

Creativity, Innovation and Intellectual Property (LCMB7007)

Week – 8

Part 2

Innovation Impulses

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INNOVATION IMPULSES

SOURCES OF INNOVATION IMPULSES

Internal environment

- Own R&D
- Technical divisions – design, technology
- Production divisions (production, provision of services)
- Marketing and sales
- Logistics (purchase and supplies)
- Guarantee and post-guarantee service
- Owners

SOURCES OF INNOVATION IMPULSES

External environment

- Customers
- Suppliers
- Competitors
- Consultants, R&D institutions
- Schools, universities
- Professional publications, Internet
- Exhibitions, fairs, specialized seminars and conferences
- Advertising agencies
- Investors
- Media
- Authorized testing laboratories, certification agencies
- State institutions, public sector
- Legislation
- Globalization

MARKET PULL - R&D PUSH

- **Market pull**

- looking for the best way of satisfying a newly emerging customer demand
- improvement of the existing products, extension of the existing offer or decrease of price
- impulses for continuous, incremental innovations or for process innovations

- **Research and development push**

- looking for commercial use of new impulses resulting from the R&D results
- generating of new markets for conceptually different products

7 SOURCES OF INNOVATION IMPULSES

(Drucker)

INTERNAL

1. *unexpected event*
2. *contradiction*
3. *change of work process*
4. *change in the structure of industry or market*

EXTERNAL

5. *Demographic changes*
6. *Changes in the world view*
7. *New knowledge*

1. **Unexpected event**

- *Unexpected success*

- 1) What will the use of the offered opportunity mean to us?

- 2) Where will its introduction take us?

- 3) What do we need to do for its implementation?

- 4) How can we achieve that?

- 5) *Unexpected failure*

- 6) *Unexpected external event*

2. **Contradiction**

- *Non-compliance with economic reality*
- *Contradiction between reality and anticipations about it*
- *Contradiction between the anticipated and real behavior of customers and their values*

3. Change of process

- realize the necessity of change, identify the weak point of the chain
- be convinced that if something does not work the way it should, then it is necessary to attempt a change
- the solution must be convenient for those who will implement it. It must place moderate and feasible requirements

4. Change in the structure of industry and market

- Rapid growth of the industry
- Identification of new market segments
- Convergence of technologies (e.g. use of computers in telecommunications)
- Rapid change of the industry and resulting need of a structural change

5. Demography

- easiest to describe and to predict
- influence what will be bought, who and in which amounts will purchase

6. Change of attitudes

- change in the approach to health: health-care, food, spending the leisure time
- “upper-middle class”: a chance to offer non-standard services at non-standard prices
- increasing migration, feminism, regionalism etc
- Timing is essential - to be the first

7. New knowledge

- Based on convergence or synergy of various kinds of knowledge, their success requires, high rate of risk
 - Thorough analysis of all factors. identify the “missing elements” of the chain and possibilities of their supplementing or substitution;
 - Focus on winning the strategic position at the market. the second chance usually does not come;
 - Entrepreneurial management style. Quality is not what is technically perfect but what adds the product its value for the end user

IMPULSES FROM THE MARKET ENVIRONMENT

- Customers
 - product presentation**
 - **realistic**
 - **simple, demonstrative and precise**
 - **moderate**
 - **representative sample** of customers
- Suppliers
- Competitors

INNOVATION IMPULSES OF THE R&D

- **identification research:** to monitor the scientific, technical and economic information and identify innovation impulses applicable in the company
- **basic research**
- **applied research:** acquire knowledge and means applicable for the meeting of specific, beforehand-defined goals
- **development:** systemic use of knowledge and means acquired in the applied research for the creation of a new or improvement of the existing product or for the creation or modification of processes

INTERNAL IMPULSES

- usually combined with external sources
- supported by
 - creative techniques
 - innovation tools
- REGISTER OF IMPULSES

GENERAL INNOVATION TOOLS

- ★ Benchmarking
- ★ Brainstorming
- ★ Business Process Reengineering
- ★ Change Management
- ★ Technology Audit
- ★ Technology Forecast
- ★ Value Analyses

PRODUCT INNOVATION TOOLS

- ★ Design for X
- ★ Quality Function Deployment

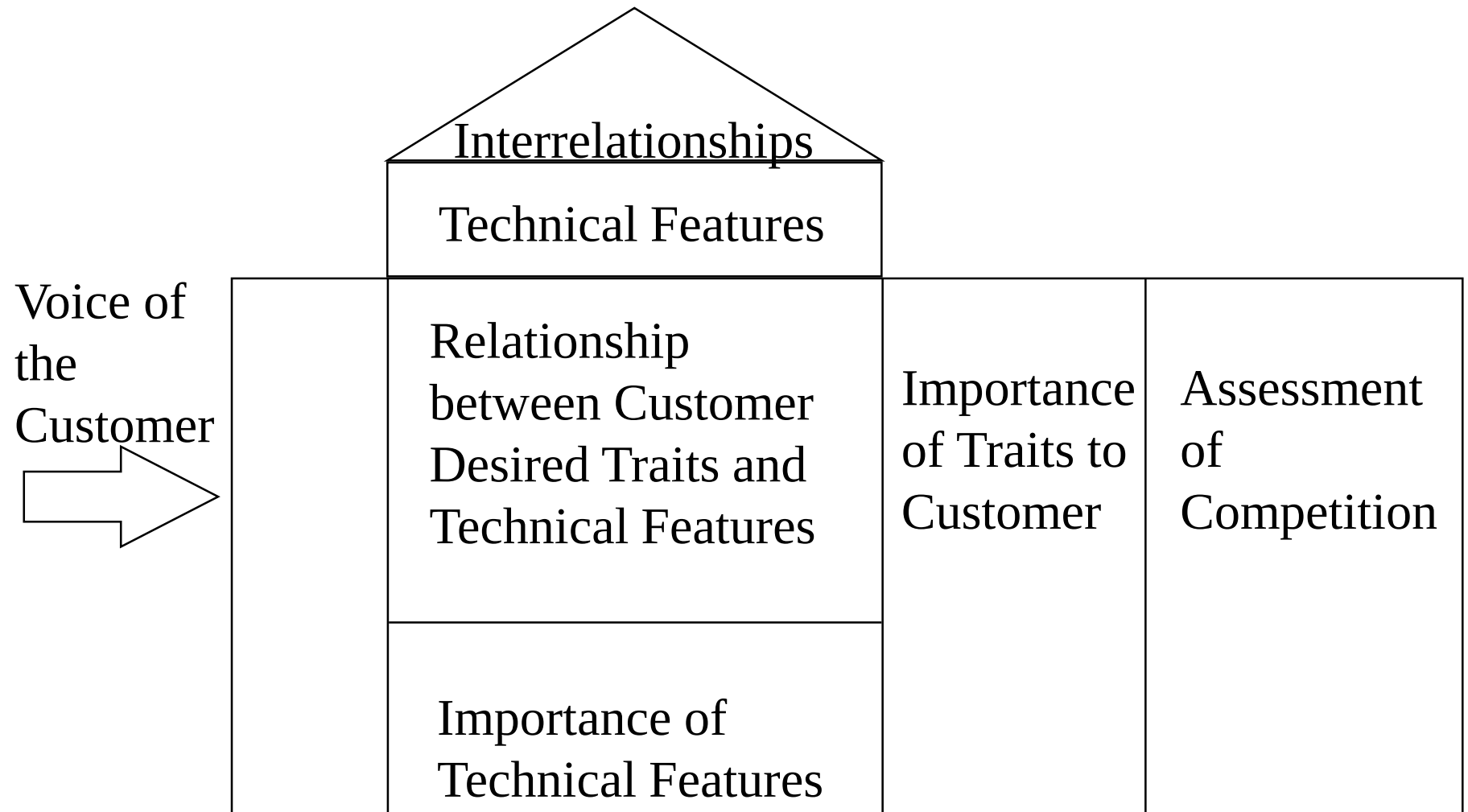
MANAGERIAL INNOVATION TOOLS

- ★ Failure Mode and Effect Analysis
- ★ Peer Evaluation
- ★ Team Building
- ★ ISO 9000
- ★ Total Productive Maintenance

PROCESS INNOVATION TOOLS

- ★ Design for Manufacture and Assembly
- ★ Lean Thinking
- ★ Continuous Improvement
- ★ Concurrent Engineering
- ★ Just In Time

House of Quality



House of Quality: Steps for Generation

1. Identify Customer Attributes
2. Identify Supporting Technical Characteristics
3. Correlate Customer Attributes with Supporting Technical Features
4. Assign Priorities to Customer Requirements and Technical Features
5. Evaluate Competitors' Stances and Products
6. Identify Technical Characteristics to Deploy in the Final Product Design

Innovation and creativity

- creativity is manifested in the production of a creative work (for example, a new work of art or a scientific hypothesis) that is both *original* and *useful*
- innovation begins with creative ideas,
 - creativity by individuals and teams *is a starting point for innovation*; the first is a necessary *but not sufficient* condition for the second
- creativity results:
 - in producing or bringing about something partly or wholly new;
 - in investing an existing object with new properties or characteristics;
 - in imagining new possibilities that were not conceived of before;
 - and in seeing or performing something in a manner different from what was thought possible or normal previously.
- Many creative ideas are generated when somebody discards preconceived assumptions and decides on a new approach or method that might seem to others unthinkable
- Serendipity - effect by which one accidentally discovers something fortunate, especially while looking for something else entirely

BASIC CONCEPTS

- ***Creative thinking represents a combination of logic and intuitive approaches***
- Being creative means dealing with the aspects and possibilities of today and tomorrow
- That requires a person to be open to everything new, do not stick to things that we are all used to, do not adhere to yesterday so much
- Creativity does not mean dreaming, it means productive managing of specific tasks.
- Only a creative approach to the problem solution can be successful.

Creativity in organizations

- **Amabile:** to enhance creativity in business, three components are needed:
 - **Expertise** (technical, procedural & intellectual knowledge),
 - **Creative thinking** skills (how flexibly and imaginatively people approach problems),
 - **Motivation** (especially intrinsic motivation).
- **Nonaka:** creativity and knowledge creation are important to the success of organizations. In particular, he emphasized the role that tacit knowledge has to play in the creative process.

Creativity and economics

- Joseph Schumpeter: ***creative destruction*** - the way in which old ways of doing things are endogenously destroyed and replaced by the new.
- Paul Romer: the recombination of elements to produce new technologies and products and, consequently, economic growth. Creativity leads to capital, creative products are protected by intellectual property laws.
- The ***creative class*** as important driver of modern economies. Richard Florida in *The Rise of the Creative Class*, 2002 popularized the notion that regions with "3 T's of economic development: Technology, Talent and Tolerance" also have high concentrations of creative professionals and tend to have a higher level of economic development.
- Important aspect to understanding **Entrepreneurship**.

Stages of creative process

- Orientation: Need identification, intention to create
- Preparation: Information collection, problem formulation
- Incubation: seeking solution, evaluation of variants, unconscious thinking
- Illumination (Eureka!): synthesis, creation of ideas
- Realization: transformation of the idea into reality
- Verification: evaluation, learning, improvement

Barriers to creativity - 1

- The value of getting things right time can induce a fear of mistakes and experimentation.
- So can a blame culture where people become afraid of making mistakes.
- Managers who are not as secure as they should be can resist or block ideas that are not their own or which they see as threatening.
- A culture that over emphasizes cost containment, processes, consistency or efficiency.
- A reward system that too exclusively celebrates getting things done fast with no mistakes.
- A general fear of risk taking, wanting to analyze everything to death, to wait and see what others do in the market before acting.

Barriers to creativity - 2

- A lack of explicit funding for experimentation.
- A strict requirement to demonstrate the value of an idea before it has a chance to prove itself.
- A tendency to shoot down novel ideas as a way of scoring points.
- An over allegiance to past successes, proven experience and tried and tested methods.
- A suspicion of novelty, a fear of the unproven.
- A resistance to learning from mistakes or trial and error, a tendency to blame external factors or other people for failures rather than to learn from them.
- Short termism - a drive to meet short term financial goals rather than to invest in the future.

Barriers to creativity – 3

<http://members.optusnet.com.au/~charles57/Creative/Basics/obstacles.htm>

CREATIVITY STIMULATION

- Keep in touch with creative people
- Accommodate the effort to the targets
- Evaluate and appreciate the effort
- Protect creative employees
- Leave them peace and time
- Provide them with security
- Tolerate failures
- Maintain creative atmosphere
- Evaluate the creative ideas quickly
- Be persistent - nothing comes for free

Fostering creativity

- Establishing purpose and intention
- Building basic skills
- Encouraging acquisitions of domain-specific knowledge
- Stimulating and rewarding curiosity and exploration
- Building motivation, especially internal motivation
- Encouraging confidence and a willingness to take risks
- Focusing on mastery and self-competition
- Promoting supportable beliefs about creativity
- Providing opportunities for choice and discovery
- Developing self-management (metacognitive skills)
- Teaching techniques and strategies for facilitating creative performance
- Providing balance

METHODS OF CREATIVE ACTIVITY

- increasing the individual's or team's creative potential
- contributing to the improvement of the creative work conditions
- facilitating the problem solution

Creative Process

- ***Problem Definition*** - including problem analysis, redefinition, and all aspects associated with defining the problem clearly.
- ***Idea Generation*** - The divergent process of coming up with ideas.
- ***Idea Selection*** - The convergent process of reducing all the many ideas into realistic solutions
- ***Idea Implementation*** - Turning the refined ideas in reality.
- Processes - Schemes and techniques which look at the overall process from start to finish (or at least 3 of the above 4 areas)..
- [http://www.mycoted.com/Category:Creativity Techniques](http://www.mycoted.com/Category:Creativity_Techniques)

Synectics

- problem solving approach that stimulates thought processes of which the subject is generally unaware.
- developed by William Gordon,
- central principle: "Trust things that are alien, and alienate things that are trusted."
- Encourages
- fundamental problem-analysis and, on the other hand,
- the alienation of the original problem through the creation of analogies
- It is thus possible for new and surprising solutions to emerge.
- Synectics is more demanding of the subject than brainstorming, as the many steps involved mean that the process is more complicated and requires more time and effort.

Synectics - steps

- Analysis and definition of the problem
- Spontaneous solutions
- Reformulation of the problem
- Creation of direct analogies
- Personal analogies (identification)
- Symbolic analogies (contradictions)
- Direct analogies
- Analysis of the direct analogies
- Application to the problem
- Development of possible solutions

Lateral thinking

- de Bono
- methods of thinking concerned with changing concepts and perception; reasoning that is not immediately obvious, ideas that may not be obtainable by using only traditional step-by-step logic
- shifting of thinking patterns, away from entrenched or predictable thinking to new or unexpected ideas.
- A new idea that is the result of lateral thinking is not always a helpful one, but when a good idea is discovered in this way it is usually obvious in hindsight, which is a feature lateral thinking shares with a joke
- We may need to solve some problems not by removing the cause but by designing the way forward even if the cause remains in place
- [http://en.wikipedia.org/wiki/Lateral thinking](http://en.wikipedia.org/wiki/Lateral_thinking)

Lateral thinking vs. critical thinking

- Critical thinking is primarily concerned with judging the truth value of statements and seeking errors.
- Lateral thinking is more concerned with the movement value of statements and ideas. A person would use lateral thinking when they want to move from one known idea to creating new ideas.
- Critical thinking is like a post-mortem while lateral thinking is like diagnosis.

Lateral thinking - inspiration

- **Random Entry:** Choose an object at random, or a noun from a dictionary, and associate that with the area you are thinking about.
- **Provocation:** Declare the usual perception out of bounds, or provide some provocative alternative to the usual situation under consideration. Prefix the provocation with the term 'Po' to signal that the provocation is not a valid idea put up for judgement but a stimulus for new perception.
- **Challenge:** Simply challenge the way things have always been done or seen, or the way they are. This is done not to show there is anything wrong with the existing situation but simply to direct your perceptions to exploring outside the current area.