Creativity to Productivity: A Comparative Case Study

Kay Fielden
Unitec New Zealand
kfielden@unitec.ac.nz

Abstract

In this paper, a theoretical model (Bounded Innovation Management Model (BIMM)) is described that provides a theoretical foundation for tracking the path of creativity to productivity in two large organisations. This model is based on the four core systems properties of control, communication, structure and emergence, as well as the four additional characteristics of whole system, incentives, positional role and final outcome. Applying BIMM to these large organisations suggests that formal structures within each organisation acted against the free expression of creativity in developing innovative solutions.

Keywords: Creativity, Systems concepts, Productive outcomes

INTRODUCTION

Creativity is an important ingredient in the development and use of information technology in organisations. In this paper, a comparative case study is described in which two large organisations are compared for the ways in which innovation and creativity are harnessed. The theoretical framework emerging from the data is a novel approach to illustrating these different patterns of innovation. This model is situated within the realm of core systems principles (Checkland, 1980) but does not rely on other general systems theory models. The structure of the paper is as follows: first the Bounded Innovative Management Model, is described; a literature review investigating creativity and innovation within organizations is presented; the case study approach for this paper is discussed; a discussion of the organization with its individual staff BIMM pictograms is described; followed by findings, future directions and conclusions.

LITERATURE REVIEW

Creativity Defined

Whilst creativity from an aesthetic sense is well defined, the literature on the role of creativity in organisations has not been so well defined. Creativity has been studied within many disciplines without consensus on one defining notion. McIntyre, Higgins et al. (1993) state that: 'the subject of creativity is a neglected area in the literature . . .' p 377. McIntyre, Higgins et al define creativity and the innovations that arise from creative acts as those that demonstrate 'radical newness' in situations where the initial problem situation was ill-defined. They also embrace the idea of recombination of known factors to produce something new.

Heerwagen (2002) stated that creativity is 'useful novelty' (p1) – novelty that can be applied and add value to an organization's products and services. Creativity includes the generation of ideas, alternatives and possibilities. Peterson (2002) also suggests that both originality and purpose are required for a product to be judged as creative. Unique products with no purpose are judged as having no value. It is important to realise that higher education institutions are service organisations when considering the multitude expressions of creativity.

Innovation Defined

In New Zealand, much emphasis has been placed on providing appropriate governmental infrastructure to nurture innovation via technology research grants, particularly grants for industry. Bartle (2002) defines innovation as opportunistic, non-linear and dynamic, and it involves the process of extracting value from ideas. Jones and Myers (2001) in considering the adoption and diffusion of information systems innovations state that an innovation is an idea practice or object that is perceived as new. At the core of academic activities is the notion of discovery or enquiry.

Productivity Defined

Implicit in the definition of productivity is that whatever is being produced will result in a value-added solution. Bartle (2002) suggests that innovation and productivity are interlinked and that innovation, particularly technological innovation, will increase productivity. He also suggests that this topic has been the subject of most quantitative studies and national surveys (Winsley, Gilbertson, & Couchman, 2001). In recent times, productivity, particularly research productivity, has been subject to rigorous external and internal audit procedures. This topic will be explored more fully later in the paper.

Theories Relating to Creativity and Innovation
Jones and Myers (2001) consider three theories of information systems innovation: the 'stages model' Rogers (1983) (ii) the Decision Episode Framework (DEF);and (iii) Technological Frameworks. Each model takes a different perspective from linear (the stages model), decision episodes within a network of interrelationships (DEF) to the perceptions of various groups within an organization and the alignment of their technological frameworks. They believe that no one theory is complete and can explain on it own what happened in tracing innovation in any one case. Each theory has its own strengths and contributes to an understanding of the entire innovation adoption process in IS.

Table 1: Force Field Analysis: How to ensure Creativity Techniques Are Utilized (Mcintyre et al, 1993)

Catastrophe - forces	Ideal + forces
Minimal use of creativity techniques despite training and availability of materials	Use of creativity techniques in everyday activities for all employees
Incorporated in standards manual but not enforced	Used in system development methodology for all new applications
Managers do not use creativity techniques themselves	Managers demonstrate value by use of techniques in their own activities
No change in ways IS department runs its meetings.	Meeting procedures changed to include creativity approaches
Training not reinforced	Follow-up sessions held regularly
Little recognition given employees for creative ideas	Management gives high visibility and recognition to creative employees
Creativity skills not stressed for advancement	Skill list for promotion includes knowledge of creativity
Creativity not rewarded	Bonuses and salary increases provided to reward creativity

Kelly (1999) resorts to complexity theory in an endeavour to understand innovation with human complex adaptive systems that exist within an organization. He states that mechanistic thinking is not sufficient and that complex adaptive systems offer more robust capabilities in accommodating the variety that exists when innovation in organizations is considered.

Bean (2002) argues for a model to manage innovation. He is of the opinion that a model allows the situation to be seen more clearly and assists in the understanding of how an innovation functions, is directed and supported.

Mcintyre et al (1993) suggest that creativity techniques can be utilised according to force field analysis (Table 1). To move from catastrophe to an ideal situation requires a managed approach that incorporates the use of creative techniques in everyday activities, role-modelling of creative techniques by managers own activities, meeting procedures that include creative approaches, regular follow-up sessions, high visibility and recognition for creative staff, creative approaches included in promotion criteria and extrinsic rewards in bonuses and promotion payments.

Need for Research
Many authors point to the need for further research to develop an understanding of how creative ideas become productive outcomes (Fichman, 2004; Galliers & Meadows, 2003; Glenn & Gordon, 2000; Lapierre & Giroux, 2003; Marc Edwards, 2000; McIntyre et al., 1993; Peterson, 2002).

Fichman (2004) states that 'the ultimate outcomes or benefits of innovation are rarely considered in studies within the dominant paradigm' (p317). (Fielden, 2005) also believes that barriers to acceptance are situated within the traditional dominant paradigm and recommends mindset shifts generated by alternate thinking styles. Maloney (2002) also states that the factors that drive private sector innovative activity are poorly understood.

Trust and Innovation
Lu, Liu et al. (2002) suggest that trust is a complex social phenomenon that reflects numerous ways of interacting between people and technology. These aspects include: technological, behavioural, social, psychological as well as organizational factors. In investigating patterns of innovation it was found that many organizational and social factors (rather than technological) influenced these patterns.

Dahlberg, Mallat et al. (2003) in describing their trust-enhanced Technology Acceptance Model (TAM) describe two factors they believe were missing from the original TAM model described by Davis (1989) These were: disposition to trust and perceived trust. Disposition to trust describes a person's attitude or willingness to trust others and perceived trust indicates whether a person perceives a technological solution is secure and trustworthy or not. PriceWaterhouseCoopers (2003) in their survey describe trust as the 'number 1

differentiator'. (p8) Their findings suggest that trust empowered individuals to communicate and implement change in order to bring strategic aims to reality. They also suggest that innovators are connected by a sense of energy, curiosity and trust and that the role models required within organizations encourage, consider and trust rather than coerce, dismiss and control.

Management Styles

Managers within organisations need to provide a 'heat shield' (p 20) for innovators to work effectively (MacMillan, 2004). This heat shield consists of a management matrix that encompasses recognition of opportunities, market entry and take-off, as well as venture capital, championing the innovation and moving the innovative product or service to market with appropriate speed. The PriceWaterhouseCoopers (2003) survey revealed that: top innovative organizations have well-defined ideas of the management processes required to create a culture of innovation; and that an open management style was important. Goodman (2000) advocates a 'people oriented, visionary approach' (p53) but believes that management's prime task should be to shape and co-ordinate employees' behaviour so that the objectives of the organization can be achieved.
Lapierre and Giroux (2003) describe how the fostering of creativity is a critical part of effective management.

Motivation in Organizations

culture McIntyre, Higgins et al. (1993) and Amabile (1997) believe that both intrinsic and extrinsic motivation factors are important in supporting the development of creative ideas into productive outcomes. Amabile identified that extrinsic motivators can take many forms, from the obvious factors such as rewards and recognition though to factors such as having clearly defined goals and providing frequent constructive feedback. Amabile is of the opinion that although intrinsic factors provide greater motivation, enabling extrinsic motivators, such as additional technical resources, provide additional support to intrinsic motivators. The PriceWaterhouseCoopers (2003) survey found that carefully designed reward recognition systems to reinforce management behaviour can provide both intrinsic and extrinsic motivational factors. The survey also pointed to the innovative success provided by a creativity improvement program, innovation being a priority at board level and the importance of an innovative within the organization.

Organizational Culture

Cooper (2000) suggest that organizational inertia typically inhibits organizational change and that managing creativity is a complex process requiring understanding of both creativity and an ability to manage effectively in the face of organizational inertia.

Peterson (2002), Dewett (2003) and Amabile (1997) stress the importance of positive feedback and encouragement as well as open and active communication within an organization to enhance creative flow within organizations.

Patterson (2001) suggests that there are three important elements: a culture of innovation; a reliable infrastructure; and an integrated network with free-flowing linkages. Previous work by Amabile (1997) placed importance on the orientation of the organization towards wanting to take risks in order to move ahead of the marketplace; an appreciation of what employees are capable of achieving and placing value on creativity and innovation.

Bean's (2002) Innovation Management Model recognizes the importance of the organizational culture for nurturing innovation. The other three important factors identified by Bean are, the capacity within the organization for innovation to occur, the ability to implement an innovation and finally the way that an innovation can be exploited and managed.

Organizational Structure

Smaller organizations that are regarded as innovative appear to have less rigid management structures (Bartle, 2002). Whilst large organizations have less flexible management structures they have a wider range of knowledge and staff skills available, can take better advantage of market growth and can spread the cost of innovation over a wider sales base. Boulding (1989) suggests that the ability to cope with rapid change is protection against vulnerability in any human activity system including innovative organisations. Cooper (2000), in studying creativity within information technology development, also stated that organizational inertia typically inhibits change resulting in developments that reflect the status quo. Resistance tactics included resistance delay, both externally from users and internally from within the organization from inflexible processes.

Hogarth-Scott and Parkinson (2001) in considering barriers and stimuli of innovation in IT suggest that there is a need for: (i) clear corporate strategy; (ii) strong leadership with continued support for innovation; (iii) strong

staff professional development; (iv) internal marketing; and (v) getting potential clients involved in early development.

Requirements for Innovation

A complex balance of factors has been identified that are necessary for innovation to occur. These factors include:

- time to innovate (including incubation time) (Dewett, 2003; Ornstein, 1991)
- intrinsic motivation (Amabile, 1997; Dewett, 2003; Ornstein, 1991)
- clear lines of communication between management and staff (Dewett, 2003)
- cooperation across and between organizational reporting lines (PriceWaterhouseCoopers, 2003)
- an intuitive personality (Houtz et al., 2003; Isaksen & Lauer, 2003)
- mental flexibility (Maturana & Varela, 1998)
- passion, freedom to make choices and freedom to make mistakes (Peterson, 2002) and
- celebration of success (Research, 2003).

SYSTEMS CONCEPTS AND INNOVATION

Because findings from the literature suggest that it is difficult to have one definitive theory to explain patterns of creativity and innovation within an organization it was decided to structure this research around the core systems concepts of structure, control, communication and emergence (Checkland, 1984). Checkland describes structure as 'those elements in a problem situation which are either permanent or change only slowly or occasionally' (p317). Control is described as 'the process by means of which a whole entity retains its identity' (p313). Communication is described as 'the transfer of information' (p313) and emergence as 'properties of a whole entity that are only meaningful when attributed to the whole' (p314).

THE THEORETICAL MODEL (BOUNDED INNOVATION MANAGEMENT MODEL)

The theoretical model (BIMM) (described below) which has been utilized as a theoretical framework emerged from a deep understanding of core systems principles described originally by Checkland (1984). These core principles are: communication, control, structure and emergence. Communication in organizations is generally considered to be communication between people which may or may not be assisted by technology. Control within an organization is usually provided by rules, regulations, mission statements, operational procedures and practices. Organizational structure is provided by reporting lines and duties within the organization. Emergence usually refers to those characteristics, properties, entities or events that surface when the system is considered as a whole. It is this last property of emergence that is most important to consider when researching creativity and innovation within an organization.

Whilst it is possible for creativity or innovation to occur anywhere in an organizational 'space' it appears from the data gathered that the norm is for innovation to be a bounded activity. Innovation appears to oscillate either within , about or outside of organizational bounds . When innovations occur across boundaries, it appears to be an indicator for organizational misalignment . The black box in the pictogram represents organisational bounds, the green line innovative activity. These pictograms emerged as a means of illustrating these various innovative scenarios.

When innovation is confined within the bounds provided by organisational rules and regulations, for day-to-day operational procedures, creative activity is likely to be stifled, as controlling mechanisms tend to overpower individual and collective innovative patterns. In such an organization bounds are usually represented by business rules, financial constraints, organizational practices and procedures and strict adherence to only pursuing innovation that is aligned with organizational focus. Usually an innovation is required to be justified and approved within these bounds. BIMM has been applied across core systems characteristics (communication, control, structure and emergence) and also organisational characteristics of role, incentive, outcome and whole system. Figure 1 shows BIMM applied to the ITM manager for organisation A. Two large organisations have been selected for this comparative case study: a large tertiary institution (organisation A) and a large Information Technology business (Organisation B) which is the New Zealand branch of an international organisation.

FINDINGS
Organisation A

Figure 1 BIMM for IT Manager Organisation A

Communication	Control
All formal No face-to-face (except meetings)	No formal controls to monitor creativity -to-productivity pathway
Structure	**Emergence**
All structures formal	No emergence
Role	**Incentive**
No cognisance of now creativity might be incorporated in a service activity	No formal mechanisms for creativity-to-productivity pathway
Outcome	**Whole System**
New services Physical location change	Present But need → Future

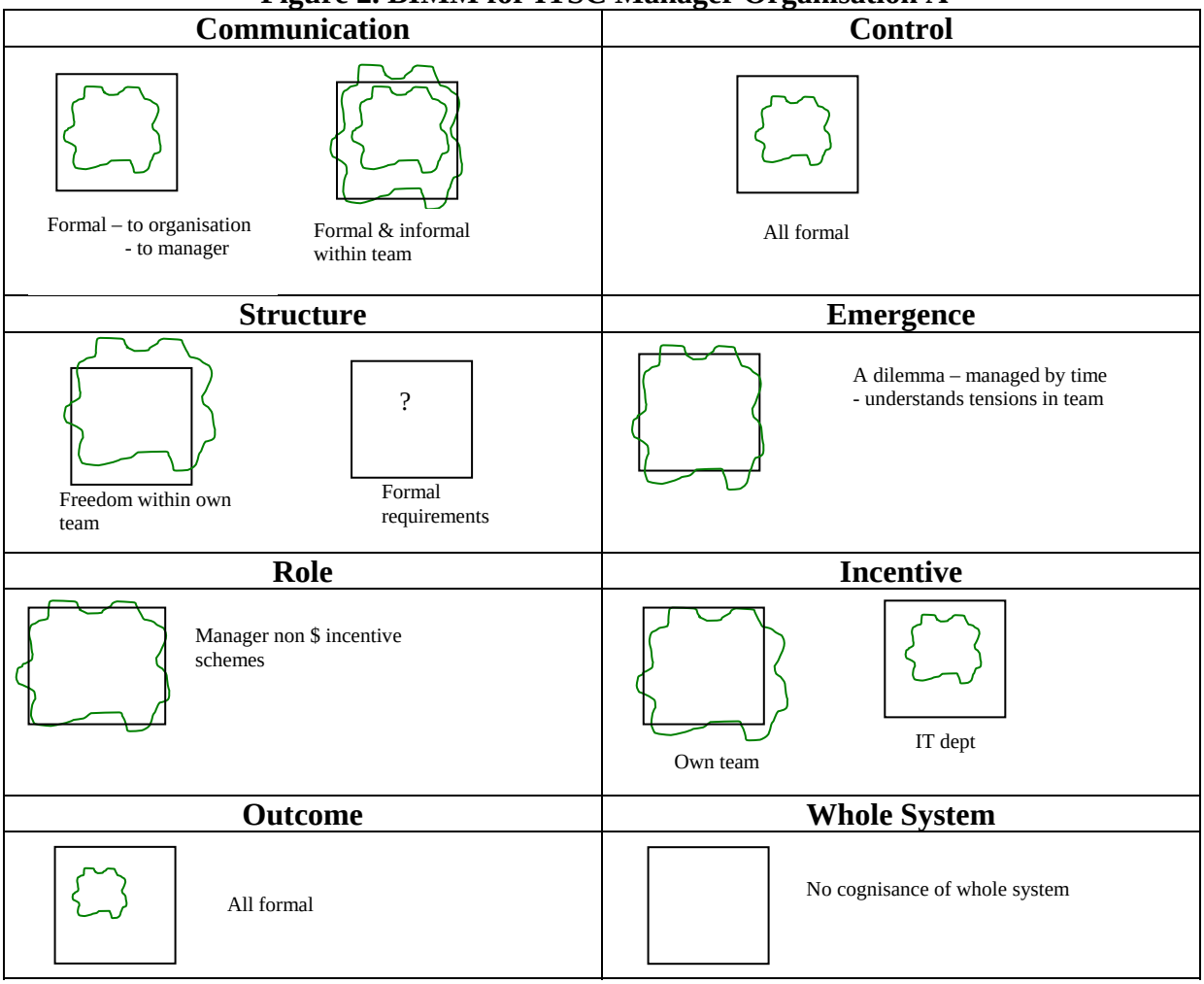
Systems Concepts
Structure
Organisation A's IT department provided internal IT infrastructure support including its own IT support centre for both staff and students. Two participants from this organisation were interviewed: The IT department manager who had overall responsibility for IT within the whole organisation; and the information technology support centre (ITSC) manager who dealt with the daily operations of the help centre. The ITSC manager reported to the IT department manager. The IT manager identified internal reviews, working parties and periodic forums as structures that were in place within the IT department to 'capture new ideas, find solutions to existing problems or to hear solutions for improvement'.

In his response the elements of radical newness (capture new ideas), recombination (find solutions to existing problems) and added value (hear solutions for improvement) can be identified as addressing the move from creativity to productivity.

The ITSC manager adopted 'an open style of management' for her role at an operational level. She believed that staff within the ITSC section should have the freedom to express new ideas or solutions 'brought on by desperation with existing solutions'. She also stated that ITSC staff reporting to her had the freedom to develop new ideas when new IT systems were introduced. Whilst she was asked about structure her reply focused on interpersonal relationships and communication styles that encompassed freedom of expression.

There is a marked difference in management style between the IT manager and (formal structures in place for new ideas to be expressed) and the open management style of the ITSC manager who believed that openness and freedom of expression was more conducive to eliciting creative ideas.

Figure 2. BIMM for ITSC Manager Organisation A



Communication of New Ideas within the Organisation
The IT manager within Organisation A stated that new services and products were communicated to the whole organisation through the formal mechanisms of monthly service meetings, campus-wide emails and handbook and website updates. The ITSC manager within Organisation A focused on informal emails, letters to students, the IT Awareness week run at the start of each semester, the 'Ask It' website provided by ITSC and co-ordinators workshops that provided a single point of contact with other organisational units within the institution.

Control Mechanisms
The IT manager could see no formal control mechanisms for the creativity to productivity pathway. The ITSC manager however at the operational level stated that evaluation forms completed after the department provided staff and student training, verbal feed back from students and formal feedback about the Ask IT website all provided control mechanisms.

Emergent Ideas
The IT manager was somewhat perplexed by this question stating that 'it was difficult to gauge' – and he was not aware of any formal structures to deal with emergent ideas. The ITSC manager believed that emergent ideas 'posed a dilemma'. She was aware of times when the new ideas that 'pop up out of nowhere' could as distracters for the staff members involved and take them away from their main tasks. This in turn, could lead to resentment in the rest of the team. She believed that the solution to this particular problem was to devote a certain number of hours for new ideas, with the remaining allocated work time for a staff member being spent on the main tasks for the job. She also stated that weekly staff meetings provided a venue for the communication of new ideas to obtain 'buy-in' from all staff.

Incentives to Share New Ideas
The IT manager within organisation A stated that there was no formal mechanism for encouraging or capturing new ideas. He stated that within the IT infrastructure department individuals generally received some recognition for their ideas which in turn may assist in gaining performance recognition, bonus or contribution noted on performance reviews.

The ITSC manager however sent out congratulatory emails which she believed provided evidence for staff awards and bonus rounds. She also provided cards, wine and food where appropriate. Discussions at weekly team meetings were described by her as an ideal opportunity to share new ideas.

Here we have a classic yin/yang scenario with the ITSC operations manager providing the 'feeling' side of support and incentives and the IT department manager working strictly within his organisational role not seeing the opportunities for providing such incentives.

***T*ransformation of New Ideas into Productive Outcomes**
The IT manager was cautious in his response to this question in his reply that 'some ideas do'. He did recognise that new services and splitting the physical location of the helpdesk into 2 locations had been acted upon. The ITSC manager said that she saw many examples of new idea transformation in the operation of the helpdesk, updated content in the handbook and customised training for different organisational units.

Productive Outcomes
The IT manager at Organisation A cited new services such as training for students, expansion of audiovisual services and the helpdesk split into 2 areas. The ITSC manager also mentioned innovations with the helpdesk (processes rather than physical location) and customised training for allied and academic staff.

ORGANISATION B
In Organisation B the Business Development manager (BDM) was interviewed. The BDM stated that his organisation had well-developed structures to support the nurturing of new ideas. A self-service environment, provided by a web portal on the organisational intranet, supplied training programs to all staff within the global organisation. Each employee was required to complete at least one program a month for which she/he was issued with a certificate signed by the MD. Staff members were performance managed (four times a year). Any new ideas generated by a staff member during a performance review were agreed to by management – if the idea aligned with the organisation. Funds were also available within the organisation to support educational development. Global online seminars were also conducted to share new ideas. Staff within the organisation also went to partners seminars both nationally and internationally to gain new ideas about the industry as a whole.

Some staff within the organisation used mentors to bring knowledge to virtual global teams. Networking was encouraged and supported within the organisation. The work ethic within the organisation was to take value gained from professional development into product development, delivery and sales.

It can be seen therefore that there exits within organisation B strong structural support both within formal (self-paced professional development and performance reviews) and informal structures (networking).

Communication of New Ideas
Within Organisation B communication processes about new ideas started with a formalised brainstorming session where everything was written down using the "Excellent', 'Maybe', 'Unusable' (EMU) principle. All ideas were recorded (no matter who the originator was) and regarded as equal during the brainstorming session with no political agendas. Brainstorming ideas were then reviewed and analysed using the EMU principle, with 'Unusables' being recorded and put aside, the 'Maybes' checked again to see if any of these ideas could become 'Excellent'. The list was then prioritised into what could be achieved quickly, what could be done with partners and what ideas related to each organisational division and section. Sometimes a third party facilitator was employed in these brainstorming sessions.

Control Mechanisms
The BDM manager of organisation B stated that staff performance reviews conducted one a quarter, weekly team meetings and virtual teams all provided control mechanisms for new idea development. He also noted that global economic situations within the whole organisation could impact on financial controls imposed on the NZ office.

Figure 3 Business Development Manager Organisation B

Role	Incentive
System integrator	Formal development and solutions program
Structure	**Outcome**
Formalised	All outcomes must be within organisation boundaries
Communication	**Control**
Formalised communication	Formalised controls
Emergence	**Whole System**
Formalised organisation inhibits emergence	Consistent company view

Emergent Ideas
The BDM manager stated that his organisation was self-sufficient and dynamic with the NZ branch being a subsidiary of a large international organisation. Informal systems were welcomed and encouraged to obtain 'buy-in' from colleagues. The organisation had a fortnightly newsletter that communicated innovations internationally. He also stated that there was no regimented concept and that any staff member could talk to him at any time.

Incentives to Share New Ideas
Organisation B has a 'Developer and Solution Program' formally established within the organisation in which small businesses are encouraged to partner in the development of new ideas and products. The business development manager (BDM) believed that small partners 'get a buzz' out of being part of the program. He also believed that the Developer and Solution Program (D&SPP) operated like a club which was all-inclusive. He stated that 'the biggest advocates are the people who work with us in this program'.

Productive Outcomes
The BDM manager discussed the process and structure for dealing with productive outcomes through the D&SPP program.

DISCUSSION

Using an interpretive tool such as BIMM at a whole systems level as well as the individual employee level within these two organizations for the constructs chosen (structure, communication, control, emergence, role, incentive, outcome and whole system) has the potential to uncover a richness of innovative pattern mappings that may have been unnoticed when an organization is viewed as a whole system. Often the assumption is that staff will be aligned in their perceptions about the impact that innovations have for the organization. This comparative study has shown that in one organisation that managers interviewed do not necessarily view innovative pattern mappings in the same way. Role dependent activities such as boundary enforcement, auditing and control can inhibit the corporate environment so that innovations are either squashed or not even recognised. The IT manager in organisation A did not seem to know what the tole of innovation was in providing IT support for the organisation. The IT support manager for organisation A encouraged and supported innovation – as long as it fitted within the organisational bounds and did not attract and cost. The

BDM manager in organisation B described an organisational environment in which innovative solution finding had been formalised. It is often the case when such formalisation is in place that creativity is inhibited.

CONCLUSION

BIMM appears to reflect the views being expressed in the literature on innovation management and the model shows clearly what innovative pattern mappings exist within both organisations and how these pattern mappings are managed. Relating innovation concepts to core systems properties has enabled a different view of the management of innovative pattern mappings within organizations.

This investigation of innovative pattern mappings with the bounded innovation management model (BIMM) that shows via pictograms based on core systems principles how innovative pattern mappings occur within an organization. This model has potential to uncover organizational misalignment in managing creativity. In this research project the innovative pattern mappings for two large organisations were studied. Very different innovative patterns were discovered between the ITM and the IT support manager within organization A. The most important factor that aligns with existing research is how critical management of innovation is. (Goodman, 2000; MacMillan & McGrath, 2004) and (Lapierre & Giroux, 2003) all stress the importance of fostering creativity as a critical part of effective management. In both organisations studied formal structures within each organisation acted against the free expression of creativity in developing innovative solutions.

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