Student Work

5-1-2005

A Design & Evaluation Framework for Setting Up a Community of Practice

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A Design & Evaluation Framework
for Setting Up a Community of Practice

A Thesis

Presented to the

Department of **ISQA**

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

MS in MIS

University of Nebraska at Omaha

by

Anita Chakrapani

May 2005

UMI Number: EP73343

UMI®

Dissertation Publishing

UMI EP73343

ProQuest®
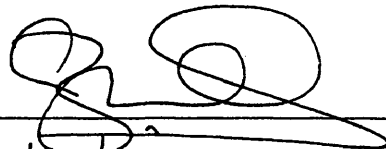
A Design & Evaluation Framework
for Setting Up a Community of Practice

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University of Nebraska, 2005

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In the recent years, there has been a tremendous amount of exposure of Knowledge Management (KM) and value creation. Organizations are beginning to understand the need to capitalize all the available information, tacit and explicit, as most of the organizations are operating in a global and competitive economy. One such organizational concept that can capture both tacit and explicit knowledge is Communities of Practice.

Communities of Practice (CoPs) are seen as a mechanism for knowledge sharing and learning across and within institutions, based on the common ground of a professional discipline, a skill, a topic, or a business process. Although CoPs have been receiving much attention recently and could play a critical role in knowledge sharing, it is very important for organizations to find out if it is viable before they invest their time and money in building it.

The objective of my research is to layout the frameworks for designing and evaluating CoP's before launching them. The research is carried out through an in-depth study on a Community of Risk and Control Self-Assessment (R&CSA) facilitators at International Financial Services (IFS). The practical goal is to identify and prototype some of the key Community of Practice processes for the R&CSA approach. The design framework can lead the coordinator through a series of steps to gather the requirements in a short amount of time. The evaluation framework will measure the outcome and tell us if launching a CoP is desirable.

The research is conducted by **Anita Chakrapani**, MIS graduate student at UNO under the guidance of **Dr. Gert-Jan de Vreede**, Professor, ISQA department, UNO. The other members of the committee are **Dr. Ilze Zigurs**, Professor, ISQA and **Dr Ken Dick**, Professor, Computer Science.

Acknowledgements

First, I would like to thank my supervisor and mentor, **Dr. Gert-Jan de Vreede**, whose endless patience, tireless guidance and tremendous insight has made this a reality. Very special thanks to him for all the long hours he spent with me and I am grateful for his invaluable contributions. I would also like to thank Dr.Ilze Zigurs and Dr.Ken Dick for offering their valuable suggestions on my research.

Secondly, I would like to thank all the people who were involved in the data gathering and evaluation process. Special thanks to the problem owner from IFS for providing us access to the required resources. Although directly not involved in the project, I would like to express my gratitude to the System Administrator at the College of IS&T for setting up the required facilities for this research.

Finally, I would like to thank my family and friends who supported me in all my activities.

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1. INTRODUCTION

Communities of Practices are playing an important role in the field of Knowledge Management. Organizations are beginning to understand the need to capitalize all the available information, tacit and explicit, as most of the organizations are operating in a global and competitive economy. The field study for this research is a distributed financial organization. This chapter provides a context and background for the thesis by exploring the necessity for the financial organization to manage and monitor the sharing of knowledge by developing a CoP.

In the recent years, there has been a tremendous amount of exposure of Knowledge Management (KM) and value creation. Sixteen years ago Peter F. Drucker, had envisioned that the typical business will be knowledge-based, an organization composed largely of specialists who direct and discipline their own performance through organized feedback from colleagues, customers, and headquarters. He called it an *"Information-based Organization"* [6]. Today we are indeed seeing with the advent of globalization, downsizing and outsourcing [21], that organizations are realizing the need to capture and manage their employee's tacit and explicit knowledge before it disappears. Knowledge possessed by employees is a highly valued, intangible, strategic asset [15]. The basis of value creation is highly influenced by this intangible asset. As the amount of information and turnover in businesses are increasing so fast, knowledge management is an innovative way to make the businesses more effective [38].

The concept of Knowledge Management has been broadened to include elements of sharing, learning, generating new knowledge and applying new knowledge [21]. Knowledge Management is the systematic and organizationally specified process for acquiring, organizing and communicating knowledge of employees [1], so that other employees can put information into action in ways that strive to improve organizational performance [30] and sustain competitive advantage [17].

Research suggests the existence of different types of knowledge. Knowledge can be either tacit or explicit [30]. Tacit knowledge refers to the knowledge that has a personal quality that makes it hard to articulate or communicate. It refers to the knowing or the deeply rooted *know-how* that emerges from action in particular context [20]. Explicit knowledge refers to the codifiable component that can be disembodied and transmitted. It refers to the, *know-what* which can be extracted from the knowledge holder and shared with other individuals [20]. There are so many approaches and strategies to capture and manage explicit knowledge [12] and tacit knowledge [21]. But capturing and managing tacit knowledge is posing a big challenge in organizations [32].

Current knowledge management strategies suggest that the most critical know-how in any given company is not stored in its computer systems or the company's rule book or manual, but in its casual conversation [25], self-organized group interactions, and also individual relationships [26]. Organizations are also starting to understand that to be effective, they have to focus on one of the strategies and use the other in a supporting role

[18]. For example, if a group of system designers wanted to share their knowledge on the design aspects, they would want to understand and discuss the logic the other designers use (tacit), but also document the attained knowledge in a common database (explicit). In this example, the core strategy is to capture the insight which is also supported by documenting the knowledge. One such organizational concept that can capture both tacit and explicit knowledge is Communities of Practice. For my research, I focus on Communities of Practice (CoPs), which are seen as a mechanism for knowledge sharing and learning across and within institutions, based on the common ground of a professional discipline, a skill, a topic, or a business process [38]. A CoP is defined as "groups of people who share information, insight, experience, and tools about an area of common interests" [38]. The purpose of a CoP is basically to stimulate interaction, foster learning, identifying best practices, and create new knowledge [29]. A CoP enhances knowledge exchange through a shared workspace. [39].

Although CoPs have been receiving much attention recently and could play a critical role in knowledge sharing, it is very important for organizations to find out if it is viable before they invest their time and money in building it. Also, the organization might have to bring in an external consultant who has the domain knowledge on Communities of practice, to initiate and develop a CoP. This might represent a significant cost to the organization. The objective of my research is to layout the frameworks for designing and evaluating CoP's before launching them. The frameworks can be executed by an individual (coordinator) who is part of that community or who is willing to take the

initiative, to find out if a CoP will work for their community. The research is carried out through an in-depth study on a Community of Risk and Control Self Assessment (R&CSA) facilitators at International Financial Services (IFS). Some of the R&CSA facilitators had expressed their need for an environment where they could discuss and seek advice from others. The practical goal is to identify and prototype some of the key Community of Practice processes for the R&CSA approach. The design framework can lead the coordinator through a series of steps to gather the requirements in a short amount of time. The evaluation framework will measure the outcome and tell us if launching a CoP is desirable. The R&CSA managers/facilitators at IFS will benefit from the CoP developed, as the facilitators are widely spread and the platform would encourage knowledge sharing among them.

1.1. Research question/ objective

The purpose of my research is to design and prototype a CoP for R&CSA facilitators. The focus will be on the frameworks for designing a proof-of-concept prototype and evaluating the outcome before launching them. The design elements that support my research will be explained in chapter 3. In this section the research objective and the questions are formulated. The research outline is also presented.

RESEARCH QUESTION

The main research question for my master thesis is:

"How should we design and evaluate a Community of Practice that supports a particular business area in an organization?"

RESEARCH OBJECTIVE

Practical Objective

"To identify, design and develop the key R&CSA CoP functionalities at IFS".

Scientific Objective

"Formulate a design and evaluation framework for CoP Processes"

The main research question is sub-divided into two sections. Sub questions related to the *design* aspect of CoP include:

1). What is the Community Strategic Intent for the CoP to be designed /developed?

2). What are the knowledge work activities that might support the community intent and leverage the CoP?

Sub questions related to the *evaluation* aspect of CoP include:

1). What is the added value of a CoP for the R&CSA process?

2). How can we measure the perceived individual benefits through implementing the CoP?

1.2. Structure of the thesis

The remainder of this thesis is structured as follows:

Chapter 2 gives a short introduction to the company where the research is carried out.

Chapter 3 presents the literature review on different aspects that support my thesis. In

chapter 4, the R&CSA framework followed at IFS is explained with the process followed

and the tools and techniques used for the process. The process lays a foundation for

understanding the requirements needed for designing the CoP for the R&CSA facilitators.

In *chapter 5*, the research model used for the thesis is noted. The methodology used as a

basis, for the design framework of a CoP is Unified Process. In *chapter 6,* each of the

steps in the design framework is explained and in *chapter 7* the different constructs for

the evaluation framework is explained. In *chapter 8*, the findings from the executed

process and the prototype developed are presented. In *chapter 9*, the evaluation findings

of the process are presented *followed* by conclusions stating the limitations of the thesis

and also some recommendations for future research.

2. COMPANY

In this chapter a short introduction to the company is done to introduce the context of the research.

International Financial Services (IFS) is a global financial institution offering banking, insurance and asset management to over 50 million private, corporate and institutional clients in 65 countries. The clients are individuals, families, small businesses, large corporations, institutions and governments.

IFS's shareholders, board, regulators and rating agencies require that IFS consistently and periodically identify, measure, and monitor its key operational risks which the business runs in achieving its objectives. The objective of the corporate Operational Risk Management (ORM) function is to assist General Management with the control of operational risks, based on:

- The optimization of the internal organization and the system of internal controls
- A comprehensive framework & process of identifying, measuring & monitoring operational risks.

IFS has a number of company standards for assessing Operational Risks. One of the recommended ORM standards at IFS is Risk & Control Self-Assessment (R&CSA). The focus of the R&CSA is on aiming for an acceptable (controlled) level of risks and achieving a minimum level of unidentified risks. A generic approach has been developed,

which allows for the specifics of businesses, but still creates a certain level of uniformity where possible and desired. This approach will help the business units to perform a *Risk & Control Self-Assessment* by themselves.

Risk Assessments can be performed in various ways. To conduct a risk assessment, the Operational Risk manager in co-operation with the executive should select a method to perform the Risk Assessment. A workshop is one of the widely use techniques at IFS to perform the R&CSA exercise. A workshop allows a group of people from several departments to perform brainstorming exercises to identify and evaluate the operational risks that are relevant to a business area. These workshops are facilitated by the Risk Managers.

Since fall 2002 over 250 R&CSA facilitators at IFS have been trained to execute the R&CSA process. They play a vital role in the organization, as they are assisting various groups in periodically and consistently identifying, measuring and monitoring the operational risks in all the business units. The facilitators can choose different methods to execute R&CSA, but the recommended practice at IFS is the Collaborative R&CSA process.

3. BACKGROUND

This chapter presents the literature review on different aspects, which support my thesis. The importance of understanding the different knowledge work activities in a business unit while setting up the CoP initially is explained. This chapter also elicits the different collaboration technologies that we could look into while setting up a CoP.

3.1. Communities of Practice

In today's knowledge economy, value creation is a very important aspect that needs to be understood. As long as mankind is there, there will always be a constant interaction with the world and with each other. We basically attune with each other and the world. In other words, we learn [39]. In our opinion, when a group discusses and works together, minds converge towards a determined goal because they focus on relevant issues. People collectively start learning from participating in more specific communities. This practice would then lead to forming formal or informal communities.

In organizations when groups of people work together and deliberate on common grounds with regards to work, they form a community. The existence of this community is totally based on the level of communication and participation. We communicate to express ourselves, to transmit information and to learn [32]. But how do we collaborate in or support such a community? How do we support interaction directly? This can be achieved by designing and developing a Community of Practice (CoP).

A CoP is defined as "a group of people who share information, insight, experience, and tools about an area of common interests" [38]. The members help each other to solve

problems, ponder on common issues, explore ideas, and act as sounding boards [38]. A CoP often enhances knowledge exchange through a shared workspace. A CoP is established for a group of people who want to learn. A CoP does not reduce knowledge to an object. It makes it an integral part of the activities and interactions, and it serves as a living repository for that knowledge [38]. A CoP is not just a portal that stores information, and various resources. It is very easy to document the knowledge that the participants share, but the most important aspect that is captured in a CoP is *"the thinking"* about the topic that is central to the community [39]. A CoP can codify knowledge as it can combine tacit and explicit aspects. Some of the important characteristics of a CoP are: [7]

➢   a base for knowledge development and accumulation

➢   value creation is derived both formally and informally

➢   have both tangible and intangible outcomes

➢   develop a sense of identity

➢   creates a bond between members of the same working community.

The purpose of CoP is basically to stimulate interaction, foster learning, identifying best practices, and create new knowledge [29]. The American Productivity & Quality Center in its study [29] distinguishes four purposes served by a CoP: (1) to help each solve everyday work problems in their discipline [Helping communities] (2) to develop and disseminate a set of best practices [Best-practice communities] (3) to develop and steward the tools, insights, and approaches needed by members in field assignments

[Knowledge stewarding communities] and, (4) to develop highly innovative solutions and ideas [Innovation Communities].

A CoP on the whole creates an environment for everyday learning. When supported by appropriate technology, a CoP could carefully bring together expertise, so participants can get the knowledge they need faster. Communities of Practice create the horizontal connections that enable the practitioners themselves to become knowledge managers [8].

The benefit of having a CoP in an organization can be seen from three different levels: organizational, community and individual [28]. For the organization a CoP can improve the communication among members which could result in project success, new business and product innovation [28]. For the individuals a CoP can mean an increasing access to subject matter experts and valuable information resources, increasing trust level, improving reputation and giving a better overview of activities around the organization [28]. For the community itself, the benefits of a CoP include increase in idea generation, in quality of knowledge and in advice and also in problem solving [28].

Creating a CoP is difficult. There is no standard set of procedures that can be followed to develop a CoP. Every community has its own set of interests. Cultivating Communities of Practice in an organization is an art [39]. We must first learn to understand and work with the different processes and the dynamics involved in creating a CoP. A developmental model is used for this research (figure 1) which is drawn from prior

research [39]. This model clearly explains "*what needs to be done to develop a CoP for a particular business area in an organization*". This model is chosen to provide some direction in identifying and developing some of the key CoP processes for the R&CSA approach.
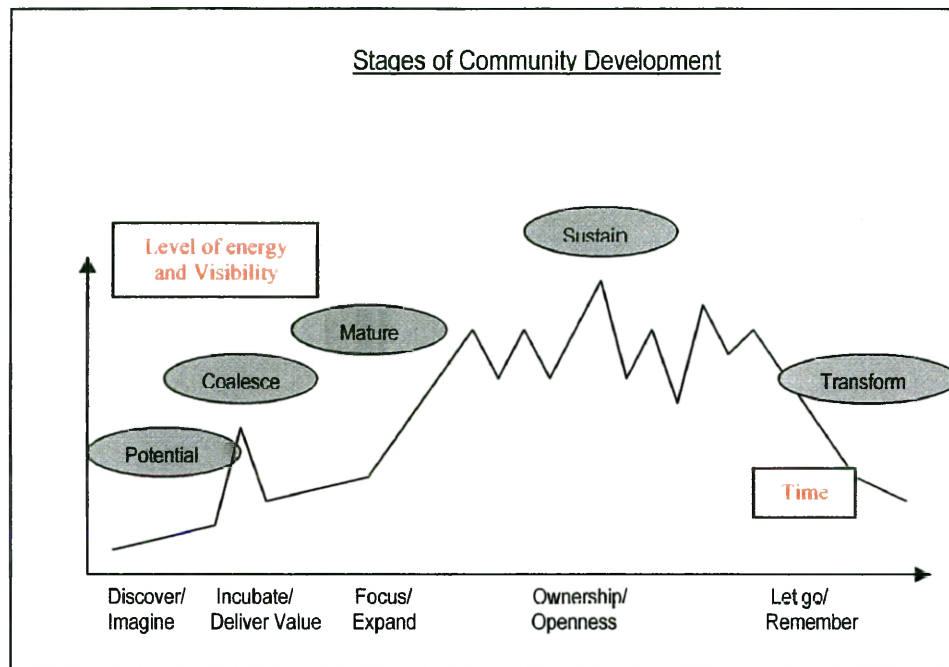
figure 1. The Stages of Community Development

For this project we are only going to focus on the first stage, as it clearly explains the process and the key issues to be considered in launching a Community of Practice. This model will not be used literally. The first stage describes the issues the communities face and also clearly explain some of the activities that can help the community develop. Stages 1 and 2 explain the process of launching a community of practice, stages 3, 4 and

5 addresses the challenge of sustaining a community through its growth and maturity. For this research we will focus mainly on stage 1, Discover and Imagine.

Discover and Imagine

The key issue at the beginning of a community is to find enough common ground among members for them to feel connected and see the value of sharing insight, stories and techniques [39]. There are three key dimensions that are related with each other and definitely need to be identified [39].

➤ Establish the scope of the domain

➤ Finding people who are already network on the topic

➤ Identifying common knowledge needs

As the scope of the domain is established and the common knowledge needs are identified the community becomes clearer. As the community is built, people identify common knowledge needs [39]. The knowledge needs were gathered using a set of variables called as Knowledge Work Activities which are developed by O*Net Consortium.

3.2. Knowledge Work Activities

The work activities were developed to provide detailed information about work done in terms of tasks that can be applied across occupations (Generalized Work Activities) [11]. A The National O*NET Consortium developed a Content Model that is organized in to six majors [31]. One of the majors is Occupational Requirements that includes a comprehensive set of variables or detailed elements that describe what various occupations require.

The O*NET approach identified 41 generalized work activities (GWAs) or dimensions that summarize the kinds of tasks that may be performed within multiple occupations [17]. These activities were abridged in to five clusters of **Knowledge work activities** [24]. The five knowledge work activities are *Searching, Processing Information, Decision-making, Communicating, and Coordinating.*

As these work activities summarize the various tasks across occupations, we incorporated these activities and used them as our main constructs for gathering data from the representatives. This allowed us to define our scope for requirements gathering. The definitions of these work activities [24] are explained below.

- *Searching:* Searching activities relate to looking for, accessing and acquiring information from relevant sources.

- *Processing Information:* Processing information activities relate to gaining a deeper understanding of the underlying principles, reasons or facts.

- *Decision-making:* Decision-making activities relate to solving problems, analyzing and evaluating, by using job relevant information to choose the best solution.

- *Communicating:* Communicating activities relate to interacting with fellow community members, providing information to them, or asking questions.

- *Coordinating:* Coordinating activities relate to organizing the work of others, the storage of relevant information, managing, training, or advising others.

We further analyzed the knowledge work activities and made some modifications. We included "**Documentation**" along with Coordination as documentation plays an important role in any work. So the five knowledge activities defined for this study are *searching, processing information, decision-making, communicating and coordinating & documenting.* The dimensions (41 GWAs) are placed under the 5 knowledge work activities based on their definitions. The placement of these dimensions can be subject to change based on individual's perception. The dimensions that elaborate on these work activities are explained in Appendix A.

Requirements are to be gathered based on these work activities for a particular business area. The process followed for gathering requirements is explained in chapter 6. As the work activities summarize the kinds of tasks that may be performed in an occupation, by following this step, two things can be achieved:

> The requirements for defining the objective of the CoP and the functionalities to support it are gathered in a more organized fashion. It also provides a clear perspective for the community members to brainstorm on.

> It also helps in clearly eliciting the community intent. This helps in developing a CoP with the right processes. Addresses the type of community we are trying to support.

In the next section we explain some of the tools that can be used to support data gathering and also collaboration technologies for CoP that are widely available in the market.

3.3. Collaboration Technologies for CoP

A collaboration technology is a tool that enables individuals to jointly engage in active production of shared knowledge [9]. The technology becomes an instrument of mutual knowledge construction for a group of people. The goal of a collaboration technology is to support the construction of communal ways of seeing, acting and knowing. CoPs rely a lot on technology to connect and communicate among the members. The role of technology for a CoP is significantly growing. But there is no single tool or an ideal system available in the market that can accommodate all the features of a CoP.

Wenger lists some of the most common online facilities that communities of practice will need [39]. The facilities include:

a home page to assert their existence and describe their domain and activities

a conversation space for on-line discussions of a variety of topics

a facility for floating questions to the community or a subset of the community

a directory of membership with some information about their areas of expertise in the domain

a shared workspace for synchronous electronic collaboration, discussion or meeting

a document repository for their knowledge base

a search engine

community management tools

Furthermore, according to Wenger [38] a technological platform for communities of practice should ideally be easy to learn and use, should be easily integrated with other

software that members are using and should not be too expensive. Even though Wenger has not seen the ideal system he picked a product called COMMUNISPACE that serves as a good illustration for community activities. The system has several features that come close to the online facilities that Wenger mentioned above.

Some of the widely used products available in the market are [38]

Software	Notes	Link
ERoom Browser-based tool	Share Documents Discuss Ideas Manage Calendars Conduct Polls and Survey Plan projects	http://svm.eroomhosting.com/
SiteScape Forum Browser -based	Knowledge bases Problem Resolution Workflow News E-mail Integration Events Calendar Discussion Search Shared Insights Personal Biographies Special Projects Collaboration	http://www.sitescape.com/
Enable2 Browser-based	Document Management Threaded discussion forums; Member profiles with skills search A comprehensive search engine Personalization Calendaring Networking tools Wiki - Content Management Information Management tools.	http://www.enable2.com/content/home/index.html
Tomoye Simplify 4.0 Browser-based	Scheduling and task management E-mail based Subscriptions Community Calendar	http://www.tomoye.com/ourproducts/ourproducts.htm

	In-Context Discussions Knowledge Rating Tool Customizable Identity & Templates Community Role Delegation	
ArsDigita Community Systems Browser-based	Publishing Personalization Collaboration facilities Transactional capabilities Site Management	www.arsdigita.com

Before choosing or building a CoP system there are a couple of questions that should be thought about [38]

1. What type of community are you trying to support? – The community intent and the purpose must be clearly defined.

2. What are you trying to accomplish with technology?

3. Do you want technology to modify behavior?

4. What is the pricing structure?

In conclusion, Communities of Practice are playing a significant role in today's knowledge economy, so it is very important to identify the right functionalities and certainly the right tool. When this is thoroughly analyzed this will help the members and coordinators to easily establish, maintain and leverage their CoP. In Chapter 6, a design framework clearly elicits *"How to do"* what needs to be done in cultivating a CoP.

4. RISK & CONTROL SELF-ASSESSMENT AT IFS

Organizations today are faced with many operational risks while conducting their business. In the finance sector, one has to periodically assess the operational risks. This chapter provides the background information on the Risk & Control Self-Assessment approach followed at IFS. The information in this chapter is largely based on documentation provides by IFS's Corporate ORM department.

4.1. R&CSA Framework

IFS consistently and periodically identifies measures and monitors its key operational risks which the business runs in achieving its objectives. Operational Risk can be defined as "The risk of (direct or indirect) loss resulting from inadequate or failed internal processes, people and systems or external events". Operational risk events are not confined to incidents in operations alone. All activities within the institution should be considered as potential sources of operational risk losses. One of the required tools to assess Operational risk, used at IFS is Risk & Control Self-Assessment (R&CSA).

R&CSA has become an industry's best practice, in banking, insurance and asset management. The R&CSA process aims for an acceptable (controlled) level of risks and achieving a minimum level of unidentified risks. IFS has developed its own R&CSA framework. A graphical representation of the R&CSA framework is given in *figure 1* below. The framework allows for the specifics of the businesses, but still creates a certain level of uniformity where possible and desired. This approach will help the business units to perform a Risk & Control Self Assessment by the business itself.

IDENTIFICATION   **ASSESSMENT**   **MITIGATION**
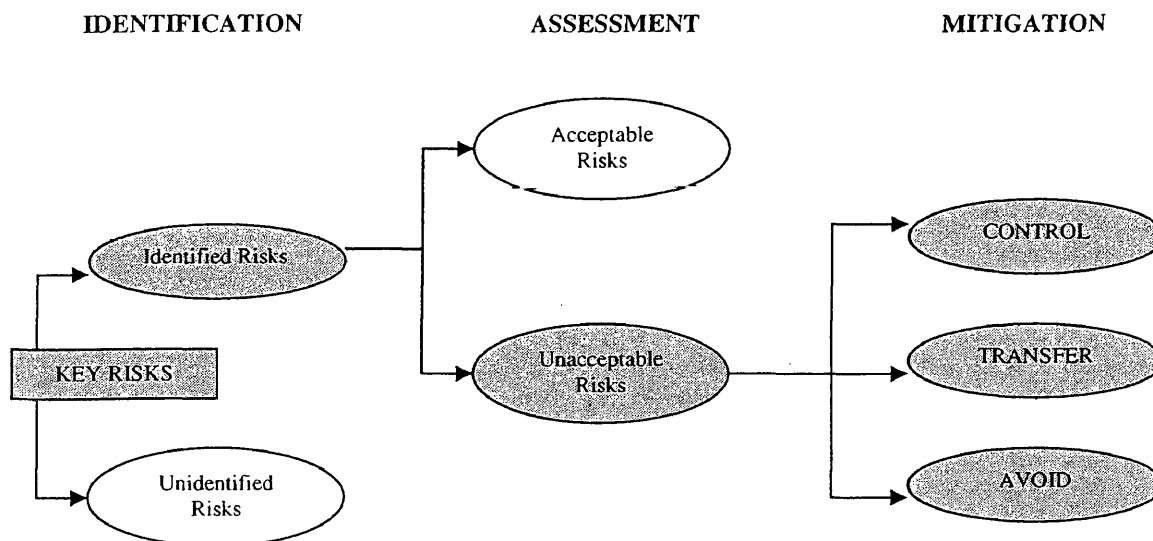
Figure 1: R&CSA Framework

In the Identification phase the key risks are identified. The purpose of this phase is to keep the number of unidentified risks as low as possible. The outcome of the Assessment phase is a set of acceptable (controlled) risks and set of unacceptable risks. During the Mitigation phase adequate measures are developed (control, transfer, or avoid) to mitigate the unacceptable risks. Risk avoidance is stopping, if possible, the activity that generates the risk. Risk control is to reduce the probability and/or in part the occurrence by improving supervision or testing, training or implementing process controls. Another way to mitigate risks is to transfer the risks to other parties who bear or share (parts of) the same risk.

The R&CSA framework meets the available regulatory standards (Risk Oversight Committee (ROC), Basel). The framework also secures the linkage of the R&CSA process with other risk management processes, i.e. development of Key

Risk/Performance Indicators, operational loss data collection, audit findings and action tracking. By following the R&CSA framework, the business will have an opportunity to:

➢ have a faster and better risk analysis

➢ identify possible control gaps and weaknesses

➢ measure its quality of control rating

➢ identify and perform Key risk/Performance indicators

➢ achieve a higher level of efficiency of operations

➢ comply with regulatory requirements

4.2. R&CSA Process

The R&CSA process facilitates the identification, assessment and mitigation of risks. The process is performed to understand the control environment with a view to improve any weakness identified. The process developed is cyclical and has a certain level of uniformity, i.e. the business will periodically conduct the R&CSA process, facilitated by the operational risk managers.

The R&CSA process is driven by regulatory and operational risk requirements, and is supported by the Operational Risk Management (ORM), i.e. the ORM function takes care of the process management and it provides toolkits and advice. The business units conduct the process regularly as there might be changes in the internal/external environment. *Figure 2* below gives an overview of the main steps in the R&CSA process. The R&CSA process consists of three phases (1) R&CSA Risk Identification process, (2)

the R&CSA Risk Assessment process and, (3) the R&CSA Risk Mitigation process. The

three phases are performed by the business units to assess the operational risks.

REGULATORY / ORM REQUIREMENTS

PHASE I   PHASE II   PHASE III

RISK IDENTIFICATION → RISK ASSESSMENT → RISK MITIGATION

Toolkit   Toolkit   Advice

PROCESS MANAGEMENT & SUPPORT BY ORM
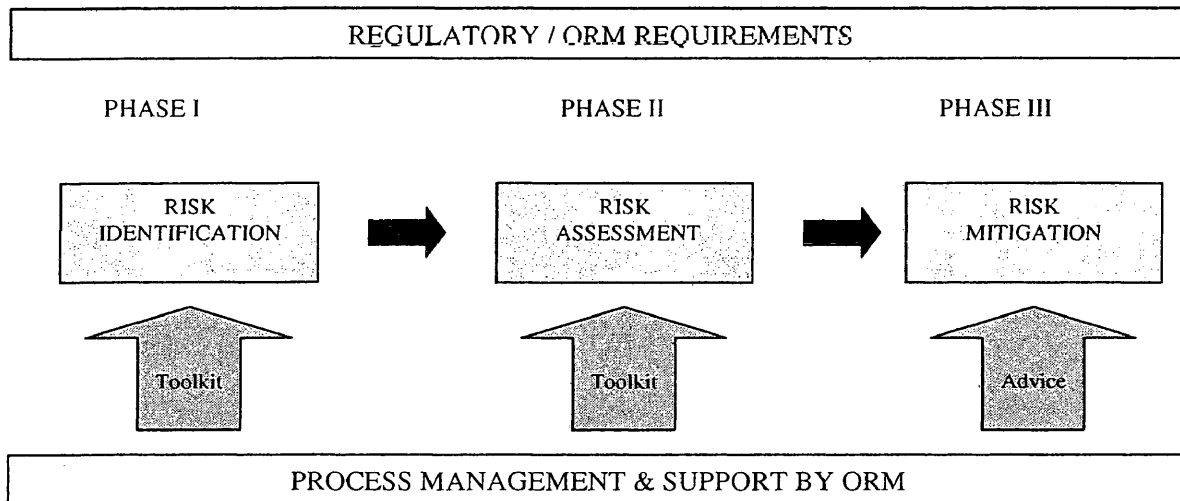
Figure2: Overview of the steps in the R&CSA process

Risk identification is the first step of the process. The initiative to conduct the Risk

Identification process is driven by management and/or ORM. The aim of the R&CSA

Identification process is to generate a comprehensive list of material operational risks in

order to keep the level of unidentified risks to minimum. The output of this process is a

list of prioritized and endorsed risks. The prioritized and endorsed risks are the input for

the R&CSA Risk Assessment process. The aim of this process is to measure the level of

each prioritized risk, as identified in the Risk Identification process, by measuring the

possible impact and the probability of these risks. Based on the results from the Risk

Assessment phase possible mitigation measures will be determined and developed. The

aim of this process is to find cost effective mitigating controls to bring the risks to an acceptable level and to implement the controls accordingly.

4.3. R&CSA Technique

Risk Assessments can be performed in various ways. To conduct a risk assessment, the Operational Risk manager in co-operation with the executive should select a method to perform the Risk Assessment. A workshop is one of the recommended techniques at IFS to perform the R&CSA exercise. A workshop allows a group of people from several departments to perform brainstorming exercises to identify and evaluate the operational risks that are relevant to a business area. A workshop also creates an environment, where the participants can identify risks in an open and constructive manner and also challenge each other on the risks. A workshop creates awareness on the ORM philosophy – "Risk Thinking".

There are a series of steps that need to be followed in a workshop which is clearly defined in the IFS R&CSA handbook. Taking in to account the required steps, a collaborative process using thinkLets has been defined to assist the R&CSA practitioners. The process helps to identify, assess and mitigate risks. The thinkLets help the practitioner to establish a pattern of collaboration among people working towards a goal. A thinkLet is the smallest unit of intellectual capital required to create one predictable, repeatable pattern of group deliberation – a pattern of thinking among people working toward a goal [3]. The thinkLet describes an elementary group process through which decisions that have to be made are based on the group's behavior [3]. ThinkLets may be

used as building blocks for repeatable methodologies for accomplishing critical-collaborative tasks. The collaborative process in total has three tasks. For each task the practitioner has to go through a series of activities by establishing patterns. For example the first task is Risk Identification. In this task the practitioner has to complete 4 activities to get the final outcome which is to generate a comprehensive list of material operational risks. For the other two tasks also, the practitioners have to follow a set of pre-defined activities. So far, over 200 IFS employees have been trained to facilitate, and coordinate such workshops. None of these practitioners are fully competent, general meeting facilitators. They cannot design their own process. They just follow the R&CSA process, which includes a script for each constituent activity.

4.4. R&CSA CoP at IFS

Setting up a CoP for R&CSA at IFS has an added value, as it would support knowledge creation and sharing among IFS employees, who are involved in facilitating, coordinating, or stimulating collaborative Risk & Control Self Assessment activities. The R&CSA CoP participants will use the IFS intranet to exchange, retain information and discuss on issues regarding R&CSA and facilitation.

The R&CSA CoP will be developed around things that matter to Operational Risk Managers/Facilitators. A R&CSA CoP could fulfill a number of functions with respect to the creation, accumulation and diffusion of knowledge at IFS [38]:

A node for the exchange and interpretation of information – R&CSA CoP participants will have a shared understanding on R&CSA process and they also

would know what is relevant to communicate and present information in useful ways.

A place to retain knowledge – R&CSA CoP will capture accepted aspects of knowledge with relation to R&CSA activities. For this reason this setup would be ideal for initiating new comers.

A way to keep the organization at the cutting edge – The participants discuss novel ideas, work together on problems and keep up with developments inside and outside a firm. This collaborative inquiry makes the membership valuable as people invest their professional identities.

A mechanism to increase and instill a sense of belonging among facilitators

A place to turn when facilitators have questions, hesitations or doubts

A place to find reference materials & templates

The CoP designed and developed will be used by R&CSA facilitators for preparation purposes, reference materials, experience sharing, and learning techniques. They will be used by Operational Risk Managers for organizing community activities and also by top management to find experienced facilitators.

4.5. Challenges

In designing the CoP, we must first consider the various processes, functions, and business objectives to which the community would add value to. We must then analyze if there is an on-going communication between the R&CSA facilitators. Merely offering an electronic means is not likely to create this.

As Communities of Practice are driven by the value they provide to members, organized around changing topics, and bound by people's sense of connection, they are very different from teams and other organizational forms [39]. The challenges they pose are different. We have identified 4 key challenges for this project. Some of the challenges identified by McDermott in starting and supporting communities that share knowledge and think together are used here:

➢ *Management Challenge*

- Focus on knowledge important to both business and the people.

- Find a well-respected community member to act as coordinator.

  Make sure people have time and encouragement of participate.

- Build on a core value of the organization.

The need to develop a Community of Practice has to be determined. The knowledge leveraged should have some impact on both the business and the people. One of the key factors that need to be considered at IFS is to find out the time people have to participate.

➢ *Participants Challenge*

- Involve thought leaders.

- Create forums for thinking.

  Maintain personal contact among community members.

  Develop an active, passionate core group.

  Create real dialogue about cutting edge issues in community forums.

- Initiating creative participation within the members

As the scope of this project is limited to identifying and developing R&CSA CoP processes at IFS, factors like getting a thought leader to build energy in the community might be out of scope.

➤ *Technical Challenge*

- Make it easy to connect, contribute to and access the community.

  Choice of technology

- Platform Constraints

- Enabling world-wide access

➤ *Functional Challenges*

- Define the requirements from different users

  Define the different actions that the CoP must perform

  Clearly define the CoP processes

-

R&CSA CoP is likely to be successful only when viewed as a long term management strategy. Chapter 8 explains how each of these challenges was handled.
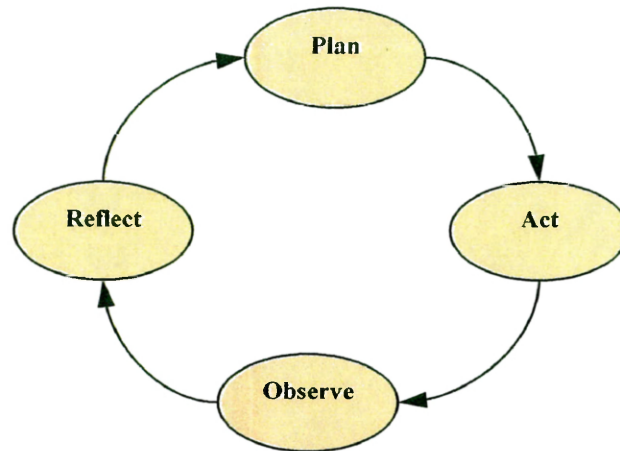
5. RESEARCH METHOD

This chapter gives an overview on the research method applied for this thesis study. We discuss the principles and processes of the research method.

5.1. Research Model

The research method applied for this study is **Action Research**. Lewin [27] characterizes Action Research as, "a comparative research on the conditions and effects of various forms of social action and research leading to social action", using a process of "a spiral of steps, each of which is composed of a circle of planning, action, and fact-finding about the result of the action". Action research is a cyclic process which has joint goals of action and research. Put simply, "Action Research is a way of doing research and working on solving a problem at the same time" [22]. The researcher studies the system (research), and jointly, collaborates with the stakeholders involved in the system and thus producing a desirable direction (action).

The cyclic practice of action research involves four stages [41] which are illustrated in figure 5.1. A group of people approach an opportunity or a problem, make **plans** to resolve them, **act** by going through a series of planned steps which can be evaluated, **observe** how successful their efforts were and **reflect** on the results to see if they are satisfied or not and also evaluate the plan. When the plan is evaluated, it allows the researcher(s) to reflect on the way they had addressed the problem or opportunity. If, the researcher(s) are not satisfied by the practical outcome and the evaluated outcome, they may try again. Action research aims to contribute both to the practical concerns of people

in an immediate problematic situation and to further the goals of social science simultaneously [23]. For an action research to be successful, it is essential that the organization under investigation is supportive of, and the processes being investigated to be favorable to information sharing and learning [23].

figure 5.1 Action Research Methodology [41]

Action Research is used generally in real situations focusing on solving real problems [1]. For this study action research was applied for a number of reasons:

- Action Research is appropriate to address "how to" questions [16]. This study is aimed to explore ways on *how to* design and evaluate a Communities of Practice (CoP) in an organization before it is established. Some literature is available that tells us in general terms how to design and develop a CoP. Although this literature provides some general guidelines for the activities of a CoP, there is a lack of concrete step-by-step methods to follow. The purpose of this study is to provide guidelines on "how to do what needs to be done" in designing and developing a CoP

before it is established. It is also aimed at answering, if a CoP was to be developed, would it add value to the organization, and the community.

- To achieve the practical objective which is "*to identify, design and develop the key CoP functionalities*", **following concrete guidelines** the design framework was developed. By applying action research, we expect to be able to provide justification to the framework formulated, as it allows us to show how data (observations, analysis of the functionalities), and reflection [22] have provided a basis for the prototype, developed and tested.

- Action research is a cyclic process. It allows the researcher to systematically learn through each of the stages, and make the required changes if needed. The researcher has to actively participate in all the research activities. The researcher interprets the results from each and every design step in the process, assesses the results and makes changes if needed to the process and moves on to the next step. Our research concerns defining a process that can be followed to design a CoP and also assess its value to the organization and the members before it is established. By applying action research, we can be open to changes in the process and also responsive to any opportunity [22]. For the design framework as each of the steps planned were acted upon, it allows the researcher to reflect on the executed step and make changes if needed to that step.

The Design Framework developed to achieve the practical objective is framed during the first two stages (Plan and Act). The Evaluation Framework was developed to assess the

added value of a CoP, to the organization, to an individual and the community. This is framed in the last two stages of Action research. Also in the last stage (reflect), the researcher expresses his conclusions on the design framework and on the evaluated results achieved through the evaluation framework. Figure 5.2 depicts the strategy followed for this study.
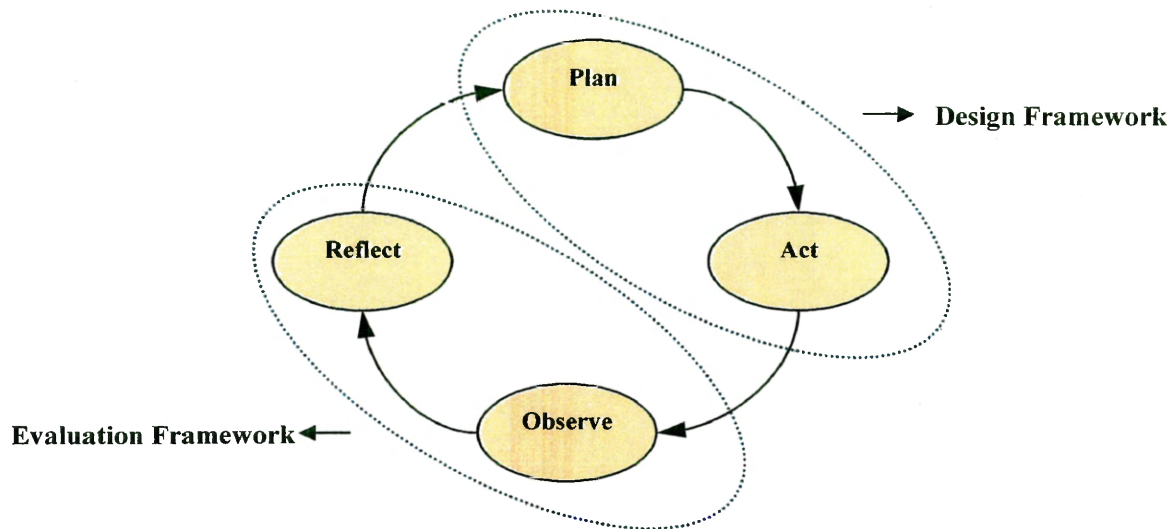
figure 5.2. Action research strategy for this study

Below, the four stages described by Zuber-Skerrit [41] are explained in the context of the thesis study.

➢ **Plan** - The researcher explores the research area and plans the intervention. The primary objective of the study was to propose a design process, with concrete guidelines, for cultivating a CoP. The reason for creating the design process is that, there was not enough information, which can guide a coordinator, who is looking into developing a CoP for his organization. For achieving this, a design framework was

developed, incorporating some of the steps followed already in the literature and also a process for collaborative requirements gathering. Different articles, journals and case studies on CoPs were studied in an in-depth literature review, particularly on the suggested steps to cultivate a CoP. The collaborative requirements gathering process was developed using thinkLets [3]. The different activities or steps in the design framework are explained in chapter 6. Representatives of the case organization were approached to be involved in the research. An initial design process was formatted with the information gathered.

➤ **Act** - The researcher intervenes by executing the steps planned. Once the steps in the design framework were developed, it was executed to see the design process in action. The case study to execute the design process was conducted in an International Financial Institution in Europe. The representatives were facilitators for a risk management process used in the organization. The representatives chosen were widely distributed to represent the global nature of this group of facilitators. The case study helped to observe the design process in action and also helped in redefining some of the steps in the design framework.

➤ **Observe** – In stage 3, the researcher collects data during and after the actual intervention. The data collected from the previous stage is analyzed to determine whether the intervention was a failure or a success. As the representatives were widely distributed, the tools used for data gathering were e-mail, and some online tools for brainstorming and voting. Observation in terms of notes, insights, inspirations were made for each every step, to help reflect on the followed design

process. Once the data was collected, a prototype was designed and developed for the representatives to have a look and feel for what they had put together, in terms of functionalities. The usage of the prototype was also observed as it was hosted in web environment. The definition of the indicators for measuring the added value of CoP was discussed with one of the problem owners and questions were phrased for each of the indicators. The questionnaire was framed in a survey tool and subsequently sent to the representatives to evaluate the prototype.

➢ **Reflect** – The researcher analyzes the data collected and infers conclusions regarding the intervention. In the last stage we analyzed the observations made and reflected on them with reference to the design framework and also the evaluation framework. The researcher concludes by stating the limitations of the research and also sets a stage for future improvements.

6. DESIGN FRAMEWORK FOR CoP

In this chapter we discuss the design framework that can used by an organization to find

out if a CoP will work for them before it is formally and completely established.

Developing an online community is different from designing software. For software, once it is designed, developed and shipped, it is stable until the next upgrade [33]. The users of the software can change the components or functionalities, but cannot change their interaction experience [33]. For an online community, specifically designed for a group of people who share common grounds, the human factor is the most crucial factor. Participation in such a community totally depends on the number of people involved, the type of discussions, the level of usage of the data present and most importantly, it has to be adaptable to change as it has to support people's work practice. For example, if a community is formed for a group of developers who specialize in Java applications, the success of such a community depends on the level of data usage and people involved and more importantly, as the technology changes people should be willing to adapt to those changes and keep the community updated. This involves a lot of commitment from the members and also changes the social interaction from time to time between the members.

In the literature available on Communities of Practice (CoP), there are steps that guide a coordinator to collaborate with the community representatives to design and develop a CoP. In the first stage "Potential", defined by Wenger [39], he draws out seven steps that can help an organization to establish a CoP. To sum it up, he thoroughly looks into the

scope, defines the primary intent of the community, interviews potential members, draws out the functionalities, identifies coordinators and builds the community. Though the potential members of the community are approached for requirements gathering and understood, the success of the community totally depends on how these members use the community. Many communities were established in collaboration with the members, but have failed over time for various reasons. The interactions between members reduced over time, the functionalities earlier developed no longer serve the purpose or the CoP is not maintained on a regular basis. A key aspect of communities is that they are created spontaneously and that they operate on a voluntary basis [41]. So, creating a CoP without knowing the commitment level from the members or the added value for the members and the community is an expensive investment for the organization. So far in Communities of Practice research, it appears that few measures have been taken to assess the value of a CoP, before it is formally launched and established.

The purpose of this study is to propose a framework that would allow a coordinator who is part of the organization to gather requirements from the representatives to design a CoP prototype and evaluate the organizational, individual and community benefits before the CoP is established. The framework therefore consists of two parts: a design part and an evaluation part. The former is the topic of this chapter; the latter is presented in chapter 7. The difference between this design framework and the models available in the literature are:

> A process is designed to gather requirements with guidelines using thinkLets. This allows the coordinator to gather information faster.

> The 5 knowledge work activities developed by the National O*NET Consortium is incorporated in the process to derive more definite functionalities that would support their work practice from the representatives.

> A proof-of-concept prototype is created to provide the representatives with a look and feel of the community.

The Design Framework is inspired by the steps in the Unified Process [36] and the seven steps defined by Wenger [39]. The assumptions considered while drafting the Design Framework include:

> This framework is to be used by an individual in an organization, to find out the different functionalities that the members are passionate about for the online community, which might support the work practice.

> This framework can also be used to establish a CoP if the potential members have expressed a need for a community.

There are nine steps in this Design Framework and each of the steps is elaborated on purpose of the step, what the coordinator should do and an example if needed. The last step in the design framework "Evaluate the outcome" is assessing the added value of the CoP. This is explained in chapter 7. Figure 6.1 depicts the nine steps.
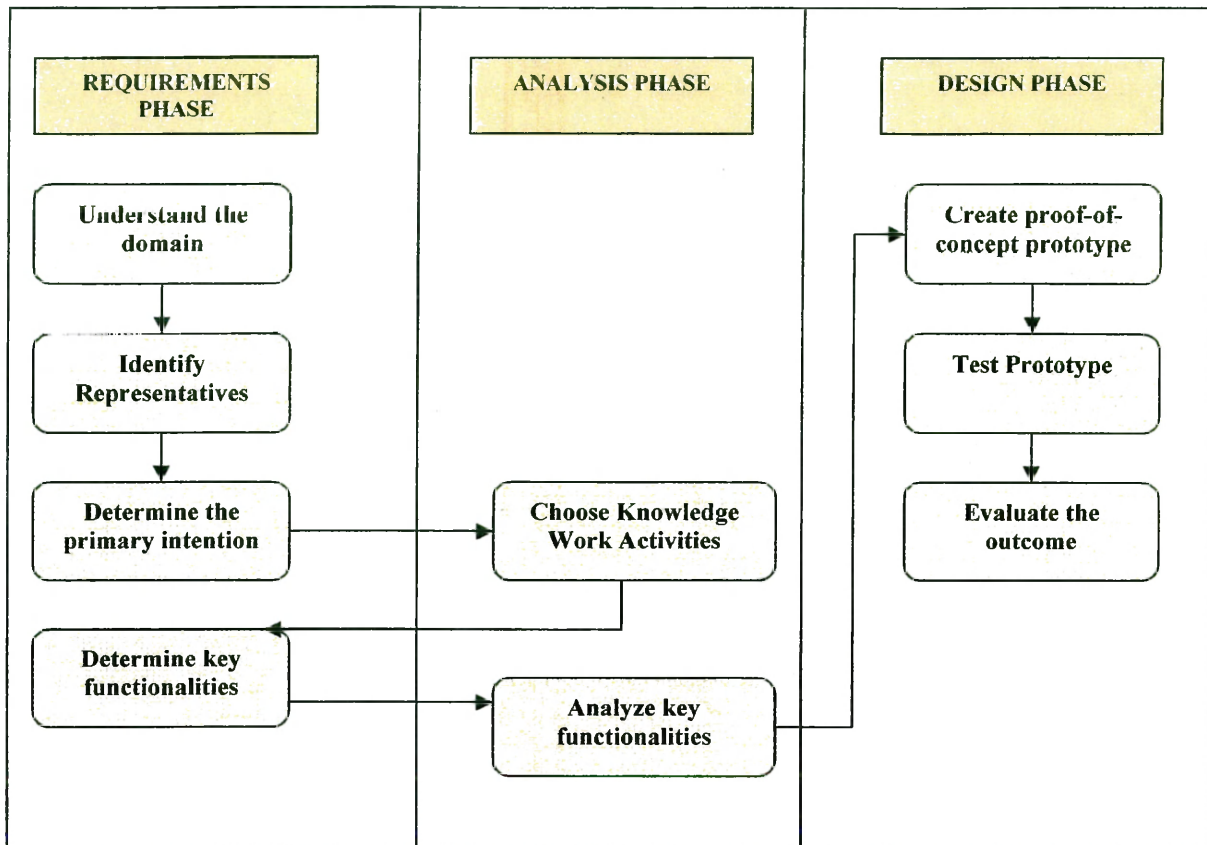
figure 6.1. Design Framework

Step 1: Understand the Domain

The first objective is to understand the domain. The domain or an area in any business environment should represent common ground and a sense of common identity [39]. It is the common ground that inspires members to contribute and participate and gives meaning to their actions [39]. As mentioned earlier this framework is to be used for online communities that support professional discussion and work. The coordinator could go through the documents related to the domain and also collaborate with the manager if needed, find out if there are any online resources already available or if they

communicate with an external system. The coordinator should make sure he understands all the terms used in the domain, the processes and the practices followed. Some of the key aspects that can be looked into to understand the domain are: purpose of the domain, execution methods followed, and any engaging issues within the domain in terms of problems or opportunities.

Secondly, it is particularly important to define the scope for the domain. Defining the scope helps in bringing out the engaging issues within that particular domain. There are three criteria to help define the scope of the domain [39].

➢ focus on the dimensions of the domain that are particularly important to the business

➢ focus on aspects of the domain community members will be passionate about

➢ Define the scope wide enough to bring in a lot of ideas but narrow enough that will keep the members interested.

The coordinator should collaborate with the manager or anybody who has enough experience to define the scope. For example, Risk Management is a business environment and it is impossible to create an online community to cover the whole spectrum of Risk Management. We might be able to create a CoP covering a broad range of issues, but, focusing on the Risk & Control Self-Assessment process, which is one of the major functions in Risk Management, allows setting boundaries. The purpose of the domain here is: to consistently and periodically identify measure and monitor its key operational risks which the business runs in achieving its objectives by using the R&CSA tool. The

R&CSA has three phases and it is very important for the coordinator to understand these phases. The coordinator must make sure that he only focuses on what is within the scope.

Step 2: Identify Representatives

This is a very important task. If the coordinator has had experience in the domain and has also been around in that business environment, it becomes easier to choose the representatives for **requirements gathering**. If the coordinator is fairly new, he should approach the manager and get his support in identifying the representatives and getting their consent for participation. There are two key points that the coordinator should mention while getting the consent from the representatives:

➢ Define the scope of the online community

➢ The agenda for eliciting the requirements and also the time period required to complete this.

If the community is a distributed community, where the representatives are widely spread, the coordinator should make sure he has a good balance from the different branches. There has to be a balance when choosing representatives for this phase. Well-respected members with years of experience and members who are new with innovative ideas should be chosen. Table 1 shows the proposed number of members needed for requirements gathering.

Table 1: No. of members for requirements gathering

Community	No-of Members
Distributed	8-15
Same Location	5-8

Step 3: Determine the primary intention from the representatives

Communities of Practice start with different intents. Once the scope of the domain is identified it is very important to determine the community focus. *"What would the community members want to do? Would they want to discuss issues or search for content or document their results or do all the activities mentioned?* It is important to adapt the structures, roles, and activities most suited to the intent. By executing this step, the coordinator gets the perspective of the representatives in terms of the overall functionality of the online community. As discussed in chapter 3, the APQC identified four strategic intents: Helping communities, Best-practice communities, Knowledge-stewarding communities and Innovation Communities. Interpreting the primary intent from the representatives can make the development more natural and easier for members to imagine [39]. The coordinator can use these examples as a guidance to see if the intent fits in any of them.

The coordinator can gather the primary intent in a number of ways. He can get this information just through e-mail from the chosen members. He can also make use of a brainstorming tool where members can contribute and also see the ideas of others [See chapter 3 for examples of brainstorming tools]. Once the primary intent is established, the coordinator can have a general idea to choose the knowledge work activities.

Step 4: Choose Knowledge Work Activities

The work activities were developed to provide detailed information about work done in terms of tasks that can be applied across occupations (Generalized Work Activities) [11]. The five clusters of the knowledge work activities define the tasks in any work area [24]. The five community activities are *Searching, Processing Information, Decision-making, Communicating, and Coordinating & Documenting* [see chapter 3 for details]. When the knowledge work activities accommodate the community intent, it leads to developing a CoP with the right processes. Table 2 gives a generic idea for the coordinator in choosing the knowledge work activities with the primary intent identified.

Table 2: Grouping the work activities with the Community Intent.

Community Intent	Primary Knowledge Work Activities
Helping communities	Communicating, Coordinating
Best-practices communities	Searching, Communicating, Decision-making, Coordinating & Documenting
Knowledge-stewarding communities	Searching, Communicating, Coordinating & Documenting
Innovation communities	Coordinating, Communicating, Processing

Another advantage of going through the work activities is that, the coordinator while deciding which one will support the community intent, he can envision scenarios related to the domain. The coordinator can do this by looking at the dimensions [Appendix A] of the different knowledge work activities. This again helps him to remain within the scope of the domain. Also, with the intent determined it is easier to look into the structure of the community. For example, if a community determines its scope to be in Java Development, there is no use to focus on processing information and decision making. The members would want to post requests for help (communicating), document execution

of difficult codes (document & coordinating) and some best-practices. By doing this, it helps the coordinator to focus on gathering only relevant information. The knowledge work activities are, of course, likely to shift as the needs of the community change. There is a possibility that with the intent determined, all five knowledge work activities might be chosen for gathering the functionalities or the processes.

Step 5: Determine the Key Functionalities Based On Work Activities

Once the knowledge work activities are determined, it is fairly straightforward to execute a session to elicit the key functionalities needed for a community. The activities to be followed in the steps so far (step 1 – step 4) are the same for the distributed as well as the co-located community. For both the communities, there are three main steps to be followed to gather and prioritize the key functionalities. The requirements gathering process designed for a distributed community is different from a co-located community. The process is designed using thinkLets which create a pattern of collaboration that moves a group of people through a reasoning process. The difference between the process for co-located and distributed CoPs is the thinkLets used and length of the period in which the process is executed.

The thinkLets help the practitioner to establish a pattern of collaboration among people working towards a goal. A thinkLet is the smallest unit of intellectual capital required to create one predictable, repeatable pattern of group deliberation – a pattern of thinking among people working toward a goal that moves people through a reasoning process [3]. To move through a reasoning process, people must engage in a sequence of basic patterns

of thinking. To date, there are five such patterns. *Diverge, Converge, Organize, Evaluate and Build Consensus* [3]. The thinkLets used for this process are explained in the table 3.

Table 3: Examples of ThinkLets

Pattern	ThinkLets	Purpose
Diverge	LeafHopper	To have a group brainstorm ideas regarding a number of topics simultaneously.
Converge	FastFocus	To have the group extract a list of key issues and assure that they agree on the meaning and phrasing of the items on the resulting list.
Organize	ExpertChoice	To someone knowledgeable available to organize the ideas.
	PopCornSort	To have the group to quickly organize an unstructured set of brainstorming comments in to related clusters.
Evaluate	BucketWalk	To have the group to validate results of a PopCornSort or ExpertChoice.
	StrawPoll	To have a group evaluate number of concepts with respect to a single criterion.

There are three main steps in the process for requirements gathering:

- Elicit key online functionalities

- Validate online functionalities

- Prioritize online functionalities

Figure 6.2, depicts the process that can be executed for a distributed and co-located environment. The process is presented in terms of the thinkLets used, the pattern of collaboration and the activities in their order. For a **distributed community** the activities defined are:

➢ Solicit participant feedback for relevant work activities

➢ Structure the ideas into respective work activities

> ➤ Validating the ideas organized into work activities

> ➤ Prioritize the ideas based on Important to Less Important

For a **co-located community** the activities defined are:

> ➤ Solicit participant feedback for relevant work activities

> ➤ Distill / formulate key functionalities

> ➤ Placing the ideas in to relevant work activities

> ➤ Validating the ideas organized into work activities

> ➤ Prioritize the ideas based on Important to Less Important

The difference between these two sessions lies in the execution of the process. The thinkLets used for some of the activities are different and the through put time is more for the distributed community. In the distributed community, more time was given for gathering the requirements, as the members are not in the same place. Also, it is cumbersome to organize the functionalities under relevant work activities in a distributed environment. In a co-located community all the activities can be in one sitting. Table 4 will explain how each of the activities is executed for a distributed community and a co-located community.

Table 4: Process Execution

Activity	Community	
	Distributed	Co-located
Diverge		
Solicit participant feedback for relevant work activities ThinkLet used - LeafHopper	Use the e-mail facility or a survey tool. If an online brainstorming tool is available that would be the right choice.	Sheets of paper or Electronic Brainstorming -GroupSystems (Groupware tool)
Converge		
Distill / formulate key functionalities ThinkLet used - FastFocus		sheets with the ideas from the previous step, blank sheets to input the distilled ideas or Categorizer – GroupSystems (Groupware tool)
Organize		
Structure the ideas into respective work activities ThinkLet used - ExpertChoice	The coordinator cleans the data by removing redundancy and places the ideas into relevant work activities	
Placing the ides in to relevant work activities ThinkLet used - PopCornSort		Use stickie pads for work activities and place it on a white board and ask the participants to place the distilled ideas under relevant work activities or use categorizer.
Evaluate		
Validating the ideas organized into work activities ThinkLet used - BucketWalk	Ask for the participant's approval on the ideas placed under work activities. This can be done using e-mail	Ask the participants to take a few minutes and look at the placement of ideas. If the members are not satisfied ask to justify and move the ideas.
Prioritize the ideas based on Important to Less Important ThinkLet used - StrawPoll	Use a voting tool	Use a voting tool

Distributed Community   **Co-located Community**

LeafHopper	
Diverge	Solicit participant feedback for relevant work activities

↓

ExpertChoice	
Organize	Structure the ideas into respective work activities

↓

BucketWalk	
Evaluate	Validating the ideas organized into work activities

↓

StrawPoll	
Evaluate	Prioritize the ideas based on Important to Less Important

Co-located Community

LeafHopper	
Diverge	Solicit participant feedback for relevant work activities

↓

FastFocus	
Converge	Distill / formulate key functionalities

↓

PopCornSort	
Organize	Placing the ideas in to relevant work activities

↓

BucketWalk	
Evaluate	Validating the ideas organized into work activities

↓

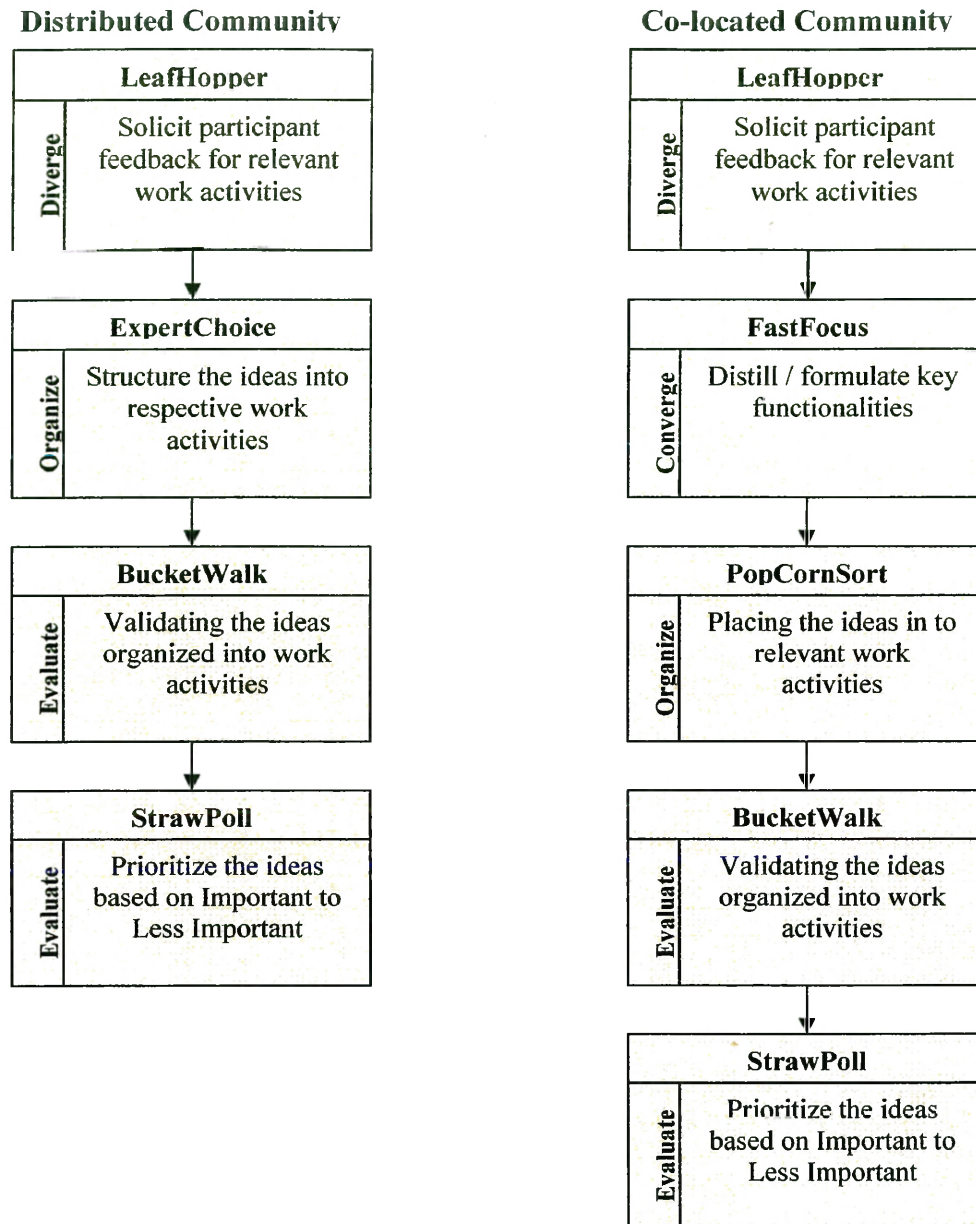|	
StrawPoll	
Evaluate	Prioritize the ideas based on Important to Less Important

figure 6.2. The Requirements Gathering Process

Step 6: Analyze the key functionalities

From the previous step, we get a set of functionalities that the members find most important. The coordinator must choose the functionality that will allow the members to

reflect on, once the prototype is built. So, the coordinator must choose a functionality that is both effective in terms of added value and easy to implement. It is not necessary for the coordinator to design a prototype containing all identified functionalities, as we are only developing a rapid prototype. The coordinator can just work an effective functionality and mock a couple of functionalities. By doing this the members can see the working of the mock functionalities and also will have an opportunity to execute that one effective functionality. An example of placing the prioritized functionalities in the model is depicted below.

Effectiveness: H=> High   L=>Low

Ease of Implementation: H=>Easy L=>Hard

The coordinator should place the prioritized key functionalities in the grid based on *"how easy it is to implement a functionality and what is the added value to the users"*. Placing the functionalities in the grid will give the coordinator an idea on what he has to work on. As far as possible the coordinator should try to prototype the functionalities in the grid

highlighted in red. In this grid the functionalities are easy to implement and also effective.

For this project, we are using Unified Modeling Language (UML) to model the functionalities. An object-oriented methodology is used to develop a CoP system with the information we have. As we don't want to spend a lot of time designing and developing a CoP before launch, Unified Process has steps defined that have guidelines that can be followed and the steps are descriptive. Also, the functionalities are prioritized in a way that only the top three or five functionalities are considered for this phase. An advantage of doing this is, if the CoP materializes, most of the systems analysis and design would be already done. Also, it gives an idea to the management as to how much work will be involved in implementing the system. If the CoP turns out not to work for the organization, the coordinator would have not used up a lot of time to do so. For this framework, following are some of the steps that need to be followed [36]:

- Draw up initial use case models

A *Use case* models an interaction between the information system (CoP) itself and the users (community members) of the information system. This gives a high level overview of the working of the CoP. Also, it shows the interaction between the information system and the environment in which the information system operates. In the use case model, the inputs of the details of various use cases are also defined. A step by step description of the use cases is recommended.

- *Entity Class Extraction*

Entity class extraction consists of three steps that are carried out iteratively and incrementally: *functional, class and dynamic modeling.* In functional modeling we present scenarios of all the use cases. In class modeling we determine the entity classes and their attributes. Then, we determine the interrelationships and interactions between the entity classes. In Dynamic modeling, we determine the operations performed by or to each class or subclass. For the CoP systems development, if the coordinator chooses not to determine the attributes for the entity classes or operations performed by each class, he would still have enough information for drawing up a prototype. An important point that the coordinator needs to remember is, he is analyzing the **key** functionalities for a CoP system that can be presented to the community members and the management, so they can envision the system beforehand.

- *Extracting Boundary Classes*

After presenting scenarios, determining the entity classes and operations we have to extract boundary classes. A boundary class models the interaction between the information system and its actors. They define the various data items associated with input and output. In general, each input screen, output screen and printed report is modeled by a boundary class.

- *Extracting Control classes (if needed)*

Based on the input details from the use cases control classes are defined. A non-trivial computation is modeled by a control class.

In all the steps mentioned above, the coordinator must always remember that it is not necessary to go in depth. The most important thing is to capture the functionalities and present it in an easy-to-understand model.

Step 7: Create a proof-of-concept prototype (rapid prototype)

Once the functionalities are modeled, a prototype has to be developed to test the representative's interest, and the technical feasibility of the CoP system. An important key point of rapid prototyping is that it must be "fast". As mentioned earlier, the coordinator should at least exhibit one of the key functionalities. Rapid prototyping may be done with sketches, paper prototype, application development, or Computer Aided Design (CAD) visualizations. For this study, an application was developed to accommodate one of the prioritized functionality and also a mock of other functionalities. The modeled results and screen shots of the prototype are depicted in chapter 8.

Step 8: Test Prototype

Based on the technique (paper, website etc) used to implement the functionalities the coordinator should present the prototype to the representatives. He should give them a set of tasks to execute based on the functionalities implemented. For a distributed community, the length in period to execute the tasks will be more than a co-located community.

In the next chapter (chapter 7) we discuss the constructs used for the evaluation framework to assess the added value of a CoP.

7. EVALUATION MODEL

In this chapter we discuss the evaluation model that can be used by the coordinator to find out the added value of the CoP to an individual and the community before it is formally and completely established.

A lot of research is aimed at developing measures to improve the quality of delivered systems. The evaluation model for this study is drawn from prior research [4, 5] on Technology Acceptance Model (TAM) and expanded upon [2] resulting in the Technology Transition Model. TAM was originally developed to predict future technology use after a first short exposure. TAM posits that actual technology use (AU) is directly caused by behavioral intentions (BI) and BI will be determined by two attitudes: *perceived usefulness* (U) and *perceived ease of use* (E) [4,5]. Usefulness depends on the extent to which an application contributes to the enhancement of the user's performance [5]. Ease of Use relates to the effort required by the user to take advantage of the application [5]. TTM, on the other hand was developed to study GSS transition that into the workplace. TTM attempts to explain what causes a group of technology users to become self-sustaining [2]. Though TTM emerged from TAM, it does not replace it.

Why use TTM for evaluating a CoP?

The main focus of this study is to *design and evaluate a Community of Practice that supports a particular business area in an organization before it is established.* Once the functionalities are identified using the Design framework and are implemented in the

form of a prototype, the coordinator needs to assess the added value of the CoP to an individual and the community. By doing this, the coordinator can advise whether the CoP will be a practical investment or not. As TTM was developed to study the transition of a collaboration tool [2], regarding the extent to which users become self-sustaining in using it, we decided to use this model for our study:

- CoP is a tool for a collaborative environment

- TTM can help us to understand some of the motivations or thoughts of prospective users whether or not they intend to embrace the CoP

- Also, we expect that through TTM we can identify whether there will be resistance to the introduction of the CoP.

The Technology Transition Model

The TTM model is used to provide direction in assessing the added value for a collaboration tool before it is adopted. Like TAM, TTM posits that the actual system use is a function of behavioral intentions (BI). It posits, however that BI will be a multiplicative function of perceived net value (V) and perceived frequency of net value (F) [2].
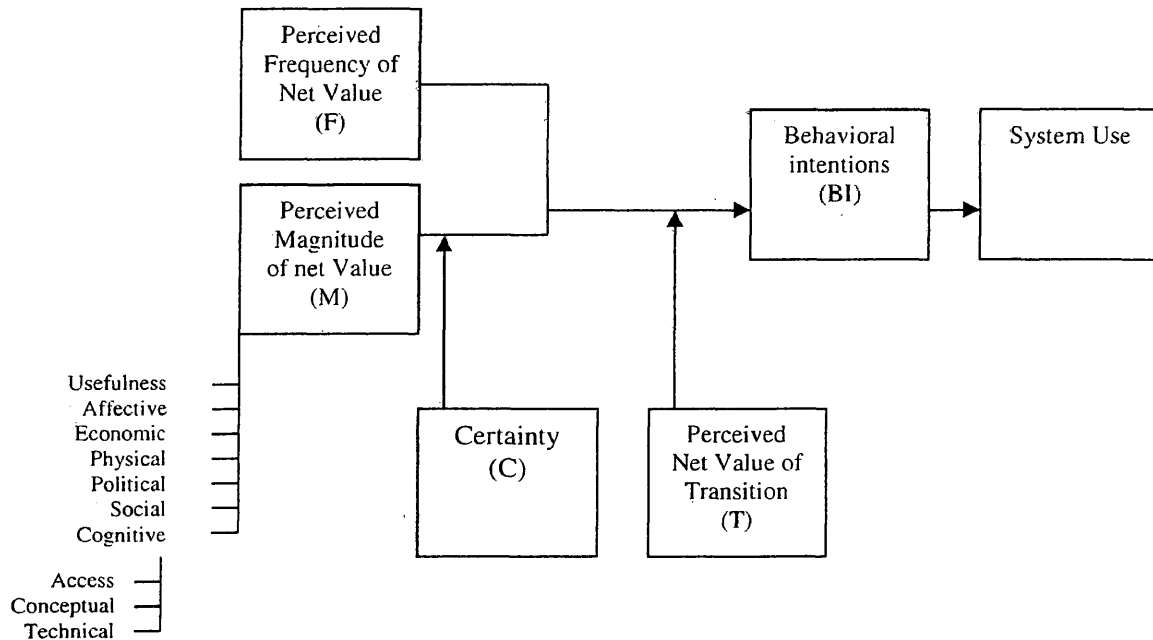
Figure 7.1 depicts TTM

figure 7.1 The Technology Transition Model

Perceived Magnitude net Value

Perceived Magnitude of net Value (M) can be defined as an attitude, where users contemplate how the proposed technology will affect many elements in their professional life [2]. The users react on these elements by assessing them in terms of the (probable) consequences of changing from existing technology to the proposed technology. For example, if the user thinks that the new technology on the whole will improve his job performance, the user may perceive a positive value. It measures how the prospective user feels about the difference.

There are a number of dimensions for perceived net value, but the most prominent instance according to Davis is Usefulness. Usefulness is the degree to which the user believes the technology will enhance his job performance. The other dimensions from the TTM model are [2]:

- Affective – A prospective user may attach a positive or negative emotional response to the change in technology

- Economic – Economic status of the individual or the organization may change

- Political – A new system may cause power shifts in an organization

- Physical – A new system may affect the well-being of a prospective user

- Social - Adopting a new system could affect the personal relationships of prospective users

- Cognitive – A proposed system may cause some change in the attention demanded to accomplish a task

For this study we did not focus individually on the above mentioned dimensions. In general, users can perceive net value through many dimensions or combination of dimensions. We captured the essence of some of the dimensions above and formulated questions from an overall perspective. By measuring the perceived net value for the CoP system, we can clearly distinguish if the users are willing to embrace the system as a whole.

Perceived Frequency of Net Value

For the CoP system we also needed to consider, how frequently (F) do the users expect to derive the net-value they perceive [2]. TTM posits that F and M combine multiplicatively to cause BI. F may be zero or positive, it cannot have a negative value because there is no frequency less than zero occurrences per time unit. No matter how high M becomes, if F is zero, BI will be zero. Likewise, no matter how high F becomes, if M is zero, BI will be zero. By measuring the perceived frequency, we can find how often the users will have a need to use the CoP functionalities which would support their job related activities.

Perceived-Net-Value-of-Transition

TTM posits that users also attend to the perceived-net-value-of-transition (T) when choosing whether to accept a new technology [2]. That may depend on perceptions of switching costs and benefits. There are both costs (e.g. time) and benefits (access to years of knowledge) to the transition process. By measuring the perceived transition, we can find out if they are willing to outweigh the sacrifices to achieve the perceived net value.

Certainty

People develop their attitudes toward a new technology based on their exposure to it [2]. For this study as we have developed a prototype, the prospective user will not only use it to form some assessment on the magnitude of the perceived-net-value, but also some degree of certainty (C) about that assessment.

For this study we designed a questionnaire based on a TTM questionnaire [Appendix D].

8. DESIGN OUTCOMES

In this chapter, we describe the Design results for each of the steps in Design framework

Data for this study was collected from 12 participants distributed in Europe and North America and the problem owner from IFS. The instruments used to analyze the design outcomes were a questionnaire, post session interview with the problem owner, data resources, a brainstorming tool, expert estimations, and observations. Below we present the results for each of steps in the Design Framework.

Step 1: Understand the Domain

Instrument Used: Data Resources and Post session interview with the problem owner

Once the need was established for a community in Risk Management, the first step was to understand the domain. We had elaborate sessions with the problem owner to understand the importance of the different aspects in Risk Management. The problem owner was helpful by providing access to many documents on the practices and processes followed in IFS with respect to Risk Management. We carefully studied all the important information to make ourselves familiar with the environment. An important point to note here is that prior to this study we had no thorough knowledge regarding Risk Management. We familiarized ourselves with the domain knowledge only through the documents and interviews.

The next step was to define the scope for the domain, as it is impossible to create an online community to cover the whole spectrum of Risk Management. In consultation with the problem owner, we focused on Risk & Control Self-Assessment (R&CSA) process which is one of the major functions in Risk Management.

Step 2: Identify Representatives

Instrument Used: Interview with the problem owner.

As we had no prior information on the people working in IFS, we had to approach the problem owner to choose the representatives. As IFS represents a distributed work environment, we had 3 things to consider for selecting the representatives:

- They had to be from different branches
- There should be a balance between new members and members with years of experience.
- They had to have facilitated at least a few R&CSA sessions

As we mentioned in the Design framework the number of representatives we needed for a distributed environment should be 8-15. We approached 18 members requesting their participation to jointly define the scope of the online community and the agenda. 16 representatives gave their consent to participate. The representatives were widely distributed:

Mexico	1
Sao Paulo, Brazil	1
Atlanta	1
Guernsey	1

Bucharest	1
Curacao	1
Netherlands	9
Belgium	1

Step 3: Determine the primary intention from the representatives

Instrument Used: Brainstorming tool

Once an initial understanding of the domain was established we approached the representatives to determine the community focus. We used a brainstorming tool [37] to gather data. The question we asked the representatives was:

- "What would the online platform be and how it would help you in your R&CSA related activities?" Please provide a description of how you see the online R&CSA platform.

Following are some of the responses that we received from the 12 representatives:

- Place of sharing information, setting standards based on best practice and active forum: How to handle when...
- I would like to discuss the experiences thus far of others that have been performing RCSA's. Over time I presume amendments / improvements have been made, based on experiences. That's at least what we did.
- Help for facilitation tips/tricks, feedback environment, download area for general presentations etc.
  The online platform has to enable the facilitator and participants of an assessment to give an update of or additional information to the results of a RCSA.
- A concise rehearsal of the theory, specifically the principles and reasons for the different phases, how to formulate a risk, what risk really is (e.g. probability vs possibility),etc.;
  A short rehearsal of why IFS chooses a particular methodology (brainstorm vs. questionnaires e.g.), what the advantages and major pitfalls are;
  Online platform have to be able to offer solutions/alternatives in case of non-collaborative patterns during the voting sessions

The feedback from the participants ranged from a general perspective to very detailed descriptions. With the feedback, we got a better understanding what the representatives

wanted in terms of the overall functionality of the online community. This also helped us in defining the Knowledge work activities. The summarized data is presented in the next section.

Step 4: Choose Knowledge Work Activities

Instrument Used: Expert Estimation

Based on the feedback from the previous step we had to decide whether we were going to choose a subset or all five work activities. We thoroughly went through each of the 12 participants' feedback and summarized all comments. Following are the summarized feedback:

The Online Platform is seen as a virtual space to:

1. Store and share the different pieces of information required for the activities of the facilitator [articles, excel sheets to calculate risks from the ballots, reports, presentations on the phases]. This information should be downloadable.
2. Have discussions for facilitators and between facilitator [feedback environment], through text, audio, and/or video messaging and conferencing.
3. Allow documentation and reporting of the different phases in R&CSA after each workshop. Based on this documentation it should be possible to do cross analysis reports and also present trend analysis of different groups behavior.
4. Allow documentation of lessons learned, mistakes to avoid, and improvements made to the R&CSA process.
5. Offer solutions, alternatives (tips and tricks), best practices in terms of thinkLets, and the preparation, execution, and documentation of the different phases in R&CSA.
6. Provide standard lists of controls, risks, presented in general or by industry line.
7. Offer a library of definitions of different phases, of facilitation techniques and of facilitation principles.

We discussed this summary with the problem owner. In this consultation, it was decided to focus on all five work activities i.e., *searching, processing information, decision-*

making, coordinating & documenting and communicating as the different activities in the R&CSA process covered all aspects of the knowledge work activities.

Step 5: Determine the Key Functionalities Based On Work Activities

Instruments used: The Requirements gathering process, Brainstorming tool

Once the work activities were defined, we had to execute the *Requirements gathering* (RG) *process.* To this end, we used a brainstorming tool [37] for gathering the requirements. In chapter 6, we mentioned two RG processes, Distributed and Co-located. This case study represented a distributed environment. There are four activities in a distributed RG process. Each of the activity is explained below:

- **Activity 1: Solicit participant feedback for relevant work activities**

Each of the five work activities was defined in the context of the R&CSA process to lead the participants in the right direction, and then we formulated questions to gather data for each activity. For example, *Processing Information* we defined and inquired about as follows:

"Processing information activities relate to gaining a deeper understanding of the underlying principles, reasons or facts. Examples of information that could be processed include, but are not limited to, trend analysis or cross workshop analysis."

Question: *What should the online platform be able to do in order to be useful or valuable for processing information regarding R&CSA?*

We followed the same pattern for each work activity. The time frame for this exercise was 2 weeks. We also added an extra question for "additional comments". As mentioned

earlier we used a brainstorming tool where the representatives would feed in their data and we estimated that it would take about 25 minutes of their time.

- **Activity 2: Structure the ideas into respective work activities**

After collecting the participants' feedback, we first had to clean it. We had to identify any redundant ideas or see if the representatives had entered the ideas in a different work activity. Most of the representatives had combined more than one idea in a sentence. We broke these into separate ideas. We discussed the categorization of the ideas with the problem owner to get his approval for our interpretation. Then we sent it to the representatives for their validation.

- **Activity 3: Validating the ideas organized into work activities**

The cleaned and structured data was sent to the representatives through E-mail. As we had fine-tuned the ideas, we wanted to get their approval. We received feedback from 3 representatives telling us to add examples to the ideas to make it clearer and also change the formulation of the ideas.

- **Activity 4: Prioritize the ideas based on Important to Less Important**

Once all representatives had given their consent with the categorization of the ideas, we asked them to prioritize the ideas based on their perceived importance. As the feedback differed for each activity in terms of the number of ideas, the number of important ideas to be chosen had to differ as well. We used a survey tool [37] for voting. We decided

with the problem owner on the number of ideas they had to choose. Table 1 shows the final number of ideas for each work activity and number of ideas they were asked to choose.

Table 1: No. of Ideas chosen

Work Activity	Total No. of ideas	Ideas to be chosen
Searching	16	5
Processing Information	7	3
Decision-making	6	3
Coordinating & Documenting	15	5
Communicating	4	2

For example, in Communicating work activity, after cleaning the data, we had 4 unique ideas. We asked the representatives to choose the top 2 ideas that could be included in the first version of the platform. The question that was asked:

The online R&CSA platform should allow facilitators to COMMUNICATE with each other: Please check the 2 MOST IMPORTANT Communication functionalities (functionalities are same as ideas) for the platform i.e., please check the 2 items that should in any case be included in the first version of the platform

- On different activities related to R&CSA by posting questions and providing answers

- By sharing tips for impact & probability assessments

- By receiving recent announcements related to R&CSA

- Over the platform anonymously

For all activities mentioned above in step 5, we kept the representatives updated continuously through a website. We added the results from each activity and the summary of the results. Figure 8.1 depicts the website.
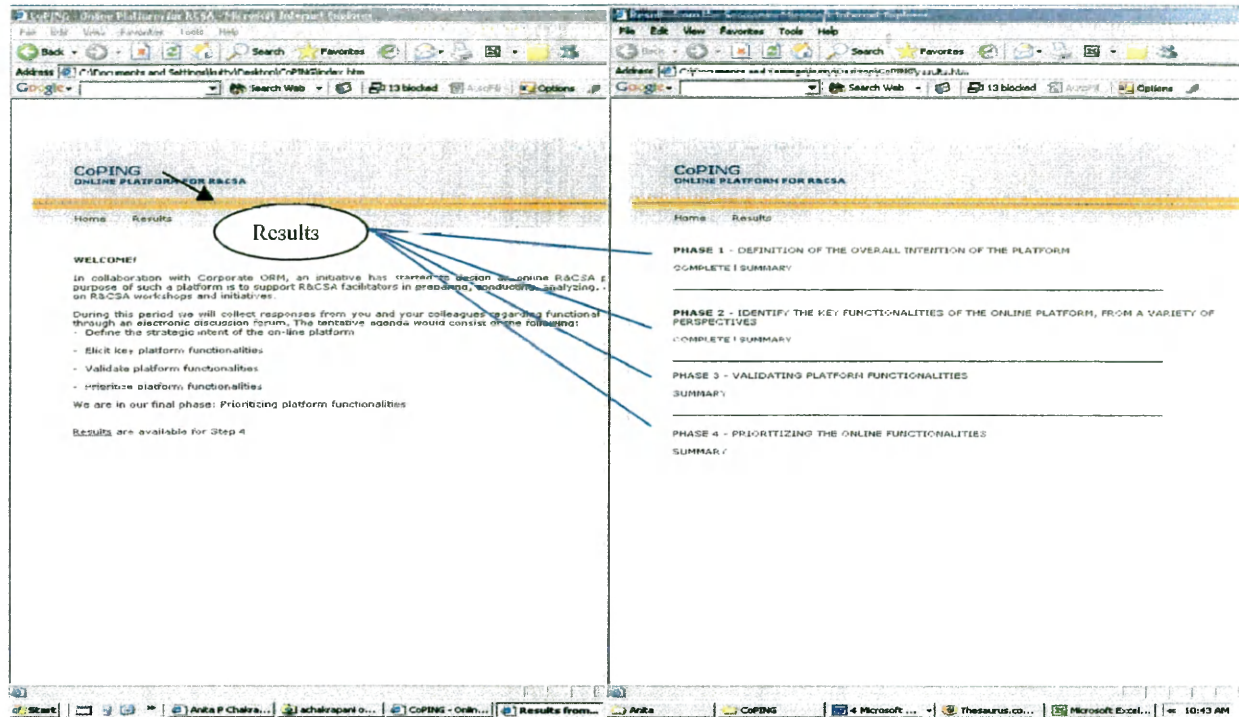

figure 8.1. Website

Step 6: Analyze the key functionalities

Instrument Used: Expert Estimation

The previous step yielded a set of functionalities that the representatives found most important [Appendix B]. As mentioned in chapter 6, we placed the prioritized functionalities on the *Ease of Implementation* and *Added value model* (chapter 6, step 6). As we had limited time to develop the first prototype, we chose some of the functionalities that were easy to develop and perceived to be most important. Most of the functionalities chosen were not prototyped in great detail as it involved connectivity to a database. The analysis and design of the functionalities chosen were

modeled using UML [Appendix C]. For this study we did not find it necessary to extract entity classes.

Step 7: Create a proof-of-concept prototype (rapid prototype)

Instrument Used: Website development (DreamWeaver)

From the functionalities chosen above we decided to prototype them through a website. We used DreamWeaver software to develop the website and also used JavaScript to imitate the flow of some of the functionalities. It took about 10 days in total to complete the website. We used some of the documents provided by the problem owner to fill in content for some of the functionalities.

The functionalities that were included in the prototype are:

Communicating

- On different activities related to R&CSA by posting questions and providing answers

- By receiving recent announcements related to R&CSA

Documenting & Coordinating

- Templates for various reports including plan of approach and RCSA status

- Controls and recommendations for risks for different categories.

- Best practices regarding planning and execution of R&CSA

- Guidelines on thinkLets

- Guidelines on the phases of R&CSA (Risk Identification, Assessment and Mitigation)

- Controls that link to the risks identified in different business units

Following are some of the screen shots from the website.

- Figure 8.2 depicts the *Home page* with some of the functionalities prototyped

figure 8.2. Screen shot of the Home page

- Figure 8.3 depicts R&CSA Best Practices, R&CSA Resources and Discussion Forum

figure 8.3. Online functionalities

In figure 8.3, we have highlighted three major functionalities

- R&CSA Resources – This allows members to access the resources available in the three phases of R&CSA process: Risk Identification, Risk Assessment, and Risk Mitigation.

- R&CSA Best Practices – This allows members to access tips and guidelines for all phases of R&CSA phases. The members also have an option to update them. This is depicted in figure 8.4.

- Discussion Forums – This allows members to communicate with each other, ask questions related to the R&CSA process.

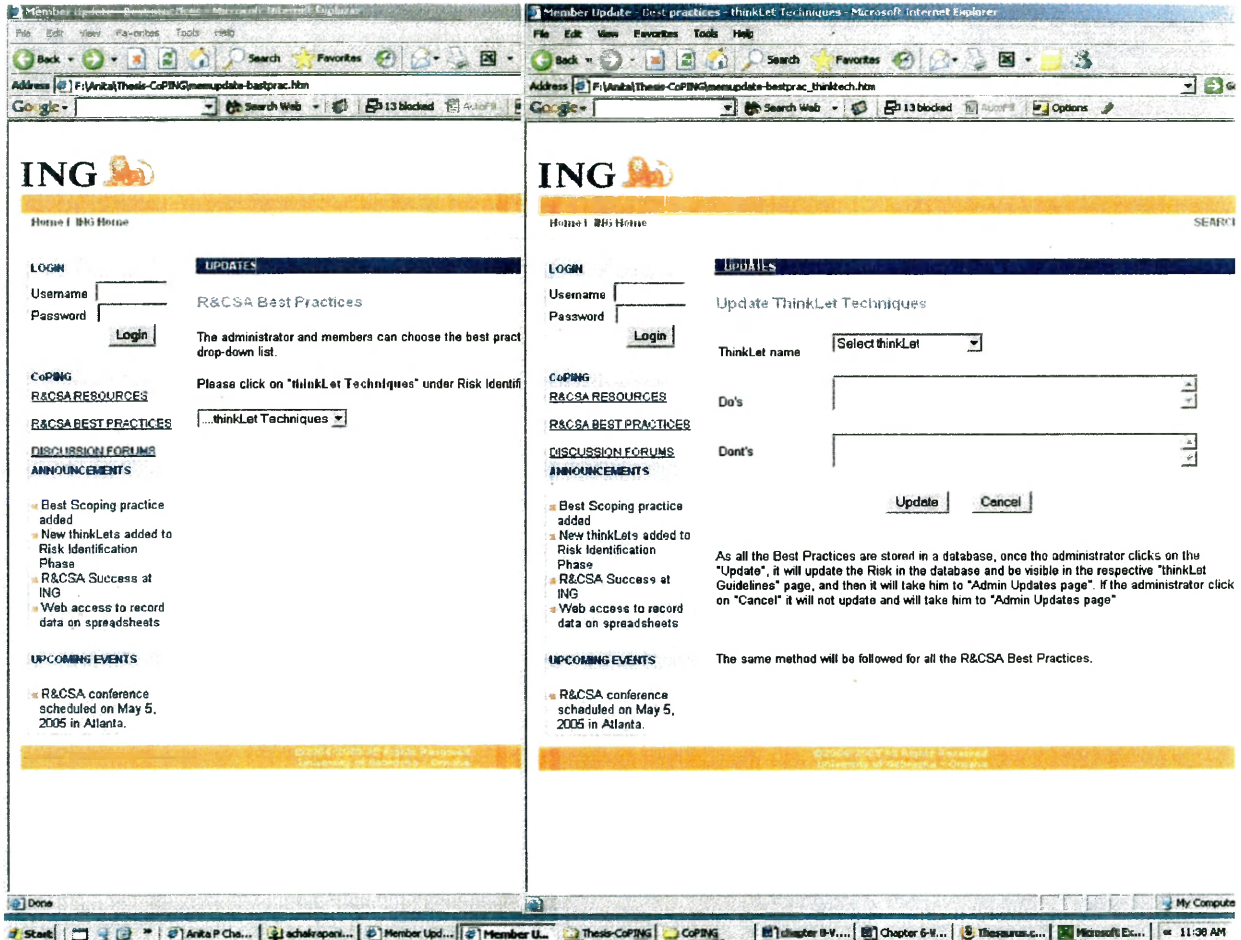Figure 8.4 the screen the members can use to update R&CSA best practices through a Username and password.

figure 8.4. Screen shot of Update R&CSA Best Practices.

Step 8: Test Prototype

Once we finished prototyping the functionalities we asked the representatives to evaluate

the prototype through the questionnaire mentioned in chapter 7. As this was first iteration

for the prototype we could not give them specific tasks to do. In the next chapter, we

discuss the results from the evaluation of the prototype.

9. EVALUATING THE PROTOTYPE

In this chapter, we discuss the evaluation outcomes of the prototype with the different constructs from the TTM model.

9.1. Evaluation Results

The instrument used to evaluate the participants' perception of the prototype was a questionnaire. Below we present the results with respect to their individual perceptions. The same 12 representatives that participated during the earlier design activities were approached to evaluate the prototype. Out of the 12 representatives, 2 had to cease their participation as their business units were sold by IFS to a different company. So finally from **10** representatives, **7** responded back with their feedbacks. We present the results with respect to Perceived magnitude of net value, Perceived frequency of net value, Perceived net value of transition, Certainty and, Behavioral intentions. All participants' perceptions were on a 7-point scale, (Strongly Agree to Strongly Disagree) 7 being the highest. We gathered feedback through open-ended questions with reference to added value to the organization and community and also the pros and cons of using the online platform. The open-ended questions provided representatives an opportunity to give more elaborate feedback which enabled us to gain a richer understanding of their thoughts about the prototype.

As mentioned in chapter 7, the questionnaire was administered through a survey tool [37]. The time frame given to the representatives was 10 days. The final outcome will

give us some indication whether desirable to launch and establish a Communities of R&CSA Practice at IFS. Following are the results from the different TTM constructs.

Perceived Magnitude of Net Value

Measuring the perceived magnitude of net value, we can find out how users think they might benefit from the proposed CoP platform. Table 1 shows the results for perceived magnitude of net value.

Table 1: Results for Perceived Magnitude of Net Value

Perceived Magnitude of Net Value	Mean	STD
The Online platform is easy to use	5.14	0.90
The Online platform will address my R&CSA related needs	5.57	0.79
My work will benefit from the Online Platform	5.43	1.27
The Online platform will increase the quality of **knowledge** among my fellow R&CSA facilitators	6.00	1.15
The Online platform will increase the quality of **expertise** among my fellow R&CSA facilitators	5.71	1.38
I will benefit from the Online Platform	6.14	0.90

From the results mentioned above, we can say that,

- The representatives feel that the adoption of the online platform in to their professional life will have a positive perceived value for the community as well as the individual.

- The representatives perceive that the online platform will benefit the community as a whole in terms of increase in quality of knowledge and quality of expertise. An important point to note here is the users while evaluating the prototype knew it was a

distributed environment. This shows that the representatives are willing to go across divisions and cultures to create a joint stage for shared learning.

- The representatives consider the online platform as a useful tool that can support their R&CSA needs.

- The representatives might not require training to use the online platform as it was easy to use. One representative through E-mail said "It was easy to navigate (at least for those already in to the matter)".

- The representatives will benefit from the Online Platform. From the data we collected, the representatives have facilitated at least 2 R&CSA sessions and on an average they have been with IFS for 5 yrs and more. By this information, we can say they have enough exposure to the different aspects of R&CSA process and that they will benefit from the platform. They evaluated with a Mean value of 6.14 on the question "I will benefit from the Online Platform" which is definitely a positive perceived value.

Perceived Frequency of Net Value

Measuring the perceived frequency, we can find how often the users may have a need to use the CoP functionality's, which would support their job related activities. Table 2 shows the results used to measure the perceived frequency of net value.

Table 2: Results for Perceived frequency of net Value

Perceived Frequency of Net Value	Mean	STD
The Online Platform can bring me value often	5.57	1.13
I have a need to use the Online Platform often	4.86	1.57

The results show an interesting difference: When asked if "The Online Platform can bring me value often" they evaluated with a mean value of 5.57. But when asked to evaluate "I have a need to use the Online Platform often" they came up with a mean value of 4.86. The reason for this difference could be that,

- As the functionalities were not prototyped to cover all the details, the representatives might have not been able to envision the complete usefulness of the online platform (and/or)

- Some of the representatives might have felt that using the platform for their job related needs would be time consuming (and/or)

- As running R&CSA workshops is not the respondents' daily responsibility, they may not feel the need very frequently.

From the results above, we can say that the representatives might not access the online platform continuously, but might use it from time to time.

Perceived Net Value of Transition

Measuring the perceived transition, we can find out if they are willing to outweigh the sacrifices to achieve the perceived net value. Table 3 shows the results used to measure the perceived transition of net value.

Table 3: Results for Perceived Transition of Net Value

Perceived Transition of Net Value	Mean	STD
Overall, the benefits of the Online Platform outweigh the sacrifices I'd have to make to start using it	5.71	1.50
I am willing to live with the cost (e.g., time) and hassles to start using the Online Platform	6.00	1.15

From the results, we can say that the representatives are willing to accept any perceived costs they have to make to start using the online platform. The reason for their high scores could be that most of the functionalities mentioned by the representatives are easy to navigate and all the required data resources to execute an R&CSA process are available in one platform. The cost of transition for the representatives is minimal as it appears that they do not require training to start using the tool.

Certainty

People become *certain* when they know that the expected net-value and the frequency of the net value will actually be obtained. Results from the perceived net value showed that the representatives attached a positive value to the online platform. The questions ranged from individual benefits to community benefits to the usability in terms of usefulness of

the platform. From the results below we can say that the representatives were certain about their responses as the results are positive and that the representatives think the value from the online platform can actually be obtained.

Table 4: Results for Certainty

Certainty	Mean	Total	STD
Given what I know about the Online Platform, I feel certain about the answers I gave above	5.14	36	2.19
The evidence I have regarding the Online Platform makes me sure of my answers above	5.00	35	2.08

Behavioral Intentions

TTM posits that the actual use of a system is a function of behavioral intention. When prompted about their behavioral intentions, the representatives scores as depicted in Table 5. From the results we can conclude that the representatives have positive intentions to make use of the online platform.

Table 5: Results for Behavioral Intentions

Behavioral Intentions	Mean	Total	STD
The Online Platform will be a standard application to support my R&CSA needs	6.00	42	1.15
I intend to use the Online Platform	6.29	44	0.95

Finally we will provide a summary of the representatives' thoughts and comments on the individual, community, and organizational benefits for establishing a CoP as collected

through the open-ended questions. The benefits will be summarized with reference to the Community of Practice benefits.

- **Individual Benefits**

According to Millen et al [28], when a CoP is established following are some of the individual benefits:

- Increasing access to subject matter

- Valuable information resources

- Increasing trust level

- Improving reputation

The functionalities prototyped included R&CSA resources relevant to the three phases, discussion forums and access to members to update certain resources. We have established through the TTM questionnaire that the representatives attach a positive value to the prototype. With the results we received, we can say that if a CoP is to be established for R&CSA facilitators, covering the different aspects of Risk Management, the users will benefit with such a platform. Some of the verbal feedbacks received from the representatives are:

- "One place to look for the required info". As I mentioned earlier, the resources needed for R&CSA process is spread across different applications and creating an online platform to host all the resources is perceived to be beneficial and definitely helpful for the facilitators.

- "The availability of a very wide range of information: very concrete in the sense of libraries and also qualitative as best practices and tips/reminders". R&CSA is regularly done for a lot of business units from time to time. Each time the R&CSA process is executed, the business units either come up with a new set of risks or implement controls for the risks that are already identified. Having a rich source of risk information where facilitators can update the results in terms of risk and their controls on the online platform, might save the facilitators a lot of time if the risk libraries are documented and updated.

- **Community Benefits**

The benefits of CoP for a community include: [28]

- Increase in idea generation

- Increase in quality of knowledge

- Increase in advise

- Increase in problem solving

In the questionnaire we included some of the community benefits and the representatives definitely agreed that the online platform would increase quality of knowledge and also quality of expertise. They attached a very high value to these questions (6 & 7). Also an open question was asked to tell us the added value of the online platform to the community of IFS R&CSA facilitators. Following are some of the responses:

- "HUGE. Knowledge share, skills improvement, tips and tricks"

- "A common framework. Sharing of information and ideas. Information sharing and more direct communication".

As the online platform is designed for a distributed environment, the facilitators have an opportunity to communicate across branches. Also as the platform is specifically set up for R&CSA facilitators, a rich source of subject matter is accessible. Though the branches follow the standard R&CSA process, the facilitators might have their own tips and tricks and they might also be able to help other facilitators in solving issues. By doing this you have access to people with different expertise and can also discuss innovative ideas or solve problems collaboratively.

- **Organizational Benefits**

For the organization a CoP can improve the communication among members which could result in project success, new business and product innovation [28]. When the representatives were asked on organizational benefits, some of the responses were:

- "It can save time if the tool is properly used by all users".

- "Re-inventing the wheel will be minimized".

- "Knowledge, tools and information concentrated in one platform".

In conclusion, we observe that, if a CoP were to be established and launched for R&CSA facilitators in a distributed environment, with well defined functionalities, and moderators to manage the community, there are strong indications that the community will become a

success. For any community to start successfully, the functionalities or tasks must be of interest to the members. With the functionalities gathered through this research study the representatives and the other R&CSA facilitators can start as a "Helping Community" which would invariably support R&CSA related activities and if needed can evolve with more ideas and functionalities.

In the next chapter we reflect on the research and conclude with a description of limitations and future steps.

10. CONCLUSIONS

In this final chapter we reflect on the research, briefly discussing the design and evaluation frameworks, the lessons learned and finally setting the stage for future research.

10.1 Research Objective

Organizations realize there is a need to capitalize on all available knowledge, tacit and explicit, as most of them are operating in a global and competitive economy. One organizational concept that has been receiving a lot of attention for this purpose concerns Communities of Practice. Communities of Practice (CoP) are platforms for a group of people who share information, insight, experience, and tools about an area of common interests. Establishing and launching a CoP is a challenging task as it involves a lot of man hours to gather what the community might need and once that is defined, there is a possibility for the community not being a success [Chapter 3]. The objective of this study was to layout and apply the frameworks for designing and evaluating CoPs before launching them. The frameworks can be executed by an individual (coordinator) who is part of that community or who is willing to take the initiative of finding out whether a CoP will work for their community.

The main research question for this study was *"How to design and evaluate a Community of Practice that supports a particular business area in an organization?"*. To design a CoP we identified 9 steps that a coordinator could follow to develop a proof-of-concept prototype. To find out if the developed CoP prototype will be acceptable in an organization we used

an Evaluation Framework [chapter 7] to assess the prototype. From the evaluation results the coordinator can advise if the CoP should be developed and focus on further development activities. This is expected to save the organization time and money.

The research was carried out through an in-depth study on a Community of Risk and Control Self Assessment (R&CSA) facilitators at IFS, an international financial institution. Each of the 9 steps was executed with the help of 12 IFS representatives. Different techniques and tools [Chapter 3] were used to support the Design framework. Once the prototype was designed we used a questionnaire instrument based on the TTM model [Chapter 7] to evaluate the prototype. The evaluation results demonstrated a positive added value for the CoP prototype. From the results we can say that, establishing and launching a distributed R&CSA CoP at IFS, will benefit the individual, the community and the organization.

10.2 Lessons Learned

In this section, we discuss the lesson learned during and after executing the Design and Evaluation framework.

Design Framework

- **Lesson 1: Requirements gathering was more structured using Knowledge Work Activities (KWA)**

The technique for gathering requirements was done by using the five knowledge work activities (KWA) developed by O*NET [Chapter 3]. This allowed us to explore the

various aspects in a knowledge work environment. We believe that the five work activities *searching, processing information, decision-making, communicating and coordinating & documenting* will bring the essential activities done for any (knowledge) occupation. The advantage of the KWA model was that it offered a comprehensive way to analyze the different work activities to execute an R&CSA process.

- **Lesson 2: Choose the right representatives for the CoP study**

One of the important focuses for this study was to choose the right representatives. We had a balance of experienced facilitators and also representatives who were relatively new to the field. This gave us a mixture of feedback in terms of

- The important and necessary functionalities for the online platform, and

- The extent to which the online platform could be used

- **Lesson 3: The importance of Effectiveness (added value) and Ease of Implementation model**

Most of the important functionalities we defined appeared easy to prototype. But, concentrating on functionalities that were expected to be most valuable would allow the representatives to react better to the prototype. So choosing an effective functionality and that is easy to implement is an important step. As mentioned in chapter 6, the coordinator does not have to prototype all the functionalities, at least not in the first iteration.

- **Lesson 4: Choice of Brainstorming tool**

For gathering requirements we used a survey tool for brainstorming where representatives could not directly see the ideas or comments made by the other representatives. Instead of using survey tool we could have used a Discussion forum, where the representatives could have seen others comments and ideas. We feel this might have yielded better ideas through improved synergy. Perhaps, it would also have been perceived more as a group effort.

- **Lesson 5: Less content, more task oriented functionalities**

For the prototype, the effective and easy functionalities to implement were mostly content based. Instead of just placing the content and telling the representatives, "this is what it would look like", we could have prototyped the functionalities with tasks using a client-side script. This would have allowed the users to understand the working of the functionalities better.

- **Lesson 6: Not necessary to extract all elements [chapter 6] for modeling the functionalities**

An object oriented methodology is definitely advisable for prototyping the CoP system. Through Use Case modeling in Unified process we were able to understand the scope of prototyping the functionalities. As mentioned in chapter 6, most of the functionalities were not covered in full detail as this model would have involved Database connectivity. The coordinator does not have to extract entity classes covering the three steps [chapter

6] in detail. He should be able to understand the working of the functionalities through Use Case modeling. Moreover, once the, CoP is established, it is likely there will be changes to the way the functionalities are executed.

Evaluation Framework

- **Lesson 1: Achieved an overall perspective in terms of added value of the CoP online platform**

Through TTM model we were able to estimate the perceived usefulness of the platform, how frequently the representatives might use it if implemented and if they were willing to transition to the online platform. As we achieved a positive value, the organization can now go a step further and run the same steps with a larger group of representatives.

- **Lesson 2: Did not reveal detailed motivation for (non) adoption**

The questionnaire only gave an overall perspective on the prototype. The questionnaire does not provide any insight on detailed motivation for using the online platform. This is an area where we could have followed up with representatives through interviews, to get a sense of what they feel.

10.3 Future Directions
Practical

Through the Design framework we were able to uncover relevant functionalities for establishing a CoP for R&CSA facilitators. The Design framework proved to be an

efficient way for collecting data. It did not involve a lot of time for the representatives. Following are some of the steps that the organization could do:

Execute the same Design process with a larger group of representatives

Fine tune the functionalities in the prototype and get more data on the user's perception. As there is a very large population of R&CSA facilitators' feedback from 12 participants is not enough.

Research on the tools available in IFS that can be incorporated for the Online Platform and also find out if external systems relevant to the R&CSA process can be connected to the online platform.

Research on incentives for prospective users, it terms of how to motivate and appreciate the users for being involved with the CoP.

Research

Overall the Design and the evaluation process proved to be productive for analyzing a CoP system. The users were satisfied with the results and had a sense of appreciation for the prototype. However, some work needs to be done before the Design Framework can be judged useful. Following are some of the future directions that can be done:

Develop measures to validate the efficiency and effectiveness of the Design Framework

Design an evaluation framework for a CoP system that can assess the individual, community and organizational benefits in more detail.

On the whole, our study show that our design process can be used to efficiently and effectively develop a CoP before it is formally and completely established. Further the evaluation framework can be used to assess the initial reactions to the CoP before a complete design is elaborated on. We feel that this represents a valuable contribution to the Communities of Practice area.

References

1. Alavi, M. & Leidner, D.E. (1997). *Knowledge Management Systems: Emerging views and practices from the field* (Tech. Rep. No.97/97/TM). Cedex, France: INSEAD.

2. Briggs, R.O., Adkins, M., Mittleman, D., Kruse, J., Miller, S., Nunamaker, J.F.Jr. (1999). A Technology Transition Model Derived from Field Investigation of GSS Use Aboard the U.SS. CORONADO. *Journal of Management Information Systems*, 15 (3), 151-195.

3. Briggs, R.O, & Vreede, GJ.de (2002). thinkLets: Building Blocks for Concerted Collaboration. www.groupsystems.com

4. Davis, F.D. (1986). A technology acceptance model for empirically testing new end-user information systems: theory and results. Sloan School of Management, Massachusetts Institute of Technology, Cambridge, MA.

5. Davis, F.D., Bagozzi, R.P., and Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35 (8), 982-1003.

6. Drucker, P.F. (Jan.-Feb., 1988) Coming of the New Organization, Harvard Business Review.

7. Characteristics of CoP. Retrieved on February, 2004 from www.criticalmethods.org

8. Community of Practice. Interview with Etienne Wenger. Retrieved on February, 2004 from www.knowledgeboard.com

9. Collaboration Technology. Retrieved on June, 2004 from http://openacademy.mindef.gov.sg/OpenAcademy/Learning%20Resources/EPSS/c14_a8.htm

10. Communities of practice. Retrieved on March, 2004 from http://www.xrce.xerox.com/news/feature/office_social_life.html

11. Definition of Detailed Work Activities. Retrieved on April, 2004 http://www.xwalkcenter.org/dwa1/

12. Davenport, T. & Prusak, L. (1998). *Working Knowledge. How organizations Manage what they know*. Cambridge, MA: Harvard Business Review

13. Davison, R.M., Qureshi, S., de Vreede, G.J., Vogel, D.R. and Jones, A.N. (2000) Group Support Systems Through the Lens of Action Research: Experiences in Organisations, *Journal of Global IT Management*, 3, 4, 6-23.

14. Dick, B. (1997). What is "action research"? Occasional pieces in action research methodology, # 2, http://www.scu.edu.au/schools/gcm/ar/arm/op002.html Retrieved on 10 November, 2004.

15. Foote, N.W., Matson, E. & Rudd, N. (2001). Managing the knowledge manager. The McKinsey Quarterly, 3(N.A.), 120-129.

16. Fruhling, A., Chakrapani, A., Vreede, G.J. (2005). A Repeatable Collaboration process for usability Testing. HICCS 05.

17. Definition of Generalized Work Activities. Retrieved on May, 2004 from http://competent.oxfordcc.co.uk/onet/elt.asp?e=4.A

18. Grant, R. M. (1996). Toward a knowledge-based view of the firm. Strategic Management Journal, 17, 109–122.

19. Hansen, M. – Nohria, N. – Tierney, T. (1999) What's Your Strategy for Managing Knowledge? in: Harvard Business Review, Mar-Apr, pp. 106-116

20. Hahn, J. & Subramani, M. (2000). "A framework of knowledge management systems: issues and challenges for theory and practice," *Proceedings of the International Conference on Information Systems*, 21.

21. Hildreth, P.M. (2004). *Going Virtual: Distributed Communities of practice*. Idea Group Publishing

22. Introduction on Action Research. Retrieved January, 2005 from http://ednet.kku.ac.th/~ed128/ad06/article1.html

23. Introduction on Action Research. Retrieved January, 2005 from http://www.web.net/~robrien/papers/arfinal.html

24. Jeanneret, P., & Berman, W. (1995). Generalized Work Activities. *In Development of Occupational Information Network (O*NET) content model*. Utah Department of Employment Security.

25. Kleiner, Morris M. 2000. "Occupational Licensing." *Journal of Economic Perspectives*. 14:4, pp. 189-202.

26. Lesser, E.L., & Storck.J (2001). Communities of practice and organizational performance. *IBM Systems Journal*. Vol 40 (4). pg.831

27. Lewin, Kurt. "Action Research and Minority Problems." Journal of Social Issues 2 (1946): 34-46.

28. Millen, D.R., Fontaine, M.A., & Muller, M.J. (2002, April). Understanding the costs and benefits of Communities of practice. *Communications of the ACM, 45* (4), 69-73.

29. Nikols, F. (2000). Communities of Practice Defined. Retrieved on April, 2004 from www.providersedge.com/docs/km_articles/CoPOverview.pdf

30. O'Dell, C. & Grayson, J.C. (1998). If we only knew what we know: identification and transfer of internal best practices. *California Management Review*, 40 (3), 154-174

31. Occupational Information Network. Retrieved on April, 2004 from http://www.onetcenter.org/content.html

32. Polanyi, M. (1967). *The Tacit Dimension*, New York: Anchor Books.

33. Preece, J., Abras, C., Krichmar, D.M. (2004). Designing and evaluating online communities: research speaks to emerging practice. *Int. J. Web Based Communities*, Vol. 1, No.1.

34. Qureshi, S.and P.Keen. (2005). "How to Overcome The Knowledge Paradox: Activate Knowledge Identity, Not Just Organize Information ". In (eds.) R.Sprague and J.Nunamaker *The Thirty Eighth Annual Hawaii International Conference on Systems Sciences* .IEEE Computer Society Press.

35. Renninger, K.A, & Shumar, W. (2002). *Building Virtual Communities: Learning and Change in Cyberspace*. Cambridge University Press.

36. Schach, S.R. (2004). *Introduction to object-Oriented Analysis and Design with UML and the unified Process*. MCGraw-Hill/Irwin.

37. Survey Tool – QuestionPro. www.questionpro.com

38. Wenger, E. (1998). *Communities of practice. Learning, meaning, and identity.* Cambridge university Press

39. Wenger, E., McDermott ,R., & Synder,M.W (2001). *Cultivating Communities of Practice.* Cambridge University Press.

40. What is Knowledge? Fuji Xerox. Retrieved on May, 2004 from www.**fujixerox**.com.au/files/case_studies/docs/km2.pdf

41. Zuber-Skerritt, O. 1992. Action Research in Higher Education: Examples and reflection. London: Kogan Oage Limited.

Appendix A

Knowledge Work Activities and their dimensions

Searching - Identifying information by categorizing, estimating, recognizing differences or similarities

The dimensions are:

- Observing, receiving and otherwise obtaining information from relevant sources.

Processing Information - Translating or explaining what information means and how it can be used

The dimensions are:

- Efforts to understand how we take in and store new information and how we retrieve it when it is needed

  Monitoring and reviewing information from materials, events, or the environment, to detect, assess or understand problems.

  Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data

  Making sense of information.

  Assessing the value, importance, or quality of things or people

  Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform an activity

  Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations and standards

  Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Coordinating & Documenting

Providing guidance and expert advice to management or other groups on process-related topics

The dimensions are:

Scheduling events, programs, and activities as well as the work of the others

Developing specific goals and plans to prioritize, organize, and accomplish your work.

Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions

Keeping up-to-date technically and applying new knowledge to your job.

Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form

Providing documentation, detailed instructions, or specification to tell others about the details of the different phases

Getting members of a group to work together to accomplish tasks

Encouraging and building mutual trust, respect and cooperation among team members

Providing guidance and direction to subordinates, including setting performances standards and monitoring performances

Decision-Making- Establishing long-range objectives and specifying the strategies and actions to achieve them

The dimensions are:

- Analyzing information and evaluating results to choose the best solution and solve problems

Communicating - Communicating with people outside the organization

The dimensions are:

- Providing information to supervisors, coworkers, and subordinates by telephone, e-mail or in person

 Developing constructive and cooperative working relationships with others, and maintaining them over time.

Appendix B

The Important Functionalities
Searching

1. Workshop materials (ideas, templates, etc.)

2. Guidelines on thinkLets

3. Guidelines on the phases of R&CSA (Risk Identification, Assessment and Mitigation)

4. Controls that link to the risks identified in different business units

5. Possible risks and their definitions related to a Business area.

Processing Information

6. Comparing results of similar R&CSA-subjects and identify similar risk, etc.

7. Automatically processing participants' input in standard reports, graphs and tables.

8. Cross-case (i.e. different business units and / or scopes) analysis of key risks to identify business process improvement needs

Decision-Making

9. Scopes by business unit/process/ department

10. Guidelines and tips with respect to impact and probability scales to be used.

11. Impact and probability assessment on risks

Communicating

12. On different activities related to R&CSA by posting questions and providing answers

13. By receiving recent announcements related to R&CSA

Documenting & Coordinating

14. Templates for various reports including plan of approach and RCSA status

15. Controls and recommendations for risks for different categories.

16. Best practices regarding planning and execution of R&CSA

17. Cost benefits analysis to support the decision to implement an action in the Risk Mitigation phase.

18. Matrix for each phase (absolute, managed & residual risk), including the capability to track individual or groups of risks through out the three phases.

Appendix C

## Modeling The R&CSA Functionalities

Following are the functionalities that we decided to prototype.

- Workshop materials (ideas, templates, etc.)

- Controls that link to the risks identified in different business units

- Possible risks and their definitions related to a Business area.

- Templates for various reports including plan of approach and RCSA status

- Guidelines on thinkLets

- Guidelines on the phases of R&CSA (Risk Identification, Assessment and Mitigation)

- Guidelines and tips with respect to impact and probability scales to be used.

- On different activities related to R&CSA by posting questions and providing answers

- Recent announcements related to R&CSA

Initial Use Case Models

For most of the functionalities mentioned above we modeled them through Use Case Diagrams. Also the details of use case models are defined with step-by step descriptions.

Figure 1. Use Case Diagram for CoPING
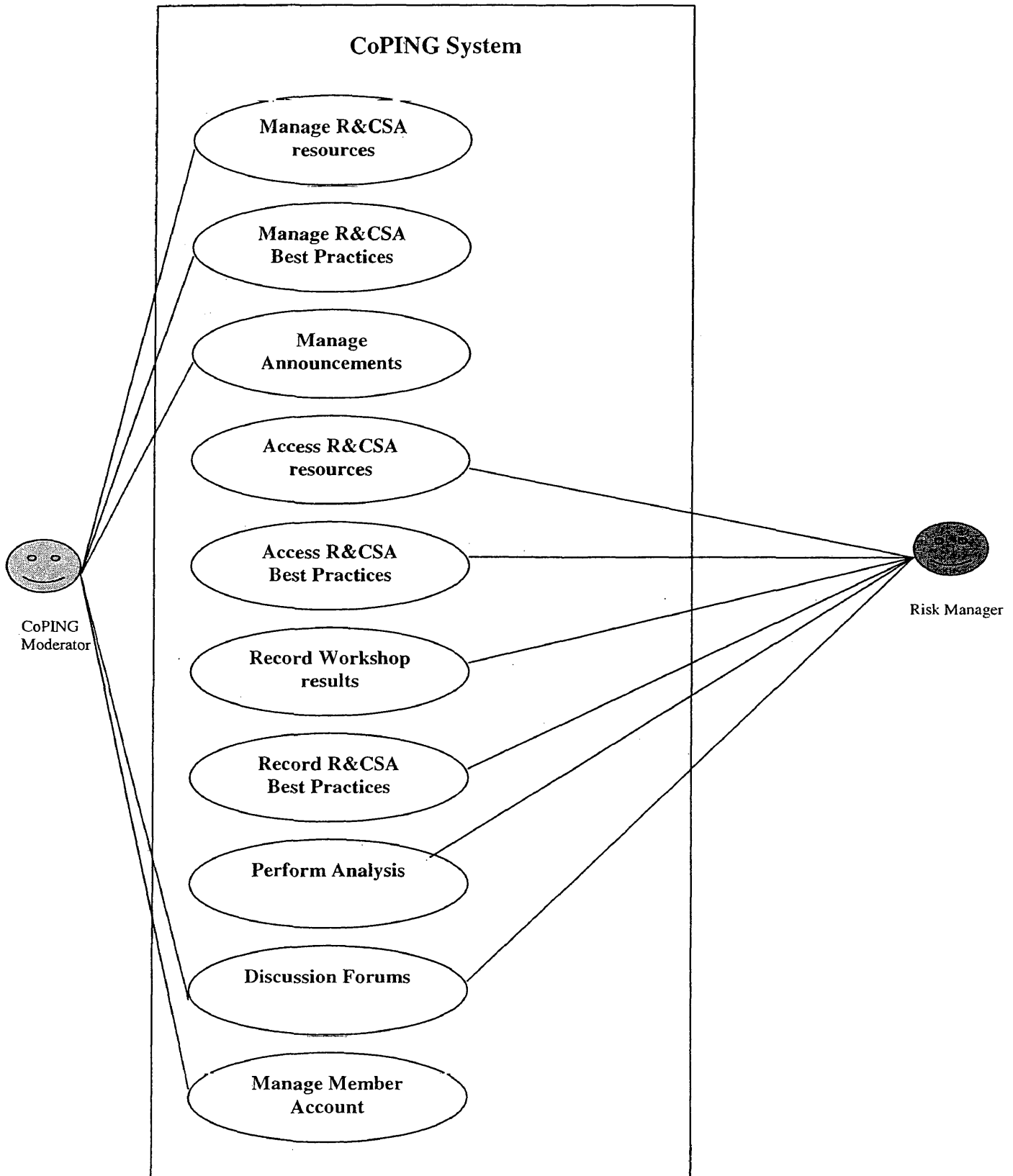
Figure2. Extended *Manage R&CSA resources* Use Case and Brief Description
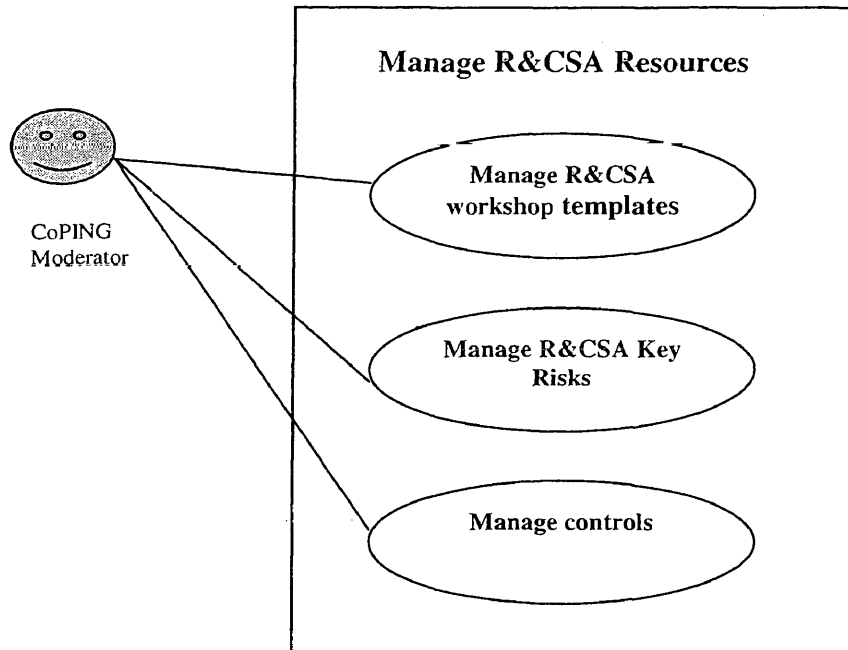
Assumption – The moderator is assigned a username and password

Brief Description
The *Manage R&CSA Workshop Templates* use case enables a moderator to add, delete or update templates for each of the Risk Management phases (Identification, Assessment and Mitigation)
Step-by-Step Description
1. The moderator selects the Risk Management phase that he wants to manage. 2. The moderator now adds, deletes or updates a template. These templates can be downloaded (printed)

Brief Description
The *Manage R&CSA Key Risks* use case enables a moderator to add, delete or update key risks with their definitions
Step-by-Step Description
1. The moderator adds, deletes or updates a key risk with their definition.

| Brief Description |
| --- |
| The *Manage R&CSA Controls* use case enables a moderator to add delete or update Controls to their related Risks |
| **Step-by-Step Description**

1. The moderator searches for the key risk
2. The moderator now adds, deletes or updates the control(s) for the risk. |

Figure 3. Extended *Manage R&CSA Best Practices* Use Case and Brief Description
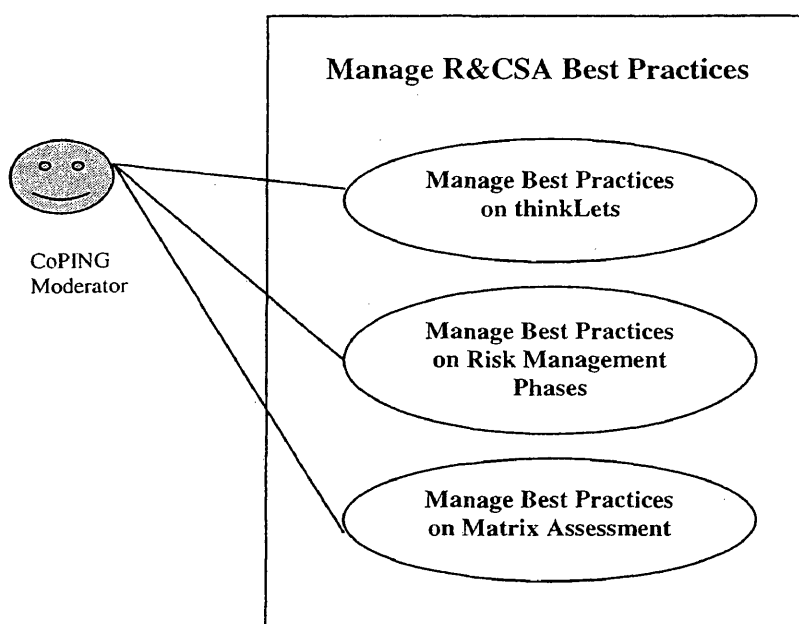
| Brief Description |
| --- |
| The *Manage Best Practices on thinkLets* use case enables a moderator to add delete or update tips or best practices with respect to thinkLets |
| **Step-by-Step Description**

1. The moderator adds, deletes or updates best practices on thinkLes. |

Brief Description
The *Manage Best Practices on Risk Management phases use* case enables a moderator to add delete or update tips with respect to the execution of the workshops on the phases.
Step-by-Step Description 1. The moderator chooses the phase that he wants to manage. 2. The moderator adds, deletes or updates best practices on that particular phase.

**Figure 4.** Use case of *Access R&CSA Resources*
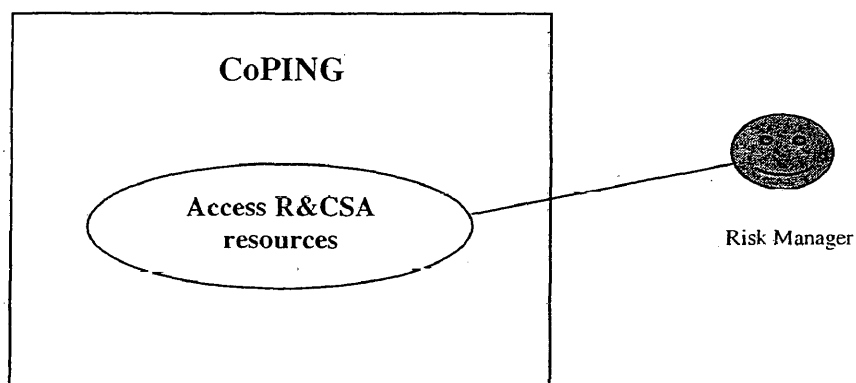
This Use Case enables a risk manager who is a member of the community to access the different resources mentioned in *figure 3*. Though the members are assigned username and password they don't have to LOGIN to access this information

**Figure 5.** Use Case of *Access Best Practices*
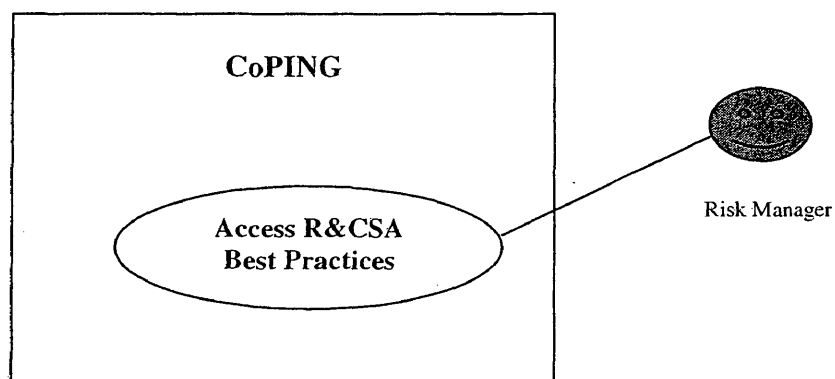
This Use Case is same as the previous Use Case (Figure 4)

Figure 6. *Record Workshop Results/Details* **Use Case**
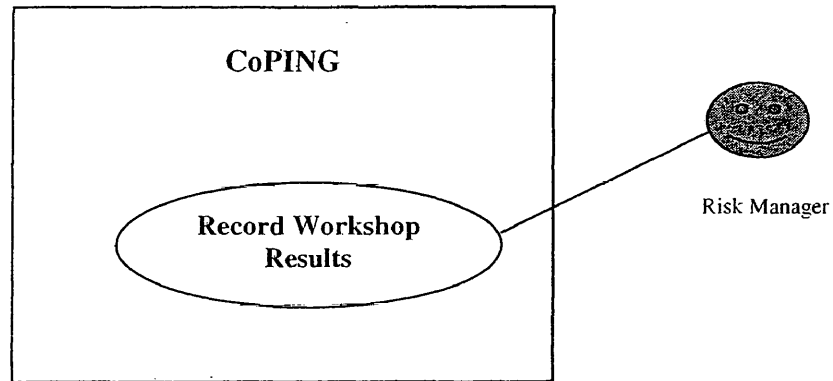
This Use Case allows the risk managers to record all the details and results from a Workshop. For now these templates could be in the .xls format and the manager can choose to input his results on to the document itself.

Figure 7. *Record Best practices* **Use Case**
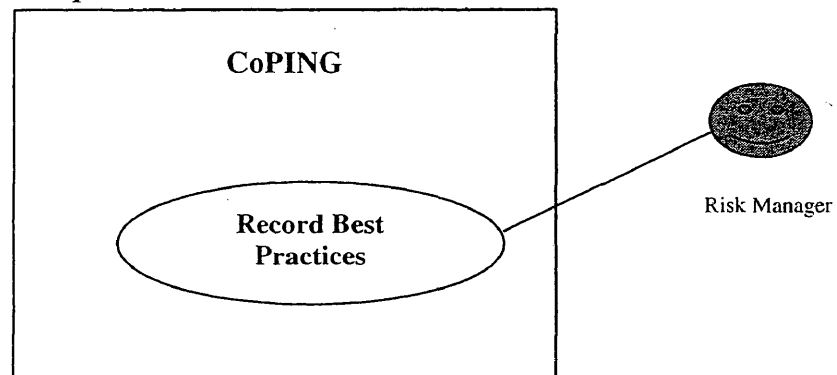
This Use Case enables a risk manager to record Best practices on the phases and the thinkLets. The manager can choose his selection and then input the details. These details are updated in the CoPING system only after the moderator approves

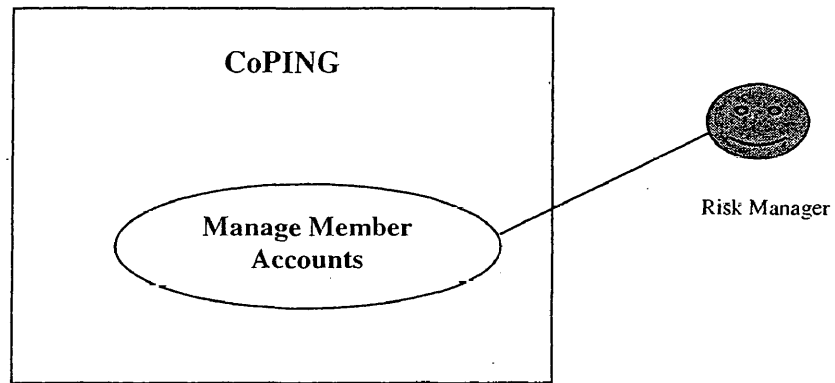**Figure 8.** *Manage Member Accounts* **Use Case**

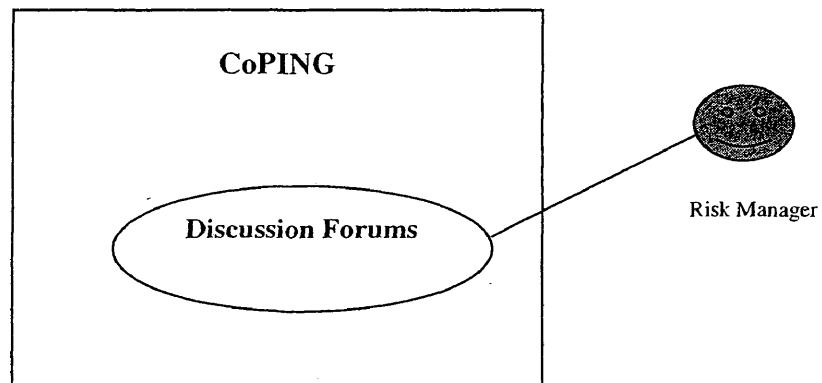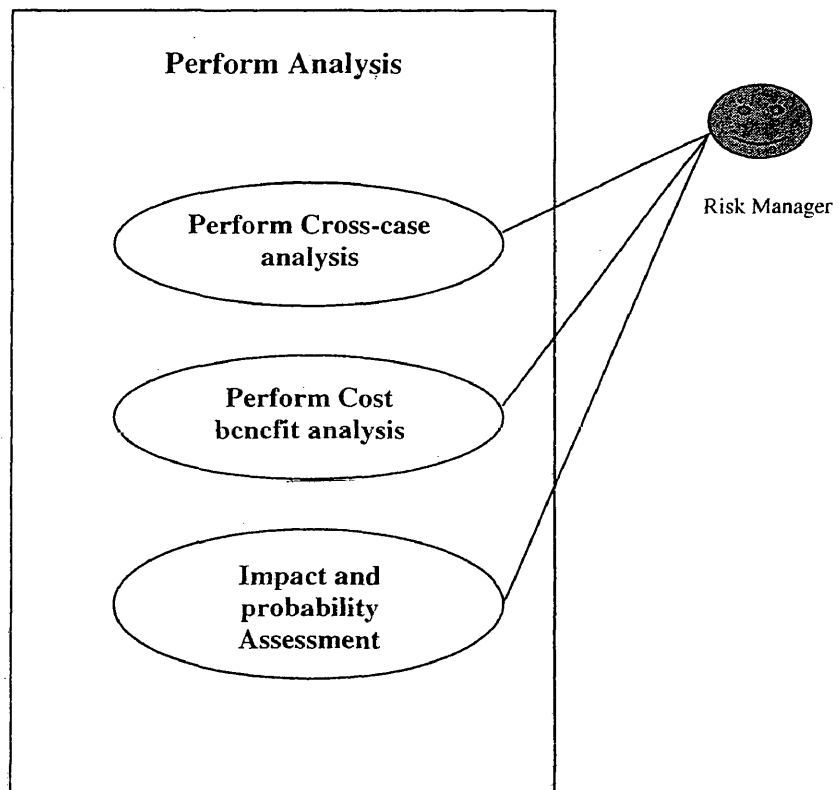**Figure 9. Discussion Forums Use Case**

Figure 10. Extended Use Case of *Perform Analysis*

Extracting Boundary Class

In our initial class extraction we have only one screen class, User Interface Class. Figure 11, depicts the first iteration of the main-menu of the user-interface screen.

```
┌─────────────────────────────┐
│        CoPING System        │
│  Resources                  │
│  Best Practices             │
│  Announcements              │
│  Discussion Forums          │
│  Upcoming Events            │
│                             │
│                             │
└─────────────────────────────┘
```
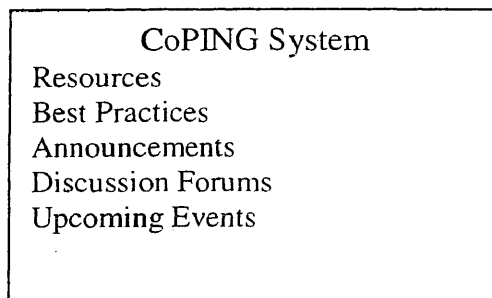
figure 11. *Textual representation of the Main Menu*

With the Main menu items defined, we placed the important functionalities that was easy to implement and effective under relevant menu

Resources

Workshop materials (ideas, templates, etc.)

Controls that link to the risks identified in different business units

Possible risks and their definitions related to a Business area.

Templates for various reports including plan of approach and RCSA status

Best Practices

Guidelines on thinkLets

Guidelines on the phases of R&CSA (Risk Identification, Assessment and Mitigation)

Guidelines and tips with respect to impact and probability scales to be used.

Upcoming Events

Conferences

Discussion Forums

On different activities related to R&CSA by posting questions and providing answers

Announcements

Recent announcements related to R&CSA

Appendix D - Questionnaire

Q.No	Questions
General Background	
1	How long have you been associated with IFS?
2	How many times have you facilitated an R&CSA session to date?
Perceived Magnitude of Net Value	
3	The Online platform is easy to use
4	The Online platform will address my R&CSA related needs
5	My work will benefit from the Online Platform
6	The Online platform will increase the quality of **knowledge** among my fellow R&CSA facilitators
7	The Online platform will increase the quality of **expertise** among my fellow R&CSA facilitators
8	I will benefit from the Online Platform
Perceived Frequency of Net Value	
9	The Online Platform can bring me value often
10	I have a need to use the Online Platform often
Certainty	
11	Given what I know about the Online Platform, I feel certain about the answers I gave above
12	The evidence I have regarding the Online Platform makes me sure of my answers above
Perceived net Value of Transition	
13	Overall, the benefits of the Online Platform outweigh the sacrifices I'd have to make to start using it
14	I am willing to live with the cost (e.g., time) and hassles to start using the Online Platform
Behavioral Intentions	
15	The Online Platform will be a standard application to support my R&CSA needs

16	I intend to use the Online Platform
Overall Perception	
17	What do you like **most** about the Online Platform?
18	What do you like **least** about the Online Platform?
19	What is the added value of the Online Platform to the organization?
20	What is the added value of the Online Platform to the community of IFS R&CSA facilitators?
21	Do you have any further comments or suggestions?

Question 1 and 17 – 21 were open ended questions. For question 2, it was a multiple choice. Questions 3 -16 were measured using Likert scale on a scale of 7 (Strongly Agree – Strongly Disagree). The results collected and analyzed will be explained in chapter 9.