Managing the Innovation Process

Creativity
Creativity theory and techniques: Part I: What is creativity
Creativity in the Big Picture: Concept generation ...

Source: Lercher 2016, 2017
Methods for generating product concepts

Generating Concepts

Creating concepts internally:
Using a managed process run by the innovation team

Market Research (Voice of the customer)
Creativity Techniques

Gathering (existing) ready-made concepts from the periphery:
Customer Co-Creation

Collect concepts from others inside the organization
Collect concepts from outside the organization
Learning objectives

- Generating concepts internally
  - What is creativity?
  - What is to consider when applying creativity techniques for concept generation?

- Creativity
  - Genius Thinking Strategies
  - Historic Roadblocks
  - Obstacles to Idea Generation
  - Barriers to Firm Creativity
  - Techniques to enhance creativity in firms
  - The Role of Management: Managing creativity in a firm
What is creativity?

**“Genius” Thinking Strategies**

- Geniuses find many different ways to look at a problem
- Geniuses make their thoughts visible
- Geniuses prepare themselves for chance
- Geniuses produce
- Geniuses think metaphorically
- Geniuses think in opposites

*Source: Wikicommons*
Facets of creativity:
What are abilities of a creative person?
Facets of creativity: What are abilities of a creative person?

- **Sensitivity**: Ability to realize problems (early).
- **Originality**: Ability to think “out of the box” and to build up associativity in an unusual manner.
- **Fluidity**: Ability to activate knowledge and terms out of memory.
- **Flexibility**: Ability to adapt knowledge to new tasks and to enlarge and reorganize knowledge because of new insights.
- **Penetration**: Ability to create a deep understanding for problems and situations.
- **Elaboration**: Ability to insistently check potential solutions for their suitability and to further look at them.
- **Redefinition**: Ability to take different point of views in consideration and to be aware of the core problems.
Teresa M. Amabile’s definition of creativity

Creativity is the production of a **novel and appropriate response**, product, or solution to an open-ended task.

- First, the **task must be open-ended (heuristic)**, rather than having a single, obvious solution (purely algorithmic).

- Although the response must be new, **it cannot be merely different** *(the nonsensical speech of a schizophrenic may be novel, but few would consider it creative).*

- Thus, the **response must also be appropriate to the task** to be completed or the problem to be solved: it **must be valuable, correct, feasible, or somehow fitting to a particular goal**.

- Ultimately, a response or product is **creative to the extent that it is seen as creative by people familiar with the domain** in which it was produced.

Source: Amabile 2013
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Creativity theory and techniques:
Part II: Different Schools of Creativity
Creativity as Individual Thought


Four stages of control leading to creativity:

- **Preparation**: "Our mind is not likely to give us a clear answer to any particular problem unless we set it a clear question, and we are more likely to notice the significance of any new piece … if we have formed a definite conception of a case …"

- **Incubation**: First, "…we do not voluntarily or consciously think on a particular problem" Second, "..is the positive fact that a series of unconscious and involuntary mental events take place during that period." We can operate in the preparation phase of a thought, while in the incubation phase of another, to make more effective use of time.

- **Illumination**: The proverbial “light bulb” or “click” as the idea come to fruition. “… when our fringe-consciousness of an association-train is in the state of rising consciousness which indicates that the fully conscious flash of success is coming.”

- **Verification**: Period where the validity of an idea is tested. The new idea is expounded upon to come up with the final solution. Whole process may iterate.
Creativity as Group Activity

Alex F. Osborn: How to "Think Up". New York 1942

Much creative activity takes place in groups or teams. Osborn observed unproductive group meetings in his advertising agency. Came to conclusion that creativity is rather a social than individual process.

Developed brainstorming technique.

- Many variants, but principle is sound: Create first, criticize later.
- For this, start by gathering a list of ideas spontaneously contributed by members of a group.

Four general rules of brainstorming, established with intention to reduce social inhibitions among group members:

- Go for quantity
- Withhold criticism
- Welcome wild ideas
- Combine and improve ideas
Creativity as a complex social psychological phenomenon


Creativity as the results of a socially mediated/enabled process

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Creativity as a complex social psychological phenomenon


Creativity as the results of a socially mediated/enabled process

Everyone is creative, it is not just something for „creative people“: „All humans with normal capacities are able to produce at least moderately creative work in some domain, some of the time—and that the social environment can influence both the level and the frequency of creative behavior.”

Two important assumptions underlie her theory:

- There is a continuum from low, ordinary levels of creativity found in everyday life to the highest levels of creativity found in historically significant inventions, performances, scientific discoveries, and works of art.
- There are degrees of creativity in the work of any single individual, even within one domain. The level of creativity that a person produces at any given point in time is a function of creativity components operating, at that time, within and around that person.

Source: Amabile 2013
Creativity as the result of a network

Creativity is a function of network density and making unobvious connections

- Granovetter’s theory of strong versus weak ties
- Both evolution and innovation thrive in collaborative networks where opportunities for serendipitous connections exist.
- Evolution and innovation usually happen in the realm of the adjacent possible.
- World-changing ideas generally evolve over time as slow hunches rather than sudden breakthroughs.
- Platforms are like springboards for innovations.
- Innovation and evolution thrive in large networks.
- Lucky connections between ideas drive innovation. Serendipitous discoveries can be facilitated by a shared intellectual or physical space.

Source: Blinklist 2010

Creativity theory and techniques: Part III: Amabile’s Componential Theory of Creativity
The level of creativity depends on the context: Componential Theory of Creativity

Influences on creativity include three within-individual and one outside components:

- **Domain-relevant skills**: expertise in the relevant domain or domains
- **Creativity-relevant processes**: cognitive and personality processes conducive to novel thinking
- **Task motivation**: specifically, the intrinsic motivation to engage in the activity out of interest, enjoyment, or a personal sense of challenge
- **Social environment**: Component outside the individual: the surrounding environment – in particular, the social environment.

Source: Amabile 2013
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Creativity-relevant processes

The cognitive process requests creativity (as constructive potential)

Creativity as...

... (1) a personal characteristic which is
(1a) learnable or (1b) inherited.

... (2) a specific form of information behavior

intersections
Creativity as a personal characteristic

Creativity is **learnable**
- **Increase in creativity**
  - Enhancement of probability
  - increased creativity by deliberate combination of creative
- **Education**
  - Creativity as the model of internal education

Creativity is **inherited**
- **Recruiting**
  - Search a problem solver instead of a problem solution
- **Division of labor**
  - Deliberate generation of synergies

Attempt to substituted the „gifted explorer“ (genius) by using adequate methods and framework conditions to enable creativity as a characteristic of „regular“ people.
Creativity as a personal characteristic

Concept generation as a result of personal creativity
Which human characteristics lead to solution capability?

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluidity</td>
<td>Ingenuity</td>
</tr>
<tr>
<td>Big Vocabulary</td>
<td>Adequate diction</td>
</tr>
<tr>
<td>Divergent Thinking</td>
<td>To not be satisfied with one solution</td>
</tr>
<tr>
<td>Originality</td>
<td>Unusual ideas</td>
</tr>
<tr>
<td>Elaboration</td>
<td>Exact development of ideas</td>
</tr>
<tr>
<td>Redefinition</td>
<td>Determination of the essential</td>
</tr>
<tr>
<td>Unconventional Thinking</td>
<td>Unused processes of thinking</td>
</tr>
<tr>
<td>Penetration</td>
<td>Breaking through a problem</td>
</tr>
</tbody>
</table>
Creativity as a personal characteristic

Concept generation as a result of personal creativity
Which human characteristics lead to solution capability?

The innovative solution is a result of intensive cognitive activity about the matter.

Cognitive basis

- analyze
- percive
- decide
- learn
- conclude
- Realize wrong approaches

Association capacity

- Problem solution

Association capacity is the skill to link or transfer established knowledge in a way that new means-end relations emerge or known ones are varied.
Creativity-relevant processes

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intersections
Creativity as a specific form of information behavior

Why does information behavior matter with respect to innovation?
Every generation of alternatives (concepts) is a production of knowledge

- Demand for information
- Information generation
- Searching and trying, finding and inventing leads to *gain of information*

Total amount of knowledge
Subset: „Purpose oriented knowledge“
Creativity as a specific form of information behavior

Why does information behavior matter with respect to innovation?
Every generation of alternatives (concepts) is a production of knowledge

- **Expert knowledge**
  - Ontological componentes
  - Nomological componentes

- **Knowledge of methods**
  - Analytical components
  - Synthetic components

- **Knowledge enabling control**
  - Knowledge about expected outcomes and its environmental conditions
  - Knowledge about resources and potentials
Amabile's Three Component Model of Creativity

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Amabile's Three Component Model of Creativity

Social Environment: *Factors in the environment that serve as obstacles or as stimulants to intrinsic motivation and creativity.*

**Factors that can block creativity**
- Norms of harshly criticizing new ideas;
- Political problems within the organization;
- Emphasis on the status quo;
- Conservative low-risk attitude among top management;
- Excessive time pressure.

**Factors that can stimulate creativity**
- Sense of positive challenge in the work;
- Work teams that are collaborative, diverse and idea-focused;
- Supervisors who encourage the development of new ideas;
- Appropriate recognition for creative work;
- Mechanisms for developing new ideas;
- Norms of actively sharing ideas across the organization.

Source: Amabile 2013
The Role of Management in Stimulating Creativity

Organizational Influences on Creativity: Innovation is the successful implementation of creative ideas within an organization.

How can a manager influence the creativity of her organization?

Source: Amabile 2013
Creativity as a social process

The creative team – Designing as a social process

Heterogeneous groups less prone to groupthink, but also more conflicts

<table>
<thead>
<tr>
<th>Affective conflicts</th>
<th>Process conflicts</th>
<th>Cognitive conflicts</th>
</tr>
</thead>
<tbody>
<tr>
<td>reduce motivation</td>
<td>decrease productivity</td>
<td>multiple points of view (problematic?)</td>
</tr>
<tr>
<td>reduce openness and communication</td>
<td>lead to low task content quality</td>
<td>more innovative ideas and solutions?</td>
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Does brainstorming enhance group creativity?
Conflict as a countermeasure to groupthink?
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Creativity theory and techniques: Part IV: Creativity techniques
Creativity techniques

Problem solving skills of people

- Inherited "natural" creativity
- Available knowledge
- Method competence
- Support by creativity techniques

Creativity as a group activity

- Individual = biased
- Group = effective

Examples of creativity techniques

Intuitive-associative
- Brainstorming
- Brainwriting
- Method 635
- Mindmapping
- Meta-Plan
- MKL-Metamind

Systematic-analytical
- Analyze of functions
- Bionic
- Synectic
- TRIZ Method
- Morphological Box
Creativity-enhancement training programs

Creativity techniques:
Set of creativity-related processes and skills on the individual and group level

Creative Problem Solving (CPS) process:
- Oldest and most widely-used program (and base for many derivations)
- Involves the use of checklists and forced relationships in addition to the brainstorming principles of deferred judgment and quantity of idea generation.

Synectics: "make the familiar strange and the strange familiar,":
- To use cognitive techniques for distancing oneself from habitual thought patterns
- Attempt to see connections between something new and something that is already understood.
- Corresponding cognitive techniques include personal analogy, direct analogy, symbolic analogy, and fantasy analogy.

Source: Amabile 2013
Creativity techniques:

Creative Problem Solving (CPS) process:

**Synectics**: "make the familiar strange and the strange familiar,":

> "Although research on the long-term effectiveness of creativity-training programs is limited, many managers and human resource management professionals utilize such programs for employee development."

Today’s perspective:

Given that creativity depends on intrinsic motivation coupled with skill, large-scale organizational development efforts aimed at embedding creative thinking approaches within an organizational environment that encourages

- skill development,
- rewards innovative results, and
- supports employees’ deep-level intrinsic involvement with their work.

Source: Amabile 2013
Creativity and Innovation

Innovation = Creativity + Action