Innovation Crafting - An Integrated framework

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Abstract
Defining Innovation as successful exploitation of (new) ideas, and realizing innovation to be a social phenomenon, this paper describes an integrated framework called *innovation crafting*. The innovation crafting framework has been culled out of experiences of solving problems at strategic, operational and tactical levels in various domains of military, governance and business. It integrates different methodologies in a seamless manner to help structure the complete innovation life-cycle. These are the Scenario Planning, Theory of Inventive Problem Solving (TRIZ), Edward de-bono’s Six Thinking Hats, the Analytic Hierarchy Process (AHP) and the Dependency Structure Matrix (DSM). The key elements of the framework, various phases and relevant techniques are described in this paper. The paper also describes various case studies where the framework has yielded robust results.

Introduction

Innovation can not be left to happen on its own. We need to make it happen. It is about shifting from what is currently working and look at what is needed and what should be the need of the customers as well. We have experimented with many techniques of idea generation and taking them to fructification. The framework called *Innovation Crafting framework* helps teams, groups, companies in new product development, process improvement, organizational change initiatives, strategy creating and aligning with vision, strategy deployment and variety of scenarios that come up as situations to be explored for implementing change. The framework defines specific phases of the Innovation process and aids the process through established techniques and methods that have given robust results.

Section 2 describes five phases of Innovation Crafting. In each of these phases we have seen efficacy of specific techniques/methodology in multiple experiences. Section 3 describes the specific mapping of these techniques for each of these phases. Paper concludes with Section 4 describing future application and development of this framework.

2. Innovation Crafting – five phases

We define 5 phases of innovation as, situation assessment, idea generation/problem solving, idea clustering/solution development, solution evaluation and solution implementation. As is known to most readers, typically any process divided into such phases will not have very sharp boundaries in each phase, so is the case here. It is the emphasis in each phase that is more important and inclusion of all the phases that is more important than specific sequence. Although we prescribe one sequence of going from situation assessment to solution implementation, but we have seen many variants of the sequence in real life implementations.
Phase I: Situation Assessment

This is the most important phase and may be a genesis of innovation, as if there is no assessment or awareness of the need, typically efforts to meet the need will be a random process. This exploratory phase also is needed to create a common operating picture when multiple stakeholders are involved in the system. This requires abilities to observe, explore and understand systems, situations, scenarios and problems. Further for technical problems/new product development cases, existing patents explorations are utilized for understanding the landscape. In the innovation crafting framework we have two sub-phases for this phase – (a) Open your eyes and (b) Open your heart. Open your eyes requires system exploration using tools helping us to come out of psychological inertias that typically get ingrained in our mind. We have found that human beings being rather emotional and sensitive – sub phase called open your heart has been a revelation in terms of opening the minds to not only to the problem at hand but even to each other. Besides modelling the system and its eco system using various modeling tools, in this phase we also include the Edward de Bono’s Red hat from six thinking hats framework. This phase typically result in one or more common operating pictures that may emerge and prepare the teams for ideation or idea generation.

Phase II: Idea Generation/Problem Solving

Since most of us have variety of psychological inertias, in this phase multiple triggers are utilized to help move towards solutions that may have either led to various solutions in the past (such as TRIZ Inventive Principles, Vedic Mathematics triggers, etc). Further from the point of view of future opportunities – given laws of system evolution from TRIZ, we utilize them to think about future ideas. There are two interesting techniques called Scenario Writing and thought experiments that have helped generate more and different ideas in combination with other techniques. We call this phase as Dream Dreams. This phase results in large number of raw ideas in multiple dimensions in and around the specific problems, issues, opportunities and possibilities.

Phase III: Idea Clustering/Concepts Development/Solution Development

Surprisingly we have found this is the most difficult phase as in this phase the hard work of making ideas work starts. In this phase various concepts need to be developed based on the raw ideas that were generated in the previous phase. In our experience multiple clustering techniques used in this phase help in multiple groups help generate better more robust solutions. In a typical Innovation Crafting Project, many raw ideas get generated from different sources, triggers and thought experiments. Once these get generated, we need to combine them or cluster them to develop them into solution directions. Typically we have the raw ideas already categorized based on different sources or triggers during the ideation sessions.

Phase IV: Solution/Concept Evaluation

At this phase, solutions are evaluated based on multiple criteria such as technical strength of the solution, market potential, enhancing customer value, feasibility of the solution etc. We propose the well established methodology of Analytic Hierarchy Process (AHP) – the multi-criteria
decision making methodology in this phase.

**Phase V: Solution Implementation**

We have found that use of Design Structure Matrix/ Dependency Structure Matrix (DSM) in this phase gives continuous visibility to the project teams and help exploit the concurrancies that typically lie hidden. In this phase we propose a project metric called project cacophony. We have seen the Set-Based Concurrent Engineering (SBCE) used in lean product development can of great value when it is combined with DSM and project cacophony.

3. Mapping Specific Techniques to 5 phases of Innovation Crafting

**Phase I: Situation Assessment**

- Nine Windows Operator
- Ideal Final Result
- What-Why Recursive Hierarchy
- Resources and Constraints
- Value Stream Mapping
- Process Mapping
- Perception Mapping

**Phase II: Idea Generation/Problem Solving**

- Six Thinking Hats
- TRIZ Technological/Business Trends
- TRIZ Inventive Principles
- TRIZ Knowledge of Alternative Ways to achieve a Function
- Vedic Inventive Principles

**Phase III: Idea Clustering/Concepts Development/Solution Development**

- Six Thinking Hats –Yellow hat
- DSM

**Phase IV: Solution Evaluation**

- MCDM – AHP

**Phase V: Solution Implementation**

- DSM – Activity Plan
- SBCE – Set Based Concurrent Engineering (Lean Product Development)
4. Applications and further work

The Innovation Crafting framework has been applied to new product development, software design scenarios, large project management, process improvement and various other complex problem solving situations.

We believe an open framework that uses multiple techniques at the specific need and context helps provide enough flexibility to innovation team. Instead of creating a rigid fixed structure, process, or system, in the world of largely uncertain and unknown future, the flexible, malleable framework should be the way ahead.

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