Integrating Knowledge Sharing into an Innovation Framework

Igor Hawryszkiewycz
Faculty of Information Technology, University of Technology, Sydney
igorh@it.uts.edu.au

Abstract: This paper proposes system architectures to support dynamically user-configurable innovation processes that leverage technology to combine knowledge management with a collaborative capability to facilitate continuous innovation in enterprises. It will present a framework that describes ways to leverage technology to provide the collaborative capability for the emergence of communities to pursue chosen innovation strategies and to support the communities with the ability to share knowledge. The technology will enable innovation processes to be integrated into business operations to facilitate continuous innovation in the enterprise. The proposed framework is made up of three major components, social structure, knowledge sharing and the innovation process. The paper will define measures for each of these components to provide flexibility in developing innovation architecture. It will focus on ways to support collaboration and will define a framework of collaborative capabilities that can be used to develop workspaces that support interacting communities in innovation processes. The communities will be supported by system components that support collaboration and knowledge sharing using flexible software platforms composed of lightweight services. The paper will describe ways that can be used by users to configure the platforms to the innovation strategy and evolve as the innovation process evolves.

Keywords: Innovation strategies, knowledge objects, conceptual model, workspaces

1. Introduction

Innovation has been categorised along a spectrum between radical (Hall, Baghi-Chen, 2007) and incremental. At one end of the scale, extremely radical innovations are high risk activities that will involve completely new technologies, new processes and procedures and new markets, and can generate high profit if successful. Most innovation, however, occurs at the incremental end of the scale as organizations integrate innovation into their everyday processes. Incremental innovation is based on continually improving existing products, services and processes to improve and maintain competitive advantage. This paper proposes a conceptual model, which is shown in Figure 1, to provide the basis for defining integration of innovation into business processes and to serve as the basis for defining spaces to support integration. The main parameters considered in the model are process, knowledge and social factors in collaboration.

Social structures are important as it is known that innovation flourishes in organizations where there is a culture conducive to innovation and where there are a number of enablers to such culture including organizational policy, process support, access to knowledge, technology and support of collaborating communities. Many of these enablers have been studied individually. In this project, however, as shown in Figure 1, we will consider the relationship of three of the major enablers, process, knowledge and community and the role of technology in aligning these components.

Turning to processes, innovation processes generally follow a generic model (Engel, 2006) that starts with an idea and finishes with a product. Furthermore, as shown in Figure 1, it is important to integrate the process of innovation with knowledge management. As an example, Popadiuk and Choo (2006) describe the alignment of innovation process to the highly adopted Nonaka and Takeuchi knowledge creation process (Nonaka, 1994), which was developed from extensive experience in manufacturing industries. It consists of socialisation, externalisation, combination and internalisation. Chudoba and others (2006) also emphasises process aspects by outlining the importance of continuity of work in virtual enterprises using factors such as geography, time zone, culture, work practice, organisation and technology to measure distance. The goal here will be to provide technologies that can

The importance of communities in innovation has been described in (Nahapiet and Ghoshal, 1998). They stress the importance of encouraging behaviour that fosters innovation, and distinguishes between creating and exploiting new intellectual capital. They also emphasise the link to knowledge management and ways to convert the tacit knowledge and explicit knowledge defined by Nonaka into "social" tacit and explicit knowledge through social interactions between people. They identify four conditions for community support, namely, providing the opportunity to make knowledge combination possible, encouraging people to avail themselves of these opportunities, motivation and finally providing the combination capability. Earlier research has also shown that distributed groups often result in improved team performance and creative abilities when compared to local groups. Szulanski (1996) for example noted the distributed groups to be more innovative than local groups in information searches and hence electronic workspaces that allow distributed groups to collaborate can add value to innovation. Our goal is to support collaboration at a distance using InterNet and collaborative technologies to provide the infrastructure needed to integrate collaboration into the business process and to facilitate the emergence of groups and communities (Adenflett 2005, Biehl, 2007) focusing on innovation within business organisations.
Figure 1: Innovation infrastructure: New system architectures supporting technology tools for innovation processes

In this environment, technology can contribute to innovation in two ways. One is to reduce activity times using collaborative tools to accomplish individual tasks in a business process. What is more important is that technology can also support the critical dependencies of innovation capabilities on knowledge management (Popadiuk & Choo, 2006), or collaboration (Kratzner 2006) or the enterprise's processes (Christensen & Overdor, 2000) by presenting such dependencies through flexible workspaces. The way technology is used will depend on innovation goals. Innovation goals can take a variety of forms (for example "to reach the market quickly", "to develop technology leadership", or "to achieve operational excellence"), but all should ultimately deliver financial gain. This paper will illustrate the ways that groupware technology can support such processes.

2. Major components

Figure 2 illustrates the major components of our framework. The figure illustrates the major components with what are called measures or the parameters that can be varied to create the innovation strategy. It shows the major parameters that can be varied to provide the environment for innovation.

Figure 2: The major components of the conceptual model

2.1 The process model

Figure 3 illustrates a typical process model based on the structure suggested by Jacobs (1998) for innovation in a work context. It includes 6 major activities, namely:

Data gathering where information is gathered on a particular set of business activities. This is gathered by people involved in the activity who report their observations. An example here may be customer feedback on an organization's products, associated with perhaps some market analysis. In Nonaka's terms the activity is one of socialization,
Situation assessment where the gathered information is assessed. This is primarily a process of socialization and externalization. It identifies reasons for any dissatisfaction or new customer requirements externalizing them into the organizations operations. Any knowledge created here is recorded in the situation assessment database.

Defining and selecting courses of action where we now combine any knowledge on available resources in defining ways to improve operations. Basically this is a design process to create or redesign products. This combines existing knowledge using various service directories and recording selected choices of actions together with ways issues are resolved to capture knowledge used in the selection process.

Execution planning and execution, which are seen at the process of internalization. Again a program board is created to raise awareness of activities throughout the process.

![Process Model](image)

**Figure 3:** A process model for an innovation process

The places required in each of these activities differ from each other. Thus data gathering requires communications from a variety of sources to some collection role. This collected information is then assessed. Such assessment requires a space where assessors can share their interpretation of the situation. The requirement here is the ability to set up spaces that include a variety of artifacts and people to access these artifacts and discuss issues about them.

### 2.2 Adding the social component

Community based approaches for innovation and knowledge sharing have met with success (Hansen, Kodama, 2005) in earlier practical applications. The social component focuses on setting up community spaces for the actors in the different innovation activities. Figure 4 illustrates a way to support such communities using groupware. Here separate workspaces are set up for different communities with coordination between activities in the different workspaces. Here there is a separate workspace for each of the activities shown in Figure 3 with coordination workspaces to coordinate these activities. These workspaces combine process and community by including ways to quickly assemble groups in the workspaces and providing the communication facilities to support their interaction. The remainder of the paper focuses on ways of structuring such spaces and the services needed to support such communities.

The requirement here becomes ways to create new communities and set up spaces for them to work together.
2.3 Integrating business and innovation process

Figure 5 illustrates the integration. It distinguishes between the business process and the innovation process and provides a way to choose potential integration strategies. It shows processes in three levels, planning, coordination and collaboration.

Figure 5: Integrating innovation and business processes

Figure 5 provides a basis for formulating strategies for integration fundamentally concern bring different communities together to share their knowledge in different parts of the innovation process.

3. Implementation

Figure 6 illustrates a prototype that illustrates ways of supporting the innovation activities using workspace technology. It shows the innovation planning workspace. This includes support for creating a new group, together with adding participants to the group. It allows the inclusion of people from the business processes to share knowledge with product developers. Figure 6 shows the plan set by the manager, the team members, program board that is shared by all workspaces and maintains awareness of major outcomes in all workspaces. It also contains links to the two program workspaces. Other objects in the workspace can include discussions on issues and various documents as for example organizations strategy which may be relevant to the innovation goal.
Figure 6: The planning workspace

Figure 7 illustrates the market analysis workspace and its link to one of the area collaborative workspaces. It shows information shared between the workspaces and the different roles in each workspace. Discussion spaces as well as blogs are provided and can be grouped and presented in general "social spaces" that include discourses from many activities. Sharing of different objects across workspaces not only enables wider sharing of local knowledge but also the ability of developing best practices through comparison of outcomes in many related activities. These are then made available to subsequent s

Figure 7: An activity with associated discussion

Change can be readily made. In the first instance new participants and artifacts can be readily added to any workspace by the responsible workspace manager. Should a process change be required the innovation manager can easily create a new process workspace and include it in the plan. New collaborative workspaces can be added, as for example a new marketing area. Software requirements here include the ability to easily create spaces and populate them with people and artifacts. These can evolve as the process proceeds.
4. Summary

The paper described the broad characteristics required to setup innovation environments. It focused on social factors, processes and knowledge and stresses the need to integrate them in workspaces for various innovation activities. It then introduced a conceptual model for innovation process and defined the kind of requirements to be met by electronic spaces that support the activities of the process. These included the ability to support a variety of interactions and the ability to create communities that participate in the different stages of the process. An important requirement here is to support continuity between the various steps. It then illustrated ways to support such integration using workspace technologies. It defined the criteria or requirements for such spaces and ways that they evolve as the process proceeds and illustrated it with a prototype.

References

Artail, H. "Application of KM measures to the impact of a specialized groupware system on corporate productivity and operations" Information and Management, 2005, Elsevier Press.
(Describes teams in Ericsson)
LivNet: http://livnetilit.edu.edu.au