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ORGANISATIONAL PATHWAYS: CREATIVITY TO PRODUCTIVITY

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Abstract

In this paper a new model (Bounded Innovation Management Model, BIMM) based on systems thinking principles is presented to contribute to the research being conducted in mapping creativity to productivity pathways. This research was conducted in five information technology companies in New Zealand all presenting different pathways from creativity to productivity. It has been discovered that: (i) evolutionary pathways oscillates about and are contained by the bounds that are in place through management practices; (ii) revolutionary pathways tend to operate outside such bounds and oscillate in the surrounding space; (iii) the creative pathway to successful production tends to be stifled if completely contained within management bounds; and (iv) managers' perceived pathways may vary from the actual pathways within an organisation. This research contributes to the existing systems thinking body of knowledge.

Keywords: Creative Pathways, Information Technology Organisations, Productivity

1 INTRODUCTION

Creativity is an important ingredient in the production of new software solutions. In this research project the pathways followed within five IT organisations to proceed from new ideas to productivity were investigated. The organisations investigated ranged from a large multi-national company to a very small company with four employees. In each organisation capturing new ideas both within and outside of the organisation was regarded by the managers interviewed as vital to remain competitive and to meet budget requirements. Very different pathways were discovered within each of these organisations. The theoretical framework emerging from the data is a novel approach to illustrating these different pathways. This model is situated within the realm of core systems principles but does not rely on other general systems theory models.

The structure of the paper is as follows: first this new model – the Bounded Innovative Management Model – is described; a literature review investigating creativity and innovation within organisations is presented; the case study approach for this paper is discussed; five vignettes with their individual BIMM pictogram is described; followed by findings, future directions and conclusions.

2 THE BOUNDED INNOVATION MANAGEMENT MODEL

The model emerging from the data gathered for this research is based on core systems principles of communication, control, structure and emergence (Checkland, 1984) and on the fact that organisational systems when considered as a whole are bounded. Rules, regulations, mission statements, operational procedures and practices all provide organisational boundaries. As has been discovered by many researching in this field (Amabile, 1997; Bartle, 2002; Cheskin & Fitch, 2003; Cooper, 2000; Cross & Travaglione, 2003; Davis-Havill, 2004; Dewett, 2003; Fagan, 2004; Fichman, 2004; Jones & Myers, 2001; Maloney, 2002; Marc Edwards, 2000; McIntyre, Higgins, & Couger, 1993; Patterson, 2001; PriceWaterhouseCoopers, 2003) capturing knowledge about the creative process is no easy task. In considering core concepts rather than building on existing theoretical models of managing innovation and creativity a different lens through which to study this complex phenomena is provided.

All people within an organisation tend to view the creative process differently. Indeed data gathered in this project tends to show that participants interviewed tended to give information about individual perceptions of the creative process as well as information about the actual processes

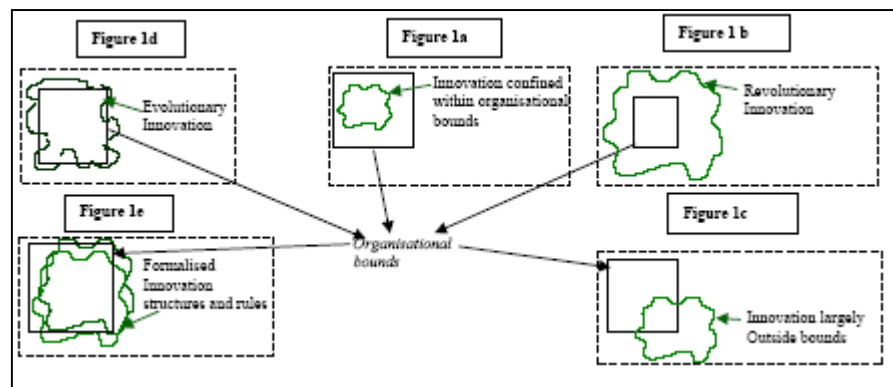


Figure 1 Bounded Innovation Management Model

involved in mapping the path from creativity to productivity. In Figure 1 five different models are shown. In Figure 1a innovation is confined within the bounds provided from the mission statement through to day-to-day operational procedures – a potential stifling of creativity where controlling mechanisms tend to overpower individual and collective creative activity. Figure 1b shows creative activity oscillating outside and around organisational bounds. Even the most innovative organisations studied had firm management boundaries in place – and yet innovative activity proceeded with minimum control – as long as long as it was aligned with organisational goals. Figure 1d shows a ‘leaky’ creative boundary which allows for influences to the creative process from outside of the organisation. All other pathway maps presented have solid boundaries indicating that the creative pathway is considered to be internal to the organisation. Figure 1c shows the creative arena displaced

and still influenced by organisational bounds. This tends to be a problematic situation and one that was present in one company studied. In Figure 1d the creative activity oscillates in direct relationship and alignment with the organisational bounds. This view tends to be held by managers, directors and leaders as a perception that may not be a reality. Figure 1e demonstrates the formalising of the creative pathway in an endeavour to maximise the return on investment to reach productive outcomes. This was the pattern described in one company in the study. This is an 'official' view of how the pathway is mapped and because this particular organisation is very large there will be many more mappings of the shape of the creative pathway. Whilst only five mappings are shown, these are indicative only of many more such mappings. The theoretical position presented in this paper is that: (i) each person within an organisation will have at least one creative path mapping; (ii) this perceived creative path mapping may or may not be aligned with the actual organisational model of creative pathways provided within the organisation; (iii) all innovative organisations hold at least one creative pathway which may or may not be explicit; (iv) all creative pathways are influenced by organisational bounds; (v) barriers provided by tightly controlled bounds may stifle the creative pathway; and (vi) creative pathways out of alignment with organisational bounds may inhibit the development of creative ideas.

3 LITERATURE REVIEW

Whilst creativity from an aesthetic sense is well defined, the literature on the role of creativity in information technology has not been so well defined. Marc Edwards (2000) while differentiating between 'eminent' and 'everyday' creativity (p. 221) maintains that creativity is not easily defined. Creativity has been studied within many disciplines without consensus on one defining notion. McIntyre, Higgins and Couger (1993) state that: 'the subject of creativity is a neglected area in the literature on information systems' (p. 377). McIntyre, Higgins and Couger 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 (p. 381). They also embrace the idea of recombination of known factors to produce something new. Implications for the IT industry arising from these attempts to define creativity that impact on this industry in tracing the process from creativity to productivity are: (i) ill-defined problem situations; (ii) recombination of existing factors for innovation; (iii) radical newness (and the industry acceptance of this); (iv) the products of creative endeavours must have value; and that (v) creativity is a bounded activity. In New Zealand much emphasis has been placed on providing appropriate governmental infrastructure to nurture innovation via technology research grants, particularly grants for industry.

3.1 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 with IT are rarely considered in studies within the dominant paradigm' (p. 317). 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.

3.2 Innovation Management

Effective IT managers need to provide a 'heat shield' (p. 20) for innovators (MacMillan & McGrath; 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. In the Price Waterhouse Cooper (2003) survey it was discovered that top innovative organisations have well-defined ideas of the management processes required to create a climate of innovation, recognising the importance of an open management style. Goodman (2000) advocates a 'people oriented, visionary approach' (p. 53)

but believes that management's prime task should be to shape and co-ordinate employees' behaviour so that the objectives of the organisation can be achieved. Lapierre and Giroux (2003) describe how the fostering of creativity is a critical part of effective management. Cooper (2000) suggest that organisational inertia typically inhibits organisational change and that managing IT development creativity is a complex process requiring understanding of both creativity and an ability to manage effectively in the face of organisational 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 organisation to enhance creative flow within organisations. 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 placed importance on the orientation of the organisation 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 recognises the importance of the organisational climate for nurturing innovation. The other three important factors identified by Bean are the capacity within the organisation for innovation to occur; the ability to implement an innovation; and the way that an innovation can be exploited and managed.

Smaller organisations that are regarded as innovative appear to have less rigid management structures (Bartle, 2002). It is important to note that in New Zealand technical innovative activities are concentrated on Small and Medium Enterprises (SMEs) (<100 employees). Whilst large organisations 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 businesses.

3.3 Systems Concepts and Innovation

Because findings from the literature suggest that it is difficult to have one definitive theory to explain the path from creative ideas to productive outcomes within an organisation 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' (p. 317). Control is described 'as the process by means of which a whole entity retains its identity' (p. 313). Communication is described as 'the transfer of information' (p. 313) and emergence as 'properties of a whole entity that are only meaningful when attributed to the whole' (p. 314).

4 RESEARCH METHOD

Five case studies were conducted with in-depth interviews with the managers of these organisational units to identify differing perceptions of creativity to productivity pathways. These five organisations were chosen through industry alliance networking by a purposive sample of small, medium and large, as well as national and international organisations. Purposive sampling is a non-probability sampling technique in which researchers select samples based upon their own judgment about appropriate characteristics required of participants. It should be noted that the results obtained in this study cannot be generalised to all organisations. Organisation A was the IT infrastructure department of a large higher-education organisation. Organisation B was a small innovative software development company. Organisation C was the software development section of a medium-sized company (one of four sections). Organisation D was the New Zealand branch of an IT publishing company. Whilst the global organisation is large, the New Zealand branch is a medium-sized organisation reporting to the Australian office, which in turn reports to a head office in the US. Organisation E was also the New Zealand branch of a large global organisation (once again, a medium-sized branch).

Although a series of questions was prepared, each interview did not take the same format as each interviewee had different experiences to explore which were interesting and informative for this study. In the first part of the interview demographic data about the organisation and the manager's role

within the organisation was gathered. The second part of the interview concentrated on exploring incentives to share new ideas, manager's roles in any incentive scheme, organisational structures to nurture new ideas, transformational processes, productive outcomes, organisational communication patterns for dissemination of productive outcomes, controls, and how the organisation responded to new ideas that emerged spontaneously.

4.1 Data Analysis

Content analysis of interview transcripts resulted in the Bounded Innovation Management Model, BIMM (Figures 1 – 6) that uses pictograms to represent the

Role	Incentive
<input type="checkbox"/> No emergence No creative pathway	<input type="checkbox"/> No formal mechanisms for c-to-p pathway Tries to provide 'receptive environment'
Structure	Outcome
<input type="checkbox"/> Internal reviews, working parties and periodic forums	<input type="checkbox"/> New services Physical location change
Communication	Control
<input type="checkbox"/> All formal No face-to-face (except meetings)	No formal controls to monitor c-to-p pathway
Emergence	Whole System
No emergence	Present <input type="checkbox"/> But need → Future <input checked="" type="checkbox"/>

Figure 2 ITM Organisation A

mapping of creative processes and organisational bounds. As the interview transcripts were analysed it became apparent that within each organisation and for each of the questions the creative pathway was influenced in some way by the organisational bounds. Individual vignettes for each interviewee were developed to convey this rich data.

4.2 Case Study A

The BIMM mapping for Organisation A, as perceived by the IT manager (ITM) who was responsible for all IT infrastructure and the ITSC manager who looked after the help desk, are shown in Figures 1 and 2.

These were developed from analysing interview transcripts with the IT Manager and the information technology support centre (ITSC) manager (who reported to the ITM).

The IT manager identified internal reviews, working parties and periodic forums as structures (Figure 1) that were in place within the IT department to 'capture new ideas, find solutions to existing problems or to hear solutions for improvement'.

Role	Incentive
<input checked="" type="checkbox"/> Manager non \$ incentive	<input checked="" type="checkbox"/> Own team <input checked="" type="checkbox"/> IT dept
Structure	Outcome
<input checked="" type="checkbox"/> Freedom within own team <input type="checkbox"/> ? Formal requirements	<input checked="" type="checkbox"/> Formal
Communication	Control
<input checked="" type="checkbox"/> Formal - to oeg <input checked="" type="checkbox"/> Formal & informal within team	<input checked="" type="checkbox"/> All formal
Emergence	Whole System
<input checked="" type="checkbox"/> a dilemma - managed by time	No comments

Figure 3 ITSCM Organisation A

In this 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 where staff within ITSC had the freedom to express new ideas or solutions ‘brought on by desperation with existing solutions’. Whilst she was asked about structure her reply focused on interpersonal relationships and communication styles that encompassed freedom of expression.

The IT manager could see no formal structures for capture of new ideas. He stated that staff generally received some recognition for their ideas which in turn could assist in gaining performance recognition, bonus or contribution noted on performance reviews. The ITSC manager 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 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. Both managers identified formal mechanisms for communication –service meetings, website updates, campus-wide emails and handbook.

The ITSC manager also 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 the technology partnership agreement co-ordinators’ workshops that provided a single point of contact with other organisational units within the institution. For the IT manager there were 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 from technology partnership agreement coordinators about the Ask IT website all provided control mechanisms.

The ITM recognised only that new services and splitting the physical location of the helpdesk into 2 locations as transformations. The ITSC manager 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. The ITM 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 act 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. The IT manager stated that as the organisation grew there was a danger that individual staff members could feel distanced from senior managers and that their ideas were not valued, relevant or listened to.










Role	Incentive
 Control (S. HR, board, leadership)	 Has S control of incentive
Structure	Outcome
 Formal setting Informal process (brainstorming sessions)	 Multiple outcomes Ideas, strategies, tactics
Communication	Control
 Multiple communication channels: Verbal, face-to-face, formal and informal	 Monitor  Future Plan
Emergence	Whole System
 Accept all new ideas Examine Formalise	 All ideas must fit within vision ‘Ducks in a row’

Figure 4 MD Organisation B

He believed that managers cannot be the only source of good ideas and that the organisation needed to tap into ideas from across the wider group.

4.3 Case Study B

For the managing director (MD) weekly brainstorming sessions were an essential structural element in nurturing the development of new ideas. Key incentives for his staff were participant involvement in the ownership of the venture (the organisation is operating as a joint-venture partnership). Open multi-channel communication within the organisation was the norm using what was most appropriate whether it was verbal, written or face-to-face. There were formal reporting requirements, monthly management meetings (with formal minutes circulated to all relevant parties) and formal structures in place to monitor and control innovation within the company – project plans, milestones and monthly monitoring.

Transformation of new ideas into productive outcomes was core business for Organisation B in developing innovative software solutions. The MD particularly stressed the need to stay focussed and that their business processes needed to be disciplined in order to reach final production. The MD stated that outcomes included productive ideas, strategies, and tactics to ensure productive outcomes. He believed that the timely order of doing things was important. He liked to get ‘all the ducks in a row’. In a small organisation where resources were limited he believed that this was important. He was very conscious of the need to examine every new idea emerging and if it turned out to be of potential value to the business the innovation would be formalised into implementation parts and procedures immediately. He also realised that whilst fostering an environment for idea generation one must always ensure they fit into the overall vision and strategy that is in place to deliver this vision.

4.4 Case Study C

In Organisation C, a medium-sized New Zealand Company selling forecourt technology to retail outlets for petroleum products, the production development manager (PDM) was interviewed. He believed that within his organisation new ideas were nurtured informally with no specific ‘think tank’. Acceptance and development of any new idea was market-driven out of what customers wanted to

Role		Incentive	
	Encourage development of new ideas		Culture
Structure		Outcome	
	Informal – no specific think tank Org provides tech soln to client problems		Formal (business case) New or enhanced product
Communication		Control	
	Layered – informal in project teams		Formal (after development underway – to senior managers)
	Evaluation by senior managers		
Emergence		Whole System	
	All new ideas fed into next brainstorming session		

Figure 5 PDM Organisation C

achieve. The customers provided the business problem for which the company provided a technical solution. Innovation within Organisation C therefore was driven by the value-added component of creativity.

The PDM stated that the organisational culture was vital to providing incentives to staff. The organisation encouraged informality and research and development was welcomed. Central to this culture was the concept of no individual ownership of a particular product especially when the final product was generated by the team working on the new product. He believed that a collaborative working environment provided sufficient incentive stating that ‘Everyone adds value and no-one is guru’. Organisation C had four divisions and everyone within a division ‘knows what is going on’ within that particular division. People working on a particular project ‘know by informal dissemination of ideas’ what is going on. Formal presentations to senior managers (usually after development was underway) were made. These formal presentations helped to ‘create a vision of what the organisation was trying to achieve’. The PDM stated that the main control in place within his organisation was the evaluation process required. Any new ideas required a business case that was presented to senior managers and new products requiring large financial investment also required board approval. All decision on whether a new idea was transformed into a productive outcome was market driven rather than purely relying on research and development. Emergent ideas were fed into the current market developments and as such went through normal processes.

4.5 Case Study D

The managing director for Organisation D, the New Zealand branch of an international IT publishing house, was interviewed. He stated that any new idea (if it required financial support) required a business plan that would be considered by him before being passed up the organisational hierarchy.

However, he stated very strongly that if a new idea within the New Zealand

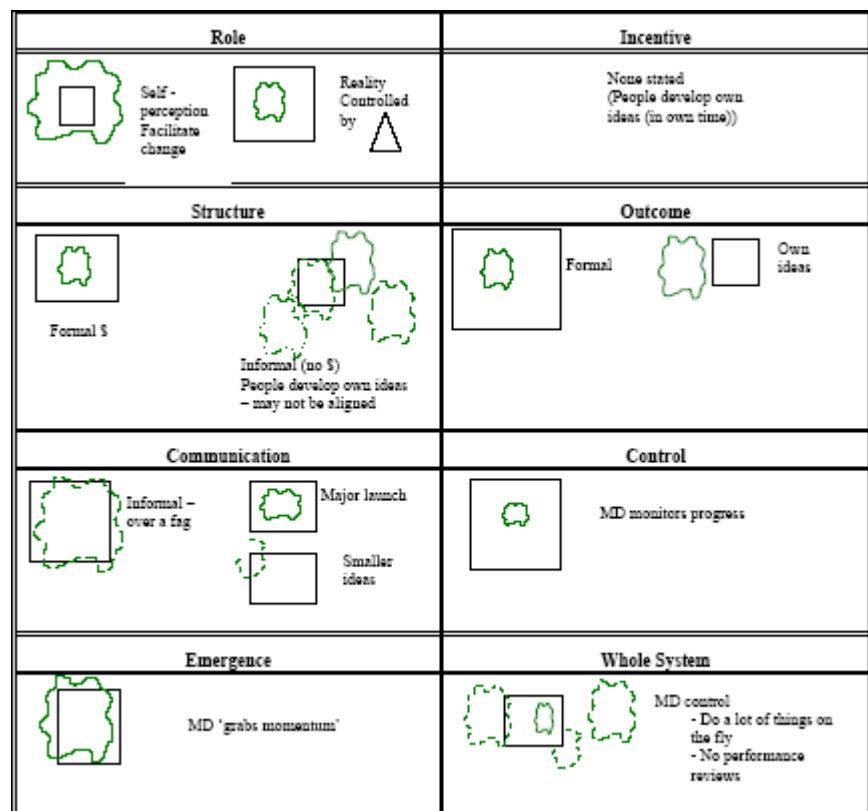


Figure 6 MD Organisation D

office did not require any financial investment the staff member concerned should ‘just get on with it’. He stated that the organisation was strongly market-driven and therefore it was necessary to secure finances before committing any resources to exploring new ideas. In this response can be seen the balance required within a multi-national organisation in which new ideas that needed financial backing required approval at all levels of the organisation. Innovations not requiring backing were the responsibility of the individual staff member – on top of normal duties. There were no formal financial incentives and the MD believed it was important to let people develop their own innovative ideas and carry these innovations through to production. This statement does not include the formal approval process required for these ideas if they need financial investment from the company. The MD also believed that communication within his section was best done informally ‘over a fag’ where the ideas were bounced around first before being communicated more widely in the organisation. The informality meant that there was no set communication pattern. For major launches of new products there was formal communication within the organisation. For smaller ideas the communication was on a need to know basis. Controls depended on the size of the project. A business plan was required

setting out financial investment, time and final outcomes. The MD monitored progress as a control mechanism getting involved as much as he needed to. Working arrangements within the organisation were flexible where people could work at home if necessary work less than 40 hours, or at a distance. There was rapid transformation from new ideas to products or outcomes. (This was somewhat at odds with the previous responses given about business cases having to be made).

The MD believed that a business case for new ideas was a productive outcome (and those who had the new ideas should develop the business case). He stated that emergent ideas ‘happened all the time’. A new product could be in the market place between 2 and 12 months from initial inception. He believed in ‘grabbing the momentum to get to fruition’ when staff members came up with new ideas and projects. Their enthusiasm had the momentum associated with something new that could drive a project along. The MD stated that ‘we do a lot of things on the fly’ and that the organisation had no performance reviews – unless an employee asked for one.

4.6 Case Study E

In Organisation E the Business Development Manager (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. Staff members were performance managed

Role	Incentive
<input type="checkbox"/> No emergence No creative pathway	<input type="checkbox"/> No formal mechanisms for c-to-p pathway Tries to provide ‘receptive environment’
Structure	Outcome
<input type="checkbox"/> Internal reviews, working parties and periodic forums	<input type="checkbox"/> New services Physical location change
Communication	Control
<input type="checkbox"/> All formal No face-to-face (except meetings)	No formal controls to monitor c-to-p pathway
Emergence	Whole System
No emergence	Present <input type="checkbox"/> But need → Future <input checked="" type="checkbox"/>

Figure 7 BDM Organisation E

(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 exists within organisation E strong structural support both within formal (self-paced professional development and performance reviews) and informal structures (networking).

Organisation E had a ‘Developer and Solution Program’ formally established within the organisation in which small businesses were encouraged to partner in the development of new ideas and products. The BDM believed that small partners ‘got a buzz’ out of being part of the program. Within Organisation E communication processes about new ideas started with a formalised brainstorming session. All ideas were recorded (no matter who the originator was) and regarded as equal during the brainstorming session with no political agendas. The BDM stated that regular staff performance reviews 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. Informal systems were welcomed and encouraged to obtain ‘buy-in’ from colleagues. The organisation had a fortnightly newsletter that communicated innovations internationally.

5 FINDINGS

In Organisation A markedly different management styles were displayed by the IT manager and the

Organisation/Role	Incentives	Transformation	Outcomes
<i>A – IT manager</i>	None recognised	‘Some ideas do’	New Services
<i>A – ITSC Mgr</i>	Non \$ incentives (own team)	Many ideas do	Innovative processes, customised training
<i>B - MDr</i>	\$ incentives	Core business	Get the order right
<i>C - PDMgr</i>	Culture	Business case required for all	New or enhanced products
<i>D - MDr</i>	None stated	Done rapidly	Business case (those with the idea develop the product)
<i>E - BDMr</i>	Formal dev program	If ideas align with organisation	Done through Formal dev program

Table 1 BIMM Characteristics

ITSC manager. The IT manager did not recognise creative pathways, managing formally within the organisational boundary whilst the ITSC manager on the other hand demonstrated flexibility both towards her staff in encouraging and motivating within her sphere of influence and in modifying her management style in liaising with the IT manager to whom she reports. Multiple creative pathways were found in analysing data from her interview. The formal management style of the IT manager contrasted with the open management style of the ITSC manager who believed that openness and freedom of expression was more conducive to eliciting creative ideas.

The managing director of organisation B displayed remarkable leadership qualities within such a small organisation. Whilst the core business was to develop innovative software solutions and the funding line was still venture capital, controls, reporting lines and audit procedures were clearly demarcated and managed. This was done in conjunction with visionary leadership in providing multiple communication channels for the expression, tracking, debating and investigating any new idea that was presented (Tables 1 & 2).

It can be seen from Figure 5 (organisation C) that creative pathways are fewer and much more tightly controlled. Formal organisational practices prevail and there is no ‘ownership’ of ideas by individuals.

Organisation	Structure	Communication	Control	Emergence
<i>A – IT manager</i>	Internal reviews, Working parties, Periodic forums	Formal mechanisms	No formal control for c-to-p pathway	‘Difficult to gauge’
<i>A – ITSC Mgr</i>	Open Mgmt style	Informal emails, Letters, IT awareness week	Evaluation, Feedback, AskIT website	‘Posed a dilemma’
<i>B - MDr</i>	Weekly brainstorming	Open communication	Formal monitoring	Examine every new idea, Check alignment
<i>C - PDMgr</i>	New ideas nurtured informally	Informal within teams, Formal for new product	Business case required for all, Evaluation rigorous	Fed into current market development
<i>D - MDr</i>	Formal business plan (for \$ ideas), Approval required at all levels of org	‘Over a fag’, Major launches done formally	All controlled by MD	Happen all the time, Seize momentum
<i>E - BDMr</i>	Web portal, Development program	Formal brainstorm, Regular newsletter	Regular performance evaluation, Financial	Encouraged

Table 1 Organisational Role, Incentives, Transformation, & Outcomes

The MD of organisation D demonstrated a ‘scattered’ approach to the management of creative pathways within the organisation. There was a marked difference between informal and formal

systems within the organisation. Employees had the freedom to develop their own ideas – only if these ideas attract no funding requirements – which they appear to do without attention to alignment with the formal requirements of the organisation. One of the dilemmas exposed by BIMM for this organisation is that the MD displayed a high level of control and at the same time ‘gives staff freedom to develop new ideas’.

The product development manager of organisation E displayed all the characteristics of a perfectly aligned manager with organisational vision for the development and tracking of new ideas both within the organisation and with partners engaging in the organisations ‘Developer and Solution Program’. Formal mechanisms were also in place within the organisation to capture new ideas from employees.

6 FUTURE DIRECTIONS

Because the BIMM model has been formalized with this research project it would be interesting to apply the model to a wider cross-section of IT industries. Whilst this project considers five New Zealand organisations drawn from: a large international company with a branch in New Zealand; a medium-sized New Zealand company; the New Zealand branch of a medium-sized international company a small New Zealand organisation; and a large New Zealand higher education institution, data has yet to be gathered for a selection of IT industries within each organisational domain. Of particular interest in the New Zealand context are small organisations as most IT business is conducted within the SME sector.

BIMM appears to reflect the views being expressed in the literature on innovation management and the model shows clearly what creative pathways exist within an organisation and how these pathways are managed. Research on how performance measures for innovative companies could assist managers develop mechanisms that incorporate systems thinking concepts would be a possible future direction. Frigo (2002) Huang, Souter, and Brown (2004), and Salter and Torbett (2002) all suggest that performance measures for innovation are poorly understood and that further research is required. Robinson, Carillo, Anumba, and Al-Ghassani (2005) believe that performance measurement models that incorporate innovative processes will help managers in developing performance indicators. Relating innovation concepts to core systems properties has enabled a different view of the management of creative pathways within organisations.

7 CONCLUSION

This investigation of pathways from new ideas to productive outcomes has led to the development of the bounded innovation management model (BIMM) that shows via pictograms based on core systems principles how creative pathways oscillate around or in the vicinity of normal management practices within an organisation. Each organisation investigated displayed a very different BIMM. It is interesting to note that in the large multi-national organisation there is uniformity throughout the model with organisational practices aligned formally with creative pathways. It seems apparent that the organisation with the most divergent pictograms (Organisation D) has some alignment problems in capturing creative ideas effectively. These results cannot be generalised, however the model has potential to uncover organisational misalignment in managing creativity. In this research project the pathways followed within five IT organisations to proceed from new ideas to productivity were investigated. The organisations investigated ranged from a large multi-national company to a very small company with four employees. In each organisation capturing new ideas both within and outside of the organisation was regarded by the managers interviewed as vital to remain competitive and to meet budget requirements. Very different pathways were discovered within each of these organisations.

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