Innovation Management in practice

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Abstract

Although the process of innovation is one of the most important drivers behind the growth and prosperity of today´s global economy, it is also one of the least understood.

The new challenge is to master the process of innovation, creating new competitive advantages by offering better products, using better processes, delivering better services or even offering enterily new solutions.

This trend has enforced the companies to be more innovative and to launch new products on the market in a rapidly increasing sequence.

What is Innovation in basic terms? Many definitions are stated in text books about innovation, but a general definition is that innovation occurs when inventions of new products or processes are brought out of the workshop or the laboratory and getting them ready for the market.

Lars Kolind, previous CEO of the company Oticon, the winner of the Danish Innovation Cup 2006, defines innovation as Creativity + ability to carry out the plans.

It is possible to differentiate three categories of innovation: product innovation, service innovation and process innovation. In this paper focus will be on how to carry through product innovation, but the basic theory and methods used in all categories are the same.

In accordance to David Smith, product innovation may be divided into incremental innovation, architectural inovation, modular innovation and radical innovation. In radical innovation new components are linked in new configuration or architecture. This strategy but also architectural innovation, where improved components are linked into new configurations, may contribute to the Blue Ocean Strategy defined by Chan Kim and Renee Mauborgne. The market where the Innovative company has no competitors because its product is unique.

J.Roland Ort states that innovation processes have changed significantly over the last five decades.
Showing a transition from technology oriented R&D to dynamic innovation processes that take place in networks. Now we see the fourth generation of an innovation process, the Cyclic Innovation Model which links changes in scientific insights, in technological capabilities, in product design and in market demand.

In this paper new models for managing innovation processes are compared to best practice illustrated by research works, among others The seven circles of innovation, an innovation model developed by the Center for ledelse & Fremtidstanken in Denmark.

Keywords: innovation drivers, Managing innovation processes, product innovation, best practice, team building

1.Introduction

Without innovation many jobs are at risk in the future. Denmark risks loosing jobs within the next 10 years - not because of outsourcing but just as much because we are being overtaken on the inside by more innovative companies.
The competition within making more and more innovative products is becoming more and more serious because of the globalization with its increasing sharing of knowledge.

Innovation also means creative destruction of established habits and routines. That is why people often resist changes and therefore produce obstacles to systematic innovation. To overcome this it is vital to have a culture and basic values in the organization where innovation is the focal point. That is why innovation is a matter for the top management as well as for the board of directors.

Innovation management is about realizing changes and readiness to move into new areas.Adapting new knowledge and building new competencies in particular fields.

The proces model below introduces the key factors for managing the innovative process.

Strategy: the main elements are

- position of the company in terms of its products, processes and technologies.
- The technological path open to the company.
- The organisational process followed by the company in order to integrate strategic learning across fuctional and divisional boundaries.

Supportive organizational links: in which creative ideas can emerge and be effectively deployed.
It involves working with

- structures,

- training, reward systems and communication.

Effective Implementation mechanisms: are needed to move the innovation from ideas to a sale. Project management skills as well as the ability to develop both the market and the technology simoultaneously. The ability to manage sourcing and to identify key competencies which should stay in house may lead to competitive advances for the company. A more detailed discussion about effective teams will be done in the following chapters.

Effective external links: to establish close interaction with markets, with suppliers of technology and know how and other organisational players is crucial for enabling the innovative process.
Having a good understanding of user needs and involving lead users in the development will improve the chance of success.

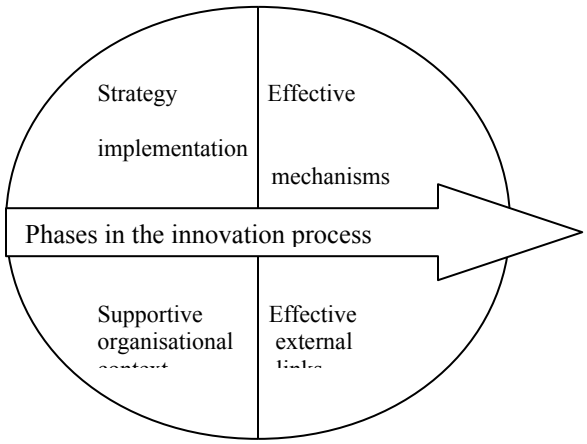


fig.1.1 The process model, (Tidd & Bessant 2001)

2. Innovation Management Models used in practice

In this chapter two different models of innovation management are described. They are all used in practice at different areas of impact within Danish companies and institutions and it is therefore possible to draw conclusions on the usefullness in practice.

2.1 The seven circles of innovation - an innovation management model

Center for ledelse og fremtidstanken, a forum for innovative thinkers, initiated a project in 2004 aimed at developing a practical tool for managers that could lend guidance and deliver insight into managing the innovative process in an organisation.

The result of this project was a model based on a representative field survey and international best practice.

The conclusion of the field survey was that:

- 85% of Danish companies agree that innovation is of strategic importance.
- only 51% have formulated an innovation strategy.
- only 16% are highly successful in managing the innovation process.
- Innovation management is practiced in a wide variety of companies and delivers results where it is practised.
- Innovation management excellence delivers a premium by having a significant impact on the bottom line - contributing with a mean added revenue of 20% compared to a mean value of between 5 and 10%. Generated savings are also significant for highly innovative companies.

(Center for ledelse og fremtidstanken, 2005, p.9)

The model highlights that innovation excellence involves a series of interrelated innovative process steps closely linked to the market. The model consists of the fundamental circle, the five process circles and the market circle.

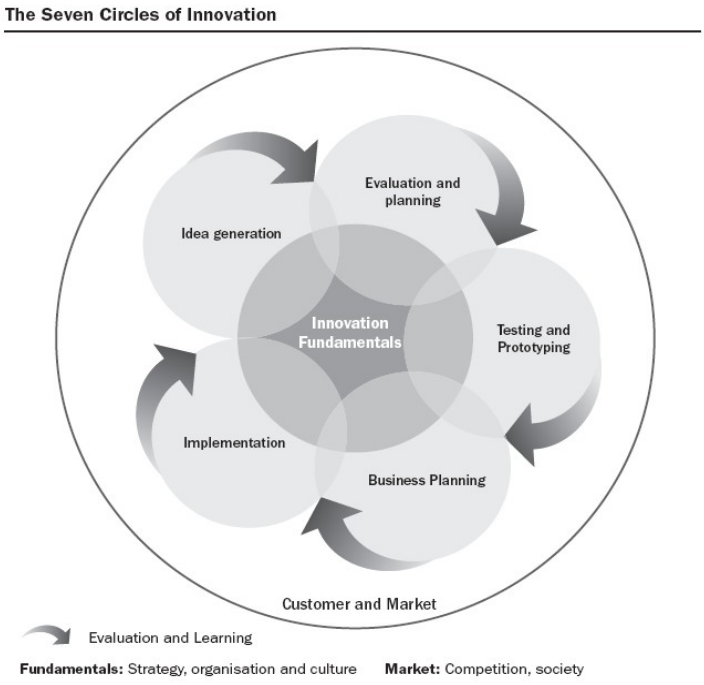


Fig 2.1 The seven circles (*Center for ledelse og fremtidstanken)*

The contents of these are:

Fundamentals

The fundamentals are the basic elements of the organisation.

- *Strategy*- innovation should be a central element in the company strategy.
- *Culture*- a strong innovative culture must be established. A value system that allows for mistakes for the purpose of learning.
- *Cooperation*- cooperation with universities, customers, suppliers, partners and other stakeholders must be built up.
- *Teams*- high performance teams have to be built for each specific task and muust include all necessary competencies.
- *Empowerment*- employees are to be encouraged to act in a creative and independently way and constructive feedback is to be given to all employees generating ideas.
- *Structure*- clear and written procedures for innovation processes need to be established. Organisational competencies need to be mapped and developed. New competencies needed for innovation have to be identified. Facilities to support creative thinking muust be established.
- *Monitoring*-fixed procedures for evaluating innovation projects need to be established. Bechmarking with competitors and financial track of innovation projects. *(Center for ledelse og fremtidstanken, 2005, p.13)*

Processes

The innovative process consists of the following phases:

- *Idea generation* – there are clear objectives and criteria for idea generation,as well as procedures for filtering ideas.
- *Evaluation and planning*- a preliminary business case is formulated(strategy,market,technology and competences),as well as early planning of the entire innovation project.
- *Testing/prototyping*- innovations are always tested by means of prototypes, test runs, scenarios, etc.
- *Business planning*- alignment with the company strategy is checked.Funding of the innovation project is considered and decided.
- *Implementation*- Clear and structured procedures exist for the transition from innovation phase to daily operation.Objective criteria for the final decision to invest, considering finances, marketpotential, technology and human ressources.

(Center for ledelse og fremtidstanken, 2005, p.14)

Market

The market plays a crucial role because meeting the user needs and the customer demands are the basis for achieving a succes in the innovation project.
Each of the above mentioned processes are linked to the market by strong customer relations.

Conclusion

The innovation management model measures the most important elements of innovation in Danish organisations:

The main drivers for innovation are:

- Establishing teams
- creating motivation
- building culture and setting clear goals

The barriers are:

- finance and lack of resources
- lack of time
- lack of strategy and structure
- Assignment of right competencies

(Center for ledelse og fremtidstanken, 2005, p.15)

These barriers show that the innovation culture still is far from a mature condition.

The following *recommendations* are given in the report:

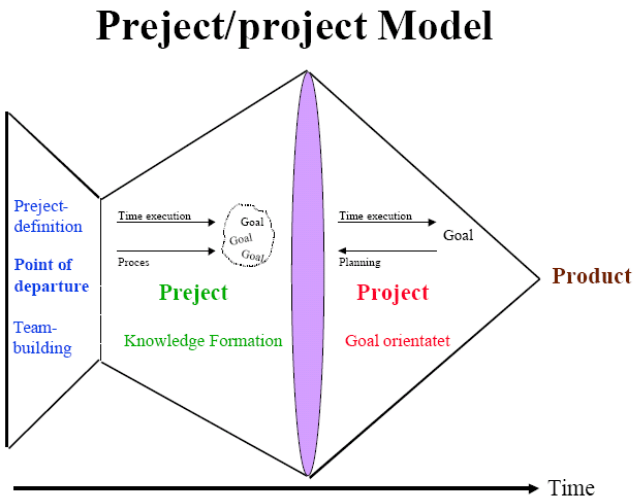
- Give innovation management top priority
- Built an innovation framework suitable for the organisation
- Open the company to the customers, universities and other stakeholders
- Remember innovation is much more than inventing the "new wheel".
- Innovation management is more than just a new way of change management.

2.2. The KUBUS model

Innovation theory does not focus much on processes prior to the development of inventions. The efforts following the creation of the basic ideas of a product has much attention paid to it and is controlled by rational management tools like project management. This is well developed and students at the Danish engineering schools are

taught and trained in that. Mikkelsen and Riis stress the fact that if the project operates in a turbulent world, the project decissions in the early stage has much impact on the result of the project, while the available knowledge and information is limited. Therefore the definition of the project task should be taken very seriously.

In the KUBUS model Herlau and Tetzschner put focus on the *preject* phase where the basic ideas of the innovation project are created and developed. In this phase the accessible knowledge and the outcome of the decisions based on this knowledge diverge. Later on in the project phases the goal is well defined and the degree of uncertainty decreases, the processes converge.



Source: Herlau and Tetzschner (1999:216).

The KUBUS model is in its basic form a management tool by which an interdisciplinary group in cooperation with a company investigates the space of opportunities for the company. Even if the goal of the investigations are not very well defined the working process will follow a well defined structure and rules that help organise the group in the project phase.

The model consists of six areas of discussion as shown below.

- External data
- Network
- Knowledge
- Project resources
- The project group
- Why-questions

Management is practised as a service that individual participants perform in rotation. Two complementary leadership roles are used, process oriented and an outcome-oriented. In consequence, all participants take turns at working with exposing the management

functions within these two areas, also called the red management and the green management.

The model has been tested at some projects in Copenhagen with project groups manned by students from different disciplines and it is at the moment being tested in Odense with project teams consisting of unemployed academics from different disciplines.

The principle of forming groups with different educational profiles is important if you want quite new ideas.

If a team of 100 engineers is put together and given a task to develop a new car, they will split it into subsystems and consequently achieve a better car but not a radical new concept.
(Lars Kolind, Ingeniøren 15.september 2006, p. 9)

3. Teamwork

As stated in the two above described models creating the right team of individuals are a crucial point in the innovation process.

Teamwork, Project Management and Innovation are closely linked together and many companies are now investing much time and effort in promoting training in these areas.

It is however the Universities that should take the first steps in providing such education, so that our graduates become fully prepared for the competitive challenges of the global market place.

In a recent paper, *B.Hansen* makes these points very strongly. We still need however to convince many university professors of the benefits of such a team-oriented approach, and to move away from the more traditional forms of engineering education.

Danish universities have long had a strong reputation for *project based learning* initiatives and in the same way that such initiatives now have a prominent place in schools curricula, a team based approach to learning should be the next major change to take place in the education of our school children!

An appropriate objective for our project based learning institutions of higher education could be: *'To enable students to work effectively in a team, systematically applying design and problem solving tools and techniques to complete an innovative project'*

Students must learn that innovative thinking is not a gift that we are born with and that we can acquire such skills in a systematic and structured way. *Nigel Cross* explains this process with respect to product design and provides a logical set of guidelines to help stimulate innovative solutions to product design problems which are acceptable to both engineers and customers alike.

A degree course which is attempting to provide a continuing team-oriented and international experience for students is the *B.Eng in*

Global Management and Manufacturing at the University of Southern Denmark in Odense.

A structured team building course formed part of the introductory week during the autumn semester this year. Initial feedback confirms that the course started off in the right way. The problem now facing teaching staff is how to maintain the momentum!

The course attempted to make students aware of the basic elements of effective teamwork in a supportive environment conducive to open discussion and feedback.

After the usual ice breaking activities it is essential that the newly formed teams take on a first task to immediately learn from the experience of working together.

Such 'hands on' activities such as *tower, bridge and raft building* have been used successfully to involve team members in planning, organizing and executing tasks of a physical, mental and perhaps emotional nature.

The benefits of such tasks however lie in the content and quality of the feedback and the parallels to be drawn from such activities with the technical projects yet to be performed.

The next stage is to develop some awareness of team profiles. *Dr Meredith Belbin's* work with management teams has long been acclaimed, and the 9 roles established by Belbin form a strong basis for understanding how teams can work effectively by appropriately using the strengths and preferences of all team members.

A self perception inventory can be performed on-line to establish the team role profile of an individual (in Denmark, organized through www.potential.dk)

Belbin's hypothesis can then be 'tested' by comparing an individual's predicted Belbin 'preferred role(s)' with their performance in any given team task. The main outcome of such activities however is not to brand an individual with a Belbin profile but to clarify understanding of an individual's role within a team and the roles played by the other members of the team.

Stephen Covey has made some very interesting observations of individuals who are highly effective and in his book discusses the 7 habits necessary to follow in order to achieve these levels of effectiveness.

The habits reflect a high degree of personal integrity, trust and honesty which form the basis for development of good teamwork with people empathically communicating with each other to achieve goals biased toward win-win solutions.
Introducing students to such ways of thinking can be very powerful and stimulating in the early stages of team formation and can assist in the promotion of creative and innovative strategies.

The success or failure of teams often depends on how good the team is at resolving conflicts.

Conflicts should be seen as constructive and should be used to encourage teams to appreciate the differences in attitudes and opinions etc. represented within the team.
It is of course commonplace that such conflicts give rise to destructive interaction between members with the inevitable possibility of dissolution of the team.

Students should therefore need to have some introduction to conflict management styles (*The Team Developer – student guidebook*) and to take part in case study exercises using role play to stimulate understanding and discussion.

The use of *lateral thinking* and *brainstorming* techniques are well established where innovative solutions are sort.
Students can be made aware of the how important a good discussion strategy is and learn how to listen, understand and share information in a productive and positive way.
Exercises like the NASA Moon Survival task can be used effectively to monitor the way that teams interact and share information. The exercise also provides a good demonstration of how groups cut short discussions to reach quick logical solutions without fully exploring all *possibilities.*
A revealing mathematical assessment can be made which shows how most groups initially fail to reach good consensus decisions. The analysis can also be used to explore the reasons for this failure.

The use of a number of the techniques discussed above has been used on the B.Eng course in Global Management and Manufacturing at the University of Southern Denmark.
The progress of the students on the course will be closely monitored after the encouraging start to see whether their effective contribution in a team gives rise to improved quality, creativity and innovation in their project work.

This team-centered approach however can also be of direct use to industrial teams which may be in danger of losing direction.
A person responsible for project management with a working knowledge of the essential team working skills can easily lead a failing team out of the rut.
Companies in such a position willing to invest in a team building course tailored to their own specific agendas could find the investment extremely profitable in the long term.

4. Conclusions and perspectives

Through the last decades organisations have changed their culture and habits because of new business philosophies like TQM, lean manufacturing and project management. Adapting to these the companies now are facing the demand of Innovation Management which to a considerable extend conflicts with the previously adopted philosophies. Radical innovation is based on a culture where risks are taken while TQM and project management try to diminish uncertainties and failures.

Increasing focus on the customer needs, competition and the market together with global sourcing and networking will push the development of new knowledge about how to handle innovation in a practical way.

The universities are launching new educational programmes within this field and governments are paying more attention to supporting this area of impact.

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Biography

Leif Henriksen is currently a senior Lecturer at the Faculty of Enginnering, The University of Southern Denmark. He performs teaching within product development, technology and project management. Beside that he has been involved in developing new educational programmes within engineering disciplines and creating international partnerships between european universities.
He has a background in the industry for 14 years where he was engaged as development engineer and project manager in different companies within areas as shipbuilding, Mechanical Industry and Consulting Engineering.

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David Swetnam is currently a free-lance consultant in teaching and learning living in the UK.
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