Model of Knowledge Management for the diffusion of the Investigation’s Group Work based in Web Semantic Services

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Abstract:
This project consists to design a Model of Knowledge Management model and the technological platform based in web services which must be in capacity to support the diffusion of the generated knowledge into the Groups of Investigation. The Model of Knowledge Management will be the base of the system which allows the interaction between the Groups of Investigations and the different actors who can grow with the produced knowledge in each group making easier the interaction between the internal (professors and students) and external actors (Knowledge networks, companies, schools and government entities). Everybody take part in the work that develops the groups.

Key words: Knowledge Management, web semantic services, technologic platform, processes of knowledge.

1 Introduction

At the moment, the competitive advantages of the organizations are in the knowledge and are the human resource that generate it and spread, for that reason the modern management, focus their attention on the creation and distribution of the knowledge that stimulates them to being more competitive in the market that develops, valid reason to design effective models to maintain it and to share it.

Being the University conceived like a dynamic organization, in constant movement and interaction with his surroundings, one is faced every day new challenges in a society that evolves in permanent form and to exaggerated steps, in where the process of organizational socialization with base in open systems, is made complex more and more when the educative institutions grow and they are developed; for that reason one becomes necessary to study the management of the knowledge in the investigation area, before the new exigencies and deals with accelerated form changes that force to the management and preparation for the attainment of the objectives.

Since the society and the organizations in general, are walking towards denominated a new order or set of paradigms, concepts, structures, processes, forms of association, relation and transaction, in where now it begins to have value and use the knowledge, speech of virtual work and capital intellectual; and within the framework of this new order, the organizations are defining and redefining, the form to handle itself with their surroundings in an atmosphere that tends to be global, with the use of information technology, where the results less and less
depend on time and the distance, and where the human resource is being considered as the most important capital and its effort is focused to add value.

On the other hand, the management of the knowledge is being positioned like the great paradigm of the direction of companies of the new millennium, but it is necessary to confront an important challenge; to become a practical discipline that it helps to improve the internal management through the management of the knowledge in an era where the speed of the technological change is high and increases daily.

This project finds its justification when considering necessities to lead processes of generation and diffusion of knowledge, to adapt its organizational structures of management of the own activities of investigation as well as processes of this activity to object to raise mechanisms and procedures of fortification of the individual and collective intellectual capital that promotes competitive advantages in the specialization areas in which the knowledge is grouped.

At the moment it is recognized that one of the main sources of wealth is in the knowledge and the creation of intellectual capitals by means of the education, therefore to study sources that are related to the generation of new knowledge, and to take them to a communication axis where one spreads is important and much more within the university communities.

Of equal way, the establishment of options or alternatives of management of the knowledge in the area of investigation in the University will allow potentially, the collective growth of the intellectual capital, elevating the institutional quality and the social opportunities of the community in the educative sector.

In the knowledge society, Castells argues that the generation, processing and transmission of information become the fundamental sources of productivity and power. (Camps, Leal, 2002) and (Castells, 2000). The organizations of the XXI century will be intelligent, ie, organizations will be able to create, develop, disseminate and exploit knowledge to enhance their innovative capacity and competitiveness. Are structured in the form of networks that arise or are set free and constantly reconfigured, networks that facilitate the sharing of values and knowledge, both inside and with their environment, where relationships are critical; where people share interests and knowledge, organizations exist within many levels of cooperation (Camps, Leal, 2002). Knowledge ceases to be an individual possession and becomes, through networks, in one of the most important assets of organizations. Knowledge management becomes a major issue, where knowledge creation is a source of competitive advantage, and organizations must turn their attention to the needs of people who will work in groups to generate knowledge (Camps, Leal, 2002) and (Ichijo, K. et al, 2000).

Within this context, is the University Distrital Francisco José de Caldas and in particular research groups, which constitute one of the major players in the development of research in the University. They involve research faculty, researchers and foreign students, who are continuously generating information and knowledge, but his work has been affected by factors such as: 1) the scenarios available to the University for the publication and dissemination of information and knowledge Groups generated by research are limited. 2) Access to information and knowledge produced by members of the research groups are small and in many cases it is not exploited. Additionally, this information and knowledge is not widely used by students and teachers who are not linked to the groups. 3) The interaction between different groups is very low and hence the collaborative approach and the development of new joint research projects.
In this situation, Research Group Metis, Faculty of Technology University Distrital Francisco José de Caldas, developed a research project to respond to the following hypothesis: Does having a model of knowledge management supported by a collaborative setting (technology platform) based on semantic Web services, will enable research groups to strengthen the dissemination of their work?

This article seeks to describe the process followed within the research project to obtain the model of knowledge management, the technology platform based on semantic Web services that supports it and the initial results from its implementation. Additionally, this article seeks to provide a methodology to integrate organizational needs with the design and development of collaborative technology platforms supported by Semantic Web technologies to enhance the work they do.

2 Problem

The problematic one of the investigation that considers in the project is based on the following exposition:

A model of management of knowledge for the diffusion of the work which they develop to the groups of investigation based on semantic services Web, will allow to the Distrital University Francisco Jose de Caldas to count on a scene for the diffusion of knowledge and interaction between investigation groups?

Distrital University, counts on construction of permanent fortifications that investigation composes by groups of, which they are known like the set of people who meet to make investigations on a thematic one given, to formulate one or several problematic ones of interest.

Due to the amount of information that is handled within each one of these groups of interest, one becomes difficult to the diffusion of all the information and the knowledge of the existing groups of investigation within the university, these research centres are employees of mass media so that their information is well-known by different the communities not only within the scope of superior formation, if not by all the communities, that can contribute in problematic of the new one investigations.

The problematic one which it considers to solve in the project is the one to present the groups investigation like knowledge centres, designing a functional scheme that allows the integration of all the processes that are carried out within the organizations.

Not system exists of diffusion of contents which it allows the publication of information implemented on a technological platform based on semantic Services Web, that allows to support to the requirements and characteristics of a functional scheme and a model of knowledge management, where are identified to each one of the organizations of the system.

3 Approach the solution

At the present time they exists a great number of works, investigations and experiences of the application of the management of knowledge in the university context, in areas like the investigation, the social projection, teaching and the university organization.
Within the experiences related to the investigation it is worth the trouble to mention the Project of Investigation "Management of the Knowledge in Universities and Organisms Public of Investigation" in which a Model for the Direction and Management of the Knowledge in the Universities and Organisms considers Public of Investigation that allowed the evaluation of the investigating capacity of the educational and investigating personnel pertaining to these.

In the area of social projection we have the study and experience that Santoro D. and Bierly P.E relates in his article “Facilitators of Knowledge Transfer in University-Industry Collaborations: To Knowledge-Based Perspective” (Santoro D. and Bierly P.E., 2006) in which it describes the way as the research centers can take the generated knowledge to different organizations.

In the teaching area and university organization we found the investigation and experiences of Medina V. with his project of research “Modelo Organizacional y Tecnologico de Gestión del Conocimiento en la Universidad: Aplicación Universidad Distrital Francisco Jose de Caldas-Bogota (Colombia)” which he developed a Knowledge Management Model for the University. (Medina. V and Joyanes. L. 2004)

These experiences allowed facing some of the problems, which have the Universities, and other authors who will be referenced and they have permitted solve disadvantages of the develop of the Knowledge management in the organizations and the way as we can confront the problematic presented, is through the design and development of a knowledge management model that permit to define the settings of contribution among the members of the academic programs of Technology in Systematization of Data and Engineering in Telematic, to support the system organizational with which they determine the specifications of a technological platform that it backups.

![Figure 1 System Structure](image-url)
These scenes of collaboration will allow supporting the process of education and investigation and will fortify the relation with the surroundings generating greater impact on the community that surrounds taking it knowledge to schools and computers of the people that do not have access to the university, which will allow facilitating the social development.

A knowledge management model that permit to support the administration of the knowledge inside the academic programs, will be conformed by various general elements: the subsystems of organization, knowledge, interaction and a technological platform, Figure 1.

3.1 Subsystem of Organization

Through the years different types of organization have arisen among which are emphasized the bureaucratic organization, “systemic”, contingent, among others. Nevertheless, in the context of the company of knowledge, where the knowledge becomes one of the elements of greater importance, we can visualize a new type of organization where the processes of capture, organization, diffusion, learning, application and evaluation the knowledge are their base.

Nevertheless, an interest approach if formulated by Brian Quinn, who describes his model called “spider’s webs” (EKMF, 2003) as organized networks to attend a private project. At the end of the project the network is dissolved. Spider’s webs, is a plan that permits to resolve complex problems in which are working many specialists simultaneously. It permits the contribution of many specialists in different locations. In the figure 2, the plan of work is shown.

![Figure 2 The spider’s web](image)

If we have in mind the previous points, the subsystem of organization is conformed by professors, students, research teams, and unit of extension and administrative, which are related through an information relation network and the know-how that permit them to interact for the achievement of the activities that they have under their responsibility. The structure of the organization is conserved, nevertheless a plan of work in the shape of network is defined, in which, the different actors are connected each other through the information and the knowledge that require for the development of their activities. The previous thing has permitted greater interaction between their members and greater joined work.

3.2 Subsystem of knowledge

The fulfillment of the vision, mission, objective and strategies of the organization is fortified through knowledge management models that keep in mind the needs and the available knowledge inside the organization, in order to developing or to acquire the necessary information. This knowledge should be diffused the different members of the organization in
order to be applied to the different processes that are carry out. Subsequently the knowledge should be evaluated in order to feedback it and to improve it.

A way as we can visualize the distribution of the knowledge inside an organization is through maps of knowledge that permit us to locate inside the different dependences of the organization the types of information and knowledge that are handled. Additionally, as it says Gutierrez, the map of knowledge is a document of capable, versatile interconnection to admit unexpected events that praises the contents of information by its attraction, dynamism, coherence and confidence, Figure 3.

![Figure 3 Knowledge Management Systems – Knowledge Map](image)

Around the different types of information and knowledge, they rotate different actors and communities, that are the ones that create, capture, organize, diffuse, learn, apply and evaluate each one of these types. To this type of communities we have called them communities of practice, which are conformed by people and groups that consider a common interest in the development of a thematic punctual.

The communities of practice include processes of knowledge that are carry out among the members that conform it and that should be kept in mind at the moment of administering the knowledge of an organization. Different approaches exist as the processes of knowledge inside an organization, one of them plant that the knowledge passes for the phases of capture, organization, diffusion, learning, application and evaluation. Inside this context, the subsystem of knowledge, defines the knowledge management model that permits to administer the information and the knowledge of an organization, from the definition of the map of knowledge of the organization, the different types of information and knowledge that is handled, the communities of practice that bear them and the processes of knowledge that develop. Based in the previous fact, the knowledge subsystem has a knowledge management model. This model allows administering the information and the knowledge that is handled by different people and group of the academic programs. The knowledge management model
integrates the different communities of practice, the knowledge and its respective processes of knowledge.

3.3 Subsystem of Interaction

The interaction of the different members of the organization is fortified with the design and development of settings that permit the diffusion, empowerment and storage of the information and the know-how, necessary for the success of the organization.

The interaction subsystem counted on a scene of diffusion conformed by a Chat that the connection of the nodes of the knowledge network allows developing and interchanging knowledge, a Forum that allows the integration of the opinions and possible contacts that can arise in the network and a LMS Moodle which administers the system of the learning that is generated or been able to generate in center of Knowledge.

The subsystem of diffusion determines the way as is going to transfer the information and the knowledge to the different members of the organization. This should include technological tools that permit to put at the disposal of the people of the organization, the information and knowledge that possesses a person or group of private people.

The empowerment subsystem permits to determine that so much knowledge in reality has been learned for the members of the organization, for such purpose settings they should include themselves and technological tools that permit to do it. This subsystem includes aid to define strategies and to improve the processes of learning inside an organization.

The subsystem of storage will permit to the organization to have a historic memory, share and utilize the information and the know-how of the different members that conforms it, through the time. In a future the organization will include a base of knowledge to present new strategies and to face the changing conditions of its environment. Subsystem of interaction: Once defined the way as the different tools support the processes of the organization, its responsibilities were classified in three subsystems; Diffusion, it counts a Chat that permits the connection of the nodes of the knowledge network, exchanging and developing knowledge. A Forum that permits the integration of the opinions and possible contacts that can arise in the network and a LMS Moodle which manages the system of the learning that is generated or can be generated in the Center of Knowledge. The subsystem of storage conformed by an agent of contents, that has the function of storing the different documents generated inside of the organization, the system of information that administers the information of the users of the platform and a LMS Moodle that permits to store academic contents. The subsystem of empowerment, which counts on a tool that permits to do monitoring to the students of matters you specify, verifying they have been appropriated or not the know-how.

After the previous steps we could define the Knowledge Management Model as Figure 4.
3.4 **Technological Platform**

We define the Architecture of a Knowledge Management System taking in mind that the model has to support a great quality of knowledge.

The Technological Platform: conformed by four technologies for the development and implementation such as Operating System Linux where they will be supported the languages of development and knowledge generated, Language HTML and Java for the graphic development and of presentation to the user and J2EE - JBOSS for the functional development of the Center of Knowledge.

Additionally a web semantic service has been developed to looking for researchers which know related topics of their experiences. It was implemented using Protegé for define ontology, Jena for searches on ontology and Axis like web semantic services content.

4 **Methodology**

The different activities that we made along the developing of the project and subsystems of the knowledge centre were obtained of the integration of the below methodologies:
4.1 Subsystem of Organization

Table 1 Description of the activities developed applying an Organizational Analysis

<table>
<thead>
<tr>
<th>METHODOLOGIES</th>
<th>ACTIVITIES</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Strategic Management (Serna H. 2003).</td>
<td>Design and elaboration of the Surveys.</td>
<td>The surveys allowed knowing the internal and external situation of the organization.</td>
</tr>
<tr>
<td>- Systems of Information (Andreu R., Ricart, J. and Valor, J. 1991).</td>
<td>Recognition of the Organization</td>
<td>This phase understands the harvesting and study of the initial information of the organization, that permit us reunite the mission, vision, objectives, strategic plan, organizing structure and the technological, human resources and financiers with which counts the organization.</td>
</tr>
<tr>
<td>- Organizational Diagnosis (Rodríguez D. 2005)</td>
<td>Internal Analysis of the Organization</td>
<td>This phase understands the analysis of an assembly of internal factors of the organization that permits us to obtain a diagnosis of the internal situation of the organization, with the objective of establishing as the center of knowledge can help to fortify it.</td>
</tr>
<tr>
<td>- Organizational Diagnosis (Vidal E. 2004).</td>
<td>External Analysis of the Organization</td>
<td>This phase understands the analysis of an assembly of external factors that permits to obtain an diagnose of the state of the organization in front of environment that surrounds it, with the objective to establish as the center of knowledge can help to fortify the organization from this aspect.</td>
</tr>
<tr>
<td></td>
<td>Analysis if the variables of the Commission of Accreditation</td>
<td>Based in the surveys we could view the fulfillment level of the organizations besides the variables of institutional accreditation given by the National Commission of Accreditation of the Ministry of National Education.</td>
</tr>
<tr>
<td></td>
<td>Organizational Diagnosis</td>
<td>Based in the previous analysis we obtained the situation of the organization at this moment.</td>
</tr>
<tr>
<td></td>
<td>SWOT Analysis</td>
<td>Based in the organizational diagnosis we could determinate the strengths, weaknesses, opportunities and threats of the organization.</td>
</tr>
</tbody>
</table>

4.2 Subsystem of Knowledge

In the next table we can see the knowledge management methodology applied in our organization.

Table 2: Description of the activities developed applying Knowledge Management.

<table>
<thead>
<tr>
<th>METHODOLOGIES</th>
<th>ACTIVITIES</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Knowledge Management (EKMF, 2003)</td>
<td>Definition of the Knowledge Communities</td>
<td>In this stage were defined actors that build communities in each one of knowledge nodes.</td>
</tr>
<tr>
<td>- Virtual Communities, (Brunold J., Merz H. and Wagner J. 2002).</td>
<td>Definition of the Knowledge Types</td>
<td>In this stage were defined knowledge types and information which are managed in each community conformed by different nodes.</td>
</tr>
<tr>
<td>- Knowledge Management (Nonaka yTakeuchi 1999).</td>
<td>Definition of the Knowledge Processes</td>
<td>In this stage were defined knowledge processes which follow each community for knowledge generation.</td>
</tr>
<tr>
<td></td>
<td>Definition of the Knowledge Map</td>
<td>Once we defined nodes knowledge types was established the knowledge processes that follow in each one of the nodes. Once defined, the processes of knowledge of each one of these was determined.</td>
</tr>
</tbody>
</table>
Knowledge Management (Gutiérrez C. 2004).

Once defined the processes of knowledge, the different technological tools were determined that bear them.

**Table 3:** Description of the activities developed applying Knowledge Management.

<table>
<thead>
<tr>
<th>STAGES</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Management System and Research Groups strategy</td>
<td>In this stage is determined the way in which knowledge management system can support different activities and tasks developed in research groups.</td>
</tr>
<tr>
<td>Definition of Knowledge Management System Architecture</td>
<td>In this stage were defined components that shape the knowledge management system, their functions and responsibilities.</td>
</tr>
<tr>
<td>Business Modeling</td>
<td>In this stage were defined the processes that will be incorporated in the system. They were designed processes diagrams, domain model and glossary.</td>
</tr>
<tr>
<td>Requirements</td>
<td>In this stage were defined the system requirements of knowledge management system. They were implemented use cases though deputation and documentation.</td>
</tr>
<tr>
<td>Análisis</td>
<td>In this stage was defined the conceptual sight for the system through seccuence, collaboration and activity diagrams for each use case and finally an analysis model.</td>
</tr>
<tr>
<td>Implementation</td>
<td>In this stage was defined the programming sight for knowledge model implementing CRC tables and signing responsibilities for each object. An interface, logical, physical models and information dictionary.</td>
</tr>
<tr>
<td>Test</td>
<td>In this stage were developed systems that form the knowledge management model. Here were made deployment diagrams, and component packages and the code of each subsystem.</td>
</tr>
</tbody>
</table>

4.3 **Subsystem of Technological Platform**

4.3.1 Web Semantic Service methodology

**Table 4:** Description of the activities developed applying Knowledge Management.

<table>
<thead>
<tr>
<th>ETAPAS</th>
<th>DESCRIPCIÓN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definición del servicio web</td>
<td>En esta etapa, se creó y monto el servicio Web de forma convencional. En este caso, la descripción del servicio Web es sintáctica, lo que quiere decir que los términos que están asociados al servicio, como entradas y salidas, solo son descritos en función de su tipo de datos y en realidad no se definió la semántica (relación entre conceptos) de ninguno de esos términos.</td>
</tr>
<tr>
<td>Desarrollo del servicio Web</td>
<td>En esta etapa, se realizó el análisis, diseño y desarrollo del servicio Web, a partir de la descripción obtenida en la etapa anterior.</td>
</tr>
<tr>
<td>Publicación y prueba del servicio Web</td>
<td>En esta etapa, se publicó el servicio web y posteriormente se probó su funcionamiento de manera aislada al portal principal del proyecto.</td>
</tr>
<tr>
<td>Incorporación de semántica al servicio</td>
<td>En esta etapa, se analizaron nuevamente solo datos de entrada y salida del servicio Web y se determinaron las clases que es necesario crear. Adicionalmente se agrupan los parámetros de entrada y salida del servicio.</td>
</tr>
<tr>
<td>Creación de las ontologías del servicio</td>
<td>En esta etapa, se realiza la especificación (meta y alcances de la ontología), la conceptualización (modelo conceptual) de la ontología, implementación (formalizar e implementar el modelo conceptual en lenguajes formales) y evaluación, para dos ontologías, una para los conceptos y otra para describir el servicio y su correspondiente implementación en owl-s.</td>
</tr>
<tr>
<td>Montaje y prueba del servicio Web semántico</td>
<td>En esta etapa, se integra la semántica del servicio (almacenada en dos ontologías, una para describir conceptos y otra para describir servicios) con el servicio web definido y probado. Posteriormente, se prueba el servicio Web semántico.</td>
</tr>
</tbody>
</table>
Integración del servicio Web a la plataforma

En esta etapa, se monta el servicio Web semántico, al portal que soporta el modelo de gestión de conocimiento, ofreciendo uno de los servicios requeridos para su funcionamiento.

4.3.2 RUP Methodology

✓ Requirements: This flow job defines all requirements of the platform. Through this one we obtained the Business Model and the Use Cases Model

✓ Analysis: This flow job defined the conceptual view of the platform. Through this one we obtained the sequence, activity, collaboration and states diagrams.

✓ Design: This flow job defined the implementation view of the platform. Through this one we obtained the objects, components, and Databases model.

✓ Implementation: We developed each one of the programs which allowed the functioning of the portal.

✓ Tests: We developed integration and system tests which allowed verify the functioning of the platform of the Knowledge Centre.

5. Results

The design and development of the HM-RG, Knowledge Management for Research Groups, permitted to the research team, generate a methodology for the development of platforms that permit the members of an organization to administer and share knowledge, Figure 5.

![KM-RG platform](image)

**Figure 5 KM-RG platform**

From the methodology obtained, new projects of investigation have been presented that have permitted to improve it and the investigation of new projects approach in lines as the
information flows structuring and knowledge through ontology and social networks. Additionally, the technological platforms have gone improving with the incorporation of new technologies as web semantics, intelligent agents, mobile computation and grid computing.

Currently the platform HM-RG is found mounted in the academic programs of Systematization of Information and Telematic Engineering of the Technology Faculty Distract University Francisco Jose of Caldas a month ago. At the moment this has with 30 students and two professors who have been used the resources thus:

<table>
<thead>
<tr>
<th>RESOURCES</th>
<th>TIMES OF USE IN A WEEK</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chat</td>
<td>3</td>
<td>This has used for subjects like: recreation activities, works of consults.</td>
</tr>
<tr>
<td>Forum</td>
<td>3</td>
<td>This has used by the professors for their subjects.</td>
</tr>
<tr>
<td>Content Manager</td>
<td>1</td>
<td>This has used for one student and his productions.</td>
</tr>
<tr>
<td>LMS Moodle</td>
<td>8</td>
<td>This has used by two professors publishing the content of their classes. This information has been consulted by the students.</td>
</tr>
<tr>
<td>News Manager</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Wiki</td>
<td>1</td>
<td>This has used for one student who has proposed a subject of the interest in the Faculty.</td>
</tr>
</tbody>
</table>

Finally were integrated the knowledge management system and systems with requirements of the system model and knowledge management components supporting the fulfillment of the requirements. Furthermore project enabled the research group Metis, the approach and development of new research projects using the Semantic Web and Semantic Web services, among which are the implementation of educational simulators and construction of intelligent agents based on the technology Semantic Web. The project development and testing yielded two methods to approach knowledge management models and the implementation of semantic web services, which can be used for other development projects and knowledge management system, despite being in its test phase, has allowed members of the Metis research group, having a platform that allows facilitated the development of some of the activities normally carried.

6. Conclusions

The design of a knowledge management model that support the objectives of an organization, should leave to know the way as the people and the groups of an organization administer the knowledge in the real world and to establish the way like is able to use that knowledge the strategies of the organization. This project implied technological platforms that support the knowledge management models are tools that try to simulate the processes of real knowledge in virtual settings that permit the dynamism the work of an organization.

Implementing a model of knowledge management in an organization involves the commitment of its members to share and disseminate information and knowledge they have, the support of the organization by providing the conditions for sharing knowledge and support a technology infrastructure that is able to rely on systems that facilitate knowledge management.

The knowledge management system expands its capacity to support technology in the Semantic Web, enabling support management of knowledge to search for knowledge and information and consultation system.
The semantic web technologies combine semantic web and web services to enhance the interoperability of automated applications, which makes components for the efficient and optimal development of knowledge management for Web 2.0.

The semantic web strengthens the functioning of knowledge management systems to allow any domain of knowledge model which is applied to the system and allowing us to deduce new knowledge based on rules of inference.

Although the design and development of platforms based on knowledge management models, should integrate the structure of the organization and its strategies, the way as is administered the information and the knowledge between the members of the organization and the different forms like is going to be stored and to diffuse the information and the knowledge inside of the organization. Actually we can develop the assembly and the incorporation of a technological platform inside an organization, generates changes that should be carried out in its interior. The previous thing requires of work plans that support the change in habits of the people that utilize it, in order to take advantage of the new possibilities that are offered.

References:


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