LLL TO IDENTIFY AND INTEGRATE COMPETENCES AND TOOLS FOR INNOVATION MANAGEMENT. THE INNOVATION PROCESS MAP.

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Abstract

Innovation is not just inspiration. As in any human field, innovate requires specific tools and competences that helps not only to deploy intellectual muscle, but also specific actions to plan, evaluate and learn. In addition, using the process map model, the question that arises is which are the process related to produce systematic innovation? The authors suggest to analyses three kind of processes facing how innovation takes place in organizations. Operative processes that interacts directly with customer, strategical process decided just by the top managers and support process to make reality above activities. First step to identify competences in any field is to have a clear idea of the process needed to deploy successfully products and/or services. Which are the process related to innovation? Which are the competences related to the identified processes? Once processes are identified and described, next step is outline the competences needed to execute the process and with which tools. Moreover, considering tools, in which organizational areas is possible to identify tools? In addition, which organizational dimensions are involved? In this paper, authors describe how the process orientation is able to help in the Lifelong learning needs identification. Not only competences but also tools needed in the innovation arena. Competences and tools, tools and competences to produce systematic organizational or technological innovation.

Keywords: Tools and competences for INNOVATION, Innovation Management, Process Map for Innovation, Lifelong Learning management, Continuing Engineering Education, Excellence models for LLL management

1   PROCESS MAPS AND INNOVATION: WHY TO CROSS BOTH AREAS?

The more sophisticated the industry gets, the more sophisticated their Lifelong Learning (LLL) needs became. This LLL management principle is the basic light that illuminate this paper. After almost 30 years analyzing LLL needs for individuals and industry, we consider a must to integrate the customer maturation level a variable that explains most part of their needs and potential requirements.

First understanding of the maturity of any organization can be arise using the well-known PDCA concept. Formulated by Walter A. Shewhart and full deployed by Deming [1], individuals must integrate in their DNA that any activity in any organization MUST respond a defined plan on advance (including indicators and objectives), executed using specific tools and/or competences and measured the achieved results. Moreover, to avoid repeating mistakes results must open acknowledge and learning dialogs to conclude new activities or corrections over the planned actions. These thoughts must include the strategic prism, from the tactical approach or from the operative consideration.

LLL organizers must understand the organizational maturity level identifying initially, if the individuals practice include PDCA discipline. If not, is simple to identify a cultural change need. If so, tools and competences for planning, measuring and learning generates an opportunity space for LLL suppliers to offer more and less standard learning experiences. Is important not to forget the systematic PDCA allows, "*to comprehensively improve competitiveness, products and services, improving quality systematically, reducing costs, and optimizing productivity, reducing prices, increasing market share and profitability*" [2].

What we have faced in several LLL projects is the tools for the "executing" phase never respond to general standards. These activities depends on the business nature and the implemented business process. The implementation level of these processes and the organizational maturity on excellence management shows the needed LLL roadmap for the organization. To have a process map description

is a variable that explains deeply how sophisticated the company is and how systematical can be their PDCA approach and practice. Under this consideration, the process definition, manage, measure and improvements gains specific priority for LLL suppliers, as process must be the nucleus of the business deployment. The European Foundation for Excellence Management and ISO 9001 define three process levels: operational, strategical and support ones. Operational process are those processes in direct contact with the customers and the focus must be produce satisfaction on them. Strategical process depends on the top management team and only they activate the process with their decisions. Support process are those that allows the organizations follow their objectives and develop the rest of processes but without direct interaction with external customers. To identify process and the competences and tools needed to their deployment is an excellent first step to define LLL needs in any organization.

Innovation is a concept that has evolved from a pejorative acceptation to the actual "fetishisms". From first interpretations (to change the established order) to actual ones, "*a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)*" [3], innovation means challenges. Our main function as LLL suppliers consist in offer responses for Lifelong Learners to face challenges, to face innovation. Innovation as the activities by which innovations come about or innovation as an outcome. Both cases we must understand deeply what innovation is about and how innovation happens using tools and competences. In addition, to help in the understanding process, Montesinos & Koskinen in 2004 formulated a simple paraphrase to understand innovation "*innovation is to see what everybody see, to think what only a group think and to do what no one has done*" [4]. Nowadays I would recommend to include "… without losing money".

2   PROCESS MAP FOR INNOVATION

Having identify how useful are the process maps to identify LLL needs and having identify how important is to help our customer to manage innovation, which could be the process map related to innovation? Which are the operative, support and strategical processes? Moreover, after that, which are the tools and the competences needed to deploy with excellence each of these processes? Next graphic tries to offer responses to the first two questions.
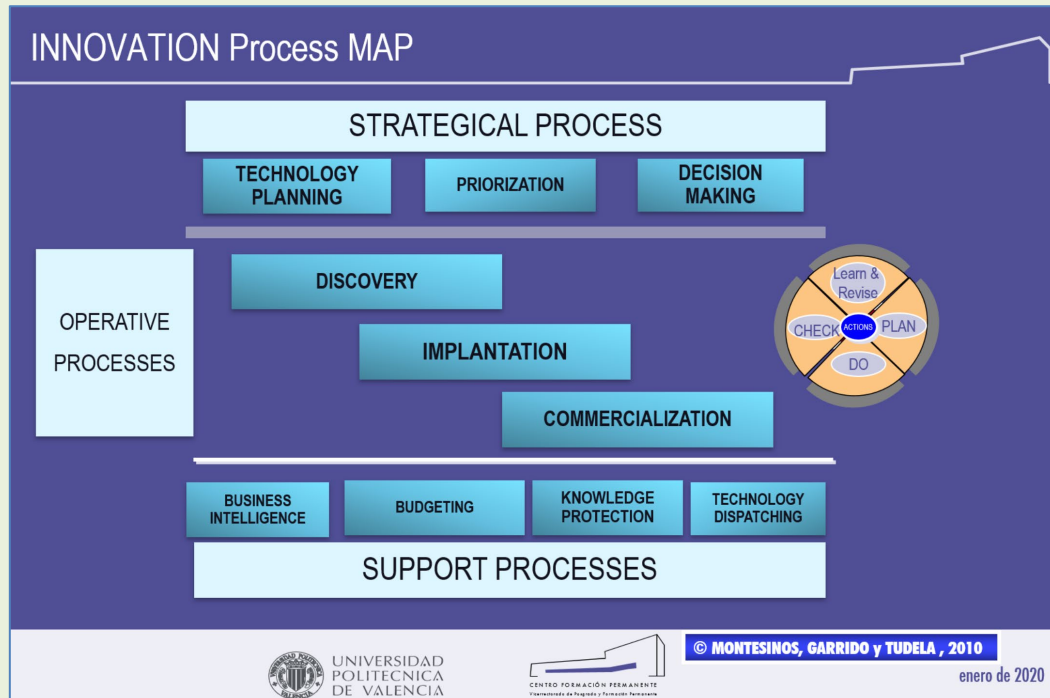

Figure 1. Innovation Process Map (Montesinos et at, 2010)

This process map, developed in 2010 in the *INWENT* project [4bis], solves not only the innovation as an outcome, but also innovation as a set of activities that conduct internal or external innovation. In each case the commercialization will be or internal or external one. Next table shows the description of each of the identified processes.

STRATEGICAL PROCESS		
Technology PLANNING	**PRIORIZATION**	**DECISION MAKING**
It is the selection, deployment and follow-up of short, medium and long-term technological action lines.	It is the strategic ordering of the innovation options discovered for its subsequent deployment and sales.	This process refers to the planning, coordination and evaluation of actions related to the organization, the investments and changes needed, focusing on the interests of customers and stakeholders.
OPERATIVE PROCESS		
DISCOVERY	**IMPLANTATION**	**COMMERCIALIZATION**
It is the process of identifying opportunities. Includes identification of consumer needs, problems, and benefits and finally, the characteristics that are viable for the new product, service or process following customers' expectations.	It is the realization of the innovation projects until the final launch of a new or improved product on the market, or the adoption of a new or substantially improved process within the organization.	The sale (internal or external) of the product, service or process discovered and developed in the above processes. It includes the commercial exploitation of such innovations and and the organizational changes that are developed for it.

SUPPORT PROCESS			
Business INTELLIGENCE	**BUDGETING**	**KNOWLEDGE PROTECTION**	**TECH. DISPATCHING**
It is the systematic search of environmental signals and signs that allow identifying threats and opportunities for innovate.	Process for calculating the costs to the organization of an innovation.	It is the safeguard and care of the technological heritage of the organization, generally by obtaining intellectual property titles.	Process of obtaining, within and outside the organization, necessary technologies and resources needed for the discovery and the innovation implementation, in process and, if it is an innovation in product or service, necessary for its necessary for further marketing.

Table 1. Innovation Process Map description

Each of these processes requires specific competences and tools applications. Problem usually faced is specialists of one area consider JUST their PROCESS as INNOVATION, and this attitude limit identify solutions as a whole. This holistic approach allows depth understanding of the different actors needed to produce innovation. A result in the discovery phase without a correct implantation and commercialization will produce, as all the useless effort, just melancholy. Support process will offer protection not only to the outcomes, but also must guarantee the needed resources (funds and technology) and must offer a logical framework to assure no one is reinventing the wheel. Strategical process will assure the technical framework, will assure a formal priorization and will support the commitments innovation suppose in any field of activity.

Among the tree operative process identified, discovery is a fundamental part but not the only one. In any of the areas is needed special personnel with specific competences and tool management. Organizations use to forget that only with creativity is not possible to innovate, as they forget that just without business intelligence is possible to invent the hot water. The challenge for LLL suppliers? To understand and help to understand customers the (at least) ten needed processes to systematize innovative outcomes and innovative actions. Ten process to organize LLL, to design and supply learning experiences.

3   COMPETENCES & TOOLS FOR THE DISCOVERY PROCESS

As mentioned, discovery is probably the most important process but not the only one. However, is also true that is the less developed formally in engineering education, and as result, is an impotent space for LLL opportunities. As showed in fig. 2, we use three approaches to identify the needed learning experiences for a process deployment: first, the competences (as the muscles), secondly, the tools (as the dumbbells) and finally, the needed culture for the global purpose of the process map.
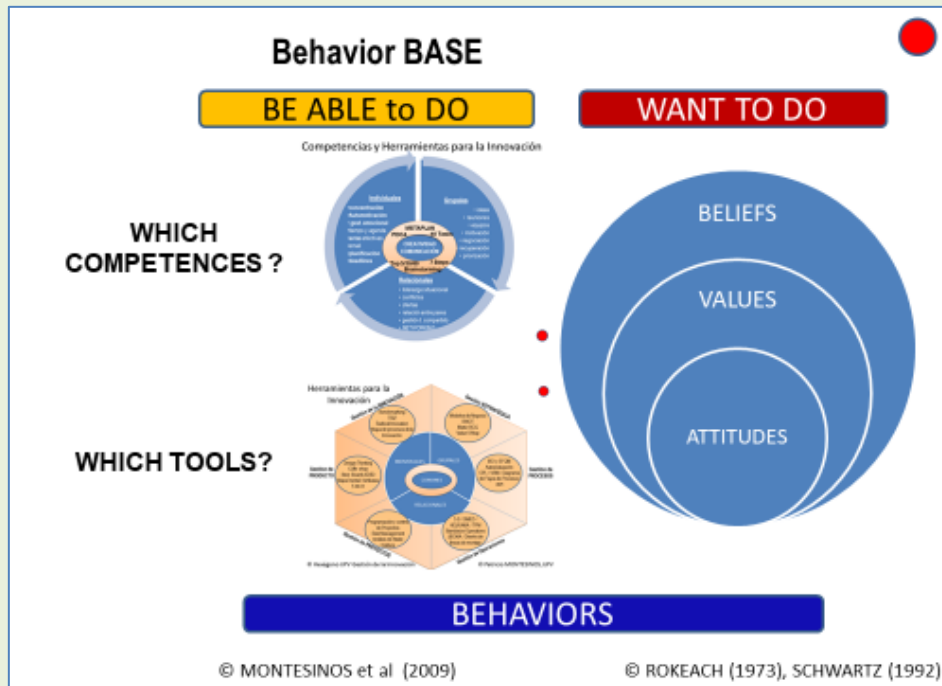

Figure 2. Competences, tools and culture

The understanding of the "competence" concept generates always empirical and theoretical controversy. Two focus exist to land the concept. First is more based on the observable behaviors [5] and the underlying characteristics. Second, more related to the knowledge application [6] [7], helped us to define competence as "to know how to do something". We use this second acceptation for identifying four different competences levels in any activity field: individual, groupal, relational and nuclear. Individual competences are those needed to develop tasks isolated in your work place. Groupal are those competences needed to operate with formal or informal groups inside the organization. Relational are those competences needed to operate externally the department, center, university … with individuals with no direct hierarchical relationship but with common professional interest. Nuclear competences are those that must be present (with different approaches) in the individual, groupal or relational field.

Tools are (following the Collins English Dictionary) "*any instrument or simple piece of equipment that you hold in your hands and use to do a particular kind of work.*" This definition includes the conceptual instruments used in the organizations to empathize, defines, ideate, prototype and test any innovative outcome or activity that generate innovation. We propose six organizational dimensions where innovation happens. Not only products and/or services can be innovated. Strategy, process management, operations management, projects and the same innovation process, are dimensions where is possible to empathize and define, ideate and prototype to test. A toolkit to help innovation in the any of organizational dimensions helps LLL customer to understand and contract the LLL suppliers. Again, time is crucial. Thera are long-term tools (those that needs weeks or months to be used an achieve conclusions) and short terms ones. Short term allows crossing the "creativity road map" just in hours instead of weeks. Both kind of tools are useful and needed but the key questions is to identify when and for what innovation scope will be used and useful. The scope of the tools application is also relevant. The application of same tools can be for strategical purposes, tactical or operative projection, depending of the nature of the identified challenge. Most part of the tools are able to generate strategical

challenges (normally more than one project is needed for the resolution), tactical challenges (usually the solution is related with a single project) and operative ones. Solving the operative ones usually requires just changes in a small set of process activities or product/services characteristics. The ETOP approach (acronym in Spanish for Strategical-Tactical-Operative) showed in the Fig. 3 helps to assign the scope for the innovation challenge and the term. As mentioned, tools are applicable for any of the ETOP levels, with strategical, tactical or operative challenges faced and solved.
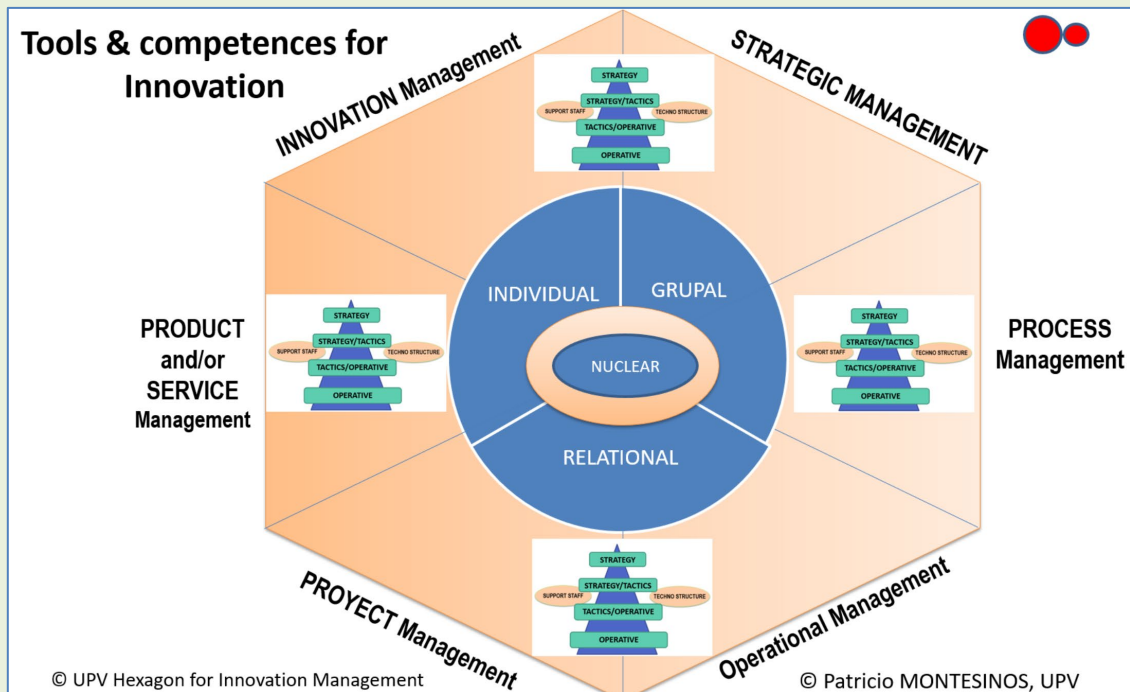

Figure 3. UPV Hexagon for Innovation comprehension with ETOP synchronization

Finally, Culture. Forget the cultural issues guarantees more and more difficulties to deploy innovation in the organizations. Competences and tools are fundamental but without the cultural sensibility, nothing happens and the feeling of burning resources acts against future investments for LLL. Several authors faced the relations among beliefs, values and attitudes [8] [9], and most part of them agree to consider the "culture" as an aggregation of the three elements and their relations. A belief is an idea that an individual holds as a basic true. Value represents "what is important" for the organization. An attitude is something internal and personal. Are mental dispositions individuals have towards situations, the colleagues or the stakeholders before acting with specific behaviors. Attitudes takes place with underlying values and beliefs. To generate innovation culture in the organizations and in the society, actual culture should be understood and secondly, specific actions to evolve belief and values must be planned, deployed and measured and finally, learned over results and rekindled if needed.

Competences and tools will represent if any organization what their individuals "are able to do". Culture is a measure of the willingness, represent if the individuals "want to do". Tools and competences are a measure of the available capacity. Any discrepancy between "want to do" and "be able to do" will generate failures and ambiguities in capacity building, in LLL for innovation deployment. Beliefs evolves based on experiences and fieldwork. Values evolves if the beliefs evolved. Attitudinal changes needs the references and permanent supervision by the top managers. The tree elements conforms what is consider the culture. To work on the culture for innovation is a second space open for LLL suppliers and actors.

4 LESSONS LEARNED & CONCLUSIONS

Many challenges arises to develop organizational innovation capacities. Cultural resistances are as important as the ignorance. One excellent road map to combat both ignorance and reluctance are the in site visits. Observe personally changes and innovation culture in other environments, analyzing best or bad practices are excellent opportunities to move on the cultural change towards innovation. Exist different road maps to set up basis for systematic approach to innovation but probably the most simple to use are the processes discipline. Process maps and all the riteology related support systematic improvements and support systematic land on organizational innovation.

LLL suppliers has an excellent opportunity to use the organizational process maps to organize specific learning experiences to support process thought the needed competences and tools. Oher organizational dimensions (leadership, talent management, strategical planning, alliances, resources management and indicators management) needs their own learning experiences to grow and improve their own competences and tools. It happens also with innovation. Exist tools and competences related to the process maps associated to innovation where LLL suppliers must find opportunities to serve and develop their economical environments. Authors share one example of process maps but for sure, many others organizations made the effort to identify their own strategical, operative and support process for active innovation. The key is not to use this particular process map; the key is to use the process map discipline also in the innovation field. The process map must exist to produce innovation (actions and/or outcomes). The sustainability of the innovation may exist if systematical process design happens, execution takes place and improvement discipline is practice.

Finally, main challenge is to develop the logical frameworks that respond to not only to "which tool for which purpose" but also "when the organization is ready to use the correct tool whenever is needed". This synchronization between tools and competences with the organizational culture is basic to avoid risks in this fascinating duty LLL suppliers must assume to help our societies to improve also from the innovation point of view. An unlimited and exciting panorama for all of us.

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