

Knowledge Management Model for Research Projects Masters Program

Víctor Hugo Medina García, Darío Alejandro Segura Torres

Abstract—This paper presents the adaptation of the knowledge management model and intellectual capital measurement NOVA to the needs of work or research project must be developed when conducting a program of graduate-level master. Brackets are added in each of the blocks which is represented in the original model NOVA and which allows to represent those involved in each of these.

Keywords—Knowledge management, masters programs, Nova model, research projects

I. INTRODUCTION

THE purpose of pursuing a master's degree is "... To provide the tools for the formulation of research projects ..." [1]. The student applicant must master to present the results of a research project to prove its sufficiency and thus get his Master's Degree. Winning the title of Magister, is the first formal experience of most researchers to a research, at this point and from then on we live together with the measurement of progress and results of a generation of such project.

The result of this research, or otherwise, is but an appropriation, modification or generation of knowledge. To achieve this knowledge must follow a rigorous methodology, usually framed in a work plan and timetable, which is intended to ensure good results of the research process. The development progress of the research is evaluated to see which objectives have been achieved and the current progress on schedule and the best a DOFA matrix, which has its weaknesses [2]. These evaluation methodologies only show progress or delays a proceeding before an initial idea and are limited to assessments of who carries them out, but do not contribute to the research process and leave out the main objective knowledge. In assessing progress through the schedule need to consider whether results have been unexpected, but beneficial in the process and in the case of the DOFA matrix usually leave out these results, as it does not work in assessing the advance of knowledge that was generated during the investigation.

Knowledge management delivery and display means to assess many factors involved in a research and that are not taken into account on a schedule or a DOFA. Some of these media are the knowledge management models that allow visualization of many components involved in the generation, modification and creation of knowledge.

Víctor Hugo Medina Garcia is with the Engineering Doctorate, District University "Francisco José de Caldas, Bogotá - Colombia. (phone: +571 3239300 ext. 1402; fax: 5713239300 ext. 2421; e-mail: vmedina@udistrital.edu.co).

Dario Alejandro Segura Torres, is with the Master of Information Systems., District University "Francisco José de Caldas, Bogotá - Colombia. (phone: +571 3239300 ext. 2425; e-mail: togo3@hotmail.com).

This article aims to show how the knowledge management model NOVA [3] adapted and modified, allows tracking a research project by providing better information to a timetable on a regular assessment.

II. RELEVANCE OF PROPOSAL

Why apply the NOVA model of knowledge management to the development of a research project, which gives this model? A research seeks innovation in knowledge and this is the center of a knowledge management model.

The NOVA model presents temporal characteristics [4], making it compatible with the evaluation of a compliance schedule and goals. The NOVA model is a business model, but 100% applicable to monitoring the evolution of knowledge in any other area, in this case a research process.

A. Schedules

A schedule can be defined as: "Basic scheme where it is distributed and organized as a temporal sequence set of experiences and activities designed along a course. The temporal organization primarily is organized around two axes: the duration of the course and the time the student is expected to focus on the development of each activity".

The activities described in the schedule can be oriented to research project and express activities in terms of research goals. When performing an assessment can determine the degree of compliance with the goals or activities that are expressed but there is a void when it is needed to determine the causes that lead to a delay in the schedule.

When you have no knowledge of the causes that influence outcome it can't take any action, either to correct the cause that leads to failure to schedule and to identify the strengths that they reach compliance. In conclusion, only the schedule for the monitoring of a research project it can't be management performed on it.

III. THE NOVAL MODEL OF KNOWLEDGE MANAGEMENT

A previous proposal to implement knowledge management is presented by Grillitsch [5], which proposes an iterative model of this effort, and shown in Fig. 1. Knowledge oriented promotion of projects throw.

This proposal suggests that the method should be used after the completion of a project to detect the relevant features of it and be applied to the next project. This makes the proposal unworkable for a research project which should be under constant supervision and in the case of a master, at least from the standpoint of the applicant, is a single project and it can't afford to do more to learn to do them well. The model also aims to improve the design process, but not to measure the results.

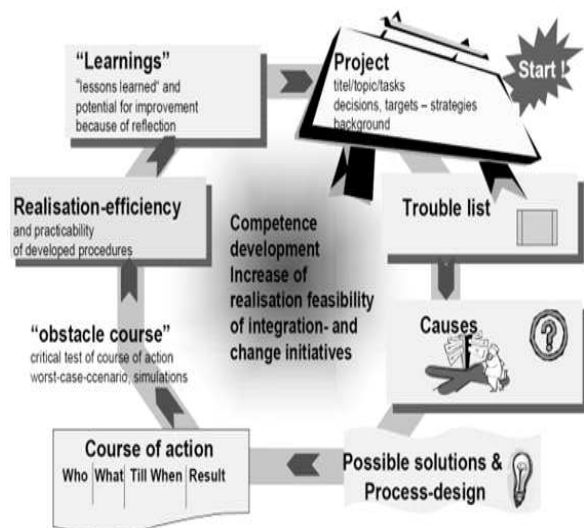


Fig. 1 Knowledge oriented promotion of projects through supervision.
 Source: From [5]

The knowledge management model NOVA [1], it has elements on which to assess the knowledge resulting from a process and can be applied at time intervals without terminating the project to be evaluated. Furthermore, this model is by its nature, iterative allowing for continuous application during the research process. The NOVA model [1] original is shown in Fig. 2.

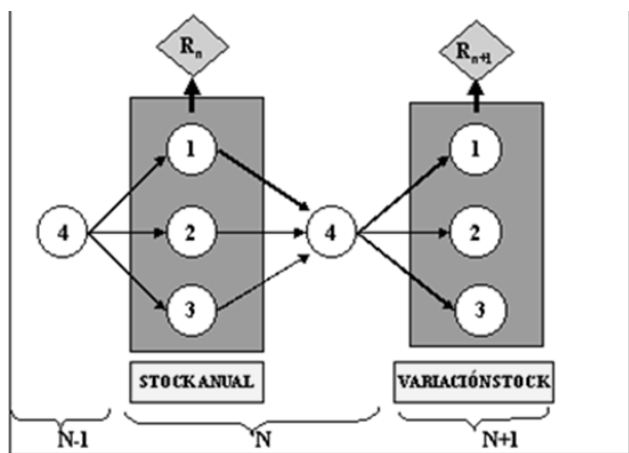


Fig. 2 NOVA model. Source: From [2]

A summary view of the model begins with the definition of the four blocks involved in capital management (represented by circles):

- Human capital
- Organizational capital
- Social capital
- Innovation and learning capital

Human capital refers to the knowledge and skills of those involved in the project. The organizational capital represents the common and specific results of the working group within the company and the same company, for example patents, procedures or techniques.

Belong to this block: the legal part of the products belonging to the company and availability of knowledge of the organization for those involved. Social capital refers to relationships between business that can achieve and maintain, as well as the relationship with enterprise customers, such as maintaining ties and create new links.

The fourth block is the capital of innovation and learning, to which they belong: creativity and innovation skills, knowledge of the processes for new products, effectiveness of efforts to disseminate knowledge and new efforts devoted to innovative activity.

The model expresses, grouping in the green rectangle, as the blocks one, two and three influence the results of the block four, namely knowledge of people, the organization and how to maintain the interaction with other entities and people, stimulate the generation of new knowledge and this knowledge in turn drives new ideas and skills in people, processes and intellectual property of the company and interaction techniques with others.

The model presents a continuous and unstoppable sequence of evaluation for improving the organization from time to time N, a point that gives this model from the others in order to be applied on a project and contrasted with a timetable.

IV. NOVA ADAPTATION OF THE MODEL TO BE APPLIED TO A RESEARCH PROJECT IN THE MASTER'S DEGREE

Why the NOVA model need accommodations? This model is aimed at an organization, so the blocks should be defined clearly in the case of the research project, the model does not express a completion of activities and it can't support the representation of each of the model blocks and possible relationships between them.

The first shoulder is the term organization, which is limited to the educational institution and the research group which is attached to the project.

The model blocks can be limited as follows:

Human capital: This block applies without modification. Involved: "The technical knowledge of people, experience, leadership skills, teamwork, personal stability and ability of directors and the advance of challenges" [1].

Organizational capital: In the case, availability of sources and information from local and external projects. Experience in the subject of the research group. Experience in the research process. Using the group's own findings in other investigations. Training on some issues for those involved.

Social capital: Administrative management, namely in the legal processes of the institution. Information exchange with other research groups inside and outside the school.

Capital Innovation and Learning: Focused towards the goal of the thesis and its specific objectives. Innovations outside the scope of these objectives that benefit the processes and increase knowledge.

Should be added to the model involved in each of the blocks, namely those who support it, as it is important for a research project to detect those responsible for possible solutions.

In terms of human capital involves two people: the director and candidate. But the candidate has greater responsibility, as opposed to a project or undergraduate career where intellectual responsibility lies with the researcher director, since the researcher, the candidate in the case of a master's project is directly responsible search and application of knowledge and the director just a guide. Director is expected that more than knowledge in the field of research and hard work, support the research process, that is the experience that the director must provide support and serve the researcher (Fig. 3).

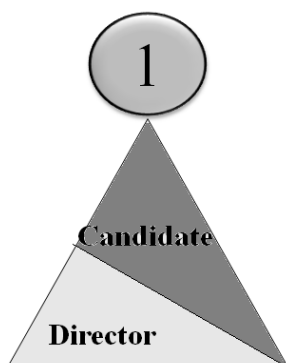


Fig. 3 Block 1 Human capital and support the proposed model. The researcher, candidate for the case of a master's project, is directly responsible and is supported by the Director.

Organizational capital (Fig. 4.) Is supported directly by the research group but in turn this group as part of the institution depends on it at least economically.

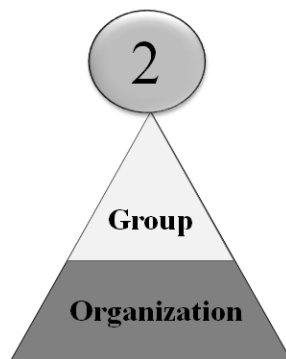


Fig. 4 Organizational capital

The social capital (Fig. 5) is supported by the organization as this must give the director and the applicant's physical and economic resources for the final result and promote interaction with other institutions.

The principal is who has the experience to generate contacts and research protocols in the field, who knows best knows the institution and its regulations. But again, although with less responsibility for the lack of experience in this area, the direct responsibility of social capital is the researcher, but with strong support from the organization and the director.

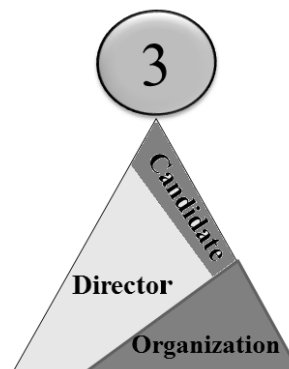


Fig. 5 Social Capital. The candidate is directly responsible for this capital, but should be strongly supported by the director and the organization. As the director to support the candidate needs the support of the organization.

Innovation capital (Fig. 6) is not simply the result of other capitals.

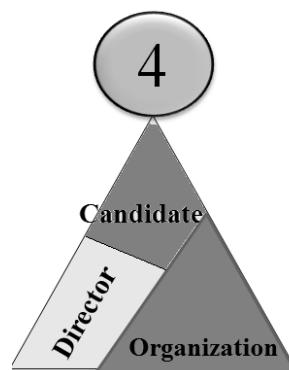


Fig. 6 Innovative capital

Apply the proposed model also allows a document to be developing for the book advances or final research thesis. Allows to reinforce the weak points of the development process of the investigation for a period to reinforce the next.

V. MEASURING INTELLECTUAL CAPITAL RELEVANT

Every so often, as proposed by the NOVA model, you must perform a verification of progress, which must be documented record of making progress and delays, according to the model identifying those responsible for them and possible alternatives to advance issues that are delaying the correct development of the project. Although not always the solution is in the hands of the applicant or the director, the two direct involved, it must identify new strategies to address the events that negatively affect the project.

A. Qualitative indicators

The main indicator of a research project is the knowledge generated, this can be identified with a simple question: "What I know today, did not know before?" And this question must be asked at various levels to determine their significance, are performed at the applicant, at the research group at the level of the organization.

B. Quantitative indicators

The production of documents that support the knowledge acquired must be the primary quantitative measure. All documents such as articles, abstracts or books, are a strong production sample of the project.

Within the research products also fall patents that may be generated, new algorithms, procedures or techniques, which show an improvement in processes and participation in them. It is important to record the progress of each of these indicators, ie the indicator should not be recorded only when it has been, you must register progress or advancement.

VI. PROPOSED MODEL

The proposed model is shown in Fig. 7, which aims to optimize development time of an investigation, particularly for a master's thesis, by applying a continuous assessment model for managing knowledge for a project which managers are few and must show progress in the knowledge of the area.

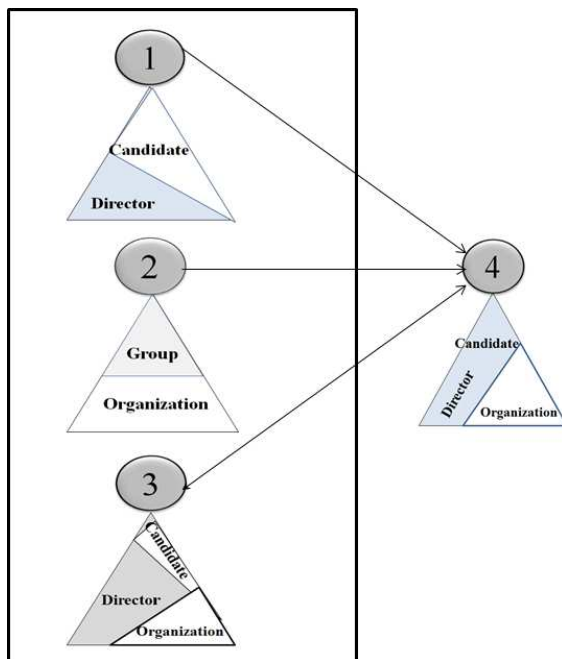


Fig. 7 Final model for a period of time. Source: authors

VII. CONCLUSIONS

In the final model shows the strong responsibility that has an organization to support research by supporting their research groups and researchers. It is the responsibility of the researcher and the research group published results. The model allows to express and communicate the roles involved in the research process and responsibilities of each, to complement classic methodologies for monitoring projects, as these methods do not have a way to express the process of knowledge.

REFERENCES

[1] Universidad Distrital F.J.C. Maestría en Ciencias de la información y las comunicaciones - Misión. Vision. 2007-2011; Available from: <http://www.item.ntnu.no/academics/grading/proj-grad>.

[2] Codina, A. Deficiencias en el uso del FODA. Causas y sugerencias. 2007 [cited 2011; Available from: http://www.degerencia.com/articulo/deficiencias_en_el_uso_del_FODA_causas_y_sugerencias.

[3] Camisón, C. and D. Palacios. MODELO NOVA. 1999. 2011. Available from: http://www.gestiondelconocimiento.com/modelo_valencia.htm.

[4] Diccionario Real academia de la lengua española. 2011 [cited 2011; 22: [Available from: http://buscon.rae.es/draeI/SrvltConsulta?TIPO_BUS=3&LEMA=cultura.

[5] W. Grillitsch, A. Mullerstringl, and R. Neumann, Cross-Project knowledge Oriented Project Supervision, in Real-life knowledge Management. 2006.

Victor Hugo Medina Garcia is PhD in Computer Engineering from the Pontifical of Salamanca University in Spain. DEA Languages, Systems and Software Engineering and Master in Computer Science at the Politécnica University of Madrid in Spain. Specialist in Marketing from the Rosario University and Systems Engineering of the District University "Francisco José de Caldas" of Colombia. Currently is a researcher and senior lecturer at the Faculty of Engineering at the District University "Francisco José de Caldas" in Bogotá - Colombia, where he serves as Director of Engineering Doctorate. It is also coordinator, associate professor and visiting professor in Computer Engineering from the Pontifical of Salamanca University campus of Madrid - Spain. His area of work and research is knowledge management and software engineering, where he participated as a speaker and organizer in numerous national and international events. In the academic field has been linked to Colombian universities as follows: School of Business Administration - EAN, EAFIT, Nacional of Colombia, Piloto of Colombia, Central, Jorge Tadeo Lozano and La Salle. Is even academic evaluator of CONACES (MEN), the CNA and COLCIENCIAS in Colombia and international academic SINAES pair of Costa Rica. Within its business experience, was linked in Madrid (Spain) as a Systems Engineer at Computer Associates and Cullinet Software; and Bogota was Director (E) and Director of the SIE in the Colombian Corporation for Industrial and Technological Innovation (INNOTECH), Director of Systems of the Autonomous Regional Corporation of Bogota - CAR and Systems Analyst, Instituto Colombiano de Crédito Educativo (ICETEX) and the Institute of Transport. Also carried out advisory and consultancy with the Ministry of Defense, the Kaizen Group PBT, Online Systems Ltd, Spiral Computing, Dispotex, Hospital Clinic Tolima, Representaciones Maluma and American Bazaar.

Dario Alejandro Segura Torres is teacher of Santo Tomas University in Colombia. Currently a student of the Master of Science in Information and Communication of the University District "Francisco José de Caldas, Bogotá - Colombia.