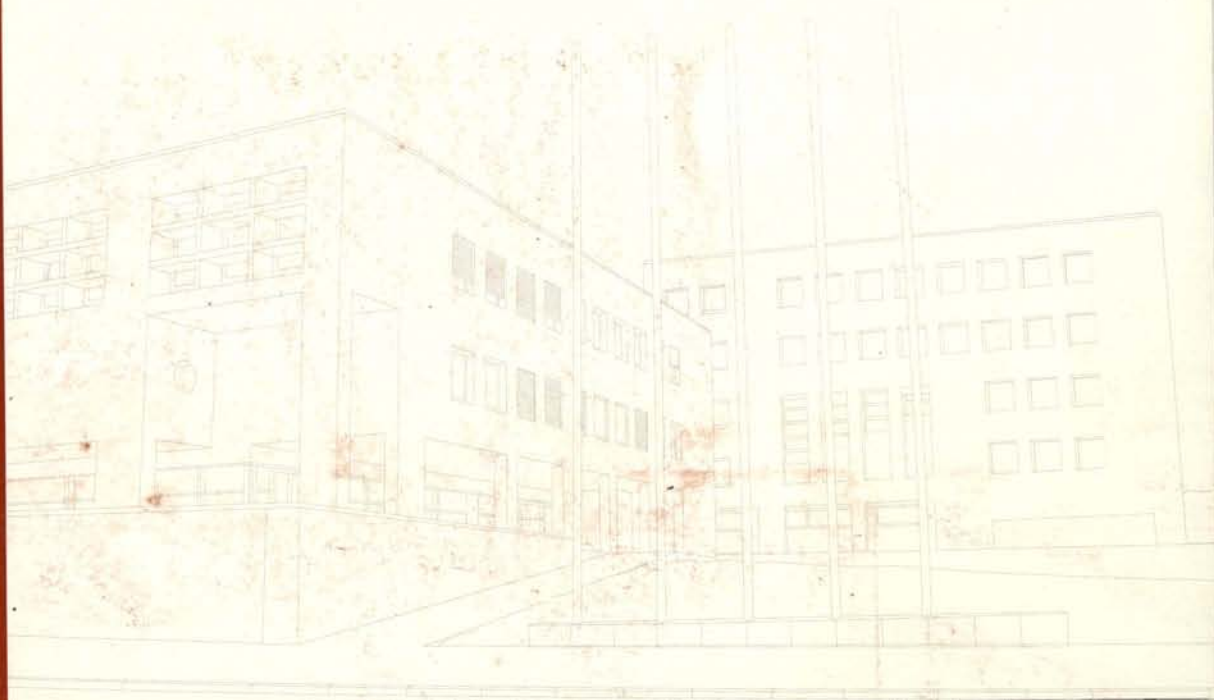




Creativity and Idea Management in Collaborative Networks

The Role of Information Management

Hugo Jorge Cavaleiro Vara
MIEIC 2008

FACULDADE DE ENGENHARIA DA UNIVERSIDADE DO PORTO



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Creativity and Idea Management in Collaborative Networks: The Role of Information Management

by

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Porto, 2008

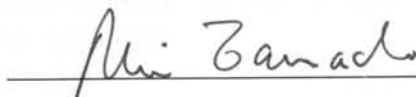
Creativity and Idea Management in Collaborative Networks: The Role of Information Management

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Dissertation Report for an Integrated Master in Informatics and
Computing Engineering

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Productivity and Time Management in Computer Networks: The Role of Information Management

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Abstract

Collaborative systems and methods are used in organisations to support innovation and management of new ideas. The aggregation of innovation-related information from a community of collaborators is a non-trivial task that requires the use of specialised collaborative systems and methods.

The term innovation process is used to describe the array of sources and objectives that culminate in the act of innovation. An examination of the innovation process is thus designed to bring about a more comprehensive understanding of the characteristics that innovative organisations share, as well as of those characteristics that set innovators apart from other businesses.

Nowadays idea management and innovation processes are constantly changing and there aren't strong guide lines to define these fields. This means, innovation processes and idea management aren't well documented and well developed/defined areas. There aren't any defined processes or a main rule to guide innovation process and idea management. So it's important to define these issues and think on a comprehensive application that can hold with the organisation's needs in these areas.

One objective is specifying a generic information architecture of an application to support collaborative idea management, involving a collaborative network of organisations. The information architecture was developed based on the TOGAF framework. Align with the architecture is defined an IT/IS platform to support idea management centred innovation processes in collaborative networks. The information architecture developed comprehends an organisation's information structure, classification, life-cycle and user roles.

During this work, a study of all the existing solutions and a comparison between them is made. The architectures and the application's features were studied, with the aim of understanding which one of these solutions it is possible to use and what are the positive aspects of each one of them. The best of each solution is used to propose a comprehensive application to support collaborative idea management.

The designed architecture solution is agile. Several features from the current solutions are used on the final proposal. The current market solutions don't cover all organisation needs, but we can merge the best features of each one in a final

proposal. Using the principal features of current solutions brings a huge advantage to deal with the idea management problem.

Probably the designed architecture isn't the best solution. Some errors can be corrected in future developments. But it is a good contribution to the field of idea management and network solutions to support collaborative work. Idea management is an unstable field, everyday arise some new issue an organisations ask for new requirements. So these kinds of solutions must be adaptable to changes and to future development.

Keywords: *Innovation networks, social networks, idea management, knowledge management, IT, IS, platform, collaborative, network application, idea*

Resumo

Sistemas colaborativos bem como diversos métodos são usados nas organizações para suporte à inovação e gestão de novas ideias. Para reunir informação relativa aos grupos de colaboradores intervenientes nos processos de criação de ideias muitas organizações desenvolveram e usam métodos e sistemas colaborativos especializados.

A palavra inovação é usada para descrever o conjunto de fontes e objectivos que culminam no acto de inovar ou reinventar. Um estudo exaustivo dos processos de inovação actualmente usados nas organizações pode contribuir para a compreensão das características específicas que a organização utiliza para coordenar processos de inovação e gestão de ideias.

Hoje em dia a gestão de ideias e os processos de inovação encontram-se em constante mudança e não existem linhas de orientação rígidas. Por outras palavras, os processos de inovação e a gestão de ideias não se encontram bem documentados. Não existem regras para os processos de inovação que conduzam inequivocamente ao sucesso. Assim sendo é importante definir um pouco melhor essas regras e pensar num sistema abrangente para suportar as necessidades das organizações nesta área.

Um dos objectivos é especificar uma possível arquitectura de informação para um sistema de suporte a gestão de ideias em ambiente colaborativo. Este sistema envolveria toda a rede de ligações que circunda a organização. Esta arquitectura de informação foi desenvolvida com a ajuda da *framework* TOGAF. Esta arquitectura compreende diversos actores, ciclo de vida das ideias e actores externos à organização.

Foi feito um estudo exaustivo das soluções existentes nesta área. As soluções foram comparadas por meio de tabelas. Este estudo teve como objectivo principal perceber que funcionalidades destas soluções perderiam ser reaproveitadas. O melhor de cada solução foi aproveitado e é feita uma proposta para uma aplicação para a gestão de ideias em ambiente colaborativo.

Provavelmente que esta não é a solução ideal, mas é um bom início para um possível futuro desenvolvimento. Nesta área onde todos os dias surge algo novo era importante existir uma base sustentada e abrangente. Com este trabalho essa base foi criada, poderá agora ser desenvolvida e implementada.

Palavras-chave: *Redes de Inovação, redes sociais, gestão de ideias, gestão de*

conhecimento, IT, IS, plataformas colaborativas, aplicações em rede, ideia

Estratto

I sistemi e i metodi collaborativi sono usati nelle organizzazioni per supportare l'innovazione e la gestione delle nuove idee. L'aggregazione dell'informazione relativa all'innovazione da una comunità di collaboratori è un compito non insignificante che richiede l'uso di sistemi e metodi collaborativi specializzati.

Il termine processo di innovazione è usato per descrivere l'insieme delle fonti e degli obiettivi che culminano nell'atto dell'innovazione. Un esame del processo di innovazione è quello designato per consentire una comprensione maggiore delle caratteristiche che le organizzazioni innovative condividono, così come di quelle caratteristiche che mettono gli innovatori a parte dagli altri affari.

Oggigiorno i processi di gestione e innovazione sono in continuo cambiamento e non ci sono forti linee guide che definiscano questi campi. Questo vuol dire che i processi di innovazione e la gestione delle idee non sono ben documentati e ben sviluppati/definiti. Non ci sono molti processi definiti o una regola generale per guidare il processo di innovazione e la gestione delle idee. Quindi è importante definire questi campi e pensare a una applicazione onnicomprensiva che pu conciliarsi con le necessità organizzative in queste aree.

Un obiettivo è la specificazione di un'architettura informativa generica di un'applicazione per supportare la gestione collaborativi dell'idea, comprendendo un network collaborativi di organizzazioni. L'architettura informativa è stata sviluppata in base alla struttura TOGAF. Sulla stessa linea dell'architettura bisogna definire una piattaforma IT/IS per supportare i processi di innovazione centrati sulla gestione dell'idea in network collaborativi. L'architettura informativa sviluppata comprende una struttura informativa di organizzazione, una classificazione, un ciclo vitale e regole di utilizzo.

Durante questo lavoro viene fatto uno studio di tutte le soluzioni esistenti e una comparazione tra esse. Sono stati studiati le architetture e i caratteri dell'applicazione, con lo scopo di capire quale soluzione è possibile utilizzare e quali sono gli aspetti positivi di ognuna. La soluzione migliore viene usata per proporre un'applicazione per supportare la gestione di un'idea collaborativa.

La soluzione ottenuta agile e adattabile, i caratteri cruciali e più importanti di

ogni soluzione vengono presentati nella proposta finale. Le soluzioni di mercato sembrano sempre incomplete, quindi perchè non prendere tra tutte la migliore soluzione? Prendendo i caratteri principale dalle soluzioni esistenti, è possibile avere dei vantaggi, costruire ed avere una migliore soluzione per lavorare con i dati della gestione dell'idea.

Naturalmente non è la soluzione ideale, ma è un buon inizio in una campo dove le cose sono recenti. Nonostante sia una soluzione nuova, può essere velocemente adattata a diversi impieghi organizzativi.

Parole chiave: *Le reti d'innovazione, reti sociali, gestione di idee, gestione della conoscenza, IT, IS, piattaforma collaborativa, rete di applicazione, idea*

Chapter 1

Introduction

1.1 Relevance of the Proposed Theme

Ideas management is a central component of creativity processes in organisations. It involves the generation, collection, development, evaluation and selection of ideas by the elements of an organisation. Idea management isn't simple managing of an electronic suggestion box.

Information and its management are a hard and complex task. Being objective, consistent and strict with all the information that is received everyday is a difficult job. There are some solutions to deal with this problem, but here, the subject is about a little different area, Idea Management in collaborative networks, isn't just information management, it is management of new and fresh ideas that are born inside or outside organisations. These ideas must follow a well defined path/processes to become useful to the future of the organisation.

Design generation ideas in a collaboration discussion environment is a complex and dynamic process. Some design ideas are accepted, others are rejected, many others are modified and combined. The fluent expression of ideas and the ability to interact and build on representations created by others contribute significantly to the idea generation process. Computerised shared development applications support this fluency and interaction, but such tools need to aid not only the developing process but also the management of design ideas during group interaction.

This work focus on a not well developed and undiscovered area, where there aren't so many solutions and where everyday something new appears. This area, Idea Management in collaborative networks, is a new subject that was born some years ago. The organisations realise that it is important to look for new ideas. So, they use every means to improve and develop those new ideas. The organisations have to catch these ideas, so they start using specialised software.

To help the organisations, some software development centres think of some

solutions. But these solutions are always rigid so it's important to think of a flexible solution, that adapts itself to the needs of each organisation.

Creativity management is a crucial topic to consider in the debate about the innovative research department. Against the background of discussions about individual creativity and organisational commitment, it is presented by many authors that the creative process in organisations is a matter of political strategies. The creative individual literally has to sell his/her idea.

Recent research in organisation management studies has shown the relevance of information systems to steer creativity knowledge/ideas exchange among members of the organisation. Information systems can become a leading tool in shaping a community of practise in the organisation, which enables collaborators to share knowledge and to create a link between learning and performance. Thus, creativity is clearly identified with idea generation and learning, and not necessarily with end products or services.

In the past years, much attention has been focused on managing the process of exploiting ideas and progressing them into innovations. However, the process by which organisation's generate these ideas is one which has received significantly less attention and been allowed to develop in an "ad-hoc" fashion. Some articles noted that "innovation" is assumed to be a process with distinct stages stretching from "idea generation" to "implementation". Creativity is considered as that part of the process which leads to, and includes, the idea generation stage in the innovation process.

The simple diagram presented at the Figure 1.1 shows how the idea creation process occurs.

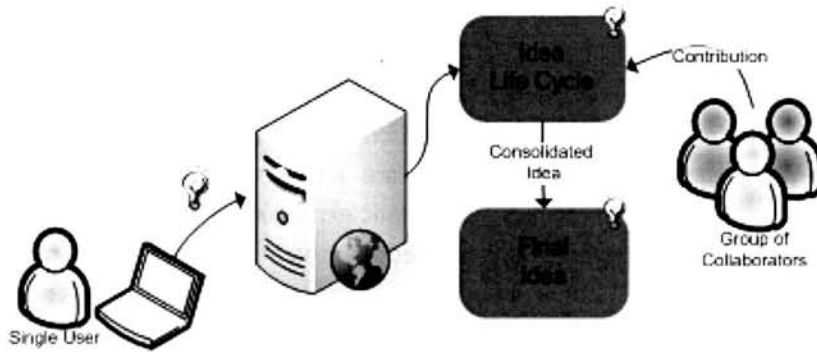


Figure 1.1: Simple Idea Creation Process Diagram

At the daily work, with help or not of an application, a collaborator has an idea and inserts it in the system. Then the system, with the help of the other collaborators, makes a decision about that idea. If the idea matches with the organisation's goals, it's a "good idea" so the idea will be shared with all the company collaborators, and all of them can develop and improve that idea. With the help of the system the idea

will navigate through all places in the company. Using this method everyone can participate on the idea consolidation and evaluation.

The innovation phase of the idea creation process is cheapest than later development stages. Normally the output of idea creation phase is maximised. A large number of higher calibre ideas will be available for exploitation by the organisation. *"Through this greater choice of potential innovations as input for the innovation process, it is probable that the eventual outputs will be more effective and profitable, since increased competition between ideas will ultimately improve the quality of potential innovations being presented to the process"* [25].

1.2 Objectives of this Work

This report aims to present a state review of the creativity in collaborative environment in organisations. The proposed work is focused on a very curious and interesting area, where people, their thoughts and perceptions are taken into consideration. The Idea Management is supposed to involve all departments in organisations and all collaborator's efforts. An organisation is not an isolated island. Organisation needs external providers and collaborators. Interacting with them creates value and new ideas appear. Is important have a methodology to make an efficiently and effectively interaction.

The goals of this work are well defined. Initially is important to look around, make a dedicated and thorough search for existing solutions in this specific area. Doing that, it will be possible to decide if the present solutions are adapted to the needs of the present/future organisation.

The report will present comparable tables with the principal features about the most used solutions by organisation's creativity departments. This review about the scientific and technological state-of-the-art on information systems to support creativity and ideas management in organisations will provide a huge help to decide what is necessary to develop/improve on this undiscovered area. With this thorough research it will also be possible to discover what the present applications can teach to the future applications development. The best of each solution is used to propose a comprehensive application to support collaborative idea management. Most important features, from each current solution, are used on the final proposal. The organisation requirements are analysed and a compilation of what organisation needs is made.

The framework architecture proposal was developed using the TOGAF model. The model can cover four important fields: Business Architecture, Information System Architecture, Application Architecture and Technology Architecture. However joined with this architecture there is another system, which supports idea management in a collaborative network of organisations.

The specified architecture covers a collaborative network of organisations with

complementary and overlapping roles. The presented architecture will be as simple as possible, but at the same time detailed, with all the needs that an application like this one requires. This architecture is a generic view about the application system. It helps to make the system more structural and to refine the original thought about the application. Organisations must recognise the importance of information architecture or else they run the risk of creating great content and functionality that no one can ever find.

However, to develop a new idea it is important to specify an IT/IS platform to support idea management centred innovation processes in collaborative networks. That platform should hold all special needs of the organisation. It should be, as far as possible, flexible and adaptable to every use scenario. The platform that will be presented contains specific terminology in the development area. It will be understandable and simple to everyone with the minimal knowledge in this area.

This report strives to present a structured approach to managing idea generation. The process by which organisations attain these improvements is through innovation. Over recent years, significant research has focused on the issue of managing the process of developing ideas towards eventual organisational innovations.

An application scenario is presented just to easily understand all idea creation processes. In this scenario are involved R&D institutes, a University Documentation Service and a Commercial Company. This part of the work will involve external organisation analyse and research. With properly research and prospect it will be easier to have a comprehensive application. The application scenarios specification is complicated, because each one involved has special needs and requirements. The purposed application architecture provides an infrastructure for the effective management of ideas and their transfer to innovation processes.

1.3 Structure of the Dissertation

This dissertation is organised with six chapters and a conclusion and further work. All the chapters begin on the top page. This will help the reader to read the dissertation.

The first chapter is the present one, "Introduction", in which the context where the work was developed is explained. So, there is a description about INESC Porto as an organisation, and a description about *La Sapienza - University of Rome* as the University where the work was developed. After that, there is an explanation of the relevance of this theme nowadays and its importance in the organisations environment. Then, the specific objectives of the work are presented.

The second chapter is "Creativity and Idea Management in Organisational Networks". This chapter situates and involves the reader in the area that will be talked about in the dissertation. The first section of this chapter is "The Innovation Process in Organisations". In this section it is written how organisations need to use innovation process to increase and improve their core business. The next section is

"Ideas Management as the Entry Point in Innovation Processes?". Here we can find the explanation of how innovation processes have to care about ideas management. Afterwards, there is the section "Innovation Networks as the Natural Context for Innovation Processes". In this section it is presented the idea that innovation processes have to deal with networks and collaborative work. The next section is "The Problem of Ideas Management in an Organisational Networks Context", where it is described how difficult it is to manage ideas and make them develop. The final section in this chapter is "Idea Management as an Information Management and Knowledge Problem". This section contains the explanation of how knowledge and information management are important to improve and evaluate the idea management process.

The third chapter is "State-of-the-art in Information Systems for Idea Management", where there is a history and a revision about the present solutions in this area. After that, the concept of an idea management system is explained in the section "Ideas Management Systems". The next section is "Recent Collaborative Technologies Supporting Organisational Networks", where the few existing solutions to this problem can be found. The final section is "Critical Review and Development Opportunities". This section shows the paths that are available in this area, and the ways which need some development.

The fourth chapter is "An Information Architecture to Support Collaborative Idea Management". In this chapter is described the information architecture to hold a collaborative idea management. The first section is "What is Information Architecture?", there is an explanation of the meaning and the objectives of information architecture. Afterwards, there is a presentation of the reference models in the information architecture. The next section is "Idea Life Cycle", where it is shown the cycle that an idea must make. The fourth section in this fourth chapter is "Information Architecture Specification", where the architecture proposal is specified and followed by a definition of its features.

The fifth chapter is "A platform to Support Idea Management in a Collaborative Network Context". The first section in this chapter is "Functional Architecture", where the architecture platform development is explained. The next section is "Deployment Architecture", where the architecture implementation is shown.

The sixth chapter is "Application Scenario". In this chapter one can find a real scenario with real roles. The first section is "Collaborative Application Involving R&D Institutes, a University Documentation Service and a Commercial Company". Afterwards, there is the scenario specification, with all the features and issues to implement this application. The next section is a little explanation about the scenario; it is like a walk through.

At the end "Conclusions and Further Work". In this chapter all development work is explained. The ideas and work that can be developed after this report are presented. It also opens ways for the future in this field. Here are made considerations about the further work for the presented solution.

The final chapter is the "Bibliography", where all the references used to write and develop the report can be found.

There are also lists of figures and tables, to a easy navigation through the report.

1.4 INESC Porto Presentation

INESC Porto - Institute for Systems and Computer Engineering of Porto - is a private non-profit association, recognised as Public Interest Institution, that has been recently appointed as Associated Laboratory.

"Created in December 1998, after the Porto branch of INESC, INESC Porto is the result of the latter deep restructuring process that began with progressive local specialisation and independence of its different branches, concluded with the creation of a number of new institutions. Presently INESC Porto (the institution) is a legally independent, private, non-profit association, recognised as a public interest institution, appointed Associated Laboratory by the Ministry of Science and Higher Education" [19].

The main activities of INESC Porto are scientific research and technological development as well as consulting and advanced training. Activities are clustered as follows: Telecommunications and Multimedia, Power Systems, Manufacturing Systems Engineering, Information and Communication Systems.

INESC Porto pursues his mission by carefully selecting the areas and forms of activity in which he wishes to promote innovation, internationalisation and socio-economic impact. By establishing a set of strategic partnerships his, INESC Porto achieves sustainability which guarantees his liability.

INESC Porto strategic objectives are:

- Develop science and technology able to compete evenly in national and international standards.
- Cooperate in the training of human resources of technical and scientific quality, encouraged to believe in the national capacities and in the modernisation of the country.
- Contribute to the development of the scientific and technological teaching system, updating and adapting him to the needs of the social and economic environment.
- Facilitate and incubate business initiatives in order to improve its R&D activities and to promote initiative and risk behaviour among its young researchers.

1.5 La Sapienza - University of Rome

La Sapienza - Università degli Studi di Roma was founded in 1303 by Pope Boniface VIII, as a *Studium* for ecclesiastical studies. The University is divided into 21 faculties. There are faculties in every areas of study.

In the Engineering Faculty there is The Department of Computer and Systems Sciences (Dipartimento di Informatica e Sistemistica - DIS). It was established in 1983 as a centre for research and education at the undergraduate and graduate levels. In 2001 it was named after Antonio Ruberti, the eminent scholar who founded it.

The department has strong collaborations that are maintained with researchers in other universities, research institutions and companies, in Italy and abroad. National and European research contracts and grants are routinely acquired by DIS, totalling to about two million euros a year.

Each year DIS publishes hundreds of papers in the foremost international journals and conference proceedings, and its members appear in the program and steering committees of the most prestigious scientific events and institutions. Numerous prizes and awards have been assigned to its members for their scientific and educational activities.

On the educational side, the main goal is to prepare students for professional, research and teaching careers either in universities or in industries and public administration. Starting September 2007 DIS offers a curriculum in Computer Engineering entirely taught in English.

At the present year 2008, the Vatican cancelled a planned visit to *La Sapienza* University by Pope Benedict XVI. The Pope will speak at the university ceremony launching the 2008 academic year, but there are protests by some students and professors.

Chapter 2

Creativity and Idea Management in Organisational Networks

2.1 The Innovation Process in Organisations

Today it is generally accepted that innovation is one of the most important, if not the single most important, drivers to secure long-term growth and future competitiveness.

Many creativity departments are constantly focused on achieving innovation. These innovations must represent a competitive advantage and bring social benefits to organisation. "Typically involves examining the personality traits and styles of individuals, developing an organisational context in which creativity might be fostered, examining systems to see how the systemic tendencies toward stability might be interrupted, to stimulate new actions and/or different activities" [48].

Management theory typically assumes creativity is solely about the creation of new ideas. This is innovation.

The increasing importance of relationships between information, knowledge and IT has encouraged an interest in how organisations operate yet they are relatively under-researched. They are also knowledge-intensive, the work requiring application of considerable knowledge and expertise.

Many authors, how is noted in [39], defend there are three "types" of innovation:

- *Incremental Innovation* - incremental innovation is focused on making small but significant improvements to existing products or services.
- *Breakthrough Innovations* - this type of innovation introduces an existing technology into a new market, a new technology into an existing market or changes the way the offering is delivered. A good example is adding air bladders to running shoes. Air bladders existed in other applications, but it was a new and interesting idea to add them to the soles of running shoes.

- *Game Changers* - this type of innovation disrupts an existing market or creates a whole new market. A good example is the switch from cloth diapers to disposable diapers.

In the innovation process there are four key elements:

1. innovation itself.
2. communication channels by which knowledge of the innovation is transmitted.
3. a temporal dimension tracking the adoption of the innovation over time
4. the social system in which the individual adaptors exist

Innovations are an organisation's improvement when they provide a relative advantage compared with the old ideas/processes. The new ideas must be compatible with the existing business value and they must be understandably to all persons in the organisation.

In an organisation the innovation processes can be split in two different parts. These are the main parts of the process, they are: initiation and implementation. "The split between the two parts is the point at which the organisation decides whether or not to adopt. These two main elements are sub-divided into five further stages" [11].

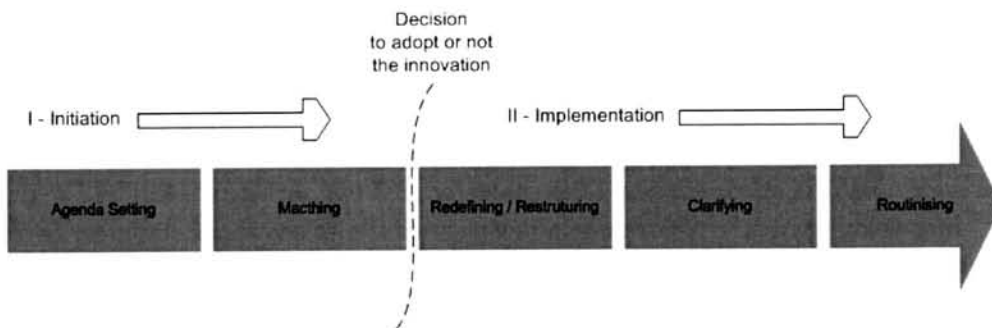


Figure 2.1: The innovation process in an organisation [41]

During the first phase, the *Initiation* phase, management focus on problems and opportunities connected to the potential innovations that match the goals of the organisation. This phase includes information gathering and planning, resulting in a decision whether or not to adopt the innovation. If the innovation is adopted then a second phase will follow (*Implementation*). During the restructuring/redefining tier there is a small window of opportunity when the innovation may be re-invented to achieve a closer fit with the needs and expectations of the organisation. After this period the innovation rapidly becomes part of the routine of the organisation, eventually losing its novelty and innovative character.

Innovations may not occur in isolation but be "bundled" together with related innovations. The adoption or rejection of contingent innovations can only be made following a prior decision.

There are other models that describe the innovation process in a similar way. For example Kwon and Zmud's IS and Cooper and Zmud.

The organisation creative output should be viewed as a result of the interaction between collective individuals with organisation. The knowledge changes are crucial. The available resources to be expended on creativity, such as, the culture and beliefs that exist within the organisation are also a good contribute to idea management.

"Organisational culture will influence the types of processes, tasks and systems that exist within the organisation" [25].

When organisations initiate an innovation initiative it may be perceived by many collaborators as disruptive of their structures. Asking collaborators to contribute creative ideas to the organisation is itself an unstructured task. Collaborators are unsure of what is wanted, creative thinking is a comparatively unstructured process and determining how well you are doing in terms of participating in a creative thinking process is not easy. Moreover, creative thinking generally requires breaking down structures and combining existing ideas in new ways.

As a result, a lot of people choose not to participate in innovation initiatives. And when forced to participate, often share incremental ideas that are far less creative than they are capable of devising.

Human resources are the most important part in a creative process. Organisations are dependent upon the creativity of their human resources. Creative processes are always specific to an individual and his contributions depend on the environment which he is involved in. *"Some authors, highlight that the failure of individuals to reach their full creative potential often relates to the inadequate development of both hemispheres of the human brain" [25].*

"The corporate cultures in many organisations have emphasised a focus on cost cutting, outsourcing, quality and process excellence. This thinking pervades the perspective people have about their jobs, their compensation and their long term success. There is a consistent focus on process excellence, quality and quarterly achievement of market expectations from the management team. This corporate culture presents a significant hurdle for innovation" [33].

Sustainable and long-term innovation is characterised by the organisation having a process and a culture that drives innovation. The innovation process then relies on three cornerstones: idea identification and generation, implementation through idea development and idea management, and finally, the people making innovation happen, the roles in innovation process. These three subjects are related between them how is shown at the Figure 2.2. This kind of organisation is presented in many conferences like the "Seminar on Innovation Processes & Idea Management" promoted by *House of Ideas Seminar* (<http://www.houseofideas.se>), and is

defended by many authors. This three-day seminar provides an in-depth introduction to innovation and idea management, covering the key aspects of the innovation process and providing creative tools for idea development.

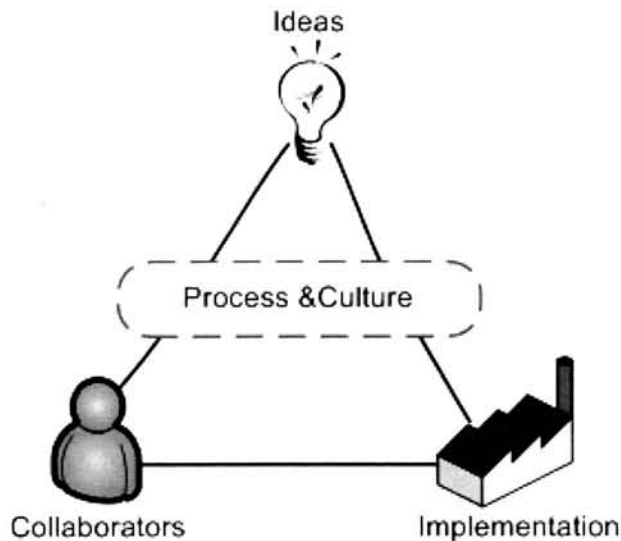


Figure 2.2: Three Point Innovation

Ideas can be born as a reaction to a situation or they can originate as an active action to exploit a new opportunity. Some authors suggest that ideas for innovations can originate from a recombination of old ideas, a schema that challenges the present order, or a formula or unique approach that is perceived as new by the individuals involved.

"An innovative idea therefore can originate from a broad spectrum of sources. Potential innovative sources include customer complaints, corrective action systems, suggestion boxes, supplier developments and benchmarking studies. Various creativity techniques may be employed to flesh out and develop a vague suggestion into a concrete idea" [5].

The creative capabilities of an organisation are essential to its ability to innovate and survive in today's competitive environment. Systems must be in place that are capable of developing and holding concepts and ideas together in a creative balance, without rushing to some premature resolution and yet which protect the concepts "falling between the cracks" of operational life within the organisation [14] and [9].

2.2 Ideas Management as the Entry Point in Innovation Processes

"Innovation ultimately means you keep ahead of other competitors. New technologies and new products provide a organisation with far more business opportunities than

by any other means. To achieve this goal requires the organisation to manage the uncertainties and forge ahead" [20]. Innovation is the most important competitive advantage that enables a organisation to thrive in today's business environment.

Innovation doesn't necessarily imply the commercialisation of only a major advance in the technological state of the art (a radical innovation), it includes the utilisation of even small scale changes in technological "know-how" (an improvement or incremental innovation). There are some types of innovation, namely incremental, radical and architectural. Incremental innovations involve the adaptation, refinement and enhancement of existing products and services and/or production and delivery systems. Radical innovations involve entirely new product and service categories and/or production and delivery systems. Architectural innovations refer to reconfiguration of the system of components that constitute the product. Some authors view innovation as falling into three categories namely technology, administrative and ancillary innovations. They view the potential scope for innovative change as effecting the technology application of the organisation, the interaction between the organisation's social and technical systems and the interactions that occur across the organisational boundaries.

Idea management is a structured innovation process for capturing ideas from across a large group of people - such as organisation's collaborators - and evaluating those ideas in order to identify the most promising.

"Implementing an innovation culture together with an idea management solution requires a significant investment and the software costs are but a small part of the investment" [3]. "The greatest cost is staff time. Idea management is the practise of gathering and evaluating ideas in a structured fashion, with a goal of selecting the best ideas with the greatest bottom-line potential for implementation" [46]. The organisation has to keep the good ideas to future development.

Some authors defend that innovation is defined as the profitable implementation of ideas. It includes three core elements of innovation:

1. ideas
2. implementation
3. profit

A customer should be provided with an innovation that brings more choice than what is currently available. Only with this thought the innovation will succeed. Markets are based on demand for solutions to specific needs.

"Improving the process of making a choice through recommendations is also an innovation" [34].

Few organisations have an "innovation department" and very few organisations have metrics around innovation or systems and processes to support innovation.

Everyday, organisations develop their innovation processes, they use new means to achieve the proposed objectives. These processes are constantly changing, because

there are always new things to develop, so processes must adapt to new required features. Ideas Management is a kind of process. Nowadays, it's not such well defined, but in the near future it will be a casual process like many others inside the organisation.

In many organisations, a product and services teams seek to generate more ideas and evaluate those ideas to create new products and services. While many organisations have well-defined new product or service development processes, few organisations have mastered the generation and management of ideas. *"One of the biggest challenges to becoming more innovative as a organisation is changing the corporate culture to accept and embrace innovation. While many approaches recommend adapting corporate culture to the innovation focus, little information exists on the methods to change corporate culture to accept and embrace innovation"* [33].

Determinants of innovative behaviour, such as leadership and autonomy, can explain the relationship between innovation strategy, managerial control and organisational behaviour but have not yet been applied to examine the differences in various innovation control system's design.

Strategic technology management and project management are focused on decision-making and selection of ideas and projects. Project management is focused on the efficient management of individual R&D projects. On the whole, innovation performance measurement reveals the entire innovation process and its related business process's overall innovation performance.

Of course, not every idea is a good one and many good ones will not bring value to the organisation's core business. Hence, any idea management system must have a means of evaluating ideas, to determine whether or not they would meet the organisation's specific needs.

"The implications of the new understanding of innovation tend to push for a stronger integration of functions across an organisation. Attention must be given to a host of factors: basic research is important, but hardly crucial or even necessary for innovation, communication is key, coordination and integration of decision units are a requirement" [13].

Some years ago, in 2000, PwC (PricewaterhouseCoopers) provided a "Innovation Study". In this study is explained and showed how an idea appears inside of an organisation and where ideas came from. It's presented in this study the "sources" from where ideas can/should show up. The study concluded that the most of the ideas came from outside the organisation, this explains why organisations can't close on themselves.

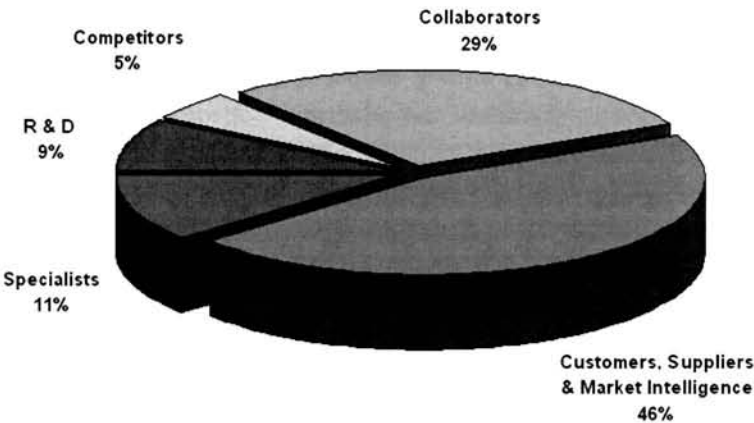


Figure 2.3: Where ideas came from ?

"The term innovation process refers to the key features of inputs to, and outputs from an innovation strategy. It is comprised of several elements: the set of objectives that new products, processes or business routines are designed to address, along with the array of sources, both external and internal, that contribute to their development." [15].

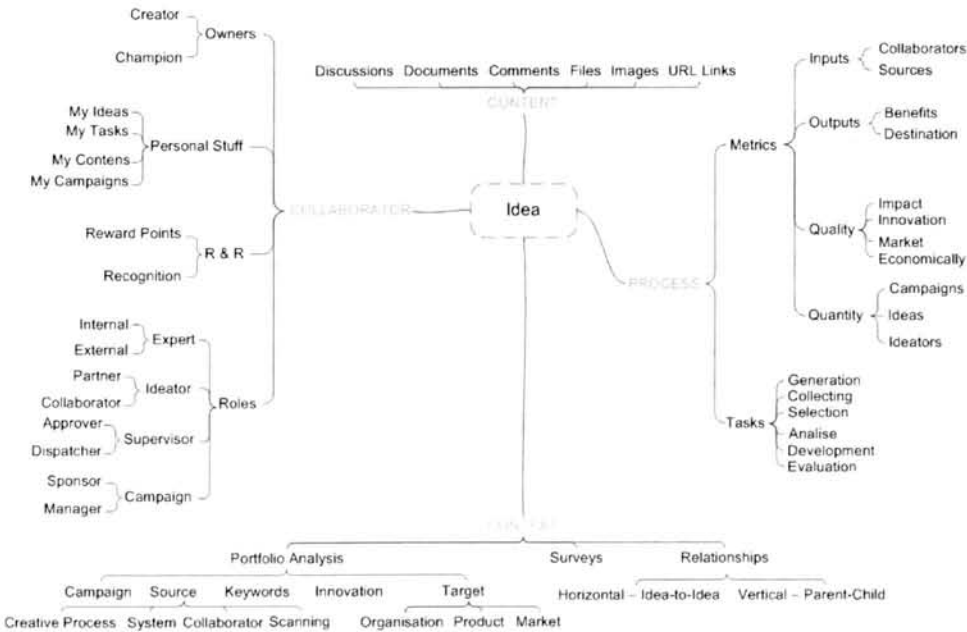


Figure 2.4: Idea Mind Map

On the Appendix A is noted a better view of the developed Idea Mind Map.

Mind maps are artefacts for organising and representing knowledge. Their origin lies in the theories about the psychology of learning in the 60's. A mind map is a diagram showing the relationships among concepts.

Mind maps are used to stimulate the generation of ideas, and are believed to aid creativity. For example, concept mapping is sometimes used for brain-storming. Although they are often personalised and idiosyncratic, concept maps can be used to communicate complex ideas. Formalised concept maps are used in software design. Mind mapping can also be seen as a first step in ontology-building, and can also be used flexibly to represent formal argument.

The Figure 2.4, is a kind of mind map, where are describe the most important terminologies in the idea management and creativity fields. The draw explains how is possible have a comprehensive view of all the terms. By this way, the brain becomes organised on the right way. It is a good help on the idea creative process, as well on the innovation process.

When a group of collaborators have ideas on how to approach the problem, it is possible rank the solutions and select the best approach. Develop the solution or solutions to the problem and select the best solution. During the development process, it's important don't forget to keep the marketplace in mind. Whenever feasible, try to validate the potential solutions with selected, trusted customers. Use them as unpaid consultants to help evaluate the effectiveness and appropriateness of the proposed solutions. Bounce the concepts off them, listen to their responses, determine what improvements they suggest are appropriate for incorporation into the prototype. Once the final configuration has been determined, write out an action plan for trials and for final roll-out. Some organisations, use the same approach as outlined above to establish the roll out plan, including prototyping, selected customer trials and final evaluation. Finally, evaluate the effectiveness of the process the team has followed to get to this point, and incorporate the lessons learnt when do this again the next time.

2.3 Innovation Networks as the Natural Context for Innovation Processes

"Network relationships usually take a relatively long period of time to develop but, once established, they tend to be characterised by mutual interdependence, intensive communication, reciprocity, and high levels of trust. However, occasional conflict and power-asymmetry are not ruled out. The focus of networks analysis is more on the relationships and interactions between interdependent actors or organisations than on these actors or organisations themselves" [17].

The close relationship between flexibility, the combination of technical and organisational change, and the closer co-operation between the organisation and its

customers, reflect that large and medium-sized organisations score higher values at the flexibility index than small organisations. Organisation size is positively correlated with most of the features that characterise the most flexible organisations the higher the propensity to develop new products/services and to do so in order to conquer new customers, especially on the global market. Finally, the importance of organisation size is quite clear in the case where organisational change is undertaken in order to strengthen the ability of the organisation to develop new products and services.

In this world, some outsourced services will become highly commoditised while others will be truly differentiating. Organisations will increasingly look outside their walls not just to reduce costs but for innovation in processes, product and service differentiation to free up resources, transform their businesses, and facilitate sustainable competitive advantage. As supply networks become more global and complex, winning will depend on transparency and reciprocity. In a word: collaboration.

"Collaborative sourcing means more than connecting up systems and writing contracts that align the interests of buyers and sellers. Collaboration entails fundamental changes in how organisations relate to one another how they achieve and sustain trust, share risks and rewards, and respond when expectations are not met" [40].

Innovation means and is change. To make use of changes and innovations in a networked organisation it's important to be able first to find them and then use them in a constructive manner. Finding them is tightly related to the communication of the network, and utilising them is related to the technical background structure of the network.

"Sustainable innovation networks are local, transient cooperation among a small, but diverse set of agents from a wide range of organisations, bringing forward a social and technical breakthrough innovation. Some literature say that the corresponding theoretical aspects of social network analysis and evolutionary economics are rarely mentioned in peer-reviewed industrial ecology literature" [1].

"Sharing an idea, the emergence of global innovation networks" this sentence refers to the truth and unique aim of the innovation networks in the in the field of idea management. The most important job is sharing the idea, and then everything can happen. With this thought every collaborator can contribute to the idea's growth. This contribute is maid through the innovation network.

The traditional process of innovation, whereby a company maintains and funds a centralised research and development department, is gradually being superseded. In its place, organisations from a variety of sectors are seeking ways to desegregate their R&D departments and distribute the innovation process across a network of external partners and offshore sites. This enables them to allocate activities according to the strengths of particular countries and external organisations, and thereby make their R&D processes more effective and efficient.

"While global innovation networks undoubtedly have their advantages, there are also important risks to consider. Unlike many other business processes, R&D is often

considered core to the organisation's identity and exposing it to outside organisations may require a loss of control that could erode competitive advantage. Global innovation networks are also subject to the same management challenges that affect all outsourced operations" [47].

Another key characteristic of the global innovation network is that it involves a variety of organisations. Long gone are the days when one central R&D department could monopolise knowledge and innovative capacity. Increasingly, organisations are outsourcing R&D or forming partnerships with other organisations to share the work and spoils of innovation.

As said before an organisation doesn't act alone. An organisation isn't an isolated island. To improve and learn organisations use external actors, this interaction helps in organisation development. The contact with clients and suppliers provide value creation. With this contact ideas can birth and be developed. It is important that contact processes are defined and adapt to external actors issues and requirements. The Figure 2.5 shows the principal actors that organisation "use" to learn and to improve his own processes. The crucial part is involving the external actors with the idea creation process. Understand the signs from clients, market and society are vital to idea creation success. Idea creation is a multi way process, this means, organisation expects that external actors provide value information to create a good innovation. The external information provided sometimes is the most valuable to all creation process. This happens because the external actors view is more comprehensive. External contributions are made naturally and without pressure which sometimes occurs inside of organisations, collaborators don't have time to think and to explain their ideas. Ideas can come from every external actor that organisation has contact.

All these external contact processes are sensible and delicate, because everyone has his own needs and ideas. Organisation must be as possible assertive and converge all the interests to one common interest. Accept knowledge from almost everywhere it is important filter what really has value to organisation improvement and organisation core business.

2.4 The problem of Ideas Management in an Organisational Networks Context

"Innovation is the way to drive growth in an organisation. Innovation management, what it's called innovate with any purpose, is a structured business process to help people innovate. When talking about "innovation" we are defining innovation as putting ideas into valuable action. An innovative organisation must move ideas from the concept stage to the evaluation stage, through a new product development or prototyping process, and then launch a new product or service" [35].

People are very important in an innovation initiative and in creative processes. Much of the work of innovation is at the "fuzzy front end" where there may not be

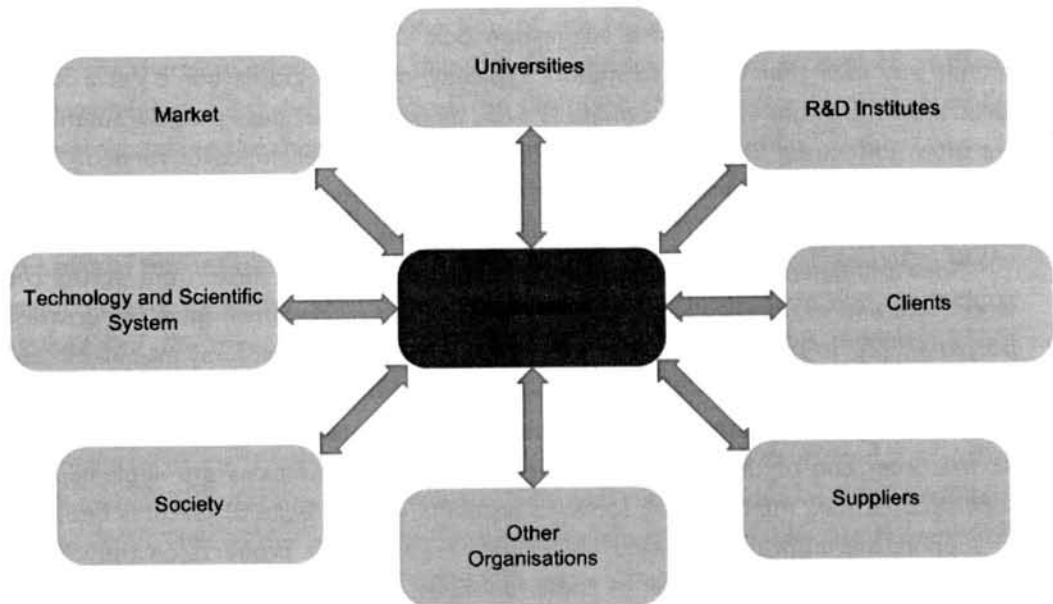


Figure 2.5: Organisation Network Environment

as many clear cut milestones or metrics, and traditional transitional systems can't provide much value. Therefore the people, the process and the culture must fill the voids. However people are normally separated in space, so it's important have applications here collaborators can "meet" and explain their new ideas. This kind of systems should be flexibly as the collaborators need. This application is normally called a Idea Management System.

"Traditional innovation meant creating ideas and fostering the ideas internally, and creating those products internally as well. More and more, organisations are recognising that while they may possess great minds, there are simply more ideas outside the organisation that must be evaluated. Thus the idea of "open" innovation has become a significant topic for discussion" [32]. The problem with most "open innovation" is not the identification of ideas but the establishment of the intellectual property.

Robert Cooper wrote *"Idea generation is everyone's job and no one's responsibility"*, describing how no one individual in an organisation or business unit is specifically in charge of idea generation, and often, when new ideas surface, no action is taken. This lack of action could be due to the absence of a process to evaluate the worthiness of one idea compared to others or, more often than not, to the difficulty of finding the right home for the idea. In order to be successful, the idea management system needs to be implemented in a culture of innovation in order to ensure that the organisation do indeed capture and identify highly creative ideas that can be implemented to become highly profitable innovations.

However, the classical idea management system as described in many books on

innovation is little more than a suggestion box. Collaborators are encouraged to submit any idea that comes to mind. Typically, such programs don't get a lot of ideas after the initial marketing phase is over, moreover, the ideas that are submitted are often unfocused and hard to process and are rarely developed or funded. As a result, the process of extracting value from collaborator's ideas is often inefficient and random. Ideas are only as good as collaborator's ability to make them happen.

"Idea Management is a structured process for capturing ideas from across the work force and evaluating those ideas in order to determine which have the greatest potential" [2]. In smaller to medium sized organisations, the first foray into Idea Management is often a dedicated e-mail address where collaborators may submit ideas. A team typically reviews all ideas on a regular basis and decides which ideas to develop. At the other end of the spectrum, more and more organisations are implementing sophisticated idea management software products with a range of features designed to support the innovation process. Most idea management products on the market today include several, if not all, of these functions:

- Means for soliciting ideas
- Means for capturing ideas
- Collaboration tools that allow people to build or collaborate upon ideas
- Reward tools
- Idea review tools for determining which ideas offer the most promise
- Reporting tools

Most applications which support idea management provide several functions, such as e-mail notifications of new ideas, automatic rewards schemes, creative thinking support and more. Idea management can bring substantial benefits to organisations. Moreover, it is a cost effective approach because it allows you to tap into organisation's own workforce. *"The best strategy with idea management particularly an idea management based on ideas campaigns is to run ideas campaigns on various challenges, ranging from those looking for radical new product and operational ideas to those seeking simple cost cutting and conservation solutions. Add the odd strategic level innovation challenge and you have a well balanced innovation strategy based around idea management"* [4].

In the Idea Management field there are two basic models. They will be presented on the next sections. These are leading models from the field of management of creativity that have been recently published in international journals:

1. The model of Van Dijk and Van den Ende
2. The model of Hellström and Hellström

Both models address the connection of the individual actor and organisation. There are therefore interesting in this area to understanding the process of creativity management in R&D settings. It will be discussed the background of each model separately, taking the theoretical starting points into consideration.

The Creativity Transformation model by Van Dijk and Van den Ende, published in 2002, is an important base model in this area. It can be interpreted as a reaction to the idea of the unilateral relationship between cultural and structural elements. In the model, shown in Figure 2.6, the cultural and structural aspects are two overlapping domains of the organisation. The theoretical perspective of this model is based upon individually related factors and organisational related factors. Van Dijk and Van den Ende's model suggests mutual influence of both factors and elements, with the main focus on the organisational part. The authors have developed a so-called three-step model, distinguishing between "idea extraction", "idea landing" and "idea follow-up". This model is practical and the distinguished variables are recognisable in organisational contexts. As it's possible seen, Van Dijk and Van den Ende stress the mutual relation between cultural and structural factors and the multi laterality of the process. The focus seems to be on the manager, considering terms such as idea extraction.

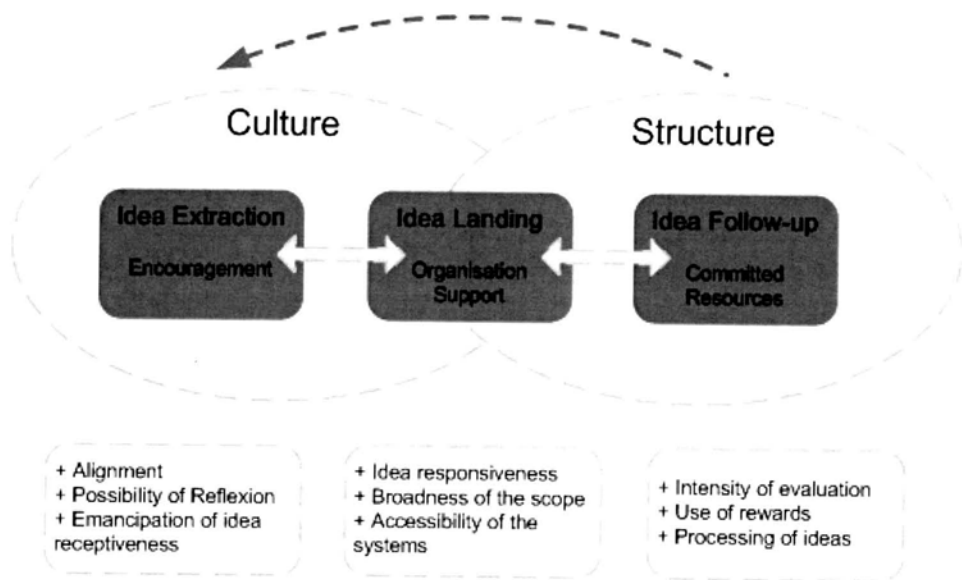


Figure 2.6: Van Dijk and Van den Ende Model

"Likewise, in a critical reaction on the unilateral flow of ideas in organisations, Hellström and Hellstöm introduced a management of creativity process model. The title of their article: "Highways, Alleys and By-lanes: Charting the Pathways for Ideas and Innovations in Organisations" is indicative of their opinion that it is impossible to regard idea processes as unilateral. Based upon an in-depth interview study with 34 members of a large Swedish telecoms corporation, the authors tried to find out how creativity is facilitated in organisations." [18].

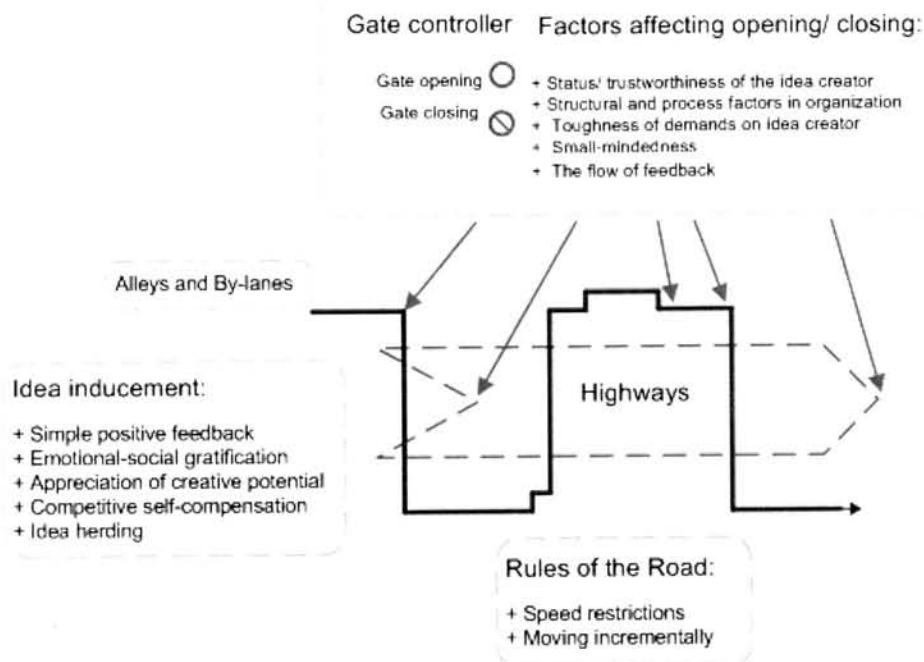


Figure 2.7: Hellström and Hellström Model

In the first model, Van Dijk and Van den Ende, the focus is on the manager, who is presented as an industrial entrepreneur, whereas in the second, that of Hellström and Hellström, there is more space for both the collaborator and the manager, the manager being a road builder, rule-maker and gate-controller, whereas the collaborator is looking for the best routes. It is a way to focus upon the managerial aspect of the organisational-creativity process. However, what is missing in these two models is an indication of how the manager can deal with the tension between creativity as expression on the one hand and creativity as purposeful action on the other hand. Many ideas that arise in an organisational context are hardly free from interpretations, expectations and other experiences that idea creators have developed in their working life these are the people, operating within different organisational cultural contexts, who give meaning to the ideas.

Idea management measurement is a critical discipline for organisation's development. The capacity of organisations to innovate is determined by multiple factors that relate both to their own internal organisation and to their market environment. The task of generating and then converting ideas into usable and marketable products requires high levels of inter-functional co-ordination and integration." *The general observation is that innovation measurement does not appear to take place routinely within management practise and that, where it does, it tends to focus on output measures. This suggests that a large part of the contemporary conceptualisation of the innovation management phenomenon is overlooked in practitioner's measurement*

practises and, consequently, that opportunities for the more efficient and effective management of the innovation process are not realised" [38].

Ideas are complex wholes of interrelated elements that form part of larger wholes. Idea evolution is strongly shaped by the organisational context, in the end not all ideas are equal.

2.5 Idea Management as an Information Management and Knowledge Problem

Information isn't knowledge, this sentence appears in so many books, articles and reviews. The authors say this because when you have information you don't have knowledge.

"Knowledge has been of growing importance in organisations life during the last century, and most organisations depend on knowledge for their existence. Knowledge is both external and internal to the organisation, explicit within the organisation or tacit, resting with its collaborators. There are different forms of knowledge, and knowledge is the intellectual capital of organisations" [23]. This valuable capital can be collected, documented, classified and organised, using a new type of computer software, the Idea Management application.

These days world is called an "information" society, instead a "knowledge" society, why? Is helpful at all distinguish between these terms in the first place.

The information sciences have continually distinguished between information and knowledge. Generally, "information" and "knowledge" are distinguished along three axis:

1. multiplicity: Information is piecemeal, fragmented and particular. Knowledge is structured, coherent and universal.
2. the temporal: information is timely, transitory and even ephemeral. Knowledge is enduring and temporally expansive.
3. the spatial: information is a flow across spaces. Knowledge is a stock and specifically located.

"Information is conceived of as a process, whereas knowledge is a state. Information is elemental and takes up a position akin to energy in the discipline of physics. It is this discovery of the elemental nature of information within a complex range of phenomena that serves as the self-defined originally moment of the development of the information sciences" [44].

Knowledge is an important competitive advantage for any organisation. Increasing competition, continuous changes and mergers in industry have, however, made the risk of losing valuable knowledge, due to transfer or termination of collaborators,

a real problem. Organisations must, therefore, preserve their knowledge base and take steps to utilise effectively both the internal and external knowledge which is of relevance to their operations and make it explicitly available to their collaborators. One way to manage and share this knowledge is to employ for this purpose a computer-based information system, which is a collection of computer software and work processes.

"A good Idea Management system gives more than just the standard Dynamic Knowledge System benefits. It also provides the ideal platform from which to launch further Knowledge Management initiatives. Due to the collection of strategically focused knowledge, and the results produced by the approach, the value of the collaborator's knowledge is enhanced, driving the need for further knowledge management" [12]. This new knowledge needs to be stored and shared around the organisation in an informational Knowledge Management system. As this database grows, people need tools to be able to search and filter through previous submissions. The dynamic nature of the content means, that the process captures both tacit and explicit knowledge from employees. This means that a organisation's true experts are revealed which is a far more accurate basis for Knowledge Management than trawling through e-mails looking for repeated words and terms.

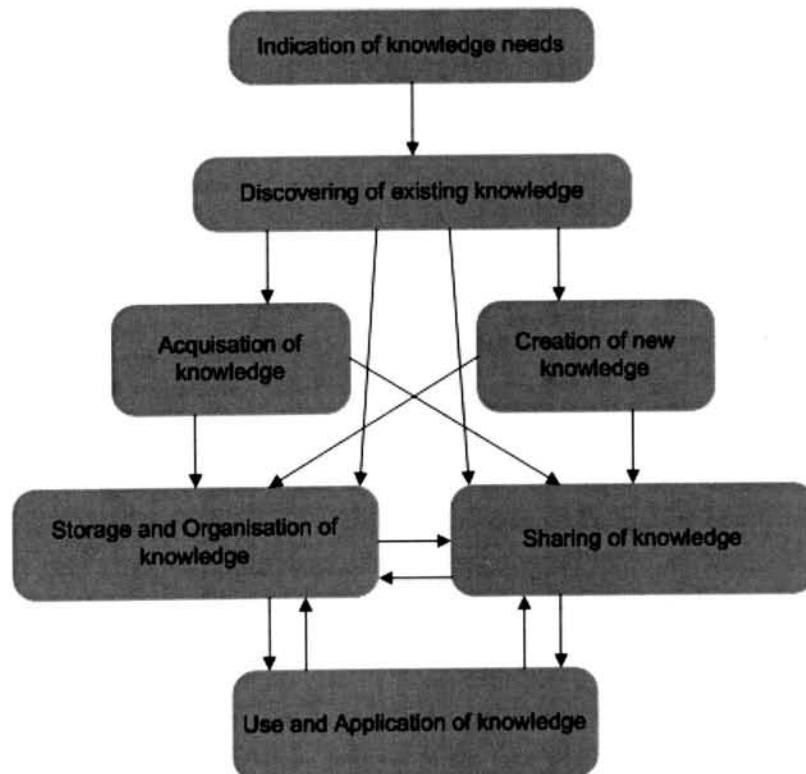


Figure 2.8: Conceptual Framework: Knowledge Management Processes

"Idea Management systems have been around for over 100 years in the form of

stodgy old corporate suggestion box - yet recent advances in technology, and far more importantly, understandings of the underlying processes have rejuvenated this into a must-have corporate tool. A tool that early adopted organisations are using to realise big benefits" [36].

During the last quarter of the 20th century, there has been an increasing focus on the use of knowledge in organisations.

In business, as in so many fields, it helps to know what one is doing. Knowledge is an important asset which individuals and organisations can use to their advantage in our competitive world. Many organisations have realised this and have embraced "knowledge management" as a way to discover, collect, document and organise a knowledge base which the collaborators of the organisation can later retrieve, distribute and use in their individual daily work and in their collaborations with their colleagues. This new environment, the system of people, practises, technologies, and values are even acquiring a new name, the information ecology.

Knowledge management projects focus on [16]:

1. Creating knowledge repositories
2. Facilitating the capture, creation, transfer, use, and sharing of knowledge
3. Managing knowledge as an asset, structuring it, organising it, safeguarding it

The essence of knowledge management is [16]:

1. Connecting people with people
2. Connecting people with information
3. Enabling conversion of information into knowledge
4. Encouraging innovation and creativity

All authors in this area say that there are many ways to look at knowledge. On the one hand, there is the tacit or implicit knowledge resting in the minds of collaborators, such as work experience or contacts with customers. This knowledge can easily become lost to the organisation when collaborators leave, especially if their work is terminated due to a dismissal. On the other hand, there is explicit knowledge which has been documented in some way. This knowledge can be both inside and outside the organisation. Knowledge is internal or external to the organisation and how it can become internalised and made explicit.

These days information management is a big challenge to all organisations. Everyday they have to face new information, they have to use it, to store it, to publish it, to protect it. To do this organisations use some software applications, that help them management all this information.

In all that information, most of times, there is some of it that it's not useful. Here enter the knowledge problem, where it's compulsory know what is important and what isn't. The line that divide, what is important and what isn't, it's a irregular and non well define. Decide what is useful and what isn't its hard job, and not everyone can do it.

Knowledge is taken as the basis for what an organisation does, but it's important to know that creating knowledge can be as important as processing knowledge. A key idea is that some knowledge is tacit and other is explicit. Knowledge creation is the process of making tacit knowledge explicit.

How is said in [21] new knowledge is created by conversion, for example, when personal knowledge becomes public knowledge. These conversions are of four types:

1. From explicit to tacit (internalisation): Organisation learn by acquiring public knowledge. This knowledge is internalised. Organisation obtains general knowledge from books, the Internet, and other public sources.
2. From tacit to tacit (socialisation): Collaborators learn by socialising with other people, exchanging ideas and experiences.
3. From tacit to explicit (externalisation): Personal knowledge becomes public or explicit knowledge through documentation. The knowledge of individuals is collected, documented and classified to be available for re-use by others.
4. From explicit to explicit (combination): Here explicit knowledge from different sources is combined, mixed or connected to create new knowledge, new innovations.

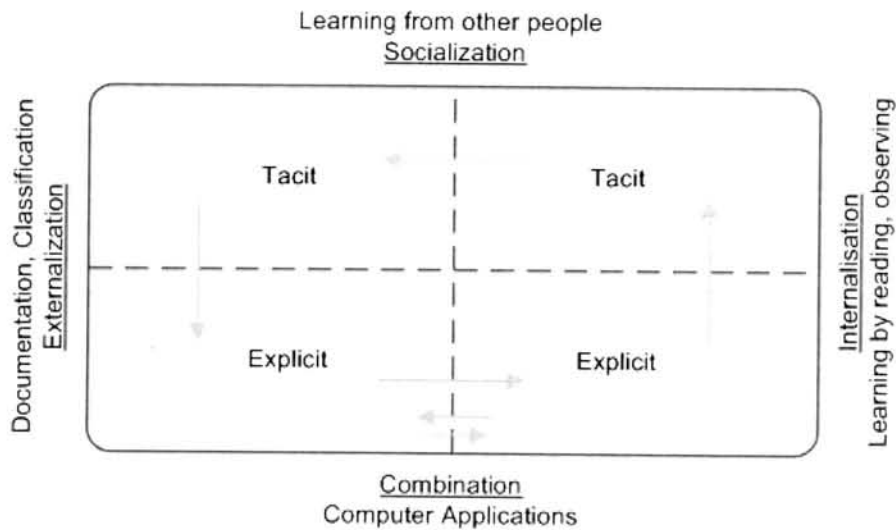


Figure 2.9: Organisational knowledge conversion

Organisations, should select their knowledge management strategy based on their competitive strategy. These systems offer even the opportunity that people participate in discussions, present and challenge ideas, and vote on issues, anonymously, thus creating an environment where the collaborators can be frank and open without having to worry about the various consequences

Chapter 3

State-of-the-art in Information Systems for Idea Management

3.1 Ideas Management Systems

"Some years ago, all the organisations had the traditional Suggestions Box. It was originally a physical box, with a slot in the top, that sat in a suitable location in a building and people physically dropped their written idea suggestions into it. The ideas submitted to the suggestions box were then periodically reviewed by a designated person, typically a member of the administrative staff or the owner of the business or manager of a business unit" [27].

"Recently, developments around innovation practises such as the notion of a stage-gate process lent more discipline and rigour to the process of innovation, and organisations became more sophisticated about the kinds of organisational structures used to assess idea suggestions. With these developments, the modern Idea Management System was born" [27].

"Idea Management begins to answer the question of competitive advantage by simultaneously examining technology and market factors. Ideas about possible market opportunities made feasible by new technologies is often the point where innovation begins. In an all out race to gain competitive advantage over their competitors, managers of leading organisations personally go to great extents to make sure the climate of the organisation for "idea creation" is optimum. They personally sit on review boards, offer monetary incentives, and free collaborators from their day-to-day routine all in the effort to glean ideas that ultimately have commercial value" [30].

To "systematise" Idea Management these organisations often divide their R&D portfolio, and management attention, into multiple "horizons" to make sure they have the adequate investments and talents aimed at the early identification and

maturation of new, promising technologies.

Organisations need to management several processes, papers and information every day. They use these to create and manage new ideas. These ideas born and are developed inside of the organisation. To management them, there are Idea Management Systems. There aren't so many solutions in the market, but the organisations adapt them self's to the existent solutions.

A system like that must be a structured and disciplined approach to managing innovation by putting in place systems and metrics to manage. An idea cross some stages before becomes a real one:

- Idea Generation
- Idea Capture
- Idea Collaboration
- Idea Assessment
- Idea Implementation
- Idea Outcomes Monitor

An Idea Management System manages monitors and implements innovation in a structured way. Although it isn't the only way to approach innovation, it is very appealing to management as it provides structure, discipline and metrics to what may otherwise be a very qualitative and unstructured process.

A well formed Idea Management Systems involves five essential components:

1. A front-end system to capture and develop new ideas
2. A back-end system to define and implement processes for filtering and assessing ideas and decide which ones choose in the first place
3. Organisational structures and an organisational architecture to define the roles, with this the activity is facility
4. IT systems to support and enable all work flow
5. Measures to monitor the flow of ideas through the "idea pipeline" and to determine the business value of the idea generation

The Idea Management System must be simple to use. It's important that the system is able to reach everyone.

"To encourage the collaborators the system should provide modest rewards. If the rewards are too large, there's too much pressure to "get it right" and ideas never surface. If the rewards are too small, people think their ideas and participation don't

matter. The rewards often don't need to be based on money, but on recognition and the opportunity to continue working on interesting things. The system should document and share results. Providing information to the originator about the ultimate outcome and how the idea was evaluated makes the person much more likely to contribute again" [31].

Idea management software tools use one of two models for capturing and processing ideas [4]:

1. Suggestion schemes
2. Ideas campaigns

The first one, the suggestion schemes, seems a simple yet effective approach to capturing ideas from the workforce. After all, collaborators have ideas all you need is a tool to capture and evaluate those ideas. The best suggestion schemes will be transparent, allowing idea submitter to review their own and other ideas as well as comment on ideas. Ideas are submitted directly to the reviewers and no one can see what happens to them thereafter.

The second approach, the ideas campaigns, is based on creative problem solving methodology, an approach to soliciting and generating ideas on demand.

Idea campaign is a five step process:

1. It begins with an innovation challenge based on a business issue
2. Collaborators are motivated to participate and solve the challenge
3. Participants develop ideas in a collaborative environment over a set period of time
4. The most promising ideas are selected and sent to teams of experts for evaluation
5. The best ideas are implemented

"Idea management by ideas campaign is the process of running multiple unique ideas campaigns based around different innovation challenges. An idea management software solution is but one part of a comprehensive idea management and innovation strategy" [4].

Creativity is which results in the generation of new and useful ideas or the combination of existing ideas into new and useful concepts to satisfy a need. Creativity has frequently been likened to a mysterious and powerful process owned by a select and fortunate few. However, creativity is not just the remit of genius, but instead is the universal heritage of every human being. Therefore creative ability is something which is present in every individual and thus can be developed or suppressed.

Creativity is in essence an individual pursuit, which may or may not draw on others for inspiration and validation. One of the proposed methods by which creative

action occurs is thought to concern incubation within the unconscious mind of the individual which then presents the conscious mind with the creative ideas which the individual puts into action. Creative responses are the result of two processes:

- a "new" situation contains elements similar to those of an old situation, thus these elements serve as the basis for generalising the old response to the new situation
- if the new situation is completely dissimilar to previous situations, then the solution is to behave randomly combining various responses in numerous ways

"Problem solving creativity is proposed to consist of the generation of a novel solution to the problem based on one of these approaches. Creativity can be divided into three categories, depending on how it originates. These are normative creativity, exploratory creativity and creativity by serendipity" [25].

There is really only one reason to implement an idea management application: to keep ahead of the competition unless the competition is already ahead of the organisation, in which case the need for a successful idea management solution is critical.

"That may seem a lofty goal for a simple piece of software but it is a very realisable goal. After all, the most effective means of keeping ahead of the competition is to out-innovate them. If you can constantly improve existing products, introduce innovative new products and improve the efficiency with which you manufacture or provide those products, you have a successful recipe for being a leader in any market" [4].

But idea management can also bring smaller, yet still valuable benefits:

- Cost cutting ideas can reduce operational expenses and therefore increase profitability
- Human resource ideas can make working at your organisation more pleasant and therefore ensure your best employees stay in place
- Taking a creative approach to solving problems can minimise damage when things go wrong

The concepts about idea flow incorporate a significantly number of participants. These attributes mean that the culture reinforces the use of such a system and that the organisation has a bias toward action in everything it does. These concepts could not work successfully in an organisation where one must seek permission, but one where initiative is rewarded.

At the same time that the conversion of the Suggestions Box into the Idea Management System companies such as Imaginatik (<http://www.imaginatik.com/>) at 1994 and BrightIdea (<http://www.brightidea.com/>) at 1999 entered the market, allowing companies to capture and process ideas through dedicated software

packages. In addition to these industry pioneers, other vendors have entered the market, such as JPB (<http://www.jpb.com/creative>) with Jenni Software and OVO (<http://www.ovoinnovation.com/>).

3.1.1 Imaginatik - Idea Central Software

Imaginatik is the leading vendor of Innovation and Idea Management technology and services. With over ten years experience spanning over 300 clients.

The key to exploiting a organisation's creative potential is a coordinated approach to the key stages of the Idea Management process. Imaginatik's Idea Central application addresses these stages and takes into account the relevant people issues that are involved in these processes.

Idea Central is a web-based application designed to help organisations maximise the benefits from the creativity, expertise and knowledge of employees, customers, suppliers and other trusted third parties. It focuses the creative abilities of participants to generate, capture and automatically share ideas across the organisation. It provides the necessary tools to achieve the creation, identification and development of good ideas as quickly as possible and to select the best ones for exploitation. Idea Central recognises that these activities are the key elements of effective innovation, and it provides a comprehensive solution to support and measure them.

The application is very simple, the organisation's innovation infrastructure is based around the core Idea Central software, collaboration, evaluation and work flow, and complimented with add-on modules that extend the functionality and use of the system. The software code is common across all customers, allowing all clients to benefit from new releases.

This system has advantages that make it unique in the market:

- Develop innovative products and services
- Continuously improve business processes
- Harness creative talent to achieve corporate goals
- Increase employee motivation by making things happen

The principal features of Idea Central Software are very well documented and all organisations know them:

- Idea Central streamlines idea capture
- Idea Central stimulates focused creative input
- Idea Central is a collaborative environment
- The informal review process

- Idea Central supports an efficient review process
- A private space for the review team
- Idea Central tracks performance
- Idea Central is highly configurable

Imaginatik's software and consulting services have helped organisations discover significant sources of additional revenue, as well as tangible cost savings, process improvements and increased product pipeline. Imaginatik is also committed to developing strategic solutions in the field of innovation, working with academic institutions.

3.1.2 OVO - Incubator

OVO was formed as a division of NetCentrics to focus on innovation and idea management. NetCentrics has over ten years of experience in consulting, business process improvement and technology commercialisation.

OVO has deep facilitation experience and offers a number of practical approaches to generate ideas that can be quickly converted into new products, services or business models.

OVO Tools is a group of software applications that can work independently or together to improve your innovation capacity, increasing the ability to include everyone in the innovation process, reducing innovation cycle time, reducing redundancy and rework, and improving return on innovation.

The applications provide a collaborative framework to enable organisation development teams and business partners to generate, capture, incubate and evaluate new ideas and business concepts.

Incubator is an application from that suite of software applications. It is a collaborative, web-based software application that acts as a repository for organisation's best ideas - allowing the innovative teams to capture, manage, incubate and evaluate their ideas effectively and consistently. It includes a configurable evaluation framework to ensure ideas are evaluated thoroughly and consistently. In addition, this application retains information about ideas and initiatives to reduce rework and duplicate effort.

Incubator helps work groups to manage their best ideas:

- Capture: Ideas from any source can be captured by Incubator. Users can email ideas to Incubator, use a simple web interface to add ideas to Incubator, or use other idea generation tools to generate ideas and import those ideas into Incubator.
- Incubate: In Incubator, a simple idea can be fleshed out over time. Users can add graphics, documents, links and comments to an idea to give it context. Incubator also creates a threaded discussion forum each time an idea enters the system.

- Evaluate: Incubator provides a configurable framework to allow teams to determine what process or groups should evaluate an idea, and what the evaluation criteria should be. Incubator provides for consistent, transparent evaluation of ideas and helps to manage the idea portfolio.

Incubator includes capabilities to help manage ideas in the innovation process, including keyword search and sophisticated filtering in an application that is easy to use and easy to understand.

In resume, this software provides a collaborative works pace where organisation teams can capture, incubate, and evaluate new ideas for innovative products, services and initiatives. Incubator helps identify great ideas, ensures a consistent evaluation framework, and provides one central location for idea management.

3.1.3 TeamSpirit

Organisations are going global and this is especially true for organisations which participate in the global supply chain. To become agile enterprises, these organisations are deploying virtual teams to carry out short and long-term projects.

"Support for group communications in existing Web-based collaboration technologies is limited to discussion forums, e-mail, instant messaging, and Web-based audio/video conferencing tools. TeamSpirit is a Web-based GDSS designed to support group problem solving and decision making with generic problem-solving tools to be used by teams working anytime and anywhere. It is intended to be used by any team members to create their own online meetings supporting group problem-solving processes so that no professionally trained facilitators are required" [29].

The design and structuring of group decision processes have been shown to be an important element if teams, particularly distributed ones, are to succeed. Therefore, an online "meeting" is used metaphorically to represent a group problem-solving process for the specific problem at hand in TeamSpirit Figure 3.1.

A meeting consists of a roster and an agenda. A roster contains a list of users who are invited by the facilitator to participate in the meeting. Every registered user can be a facilitator who can create meetings. The facilitator can assign the facilitator's role to other users. A meeting agenda consists of a list of agenda items representing group activities. Each group activity is supported by one of the group tools built into TeamSpirit. The agenda in TeamSpirit is not static, but is an executable agenda that meeting participants can use to invoke the appropriate participation version of a group tool. The facilitator needs to design a group decision-making or problem-solving process according to the problem or issue at hand and set up a meeting agenda accordingly.

TeamSpirit is designed to support the Creative Problem Solving (CPS) process. Meeting users are classified into two different roles: participants and facilitators. Any user can create a new meeting and become a facilitator of a meeting.

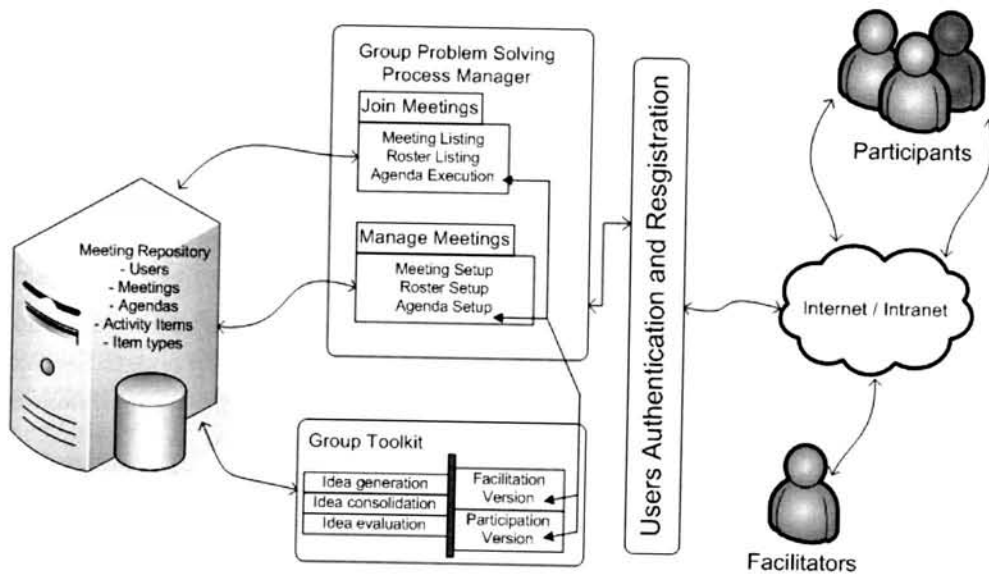


Figure 3.1: The architecture of TeamSpirit

The group toolkit system used to support group activities. The system consists of idea generation, idea consolidation and idea evaluation. The TeamSpirit idea generation tool consists of:

- **Brainstorming** - to generate new ideas. Users can enter a brainstorm session anonymously, semi-anonymously (just the meeting facilitator can see the name of the user) and without anonymity
- **Multi-aspect brainstorming** - in which users can solve problems by studding different views on an existing idea or problem.
- **Discussion forum** - in which users can communicate and collect different ideas.
- **Information sharing tools** - for sharing documents, files, articles and web links.

Since the idea generation phase can result in many ideas, the idea consolidation tool is used to consolidate several user inputs into one general idea and out come. In this case, for example, duplicated items can be merged with this tool.

The idea evaluation tool contains several user tools that help at the evaluation process:

- **Rating tool** - which enables users to evaluate ideas and rate them on a scale from 1 to a defined max value.
- **Ranking tool** - to supply participants with the possibility to rank original idea alternatives.

- **Selection tool** - which may be used to vote on different alternatives.
- **Multi criteria evaluation tool** - used to obtain weighted criteria from TeamSpirit users.

All these tools have two different kind versions. One to facilitate a meeting and one that is used by meeting participants. There is a meeting repository, which is used to store meeting data, such as performed collaborative activities, agendas, documents and user accounts.

The TeamSpirit architecture, with its shared repository as well as reusable components implemented in User Controls in ASP.NET, makes the development of new group tools relatively easy. Therefore, group tools can be easily integrated into the TeamSpirit environment.

3.1.4 IBM/Lotus Software - Lotus Learning Management System

Lotus Learning Management System (LMS) is one of the first Lotus products based on J2EE standards. It is flexible and scalable enough to serve the learning management needs of small organisations or global enterprises. The J2EE platform is a fast and secure foundation for building and deploying standardised, modular client-side enterprise applications. The WebSphere application server, which is embedded into the application, makes the Lotus Learning Management System highly scalable and reliable.

Develop competency-based learning solutions to help increase worker productivity and reduce training costs. The IBM Lotus Learning Management System is a scalable, flexible platform streamlining administration of training programs for both classroom-based and e-learning activities.

WebSphere is IBM's integration software platform. It includes the entire middleware infrastructure needed to write, run, on demand Web applications and cross-platform, cross-product solutions. WebSphere provides reliable, flexible, and robust integration software.

WebSphere Application Server is the base for the infrastructure, everything else runs on top of it. WebSphere Process Server, which is based on WebSphere Application Server, and WebSphere Enterprise Service Bus, provide the foundation for service-oriented architect, modular applications.

Lotus Learning Management System consists of several core components, such as, IBM HTTP Server, IBM WebSphere Application Server, IBM Lotus Learning Management Module, IBM Lotus Learning Management System Delivery Server and Database server. It's possible add optional components, like a FTP server, authoring tool and command line interface utility.

The next figure is showed at the Lotus Learning Management integration feature web page, <http://www.ibm.com/developerworks/ibm/library/i-workplace15/>. It describes how to fit it in an on demand workplace framework.

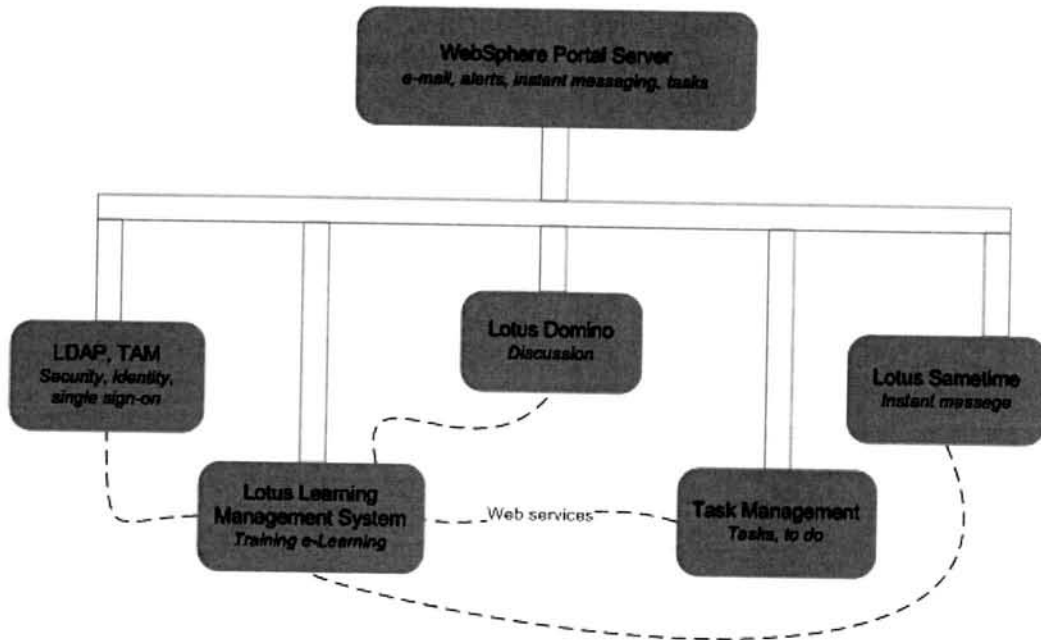


Figure 3.2: Lotus Learning Management System Architecture

The Lotus application has some features that are very important, nowadays, in the collaboration networks for idea management:

- Configurability
- Disconnected Use
- Authoring tool
- Web services support
- Multiple audiences and international customers support
- Built-in Reporting Tool
- Multiple environments support

The application advantages are:

- Curriculum and certification support
- Configurable User Interface supports various user audiences
- Wait lists and notifications via email and calendar posting
- Maintains and delivers content to users
- Tracks student progress

- Users can access the LMS in disconnected mode
- Disconnected client tracks content
- Saved progress upload when user reconnects

3.2 Recent Collaborative Technologies Supporting Organisational Networks

The development of an information system as an ongoing activity in which human relations have to be identified and information flows defined. An information system need not necessarily have a technical component, but when it does, the social system plays a crucial part in determining the way in which the technology is used. Communication through the computer network can provide powerful means of linking a group of widely separated people. These increases participate diversity. In this, the support of work processes in which people do not physically meet or see each other can be provided within collaborative structures.

"The interaction on the collaborative technology supported collaborative space is more focused and structured than in comparable face to face meetings. At the same time the collaborative space itself introduced a new level of complexity into the social interactions. This complexity was related to the technology itself, and the new, somewhat alien environment that it supported. Complexity was also brought about in the new and different ways that relations emerged and different opinions communicated on the collaborative meeting place" [42].

"People adjust their ways of communication and interaction to the technology. Light was thrown on how a media poor technology led to more focused communication in a traditionally messy, politically laden decision making environment on the one hand, but at the cost contextual information on the other hand. These insights point to a more defined role for collaborative technologies in supporting participate diversity" [42].

There are some collaborative software applications to support organisational networks. These technologies are successfully used for many organisations. Applications like these ones help organisations to organise collaborative work processes. When a collaborator participate in some "shared" discussion it's important doesn't need to think in the technical aspects of his contribution, and just think on the contribution itself. By this way, the contribution will be more useful and more effective to the discussion.

There are several types of collaborative solutions. They can be divided in different groups [26]:

- Group Software: These solutions are used, in organisations, for the last fifteen years. Solutions like these are solid in collaboration processes, they give confi-

dence on management work tasks. Because of this, they were the most used solutions in the past years.

- **Collaborative Environments:** Application like these ones are a new generation in environment work solutions. They are web based and have really low implementation cost. There are two different kinds of features, asynchronous and synchronous functionality.
- **Communication:** Is the main word in collaborative applications. Only with efficient communication proceeds its possible has a effective collaborative work. Every collaborative work environments should/must use a communication solution to facilitate the collaborators "conversation". There many communication solutions, like, mailing-list, e-mail services, chat, instant messengers and audiovisual conferences.
- **Documents Management:** These solutions help the processes of storing, sharing and validating documents, files and media in an organisation. They work in an asynchronous way, that is a important help at the collaborative work inside an organisation.
- **Knowledge Management:** Very important applications when the collaborators are separated in space. These applications are directly used to help collaborators to find resources, earn time and money on the field of knowledge reuse. Organisations use these solutions to search and recover large quantities of knowledge.
- **Content Management:** Application like these ones, merge different kinds of systems. There are some examples, like, image processing and treatment, document electronic management and companies web pages.
- **Coordination:** These solutions are projected to earn time and money. They are developed to information processes optimisation, such as, shared agendas, tasks management and work flow management.
- **Point-to-Point Connection:** There are some point-to-point solutions in the market, but they aren't very popular because these kinds of solutions require software installation on the client side. The modern organisations tend to use web applications, because of this, these kinds of solutions are a little bite "out of order". These applications are made to work in small collaborative work groups. The point-to-point architecture, is very simple, every collaborator is connected to other collaborators without the existence of a server connection in the middle. This solution isn't economic, because it's necessary reply the data in every single collaborator.

Efficient sharing of knowledge is crucial in the building of knowledge work team. The importance in developing appropriate collaborative technologies to be embedded in the knowledge generation and sharing processes has been often undermined for the successful launching of Knowledge Management solutions.

"The type of collaborative technologies and environment required depends on the nature of the business" [24].

Collaborative networking explains the strategic, organisational and human impact of technologies that support knowledge: the Internet, Groupware, collaborative technologies. It shows how they can transform organisational practises and help to improve both individual and team performances. Based on proven experience and includes customised toolkit, cases and action plans. From pooling expertise on a sales bid via computer referencing, to improving customer service using the flexible office. Knowledge management is the big management idea currently influencing organisations, and Collaborative networking explores the global impact of sharing knowledge and expertise. Collaboration and team working can be enhanced through knowledge networking concerned with people.

There are some collaborative platforms to support organisational networks. The follow sections describe the most significant ones. The descriptions are originally based on the provided information by the application developer's website.

3.2.1 FirstClass Intranet Server

FirstClass offers a cost-effective and powerful solution for both education and corporate organisations that provides all the tools for managing a communication and collaborative solution. The flexible design of FirstClass allows each organisation to choose how best to utilise the system and customise it to meet their unique needs, resulting in a variety of compelling industry solutions. There are two different solutions, FirstClass for Education and FirstClass for Business.

The first one, FirstClass for Education, enables schools and districts to connect all key stake holders within the education framework - including students, teachers, parents, administration, and alumni - within a secure online environment. The second, FirstClass for Business, facilitates and enhances communication, collaboration and knowledge sharing by connecting all stake holders across an organisation's core community including collaborators, customers, partners, and suppliers within a secure online environment. FirstClass brings together a variety of popular technologies within a fully integrated suite of applications that is cost-effective, flexible and easy to manage.

Website: <http://www.firstclass.com> **Developer:** Open Text Corporation

3.2.2 teamspace

This solution, teamspace, is very versatile and can not only be used in single teams on the Internet, but also as an own Enterprise Server license or an own Enterprise Portal on a separate server or in a organisation's intranet. Optionally available in your own design, with customised features or interfaces to other applications. It is a leading groupware system for international web based collaboration and virtual teamwork. Is available in three different versions, Online Service, Enterprise Server and Enterprise Portal.

The teamspace Online Service is the easiest and fastest start into virtual collaboration. It's possible rent single spaces on our Internet servers for individual projects and work groups directly and in appropriate length and size. It is ideally suited for beginners and small teams and companies and is ready for use at once. Graphical and technical adjustments of the teamspace software are not possible in this offer, as are installations on separate servers.

On top of using the Online Service by licensing single teams, it's possible also use teamspace as an own installation in form of an Enterprise Server license. The organisation then gets unlimited teams and memberships and only pay for the number of different users you have overall. Besides the financial advantages this offers, organisation will also be able to uniquely adapt teamspace to meet organisation's needs and organisation's work flows on a customised basis. Enterprise Server licenses can be installed on a teamspace server or on a separate server on the Internet or organisation's Intranet.

The teamspace Enterprise Portal is an integration of Internet portal, an own Content Management System and a teamspace Enterprise Server. Thus the Enterprise Portal is a complete solution for companies that need a protected and flexible information system on the Internet and want to offer single task forces individual secluded team rooms at the same time and within the same system.

Website: <http://www.teamspace.com> **Developer:** 5 POINT AG

3.2.3 Basecamp

Basecamp's flexibility makes it a great match for all kinds of groups and businesses. And while organisation's projects and purpose may be different, the goal remains the same: To allow collaborators to easily track and organise all aspects of a project or team effort in one place. There is a free plan for a single project management. It's a web based collaboration featuring task assignment, threaded message posting, scheduling, tracking time and file sharing.

This solution can be used for many different proposes. Many areas can take advantages in the use of this solution, such as, web designers, architects, study groups, recruiters, theatre groups and even musicians. This happens because Basecamp is a versatile and flexible application, that can be adapt to almost every develop environ-

ment.

Website: <http://www.basecamphq.com/> **Developer:** 37Signals

3.2.4 Clearspace

Clearspace is enterprise collaboration software built from the ground up for teams, organisations, and communities looking for an easy and productive way to work with each other - without time or location limitations. Eliminate redundant conversations, meetings, emails and ideas by opening doors to new co-collaborators, partners and customers.

The best ideas don't all reside conveniently within a single department or business unit. And even the very best ideas benefit from vigorous discussion and debate. Clearspace provides a platform to capture and retain the rapid-fire exchange of ideas and opinions that drive innovative development across entire organisation. Overworked and understaffed, IT organizations struggle to keep up with the myriad technical support issues that exist in every organisation. Clearspace gives the end-user an alternative to the trouble-ticket. A searchable library of issues and solutions rated by relevance and quality and a way to ask questions that fellow collaborators can answer.

Clearspace gives the platform to drive value into these networks. Engage organisation's collaborators, connect with customers and partners. A connected organisation is a productive organisation.

Website: <http://www.jivesoftware.com/products/clearspace> **Developer:** Jive Software

3.2.5 Caucus

Caucus is an open source, web-based e-learning and discussion platform. It is used in universities, non-profits, and organisations wherever learning, conversation and coordination must happen together. Flexible and free, Caucus is easy to install and easy to evaluate.

This solution is about conversation and education and where they meet. It is not about real-time chat or video conferencing. It is about convenience: learners use it at any time, from any place. It's about keeping a history of lessons and conversations that are at once easy to use, to keep up with, and yet easy to structure and find things in. Of course, Caucus can be used anywhere that collaborators need to coordinate their conversations. It's especially powerful for distributed groups of people that need to share information, track the history of an issue or reach consensus.

Organisations use Caucus through the web browser on their computers, connected over the Internet or Intranet to the host. Caucus supports all modern browsers on all computers.

Website: <http://www.caucuscare.com/> **Developer:** CaucusCare

3.2.6 Collanos Workplace

Collanos Workplace provides a range of tools and features that can streamline any dispersed organisation team's collaboration efforts, allowing members to get on board instantly.

It's a free peer-to-peer project management solution that integrates all project-related content in a single work space. It provides real-time or asynchronous discussions, instant messaging with collaborators and instant updates notification to collaborative team.

Collanos Workplace is built on peer-to-peer technology, similar to popular music sharing networks. The solution stores the data of shared work spaces securely on the computers of all participating team members. Collaborators can even work from behind firewalls thanks to a special relay service that helps routing traffic in these situations. All the communication between collaborators is encrypted and transmitted securely.

Website: <http://www.collanos.com/> **Developer:** Collanos Software AG

3.2.7 FacilitatePro

FacilitatePro provides support to the group decision making process with tools that facilitate brainstorming, idea generation, organisation, queued and consensus development.

This application has important features, such as, idea generation, queued, decision-making, surveying and action planning tools that transform meetings into powerful opportunities to unleash creativity, engage collaborators, solve complex problems and take decisive action. Accessed via a standard web browser, FacilitatePro tools can be used in meeting rooms to improve group productivity or to support a teleconference, video conference or web conference. They are equally effective in an asynchronous setting, where participants can use the tools to contribute to an ongoing meeting at their convenience simply by accessing the web address of the shared meeting room. The participant interface is so intuitive that no training is required.

Website: <http://www.facilitate.com/> **Developer:** Facilitate.com

3.2.8 GoLightly

GoLightly's community software gives you powerful enterprise-level capabilities, and puts the latest online networking and communication tools into the hands of the constituents. As a fully integrated and robust suite of Web 2.0 tools, GoLightly provides organisation with a platform to grow with so managers won't have to work with multiple vendors. This solution allows collaborators, to increase engagement, communication and efficiency as well as capture and share knowledge.

Software services, like, software accessed via the Internet through an application service provider, allow the organisation to focus on organisation's core mission,

while leaving software development, maintenance and management to the application service provider.

Website: <http://www.golightly.com/> **Developer:** GoLightly, Inc

3.3 Critical Review and Development Opportunities

The presented applications are recently and are in constantly development. This happens because Idea Management is an area where surge something new every day. So the software applications that support this special environment are constantly changing. Every six months is released a new version so organisations must adapt also to the new features.

Imaginatik has released the *Idea Central v4.0* recently. This version has some features that significantly redesigned user interface, which include many features to improve user and administrative navigation through the software. Administrative control over the program has also been increased allowing unparalleled flexibility in customising Idea Central Events to individual needs. Combine that with some Security and Performance upgrades.

With idea management being such a new technology, it's important to select a system that is based on solid research into human factors issues - like identifying the best practises for encouraging collaborators to share their best ideas. Imaginatik's *Idea Central v4.0* is such a system. It's highly configurable options and extensive work flow capabilities make it easy for innovation managers to configure and manage idea generation campaigns with a minimum of effort.

Imaginatik has put a lot of thought into "human factors" - the quirky ways which people interact with software and each other in collaborative environments. This is evident in the three options that Idea Central gives collaborators to identify themselves when submitting a new idea:

- Show my name: With this option, the employee's name appears along with their idea submission
- Hide my name: Some of the best ideas may be political or controversial in nature, or may adversely affect people in other departments of the organisation. Recognising this, Idea Central's developers designed the system so that collaborators can submit ideas anonymously
- Hide my name unless it is requested and I accept: This is a hybrid option where the idea starts off as an anonymous idea, allowing for fairer evaluation, and the review team can ask for consent to find out the identify of the author

According to Imaginatik Research (http://www.imaginatik.com/webdoc_idea_reports_imaginatik), anonymous ideas are 67 percent more likely to be implemented. Fewer high-quality ideas tend to be submitted if an "anonymous" option is

not offered. In addition, 95 percent of collaborators are willing to have their identity disclosed at the proper time, which suggests that this feature appears to inspire a higher level of trust among employees, and makes them more likely to share their high potential but controversial ideas.

The application, *Idea Central v4.0*, has peer review feature encourage collaborators to build upon each others ideas. This is a critical part of the process of generating high-quality ideas, because many ideas aren't fully thought through when submitted.

Idea Central v4.0 also includes some valuable security features. The system can be configured to be completely open, anyone can view and comment on any ideas, or relatively closed (to enable strict control of invention disclosure). System administrators can also set up an "idea embargo" which falls somewhere in between these other two options. In other words, newly submitted ideas cannot be viewed by other collaborators for a certain number of days. This feature, along with other security tools, allows companies to use Idea Central for invention disclosure and the development of trade secrets.

The development of TeamSpirit allows to collect research data and to add features quickly to support a new line of enquiry. Systems development research is an evolving process. The TeamSpirit architecture, with its shared repository as well as reusable components implemented in User Controls in **ASP.NET**, makes the development of new group tools relatively easy. Therefore, group tools can be easily integrated into the TeamSpirit environment.

"One enhancement to TeamSpirit is to allow users to add comments to their ideas and to provide rationales behind their votes. Another new feature will be to allow a facilitator to incorporate graphics as part of a brainstorming triggering question, thereby allowing TeamSpirit to be used in collaborative design" [29].

OVO Innovation has set its sights upon creating a suite of applications that will cover the life cycle of an idea from its generation to product launch. *Spark* is the organisation's web-based brainstorming tool for distributed brainstorming, while *Incubator* is an idea repository and management system that integrates with *Spark*.

Incubator is a web-based application is the idea repository and management system, and can import ideas from a variety of sources, including Spark brainstorming sessions, Excel spreadsheets, mind maps, e-mails and web forms. Here are some of its capabilities:

1. Edit idea
2. Tabbed interface
3. Notifications
4. Discussion forums
5. Idea connections

6. Idea evaluation

Incubator has been designed with "visual aids" that enable collaborators and participants to quickly see an idea's status.

Incubator is well-designed applications that enable facilitators to set up a customised flow through the innovation process. It's given OVO a lot of credit for extending enterprise idea management into some creative and highly useful areas, such as visual mapping of idea relationships, and colour coding tabs to help users quickly discern the status of ideas. Flexibility appears to be built into many aspects Incubator, which makes it easy for the collaborator to customise the applications to fit their existing innovation processes and evaluation criteria.

On Appendix B are presented comparison tables, where are made a functionality compilation and comparison between all collaborative technologies to support organisational networks presented before.

Chapter 4

An Information Architecture to Support Collaborative Idea Management

4.1 What is an Information Architecture?

Today, every business has an information problem. Some organisations have clearly defined positions for Information Architects, who play leading roles in development processes for everything from file systems to product architecture.

"Organising functionality and content into a structure that people are able to navigate intuitively doesn't happen by chance. Organisations must recognise the importance of information architecture or else they run the risk of creating great content and functionality that no one can ever find" [22].

The most common problem with information architectures is that they simply mimic an organisation's organisational structure. Although this can often appear logical and an easy solution for those involved in defining the architecture, collaborators using systems often don't know or think in terms of organisational structure when trying to find information.

Information architecture is the term used to describe the structure of a system. The *Information Architecture Institute* [22] defines an information architecture as the art and science of organising and labelling websites, intranets, online communities and software to support usability.

Effective information architecture comes from understanding business objectives and constraints, the content, and the requirements of the people that will use the site/platform/software. Information Architecture is the practise of structuring information, knowledge or data, for a purpose. These are often structured according to

their context in user interactions or larger databases.

There are two main approaches to defining an information architecture. These are [22]:

1. Top-down information architecture - This involves developing a broad understanding of the business strategies and collaborators needs, before defining the high level structure of site, and finally the detailed relationships between content.
2. Bottom-up information architecture - This involves understanding the detailed relationships between content, creating walk troughs to show how the system could support specific user requirements and then considering the higher level structure that will be required to support these requirements.

Both of these techniques are important in an application development. A project that ignores top-down approaches may result in well-organised, findable content that does not meet the needs of collaborators or the organisation. A project that ignores bottom-up approaches may result in an application that allows people to find information but does not allow them the opportunity to explore related content.

Information architecture can be described using this diagram [22]:

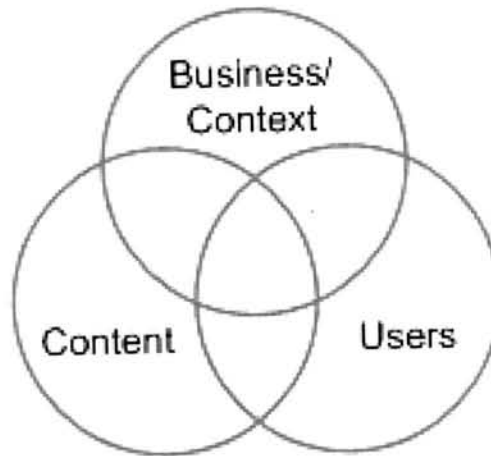


Figure 4.1: Creating an effective Information Architecture

- Users

An effective information architecture must reflect the way people think about the subject matter. There are some techniques for getting users involved in the creation of an information architecture. These techniques are: card sorting and card-based classification evaluation.

- Content

The most effective way for understanding the quantity and quality of content proposed for a system is to conduct a content inventory. Content inventories identify all of the proposed content for a system, where the content currently resides, who owns it and any existing relationships between content. Content inventories are also commonly used to aid the process of migrating content between the old and new systems.

- Business/Context

Before developing an information architecture is important have knowledge about the environment that surrounds the organisation. It is important understand the organisation's business objectives, politics, culture, technology, resources and constraints.

Information architecture is most commonly associated with websites and intranets, but it can be used in the context of any information structures, computer systems or software applications.

All the applications have the aim to be scaleable, personalised, and customisable with dynamic interaction, which usually involves a mix of onsite content creation. Integrating the complexity of these requirements into a single user-friendly interface is difficult at best.

- Scaleable is a polite way to say no one knows exactly what content will be included, so the application needs to be flexible to expand to house unknown amounts and types of information.
- Personalization requires an intelligent back-end to filter demographic information and track user preferences in order to provide content that is relevant to an individual user.
- Customisation, on the other hand, is what users do to set their own preferences for an application experience. Building interfaces that are modular enough for a user to customise is extremely difficult and setting a structure so that a user can select what he or she wants is even more difficult.

In addition to these difficulties, there are standard issues, such as, understanding and defining the target development group. Some times is important don't show others collaborators activities.

It simply isn't good enough for organisations to build functionality or write content, put it on their computer systems and expect people to be able to find it. Developing an effective information architecture is an essential step in the development of all computer systems.

Effective information architectures enable collaborators to quickly, easily and intuitively find content. This avoids frustration and increases the chance that the user will return to the system the next time they require similar information.

4.2 Information Architecture Reference Models

"A reference model is an abstract framework for understanding significant relationships among the entities of some environment, and for the development of consistent standards or specifications supporting that environment" [43].

A reference model should be a description of a domain used to compare with existing designs and implementations. It is a basic description of a field and provide a structured approach to design new systems and compare them with existing ones. The transition to a new application is also helped with the design of a reference model.

"As an illustration of the relationship between a reference model and the architectures that can derive from such a model, consider what might be involved in modelling what is important about a software application" [6].

"Reference models are an aid towards standardisation, but are not standards in themselves. A premature effort to standardise may inhibit innovation, while hypertext reference models may lead in the right direction, helping to integrate them into a general understanding of what constitutes the hypertext field. Furthermore, reference models are not full formal models: they aim to model only common features of different systems, present and future, and do not specify any of them in full. Therefore an reference model is by nature incomplete and general, explicitly leaving provisions for the detailed specification of each system" [7].

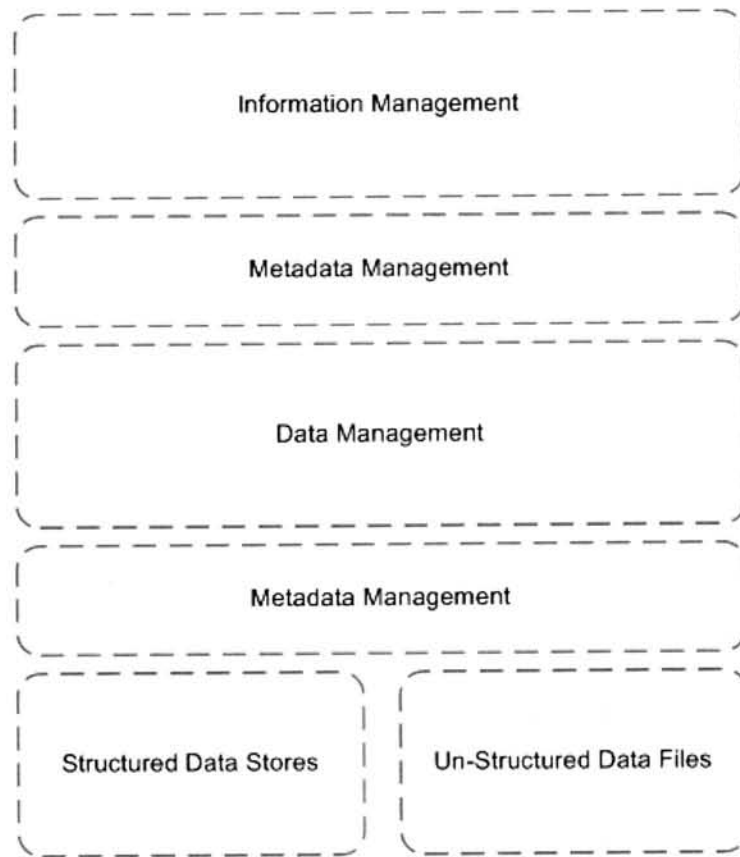


Figure 4.2: Information Architecture Model - First Approach

This first option, for a reference model to information architecture has five levels. Each level is a different work area. The first level is "Information Management", in this layer is the main activities are data discovery and data retrieval. These activities are complemented with other three, such as, search engines, interface engines and file retrieval. The next level is "Metadata Management". Metadata management is the activities associated with ensuring that metadata is properly created, stored, and controlled so that inconsistencies and redundancies are removed. So, in this level it is named conventions, indexed methods and registry. There are some taxonomies, vocabularies that are defined also here. The follow layer is "Data Management", data management comprises all the disciplines related to managing data as a valuable resource. At this time the data is standardised flowing existent methods, there are some format standards that it is possible to use. Then, appears another metadata management level, at this time it should be possible do file labels and a logical data model. The last layer, is divided in two different cells. One is "Structured Data Stores", some examples, databases and data formats. The other is "Un-Structured Data Files", such as, file servers and repositories.

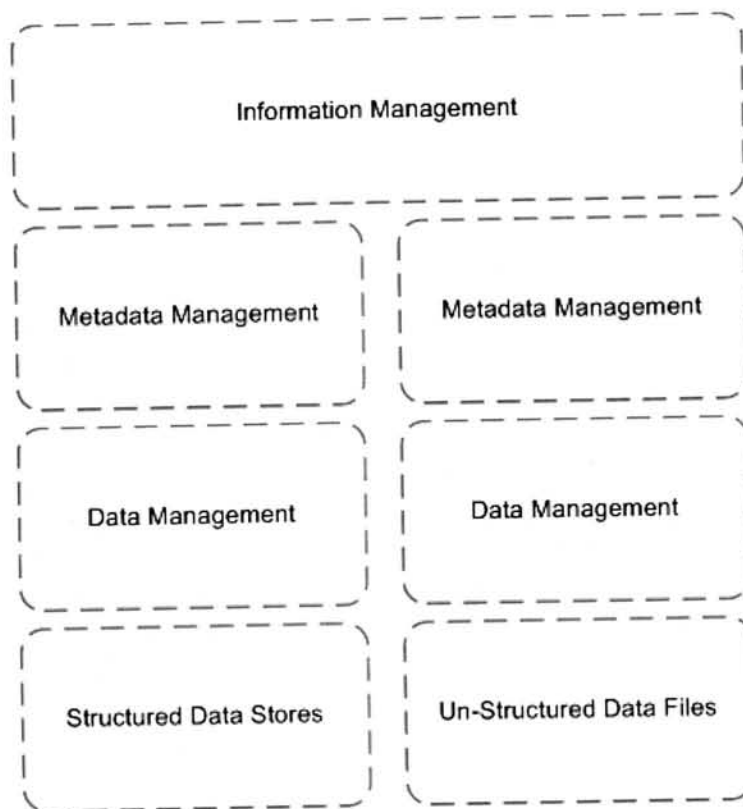


Figure 4.3: Information Architecture Model - Second Approach

This second model is a little bit different from the first one. They have more or less the same layer, but they are organised in a different way. This doesn't mean this model is best or worst than the first, they are different approaches, just that. The presented model is divided in four layers. The first one is exactly the same as the previous model, it's called "Information Management". The follow layer is "Metadata Management" has also the same name, as showed in the first model, but with a different configuration. Now this level is divided into two cells, and each one deals with different features. The features are the same, but they have a more specialised mean to solve them. The next layer is also divided in two cells. But this time each cell has different tasks. One cell, the "Data Management" deals with the data standards and middleware problems. Instead, the other cell of this layer, "Document Management" is designed to deal with vaults, format standards and control changes. The last level is divided in two cells, just like the previous model. The "Structured Data Stores" are for example, databases or data warehouses. The other, "Un-Structured Data Files", such as, web servers and repositories.

Both the above Reference Models are valid options for an Information Architecture Reference Model. They are being developed by the GEIA Homeland Security and Defense Information Interoperability Committee - (<http://www.geia.org/index.asp?bid=1207>)

4.3 Idea Life Cycle

Innovation is focused on innovation automation via the use of process and technology. The technology of innovation management takes the view that this technology should support a specific innovation business process.

There are two styles of innovation on the idea life cycle management process:

1. Top-Down or strategy driven innovation
2. Bottom-Up or idea driven innovation

Idea Life Cycle management is a formal process for managing the life cycle of ideas in an organisation from generation and conversion to realisation and exploitation in the marketplace. It is a key part of innovation performance management.

Some authors believed that the performance of Idea Life Cycle Management (ILM) is improved by a formal process of idea qualification. *"The idea management process is used to refine idea content and convert the idea into a business opportunity, but then criteria must be applied to qualify the idea and justify further investment to realise the value of the idea in the marketplace"* [28].

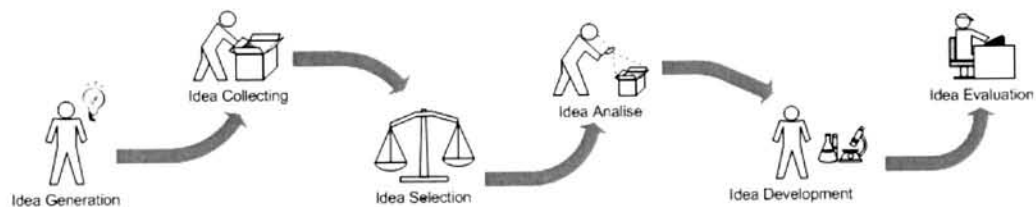


Figure 4.4: Idea Life Cycle Stages

This simple representation, Figure 4.4, shows how idea life cycle stages are linked between them. The cycle should have, as possible, well defined process to be successful. On each stage there are different objectives, and at the end, the final idea, will be a really improvement to organisation's core business. Then are explained the idea life cycle stages. Each one of the stages has several process involved. External contributions are welcome. It is important the participation of Suppliers, Clients and even R&D Institutes. Their participation provides a comprehensive innovation process and the birth of a useful idea beneficial to all participants.

1. Idea Generation

In the beginning of any new activity, business or problem any collaborator have one main idea. This idea can rise from anything, a colour, a commercial, a move seen in the street. Basically almost everything can cause a new/fresh and good idea. The collaborator just needs to be careful about things that are around him/her. Interact with others, receive information from external organisations and make a environment change can also origin an idea generation.

2. Idea Collecting

Then the collaborator should make his/her idea well-defined. What features should his/her program/process idea must have and must not have. Any idea is a complicated thing and the collaborator should clearly know what you really want. Map out everything about the idea. It is necessary collect contribute from every employers/collaborators by this way everyone can participate in the idea elaboration.

3. Idea Selection

After collect all the comments and improves about the idea, it's time to put the idea in a higher level and compare it with the objectives, core business of the organisation. This idea's selection it's made, not by the person/people who created the idea, but by the organisation leaders and marketing/sales department. They decide if the idea is incremental good to organisation core business.

4. Idea Analysis

In this phase the idea is prepared to be developed. The idea is analysed and its features are well explained to all. By this away there will be no mistakes at the development process. Every single collaborator that will be directly involved with this idea must be clarified about idea objectives and the main issues. It's important in this phase that the top level works help the base developers, because they have to merge the company goals with the final idea.

5. Idea Development

Development is the main and most fragile stage of the idea life cycle. All collaborators involved should know what to do and what things that has to care about. The idea is developed with a implementation plan, and at the end of it the idea is finally ended and ready to be evaluated. During the development stage collaborators can/should interact with clients, interact and learn with technology and scientific systems, analyse the market and society to obtain a comprehensive and almost perfect idea. All these innovation processes involve many creativity teams.

6. Idea Evaluation

This step should be a structured, comparing the idea to a set of criteria that reflects the organisation needs for the particular innovation. Determining how well the idea meets these criteria is a very good indicator of the value the idea will add to the organisation. For ideas which will have significant implementation costs or affects on the enterprise, an open meeting including experts should be held in order to consider issues that may not have been covered by the criteria chosen for the selection phase.

4.4 Information Architecture Specification

To have an effective software application, information architecture constitutes a primary aspect of conceptual modelling. Information architecture begins with content analysis which can be made through discussions with project managers and content developers and by analysing a representative sample of the existing content.

"Information systems and information technology are leading to a global organisational change. Some of the more dramatic examples are those where entrepreneurs have created radical new business structures supported by the power of information technology and the arrival of new networked or virtual organisations" [8].

The architecture is a global design of a current or desired situation based on a shared vision. It is used as an important communication, reasoning, analysis, and growth tool for systems. Architectures come in many forms. These forms cover different levels of abstraction, use different viewpoints and principles, and pursue different goals. Often architectures are used as a means to structure the discussion about the development of a desired situation. In other words, the architecture can serve as a point of reference to all parties involved.

To design the architecture proposal the TOGAF framework was used. TOGAF framework is used to develop several solution architectures. TOGAF is an architecture framework - The Open Group Architecture Framework. It enables you to design, evaluate, and build the most correct architecture approach for an organisation. The key to TOGAF is the Architecture Development Method - a reliable, proven method for developing an IT enterprise architecture that meets the needs of organisation business. TOGAF model is a solid and elegant doctrine for architectural planning. One important characteristic of TOGAF is its full cognisance and support of the organisation's business requirements and objectives which are some of the most critical inputs to the planning process. Adaptability is also a key component of TOGAF, making it possible to mould the framework to organisation's specific requirements.

Architecture design is a technically complex process, and the design of heterogeneous, multi-vendor architectures is particularly complex. An architecture framework is a tool which can be used for developing a broad range of different architectures. It should describe a method for designing an information system in terms of a set of building blocks and showing how the building blocks fit together. It should contain a set of tools and provide a common vocabulary.

The developed architecture is divided in four main blocks, as shown in the picture 4.5. They are *Business Architecture*, *Information System Architecture*, *Application Architecture* and *Technology Architecture*. Each one of these blocks has a different specification and diverse features. These different blocks have some objects that define the block main goal. Every block has a specific objective which is align with the organisation goals.

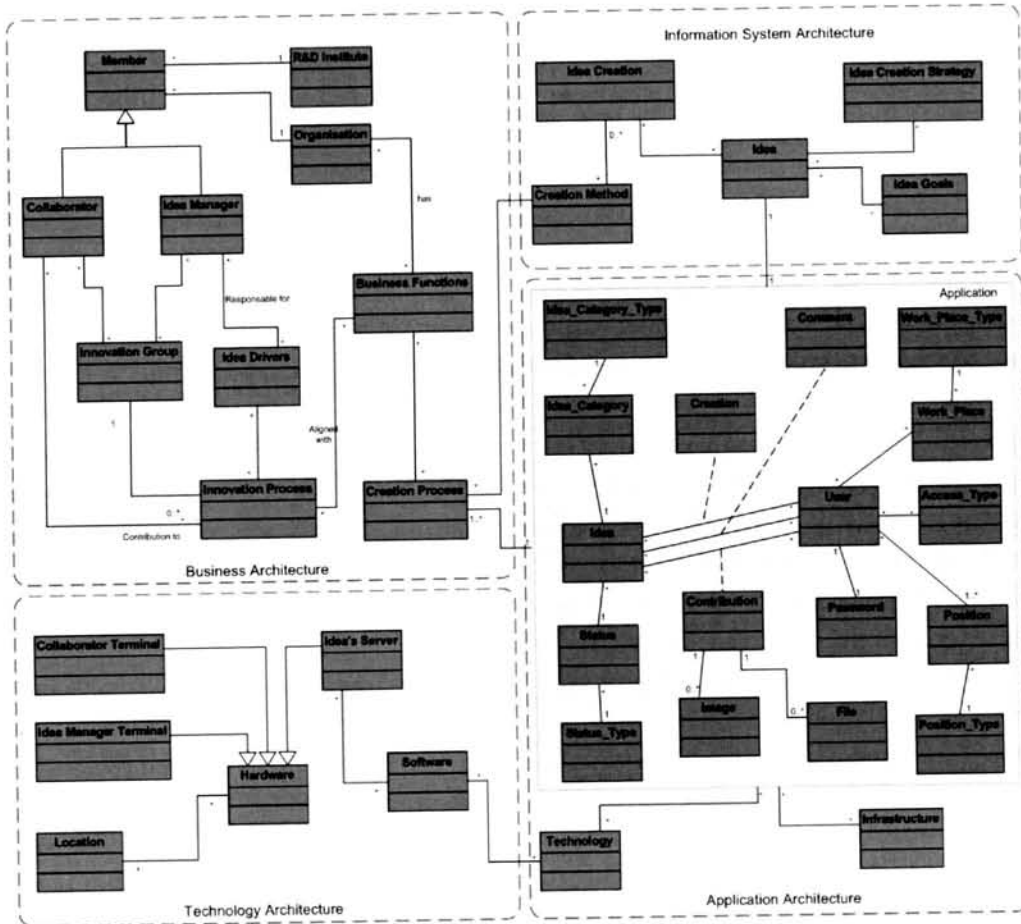


Figure 4.5: Application Information Architecture

The Business Architecture block was developed thinking on the application business needs. This means, the presented architecture can be adapted to an idea developing management environment. The knowledge of the Business Architecture is a prerequisite for architecture work in any other domain, and is therefore the first architecture activity that needs to be undertaken. In practical terms, the Business Architecture is also often necessary as a mean of demonstrating the business value of subsequent technical architecture work to key stake holders.

It is possible identify the existent creative sources, such as, a single collaborator or a group of collaborators. They are R&D Institutes and Organisations members. Collaborators interact several times with external actors, interaction usually origins innovation and ideas birth. They interact with suppliers, clients and even R&D institutes. Their participation provides a comprehensive innovation process and the birth of a useful idea beneficial to all participants. In every innovation process there is an idea manager. The responsibly of one person is very important to a comprehensive and complete innovation process. Collaborators know who can help them and they have someone to reply. The idea manager provides the orientation lines for the

creation process, gives the necessary help to organise and make the collaborator's contributions efficient. Basically idea manager gives to collaborators the drivers to idea creation processes. Each idea's birth should be aligned with the organisation objectives. This decision is, one more time, made by the idea manager. When an idea shows up, it is important to evaluate it and see if it is a good effort to the organisation business. This is a crucial step, which can save time and money. A bad evaluated idea can cost much money and make several damages to the organisation's future. Here is important look carefully to "object" idea drivers because these orientations/advises will lead and guide all the innovation process. Collaborators accept idea drivers that come from idea manager.

The objective of the Information System Architecture is to develop target architectures covering either or both of the data and application systems domains. Here are described the idea goals and the creation methods that involve all the innovation cycle. The creation methods are intimately related with the creation processes. There are some methods to develop and improve an idea, but those methods must be aligned with the organisation creation processes. To achieve good information system architecture it is important to know all the organisation business objectives and strategies because they are intimately connected with the information system architecture. To prevent bad evaluation situations, organisations develop strategies. These idea creation strategies are also considered on the system architecture. They are intimately related with the idea itself. Here idea is the central "object", as is defined before idea is the core of all creation process. Idea appears everyday, everywhere and organisation must be prepared to catch the idea development opportunity.

The Application Architecture has the objective to define the major kinds of application system necessary to process the data and support the business. The goal is to define what kinds of application systems are relevant to the organisation and what those applications need to do in order to manage data and to present information to the human and computer actors in the organisation. The applications are not described as computer systems, but as logical groups of capabilities that support the business functions in the Business Architecture. The applications and their capabilities are defined without reference to particular technologies. The applications are stable and relatively unchanging over time, whereas the technology used to implement them will change over time, based on the technologies currently available and changing business needs. Here is presented the application functional architecture, in other words the application conceptual diagram. The developed diagram can hold with all issues from the idea creativity process. As referred before, collaborators interact with several sources, so information comes from everywhere, disorganised and sometimes with many rubbish. It is important define valuable information and unnecessary information.

An organisation creating or adapting a Technology Architecture may already mandate the use of a list of approved suppliers/products for that organisation. The ar-

chitectures can then be used as procurement tools to govern the future growth and development of the organisation's IT infrastructure. The physical needs for all system and the necessary software to deal with the specific hardware are presented here. In this specific solution the requirements are not too high. An idea's server machine is needed, where the ideas are kept and stored. There will be several collaborator's terminals all over the organisation, where each one will be addressed to a collaborator. By using these computers, collaborators can make their contributions to the idea creation process.

Chapter 5

A platform to Support Idea Management in a Collaborative Network Context

5.1 Functional Architecture

The functional architecture can be viewed as the set of basic information processing capabilities available to an information processing system.

"Specifying the functional architecture of a system is like providing a manual that defines some programming language. Indeed, defining a programming language is equivalent to specifying the functional architecture of a virtual machine" [37].

"The functional architecture is comprised of a set of primitive operations or functions. This means that these basic functions cannot be explained by being further decomposed into less complex sub-functions. As a result, the functional architecture represents the point at which the decomposition of mental state terms into other mental state terms via functional analysis can stop" [10].

In this diagram two types of roles are considered: Collaborator and Idea Manager. Each one has different tasks. Each one interacts with several sources, external and internal. They observe, use and analyse everything around them. They use their perception to absorb useful information to improve the idea creation process. The relation maintained with clients and suppliers are very important to discover their specific needs. These relations must have long time duration.

The Figure 5.1 emphasise a kind of puzzle map, explaining how organisation is linked with outside world. Both can contribute to the idea creation. It is necessary a manager to organise and supervise all the process. Otherwise it would be almost impossible to have a clean, align and good innovation line. Somebody must be responsible for the idea creation process, to keep it working and with good health.

Processes must be oiled and proactive collaborators with good environment team.

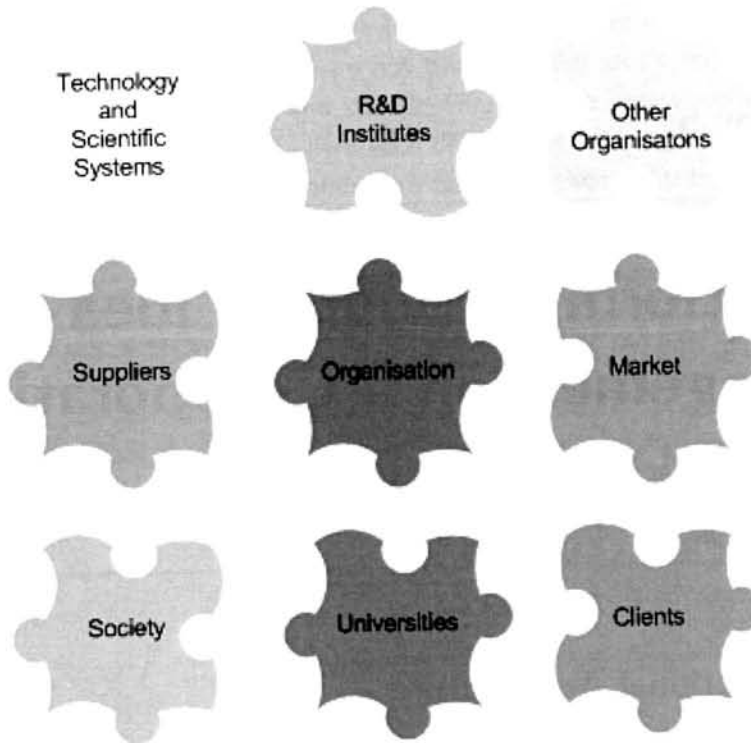


Figure 5.1: External Interaction

A functional software architecture is an architectural model that identifies enterprise functions, interactions and corresponding IT needs. These functions can be used as reference by different domain experts to develop IT systems as part of a co-operative information-driven enterprise. In this way both software engineers and architects are able to create an information-driven, integrated organisational environment. This kind of architecture is very important in application development complete process. Indeed engineers spend lots of time thinking, projecting, designing and improving application's architecture.

To the proposed system we present a comprehensive architecture, which can satisfy the organisation needs in the idea development process. The Figure 5.2 shows the functional architecture.

The functional architecture presented is a common one, with tree layers. In each layer are developed several different actions.

In the client layer, an internet browser displays the application user interface. It receives HTML, XML and JavaScript data from the application via HTTP.

The application layer comprises a Microsoft Windows or Linux server operating system. Here the application logic routines are made in order to satisfy the user requests. The necessary data control and validity is made. The application layer

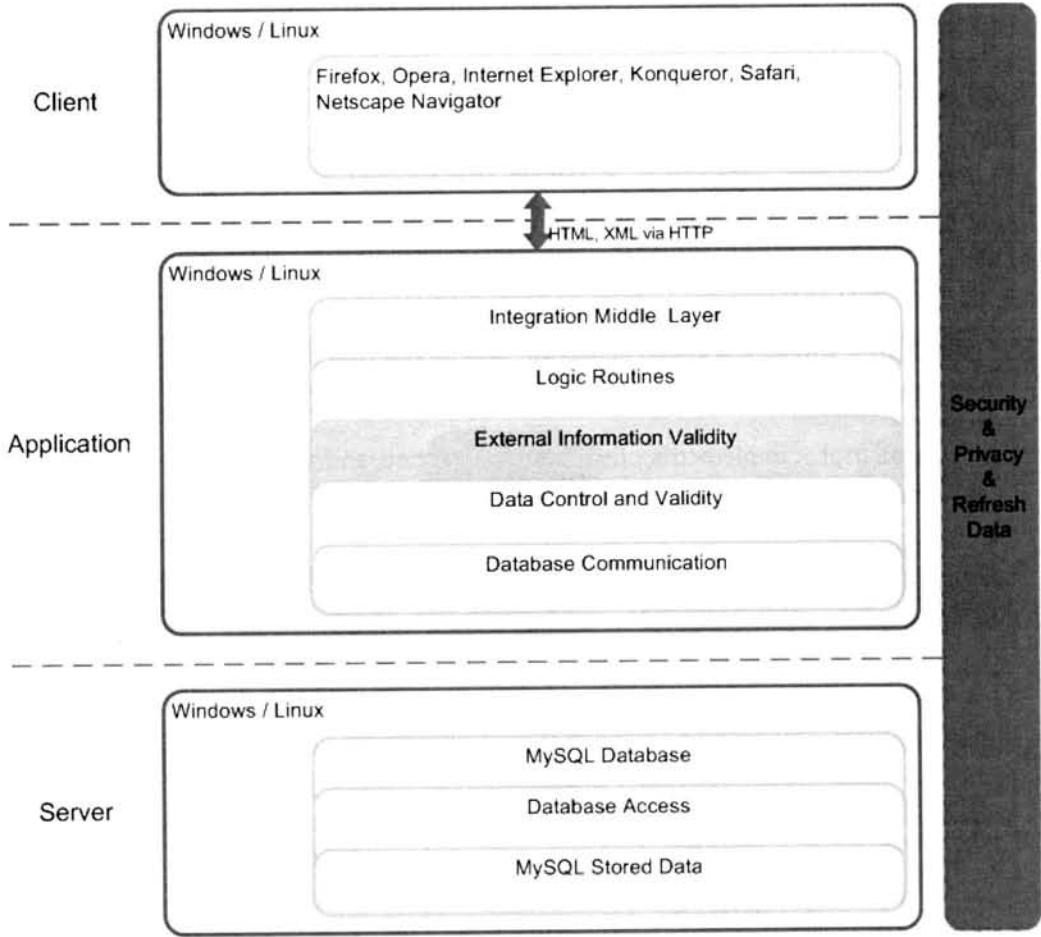


Figure 5.2: Functional Architecture

handles user requests, and communicates with MySQL database in the server layer. In this layer occurs an important task, the validity of external information. The information, suggestions and comments made by the external actors must be analysed carefully. Their contribution to all innovation process and to the final idea is crucial. So there is a specific tier in this layer to deal with this problem.

The server layer comprises a MySQL database, and the MySQL store, running on Windows or Linux server.

The application security features for the MySQL store hold the credentials necessary to access the data store and keep that information hidden from collaborators without access to that data. The three layers are covered with security, privacy and data refresh measures. These features are extremely important to application equilibrium and to reliability that users have on the system.

5.1.1 The Client Layer

The top-most level of the application is the user interface. The main function of the interface is to translate tasks and results to something the user can understand.

The client layer consists of a typical web-enabled personal computer running Microsoft Windows or Linux and an open browser. The client sends requests to the application using HTTP protocol. The pages displayed on the client are a mix of several technologies:

- HTML - supply the skeleton, layout, and interaction implementation in the user interface.
- JavaScript - implements client-side interaction and validation code, and constructs the data structures sent to the application in HTTP requests.
- XML - provide data and formatting for the data-bound web form controls.

5.1.2 The Application Layer

This layer coordinates the application, processes commands, makes logical decisions and evaluations, and performs calculations. It also moves and processes data between the two surrounding layers.

The application layer runs on Windows or Linux server running the application system. This section describes how the application is structured.

The application consists of web forms for each page rendered in the user interface, and includes several files that perform functions commonly used by the web forms.

When the user accesses the application using a client web browser, the initial page request is sent as an HTTP request. This action will show the current ideas in development, the idea creator and whether the possibility for the collaborator to make a contribution to an idea is available or not. It is also possible to make a comment or insert a related file. This is a normal collaborator view, if the collaborator is recognised as an idea manager there will be more options, such as, management of comments, coordination of each idea creation phase.

Here it is important to explain the existent tiers in application layer. View from the top, the first one, where the final integration/conversion with the client side web browser is made. The information is put where it should be and it is displayed on the right place. The information is organised with XML rules. The business logic tier is probably the most important in all application. This tier has the functional algorithms which handle information exchange between the MySQL database and the user interface. These functions transform the user's requests in SQL requests and vice versa, so it's possible query and store information. For these actions (queries and requests) success the exchanged information must not contain errors. To prevent these errors there is a data control and validity tier. This tier doesn't let wrong/bad data go to the database and fill it of garbage. The last tier of this layer is just

a communication level with the database. It makes the necessary conversions to insert/read data on/from the database.

The follow Figure 5.3 shows the different steps and interactions in each idea creation phase. These interaction processes are fragile. In each phase there are diverse tasks and objectives. It's crucial that the organisation has these tasks well defined, because it will improve the quality of created ideas. If each collaborator knows exactly what he/she needs to do in the creation process, it will be more efficient and quicker. The external participation is also welcome. As it is focused in Figure 5.3 clients, society and other organisations should contribute to this process to make it more comprehensive.

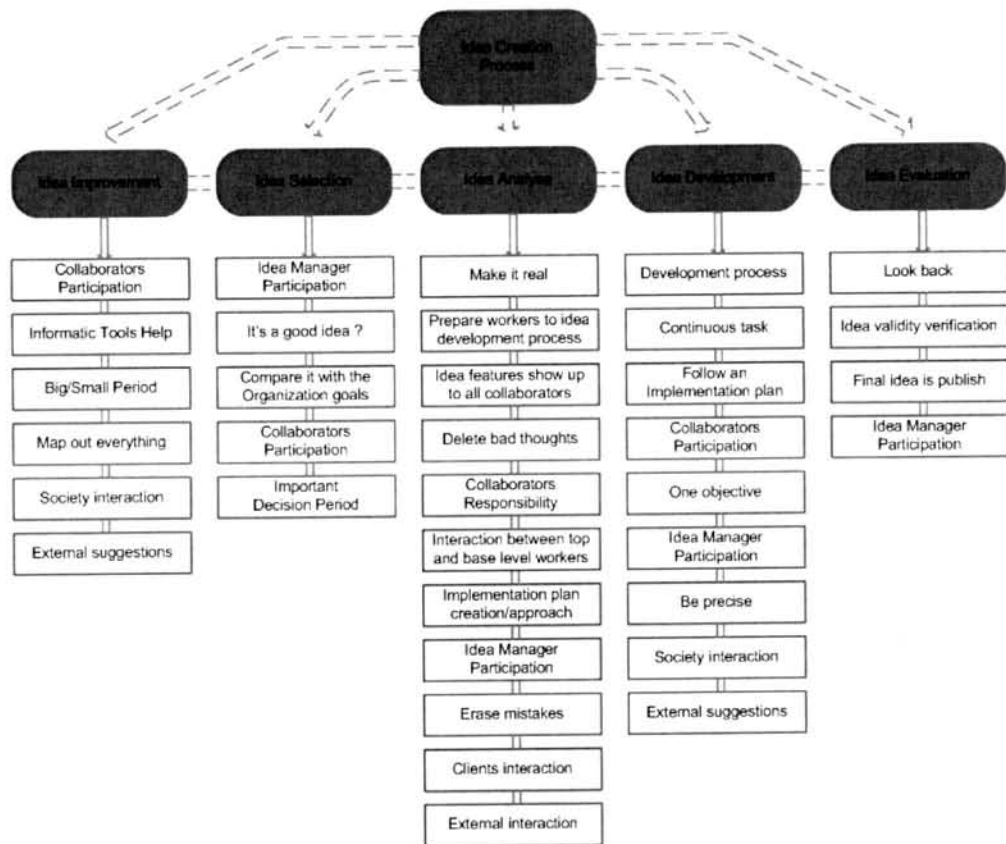


Figure 5.3: Idea Creation tasks

5.1.3 The Server Layer

Here information is stored and retrieved from a database. The information is then passed back to the logic layer for processing, and then eventually back to the user.

The application stores information about all of the ideas, collaborators, comments, idea's files related, creation dates and issues inside the MySQL store on the

server tier.

To access the MySQL store, the application calls the functions that create and handle the request. The application assembly uses the web request to make requests to the MySQL store, and to retrieve the resulting data.

The information passes between the application and server tiers as XML, to the MySQL stored database.

Returning data to the application occurs in the reverse order, starting at the MySQL store, and ending in the application tier. When the data is returned, it is processed by the application and presented to the user as appropriate.

5.2 Deployment Architecture

"A deployment architecture depicts the mapping of a logical architecture to a physical environment. The physical environment includes the computing nodes in an intranet or internet environment, computers, memory, storage devices and other hardware and network devices" [45].

Designing the deployment architecture involves sizing the deployment to determine the physical resources necessary to meet the system requirements specified during the technical requirements phase.

"After a deployment architecture design is complete the actual cost of the deployment is assessed during project approval. Once the project is approved, contracts for completion of the deployment need to be signed and resources to implement the project acquired. The detailed design specification is used in the implementation phase to build out the design" [45].

The presented architecture can hold with some requirements that other currently architectures can't. For example, some present architectures aren't web based, the applications are hosted in organisation's servers and they don't provide online access to collaborators. Clearly this is a handicap and doesn't help the idea creative process. It's important that collaborators can use the application when and where they want: at home, at the office, at the garden park, in the middle of the night, even in vacations if they are willing to. This will give freedom to innovate when they are really inspired. Collaborators aren't limited to innovate just when they are in their own office. To access the application it is only necessary an internet connection and a browser.

In this diagram two types of roles are considered: Collaborator and Idea Manager. Each one has different tasks. Each one interacts with several sources, external and internal. They observe, use and analyse everything around them.

The application server block is where everything "appends". All the information has to cross this block, here the information became useful. When a request is made by a collaborator, it's made via HTTP. It's necessary a HTTP interface to interact with the business logic, where are the necessary logic routines to answer any request. The logic routines are the bridge to interact with the database interface. These

routines are able to deal with different requests/queries, such as, create, store, update and consult data. The database interface is directly connected with the MySQL database. At this point necessary queries to access the database are constructed and validated. The information is processed and returned to the business logic layer. Here is treated with the logic routines. After all the return path is made till the collaborator web browser.

The Figure 5.4 shows the application architecture proposed, with all the connections above described.

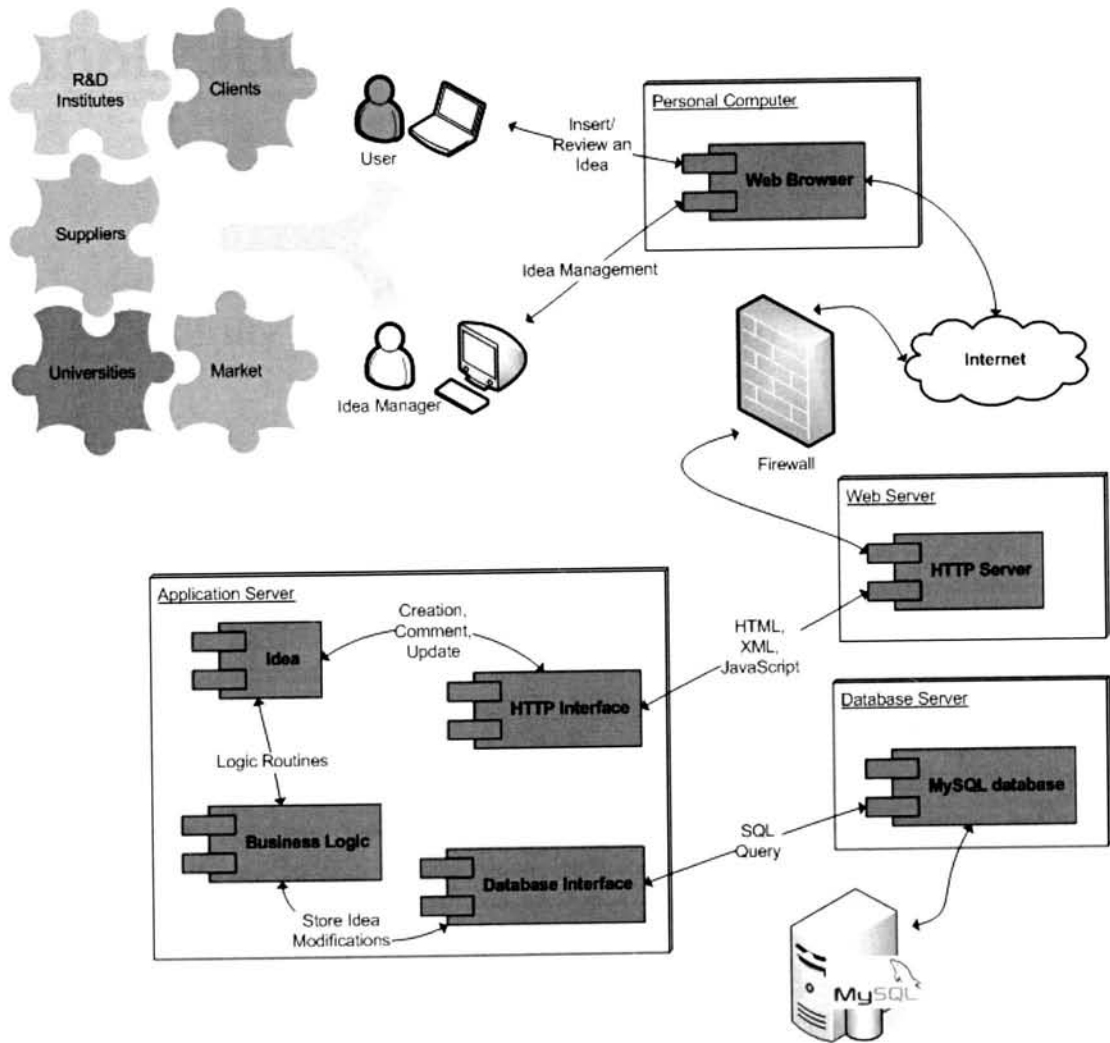


Figure 5.4: Deployment Architecture Design

The presented architecture is a top view of a deployment architecture. This kind of representation is very common to have a system all over view. In this case the system is web based, the simple collaborator interacts with the application through a browser on his/her personal computer. The interaction task can be made in a laptop

or a desktop inside the organisation's intranet. For security reasons collaborators must be connected to the organisation's intranet, they can work at home or in other place, if they can have access to the organisation's world wide web. Inside of this network they will be working as they work when they are inside their office. It is necessary to make login to access the organisation's network, but isn't necessary to access the application. Indeed a new idea can be created by an "anonymous" collaborator, this means, a collaborator isn't obliged to give his/her name to original idea.

Chapter 6

Application scenario

6.1 Collaborative Application Involving R&D Institutes, a University and a Commercial Company

A collaborative application is a set of small programs that communicate with each other to let collaborators work together on shared information. All collaborator's contributions have the same objective, the same goal. Most often, the set of programs is multiple copies of the same code running on different machines. Each of these programs is called a collaborative application client. Collaborative application clients accept collaborators input to drive updates to shared state, then propagate updates to other collaborating users.

The specific presented case is a comprehensive collection of working places, such as, University, Commercial Company and R&D Institute. Each one of these places has a department responsible by the innovation process. There are three main places: R&D Institute, University Documentation Service and a Commercial Company, in each one has people addressed to the idea creation process. These people interact with the application described on the previous sections: section 4.4, section 5.1 and section 5.2.

Idea creation involves such different actors and it is a very complex process. Everything must be coordinated and everyone should/must be heard. Every single opinion is important. Brainstorming conferences, forums and meetings should be encouraged between collaborators of distinct departments. The developed application hold with almost these requirements. The contribution from the three main centres should be equal. The R&D Institute will be the preferred idea creation birth place. Where innovation is a daily work and where researchers are focus on create new ideas. The University is the connection platform between institutes and organisations. At the University students and teachers, are recruited, as collaborators, to innovation

programs. Usually students are integrated at development teams and they make some useful contributions to innovation processes. The commercial companies are the "final users" of new innovation/idea. They make a meaningful contributions for all creation process. They analyse, monitor the process from the beginning till the end. These contributions are extremely important to a satisfactory final idea.

In resume, every single actor has an important role in all process. His knowledge, experience and creativity are essential to create a relevant innovation for organisation core business.

6.2 Scenario Specification

6.2.1 Top Vision

The specified application scenario is a top view of the relations between an institute, an university and an organisation. They "work" together with a common purpose: create new ideas, new innovations.

The Figure 6.1 shows the connections between each one of the involved parts. All of them are connected to a central ideas server, here they make their contributions to idea creation process. Their contributions are different, but all with the same aim.

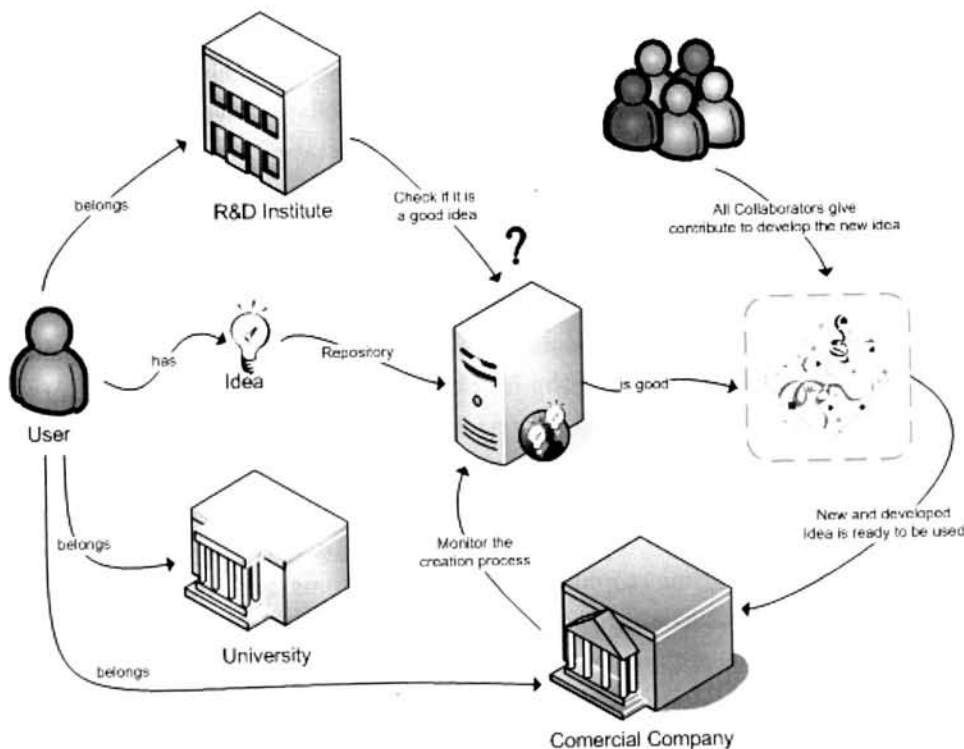


Figure 6.1: Application Scenario

In these creation processes people are the principal key. Collaborators in all the different places make their contribution through a well defined network. There are three main sources of idea generation: the Organisation, the R&D Institute and the University. Each one of the sources has different actors. The Organisation has a collaborator and idea manager roles. Both contribute for the idea creation process, but in different ways. The R&D Institute has also researchers to create/improve/develop new ideas, within innovation processes. The University has the students and teachers. They can contribute to develop new ideas if they are asked for. In the next sections the system actors are defined with more detail.

6.2.2 Use Cases Diagram

This system has four different roles. The Figure 6.2 presented them and the corresponding access level.

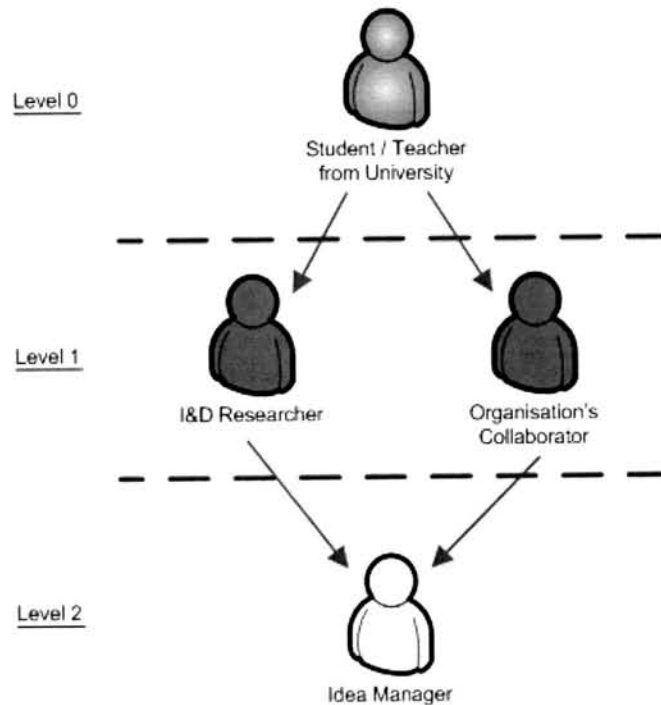


Figure 6.2: Roles and Access Levels

As identify above the roles in this application are:

- Organisation's Collaborator - person who directly contributes to the idea creation processes. The collaborator can insert an idea into the application. Can develop an idea, makes different types of contributions
- Idea Manager - is the person responsible for application configuration and maintenance. The idea manager controls all the creation processes with the appli-

cation's help. He/She has direct influence on the idea's growth by making analyses and evaluations.

- R&D Researcher - as basically the same access and permission of an Organisation Collaborator. The only difference between them is the work place. He/She contributes to the process like an Organisation Collaborator.
- Student/Teacher from University - they are just called after the idea been inserted to the application. They can't insert an idea, they make contributions to existent ideas.

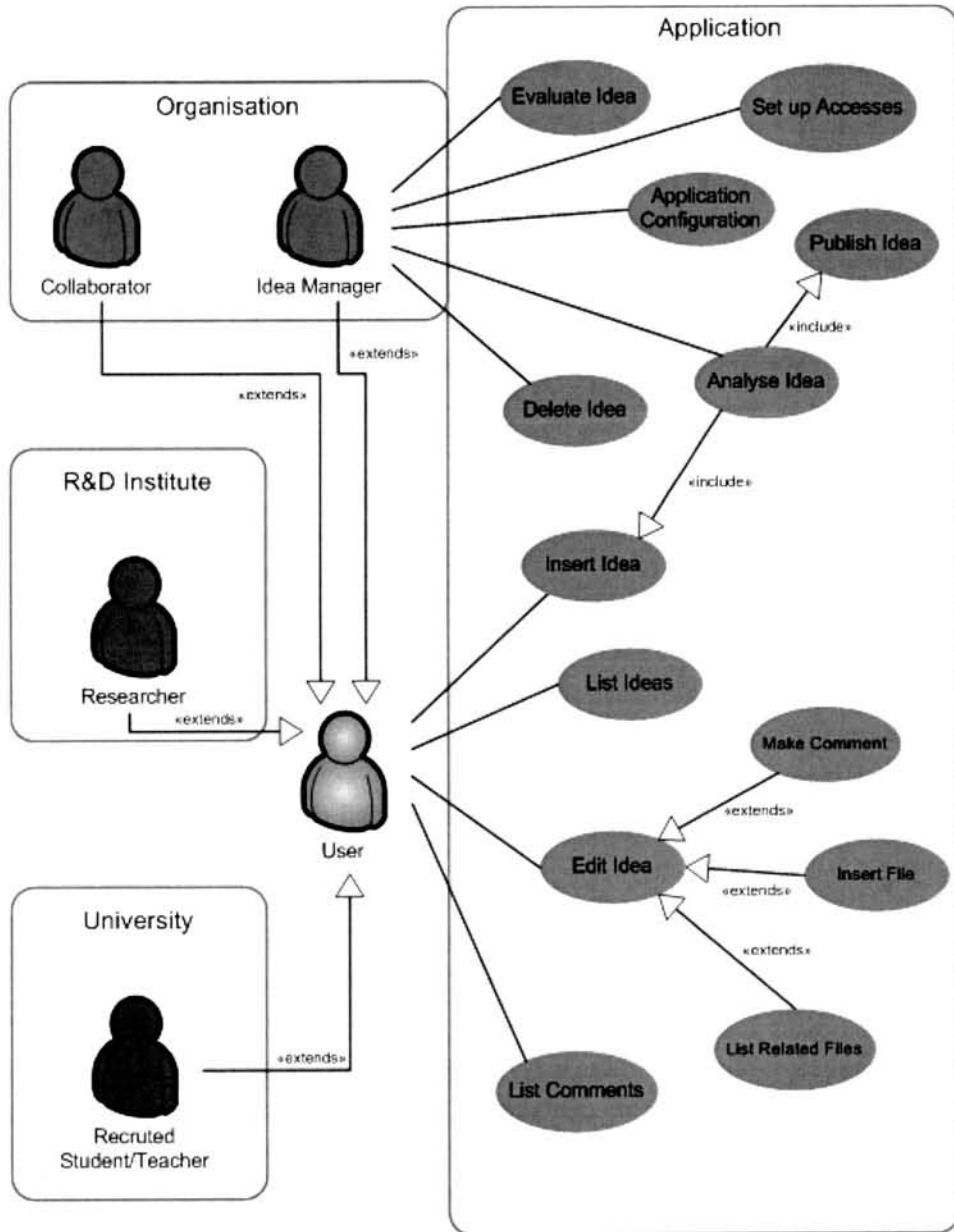


Figure 6.3: Use Cases Diagram

Use Case - Evaluate Idea

- Description: Idea Manager should makes a structured comparison. The idea should be align with the organisation objectives. Determining how well the idea meets these criteria is a very good indicator of the value the idea will add to the firm. For ideas which will have significant implementation costs or affects on the enterprise, an open meeting including experts should be held in order to

consider issues that may not have been covered by the criteria chosen for the selection phase.

- Roles involved: Idea Manager
- Priority: Essential

Use Case - Set up Accesses

- Description: Idea Manager, the administrator, can set up accesses controls for the user involved. He/She can give permission to users, configure how they access to application contents and how they can contribute to the idea creation process.
- Roles involved: Idea Manager
- Priority: Essential

Use Case - Application Configuration

- Description: As a administrator role, Idea Manager, can/should configure the all application features. With these small configurations can provide to users a better and easier work. These are generic configurations, such as, layout options, lists layout, available options menu and user options.
- Roles involved: Idea Manager
- Priority: Essential

Use Case - Analyse Idea

- Description: The idea is analysed and its features are well explained to all. By this way there will be no mistakes at the development process. Every single person that will be directly involved with this idea must be clarified about idea objectives and the main issues. It's important in this phase that the top level works help the base developers, because they have to merge the company goals with the final idea.
- Roles involved: Idea Manager
- Priority: Essential

Use Case - Publish Idea

- Description: After the analyse phase idea is publish to all. This means that now idea is align with the organisation objectives and can be an improvement to organisation core business. Now the idea is ready to be developed and "receive" user's contributions.

- Roles involved: Idea Manager
- Priority: Essential

Use Case - Delete Idea

- Description: If the idea didn't match with the organisation objectives the Idea Manager can delete it from the system. This will be a final and difficult decision, because as was said before, it is important give a chance to every single idea.
- Roles involved: Idea Manager
- Priority: Essential

Use Case - Insert Idea

- Description: It is the use case where the users input an idea into the system. There is a form to complete with some information about the inserted idea. After been inserted users make some contributions to improve the idea. When this phase is completed, the idea is align with organisation goals. Then is analysed by the Idea Manager.
- Roles involved: Idea Manager, R&D Researcher, Organisation's Collaborator
- Priority: Essential

Use Case - List Ideas

- Description: This option is available to all the application users. List all the existent ideas on the system.
- Roles involved: Idea Manager, R&D Researcher, Organisation's Collaborator, Student/Teacher from University
- Priority: Essential

Use Case - Edit Idea

- Description: With this use case users can make their contributions to ideas. They see the information about an idea and they are able to change it, comment or suggest some else. This is basically where and how collaborators improve and develop ideas. All this "editing" process is under supervision of the Idea Manager. He/She controls and facilitate all the idea creation process.
- Roles involved: Idea Manager, R&D Researcher, Organisation's Collaborator, Student/Teacher from University
- Priority: Essential

Use Case - Make Comment

- Description: An inserted idea can receive users' comments. Users make comments with intent of suggesting something to the idea development. These comments are kept for further work. The user selects the desired idea and then there is a small comment box where he/she can write the comment.
- Roles involved: Idea Manager, R&D Researcher, Organisation's Collaborator, Student/Teacher from University
- Priority: Essential

Use Case - Insert File

- Description: For a comprehensive environment around an idea it is possible to associate different file types. Some resumes, some texts found in internet or books. These files contribute for the user's understanding/knowledge about an idea.
- Roles involved: Idea Manager, R&D Researcher, Organisation's Collaborator, Student/Teacher from University
- Priority: Essential

Use Case - List Related Files

- Description: The contribution users can list all files (.doc, .pdf and others) that are linked to an idea.
- Roles involved: Idea Manager, R&D Researcher, Organisation's Collaborator, Student/Teacher from University
- Priority: Essential

Use Case - List Comments

- Description: The users can list all the comments associated to an idea. They can see what other users write about the idea and make replies to those comments. There will be always an idea's comments associated list.
- Roles involved: Idea Manager, R&D Researcher, Organisation's Collaborator, Student/Teacher from University
- Priority: Essential

6.2.3 Idea Life Cycle - Activity Diagram

This kind of diagram is typically used for business process modelling and for modelling usage scenario. The activity diagram describes the work flow behaviour of a idea creation system. This specific one is for modelling a usage scenario, since idea creation till idea evaluation. Although UML activity diagrams could potentially model the internal logic of a complex operation. In many ways UML activity diagrams are the object-oriented equivalent of flow charts and data flow diagrams from structured development. The Figure 6.4 describes the idea life cycle and the roles involved in this process.

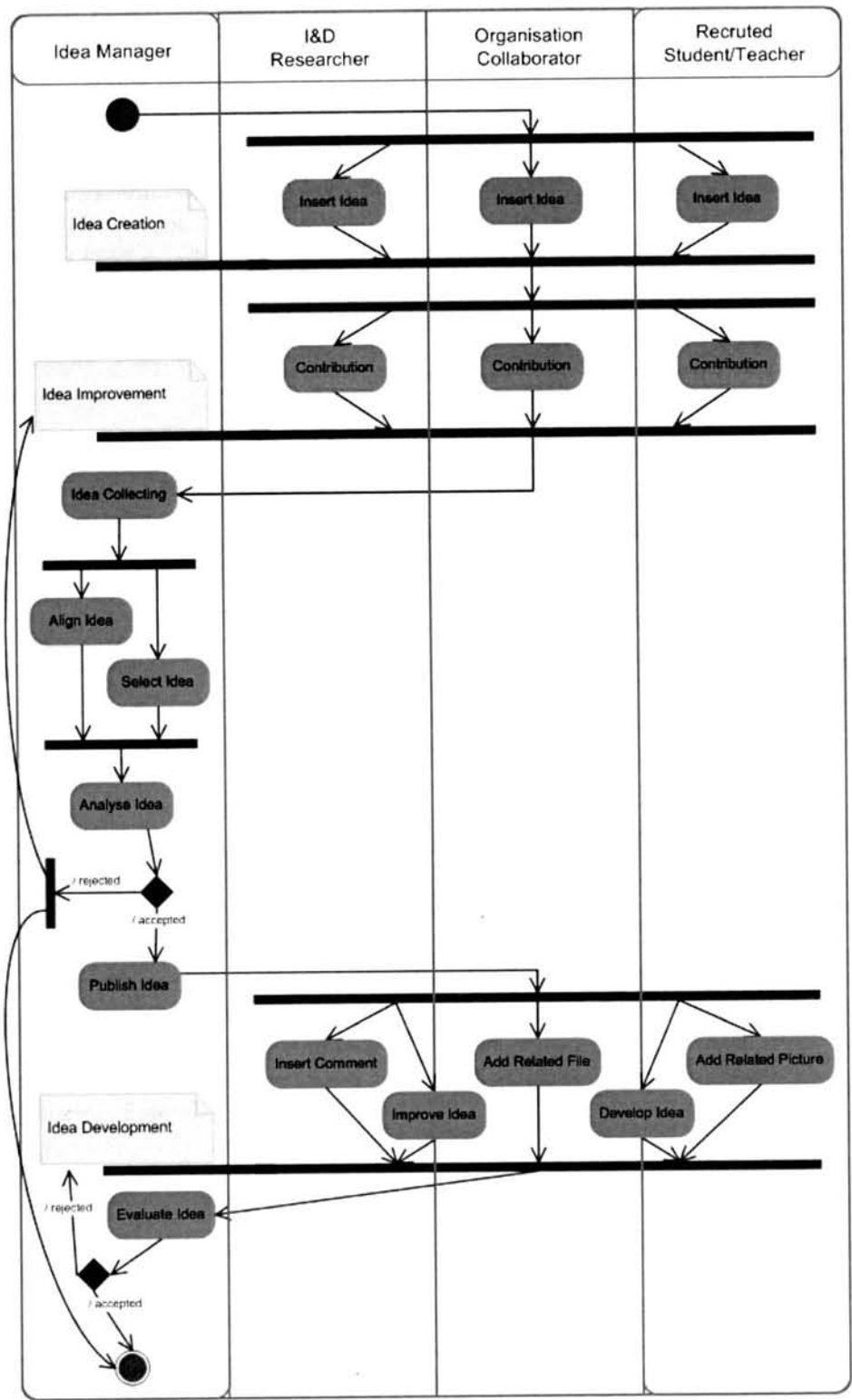


Figure 6.4: Idea Activity Diagram

The activity diagram helps describing the flow of control of the idea. An idea can be inserted by any actor. After being inserted the idea is "open" to receive comments and contributions, these should improve the idea quality. When collaborators finish contributions there is a collecting phase, where contributions are all brought together in a group. This step is critical because it is important don't loose the idea specifications, every comment and every contribution are important. The idea is aligned with the organisation objectives. The idea manager compares it the organisation goals and sees if the idea development will be significantly important to organisation's core business. The analyse provides the necessary information to decide the rejection or acceptance of idea's future development. If the idea is accepted, it is publish and it goes to the development. At the development phase the actors made comments, they related pictures and files to improve the idea and make it more consistent. This phase could be the longest phase in the all process. When the idea is sufficiently consolidated it is evaluated by the idea manager. During the all process idea manger makes some suggestions about the things that collaborators write. The idea can be accepted, this means that the idea is finally developed and ready to be implemented, or it can be rejected and return to the development phase for other improvements.

6.2.4 Classes Model

The Class Model is at the core of object-oriented development and design - it expresses both the persistent state of the system and the behaviour of the system. A class encapsulates state (attributes) and offers services to manipulate that state. Good object-oriented design limits direct access to class attributes and offers services which manipulate attributes on behalf of the caller.

A Class is a standard UML construct used to detail the pattern from which objects will be produced at run-time. A class is a specification - an object an instance of a class. Classes may be inherited from other classes, have other classes as attributes, delegate responsibilities to other classes and implement abstract interfaces.

The presented Classes Model shows static class objects in a system and the relationships between them. The Figure 6.5 shows all the application class objects. Here the main central classes are: Idea and User. These two classes are the system core. Everything happen around of one of these classes.

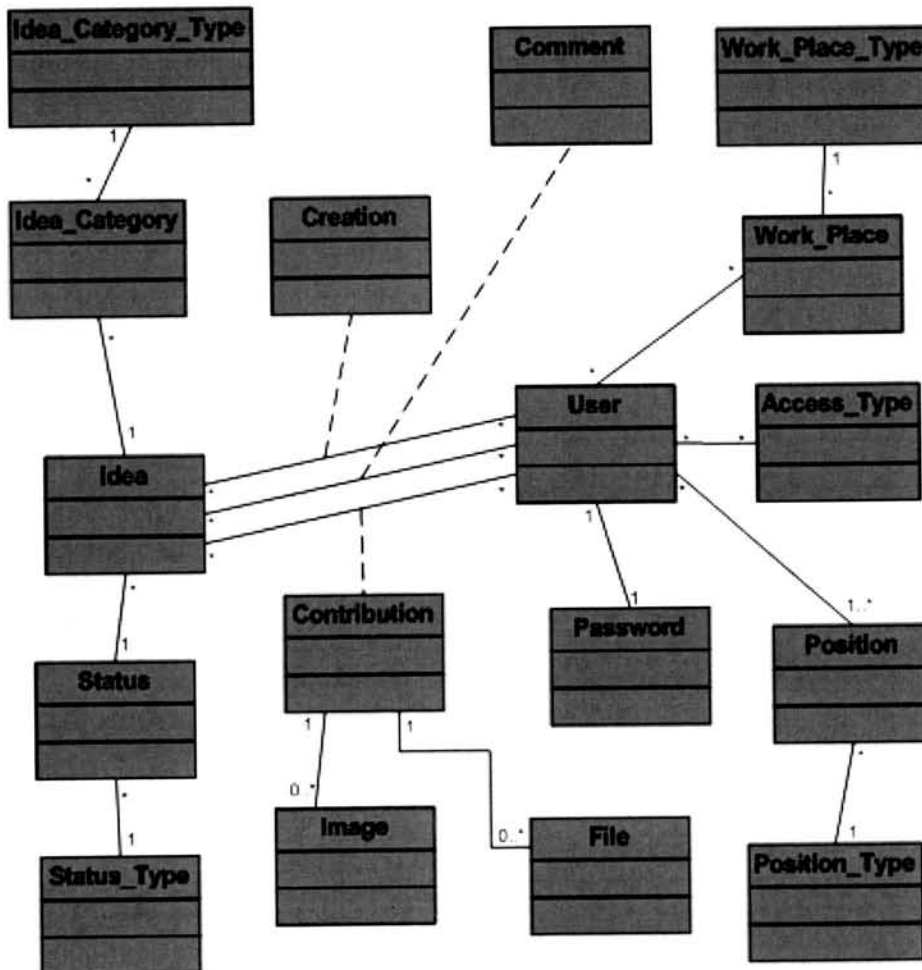


Figure 6.5: Classes Model

Users have different kind of access to the application. The access depends on the work place and the position that they have. An user can create an idea an insert it into the system. The idea is stored and a status is associated. The idea can also has a category, this helps to make idea groups or types. This means, it is possible list ideas from a kind, to easily evaluation and selection.

As described before, a user can make a contribution to improve/develop an idea. This contribution can involve just write a small text or instead it is possible add files and images to explain, describe the main idea goals. It is also possible create several comments about an idea.

6.3 Adapt and Select features from Current Solutions

Develop a system like this one requires big organisation economic efforts. Sometimes are better use current applications and take the best features of each one. These policies are usually taken when in the market are reliable and efficient applications that can give reply to organisation needs. Why build when we can recycle ? Reuse current solutions also can be a good option.

Current solutions were analysed and a selection was made. We collect the specific and necessary features. On the Appendix B as listed some current solutions with their features. Here will be emphasised features from each solution which serve to organisation idea creation process.

An application with this dimension should have accesses points from everywhere. Collaborators and idea creators should have flexibility to create and to insert ideas in the application. The easier way to do this is providing a web interface to the application. There are several applications that provide this service, such as, teamspace 3.2.2, Caucus 3.2.5 and FacilitatePro 3.2.7. These applications have available a web interface service to collaborators develop their ideas.

Idea creation is a collaborative, interactive and comprehensive task. So discussion, conversation and meetings between creation participants is crucial. There are several ways to participants communicate, like: e-mail, discussion forums, instant messaging, wikis and others. All the current applications provide some of these communications. There are tree applications that give special relevance to these issues. Collanos Workplace 3.2.6 provides real-time and asynchronous discussions, instant messages to team collaborators and alerts team manager. Idea manager can invite unlimited team collaborators, communicate with them in real-time or asynchronously and assign them distinct permissions. On GoLightly 3.2.8 application collaborators can easily create, categorise and lead creation groups or interest groups, and communicate and collaborate using group email lists, resource libraries and wiki notepad. Chat and Instant Message are available to collaborators. Virtual chat rooms allow a regular place to meet for rapid decision making. Wiki notepad is a great tool for shared work spaces to-do lists, project management and document creation. Teamspace 3.2.2

has individual notifications by e-mail, archiving of discussions, chat function enables friendly online communication with the collaborator's team. Only team members can enter the chat room and the chat can then be automatically documented in the form of a protocol. The application automatically advise if there are other members in teamspace available to join the chat. The SMS module offers an easy way to send short messages.

Like all good applications, it is important that users can customise their work environment. With the right colours and buttons at the right place idea creation can be easier and collaborators can improve their performance. Caucus application provide to collaborators graphics changes and colours via web interface, construct web page via web interface. Clearspace 3.2.4 has configurable views, with customizable filtering and interesting plugins for YouTube, Flickr and Facebook. Teamspace 3.2.2 provides a homepage for each collaborator where them can publish and organise information as they want. The teamspace calendar delivers shared calendars for working groups with worldwide access at any time of the day.

Share files helps in idea creation. Usually we say "A picture is worth a thousand words" and in idea creation processes we can apply this thought. Try to explain an idea with words most of the times is hard job, so these application provide an upload files management. All applications presented have this feature. They accept different types of files and formats. These files can be associated to discussion, forums and idea creation processes. For example FirstClass Intranet Server 3.2.1 provides: files of any type can be transferred to conferences, work spaces or a user's personal file storage repository through simple "drag and drop" from a local computer or through the available Upload/Download tools. Clearspace 3.2.4 has version history tools, upload Word documents, PDF and others. Upload files can be rated by collaborators and a list of ratings is kept. Teamspace 3.2.2 has access restrictions for files, version control and labelling. Use of unlimited files and folders and share them with all collaborators. Files and folders can be created, uploaded, altered and moved with very little effort.

Nowadays information comes from everywhere a single and independent application is always limited. Integration with other applications is important and essential. Shared information and data is difficult to management, so it is crucial integrate several applications to take advantages. The current solutions to idea creation aren't well adapted to this reality. They are simple exchange plugins but very rudimentary. Teamspace 3.2.2 has exchange with MS-Project, Outlook Synchronisation from main and home office. Clearspace 3.2.4 has LDAP and active directory integration, interfaces with existing systems ERP and CRM systems. Caucus 3.2.5 system use LDAP for user authentication.

Idea creation fluency depends on a good system administration. There is always a person responsible by management and maintain the application. The studied applications have a good administration system. Specially teamspace 3.2.2 where

access control system securely administrate the rights for reading and changing files. Caucus 3.2.5 has available multiple administrator roles with many levels of privilege, access control for all objects and has an automatic off-site data backup plan available. Collanos Workplace 3.2.6 uses extremely secure technology to protect the data, the data contained in public profile is protected and can only be shared to other users if is choose to make such information public in the software settings.

After this exhaustive study come up one final result. The most complete, comprehensive and flexible application is teamspace 3.2.2. It has the specific features that idea creation process needs. It comprehends all the idea creation stages and all the interactions with external actors. The Collanos Workplace 3.2.6 is as well a good solution but hasn't any external integration with other applications.

Chapter 7

Conclusions and Further Work

The aim of this section is to summarise the most relevant findings of the present work and to present a set of recommendations for further work. The conclusions of the work undertaken are presented, followed by the identification of its contribution to the area of innovation processes.

In the last years organisations have been trying to implement new collaborative applications, adopting new styles of work for their collaborators. These applications give the organisations the possibility to hit higher levels of creativity, efficiency and productivity.

Collaborative tools are more and more used at people's daily work. The quickly adaptation to these tools shows that people are receptive to new technologies. This encourages the will and participation in the productive organisation's processes.

Thousands organisations around the world are joining to these models for collaborative work. Organisations implement pilot projects to collaborate, management contents and knowledge.

The research and most of the dissertation writing was made in Rome, at the La Sapienza University. There I found good installations at the Informatics Department to develop the necessary research and study. It was a quiet and calm place where it is possible to work and study without being disturbed. The ambient was, as I expected, a mix of cultures.

There were many students from every country in the world. All of them doing thesis and projects to end their degrees. In resume it was an international environment which helps developing language skills and receives several reviews from different realities and/or perceptions. The final work was certainly improved by the work environment that I was involved in.

The chosen methodologies for the dissertation research and development proved to be appropriate, since the report dissertation was completed in time. The dissertation title and its surround fields were an interesting challenge. The research made

in these areas provided the acquisition of knowledge in new technologies, processes and allow deepen knowledge to other previously known.

Collaborators pro activity is the main factor for the organisation's success. Everyone in the company should have an active participation in the productive processes of the organisation presenting their ideas clearly. This will contribute to the global organisation success.

The study made about current idea creation solutions reveals that there are few applications to comprehend idea generation processes and interactions. The table comparison made helps to understand these facts. There are two of them that are almost complete: teamspace 3.2.2 and Collanos Workplace 3.2.6. These are the most complete solutions in the field. These solutions give reply to the specific organisation needs and help with the external interaction. External relationships are a strong way to get and improve ideas. Collaborators learn with the world around them. It is important that the solution provided by the organisation matches with the collaborators needs in the idea creation processes.

Surrounding organisation there is a large network of areas that the organisation should look and take attention to. Connections between organisation and exterior are a way to organisation improvement. Listening client's requirements and society sign organisation managers prepare themselves to face new challenges. It would be interesting do more research in the interaction between organisation and external field. Maybe add some other actors to these processes. For example, collaborators specialised in areas like architecture, arts, human choreography and some life experience people. Creative actors are welcome to these innovation processes.

The information architecture proposed is a comprehensive one. It is a complex design but at the same that is understandable. The principal objects are well defined and the generic idea was explained. This architecture is a good contribution to further work. It has some things which can be developed with more detail, such as the Information Architecture System block that can be more specific depending on the organisation needs. The Application Architecture itself can also be improved by detailing exhaustively some of the contained classes.

The application scenario proposal could be the first approach to a new solution specification. It is possible, as described, to use other applications to idea creation management. But if we have resources to implement a new solution which can answer to organisation requirements, why not implement it? To make this bet is a big risk to the organisation, this decision must be carefully studied and analysed by all organisation actors. It is presented a generic application system to deal with some requirements. Maybe not all requirements are covered, some of them just appear at the application implementation phases.

In resume, the main dissertation objectives were achieved. There were some initial difficulties to understand some requirements and there was some difficulty to get in the idea creation field. The idea creation management is a new and undeveloped area,

so there aren't many references and articles to read. But once we overcame these obstacles the work flowed without problems. Several curiosities have been discovered about how organisation deals with external information and how to treat/learn with it in order to improve organisation business.

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Appendices

Appendix A

Idea Conceptual Map

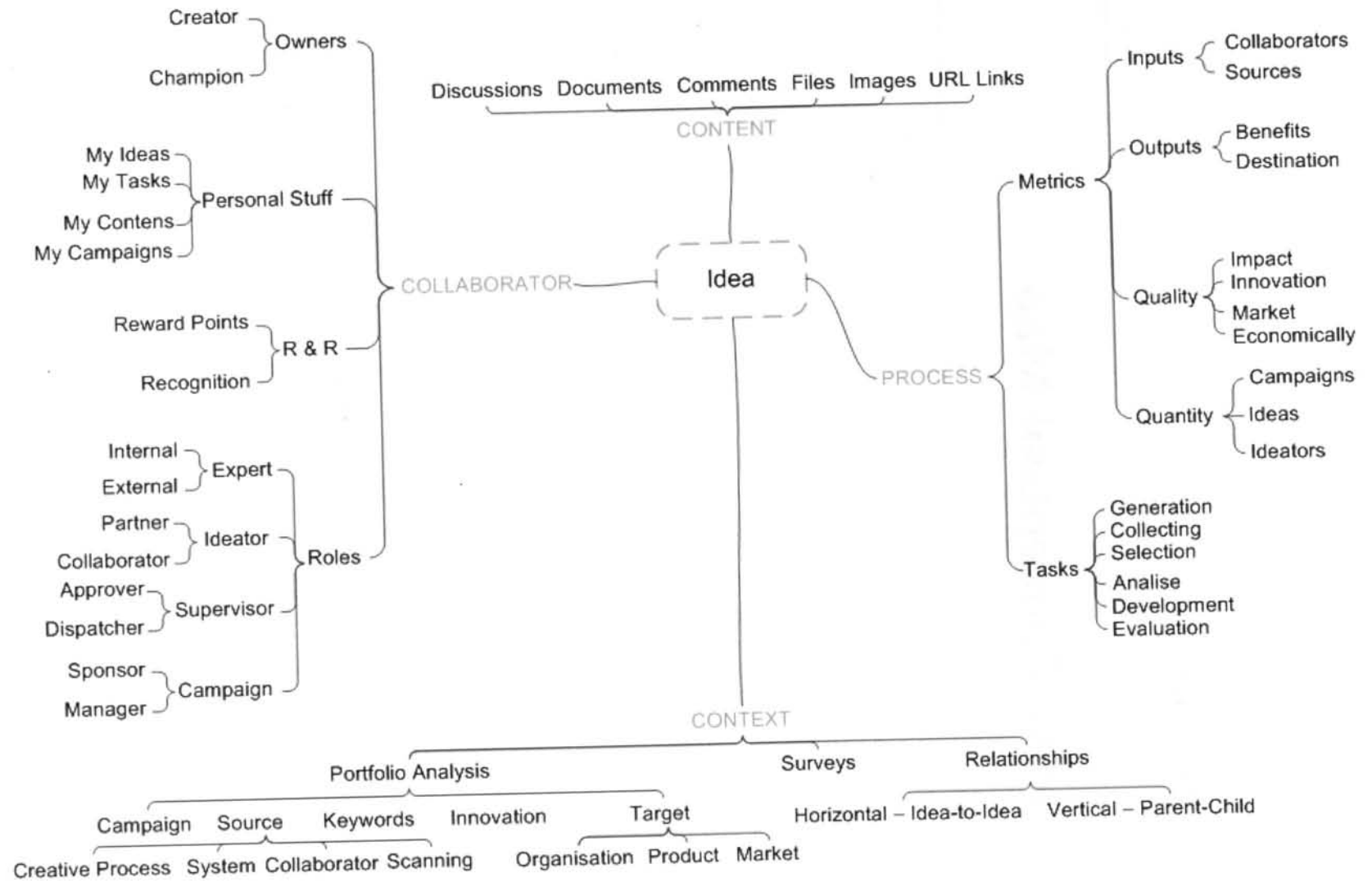


Figure A.1: Idea Conceptual Map

Appendix B

Collaborative technologies comparison tables

	FirstClass Intranet Server
Browser Compatibility	
Conversation, Participation, Discussion	Secure email, instant messaging that enables collaborators to stay in touch
Customisation	Schedules, voice files, graphics, and other information can be maintained within topic-based discussion areas that enable project team members to easily share and collaborate on specific topics of interest.
Documents	Files of any type can be transferred to conferences, work spaces, or a user's personal file storage repository through simple "drag and drop" from a local computer or through the available Upload/Download tools
Integration with other applications	
Knowledge Management	Flexible and accessible environment that ensures critical information can be quickly exchanged between relevant parts
Security, Administration	All user data resides on the server, not on individual machines, enabling multiple users to access FirstClass from the same computer with their own unique ID and password. Since no shared computers have any patient data residing on them, the organisation can provide staff with easy access to data without having to be concerned with information getting into the wrong hands
Statistics, Surveys	
Software license	Non-free software license
Blog	
Platform	Windows, Mac OSX, Linux client
Develop Languages	
Database	

Table B.1: Collaborative Technologies Supporting Organisational Networks Comparison - FirstClass Intranet Server

	teamspace
Browser Compatibility	Microsoft Internet Explorer, Netscape Navigator, Mozilla Firefox
Conversation, Participation, Discussion	Individual notification by e-mail, archiving of discussions, Chat function enables user friendly online communication with the collaborator's team. Only team members can enter the chat room and the chat can then be automatically documented in the form of a protocol. The system automatically advise if there are other members in teamspace available to join the chat. The SMS Module of teamspace offers an easy way to send short messages
Customisation	Public Pages of teamspace can integrate teamspace modules into the collaborator's homepage or organisation's own interactive web page. It can be used for example to create a general download area or to publish project results. The teamspace calendar delivers shared calendars for working groups with worldwide access at any time of the day
Documents	Access restrictions for files, version control and labelling. Use of unlimited files and folders and share them with all collaborators. Full text search and a variety of view options make it easy to find a document. Files and folders can be created, uploaded, altered and moved, with very little effort
Integration with other applications	Exchange with MS-Project possible, Outlook Synchronisation from main and home office
Knowledge Management	
Security, Administration	An access control system securely administers the rights for reading and changing files
Statistics, Surveys	
Software license	Non-free software license
Blog	
Platform	Windows NT, Windows 2000 and Unix distributions
Develop Languages	Perl and Java
Database	Not required. Data is stored on the server in directories. Encryption is optional

Table B.2: Collaborative Technologies Supporting Organisational Networks Comparison - teamspace

	Clearspace
Browser Compatibility	
Conversation, Participation, Discussion	Ability to mark comment as a question, answers can be rated, one click to convert to a document
Customisation	Configurable views, content filtering, rich-media plugins for YouTube, Flickr and Facebook
Documents	Strong version history tools, upload Word documents, PDF's and others, co-created, living documents, intuitive user comment and rating
Integration with other applications	LDAP and Active Directory integration, Interfaces with existing systems ERP & CRM systems
Knowledge Management	Powerful search cuts across all communities and people
Security, Administration	Web-based administration console, Role-based administration, Role-based access control, Pluggable user, group and authentication systems
Statistics, Surveys	
Software license	Shareware (Source code available)
Blog	Individual and group blogs, control the exact publishing date/time, post using multiple types of blog authoring tools
Platform	Windows
Develop Languages	Built with Open Standards (J2EE), Standard J2EE web application
Database	Multiple database options, Open schema available for several SQL databases

Table B.3: Collaborative Technologies Supporting Organisational Networks Comparison - Clearspace

	Caucus
Browser Compatibility	Internet Explorer, Mozilla Firefox, Netscape and Safari
Conversation, Participation, Discussion	Multiple discussion "threads" per team, richtext editor for discussions, important discussions saveable in personal notebook, important discussions link to "to-do" list, automatic email notification of new discussion, users may participate via email, Real-time "chat" and white board available, with saved history for later use
Customisation	Change graphics and colours via web interface, construct "centre" or "portal" page via web interface, supports multiple, distinct user interfaces to same data, optional customise fixed-left-menu-bar, HTML-like source code for all pages provided and modifiable
Documents	Upload documents into discussion, upload documents into separate folders (storage area), limit access to documents by class or roles or groups
Integration with other applications	Can use LDAP for user authentication, single-signon, data available via SQL
Knowledge Management	Search text (simples boolean), "Bookmark" important discussions in personal notebook, shareable "to-do" lists, optionally tied to specific discussions
Security, Administration	Multiple administrator roles with many levels of privilege, access control for all objects, works well with all firewalls and proxy servers, works with or without browser cookies, automatic off-site data backup plan available
Statistics, Surveys	Detailed user statistics available via wizard, publish results as web page or spreadsheet
Software license	Gnu Public License
Blog	
Platform	RedHat Enterprise Linux 3, 4, and 5, RedHat Fedora Core 3 and 6, Debian (Sarge), Solaris 9, MacOS X 10.4 ("Tiger")
Develop Languages	
Database	MySQL 4.1 , Available to protected MySQL queries

Table B.4: Collaborative Technologies Supporting Organisational Networks Comparison - Caucus

	Collanos Workplace
Browser Compatibility	
Conversation, Participation, Discussion	Real-time and asynchronous discussions, send instant messages to team collaborators and alerts team manager when updates have been made, allows team manager to invite unlimited team collaborators, communicate with them in real-time or asynchronously, assign them distinct permissions and know their presence status any time, since every team has their "way of working", Collanos Workplace allows team manager to create a work structure that truly reflects each team's distinct needs.
Customisation	
Documents	Collanos Workplace integrate and share any project-related content (Even images, music and video files) into the work space using the latest encryption protocols.
Integration with other applications	
Knowledge Management	Keep all project related content in a single, consolidated work space
Security, Administration	Uses extremely secure technology to protect the data, the data contained in public profile is protected and can only be shared to other users if is choose to make such information public in the software settings. Passive Information provide is stored only temporarily on secure databases and only in anonymous aggregate form unless required to provide billing information to Subscribers or to verify the integrity of your identity by Software or to comply with local laws or regulations. Computer resources cannot be accessed by any third party through Software
Statistics, Surveys	
Software license	Free, sell premium services to users seeking functionality beyond the core offerings
Blog	
Platform	Windows 2000/XP/Vista, Mac OSX 10.4.2, Linux
Develop Languages	JXTA Java SE libraries, secure 256-Bit Advanced Encryption Standard (AES)
Database	All the data is stored only on the computers of team members. There is no central file server or data repository.

Table B.5: Collaborative Technologies Supporting Organisational Networks Comparison - Collanos Workplace

	FacilitatePro
Browser Compatibility	Netscape Navigator and Microsoft Internet Explorer
Conversation, Participation, Discussion	Make ideas anonymous or attributed as appropriate to the discussion topic. Add ideas during a meeting or come back later to add to the discussion. Collect ideas from an unlimited number of participants simultaneously
Customisation	
Documents	Select among pre-formatted HTML report options or format your own. Choose RTF report to do advanced formatting with Word or another publishing application. Select from many ASCII text formatted reports to export action plan and voting data to other applications for further analysis
Integration with other applications	
Knowledge Management	
Security, Administration	Includes an integrated Web Server. No additional Web Serving. Use custom voting profiles to create set of voting profiles with multiple criteria, pop-up menus, radio buttons, forced ranking and other custom scale options. Select from several standard voting profiles with options for rating, check boxes, high/medium/low, true/false, assigning points, and agree/disagree scales
Statistics, Surveys	Set up complex surveys for distribution over the Internet/Intranet. Summarise survey results across multiple levels of organisation or pre-defined demographic categories while keeping individual responses anonymous. Monitor results online at any time
Software license	Non-free software license
Blog	
Platform	Windows 2000/XP/2003 Server, Apple MacOS X
Develop Languages	
Database	

Table B.6: Collaborative Technologies Supporting Organisational Networks Comparison - FacilitatePro

	GoLightly
Browser Compatibility	
Conversation, Participation, Discussion	Members can easily create, categorise and lead work groups or interest groups, and communicate and collaborate using group email lists, resource libraries, and wiki notepads. Let members support each other by providing a place for answers to common questions on a wide variety of topics. Chat and Instant Message: collaborators can have spontaneous or scheduled live conversations. Virtual chat rooms allow a regular place to meet for rapid decision making. Wiki Notepads: "Wiki's" are a great tool for shared work spaces to-do lists, project management, document creation
Customisation	Community home page current with fresh content, updates, and announcements. Personalised pages allow collaborators to create their own profiles, complete with photo, bio, privacy and permission settings, email preferences
Documents	Shared libraries provide a space to upload and easily find and download files, links, stories, book reviews. Collaborators can rate library items, and browse the latest submissions
Integration with other applications	
Knowledge Management	Access controls, members or administrators can search across all kinds of user-generated or organisational information
Security, Administration	Reports summarise daily, weekly, and monthly usage by tool, group, and user. Easy to use content management editing allows editors to customise any language item on any page. Member management tools let identify the deep interests of any particular member. Over 50 security settings allow you to expose or hide content, and allow or disallow access to each area. Through regular monitoring and third-party testing. GoLightly can also be installed behind a firewall as a network appliance
Statistics, Surveys	
Software license	Non-free software license
Blog	Give to collaborators and members an online voice/space to express themselves and add richness to the organisation
Platform	
Develop Languages	
Database	

Table B.7: Collaborative Technologies Supporting Organisational Networks Comparison - GoLightly

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List of Symbols and Abbreviations

Abbreviation	Description	Definition
INESC	Institute for Systems and Computer Engineering	page 14
IT	Information Technology	page 38
ILM	Idea Life Cycle Management	page 63
PwC	PricewaterhouseCoopers	page 22
TOGAF	The Open Group Architecture Framework	page 65
HTML	HyperText Markup Language	page 70
XML	Extensible Markup Language	page 70
HTTP	Hypertext Transfer Protocol	page 70
UML	Unified Modelling Language	page 85
PDF	Portable Document Format	page 90
LDAP	Lightweight Directory Access Protocol	page 90
ERP	Enterprise Resource Planning	page 90
CRM	Customer Relationship Management	page 90
SMS	Short Message Service	page 90



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