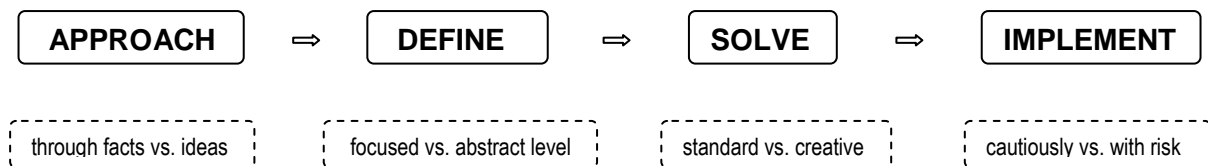


Studying and developing innovation

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Sequencing

The amorphous concept of creativity and innovation is decomposed into a problem-solving sequence composed of approaching the innovation (problem), defining it, solving i.e., producing solutions and implementing the innovative solutions. This sequencing enables to “get hands on”, i.e., truly understand and develop innovation. The ADSI sequence allows identifying innovation resources and hindrances in individuals and work teams.



Bringing opposites together

The second novel perspective for better coming to grips with innovation involves focusing on its polar interaction character. That is, thinking or cognitive styles that regulate or “drive” problem solving behavior have a bi-polar nature: individuals are described as e.g., being predominantly oriented to facts vs. to ideas in their manner of approach. Innovation, in turn, is a function of the interaction between such polar opposites. In other words, innovation derives not from some singular quality as idea-orientation, but from some form of interaction between polar opposite styles of thinking e.g., fact vs. idea-orientation. According to the present concept, coaching of innovation (or problem solving) is much about broadening the “passage of thinking” by challenging individuals to think in ways opposite to what they are accustomed to. In the above example, this means to have fact-oriented individuals rehearse idea-orientation, and vice versa. In workgroups, this translates into having differently thinking people interact with one another.

Strengthening implementation

The innovation sequence ends in implementation through either, cautious-controlled vs. quick-risk-taking manner. However, implementation deserves more attention, particularly to the motivational and attitudinal factors that serve to strengthen or inhibit it. Focus is put on such things as general achievement motivation and motivation for social interaction (given the team nature of work), as well as optimistic, success-expecting attitude. Motives drive action aspects of innovation while attitudes shape viewing of the world and oneself. The same drivers apply to individuals and work teams.



Innovative person - innovative workgroup - research at three depths - August 2011.

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Creative personality of adults has received a fair amount of empirical research throughout the history of psychology. Probably the most well-known research tradition is embodied in the studies of the Institute of Personality Assessment and Research (IPAR) at University of California at Berkeley where the author served as staff assessor and PhD student in 1986-89. The IPAR and other studies have demonstrated generality for varied personality factors as markers of creativity across occupations, an example of which is the Barron-Welsh Art Scale measuring the cognitive style of aesthetic preference. What remains less well-known is what really happens in creativity, what are the more specific effects of personality factors. Obviously, the amorphous nature of "creativity" has not encouraged more differentiating analysis and we know little about psychological factors' assumed regulation of creative accomplishment - which remains a fairly mysterious black box.

At FIRST depth, the present research performs a traditional study where personality factors are used as predictors of final creative accomplishment. A wide set of motivational, cognitive style and attitudinal factors of personality - measured by self-report, projective and non-verbal methods - are employed as predictors of creativity. To get at the mysterious process of creation, the study's SECOND level of depth involves replacing creativity with the broader, utility and process connoting concept of innovation. Innovation is further conceptualized as a problem solving sequence composed of approaching, defining, producing solutions and implementing (innovative) solutions. These sequential phases are presumed to be regulated, "driven" by a corresponding set of cognitive styles. The decomposing of innovation into problem solving offers a more tangible, differentiated screen upon which personality drivers may be projected. The study's THIRD level of depth starts from the assumption that innovation actually emerges from the interaction between polar drivers operating in each sequence. In other words, innovation should not be seen only as having good ideas, but having good ideas and facts interplay with one another.

As innovation - and all work - is today increasingly performed in teams, the question arises whether the same drivers that shape individuals' innovation also drive workgroup innovation. As with individuals, the study questions whether workgroups require a maximal amount of single drivers (traditional view) or, whether the interplay between opposing, polar drivers is the real key to innovation. In workgroups, such interplay translates into having differently thinking people interact with each other.

The research launches in September 2011, in a 2-year full-time master's program in Service Design Engineering (SDE) at Aalto University (<https://into.aalto.fi/display/ensde/Homepage>). This program is a core master pilot of the European Institute of Innovation and Technology (EIT). Students are prepared for careers in software and media business and major in technology, innovation, design, management or venturing. The studies emphasize multidisciplinary approach and development projects are conducted in teams for real clients. The research collects self, peer and teacher ratings at intervals and projects are evaluated by clients.

THREE STUDY DEPTHS

I. Innovation as final accomplishment;
driven by motives, cognitive styles and attitudes

II. Innovation as a problem solving sequence;
driven by a sequential cognitive styles

III. Innovation as product of sequential driver interactions;
driven by the interplay of sequential cognitive styles (in polar opposition)

Cognitive styles (Wopi)

Innovation sequence

| | |
|--|---|
| Orientation to facts vs. ideas | → Approaching (innovation) through facts vs. through ideas |
| Perception on concrete vs. abstract level | → Defining (innovation) on concrete vs. abstract level |
| Thinking analytically vs. intuitively | → Producing standard vs. creative (situation-sensitive) solutions |
| Deciding in controlled vs. risk-taking way | → Implementing solutions in controlled vs. risk-taking manner |

MEASURES: All personality (driver) measures can be performed online (via internet) allowing subjects to fill out the tasks at their convenience -- the measures are presented briefly below.

Wopi - Work Personality Inventory; standardized self-report questionnaire, a comprehensive inventory of personality factors at work. 224 question items form 14 scales for motives, sequential cognitive styles and attitudes presumed to steer behaviour and competence at work. The cognitive styles dimensions are patterned as a four-step sequence and presumed to shape the corresponding phases of planning & problem solving: 1. orientation to facts vs. ideas; 2. perception on concrete vs. abstract level; 3. thinking in analytic vs. intuitive way; 4. making decisions in a controlled vs. risk-taking style. **Core questions:** (I.) do motives, cognitive styles and attitudes function as drivers of innovation as final accomplishment. (II.) do sequential cognitive styles predict innovation as sequential accomplishment. (III.) Is innovation a product of interplay between sequential cognitive styles in polar tension.

BW - Barron-Welsh Art Scale; measures the cognitive style of aesthetic preference. Respondents express liking/disliking of non-representational line drawings. The test includes qualities such as symmetry vs. asymmetry, balance vs. imbalance, stability vs. lability, consonance vs. dissonance. High scores have shown to correlate with creative accomplishment across a wide array of occupations, from art to business (IPAR studies). **Core questions:** (I-II.) does aesthetic preference predict innovation as final/sequential accomplishment. (I-II-III) does psycho-aesthetics offer particular explanations.

Bvis - Bett's Vividness of Imagery Scales; measure the cognitive style of imagery vividness. The exercise has scales for eight sensory modalities, e.g., visual, auditory, olfactory, etc. imageries. The exercise has subjects rate their imagery vividness across a set of playful sensory-specific imaging tasks. Research has shown that e.g., kineasthetic imagery correlates with innovation in banking/financing. **Core question:** (I-II.) does imagery vividness predict innovation as final/sequential accomplishment.

PSE - Picture-Story-Exercise (TAT); measures non-conscious, implicit motives shown to correlate with industrial and entrepreneurial innovation (McClelland tradition). PSE allows looking at motives in contexts, in storied form. In writing imaginative stories to stimulus pictures vaguely hinting at innovation, individuals project their own behavioural tendencies into the stories. The four innovation-fantasy arousing pictures are: (1) Boy looking at a violin (*approaching* innovation), (2) Four men conversing around a table (*approaching-defining* innovation), (3) "Marie Curie" with test tube (*producing solutions*), (4) Two women with lab coats (*producing solutions*). **Core questions:** (I-II.) do nonconscious, implicit motives predict innovation as final/sequential accomplishment.