COMBINING OPEN INNOVATION AND AGILE APPROACHES: IMPLICATIONS FOR IS PROJECT MANAGERS

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Abstract

This paper describes a research-in-progress that explores the applicability and implications of open innovation in a multiple-project environment that employs agile approaches to information systems development. In doing so, it seeks to reveal any resemblance the open innovation model has with the agile process, while simultaneously investigating the challenges of such an approach for project management. This paper argues for a different perspective of project management that goes beyond single and multiple project management to scrutinise the open space of innovation that includes collaboration and knowledge-sharing with other business units, customers, partners, competitors and other relevant stakeholders outside the boundaries of the firm.

Keywords: agile methods, open innovation, project management, networking

1. INTRODUCTION

The last decade or so has seen the emergence of a number of software development methods as a response to the inefficiency of existing software development methods in rapidly changing environments (Highsmith, 2004). Some of the most popular include eXtreme Programming (XP) (Beck, 2000) and Scrum (Schwaber and Beedle, 2002). This family of methods are now commonly known as 'agile', primarily through the formation of the Agile Alliance and the publication of the Agile Manifesto (Agile Manifesto 2001). Agile methods have been well received by those in the system development community and there is strong anecdotal evidence to suggest that awareness and indeed use of these methods is highly prevalent across the community. Agile methods, given their flexible and light-weight processes, place emphasis on close communication and collaboration in project teams (Beck, 2000; Schwaber and Beedle, 2002). However, some reports have heavily criticised what agile research exists (e.g. Abrahamsson et al., 2009, Conboy, 2009, Dybå and Dingsøyr, 2008). These reports accuse the current body of agile method research of lacking rigor, cumulative tradition and sufficient theoretical grounding. They even point to the ambiguity as to what constitutes 'agility', stating that it "now means so many things to so many people, it has lost a lot of its meaning" (Conboy, 2009).

A particular strength of the agile approach is that they move away from 'introverted' development where the team building the system are detached from the customer. Instead, agile approaches continually involve the customer in the development process, supposedly leading to the development of a more innovative and hence more valuable information system (Beck, 1999; Schwaber & Beedle 2002). However, while the customer plays an essential part in the agile process, this practice could be extended to include multiple stakeholders and even other organisations. We propose that it is useful to consider how the agile innovation process can benefit from becoming more 'open', e.g., by opening up the boundaries of a systems development entity to include other stakeholders besides the customer. For example, it has been suggested that companies must increasingly work with each other to enhance their agility in adapting to market developments and developing new products/services cheaper and faster (Tapscott and Williams, 2005).

As far as we are aware, no research has focused on the role of other stakeholders in agile development besides the customer. Nor has research looked at how principles of open innovation could complement an agile approach, despite the commonalities between the two models, particularly its emphasis on the value of people, collaboration and close communications (Beck, 2000). In addition, there is no research that we know of that investigates the implications of open innovation practices for project management. Thus, the objective of this study is to explore the notion of open innovation, its applicability and implications in a multiple project environment that employ agile methods. The remainder of the paper is structured as follows. The next section presents the background to the study. A theoretical framework is then presented, followed by description of the research approach and next steps.

2. BACKGROUND TO THE STUDY

Innovation and creativity has been highlighted as a key strength underpinning agile methods (Highsmith and Cockburn, 2001; Highsmith, 2004; Cockburn and Highsmith, 2001; Highsmith, 2002; Highsmith, 2002a). Agile advocates believe that "creativity, not voluminous written rules, is the only way to manage complex software development problems" (Highsmith and Cockburn, 2001). Cockburn and Highsmith (2001) claim that "agile methodologies deal with unpredictability by relying on people and their creativity rather than on processes". Additionally, it has been contended that "agile approaches are best employed to explore new ground and to power teams for which innovation and creativity are paramount" (Highsmith, 2002a). The literature also illustrates the fact that the requirement for creativity has been highlighted in discussions of specific agile methods, such as eXtreme Programming (XP), one of the most popular agile methods (Highsmith, 2002a; Crispin and

House, 2003; Benediktsson et al, 2004). Highsmith (2002a) observes that "although XP contains certain disciplined practices, its intent is to foster creativity and communication". Indeed, Benediktsson et al (2004) claim that "given the benefits of XP in terms of creativity, value delivery and higher satisfaction levels, it is not surprising that many managers and developers have adopted such practices". Despite these claims, however, there is a lack of understanding of what constitutes creativity in software development in general and to which extent agile methods actually facilitate creativity and innovation.

2.1 The Traditional Innovation Process

Innovation is now viewed as the lifeblood of organizations that want to survive and prosper in a marketplace that is global in nature and intensely competitive. However, this particular stance on the importance of innovation did not always exist. Traditionally, the innovation process has taken a linear approach, the expectation being that investment in research and development will provide organisations with a competitive advantage (Kane and Ragsdell, 2003). In addition, conventional approaches to innovation assumed that it was the experts 'within' the company that invented and designed innovative new products to meet customer needs and organisations rarely looked outside for new ideas or inventions (Tapscott and Williams, 2005). As Hamel and Prahalad (1990) pointed out, "organizations often tend to be hidebound and so orthodox ridden, "that the only way to innovate is to put a few bright people in a dark room, poor in some money, and hope that something wonderful will happen" (p. 66). This 'Silicon Valley' approach resulted in innovation being an isolated activity where growth depended on the inventive capacity of individuals and small teams (Hamel and Prahalad, 1990). Thus, this very approach in which organisations generate, develop and commercialise their own ideas belong to the closed model of innovation (Fasnacht, 2009).

According to Chesbrough (2003) closed innovation is a view that successful innovation requires control and that firms need to be strongly self-reliant because of uncertainty with quality, availability and capability of others' ideas. Traditionally, new business development processes and the marketing of new products took place within the firm boundaries and exclusively with internal resources. Within the closed model, the innovation process is characterised by firms that invest in their own R&D, employing smart and talented people in order to outperform their competitors in new product and service development. In addition, after producing a stream of new ideas and inventions, firms must defend their intellectual property thoroughly against the competition (Dahlander and Gann, 2007). Changes in society and industry, however, have led to an increased availability and mobility of knowledge workers and the development of new financial structures like venture capitalism. Indeed, Gassmann and Enkel (2006) propose that shorter innovation cycles, industrial research and the rising costs of development, in addition to a lack of resources are motives that are changing companies' innovation strategies towards a more open direction (Gassman and Enkel, 2006).

2.2 The Importance of Open Innovation

Chesbrough (2004) argues that a paradigm shift is taking place in how companies commercialise knowledge, resulting in the boundaries of a firm eroding. This has been characterised as a move towards 'Open Innovation', a paradigm viewed as the antithesis of the traditional model of innovation where research and development activities lead to internally developed products that were then distributed by the firm (Chesbrough et al., 2006). A general theme underling open innovation is that firms cannot continue to look inward in their innovation processes, isolating themselves from possible partners, collaborators and competitors. In other words, open innovation invites firms to open up their boundaries to achieve a flexible and agile environment. The term 'open innovation' has been defined by West and Gallagher (2006, p.82) "as systematically encouraging and exploring a wide range of internal and external sources for innovation opportunities, consciously integrating that exploration

with firms capabilities and resources and broadly exploiting those opportunities through multiple channels". In addition, Laursen and Salter (2006) focused on external search breadth and external search depth for different types of innovation in a large-scale sample of UK manufacturing firms. These authors defined openness as "the number of different sources of external knowledge that each firm draws upon in its innovative activities" (2004:1204). In contrast to the linear closed model of innovation, the open innovation approach suggests that firms develop processes to ensure a flow of ideas across its boundaries because not all smart people work for the organisation and there is increasing geographical dispersion of knowledge (Dahlander and Gann, 2007). Thus, ideal business search outside their own companies for the best ideas, seeking input from other companies, which include competitors, as well as from customers, suppliers and vendors.

2.3 Project Management in an Agile Environment

In an agile development environment, the project manager's role is greatly changed, and is more akin to that of a facilitator or coordinator (Nerur et al. 2005; Alleman 2002; Lindstrom & Jeffries 2004). In agile projects, the organisation or team structure is "organic and flexible", as opposed to traditional structures which are "mechanistic, bureaucratic and formalized" (Nerur et al. 2005); the method is there not as a prescription, but something to be continuously tailored and moulded by the team (Conboy and Fitzgerald, 2009, Fitzgerald et al., 2006); the project is completed through a series of iterations, each often as short as a few working days (Fowler & Highsmith 2001; Fitzgerald et al. 2006), resulting in more frequent, short-term development; budgeting is more fluid and short term (Conboy, 2010), and software is valued over documentation (Fowler & Highsmith 2001). Significantly, the customer plays a more continuous and embedded role, and thus is intrinsically involved in most project management decisions (Griffin 2001; Farell et al. 2002; Beck & Andres 2004; Beck 2000). Moreover, developers are not confined to a specific specialised role and are encouraged to self-organise, interchanging and blending roles (Nerur et al. 2005) and become involved in project management issues that may fall outside their traditional skill areas.

In addition to all of these, the very concept of incorporating open innovation principles may throw a spanner in the works, adding further complexity for the agile project manager. As well as coping with managing in such a fluid, short-term environment, dealing with multiple projects and external entities adds further challenges and risk of unexpected outcomes. However, mechanisms for scanning the project landscape need to be incorporated into project management practices in agile organisations and project managers need to be aware that an IS project is no longer a confined matter that can be treated as a closed innovation isolated from the rest of the organisation. Indeed, knowledge in and about projects should be exchanged and individual projects should scan the open space of the organisation for other projects that constitute potential collaboration (Elbanna, 2008). Thus, taking an open innovation route may present many additional benefits for an agile environment.

3. CONCEPTUAL FRAMEWORK ADOPTED IN THIS STUDY

For our theoretical base, we propose a framework drawn from three central open innovation archetypes proposed by Gassmann and Enkel (2006). These include: (1) the outside-in process; (2) the inside-out process; and (3) the coupled process (see Figure 1). This framework provides a useful lens to examine the applicability of open innovation in a multiple-project agile environment and the challenges and implications of such an approach for project management.

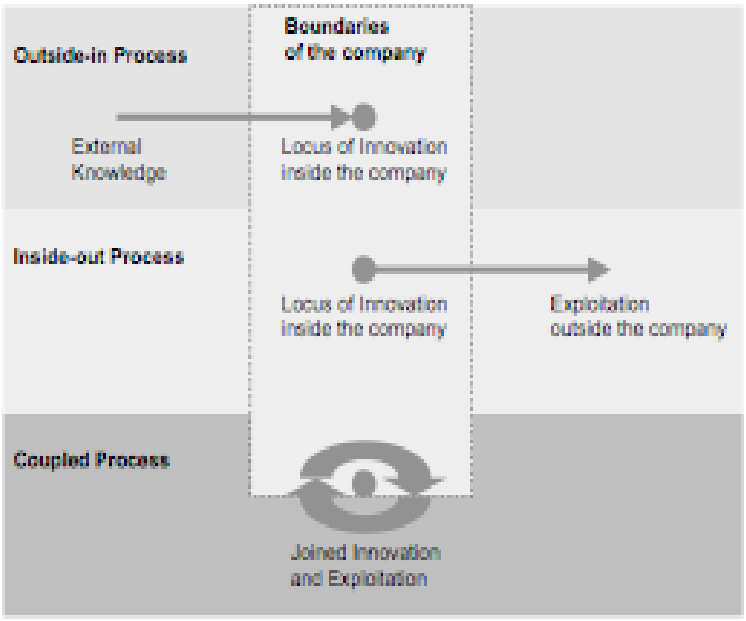

Figure 1: A Framework for Open Innovation (Source: Gassmann & Enkel, 2006)

However, open innovation can be analysed at a number of levels, which include the intra-organisational and inter-organisaional networking level (Chesbrough et al., 2006). While there exists much research about intra-organisational level networking to stimulate innovation (e.g. Lagerstrom and Andersson 2003; Foss and Pedersen, 2002; Tsai and Ghoshal, 1998), this type of networking has not been analysed explicitly within the open innovation context (Vanhaverbeke, 2006). In addition, there is no research that we know of that addresses intra-organisational networking in an agile project environment. In order to address both the intra-organisational and inter-organisational context, we have tailored Gassmann and Enkel's framework to include innovation that occurs outside the boundaries of both the business unit and firm (see Figure 2).

3.1 The Outside-in Process

Companies that decide on an outside-in process as a core open innovation approach means that they choose to cooperate with suppliers, customers etc. and integrate the external knowledge gained (Gassmann and Enkel, 2006). This can be achieved by investing in global knowledge creation, applying innovation across industries, customer and supplier integration and purchasing intellectual property. According to Gassmann and Enkel (2006), if firms possess the necessary competencies and capabilities, they can successfully integrate internal company resources with the critical resources of other members such as, customers, suppliers etc, by extending new product development across organizational boundaries. For this study, an outside-in approach will refer to the integration of external knowledge, competencies and resources gained from multiple stakeholders outside the business unit and boundaries of the firm.

3.2 The Inside-out Process

This process focuses on the externalising of company knowledge and innovation in order to bring ideas to market faster. This approach includes licensing IP or multiplying technology by transferring ideas to other companies. In addition, outsourcing can be used to channel knowledge and ideas to the external environment. The benefits of outsourcing include gaining access to new areas of complementary knowledge, managing capacity problems which allows for more flexibility, reduced time-to-market, sharing of costs and concentration of core competencies (Gassmann and Enkel, 2006). In the context of this study, an inside-out process refers leveraging and transferring knowledge and ideas to multiple stakeholders outside the boundaries of both the business unit and firm and gaining certain advantages by letting ideas flow to the outside

3.3 The Coupled Process

This open innovation approach combines the outside-in (gaining external knowledge) with the inside-out process (to bring ideas to market). In order to accomplish both, these companies collaborate and cooperate with other companies (e.g. strategic alliances, joint ventures), suppliers and customers, as well as universities and research institutes. To collaborate and cooperate successfully, a give and take of knowledge approach is crucial. Benefits of such an approach include an intensive exchange of knowledge and a mutual learning process. In this research, a coupled process will also refer to a combination of outside-in and inside-out as specified for this study. In particular, we will explore how business units cooperate and interact with other business units in intra-organizational networks and 2how firms cooperate and exchange knowledge with other stakeholders outside the firm.

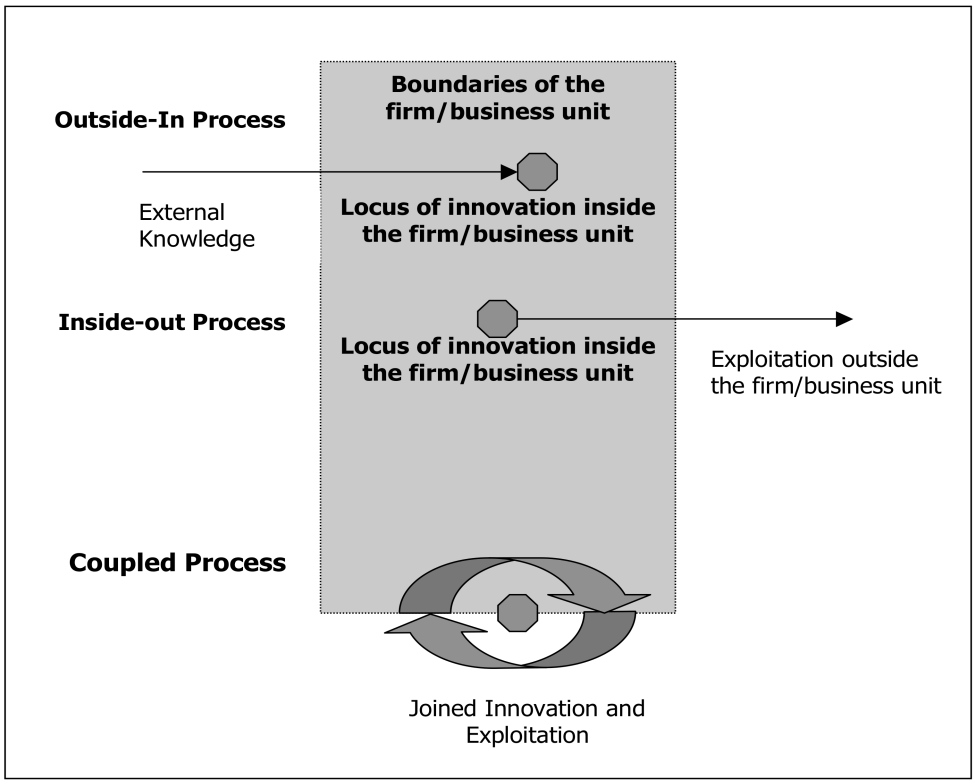

Figure 2: Adapted Framework for Open Innovation

4. RESEARCH METHODOLOGY AND CURRENT PROJECT STATUS

The study will involve a case study of a multiple-project environment. Case studies are considered to be a suitable research approach for this study since it is exploratory in nature, with the intention of investigating the principles of open innovation in a real-life context (Stake 2000; Yin 2003) and they explore a phenomenon in its natural setting, applies several methods of data collection to gather information from one or a few entities (Benbasat et al. 1987). Empirical data will be collected over a 6-month period from July 2009 to January 2010. In this research, we will observe the meetings and collect literary material written by the project members. Further, we will collect emails and other notes that are written related to the project. To analyse the collected material, we will use discourse analysis (Potter, 1999) that supports naturally occurring talk and discussions, keeping in mind its context.

In addition, data collection will involve personal face-to-face interviews, a technique well suited to case study data collection, and particularly for exploratory research such as this because it allows expansive discussions which illuminate factors of importance (Yin 2003; Oppenheim 1992). The information gathered is likely to be more accurate than information collected by other methods since the interviewer can avoid inaccurate or incomplete answers by explaining the questions to the interviewee (Oppenheim 1992). The questions will be largely open-ended, allowing respondents freedom to convey their experiences and views, and expression of the socially complex contexts that underpin information systems development (Yin 2003; Oppenheim 1992). The interviews will be conducted in a responsive (Rubin & Rubin 2005; Wengraf 2001), or reflexive (Trauth & O'Connor 1991) manner, allowing the researcher to follow up on insights uncovered mid-interview, and adjust the content and schedule of the interview accordingly. In order to aid analysis of the data after the interviews, all will be recorded with each interviewee's consent, and subsequently transcribed, proof-read and annotated by the researcher. In any cases of ambiguity, clarification will be sought from the corresponding interviewee, either via telephone or e-mail. In relation to the interviews, supplementary documentation will also be collected, including project management plans, budgets and budget reports, meeting minutes and relevant e-mail communications. Alternatively, we will carry out an interview done by questionnaires that will include both closed, semi-structured and open questions. With this choice we will ensure that we will reach also those respondents whose voice might otherwise remain unheard (Stapleton 2008).

Data analysis will use Strauss & Corbin's (1990) open coding and axial coding techniques. Open coding is "the process of breaking down, examining, comparing, conceptualizing, and categorizing data" (Strauss and Corbin 1990). Glaser (1992) argues that codes and categories should emerge from the data, while with Strauss & Corbin's approach (1990) these are selected prior to analysis. The approach adopted in this study is more akin to the latter, where the interview questions and subsequent analysis will be based on the framework of open innovation presented earlier in this paper. This will provide a list of "intellectual bins" or "seed categories" (Miles & Huberman 1999) to structure the data collection and the open coding stage of data analysis. The second phase of analysis will use axial coding. Axial coding is defined by Strauss and Corbin (1998) as a set of procedures whereby data are put back together in new ways after open coding; whereas open coding fractures the data into categories, axial coding puts the data back together by making connections between the categories and sub-categories. As the data is coded, theoretical questions, hypotheses and code summaries will arise. These will be documented in analytic memos (Miles & Huberman 1999) to aid understanding of the concepts being studied and to refine further data collection. Miles and Huberman (1999 p. 72-74) offer advice on effective analytic memos, and these practices will be followed where possible. As categories emerge, follow-up interviews will be arranged to elicit further, richer, more focused information. This will be done to confirm, extend, and sharpen the evolving list of categories. As categories become integrated, further data collection will not tend to cause any additional categories to emerge, but rather

reinforce those already in existence. At this point, the categories will be deemed to be "theoretically saturated" (Strauss and Corbin, 1990), and data collection ended.

Once the open innovation process (or lack thereof) is documented and analysed, the focus will shift to identifying the key benefits and challenges of open innovation in an information systems development environment. In all, the case study database will fulfil recommendations by Yin (2003) with its components of case study notes, case study documents, tabular material and a case study narrative.

4.1 The Case

The primary operation of Pennysoft, a large, privately owned U.S. company, (employing 40000) involves the provision of financial services and investment resources. The company has been developing software at its site in Ireland since 1995, and currently employs around 300 people at this Irish site. The software products developed are supplied mainly to internal customers in the U.S. Many projects involve co-ordinating with several teams in the U.S. and India. In many cases, the requirements are generated in the U.S. with software development then taking place in both the U.S. and Ireland. In this study we analyse three system development projects within Pennysoft (see Table 1).

	Project A	**Project B**	**Project C**
Team size	8 Ireland, 5 U.S.	24 people (sub-group of 5 using agile) Ireland 5 U.S.	7 Ireland, 6 U.S.
Team composition	1 SVP, 1 VP,1 director, 1 principal engineer, 1 tester 1 directors, 1 project manager, 1 principal engineer, 5 engineers	1 SVP, 1 VP, 1 director, 2 principal engineers 2 directors, 2 project managers, 2 architects, 15 principal engineers, 4 testers	1 VP, 1 project manager, 1 principal engineer, 1 tester, 3 engineers 1 project manager, 1 principal engineer, 1 tester, 3 engineers
Project Duration	1.5 years	7 years (2 years agile sub-group)	1 year
Type of system developed	Exploring new strategic opportunities of cutting edge Web 2.0 technologies	Security system for provision of enterprise wide access control	Suite of tools to monitor SLA adherence across Pennysoft's core application service providers (response times etc) Application for monitoring/tracking system issue resolution
Customer	Internal	Internal	Internal
End Users	General population	Pennysoft staff	Pennysoft staff

Table 1: The Profiles of the Three Projects

Table 1 describes the case highlighting their differences in three various projects. By including this case in our study we will get a good conception of how project management is carried out in agile IS projects. As the chosen project teams involve several professions, we will get a conception of open

innovation principles, benefits and challenges as perceived by the team members. In addition, the team compositions reveal that there are high-ranked people involved, such as a senior vice president (SVP) and vice presidents (VP) and this situation may influence the development of a set of best practices for enabling open innovation in an agile environment. We believe, however, that the case will offer good insight into the challenges of an open approach for project management in an agile environment.

5. NEXT STEPS

This paper constitutes part of a research in progress aimed at exploring the applicability and validity of open innovation in a multiple-project environment that employs agile approaches to information system development. At the moment, we are collecting data from the case outlined above. Each project will be examined in the context of the revised open innovation framework.

When completed this research will make a number of contributions to the field. Firstly it will provide a refined, more detailed and most importantly, empirically validated version of the framework proposed in this study. The contribution of this framework will be two-fold. Firstly it will make a contribution to the general management literature in that it will provide a lens for analysing open innovation within an organization (i.e. its' business units) as opposed to outside a firm's boundaries. Secondly, it will be tailored specifically to suit agile systems development environments, an area where no research on open innovation has been applied as far as we are aware.

Furthermore, this study will provide an insight into the role of the project manager in facilitating open innovation in a systems development environment, particularly focusing on the benefits, challenges and best practices. Beyond this study, future research could also seek to develop a set of recommended practices for enabling open innovation in agile environments.

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