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Puncturing the Balloon: Creativity and Innovation in STP`s and around. A roadmap for leadership

Parallel Session 1

Organisation of STP Services

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Executive summary

This paper seeks to discuss how STP's, aiming to increase the wealth of its communities by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions, need to review their organizational structures. Rapid escalation of complexity forces us to face the realities and challenges of this time. Our world becomes more interconnected and interdependent. In some cases, STP's are ill prepared to cope with rising complexity. Leaders who will guide through unprecedent changes and will be able to pull in the support of organizational goals that ultimately make the difference are needed. Their complete STP has to become a catalyst for creativity. The author presents a case study of a Brazilian STP, where a process of building an innovation culture using Whole-Brain-Technology is under way. [1]

Keywords

Innovation, creativity, innovation culture, change process, creative problem solving, complexity.

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[1] Date: February 13, 2012

Times of Complexity: Creativity is no Longer Optional

Complexity is seen as the degree of difficulty in predicting the properties of a system, as long as these are given[2]. It has always been part of our environment. Complex systems are high-dimensional, non-linear and rather difficult to model. Not to be confused with complicated, whose opposite is simple, complexity is the opposite of independent. In our modern world, complexity is expected to rise: climate change, energy and water geopolitical issues, vulnerable food, medicine and talent supply chains and serious security threats are forcing leaders of a variety of organizations to embrace creativity as the top competency [3].

Creativity can no longer be seen as an optional competency. IBM's 2010 Global CEO Study showed that over 1500 worldwide chief executive officers identify creativity as the single most important leadership characteristic to navigate through complexity. Today's leaders need to inspire and connect, to interact and lead in ways unseen before.

Strong leadership is essential to face more pressure from global markets. The drive for constantly new products, services and markets to reply to stakeholders expectations and environmental and social factors require a clear leadership strategy. Strategic settings of the organizational direction, alignment across the organization, gaining commitment for performance as well as refining and building strong executives and teams are part of the requirements for leaders of organizations. Skills, knowledge and demonstrated potential become crucial: personal skills like integrity and values, time management, but also people skills that will inspire and motivate others. But creativity is, today, the most valued characteristic.

Often, creativity and innovation are used synonymously. Opinions differ widely about both concepts. Some think that creativity is the starting point. It is important to clearly distinguish between both because the processes are different, as are the risks and the consequences. [4] According to Ned Herrmann, both need different mindsets. Creativity requires acceptance of risk, tolerance of mistakes, acceptance of possible failures. The organization must commit long-term to a creative culture. It is a long, formal and complex process. And for that reason it can be taught and learned.

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[2] Weaver, W. (1948). "Science and Complexity". American Scientist 36 (4): 536.

[3] IBM (2010). "Capitalizing on Complexity. Insights from the Global CEO Study". Somers, NY. USA

[4] Herrmann, N. "Creativity? Innovation? Are they different? Do we need them both?"Focus Volume 10, 3, May-June 1999

Innovation is different. Creative ideas are implemented by a process. Organizations need not only to invent new products and services or business models but must have the ability to convert ideas into new offerings on a regular, well designed basis. To establish a repeatable and scalable innovation process with built-on funding mechanisms that support innovation is the task of the leader we described. It is about designing a social system that sparks new ideas and enables decisions. It is designed cross-functional. Constantly, how to innovate has to be innovated.

Innovation Leaders

Leaders of innovation are crucial for both processes to exist and to be sustainable. The organization is to be renewed daily in order to face complexity and the level of its energy rises considerably [5]. Today, success is not possible with silo mentalities and highly-competitive teams working secretly against one another. People must change their day-to-day behavior throughout the organizations. But change is difficult, painful and requires focus. Leaders of innovation have to deal with this. The most successful ones make sure that their culture not only supports innovation but actually accelerates its execution[6].

Understanding the thinking styles involved in various stages of the creative and innovation processes allows innovation leaders and all individuals involved in them to take advantage of their brain power.

Whole Brain Thinking

The new times of high complexity require more than ever different thinking skills and more creative approaches. Each of us needs to become aware of our brain's capabilities, of our thinking preferences, of our four different selves. Situations arise where we have to optimize our contributions.

Ned Herrmann [7] is the founder of the Whole Brain Model. He worked for over 30 years at General Electric. First as a physicist and then as the Director of Executive Training, he researched about the relationship between the brain and creativity. In the 70's, he created a model which, based on the physical brain, is a

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[5] Lafley, A.G. and Charam, R. "P&G's Innovation Culture". Strategy + Business e-news. Booz & Company, 2008

[6] Jaruzelski, B., Loehr, J. and Holman, R. "Why Culture is Key". The Global Innovation 1000. Strategy + Business enews. Booz & Company. 2011..
[7] Herrmann, N. "The Creative Brain". Brain Books, Lake Lure NC. 1998

metaphor which allows insight of how different people think and communicate. It is used by 9 of 10 Fortune 100 companies.

The individual thinking profile is developed from responses to a 120-question on-line survey form, the Herrmann Brain Dominance Instrument (HBDI). The profiles resulting shows a coalition of four distinct modes of thinking. Combined analytical, organizational, interpersonal and strategic skills, organizations are able to harness creativity and innovation through the individual thinking styles. People get an insight into their own and others'thinking styles. The tool is the basis for skill development training through which they can make the most out of their own preferences as well as outreach for required skills under certain circumstances. Understanding by identifying preferred analytical, structural, emotional and strategic thinking.

The two left brain sides are

A Quadrant (upper left cerebral quadrant) is analytical, rational, mathematical, judgmental thinking concerned financial budgets, data analysis and calculations.

B Quadrant (lower left limbic quadrant) is sequential, controlled, routine, persistent thinking concerned with administration, safekeeping, maintaining the status quo, detail, tactical planning and organization.

The two right brain sides are

C Quadrant (lower left limbic quadrant) is interpersonal, empathetic, people-intuitive, value-based thinking concerned with communications, body sensations, music, nurturing, teaching and training.

D Quadrant (upper right cerebral quadrant) is imaginative, spacial, metaphorical, flexible, idea-intuitive, playful, creative thinking concerned with possibilities, visions, dreams, synthesis, change, innovation and entrepreneurship.

Each quadrant in the Herrmann model represents a cluster of distinct thinking abilities and ways of "knowing". Each person embodies a coalition of these abilities in various proportions. Differences are expressed in different vocabularies but also in different approaches to problem solving.

The HBDI is a tool for organisational and leadership development, personal growth and innovation. By helping individuals to become aware of their own and others' thinking preferences, they improve team effectiveness, productivity and communication and, consequently, performance, competitiveness and bottom-line results. Map thinking styles of leaders who shape strategy, composed R&D groups, task forces and other groups manage to identify out-of-the-box thinkers and risk takers as well as those who prefer analysis, planning and implementation. When assessing thinking styles across learning populations or when managing culture change, mergers or acquisitions, the tool becomes very valuable.

Creative Problem Solving

In traditional school or academic curricula, problem solving is an analytical or procedural approach. It employs almost exclusively left-brain thinking and is individually orientated and therefore competitive. Creative problem solving, however, is a framework that uses whole-brain power. It is iterative, cooperative and highly productive when applied in teams.

Today, thinking skills in all four quadrants are required. A longitudinal study using HBDI assessed the thinking preferences of engineering students at the US University of Toledo[8] arrived to several interesting conclusions, being one of them that industry needs engineers who can think globally and work in teams and society requests engineer/entrepreneurs that can start their own companies and create jobs. The curriculum pro-forma profile showed a strong left tilt, even stronger than the faculty profile. It became clear that students with whole-brain thinking skills and meta-cognitive abilities (thinking about thinking, not just plugging in formulas) are needed.

Demystifying the creative process and understanding the creative problem solving issues helps to understand that the unique creative ability is in each of us. So are the thinking preferences, they are unique. This implies that each individual will approach problems differently. If we accept this diversity and honor it, every member of the team will share their thinking and their ideas openly. Once that openness takes place, creativity of the group emerges. The individual preferences become advantages instead of being obstacles.

Creative problem solving is a framework that stimulates whole-brain, iterative thinking. It starts with Problem Definition, moves on to Idea Generating (many ideas), Idea Evaluation (better ideas) and Solution Implementation. It starts with the question: What is the real problem? Engineers usually use analytical techniques like Kepner-Tregoe, SPC, FMEA, customer surveys etc to collect data to define the problem. When solving problems creatively, we use a broader mindset, asking for the broader context of the problem. This requires right-brain modes and involves other disciplines.

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[8] Lumsdaine, E. and Lumsdaine, M. "Thinking preferences of Engineering Students: Implications for Curriculum Restructuring". Journal of Engineering Education, April 1995, Vol.84 N.2.

The next stage is Idea Generation. Wild and crazy ideas produced by some of the many idea generating techniques (brainstorming, etc) are allowed, while judgment is deferred. Pinching ideas is enhanced. After these ideas are collected, the next step is to engineer ideas with analytical and critical thinking skills. Ideas are not discarded when flaws are found but a further round of creative thinking goes through the process again. Finally, the judging team decides on implementing the optimal solution. Solution implementation is a new problem requiring creative problem solving. Techniques for making plans work, monitor them, plan budgets, time schedules, risk analysis and assessments help in this last stage.

In Ned Herrmann's terms the creative problem solving process starts with a certain interest, preparation of the subject, and then moving to incubation, illumination, verification and finally application of solutions.

Change is not easy. It requires patience, effort and persistence. Thinking in not preferred modes require more energy and provoke higher resistance. But the brain has great plasticity and undergoes changes in structure each time it is used. Creative problem solving allows us to use all our thinking quadrants, work cooperatively in teams and become more productive.

Innovation Culture in STP`s

By IASP's 2002 STP definition,

"... a science park is an organisation managed by specialised professionals, whose main aim is to increase the wealth of the community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions...".
Serving the companies and the innovation community they are involved with requires strong innovation leadership. It is one of the most repeated struggles in the present times: how to create corporate structures that will support and nurture innovation. In companies like in STP's there is not *one-fits-all* recipe.

STP leaders who fail to adapt to change or prepare for a complex and most uncertain future will not survive. The quality of the innovation leader talent is a key factor. Leadership culture is, on one side, all collective actions of formal and informal leaders acting together to influence organizational success and it is

all about pullling together in the support of goals. And, it is the leader himself and the relationship with other leaders within, being formal or informal. Communication, influence and collaboration happens up and down and across organizations. Needless to mention that a good leadership strategy on future leaders becomes crucial. STP's become more global, more innovative, more customer-focused, settle high-growth investments and improve operating efficiency and clearly require a whole-brain approach, a mix of logic, procedures, communication and vision. Just the fact of talking about leadership strategies causes an intervention in itself as useful conversations which otherwise would not have occured take place. They might begin a shift in beliefs and values concerning talent in the STP.

STP's around the world are increasingly considered a tool for regional development, a way to create dynamic clusters which help to increase economic growth and raise international competitiveness. This policy tool is the, by definition, not one blueprint but hundreds of diverse coalition of interests. Some promote more universities and research institutions, others focus on larger, smaller companies or start-up's, others are more government linked. In any case, they are knowledge spaces which allow to achieve critical mass and provide creative solutions to industry demands which grow very rapidly around the world, some in the most remote areas.

By definition, an STP aims to increase wealth by promoting a culture of innovation. This has to start inside, be part of its DNA. Using Innovation's OrgDNA[9] Profiler, an STP can be defined by its structure, its decision rights, its motivators and by information. These four building blocks lead to seven healthy or unhealthy stereotypes. The most healthiest to face complexity is the resilient organization - the one who is flexible enough to adapt quickly to shifts of markets and, at the same time, is very focused on and aligned to a coherent strategy. They can act speedy, responding rapidly to whatever change. Information flows rapidly creating transparency across layers and actors and finally, they are accountable. Clear decision rights and performance transparency produce better personal and group accountability.

Hence, the role of cooperation among innovation support structures in STP's becomes clear. First, the STP's leadership has to openly be committed to creativity and innovation. Crafting the vision and setting the direction and the pace, building mobilized teams which are constantly challenging new complexities and creating their future will allow innovation support structures to flow not only within boundaries but also contaminate other institutions, levels, regions.

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[9] Bordia, R., Kronenberg, E. and Neely, D. "Innovation's OrgDNA". Booz, Allen, Hamilton.2009.

Secondly, barriers must be broken. Empowered and envisioned change leaders across the STP, within in-cubators, research labs, companies, public institutions should be put in place whilst a lot of effective and focused communication helps the barrier braking process.

In third place, ownership is created. Creativity and innovation are embraced, knowledge is shared, bot-tom-up management, idea-flow and continuous learning is embraced.

In this creative and innovative culture, the STP leaders will have a roadmap. Not as a blueprint or as pre-dictions or ends in themselves but as tools that eventually become part of their own DNA. Anticipating and facing complexity with flexibility and resilience is the aim of this roadmap. It will strongly depend on the creative potential and the capacity to face change of individuals, institutions and even buildings of STP's and around.

Cooperation helps coping with uncertain futures: the STP's, their tenants, their related public bodies and knowledge-based institutions and last but not least, the community they are related to by spillover ef-fects.

Building and promoting an innovation culture, as mentioned earlier one of the aims of all STP's, goes be-yond simply responding to change. The change created in the environment forces other organizations to respond and adapt to it. It means a highly interesting competitive and sustainable advantage. The super-structure build on trust and self-reliance allows an exchange of value. This superstructure is the culture of innovation - the way things are done around there. Connecting and collaborating allows pressing human needs to come to surface, to be created and to generate an innovation.

STP innnovation leaders focus on helping individuals understand their mental diversity and their own thinking preferences. Creativity and innovation are no longer options and a culture of innovation is essen-tial when maintaining a competitive edge.

The time of staying withing the balloon, where individuals share their ideas by using logic and common sense, are gone. The balloon must be punctured so that creativity and innovation can flow and serve pressing human needs.

A Case Study: Creative and Innovative Culture of a Brazilian STP

The challenge: Founded in 2003 by the world largest hydroelectic power plant Itaipú Binacional, Parque Tecnológico Itaipú is located at the frontier with Paraguay and close to Argentina, at the Paraná river in Southern Brazil. With 14.000 MW installed, Itaipú supplies 19% of Brazilian and 77% of Paraguayan energy demand. Originally placed in the baracks of former dam construction workers, in 2012 it occupies a surface of 116 hectares and 40 more to be added soon. It has quickly become a major player in the regional knowledge production. Main focus areas are water, energy, tourism and culture. In 2005 management was handed over to the Itaipú Technological Park Foundation (FPTI). Focusing on innovation and regional development, the main areas are Education, Science, Technology and Innovation as well as Entrepreneurship. Today, over 4.000 people work at the TechPark and more than 2.000 daily visitors come to see Itaipú and premises. Partnering with higher education institutions a. o. like prestigious UNILA [10], over 2.000 students study at PTI. Highly sophisticated research & development projects as well as a number of innovation projects are in the pipeline, meaning an increased visibility in the knowledge sector in Brazil.

The fast development with interesting future outlook has lead PTI to review its innovation capacity and to make decisions regarding innovation-related structures. In complex and turbulent times like we are experiencing in 2012, static organizational frameworks with rigid divisions and specialization of labor make it difficult to maintain innovative competitiveness. In seeking a path, the author embraced an innovation culture design and implementation program in 2010.

The approach: Organizational configurations that prioritize flexibility and agility, that encourage experience-based learning and knowledge sharing, that broaden capabilities, build on open innovation and foster teams are leading when talking about the most innovative organizations. The main idea was to ensure that FPTI's culture not only supports innovation, but actually accelerates its execution and generates spill-over effects on the region. By using several tools, and Whole-Brain-Technology as the assessment instrument, the author started first sensibilization activities in May 2010. By midyear, half of the population had been introduced to the concepts of creativity and innovation. In order to identify and measure the gap of innovation perceptions in different areas, the creative climate and innovativeness was analyzed at the start of 2012. Results allowed to write an Innovation Master Plan which was presented to the board of directors. The creation of the STP of the future, meaning more freedom, more decentralized decision-making, scalable learning, information flows with strong innovation leadership had begun.

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[10] UNILA (Latin American Integration University)

The results: The strategy of change innovation management is on its way. The model applied works on various domains: on leadership, on speed and adaption to change, on management and on technical issues. The challenge is big and the goal of this paper is to show some of the issues to be taken into consideration when thinking about designing and implementig a culture of innovation in STP's and to show some of the essential components of the change process, as well as to help identify ideas, strategies and examples. First results of the thoroughly documented structured process will be presented at IASP Tallin Conference. Being an STP leader in today's defiant complexity means embracing change as part of the job description. A shift from knowledge to creativity seems to be following the usual road from information to knowledge and knowledge will become a commodity. The Brazilian case could be an emergent model of a catalyst for creativity.