ have become a feature of the first decades of the 21st Century as disruptive innovation increasingly impacts the global economy, destroying and creating industries, and the enterprises within them, and challenging cultural assumptions and mental models that have prevailed for centuries. As a consequence, with enterprises struggling to surf these ‘waves of creative destruction’, traditional assumptions about most aspects of business endeavour are beginning to be scrutinised. In particular, assumptions about organisational leadership, governance, structure/culture and research are coming into question (Verhoeff, 2011; Tzeng, 2009; Dovey and Fenech, 2007; Henderson, 2006).

At the core of the struggle of organisations to respond appropriately to these transformational pressures seems to be the inability of leaders to address the political dynamics of organisational change (Dovey and McCabe, 2014). Historically, the most common strategy for addressing these politics was that of the establishment of a *skunkworks* – the setting up of an alternative organisation, separate from the original organisation, wherein new ideas and practices could be implemented without contaminating prevailing cultural assumptions or threatening political interests, and without disrupting the norms and routines of the traditional organisation (Büschgens et al., 2013; Harris and Woolley, 2009; Rich and Janos, 1994). However, in the fast moving contexts of the current global economy, once-off innovation through a *skunkworks* strategy is insufficient to guarantee survival. Instead, organisations need to develop ‘ambidextrous’ capabilities by paradoxically being able to exploit current opportunities through existing arrangements/practices *and* gear for future opportunities through transformative endeavour (O’Reilly and Tushman, 2004). One method of attempting to address these challenges has been the creation of a *skunkworks team* (rather than a separate organisation). Located within the heart of the organisation, such teams are given high ownership of the innovation process and are buffered from the ‘business as usual’ routines and permissions regimes that operate throughout the rest of the organisation (White and Dovey, 2004; Peters, 1997). This is a risky strategy in that the visibly-preferential treatment given to such teams threatens political harmony within the organisation (Martinic and Dovey, 2011).

*Skunkworks* teams have often used action research as an ‘innovation methodology’ and have been successful in their specific domain of innovation endeavour (see, for example, Harris and Woolley, 2009). However, they have mostly failed to sustain their innovation efforts once the targeted innovation has been achieved, when the organisation resorts back to traditional practices (see Dovey and White, 2005). This failure to transform comprehensively usually has political dimensions, particularly with respect to the issues of vested interests, power relations and control over organisational endeavour and purpose (Dovey and White, 2005). In this respect, the adoption of the new forms of leadership, governance and ownership required to adapt to a dynamic global economy appears to frighten many business leaders (see Naim, 2013; Martinic and Dovey, 2011).

# Challenges to the Traditional Conceptualisation of ‘Leadership’

The historical consensus on the ontology of leadership; a consensus that rests on the assumption that leadership refers to a set of individual attributes, traits and competencies [see Yukl (2008) for an overview of this perspective, and the critique thereof offered by Carroll, Levy and Richmond (2008)] has recently come under question. The traditional view of the heroic individual as the epitome of leadership is morphing into more complex, collectivist, conceptualisations of this phenomenon. Increasingly, leadership is being viewed as the collective achievement of a set of practices that lead to the realisation of an organisation’s mission and to the honouring of its value proposition. These practices have strong contextual and contingent dimensions. However, like Burdon and Dovey (2015), Peltokorpi et al (2007) argue that individual leaders (usually business owners/founders) still have one important role to play in the innovation project and that is the establishment, and championing, of a non- negotiable strategic intent to innovate.

The emergence of the neo-bureaucratic organizational forms has raised awareness of the role played by relational resources in the collective expression of leadership (Dovey, Burdon and Simpson, in press). In particular, intangible resources, like trust, that are leveraged through particular kinds of relationship are becoming vital to leadership endeavor in the knowledge era. In this respect, the growing awareness of the link between leadership forms and organisational structure/culture, endorses Schein’s (1988, p.15) observation almost thirty years ago that structure and culture co-produce each other. Similarly, Burdon and Dovey (2015) found that structurally embedded cultural assumptions play a strong role in an organisation’s ability to innovate continuously and, thus, that structure/culture and leadership also co-produce each other. Furthermore, Naim (2013) argues that the recent success of many smaller ‘insurgent’ organisations, in challenging the market dominance of large organisations, is due in large part to the adoption of a structural form that allows more appropriate assumptions about organisational life to manifest in everyday practices that fuel continuous innovation.

Mainemelis, Kark and Epitropaki (2015), too, argue that the manner in which leadership is perceived and enacted in organisations is *ex-ante socially structured* in a way which favours the emergence of a particular conceptualisation thereof. Their notion of ‘integrative leadership’, where multiple leaders integrate their work collaboratively, is closely linked to the recent ‘practice turn’ in leadership (Crevani, Lindgren and Packendorff, 2010; Carroll, Levy and Richmond, 2008). This conceptualisation has introduced a new, radically different, set of assumptions about the nature of leadership, and has shifted the focus from the individual-as-leader to that of the manifestation of collaborative *practices* which endorse all stakeholders as leaders in some way. This perspective on leadership, challenges the

ontological and epistemological assumptions of traditional (positivist) research and creates the socio-political conditions for the recognition of contextual and other contingent factors (for example, temporal factors and social interests) in the manifestation of leadership.

# Challenges to the Dominant Research Paradigm: The Promise of Action Research

A contributing factor to the innovation challenges faced by enterprises is the fact that the vast body of research on innovation is located within the positivist research paradigm: a paradigm that features realist ontological, and objectivist epistemological, assumptions and that seeks context-free and apolitical, or value-neutral, knowledge of this phenomenon. As mentioned above, the 'practice turn' in leadership studies has shifted the focus from the traits and attributes of the individual ‘heroic leader’ towards a set of practices that differentiate a community of practitioners with respect to the realisation of organisational intent. This conceptualization of leadership emphasises the relational resources (forms of intangible capital) that underpin the collaborative achievement of strategic goals.

Embedded in this shift is the transformation of ontological and epistemological assumptions about the phenomenon of 'leadership' and, thus, a broadening of methodological perspective with respect to leadership research. This has been in response to the significant global contextual changes, as the digital era challenges traditional organisational forms and cultural assumptions and champions the collaborative nature of knowledge work. The pressures to innovate in order to survive in this fiercely competitive global economy are thus leading to greater scrutiny of intra- and inter-personal practices and, thus, to a review of power relations, governance regimes, and the social bases of learning and knowledge creation. As a consequence, alternative research paradigms that recognise the political nature of the social realities of organisations, are gaining credence in an era in which collective leadership and collaborative endeavor is increasingly viewed as the engine of organisational innovation.

# Research Methodology

The action research reported upon in this paper attempted to address the following research

question: *What practices of leadership, if any, play a role in the fostering of repeatable, valuable technical innovation?*

Following De Figueiredo and da Cunha (2007, p.70), our assumption that social realities are co-constructed ‘through our interactions with the world, in an emergent process that changes knowledge as we keep interacting with the world’, and given the nature of the research question, this research was located within the constructionist research paradigm . This means that we assumed that the social realities within ABC Corp are in a continual state of flux, as they are created and re-created according to human interests, values, beliefs, assumptions and interpretations of experience.

Having located the research within the constructionist paradigm, our epistemological assumption is that the knowledge sought through this research is inter-subjective in nature and manifests in everyday practices, activities and discourse. An implication of this is that this knowledge is emergent; that it is accessed through self- and collectively-reflexive processes, and that aspects of it can only be accessed through action. Thus, we assumed, certain forms of knowledge – or *knowing* – only manifest *in practice* (that is, in *doing*) and accessing such knowledge requires participation in the actions through which such knowledge manifests. In this respect, Denzin and Lincoln (2005, p.24) point out that this

subjectivist epistemology means that access to the requisite knowledge involves social processes (such as dialogue).

Given the assumption of an emergent, inter-subjectively constructed social reality and a subjectivist epistemology that endorses critical enquiry as a primary mode of knowledge acquisition, an action research methodology was selected for this research. Reason and Bradbury (2001, p.1) define action research as:

a participatory, democratic process concerned with developing practical knowledge in the pursuit of worthwhile human purposes, grounded in a participatory world view... It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions.

Action research embraces the practice of *praxis* whereby theoretically-informed- action and action-informed-theory constantly co-produce each other. As action research usually requires the transformation of a particular social reality (in order to achieve its practical goal) it is a politically challenging research methodology in that such transformation impacts the interests of those committed to the retention of the *status quo*. Where such people have strong power bases, action research becomes a politically dangerous research activity (Martincic and Dovey, 2011) and requires sophisticated intrapreneurial skills (Dovey and McCabe, 2014).

Action research can be conceptualised as a sustained, collectively constructed, form of reflexive action that emphasises dialogue, analysis, and synthesis in a transparent form of *praxis* that leads to relevant learning and mission-pertinent knowledge creation. As such, this methodology offered the necessary framework to analyse the social practices adopted by each of the research teams in their attempts to realise technical innovation within ABC Corp.

# Research Methods

Initial planning for the field work was undertaken in 2009 and 2010, with the research commencing in 2011 and concluding in 2013. Teams across the global span of ABC Corp’s operations were invited to participate in an action research process aimed at improving a team’s attempts at technical innovation. From the strong positive global response, two teams (one based in New York and one based in Sydney) were selected to engage in the action research, with the primary criterion for the choice of these two teams being that neither team had been able to produce a technical innovation of any sort, over the previous three years.

In general, each spiral of action research encompassed thought (planning), action, reflection, learning (new knowledge creation) and transformed action (on the basis of the learning and reflexivity that each specific spiral engendered). These activities were documented and a broad range of data was collected and made accessible to others. Through the collective interpretation of the outcomes of the action and the implications thereof for subsequent action, each team managed its ‘reading’ of the research process in the interests of achieving its practical goal of producing new innovative technical products or services.

The research goal focussed upon *what it was about the behaviour of individuals within these teams* that facilitated the co-production of innovative outcomes. In this sense, the research attempted to articulate the inter- and intra-personal dimensions of effective collaborative behaviour and, thereby, to illuminate the relationship between the personal and the political in collective endeavour.

# Results

Two sets of results are presented: firstly, the research findings; and, secondly, the technical innovations achieved by the two teams.

# Research Findings

Four leadership practices were identified as laying the foundation for technical creativity and

innovation in the two teams:

*The facilitation of interpersonal empathy and mutual identification among team members*. This practice generated significant *identity resources* - intangible capital resources such as trust and commitment that become available when shared identities are realised. These relational resources underpinned the resilience of the two research teams as they sought collectively-cherished outcomes through aligned action. Referred to by one team as *seeing- the-self-in-the-other* and *the-other-in-the-self*, this practice enhanced the absorptive capacity of these teams as members projected themselves into the situation of ‘the other’ and thereby became able to enhance their communication skills (particularly listening skills) and reduce the ‘stickiness’ of the tacit knowledge being explored through the collective action. This practice also led to the teams becoming more open to collaborative risk-taking.

*The inculcation of mutual openness to the correction or counsel of others, irrespective of status or role.* Team members began to exercise a form of *intellectual humility* that allowed them to open themselves to learning from others; to admit to not knowing and to trust that such an admission would not be exploited for competitive advantage by team members. This practice eliminated hubris and other forms of destructive politics from the social context of the innovation effort and set the stage for the collective focus on insightful learning. This practice can only be enacted in a context of high-trust as admission of ignorance or lack of understanding (or dissatisfaction with the current understanding) within highly competitive conventional organisational contexts could be self-destructive. As Kofman and Senge (1993,

p. 20) comment, ‘… only with support, insight, and fellowship of a community can we face the dangers of learning meaningful things’. By creating a social environment in which practices such as intellectual humility can manifest without fear, social innovation lays the relational foundations for technical innovation and meaningful knowledge creation.

*The development of an authentic ‘negotiated order’*. This practice, which laid the social foundations for innovative endeavour by collectively establishing the principles upon which all interpersonal interaction and engagement were to be based, enabled direct and open communication to flourish in the interests of mission achievement. An important aspect of this practice was reaching consensus on the team’s mission and on the ‘rules of engagement’ with respect to interpersonal communication and behaviour. In this respect, the choice of an action research methodology, with its emphasis on dialogue, greatly encouraged the enactment of this practice.

*The framing of interpersonal confrontation in positive terms*. This practice enabled each team to deal effectively with the difficult political and personal issues that periodically manifested among team members. Referred to by one team as ‘tough love’, this practice re-framed confrontation as a form of caring; one in which the interests of the person/group being confronted are recognised and addressed empathically. As such, it endorsed the value placed on that individual/group by the rest of the team and appealed for the confronting action to be viewed as an invitation from the team to re-engage with it constructively in the collective interest. Through this practice, potentially destructive issues were addressed without

endangering team solidarity, as may have been the case if negative approaches to failure and adversity, such as the assignation of blame and the enactment of personal victimisation, had been condoned. In this way, the personal passion that often fuels innovative action in teams was managed in ways that demonstrated interpersonal care and respect without compromising the innovation intent of the team.

# Technical Innovations Achieved Through the Action Research Process

A number of key product and technological innovations were achieved directly as the result

of the action research:

*Technological innovation in network management*. At its core, the new (BWM) system developed by one team acts as a market for network bandwidth for online systems. In providing online services to customers, ABC Corp's networks are always under increasing demand, leading to perpetual cycles of saturation, contention, provision of new capacity, and a subsequent spiral of new demand. The BWM system incorporates a novel market for real- time calculation of the maximum utility - and revenue generating value - when the last fraction of spare capacity is sought by multiple competing services. Rather than allocating this capacity at random, those services that would return the most value on the marginal network use are allocated the capacity. A complementary innovation was the technology built to feed this data back to service owners and designers, allowing them to consider the use of network bandwidth for return-on-investment forecasts. Here, software development teams could determine whether the human effort and cost in making their software services more network-efficient would see the desired marginal revenue return in times of network saturation.

*Technological innovation in software security mechanisms*. Another major innovative development from this team was the creation and development of an entirely new approach to embedding security mechanisms, protocols and standards within ABC Corp software products. This changed the nature of software development within ABC Corp; changing company-wide practices from a common design philosophy re-implemented countless times by numerous groups, to an approach that provides software security mechanisms and policy implementations as building blocks - built once to be re-used more easily and at much lower overhead than the previous approach. Initially there were doubts about whether this radical change in approach would be adopted more widely by the company but now the new approach to security has been adopted broadly across ABC Corp, and is the *de facto* standard for all new software development projects.

*A revolutionary validation product*. This technology targets the needs of the very large advertising buyers in the market: both global content and publishing companies, as well as the advertising agencies, brokers and buyers who represent them. The technology includes a combination of prescriptive rules and preferences, provided by the publisher and content generation clients, together with the team’s innovative development of a machine-learning pipeline, trained to assess advertising for validation and optional exclusion. Over and above what the software performs, the engineering expertise injected by the ‘DTech’ team means that individual validation decisions can be performed in under 200ms - from the moment the intent to display content and a possible advertisement is initiated, through the assessment and validation process, to packaging the advertisement for delivery with the content by the publisher or advertiser systems. This speed of operation is as ground-breaking as the validation capability itself. At the time of the writing of this paper, ABC Corp is the only company to be able to offer this service in real-time to the satisfaction of the market.

*New reporting system*. The existing system made customisability and user-governed selection of criteria difficult when generating reports on advertising campaign effectiveness, return on investment, conversion rates, etc. Attempting to demonstrate the effect, correlation or causation of any one, or combination, of variables required the end-user to sift through all possible variables and combinations to find results of interest. The new system, produced by the ‘DTech’ team, provides an interface with visual ‘thematic overlays’ that do not rely on lists and grouping of variables in text form. This cohesive approach to displaying the effect of the hundreds of variables contributing to the outcome – as well as the forecasting capabilities it builds and deploys - is considered to be generations ahead of other software offerings on the market.

# Conclusions

With respect to the practical goal of this action research, the two participating teams collectively produced four highly innovative products/services. These innovations have been lauded within the company and are currently used by millions of customers.

In terms of the generation of new knowledge, the major finding of this research was that, in both action research settings, social innovation was an antecedent of technical innovation. The results show that, prior to the adoption of this action research, both teams under study had struggled to innovate technically because of social and governance dysfunction. It was only once the relational environment was able to support direct, ‘creatively abrasive’, communication among team members that technical innovation began to manifest. In particular, the building of inter-personal trust was a critical innovation-related achievement. In this respect, the results point to the need to manage the politics of innovation by managing group power relations in ways conducive to constructive relationship building and effective communicative practices. This implies new ways of working, under more egalitarian power relations, within new forms of organisation.

From a traditional perspective of limitations, constructionist research is *situated research* and accesses knowledge that is context-bound. As such, it would be argued that the results of this research cannot be generalised with confidence to other settings although the insights generated by it may be useful to others attempting to create a sustained capability for technical innovation. In addressing the challenge that action research faces in transcending the ‘single case’ without losing the action element, Gustavsen (2003) presents an argument for viewing cases of action research as part of a *social movement* focussed upon a core theme or concern. In this respect, this research can be seen as a contributor to a broad social movement towards creating alternative leadership (‘political’) practices that liberate knowledge workers by endorsing their personal agency and recognising the value proposition to which they respond best (challenge and learning). While the technical innovations produced by these teams can hardly be described as contributions to societal wellbeing, the process through which they were achieved is representative of a new form of collaborative endeavour - leadership as a collective achievement - the ‘politics’ of which are addressed transparently with a view to personal and collective emancipation.

Another encouraging aspect of the results from this action research is the similarity of findings to those of some of the territorial development action research being conducted in the Basque country of Spain (see Karlsen and Larrea, 2014). The notion that has emerged from these vastly different research contexts - that technical innovation is tied in complex ways to situated socio-political issues and practices - reflects a growing sensitivity to the

political nature of social realities and, thus, the need for research paradigms that can address these politics effectively.

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