SHORT INTERVAL MANAGEMENT AND THE QUEST FOR PROCESS INNOVATION: SOMETHING NEW OR *DÉJÀ VU*

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Introduction

Ireland still punches way above its weight internationally attracting 2% of total global foreign direct investment (FDI) in 2008 which amounted to circa €2 billion (IDA, 2009). The focus of the IDA (Industrial Development Authority which is responsible for foreign direct investment in Ireland) is on three strategic pillars: Global Services, High Technology Manufacturing and RD&I (Research Development and Innovation). Consequently innovation in manufacturing processes is a vital ingredient to providing sustainable MNC (Multinational Corporation) subsidiaries in the country.

The work is presented in the context of a case study of innovation in APC Ireland, a subsidiary of the critical power and cooling services division of the Schneider Electric Corporation. Furthermore the paper will describe the utilization of a novel form of action research recently proposed to the IS community by Mårtensson & Lee (2004) which they call *dialogical AR*.

The central aim of this paper is to answer the following research question: can short interval management (SIM) support process innovation? The proposed structure of the paper is as follows. Firstly the background review will argue that SIM is not dealt with in the current literature and as a result has the potential to contribute to the conference theme. Then the longitudinal case study of a multi-national corporation together with the research approach will be outlined. An overview of the SIM process will be then presented followed by a discussion of the implications.

Background

According to Browne *et al.* (2000) product and process development "are the lifeblood of all manufacturing organisations". However it is first of all important to differentiate between the concept of process innovations (Tidd, 2001; Tidd *et al.*, 2005) and the concept of the innovation process (Angle & Van de Ven, 2000; Schroeder et al., 2000; Poole & Van de Ven, 2000). The former is the focus of this paper and deals with innovation as applied to manufacturing and supply chain operations while the latter deals with the procedures and practices that are used to bring a product or service from the initial concept to implementation.

Tidd *et al.* (2005) examine innovation under four broad categories: Product; Process; Position (eg. target market); Paradigm (e.g. change in *mental models* such as the move to low cost airlines). They also analyse innovation based on the degree of novelty involved spanning from incremental to radical changes. The figure below takes the 4Ps and maps them in an "innovation space" where an enterprise can operate. Whether an organisation "explores and exploits" this space is very much dependant on the innovation strategy.

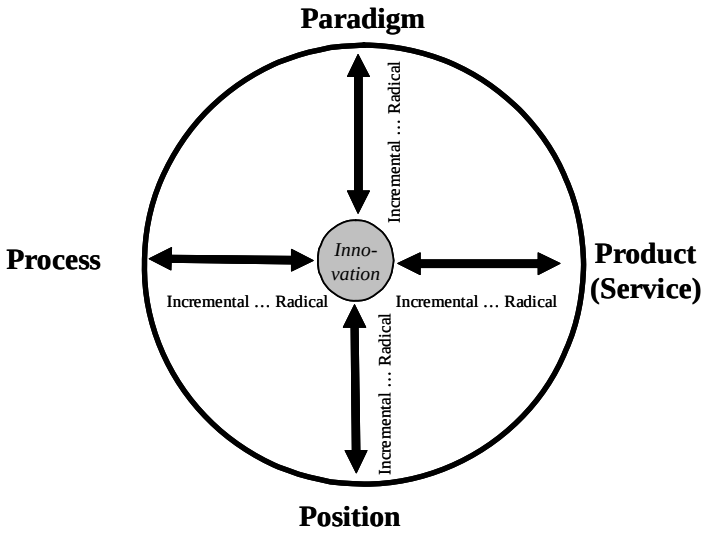

***Figure** 1: Map of the Innovation Space - adapted from Tidd et al. (2005)*

This paper will seek to make a contribution to the "process" quadrant of Tidd et al.'s taxonomy. A search was carried out of academic journals which did not result in any relevant articles being found on short interval management. The next section of the paper will provide an overview of the case study in which the work was carried out.

Case Study

The case study was based in APC Ireland, a subsidiary of the American Power Conversion (APC) Corporation. The Corporation entered a major period of transition in the first quarter of 2007 with completion of its acquisition by Schneider Electric. APC designs, manufactures and markets back-up products and services that protect hardware and data from power disturbances. The explosive growth of the Internet has resulted in the company broadening its product offerings from uninterruptible power supplies (UPS) to the high-end InfraStruXure ^{TM} architecture in order to meet the critical availability requirements of internet service providers (ISP) and data-centres. This modular design integrates power, cooling, rack, management and services, which allows customers to select standardised modular components using a web-based configuration tool. The Corporation reported sales of $2 billion in 2005, globally employs approximately seven thousand people and is a Fortune 1000 company. However, recent financial reports have stressed that the company needs to implement significant improvements in manufacturing and the supply chain (Results APCC 2006). According to these reports, the company must work to develop a "lean, customer-centric, ambidextrous organisation" in order to reach "optimal efficiencies in our processes". APC has two locations in the West of Ireland that serve the European, Middle East and Africa (EMEA) region. The Manufacturing Operations site, based in Castlebar, employs approximately 100 people while a number of functions including sales, information technology, business support and research and

development (R&D) are situated in Galway with a workforce of approximately 300. Responding to the supply chain challenge, a Lean Transformation project was set-up in the Castlebar campus in February 2006 with a cross-functional team of twelve members drawn from Management, Engineering, Manufacturing, Materials Planning, Quality, and Logistics functions. The primary management information system employed by APC is Lotus Notes, a collaborative software system that manages its knowledge flows. It provides a tightly controlled environment for asynchronous group work; where collaborators can have different or independent work patterns. The strength of the MIS function in APC was viewed as an important advantage by Schneider in their acquisition analysis and APC's "intimacy with information technology" was identified as central to the creation of synergies with Schneider's power solutions subsidiary MGE.

Research Approach

The conclusions by Benbasat & Zmud (1999) concerning the lack of relevance in IS research was, to put it mildly, a criticism of the discipline. Consequently the initial approach to the case study was closely related to the following recommendation in their paper:

> IS researchers should look to practice to identify research topics and look to the IS literature only after a commitment has been made to a specific topic.

Furthermore, Mårtensson & Lee (2004) have proposed that dialogical action research can help "resolve the rigor-relevance dilemma" which has bedevilled research in IS and in the wider context of business and social sciences. The research design followed the advice of Benbasat & Zmud that firstly there was a need to spend time in the

organization, observing and listening, in order to get a feel for the situation. Data collection methods during this phase involved: maintaining a log book, reviewing documents and information systems, records, interviews, observations (direct and participant), artefacts and surveys in order to develop a database and body of evidence (Gillham, 2002; Yin, 1994). A total of 29 unstructured or open interviews were undertaken that involved approximately 60 hours of interview time and 24 days spent in the company sites. The interviews were conducted across a wide area of the organization that included: Senior Managers with global, EMEA, and site responsibilities, Middle-Managers, Team Leaders, Engineers and a number of people in general planning roles. The main contact point during the diagnosis phase was the Plant Manager of the Castlebar location which involved approximately eleven direct meetings with an estimated seventeen hours of interaction.

There was agreement in January 2007 to move forward using dialogical Action Research with meetings every two weeks in Castlebar. The meetings during this phase resulted in over 20 hours of recorded interactions translating into almost 60,000 words of transcripts. In particular, the discipline of having to take regular timeout in a “time-pressured” manufacturing environment was a major incentive for the Plant Manager to agree to this approach. However the realities of the situation have resulted in a further adaptation of Mårtensson & Lee’s methodology: the research “timeout” for reflective one-to-one dialogues consisted of finding a quiet place in the building and away from the office. The Plant Manager also considered the framework advantageous since it allowed him to retain control and responsibility for all decisions, implementations and communications. However there are a number of practical risks to this type of longitudinal research in a dynamic changing corporate environment, such as the realities of reorganisations and relocations that are not

pointed by Mårtensson & Lee. Furthermore, in order to address the subject of rigour we adopted the five principles proposed by Davison *et al.* (2004) to evaluate the research: the Principle of the Researcher–Client Agreement (RCA), the Principle of the Cyclical Process Model (CPM), the Principle of Theory, the Principle of Change through Action, and the Principle of Learning through Reflection.

Short Interval Management

The transcripts of the dialogical action research indicated one major process innovation which had a significant impact on the operations function. This was the short interval management system (SIM). This section will provide an overview of SIM derived from a procedure issued by the Castlebar plant manager. SIM has a dual purpose to effect communication and support running of the production line. Its function is to communicate any issues upwards through the organisation and to feed information to the production line. It is designed to enable the speedy communication to all concerned of potential health and safety issues, feedback from customers and quality issues; as well as to track production build versus the production plan. By definition the system is short interval with the approach of breaking large tasks into manageable sizes and then reporting progress on a daily basis. Production teams meet twice every day for a maximum of ten minutes and the meeting is chaired by the cell supervisor or delegate. The chief communication vehicle of the process is the "SIM board" where the health and safety, quality and production issues are captured and dealt with in that priority. To enforce the priority given to health and safety, the supervisor is responsible for posting a photograph on the problem on the board. The board information has a standard format with the health and safety issues on the extreme left, followed by quality issues and production issues with the priority from

left to right. Any potential barriers to meeting the build plan are identified and if necessary escalated to the support staff.

The cell support team hold a mandatory daily meeting which should be a maximum of thirty minutes which is run by the production manager. Membership of this team includes the manufacturing and quality engineers, the material specialist and the cell supervisor. These meetings are also open to any of the management team to attend. The agenda follows the set priority referred to earlier where the following issues are reviewed:

- Health and safety
- Customer feedback
- Quality issues
- Issues escalated from the production SIM meeting
- Agreed action items from the last meeting
- Feedback from operations personnel on active issues
- Agree the issues for action prior to the next meeting.

The last item requires actions to be both specific and deliverable with the focus on meeting the short interval rather than any long term requirements. The layout of the SIM board reinforces the priorities outlined above.

Discussion

According to Tidd et al. (2005 p 10) process innovation changes the ways in which products or services are "created and delivered". This paper proposes to make a contribution by providing empirical evidence of short interval management, a subject that is not specifically dealt with in the literature. However a question remains: is it just a standard process found in other sectors such as the daily short (and often stand-up) meeting found in for example some areas of the retail sector and the service sector such as fast-food provision? Such stand-up short meetings are also a characteristic of

agile software development which is presently gaining much prominence in the software industry (agilemanifesto, 2001). While the conclusion must be that many aspects of SIM are déjà-vu, it does however provide a comprehensive methodology and structure suitable for a manufacturing environment.

The following extracts from the transcripts illustrate the impact of the SIM process on the operations of the Castlebar facility. Firstly SIM was instrumental in the plant receiving a National Award for Health and Safety.

> The National Standards Authority of Ireland (NSAI) is responsible for checking health and safety (H & S) procedures. There was a Health & Safety conference recently where they announced the winners of different categories. We won the regional ward for the West. What's more we won the new Gold Standard in Occupational Health & Safety award which is actually the SIM processes [in operation]. The judge thought it was the bees-knees and it was really groundbreaking.

The next extract refers to the operation of the SIM process

> The SIM process gives visibility to everyone on the floor; it drives closing things off; it encourages people to come forward with their suggestions. Those are things that make the difference.

While being a vehicle for process innovations SIM was regarded a being a radical innovation in itself and incorporates the two aspects highlighted by Tidd *et al.* (2005) above – the incremental and radical aspects of innovation.

> I like how this has evolved actually .. how innovativeness can be viewed as having two aspects..…the incremental and the radical. The SIM process is a radical new process [innovation] itself.

Limitations of the research study include that it was confined to one site. However as Mårtensson and Lee (2004 p. 533) point out there is a growing acceptance of "intensive research methods" and that a single-site case study can be

deemed scientific. Lee's (1989) seminal paper also lays the foundation for single case studies. The problem of bias is fundamental to dialogical AR which is based on reflective on-to-one dialogues with a single individual. This makes triangulation more difficult but it is possible to search for supporting external evidence. For example the enthusiasm for the SIM process by the practitioner was backed up by the plant winning an external national health and safety award that resulted from the implementation of the process.

Conclusions

This paper has described the uncovering of a short interval management process during a case study based in the APC subsidiary of Schneider Electric in Castlebar. The approach was a single case study offering a rich source of data where the researcher spent two years having the status of a temporary employee. The evidence indicated that the number of suggestions proposed and implemented by the SIM process was significant and as a result can support the quest for process innovations. While many aspects of SIM are found elsewhere, the approach brings them together in a novel way that is suitable for a manufacturing environment. SIM provides a vehicle for implementation of mainly incremental innovations but can be regarded as a being a radical innovation itself requiring fundamental changes to work practices. Furthermore the work is based on a longitudinal study of an MNC subsidiary of which there is a dearth in the Irish context and shows evidence of initiative taking in the subsidiary (Igoe, 2006). Future work would be profitable in examining the implementation of SIM in other industrial environments.

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