THE SEVEN CIRCLES OF INNOVATION

A Model for Innovation Management
The Seven Circles of Innovation
- An Innovation Management Model

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Foreword

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. Throughout the last century, captains of industry learnt to master the process of production to such an extent that it now no longer functions as a significant competitive advantage. The new challenge is to master the process of innovation – harnessing change, creating new competitive advantages by offering better products, using better processes, delivering better services or even offering entirely new solutions.

However, we have not yet learned to master the innovation process. In fact, many have only a rudimentary understanding of what it requires to master innovation – and what innovation really is. There is abundant evidence to support these observations, and this report is no exception. Yet for the individual company and society at large the ability to innovate is vital to ensure growth and competitiveness in the coming decades.

This is why the Center for Management in Denmark and Fremtidstanken – a forum for innovation thinkers – initiated a project in 2004 aimed at developing a practical tool for managers that could lend guidance and deliver insight into managing the innovation process in an organisation. The conclusions of the project are presented in this report. It is our hope that it will make a real difference, and assist those striving for excellence wherever that ambition resides.

We have been assisted in this endeavour by some of the foremost experts in innovation management in Europe, especially Professor Søren Salomo of the University of Berlin and his team of researchers, in particular Katrin Talke; Professor Anders Drejer of Aarhus University; Professor John Bressant of Cranfield University, and Jesper Bove-Nielsen, investment manager at TekInno.

We’ve also had invaluable assistance from Lars Bo Madsen, Director R&D, Coloplast; Per Falholt, CSO, Executive Vice-President, Novozymes; Frank Nielsen, Research Manager, Radiometer; Trine Nielsen, innovation manager, Danish Broadcasting Corporation; Tommy Rex Christensen, Senior Director for Project Management, Novozymes, and Jens Ove Nielsen, Vice-President, Jyske Bank.
Chief analyst Henrik Lau Larsen, Fremtidstanken (Penta Strategy), has done a fantastic job as the main driver behind the analysis and report, ably assisted by the team at the Center for Management.

Copenhagen, March 28, 2005

Mikael R. Lindholm  
Director  
Fremtidstanken

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Senior Management Adviser  
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Executive Summary

Managing innovation is an important process that only few Danish companies master very well. The main reason for this is that the innovation process is not fully understood or implemented by organisations, and that innovation culture is still immature.

Thus is the conclusion of this report, which charts the practice of innovation management in Danish businesses based on international best practice and a representative field survey.

Although 85% of Danish companies – private as well as public – agree that innovation is of strategic importance, only 51% have formulated an innovation strategy, and only a mere 16% are highly successful in managing the innovation process, as measured by financial performance. This illustrates awareness and maybe even ambition, yet also a general lack of insight as well as a practical means to achieve these ambitions.

However, the results included in this survey and analysis reveal a number of upsides:

- Innovation management delivers results regardless of the industry or the size of the company – small companies, large companies or companies in high-tech sectors do not have a special advantage, as the contribution to growth from innovation depends on the quality of the management effort.

- Innovation management is practiced in a wide variety of ways across different industries, i.e. products, processes, services, new business, etc., thus reflecting a broad innovation base and great potential for innovation throughout Danish business.

- Innovation management excellence delivers a premium by having a significant impact on the bottom line – overall, innovation projects contribute between 6 and 30% added revenue, with an average close to 20%, which is significant compared to general revenue growth rates of between 5 and 10%. However, growth contribution is much lower in those public sector areas not operating under commercial standards.

- Innovation management also generates savings, close to 10% on average. Public organisations report higher savings, between 20 and 50%. However, innovation functions primarily a growth driver in private companies in Denmark.

In other words, although the function of innovation is predictable, the interesting question is how to achieve excellence in managing innovation. As the analysis in this report shows, there are no easy answers to this question as there are no short cuts to excellent results. Highly successful companies do not possess a silver
innovation bullet – they don’t achieve their results by just doing one or a few things better than others. They do everything better.

Consequently, successful innovation is primarily a question of a conscious, focused and enduring managerial effort – and it is not dependant on the availability of a few brilliant scientific and/or creative minds. Innovation excellence is the result of achieving best practice in each phase and dimension of the innovation process. To be highly successful companies have to live and breathe innovation.

This conclusion is reinforced by the fact that less successful companies tend to have a weak innovation culture, e.g. they do not allow for mistakes or reward initiative, thus undermining the learning culture that is essential for sustaining idea generation and the continuous enhancement of the innovation process. Surprisingly, only 20% of all companies have a culture where “to err is to learn” applies to a high extent, although this is central to any learning culture. Less successful companies fail to embed innovation into the corporate DNA.

**The DNA of innovation**

Although highly successful innovators do everything better, they place more emphasis on certain innovation elements than others. These elements of innovation management can be divided in two main groups:

- Fundamentals for innovation - covering strategy, culture, team, competencies, learning, etc.
- Innovation processes - covering ideas, evaluation, simulation, business planning and implementation.

In fundamentals, highly successful companies achieve particularly high scores in these areas:

- Teams – recruiting compatible talent and securing the required competencies
- Empowerment – securing employee initiative and incentive
- Cultures – creating a learning culture

In processes, highly successful companies score highly in the implementation phase, particularly within the following parameters:

- Training – securing specific competencies
- Monitoring – assessment, allowing for correction and accumulation of knowledge with regard to what works and what doesn’t

The analysis thus reveals that the true DNA of innovation is not about freewheeling, chaotic organisations, celebrating an ‘out of the box’ culture and saluting the creative types that get the brilliant ideas. This approach might very well work, but it is not the approach generally taken by the high innovation performers.
On the contrary, highly successful innovators create a very clear and concise agenda for achieving innovation, creating a solid structural framework with strong empowering values that motivate all the employees in an organisation to contribute, generate and execute a wide variety of strategy aligned ideas.

In other words, innovation excellence is achieved by closely managing the innovation process, whilst stimulating creativity.

The seven circles of innovation

The findings in this report led to a strategy design model for innovation management that we have named the Seven Circles of Innovation. This model highlights the fact that achieving innovation excellence involves a series of interrelated innovation process steps, based on sound innovation fundamentals at the corporate level and closely linked to the customer and market – all stressing the fact that achieving innovation excellence is not a question of focusing on innovation as a product, but as a process requiring an optimised corporate structure (see figure 0.1).

The Seven Circles of Innovation

![Diagram of the Seven Circles of Innovation]

**Fundamentals:** Strategy, organisation and culture  
**Market:** Competition, society

*Figure 0.1*  
*Source: Fremtidstanken, 2005*
The model illustrates that innovation always has to be embedded in the market – the largest of the circles – and that all innovation activity has to build on sound fundamentals, such as culture, strategy, structure, competencies, etc. – the central circle. Yet growth through innovation is only achieved when the five development and learning circles of ideas, evaluation, prototyping, planning and implementation are set into motion, each one rooted in the market, yet building on the fundamentals and connecting and overlapping with each other, to create a continuous learning and development loop.

The circles in this model illustrate the continuous motion and effort that innovation requires in order for an organisation to achieve excellence – much like how an orchestra continuously rehearses. This is the art of innovation – the perfect coordination of all elements in the same time and space, which if managed correctly will lead to the creation of not just good, but great bottom lines.

The strategy design of innovation management consists of the following individual elements, each influencing the innovation process, and demanding excellence in execution:

**Market**

The market plays a crucial role being the buyer of innovation, therefore it is obviously extremely important to focus on customer or user demand, and design the innovation effort around these demands. However obvious this is this fact nevertheless tends to be forgotten – and as such the customer is often missing from the innovation process. The best innovation practitioners are aware of this, and consequently stress the vital importance of customer focus. This is why all the other innovation elements in the model take place within the circle of the market, linking each phase and fundamental element to the market. How the linkages between the market and the innovation processes and elements are established is individual to each phase and element – but very often-selected employees with strong customer relations act as ambassadors for a company’s customers within the company itself.

However, the market consists not only of customers, but also of suppliers, partners, knowledge centres, and society at large – all of which are potential sources of innovation and inspiration as well as potential barriers. As such, it is vital that the innovation process relates and links to all aspects of the market.

**Fundamentals**

The fundamental innovation elements are the building blocks of all organisations – without them there would be no basis for a coherent and collective effort. Consequently, these cornerstones must be established before any form of innovation process is set into motion.
**Strategy**

Innovation must be emphasised to a high degree, through an updated and communicated company strategy with innovation as a central element – incremental innovation projects must be aligned with the company’s existing technological and market knowledge, whilst radical projects may require a change in strategy.

**Culture**

A strong “innovation culture” must be established - i.e. a value system that allows for mistakes for the purposes of learning (“to err is to learn”), that values questioning processes and products, accepting that there are no ‘stupid’ questions.

**Cooperation**

Building external networks must be emphasised, whilst cooperation with universities, research centres, etc., must become a natural part of company activity, together with cooperation with customers, suppliers, partners and other stakeholders, as well as setting up a system for identifying potential innovations from external sources.

**Teams**

Successful teams have to be built for each specific task and purpose, and must include all necessary competencies, and be staffed from across all departments.

**Empowerment**

Employees are to be encouraged to act independently; “skunk work” is okay; everybody should know what to do with an idea, and constructive feedback is to be given to all employees generating ideas.

**Structure**

Everybody has to have a good overview of what everybody else does in the company; clear and written procedures for innovation processes need to be established; organisational competencies need to be mapped and developed, whilst the new competencies needed for innovation have to be identified; setting up of dedicated facilities (idea rooms, etc) and/or similar systems to support the innovation process.

**Monitoring**

Fixed procedures for evaluating innovation projects need to be established; continuous benchmarking with competitors, outsiders and others, and financial tracking of innovation projects for minimum of 2 to 3 years.
Processes

It is true of each innovation process that successfully innovative companies involve employees from their entire organisations in all phases; they in-source external competencies according to need or compensate missing competencies through training or hiring; they ensure that there are specific rewards in all processes; that goals are clearly set, and that there are structures for collecting ideas in each phase, whilst ensuring that the management’s role and commitment is clearly defined and visible at all times. On top of this, a continuous evaluation process is carried out, sorting and rejecting the ideas and projects that do not meet pre-agreed strategic requirements.

These processes may be handled using different tools – there are numerous ways to generate new ideas – but the strategy design must include all the elements of the model, whilst high innovation performers must be expected to demonstrate excellence in performing each element or process.

Beyond these general requirements, the following particular processes characterize each phase within the most successful companies:

**Phase 1 – Idea generation**

External surroundings are systematically scanned for ideas (e.g. via the internet, networks, competitors, other trades, etc.). There are clear objectives and criteria for idea generation, as well as formal procedures and systems for filtering ideas.

**Phase 2 – Evaluation and planning**

A preliminary business case is formulated (strategy, market, technology and competencies), as well as early planning for the entire innovation project (including formulating milestones, risk assessment, formulated measures for the innovation project, resource allocation).

**Phase 3 – Testing/prototyping**

Innovations are always tested by means of prototypes, test runs, scenarios, etc., and simulation can result in rejection of an innovation or its iteration in the IMM process.

**Phase 4 – Business planning**

An innovation project’s alignment with the company strategy is checked, and all functional areas (production, HR, sales/marketing, etc.) are included in the business planning. Objective criteria are combined with strategic consideration for
funding innovation projects internally, co-funding them with external partners or funding them completely externally. Also, objective criteria are combined with the strategic considerations relating to the implementation model, such as external or internal venturing or the establishment of an internal project team.

**Phase 5 – Implementation**

Clear and structured procedures exist for the transition from the innovation phase to daily operation. There also exists a formal procedure with objective criteria for the final decision to invest, which considers factors such as finance, market, technology or a combination thereof. The final responsibility for the approval of the business plan/implementation plan is clearly fixed.

**Drivers and barriers to innovation**

The innovation management model measures the most important elements of innovation in Danish organisations based on existing international best practice. However, the companies have also been asked to identify in their own words what they see as their main drivers and barriers to innovation.

Danish companies identify establishing the team, creating motivation, building culture and setting clearly defined goals – all requiring clear communication – as the most important drivers. This corresponds very well with the model (see figure 0.2).

**Top 5 Barriers to Innovation**

![Bar chart showing top 5 barriers to innovation]

**Figure 0.2:** The participants own perception of problems associated with innovation management

**Source:** IMM survey 2004
However, when identifying barriers the answers turn out to be more surprising:

- **Finance** - The lack of financial resources is identified as the main barrier to the innovation process. This implies that the innovation process is not an integrated part of company strategy and culture, but regarded as a separate activity that needs separate financing or competes with other investments. In a competitive market place, where companies compete on innovation, this should not be the case.

- **Time** - The same applies very much to the next barrier - not having enough time to innovate within companies supposedly competing on innovation is also somewhat paradoxical. Remember that 85% of the participating companies identified innovation as strategically important.

- **Strategy** - The third barrier seems more logical – obviously the entire issue of mastering innovation management has to do with the ability to establish the correct structure and strategy. And, as the analysis has shown, this is no easy task.

- **Competencies** - The fourth barrier is not dissimilar to strategy – strategy and competencies are the two predominant elements in innovation management and as such demand great attention and effort.

These barriers to innovation show that many companies have not embraced innovation as a core competitive parameter. Innovation is far from being embedded in the corporate DNA, indicating that the innovation culture in Danish businesses and organisations still needs much cultivation.
**Frequently asked questions**

Several questions typically spring to mind regarding managing innovation. Below are the most common questions followed by a short answer. The answers have been tested using regression analysis.

<table>
<thead>
<tr>
<th>Q. Is it necessary to be highly systematic in the approach to innovation management in order to achieve success?</th>
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<tr>
<td><strong>A.</strong> The IMM survey shows that highly successful companies all have high scores on elements that support a systemic approach. Highly successful companies also have a systematic framework in which to execute innovation management. Strategy, empowerment and structure all influence the innovation process significantly - and as such it is necessary to have a systematic approach to innovation management.</td>
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<table>
<thead>
<tr>
<th>Q. Is it possible to achieve success at innovation without a strategy and/or an innovation model?</th>
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<tr>
<td><strong>A.</strong> The IMM survey shows that to a large extent it is necessary to have a strategy in order to achieve success. Strategy influences innovation success significantly, whereas having an innovation model does so to a much lesser extent. However, very few companies actually work with innovation models today, and this may undervalue the significance of the model.</td>
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<tr>
<th>Q. Which is the most important - team or strategy - meaning that if you have the right team is strategy less important?</th>
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<tr>
<td><strong>A.</strong> There is no clear-cut answer to this. The IMM survey indicates that strategy and initiative are slightly more important than the team in achieving success, but the team shares a third place in the ranking with culture. The correct answer is that both these elements are very much complementary to one another, and that neither one can easily be left out of the equation in order to get a result.</td>
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<tr>
<th>Q. Is it not true that highly innovative companies are characterised by highly creative people?</th>
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<td><strong>A.</strong> That depends on how you define creativity. The IMM survey shows that structured and disciplined processes transform creativity into innovation. The most innovative industry is the financial sector, not the arts or the medical industry.</td>
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<tr>
<th>Q. Is it possible to engage in innovation if the employees find the process uninteresting?</th>
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<tr>
<td><strong>A.</strong> It is vital to understand that innovation is not about the needs of the organisation, but the needs of the customer. Successful innovators find ways to make the customers’ needs interesting to the organisation. Thus, this is a question of pure and simple good management or even great leadership - not innovation <em>per se</em>.</td>
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1. The background

The market place is changing – and so is the competition. China, India, Russia and a number of other former planned economies with well-educated, cheap labour have joined the global market place, thus increasing opportunity as well as competition. A range of new technologies and transportation solutions have decreased the importance of distance and increased the speed of communication and change. Continuous innovation – e.g. adding value for the customer – has become ever more important in order to defend market share.

Growth in innovative and static companies

![Graph showing growth in employment from 1990-1997 in innovative and static Danish companies respectively competing in markets with strong global competition.](source: DISKO survey, 2004)

Few will disagree that businesses today need to innovate in order to stay ahead of the competition. A company may attribute its traditional competitive advantage to size, assets or other factors, but business executives and academics alike increasingly see innovation as a powerful way of securing competitive advantage, and as a means to defend strategic positions. Regardless of which assets are deemed strategically important, those companies that are able to turn knowledge, technological skills and experience into new products, processes and services gain competitive strength in the market. In Denmark, this has been broadly evident since the mid 1990s (see figure 1.0).

Many, though, find it difficult to define innovation, let alone how to manage the innovation process within their company. According to the Booz Allen Hamilton European Innovation Survey, 48% of European CEOs were dissatisfied with their company’s innovation success rate, and 51% were dissatisfied with how their company identified new product and service categories. According to a Danish survey
– the ITEK Barometer 2003 – only 19% of technology companies in Denmark were fully utilising their innovative capacity, leaving much room for improved competitiveness and pointing to a mass of unutilised growth potential. The same survey demonstrated that only 40% of companies had a strategic approach to innovation, whilst 60% had no systematised innovation processes, in part explaining the low utilisation of innovation capacity.

The problems are often to do with basics of innovation, i.e. establishing the right organisational strategy, culture and processes. Added to this are the myths and assumptions about innovation amongst many managers and employees that innovation is an art form that only the brilliant and creative few are able to master. These assumptions may impede innovation by focusing too much on the creative individual, and too little on the innovative framework that systemises the collective innovative power of an organisation.

Consequently, a management tool that visualises and enhances the practice and level of innovation in Danish companies and organisations would ultimately strengthen Danish competitive advantage and raise the productivity of Danish businesses and Denmark as a whole. This is the assumption that inspired Center for Ledelse – the Danish Center for Management (CfL) – in cooperation with Fremtidstanken, a private forum for innovation thinkers – to engage in developing a Danish innovation management model.

The Innovation Management Model project was initiated in the Spring of 2004 to:

- Define an international best practice model for innovation management based on existing state-of-the-art research
- Examine the innovation management practices of Danish businesses compared to an international best practice model
- Present an updated innovation management model adjusted according to the Danish findings where applicable

The project proceeded thus:

1. A project group was established made up of:
   - Mikael Lindholm, Project Director, Fremtidstanken
   - Henrik Larsen, Chief Analyst, Fremtidstanken
   - Jesper Bove-Nielsen, consultant, Teklnno
   - Jens Holmgren, Senior Management Advisor, Center for Management
   - Wenche Strømnes, Vice-President, Center for Management
   - Ruth Zneider, Management Advisor, CfL

2. A preliminary study was conducted covering the state-of-the-art research into innovation management (see appendix A).
3. An expert academic advisory panel was established made up of:

- John Bessant, Professor of Innovation Management at Cranfield University, Fellow of the Advanced Institute of Management Research, and author of amongst other titles, “Managing innovation - integrating technological, market and organizational change”.
- Sören Salomo, Professor of Innovation at the Institute for Technology and Innovation Management at Graz University, and responsible for “InnovationCompass” in cooperation with McKinsey & Co.
- José Santos, Professor of Global Technology and Innovation, INSEAD, and author of amongst other titles, “From Global to Metanational”.
- Jesper Bove-Nielsen, investment manager at TekInno, and author of amongst other titles, “Corporate Kindergarten” and “E-Business”.
- Anders Drejer, Professor of Innovation at Business School of Aarhus, and other of amongst other titles, “Den innovative virksomhed.”

4. An expert practitioner advisory panel was established including innovation managers from some of the most innovative companies in Denmark – the panel includes:

- Lars Bo Madsen, Director R&D, Coloplast
- Per Falholt, CSO, Executive Vice-President, Novozymes
- Frank Nielsen, research manager, Radiometer
- Trine Nielsen, innovation manager, Danish Broadcasting Corporation
- Tommy Rex Christensen, Senior Director for Project Management, Novozymes
- Jens Ove Nielsen, Director of Jyske Bank

5. Based on the preliminary study and discussions with experts and practitioners a working Innovation Management Model was designed, covering the main elements of innovation, including their relational and individual significant parameters. This model formed the basis of the analysis (see appendix B).

6. A seminar was arranged with presentations from a number of innovation management practitioners presenting angles and viewpoints on a number of issues of special interest related to the preliminary study. These presentations and discussions were recorded, and included into the process (see appendix C).

7. A diagnostic tool was designed based on the preliminary study and discussions. The expert panels then commented on the questions and parameters included in the diagnostic tool (see appendix D).

8. A field survey questionnaire was developed based on the diagnostic model. Selected experts then commented on the questionnaire prior to initiating the survey (see appendix E).
9. The field survey was launched in cooperation with the market research firm Zapera, in August 2004. A total of 548 questionnaires were returned, 449 of which were valid responses, including 322 from managers in companies with more than 50 employees (see appendix F).

10. The main results of the field survey were presented at a workshop attended by both academic experts as well as practitioners. The discussion mainly dealt with the theoretical innovation management model in relation to the survey findings, and how the companies actually worked in reality. The main points were recorded, and incorporated into the ongoing process (see appendix G).

11. An in-depth study of the field survey results using factor, cluster and regression analysis was carried out by Professor Sören Salomo and his team of researchers, including research assistant Katrin Talke at the University of Berlin.
2. Point of departure

Developing a measurement/audit tool provides a valuable opportunity to help Danish companies understand how they perform and manage innovation, as well as helping them to uncover their knowledge gaps. The quality expert W. Edwards Deming embeds the first challenge in the quote: “If you don’t measure it, you can’t improve it”. Best practice, auditing and benchmarking can be very useful tools in this process.

However, there is no single “model” for business innovation today – or a single comprehensive definition. Therefore, we have formulated a definition of innovation, and constructed a working model for innovation management. We have used a broad definition of innovation, leaving ample room for developing a model that is practical as well as operational:

“Innovation management is managing the process by which new products, processes or administrative innovations are created and implemented”.

Although no singular model of innovation management exists, research has identified a number of commonly acknowledged principles that support the innovation process. Most scholars use a model similar to the dynamic 5 stage model below to discuss the theoretical framework of the innovation process:

### 5 SS model - From idea to market

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<tbody>
<tr>
<td>Idea generation</td>
<td>Idea selection and concept</td>
<td>Early prototyping</td>
<td>Alignment with corporate strategy</td>
<td>Actual investment</td>
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**Figure 2.1:**
Source: Fremtidstanken, 2004

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**Innovation types**

There are a number of different ways to define and describe innovation in an organisation - here is a selection:

<table>
<thead>
<tr>
<th>Innovation type</th>
<th>Driven by</th>
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<tbody>
<tr>
<td>Research</td>
<td>Laboratories</td>
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<tr>
<td>Market</td>
<td>Customers</td>
</tr>
<tr>
<td>Price</td>
<td>Costs</td>
</tr>
<tr>
<td>Product</td>
<td>Features</td>
</tr>
<tr>
<td>Process</td>
<td>Methods</td>
</tr>
<tr>
<td>Business</td>
<td>Market</td>
</tr>
<tr>
<td>Openness</td>
<td>Cooperation</td>
</tr>
<tr>
<td>Progressiveness</td>
<td>Step-by-step</td>
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<tr>
<td>Radical</td>
<td>Revolution</td>
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See Appendix A for a more detailed study.
The model is quite simple, and the majority of modern innovation theories can be integrated with this model. Therefore, we’ve departed from this model, developing it slightly in order to incorporate the latest research into innovation management (see appendix B).
3. The Field Survey

The field survey was conducted on the Internet. The Zapera market research institute conducted the survey amongst individuals with full or partial management responsibility in a private business or a public organisation. The survey was conducted in the period between 07.09.04 and 16.09.04.

548 self-administered questionnaires were completed, of which 449 were valid responses, including 322 from individuals employed in companies with more than 50 employees.

The survey was divided up as follows:

- Company identifiers (industry, job position, etc.)
- Performance measures
- Fundamentals for innovation
- Elements of the innovation process

Survey participants were asked to use a scale of 1-5 to evaluate questions pertaining to innovation process and management as follows:
1: Does not apply
2: Does often not apply
3: Applies
4: Applies often
5: Applies to a high extent

In other questions the participants were asked to state yes/no, choose from multiple choice answers, enter a percentage or present a statement (see appendix E for details).

Results of the field survey

The results of the survey were analysed in a series of steps to present the data in order to:

- Determine the extent of innovation management practice in Danish companies
- Verify whether the IMM model can function as a generic tool
- Determine the characteristics of successful companies
Industries represented in the IMM survey

The participating companies in the survey were characterised as follows:

- 38% of the companies were established before 1949, 30% between 1950 and 1989, and 32% were established after 1990.
- 40% have less than 50 employees, 20% between 50 and 249, 20% between 250 and 999, and 20% have more than 1000 employees.
- 46% have their main office in Copenhagen, 35% in the rest of Zealand, and 19% in Jutland.
- 43% of the companies reported an income growth over the last 3 years, 30% identified income as stable and 16% reported a decrease.

The distribution of the companies according to industry is shown in figure 3.2.

Size by turnover and employees

Figure 3.1
Source: IMM Survey 2004

Figure 3.2: The figures shows distribution of turnover and employees of the participating companies
Source: IMM Survey 2004
Financial performance

Innovation management has a significant impact on revenues. Overall, innovation projects contribute between 6 and 30% in added revenue, which is significant compared to general growth rates of 5 to 10%. Almost one in five or 20% of companies report a contribution of more than 30%, and one in ten more than 50% added revenue. This is consistent with international analysis (see appendix A). In other words, there is a clear financial incentive to achieve excellence in innovation management. This is both beneficial for individual companies as well as the economy at large (see figure 3.3).

Extra turnover from Innovation projects

![Bar chart showing the percentage of extra turnover from innovation projects.](image)

Figure 3.3: The figure illustrates how much extra turnover the participating companies have gained through innovation projects.

Source: IMM Survey 2004

Savings on the entire cost side

![Bar chart showing the percentage of savings on the entire cost side.](image)

Figure 3.4: The figure illustrates how much the participating companies have saved through innovation projects.

Source: IMM Survey 2004

Innovation management excellence also contributes to cost savings, but not to the same extent as the contribution made to added revenue. Savings are concentrated within a 0 to 20% bracket, with only a few companies achieving higher rates. In Danish companies, at least, innovation is primarily a growth driver.
Defining successful innovative companies

Financial performance is of course important, and innovation needs to create value in the market place in order to be commercially viable. As companies are rather reluctant to disclose hard financial performance figures linked to their innovation activity – due to competitive reasons or simply to the lack of adequate controlling data – perceptual measures have been used in order to assess innovation performance. However, empirical studies have shown that these measures are closely linked to financial performance. Hence, the performance measures presented here provide a valid and clear assessment of real innovation performance. The survey operates with eight performance measurement statements that aim to identify companies highly successful in innovation management.

The eight statements are:

1. Turnover per employee \textit{(calculated variable)}
2. Development in the turnover of the company
3. Innovation projects which have been commercialised and have contributed positively to the financial result
4. The company has seen a general positive financial result from both successful and rejected innovation projects
5. Number of product/service innovations that contribute positively to the company’s competitiveness
6. Number of process innovations that contribute positively to the company’s competitiveness
7. Innovation projects affect the company’s result in terms of savings
8. Innovation projects affect the company’s result in terms of extra turnover

A statistical factor analysis carried out on the responses to these eight statements tests consistency, and detects to what extent they determine successful innovation. Factor analysis narrowed down the performance measures to the following two sets of significant statements:

- Innovation projects contribute positively to the financial result of the company
- Innovation projects have resulted in:
  1. Increased turnover
  2. Cost savings

The two statements were combined into one score depicting the rate of success for each of the participating companies (0 to 5 in performance measurement equals the rate of innovation success). Following the identification of the rate of success, the companies were divided into three different success categories.

- **Highly successful** – an average score of more than 4.2 (on a scale of 1-5, where 5 is the highest)
- **Successful**
- **Less successful** – an average score of 2.39 or less

(see figure 3.4)
This performance based segmentation allows us to draw lessons from the highly successful companies, and investigate in what ways they differ from less successful companies – thus helping identify the real drivers of innovation success.

**Highly innovative industries**

A cross industry examination of the survey the results shows that innovation management is being practiced to some extent in all sectors. Although the level of success varies, the efforts are nevertheless distributed remarkably consistently across all industries (see figure 3.6).

**Industry sector and success classes**

![Graph showing distribution of participating companies]

**Figure 3.5:** The figures show the distribution of participating companies depending of their rate of success.

*Source: IMM Survey 2004*

Finance and consultancy appear to be particularly successful at innovation, with the financial industry having the largest share of highly successful companies, even surpassing the research intensive pharmaceutical industry.

![Graph showing innovation success according to industry]

**Figure 3.6:** Innovation success according to industry (*other* comprises agriculture, electricity, gas and construction).

*Source: IMM Survey 2004*
The otherwise evenly distributed innovation excellence suggests that innovation cannot be explained by particular industry conditions or because certain industries have a special innovation gene. On the contrary, evenly spread excellence suggests that successful innovation may be a function of a managerial excellence – innovation being a new discipline that only a few, the best, are able to manage.

It is striking that the industry with the largest share of highly successful innovators is the financial sector, well known for a highly structured, performance oriented managerial culture. However, the results of the study do not change when eliminating financial companies from the data set, thus showing that the results are stable across all industry sectors.

**Production vs. service**

There is no significant difference between the innovative success achieved by production companies and service companies. Some see manufacturing companies as more innovative than service companies – this view mainly derives from the research and development activity carried out by many manufacturing businesses. Yet innovation is not exclusively about R&D. It incorporates all activities where new technologies and/or new market needs are combined and introduced to the market. However, the level and quality of innovation management in general reveals no significant difference between these two sectors in Denmark (see figure 3.7).

The public sector, however, stands out as having a less innovation success and a smaller share of highly successful organisations.

This is not surprising and has much to do with methodology. Although public companies and organisations do innovate and use the same innovation practices as private companies – i.e. idea generation, testing, developing, implementing, etc. – they do not typically measure performance in terms of financial results in the same way as private companies.

**Figure 3.7:** Within each sector the distribution of innovation types are illustrated

*Source: IMM Survey 2004*
As public companies have a different approach to private companies, an analysis was carried out excluding public companies to see to what extent they had influenced the overall results. The result proved not to have a significant influence, thus showing that public and private companies are to a large extent carrying out almost the same innovation activities (see figure 3.8).

**Private and public companies’ savings on the entire cost side**

![Chart showing savings comparison between public and private companies](source: IMM Survey 2004)

As a consequence of the above, all responses, private or public, have been included in the main sample for analysis.

**Small vs. large**

Small and large companies have the same share of highly successful innovation. This may seem surprising, since it is a widely held view that small companies are more innovative than large ones. Yet if measured by financially successful innovation management this perception is not generally true for Danish companies (see figure 3.9).

**Turnover and success classes**

![Chart showing turnover and success classes](source: IMM Survey 2004)

Smaller companies, however, have a significantly larger share of less successful innovation than larger companies, indicating a more pronounced trial and error culture that might be explained by a relative lack of resources for analysis, evaluation and preparation.
It is worthwhile noting that mid-sized companies have a smaller share of highly successful innovations than larger companies, as well as a large share of less successful companies. In other words, mid-sized companies seem to be getting the worst from both worlds – being too big to be small and too small to be big. It is true that mid-sized companies are generally performing worse financially than both small and large companies. This is often explained by the strategically difficult transformation these companies go through when having to expand their organisations, and implement practices suitable for a larger company without really having the know-how or resources to do so.

In general, however, the conclusion must be that size is of little concern when considering strengthening financial performance by innovation management.

**IMM as a generic tool**

The small variations shown between companies measured by size or industry sector suggest that the Innovation Management Model can be used as a generic model applicable across all industries. Therefore, in reporting the findings below there will be no reference to variations regarding size, industry, etc., as analysis has shown no real statistically significant differences.

The IMM model is focused on managing the entire framework necessary for making innovation happen. Whether the company is large or small, whether it is a pharmaceutical giant or a local machine tool factory, it is necessary to manage many of the same types of activities and to have the same set of frames in which these activities can be carried out. Obviously, some of tools and methods within a particular element of the innovation process will be very different for the pharmaceutical company when compared to the tool factory – but the basic framework and elements are the same, regardless of whether the actual innovation project in question has a budget of EUR 10 million or ten thousand.

**New Business & Blue Oceans**

According to research by Professors Chang Kim and Renee Maugbourne of INSEAD the is a substantial difference between innovations within existing market space - so called Red Oceans of cut throat competition - and innovations creating new market space - so called Blue Oceans of uncontested market space. An analysis by the two professors into the performance of 108 companies has revealed that while Red Ocean innovation contributed 62% of revenues and 39% of total profits, Blue Ocean innovations contributed 38% of revenues and a startling 61% of profits. Only 14% of the total innovations in companies were Blue Ocean, while 86% were Red Ocean. In other words, there is much greater growth potential in creating new markets than by being marginally better in existing markets. Interestingly, the Blue Ocean share of "new businesses" amongst Danish innovations amounts to 19%. Regrettfully, there is no company specific financial data in this survey allowing a comparison with the findings of Kim & Maugbourne.
Types of innovation

Companies can innovate in a number of different ways. They can develop new products, new services as add-ons, they can optimize/create business processes that enhance the company’s competitive advantages, or they can choose to create entirely new businesses. The distribution of innovation types in Danish businesses is shown in figure 3.10.

Variation between innovation types is limited, although developing new services to create added value is most popular. However, many companies are engaged in several types of innovation, thus:

- Innovation is not confined to a single type
- Companies are engaged in product, service and process innovation, as well creating entirely new business activities

The fact that Danish businesses compete by applying a broad variety of innovation types indicates a high general level of innovation activity. The relatively many companies in the survey shown to some extent to be “successful” at innovation strengthens this assumption. This suggests that there is a broad and solid base for innovation within Danish businesses and as such a potential for increased growth.

Companies focus on different innovation types depending on their industry. Not unsurprisingly, manufacturers focus more on product innovation than service companies or public companies. The public sector focuses more on processes and services, whilst perhaps more surprisingly, service sector companies develop more new business than both manufacturing and public companies (see figure 3.11).

The development of a new business area is an especially interesting outcome of innovation. Typically, this type of innovation will not be progressive, but radical, and often yields high contributions to margins. However, the development of new busi-
Innovation type vs industry sectors

Figure 3.11: Different industry sector undertake different innovation activities
Source: IMM Survey 2004

A new business area will also sometimes be disruptive, especially when replacing old products or markets, potentially unsettling entire industries.
4. Innovation management practices

In the following, the survey is used to look at innovation management practices in Danish businesses. The survey results are divided into:

- Total frequency of answers (see appendix F for details)
- Factor and cluster analysis of highly successful companies versus less successful

And sorted into three groups:

1. Fundamentals
2. Processes
3. The relationship between fundamentals and processes

Innovation Fundamentals

The elements that comprise the fundamentals are listed according to how highly successful companies score their own management processes. The score in parenthesis is the average of the highly successful companies on a scale of 1-5, where 5 is the highest. A total of 25 statements were formulated to cover the fundamentals of innovation management.

The complete scores for all of the elements in fundamentals are shown below in table 4.1.

Team (4.1)

The right team is important for producing results in many areas, not only innovation. To assemble the right team it is necessary to recruit employees with different personal and professional backgrounds, build the team based on the competencies required, and ensure good cooperation between all the different departments in the organisation.

Building successful teams is where highly successful companies vary the most from the less successful. Successful team building is an important building block for successful innovation.

Looking at all companies, however, the frequency analysis reveals that only one in four build their team based strictly on the competencies required, indicating that many teams are built by what is available at hand, thus leaving room for competence deficiencies.
### Survey statement

<table>
<thead>
<tr>
<th>Survey statement</th>
<th>Highly successful</th>
<th>Less successful</th>
<th>Absolute Gap</th>
<th>Gap in %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Team</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When we put together a team, it is primarily based on competences and personality</td>
<td>4.18</td>
<td>3.03</td>
<td>1.15</td>
<td>27.55</td>
</tr>
<tr>
<td>In our company we work well together across departments</td>
<td>4.06</td>
<td>3.13</td>
<td>0.93</td>
<td>22.84</td>
</tr>
<tr>
<td>We emphasise having employees with different professional and personal backgrounds</td>
<td>3.99</td>
<td>3.15</td>
<td>0.84</td>
<td>21.03</td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The company has an updated and communicated company strategy</td>
<td>3.95</td>
<td>2.74</td>
<td>1.21</td>
<td>30.63</td>
</tr>
<tr>
<td>It is taken into consideration whether an innovation project is new in relation to the company’s existing knowledge of the market</td>
<td>3.80</td>
<td>2.64</td>
<td>1.16</td>
<td>30.45</td>
</tr>
<tr>
<td>The company has a written and updated innovation strategy</td>
<td>3.13</td>
<td>2.26</td>
<td>0.87</td>
<td>27.72</td>
</tr>
<tr>
<td>Innovation is an important part of the company’s strategy</td>
<td>4.16</td>
<td>3.02</td>
<td>1.14</td>
<td>27.45</td>
</tr>
<tr>
<td>The company places a high degree of emphasis on innovation</td>
<td>4.26</td>
<td>3.12</td>
<td>1.14</td>
<td>26.73</td>
</tr>
<tr>
<td>It is taken into consideration whether an innovation project is new in relation to the company’s existing technological knowledge</td>
<td>3.70</td>
<td>2.81</td>
<td>0.90</td>
<td>24.17</td>
</tr>
<tr>
<td><strong>Empowerment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All employees generating ideas receive constructive feedback regardless of whether further work is done on the idea</td>
<td>3.85</td>
<td>2.72</td>
<td>1.13</td>
<td>29.24</td>
</tr>
<tr>
<td>The management implements guidelines, which give the employees responsibility and powers so that they can act independently</td>
<td>4.33</td>
<td>3.10</td>
<td>1.23</td>
<td>28.31</td>
</tr>
<tr>
<td>The organisation encourages and supports participation in training activities</td>
<td>4.06</td>
<td>3.01</td>
<td>1.05</td>
<td>25.75</td>
</tr>
<tr>
<td>All employees know where to go if they have comments or new ideas</td>
<td>4.04</td>
<td>3.01</td>
<td>1.03</td>
<td>25.47</td>
</tr>
<tr>
<td><strong>Culture</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the company, questioning processes and products is valued</td>
<td>4.06</td>
<td>2.99</td>
<td>1.07</td>
<td>26.47</td>
</tr>
<tr>
<td>To err is to learn</td>
<td>3.77</td>
<td>3.03</td>
<td>0.74</td>
<td>19.68</td>
</tr>
<tr>
<td>In our company there are no stupid questions</td>
<td>3.96</td>
<td>3.18</td>
<td>0.78</td>
<td>19.62</td>
</tr>
<tr>
<td><strong>Co-operation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We work in a structured manner with the company’s stakeholders (customers, suppliers, etc.)</td>
<td>4.21</td>
<td>3.17</td>
<td>1.05</td>
<td>24.82</td>
</tr>
<tr>
<td>The company emphasises participation in external networks</td>
<td>3.61</td>
<td>2.97</td>
<td>0.64</td>
<td>17.77</td>
</tr>
<tr>
<td>We cooperate with universities, research centres, etc.</td>
<td>2.94</td>
<td>2.43</td>
<td>0.51</td>
<td>17.45</td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have fixed procedures for the evaluation of our innovation projects</td>
<td>3.51</td>
<td>2.39</td>
<td>1.12</td>
<td>31.92</td>
</tr>
<tr>
<td>We continuously compare ourselves with relevant companies</td>
<td>3.51</td>
<td>2.58</td>
<td>0.93</td>
<td>26.45</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In our organisation we have an actual model for innovation which we follow</td>
<td>3.08</td>
<td>2.20</td>
<td>0.87</td>
<td>28.37</td>
</tr>
<tr>
<td>There is a good overview of what everybody does in the organisation</td>
<td>3.87</td>
<td>2.84</td>
<td>1.03</td>
<td>26.64</td>
</tr>
<tr>
<td>We have organised dedicated facilities to support the innovation process</td>
<td>2.84</td>
<td>2.12</td>
<td>0.71</td>
<td>25.20</td>
</tr>
<tr>
<td>There are clear and written procedures for innovation processes in the company</td>
<td>3.08</td>
<td>2.31</td>
<td>0.77</td>
<td>25.03</td>
</tr>
</tbody>
</table>

**Table 4.1:**
Source: Fremtidstanken, 2004
Also, only 22% of companies have a very good overview of competencies – who knows what and who does what – and while companies are generally good at working together across departments, only 23% do so to a high extent.

**Empowerment (4.1)**

This is about giving the employees the opportunity to voice ideas, act independently and provided them with feedback, thus creating an organisational structure where the employees know where to go with an idea and how it will be dealt with. It is about creating initiative and mobilising the spirit and creativity of each and every employee.

No wonder then that delegating responsibility has the highest score of all the fundamental innovation elements amongst highly successful companies, whilst the less successful trail far behind, insisting to a much higher degree on centralised authority and top down initiative.

According to the frequency analysis, 57% of highly successful companies delegate to a high extent, while less than 15% of the less successful do the same. Note too that the overall level of delegation is somewhat low – only 28% of all the companies surveyed delegate to a large extent.

It is also remarkable that only 24% of all employees are sure where to go with a good idea, whilst only 18% are certain that they will receive some form of constructive feedback.

**Culture (3.9)**

Values and culture have an important influence on the thinking and actions of all companies. In fact, research shows that the more innovative a company is, the more important the attitudes of the employees and middle managers are to growth. For instance, innovative organisations must allow their employees to make mistakes and learn from them without being sanctioned – otherwise they will be unlikely to attempt anything new.

This type of learning culture is not the reality in today’s Danish businesses, and even in highly successful companies learning culture scores lowest. Since it is a hallmark of the innovative culture that mistakes are acceptable this stands out as a major weakness.

Overall, only 21% of companies accept mistakes to a high extent, and only one in three openly allow ‘stupid’ questions – in most companies employees have to be careful what they do and what they ask. Correspondingly, only 22% of companies value to a high extent that their employees question the status quo.
Strategy (3.9)

Strategy is a structured way to promote innovation aligned with the company’s existing markets and technology base, thus maximising growth potential.

Strategy is the most important driver for success, and has the highest influence on success among the highly successful companies. The less successful companies have a much lower score, indicating that they have a hard time figuring out where to focus and how to move forward.

Also, the highly successful companies emphasise innovation to a much greater extent than the less successful – this is the second highest score among all the fundamental innovation elements.

According to the frequency analysis, most companies focus on innovation. 85% see strategy as important, 51% have at least some sort of a strategy, which leaves quite a large number without a plan for something they consider very important. 27% have a fully updated strategy, and 25% consider innovation to be an important part of their strategy. However, only 10% of companies have a fully developed innovation strategy, whilst 18% have almost nothing at all.

Somewhat worryingly, only 13% consider their existing market knowledge when looking at innovation, and 19% see no value whatsoever in their existing market knowledge. Similarly, 22% companies make no use of their technology base.

Cooperation (3.6)

The use of external sources for ideas and co-operation with customers and other stakeholders is becoming ever more important to the innovation process. The speed of market change makes it necessary to in-source knowledge, expertise and ideas from external centres of excellence. Consequently, external links and cooperation become more important in order to keep up with wider innovation and the competition.

Little wonder that highly successful companies score highly on cooperation – the score for cooperating with customers is the third highest of all the fundamental innovation elements, with the less successful companies some considerable distance behind. However, the link to the main producers of new knowledge, the universities, has the second lowest score of all the fundamental innovation elements among the most successful companies, thus – according to the latest research into open innovation and innovation networks – revealing a major weakness in sourcing new ideas and technologies for innovation.

According to the frequency analysis, companies generally work in a structured manner with their customers and suppliers – 31% do so to a high extent, although 9% have no cooperation at all. However, only 14% seek new ideas and input from universities and only one in five – 20% – emphasise participating in external networks to a high extent.
Monitoring (3.5)

Having fixed procedures for evaluating innovations and constantly benchmarking with relevant companies is an important means to learn and to develop excellence. It was therefore expected that companies had relatively good procedures and systems for this.

However, even in the highly successful companies this turned out not to be the case, and the less successful companies are even further behind.

According to the frequency analysis, only 12% of companies have a fully functional procedure for the evaluation of their innovation projects, whilst 36% do not have any or hardly any procedure for evaluating innovation.

Structure (3.2)

An overview of what everybody is doing; clear procedures for the innovation process; specific innovation models, and dedicated facilities for innovation projects, are all important elements that allow for the creation of transparency and order in the internal universe of a company.

However, these important elements are not being used in Danish companies. The overview is there, allowing successful companies to tap the right resources when they need them, but there is only very limited use of actual innovation models or special facilities such as an idea room. These parameters have the lowest score of all fundamental elements among the most successful companies, and actually have a negative significance on success. This negative statistical correlation indicates that few companies have and use an innovation model or special facilities.

According to the frequency analysis, only 7% of companies have dedicated facilities supporting the innovation process. This is surprising, since many of the most innovative companies in the world do use dedicated facilities to support innovation culture in their companies. However, it may be that these facilities are more important as supportive elements to company culture rather than as actual tools for innovation.

In total, only 10% of companies have written procedures for the innovation process – i.e. the vast majority do not have a tool they can use to shape and form innovation effort. Similarly, only 19% have a clear and full understanding of what everybody else in the organisation does, which implies weak innovation linkages in many companies.

Reading the diagrams

The survey results are presented in diagrams reflecting the score for the most successful and the least successful companies, thus creating a gap illustrating the difference in success (see figure 4.1).
Reading the diagrams

Figure 4.2 shows an overview of all the fundamental elements in the IMM. From left to right, the table shows the ranking of the highly successful companies in descending order. Greater emphasis is placed on the elements stressing team, initiative and culture – the human motivational factors – than elements such as control and structure – the system factors. This priority is shared by both high achievers as well as low achievers. The largest differences, however, are to be found in strategy, initiative and control, implying that those achieving the best results have a systematic approach to the management of innovation – i.e. with regard to formulating strategy, creating initiative and controlling the result. More detailed figures can be found in appendix F.

Fundamentals - an overview

Figure 4.2: Above are the 7 elements that comprise fundamentals - illustrating the score for highly and less successful companies

Source: IMM Survey 2004
Lessons from Fundamentals

The overall key findings from the analysis of the fundamentals are:

- Highly successful companies are not just doing one or a few things better than less successful companies - they are doing everything better.
- The right team, empowerment of the employee and a learning culture are the most important fundamental elements for innovation management in the most successful companies.
- Successful companies are systematic and clear about their innovation management processes.

However, in order to analyse the differences between highly and less successful companies in greater depth, all 25 questions have been sampled, identifying those where the less successful differ from the highly successful by more than one assessment point.

The following elements are practices that divide the highly successful from the less successful, in prioritized order:

1. The management implements guidelines that give the employees responsibility and powers enabling them to act independently.
2. The company places a high degree of emphasis on innovation.
3. The company works in a structured manner with the company's stakeholders (customers, suppliers, etc.).
4. Teams are built primarily based on competencies and personality.
5. Innovation is an important part of the company's strategy.
6. The organisation encourages and supports participation in training activities.
7. The company values questioning of processes and products.
8. All employees know where to go if they have comments and new ideas.
9. The company has an updated and communicated company strategy.
10. There is a good overview of what everybody does in the organisation.
11. All employees generating ideas receive constructive feedback regardless of whether further work is done on the idea.
12. It is taken into consideration whether an innovation project is new in relation to the company's existing knowledge of the market.
13. The company has fixed procedures for the evaluation of its innovation projects.

There is a strong emphasis on structure, culture and team in highly successful companies – clear rules, strong risk encouraging values and solid competencies. Further data for each of the fundamentals can be found in appendix E.

Drivers of success

Another approach is to look at the level of influence that each of the fundamental elements has on the rate of success. Using regression analysis two fundamental elements score significantly higher in influencing success parameters:
1. Strategy consists of the following elements:
- High degree of emphasis on innovation
- Updated and communicated company strategy
- Written and updated innovation strategy
- Innovation is an important part of the company’s strategy
- Existing technological knowledge is taken into consideration whether an innovation project is new to the organisation
- Knowledge of the market is taken into consideration whether an innovation project is new to the organisation

2. Empowerment consists of the following elements:
- The management implements guidelines that give the employees responsibility and power so that they can act independently
- The organisation encourages and supports participation in training activities
- All employees generating ideas receive constructive feedback regardless of whether further work is done on the idea
- All employees know where to go if they have comments and new ideas

These findings stress the same pattern as when sorting the elements by one point alone: Clear rules combined with values encouraging initiative and competencies. When designing a successful innovation system in a company, the management should first and foremost establish strong values and structures, and then employ or develop the needed competencies.

Interestingly, these findings differ from one popular conception of the very innovative company as being a creatively disorganized entity with an anarchistic culture. On the contrary – highly successful innovative companies play by strict rules coupled with a culture of empowerment.

Innovation Processes

The fundamentals do not deliver innovation by themselves, yet they are vital prerequisites for success.

The typical innovation process consists of five separate steps or processes that can be described as follows:

- **Phase 1 – Idea (Idea generation)**
  Where ideas are generated and gathered. Ideas can be both new product ideas, ideas to save costs, distribute in new ways, enhance internal processes, etc.

- **Phase 2 - Evaluation (Idea selection & Concept)**
  The acid test of the ideas. This is the first reality check after the creative phase. This is where bad ideas are dropped and the best ideas picked.
Phase 3 - Prototyping
Takes the reality check a bit further. Here, ideas and concepts are prototyped, and tested in realistic situations to uncover weaknesses and potentials.

Phase 4 - Business planning (final alignment with corporate strategy)
Where hypotheses are tested, and the final business plan with market and financial figures is developed.

Phase 5 – Implementation and launch
Where an initial investment in a particular innovation domain takes place. From here on the new innovation is considered operational.

Lessons from the innovation Processes
In the following, the lessons from the innovation processes are reported, with the findings divided into two major components - results and competence.

Structuring the findings
The general questions relate to two major themes dealing with management effort and employee quality:

- Competencies (who is involved, how they are managed, trained, compensated, etc.)
  - Employees from the entire organisation are involved
  - External people/companies are involved
  - There is specific competency training
  - There are phase specific incentives

- Results (including management attention and measurements)
  - Management responsibility is clearly fixed
  - There are clear objectives
  - Results are specifically measured
  - The area has the management’s attention

In general, companies do less than expected. Only about one third of companies have clearly defined management responsibility in individual processes, whilst less than one in ten analyse the need for competencies to a high extent, and even fewer attempt to solve the problem of missing competencies. These numbers are surprising when taking into account that the ideal response rate should be close to 100% - after all, it should never be down to guesswork to determine who has responsibility for what within an organisation.

Likewise, it is remarkable that less than 10% of companies have a strong incentive system offering specific rewards in each phase of innovation, and between 40%
and 50% have no reward system. This relative low level of level of excellence indicates that innovation culture is to a great extent immature.

Even though the general performance level in each phase could be improved, some companies are performing better than others when it comes to innovation management. Consequently, the question is of course where exactly the highly successful and less successful companies differ. These results are shown in table 4.2, and discussed in the following.

By asking the same set of questions in each of the five innovation processes it is possible to measure the change in management focus during the innovation process (see figure 4.3).

The large gap between the highly successful and less successful companies indicates areas where best practise makes an important difference to performance.
Although the level of performance obviously differs, both highly successful as well as less successful companies prioritise the managerial elements in results over the employee related elements in competencies. As in the fundamentals, clearly set objectives within a well structured framework set by the management are the most important factor for success in the innovation process, once again overriding the importance of talent and motivation. However, less successful companies are particularly bad at managing talent and generating the motivation required to structure frameworks and reach objectives.

It is interesting that priority does not vary substantially between highly successful and less successful companies. This indicates that awareness of the necessary elements required exists in both categories of companies, and that the difference lies in the execution.

It is also interesting that all companies, regardless of success, have difficulties with the evaluation phase. This phase has the lowest score on all parameters amongst both highly successful and less successful companies. Seemingly, evaluating an idea is more difficult than producing one, whilst executing an idea is easier than evaluating it.

However, the practitioners in this project all focused on the evaluation phase as a crucial link in the innovation process. First, it is important not to reject a good idea; secondly, it is important to select the right idea, as selecting wrong ideas is expensive; thirdly, when picking the right idea it is important to create an immediate overview of the resources needed to execute the idea, and to have a clear sense of the success criteria. In other words, the evaluation phase embraces aspects of all the processes, and even though an innovation project may later be dropped for not meeting the required goals in a particular phase, the evaluation phase is clearly the most important juncture in the entire innovation process. The function of this phase is illustrated in figure 4.4.
Specific questions

Each innovation phase has its own goal, and thus the participants were asked a number of questions designed to uncover key innovation aspects specifically relating to the phase in question. As was the case with the fundamentals, the answers were divided into a total frequency and a factor and cluster analysis was carried out comparing the highly successful companies with the less successful companies.

Phase 1 – Idea generation

This phase is generally characterised by something resembling chaos. According to the frequency analysis, only 8% of companies have a very clear and fixed structure for collecting ideas, and one in three either has a weak structure or no structure at all. This implies that ideas are created randomly, and even worse, are not accounted for. This is not the optimal way to treat assets in a market place where management rhetoric states that companies have to compete on ideas. This lack of structure shows that managing the idea phase still has a long way to go. This also applies to the incentive system – only 8% of companies stated that they reward good ideas to a high extent.

The factor analysis reveals a significant difference between highly successful and less successful companies in the idea phase. According to the analysis, highly successful companies are much more systematic than less successful companies, and they also have fixed and understood structures for the collection of ideas.

Phase 2 – Evaluation

There is also a lack of systematic approach in phase 2 as well – only 8% of companies have a “high extent” of fixed structures for evaluating ideas, and 39% have none at all or practically none. This is a more worrying situation than in phase 1, since phase 2 is where the decision is made whether to invest in an idea and
develop it further. This lack of structure and systematic approach explains much of the weakness in this phase, and why this is the phase where most companies experience the greatest difficulties. This is reinforced by the fact that only 1% of companies have a strong reward system for evaluation – thus the most demanding phase has the weakest incentive system.

The factor analysis reveals – not surprisingly – an even greater difference in success levels between highly successful companies and the less successful companies when compared to phase 1.

**Phase 3 – Testing innovations**

It is obviously a good idea to test an innovation with regard to market acceptance, production limitation, etc., before proceeding to the business planning and investment processes. When the participants were asked whether their companies test innovation, only 16% stated that they do so to a high extent.

Similarly, when the participants were asked more specifically about what testing methods they apply 2% stated that they do not test at all (see figure 4.5).

**Methods of testing innovations**

![Figure 4.5: When testing innovation the Danish companies uses a variety of methods](Source: IMM survey 2004)

The factor analysis reveals that almost 1 in 10 of less successful companies do not test at all, whereas all of the highly successful companies do test their innovations (using a variety of methods, ranging from testing against customers, strategy, financial conditions, etc.).

Testing is important because innovation in itself is no guarantee of long-term success. There has to be a clear link between innovation, core competencies and strategy – as growth potential is maximised when all three elements are aligned. 28% of all companies reject an idea if it does not fit company strategy, whilst 22% are prepared to adjust strategy in order to benefit from innovation (see figure 4.6).
However, 15% of less successful companies do not test their innovations against strategy at all, whereas almost all of the highly successful companies align their innovation with company strategy. By aligning innovation with strategy, highly successful companies can then use all available options.

The survey once more confirms a substantial difference between highly successful and less successful companies – highly successful companies test their innovations much more frequently than less successful companies.

**Phase 4 – Business planning**

Evaluating, executing and monitoring an innovation normally require a business plan. However, 15% of the participating companies do not formulate a business case for their innovation projects (see figure 4.7).

**Business case elements**

Figure 4.6: What actions are Danish companies prepared to take when aligning innovation to company strategy

*Source: IMM survey 2004*

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**Phase 4 – Business planning**

Evaluating, executing and monitoring an innovation normally require a business plan. However, 15% of the participating companies do not formulate a business case for their innovation projects (see figure 4.7).

**Business case elements**

Figure 4.7: To what extent do companies take all operational issues into account when formulating a business case

*Source: IMM survey 2004*
34% of less successful companies do not formulate a business case, whereas only 6% of highly successful companies fail to do so. Highly successful companies also include a wide range of evenly distributed elements in their business strategies. This indicates that highly successful companies are aware that a successful business plan has to include all operational aspects.

**Phase 5 – Implementation**

The implementation phase is where highly successful companies most differ from less successful companies. This is of course where the project comes to life and, not surprisingly, this is the phase where management attention is at its highest. This is also where in the entire survey we find the largest gap in the scores between highly successful and less successful companies.

Highly successful companies place a great emphasis on competencies when implementing their innovations – not only by using relevant competencies, but also by upgrading the competencies of the employees that take part in the innovation implementation process (see figure 4.8).

**Elements of competence for implementation**

![Figure 4.8: The elements that comprises competence within the implementation phase](source: IMM survey 2004)

However, highly successful companies place even greater emphasis on measuring their results, i.e. determining the financial impact of innovation. Not surprisingly, highly successful companies also place a greater emphasis on clear managerial responsibility and managerial focus during the implementation process (see figure 4.9).

Yet highly successful as well as less successful companies have difficulties when transferring an innovation project to normal business, and only 13% of companies have a clear and structured system for doing this.

**The innovation machine**

Looking across the innovation processes another dimension in innovation management becomes visible: The project changes character from phase to phase, and competency demands change along the way, together with the risk profile of the projects.
The entire innovation process can be viewed as an innovation machine, continuously creating and maintaining a portfolio of ideas, experiments, business plans and new businesses, with each phase requiring new competencies, deeper investments and ever-tighter control, channelling various possibilities into specific certainties. This also illustrates that it is not necessarily the same team that brings a vision to life that should be tasked to bring a project to the market (see figure 4.10).

Although a good beginning, management of the innovation process is consequently a task that demands more than merely mastering individual parameters. It requires, as several of the practitioners remarked during the workshop, very clear and present leadership, creating an overall process flow.

**Key findings**

Highly successful companies distinguish themselves in the innovation process in a number of key ways:

- **Implementation** – the final execution of the innovation project – this is where the greatest gap is found between highly successful and less successful companies
- **Involving employees** from the entire organisation throughout the innovation process and placing great emphasis on the availability of required competencies
- **Managing innovation projects closely** and using specific goals to measure progress and success

**Figure 4.9:** The elements that comprises result within the implementation phase

*Source: IMM survey 2004*
The implementation phase is of special interest, since this is where the greatest gap is found between highly successful and less successful companies. It is thus worth stressing the following findings:

- Managers in highly successful companies are better at giving their full attention to the process and project – a characteristic that is true throughout all five processes, but of special significance in the implementation phase.
- Not surprisingly, management responsibility is clearly defined and fixed in the highly successful companies, likewise there are clear objectives established for each phase.
- Highly successful companies implement specific training to secure the necessary competencies.
Linking Fundamentals and Processes

The model in figure xx illustrates how the elements in the Innovation Management Model affect each other. For instance, the element structure amongst the fundamentals may facilitate a good structured innovation process that influences success, but structure does not necessarily have a direct positive effect on success. On the other hand, empowerment as an element amongst the fundamentals does impact success directly as well as indirectly - especially through phase 1.

The links in IMM

![Diagram showing the links between fundamentals and the innovation process]

Figure 4.11: The figure show how fundamentals influence the five phases of the innovation process, as well as how fundamentals and the innovation process influence success.

Source: Fremtidstanken, 2005

Each of the seven elements in fundamentals has been tested using regression analysis in order to determine to what extent they significantly influence the innovation process. Between one and four elements significantly influence the innovation process. In the table below, the top three elements are listed in prioritised order. Note that if there is no statistical significance the cell is left blank.

Fundamentals influencing the innovation process

<table>
<thead>
<tr>
<th>Result</th>
<th>Idea generation</th>
<th>Idea selection</th>
<th>Testing Prototyping</th>
<th>Business planning</th>
<th>Implementation</th>
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<tr>
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<th>Competence</th>
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Table 4.3:

Source: Fremtidstanken, 2004
Structure is the single most important fundamental that influences the innovation process. Structure is defined by the following elements:

- Organised dedicated facilities to support the innovation process
- A good overview of what everybody does
- The existence of an actual model for innovation
- Clear and written procedures for innovation processes

Empowerment is the second most important fundamental. Empowerment is defined by the following elements:

- Management implements guidelines that give employees responsibility and powers so that they can act independently
- The organisation encourages and supports participation in training activities
- All employees generating ideas receive constructive feedback regardless of whether further work is done on the idea
- All employees know where to go if they have comments and new ideas

Again, the results underline what has been learned by looking at the two separate blocks of innovation elements – the most successful innovators create a clearly understood and systematic approach to innovation, which is combined with values and a culture that empower and motivate employees. It is managerial devotion to fulfilling these conditions throughout the innovation process that separate highly successful companies from the less successful.

These findings are reinforced by the fact that more highly successful companies monitor the financial results of innovation projects than less successful companies. More than 40% of highly successful companies track their innovation projects for a period of 2 to 3 years, compared to the more than 40% of less successful companies that do not (see figure 4.12).

Measurement of financial result from innovation projects

Figure 4.12: Highly successful companies measure financial result to a much greater extent than less successful companies.

Source: IMM survey 2004
5. Perspectives on innovation management

The Innovation Management Model measures the most important elements of innovation in an organisation based on the best practices according to available international research. The field survey and factor analysis have highlighted which elements are most important to Danish companies. However, there may be important aspects of innovation that are not captured by the analysis. Therefore the participating companies were asked to formulate a response to what they see as the barriers to and the drivers of the innovation process.

Barriers to innovation

Overall, it seems clear that most companies perceive innovation as a demanding process (see figure 5.1).

Top 5 Barriers to Innovation

- **Finance** - The lack of financial resources is identified as the main barrier to the innovation process. This implies that the innovation process is not an integrated part of company strategy and culture, but regarded as a separate activity that needs its own financing. In a competitive market place where companies compete on innovation this seems somewhat paradoxical.
- **Time** - Not having time enough to innovate in a company competing on innovation can also be seen as paradoxical, especially as 85% of the participating companies identified innovation as being strategically important.

- **Strategy** - Mastering innovation management has to do with the ability to establish structure and execute strategy and, as the analysis has shown, this is no easy feat.

- **Competencies** - Structure and competencies are the two key elements in innovation management, and thus demand attention and effort.

The analysis shows that few companies have truly embraced innovation as a core competitive source – and as such innovation is far from being embedded in the corporate DNA of all businesses.

Taking a closer look at the individual answers, many of them unsurprisingly deal with various leadership failings. Here are a few examples:

- “The management is not receptive to new ideas”
- “Lack of leadership”
- “No development because of lack of management input and competence”
- “Lack of managerial empowerment and trust in employees”
- “No delegation of authority”
- “Difficult to reach decisions and effectuate”
- “Lack of focus from management and attention to process”
- “No attention from management”
- “Inactive leadership”
- “No focus from top management”
- “Lack of structure and responsibility”
- “Lack of clearly defined processes and responsibility – lack of leadership”
- “Unclear goals”
- “Lack of overall procedures and strategy – no attention from management”
- “Lack of goals, management, evaluation”
- “No process management”

The list is much longer, many of the replies being variations on the same theme. Obviously, these statements suggest that managerial passivity is the main culprit for when considering unsatisfying innovation effort. This supports the conclusion that managing the innovation process is no easy task, and that many managers have only a vague idea of what they should be doing. Since the majority of managers acknowledge the strategic importance of innovation this would appear to indicate a lack of specific competencies and skills in innovation management.

**Drivers for innovation**

Looking at what the participants in their own words see as important drivers for a good innovation process reinforces the findings in the survey (see figure 5.2).
Establishing the team, employee motivation, company culture and clearly defined goals – all clearly communicated – corresponds very well with the priorities identified in the survey results. The inverted priority – people before system – suggests that managers identify employee motivation as a great challenge. This corresponds with the low scores that less successful companies achieve with regard to handling talent (employees).

Time appears as a somewhat unexpected driver, suggesting that the innovation process is generally time consuming or that not enough time is being delegated to innovation.

The drivers and barriers confirm an overall observation made by the practitioners in the project about the innovation culture in Denmark being still very immature. In many companies, management and employees alike are struggling to get to grips with the innovation process and the fundamentals it requires in terms of values and attitudes – the innovation culture in many aspects being very different from the industrial culture.

The individual replies tend to be spread across a broader range than those identifying barriers: “Speed”, “determination”, “motivation”, “courage”, “creative space”, “a positive attitude to all things new”, “planning”, “team work”, “insight”, “competent employees”, “believing in the project”, “clear goals”, “communication”, “testing”, “involvement of customers”, “delivering new value to the customer”. The answers seem to reflect what we’ve already learned from the other survey questions – that success in innovation is only achieved by successfully executing all the elements at the same time.
One theme, however, transcends many of the questions: Culture, meaning attitudes and values. Many of the survey participants stress factors such as motivation, interest in new things, openness towards change (personally as well as professionally), tolerance, and a willingness to experiment. Combined with clearly set goals, this obviously represents a strong signal from insiders as to what’s important for achieving success - The right team with the right attitude, spurred by a strong leadership setting clear goals, is a fundamental condition for achieving excellence in innovation.
6. The Seven Circles of Innovation

The innovation practitioners – the managers responsible for innovation at the companies participating in this project – have contributed with comments and insights regarding the results and the model used for analysing the innovation processes. This allows for an in-depth comparison of the theory and survey results by a selection of the most innovation oriented Danish companies, e.g. Coloplast, Radiometer, the Danish Broadcasting Corporation, Novozymes, Jyske Bank.

The practitioners stressed a number of factors of particular importance with regard to the actual Innovation Management Model:

- The customer or market feedback should be made clearer in the model – Danish companies analyse, compare and evaluate each step of the progress against the market and customer needs
- The individual phases need to more clearly reflect that all professional disciplines (marketing, finance, etc.) must be involved to ensure successful innovation
- The ability and need for iteration should be illustrated in the model, though iterations can also delay an innovation project as too much time can be used revising the project
- The model appears too linear, limiting the possibilities for continuous learning and iteration in the process – it is important, though, that each phase has a start and finish point to ensure progress
- The model works well for incremental as well as disruptive innovations (if a company’s strategy is flexible enough to allow for disruptive innovations)
- The ideal innovation management model has to be a merger of culture, organisation and strategy – the twin demands of innovation and efficiency must be understood in order to achieve excellence in innovation
- Leadership is a very important enabler, both in terms of enabling and terminating an innovation

The practitioners especially emphasized the importance of involving the customer – both directly and through market analysis – in every aspect of the innovation process, including idea generation. This is not surprising – Danish businesses generally tend to focus more on customer (demand) driven innovation than technology (supply) driven innovation. This is in part to do with Danish business infrastructure – Danish businesses are generally small, and Denmark has few research & development centres of excellence, which naturally results in more demand driven inno-
vation – and in part to do with the Danish culture, which is generally more stakeholder oriented and aware of the needs of third parties than other cultures.

**The new innovation model**

Consequently, in light of the findings and discussions presented here, the ideal strategy design for innovation management might look something like this:

**The Seven Circles of Innovation**

![Diagram of the Seven Circles of Innovation]

The model stresses that the market lies at the heart of innovation – the first circle and largest circle – and within the market we find the fundamentals of every business – the second central circle. But we only achieve growth when the five developing and learning circles of innovation are set into motion, rooted in the market as well as the fundamentals, and connecting with each other.

Each innovation phase overlaps the next, creating a continuous learning and development loop, emphasising the ever-increasing need for speed. There’s no time in...
the marketplace of today to wait for one phase to be completely terminated before the next starts. This dimension – the need for speed and pace of change – has not been considered in any great depth in this analysis, but merits more scrutiny in future research.

The circles in the model illustrate the effort that innovation demands in order to achieve excellence and extraordinary results – much as a professional golfer strives to achieve the perfect swing, innovation management is a never ending process. This is the art of innovation – and it should never be overlooked that managing the innovation process is comparable to any other art form, requiring perfect coordination of all the composite elements in the same time and space, which if managed correctly will lead to the creation of not just good, but great bottom lines.

Taking into account the analysis of the individual parameters influencing the innovation process, the new strategy design model reflects the following key elements that need to be established, executed and fulfilled in order to build an enduring innovation machine:

**Innovation Fundamentals**

**Team**

- Emphasis on having employees with different professional and personal backgrounds
- Building a team for innovation projects primarily based on competencies and personality
- Working well together across departments

**Empowerment**

- Management implemented guidelines enabling employees to act independently
- Encouragement and support of participation in training activities
- Constructive feedback to all employees generating ideas regardless of the success of the idea
- Everybody knows where to go if they have comments and new ideas
- Skunk work is allowed – employees may work on their own innovation project ideas within the work environment

**Culture**

- Mistakes are allowed for learning purposes – “to err is to learn”
- Questioning processes and products is valued
- There are no stupid questions
Strategy

- Management emphasises innovation to a high degree
- There is an updated and communicated company strategy
- Innovation is a central element of company strategy
- Aligning of innovation projects with the company’s existing technological knowledge
- Aligning of innovation projects with the company’s existing knowledge of the market

Co-operation

- Co-operation with universities, research centres, etc.
- Cooperation is structured with the company’s
- Customers
- Suppliers
- Partners
- Other stakeholders
- Emphasis on building external networks
- System for identifying potential innovations from external sources

Monitoring

- Fixed procedures for the evaluation of innovation projects
- Continuous benchmarking with competitors, outsiders and others
- Tracking financial performance of innovation projects for a minimum of 2 to 3 years

Structure

- Dedicated facilities (idea rooms, etc.) to support the innovation process
- Everybody has a good overview of what everybody else does
- There are clear and written procedures for innovation processes – innovation model used
- Organisational competencies are mapped and developed
- Procedure for identifying new competencies needed for innovation
Innovation Processes

**Phase 1 – Idea generation**

- **Competence**
  - Employees from the entire organisation involved
  - External people/companies/partners involved
  - Specific training for competencies ensured
  - Specific rewards used

- **Result**
  - Management’s responsibility clearly fixed
  - There are clear objectives
  - Results are measured specifically
  - Management’s attention secured
  - Structures established for the collection of ideas
  - External surroundings systematically scanned for ideas (e.g., via the internet, networks, competitors, other trades, etc.)

- Clear objectives and measurements for idea generation
- Formal procedure and criteria for filtering ideas

**Phase 2 – Evaluation and planning**

- **Competence**
  - Employees from the entire organisation involved
  - External people/companies/partners involved
  - Specific training for competencies ensured
  - Specific rewards used

- **Result**
  - Management’s responsibility clearly fixed
  - There are clear objectives
  - Results are measured specifically
  - Management’s attention secured
  - Structures established for the collection of ideas

- Preliminary business case formulated, comprising strategy, market, technology and competencies
- Early planning for the entire innovation project, including:
  - Formulating milestones
  - Risk assessment
  - Formulated measures for the innovation project
  - Resources allocation

**Phase 3 – Testing/prototyping**

- **Competence**
  - Employees from the entire organisation involved
Phase 4 – Business planning

- Competence
  - Employees from the entire organisation involved
  - External people/companies/partners involved
  - Specific training for competencies ensured
  - Specific rewards used
- Result
  - Management’s responsibility clearly fixed
  - There are clear objectives
  - Results are measured specifically
  - Management’s attention secured
  - Structures established for the collection of ideas
  - Innovations are always tested by means of prototypes, test runs, scenarios, etc.
- Simulation can result in rejection of the innovation or iteration in the IMM process

All functional areas (production, HR, sales/marketing, etc.) are included in the business planning

Objective criteria combined with strategic consideration for funding innovation projects
- Internally
- Jointly funded with external partners
- Externally

Objective criteria combined with strategic consideration for the implementation model, such as:
- External or internal Venturing
- Internal Project team

Phase 5 – Implementation

- Competence
  - Employees from the entire organisation involved
  - External people/companies/partners involved
  - Specific training for competencies ensured
- Specific rewards used

**Result**
- Management’s responsibility clearly fixed
- There are clear objectives
- Results are measured specifically
- Management’s attention secured
- Structures established for the collection of ideas
- Clear and structured procedures for the transition from the innovation phase to daily operation

**Formal procedure with objective criteria for final decision to invest or not, such as:**
- Financial
- Market
- Technology
- Combination

**Final responsibility for the approval of the business plan/implementation plan must be clearly fixed**

**Final thoughts**

In the end, innovation is about management, not technology. Successful innovation requires the establishment of an idea process, an evaluation form, a business plan, and an investment analysis and the use a number of tools to manage these. The crucial element, however, is the overall management effort. The innovation manager is thus comparable to the conductor of an orchestra, ensuring that all the composite elements come together to achieve perfect harmony. Without the conductor, the instruments can too easily produce only discordant noise.
Epilogue

What now? How do you ensure that your company becomes a highly successful in the field of innovation? Here are a few practical tips and pointers derived from the survey:

1. It’s important to give innovation management top priority, and make it part of the strategic thinking and everyday behaviour in the company.

2. A well defined innovation framework suitable for your organisation needs to be built using the elements in the innovation management model.

3. You have to open up the company towards your customers, suppliers, universities and other stakeholders, allowing them to become integrated in your development activities.

4. Remember that innovation does not imply inventing a new wheel – it could just as easily be changing the company’s methods for handling customer service calls or distribution channels.

5. Innovation management is not yet another change-management project – it is a new way of thinking that requires continuous practise in order to achieve the best results.

Remember that innovation is always about the unknown, and that allocating resources to the unknown demands much more risk than allocating resources to production investments for example. This dilemma may be eased by well-managed innovation processes, but it can never be wholly eliminated. This is where leadership becomes the defining and shaping factor of success.

Should you ever wonder how wholeheartedly and genuinely your organisation embraces innovation then ask yourself this question: What would be easiest to set up and fund: a new IT project, or a new innovation project?
Appendix A

A Model for Innovation Management

Preliminary Study

2. draft
1. Background

A management model that assists and enhances the level of innovation in Danish companies would ultimately strengthen the competitive advantages of Denmark as such. Consequently, Center for Ledelse – the Danish Center for Management (CfL) – has decided to support the development of such a model.

This preliminary study is a short introduction to innovation and current thinking about innovation management. It’s not a full study of the entire field of innovation. The aim of this research paper is to create a common framework and facilitating a broad understanding on operational innovation management and the models developed so far.

As the study will show, there’s no single "model" for business innovation today, however, a number of commonly acknowledged principles that support the innovation process have been defined. We’ll reflect on the current innovation management literature in order to identify these principles. First, we’ll conceptualise innovation and establish how innovation has been defined and analysed in literature. Second, we’ll discuss how to work with managing innovation based on the established body of analysis.

2. An introduction to Innovation

Few will disagree with the fact that businesses need to innovate in order to stay abreast in the competition on the market place of today. Many, though, have problems defining what innovation is and more so how to manage the innovation process within their own company.

Nevertheless, scholars and company executives alike increasingly see innovation as a powerful way of securing competitive advantage and as a means to defend strategic positions. A company may attribute its competitive advantage to size, assets or something else. Regardless of which assets are deemed strategically important the companies that are able to turn knowledge, technological skills and experience into new products, processes and services are gaining shares on the market.

The Oxford English Dictionary defines innovation as “making changes to something established”. Innovations frequently disrupt the way that companies do things or have been doing for a longer period. Tidd, Bessant and Pavitt – authors of some of the most definitive literature on innovation - argue that innovation essentially is change, and that most people talking about innovation think technological change.

We’ll use a broad definition, leaving ample room for developing a model that is practical as well as operational: “Innovation management is managing the
process by which new products, processes or administrative innovations are created and executed/implemented”.

2.1 Innovation, what, where, how

As mentioned, innovation is characterised by a change. Many innovation theories concentrate on technological change. However, in the current business environment other sources of change such fashion, political or ethical orientation can have as big an impact on companies as technological change.

The above model shows the “innovation space”. The perceived extent of an innovation is the impact an innovation has on a specific company. It’s important to talk about “perceived”, as a change in one company can be incremental whereas the same change can have radical impact for another company.

Innovations take place in a number of different ways, among most authors of innovation theory two main characteristics are commonly used.

2.1.1 Disruptive changes

A disruptive innovation is when the “rules of the game” are changed and a new market is created, such as when the steam engine was introduced. Dell’s direct sale of IT-goods to the end-customer is also an example of a disruptive change for a business sector. IBM experienced a disruptive change when it almost lost the PC-market in the industry’s early days.

2.1.2 Continuous innovation

Continuous innovation is when a company on a continuous basis enhances their existing offerings to the market. A good example of this is Gillettes razor
blades, going from single blade to its Mach3 with three blades and now “vibrating wet shave blades” – all incremental innovations.

2.1.3 S-curves

The different types of innovation can also be illustrated using S-curves as shown in the figure below. An incremental innovation is a move along an already established S-curve, whereas disruptive changes for the most part involves moving to a new S-curve.

Clayton Christensen – author of the classic “Innovator’s Dilemma” – argues that for some disruptive technologies it’s not merely a change from one S-curve to another, as the performance of the technology would not fit with the current. As an example he draws on his study of the hard disc industry, where the need for small hard disc drives for laptops were calling for a new S-curve diagram.

For companies it’s very important to be able to handle incremental as well as disruptive changes. Their reaction towards them, ability to foresee and how to manage them are very different, as described later in this paper.

2.1.4 The CEO dilemma

As argued by Clayton Christensen in “Innovator’s Dilemma” every company/CEO is faced with balancing the elements of the following model:
Obviously, a company needs to manage innovation actively in order to stay competitive. Companies can be faced with different challenges depending on the type of change. In the remaining part of the text we will describe and discuss how management can be pro-active and structured towards an ever-changing business environment.

3. Different approaches to Innovation Management

Most scholars use a model similar to the dynamic 5-stage model to discuss the innovation process.

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<td>Idea generation</td>
<td>Idea selection and concept</td>
<td>Early prototyping</td>
<td>Alignment with corporate strategy</td>
<td>Actual investment</td>
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</table>

3.1. Managing innovation

However, Tidd, Bessant and Pavitt have developed a broader model in their work that we'll use for discussing innovation management in this paper. The model is not complex and a majority of the modern innovation theories can be integrated with this model. Tidd, Bessant and Pavitt have already done this to a large extent in their book “Managing Innovation”, and have also developed a number of tools for working with managing the innovation process (www.wiley.co.uk/innovate/website/index.htm).

Four phases are introduced in the model from Tidd, Bessant and Pavitt.
• Signal processing
  o Scanning environment for technological, market, regulatory and other signals
  o Collect and filter signal from background noise
  o Scan forward in time
  o Process signal into relevant information for decision-making

• Strategy
  o Analysis, choice, plan
  o Assess signals in terms of possibilities for action
  o Link with overall strategy
  o Link with core knowledge and base-competences
  o Assess cost and benefit of different options
  o Select priority options
  o Agree and commit resources
  o Plan

• Resourcing
  o Procure solution(s) in compliance with strategic decisions
  o Invent in-house through R&D activity
  o Use from existing R&D
  o Acquire via external R&D contract
  o License or buy-in
  o Technology transfer

• Implementation
  o Develop to maturity
  o Parallel technical development and development of the relevant market. For product development this is external customer market. For process development this is internal user market. Both require “Change management”
  o Launch and commission
  o After-sales support

This list contains all the “What” of managing innovation. However, to manage innovation successfully there also needs to be a “How”. In Tidd, Bessant and Pavitt operate with 4 key factors:

1. Strategy
2. Effective implementation mechanisms
3. Supportive organizational context
4. Effective external links

These four key factors are discussed later in this paper.

The list and figure above illustrates an innovation process model of which the phases to a large extent can be found in other modern innovation thinkers’
models. The terms and number of steps may well be different, but base line is the same.

3.2. Managing disruptive changes

Clayton Christensen’s study of the hard disc drive industry delivers another model (in “Innovator’s Dilemma” and further developed in “Innovator’s Solution”) for coping with disruptive changes in technologies or markets. Mr Christensen argues that many successful companies are very good at dealing with continuous innovations, whereas for the most part they are inept at dealing with disruptive changes. In dealing with disruptive changes Mr. Christensen argues that an organisation must focus on it’s capabilities to change. These capabilities consist of three elements:

- Resources are comprised of the tangible and intangible assets of a company. The better a company’s resources are, the more likely it’ll be successful at handling disruptive change. However, access to resources is not enough.

- Processes, the company’s pattern of interaction, coordination, decision making, things that are meant not to change to effective but enables the business to operate daily in an effective manner. If a company that works with ISO tries to use the same procedures for handling a disruptive change it most likely will fail.

- Values in the organisations that enable employees to act independently toward i.e. a profitable business opportunity. A company’s values are good for i.e. the sale-person that has to make “on-the-spot” decisions every day to make sure the customer buys their products. It’s important for management to induce such values. The values will also define what the organisation cannot do – in other words the sales person might lose out on a disruptive change because his values does not enable him to “see” it.

These are all issues that either are a direct activity of the above model or that will influence the activities that need undertaking.

3.3 Enhancing the process

A relatively new contribution to managing the innovation process is Lotte Darsø’s “Innovation in the making”. Lotte Darsø’s main focus is on group mechanisms within an innovation project and how to be more successful at coping with the innovation process. Issues that are related to the several of the above mentioned phases.

The model that Lotte Darsø developed through cases at Novo Nordisk is primarily a framework for enhancing the quality of communication and for
building and improving mutual understanding of innovative processes in groups.

For supporting this model four roles are suggested:

- A “Gardener”, looks after relations
- A “Jester”, stimulates divergent questions
- A “Conceptualiser”, supports the process of framing
- A “Challenger” helps to qualify the creation of knowledge.

Relations:
The aspects of relation are climate, sharing and common ground. Starting a team for an innovation process, the first step to create a climate of acceptance and confidence – something the role of a gardener is suitable for.

Concepts:
This is about getting team member to talk about the same things. The team should be allowed to slowly build their own framework through using metaphors and slogans to achieve a common ground. The role of the conceptualiser can support this.

Knowledge/Ignorance:
For an innovation process to be successful it needs both the knowledgeable and ignorant. So there are team members that are asking the “stupid” questions to make the team communicate on the edge of chaos. Knowledge is naturally also needed to take project forward. The roles of a Jester and Challenger can support this in the innovation process.

3.4 InnovationKompass

Another study is “InnovationKompass” undertaken by VDI (Verein Deutscher Ingenieure, 2001) in Germany by among others Dr. Sören Salomo. The following prerequisites were shown to have significantly impact on the organisation’s ability to manage and nurture innovation successfully.
Furthermore, the main statement from the survey is directly translated: “Success is a question of management”.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Short description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td>Make sure to “read” and understand the market environment</td>
</tr>
<tr>
<td>Organisation</td>
<td>Most is possible within your current organisation with its competences</td>
</tr>
<tr>
<td>Team</td>
<td>Put together teams with broad experience and profiles. Make sure to keep a person with the know-how throughout the innovation project</td>
</tr>
<tr>
<td>Process management</td>
<td>Top-management must show commitment. Personal interaction is better than “paper flows”. Even with disruptive change, make sure to plan properly and stick with the plan</td>
</tr>
<tr>
<td>Culture</td>
<td>Use rewards for people in the innovation team to create a culture for innovation</td>
</tr>
<tr>
<td>Interaction with outsiders</td>
<td>Make sure to have the right partners for the innovation process i.e. customers, R&amp;D societies, NGOs and similar</td>
</tr>
</tbody>
</table>

The Germany study operates with three phases of the innovation process:

1. Initiative/Research
   a. Be creative
   b. Make the idea concrete
   c. Identify technical features
   d. Customer benefits unknown
2. Develop the business aspects/development
   a. Test the idea and alternatives
   b. Pull in “Lead customers”
   c. Identify the market segment
   d. Freeze design/functionality
   e. Use and customer acceptance still unknown
3. Into the marketplace
   a. Commercialisation
   b. Customer segments established
   c. Few changes to the innovation/product

Going from phase 1 to 2 the organisation must develop the business plan/concept. Between phase 2 and 3 the organisation should aim to freeze the design and start the market creation.

3.5 The innovative company
Anders Drejer has synthesised a model drawing on elements of the other authors mentioned in this paper and expanded this in “The Innovative Company”. Professor Drejer comprises a matrix with two axis, type of innovation and necessary elements of innovation management:
Situation with stable technological change is about developing the technology faster than the competitors along the same S-curve.

Situation of continuous change is when a company experiences changes in its technological and market basis, i.e., as in the mobile phone industry or sustaining change as phrased by Clayton Christensen.

Situation of disruptive change is when the company finds itself in a situation where market, customer and performance indicators are changing together with the technology.

Each of the different boxes require different approaches to managing innovation. Mr. Drejer is using the following definition: “Innovation management is a means to create the right dynamic competence development for the future and current market”. In Mr. Drejer’s book there are numerous cases filling in the different boxes in the model.

The company’s competencies are very important for their ability to manage innovation and can be, as also argued by Clayton Christensen, both an hindrance and advantage. It’s apparent that if a company isn’t able to develop its competencies dynamically it will not be able to innovate successfully.

### 3.6 Open innovation

A theory called “Open innovation” by Henry Chesbrough argues that most of the current innovation management in many companies have some dangerous pitfalls as, put very simple, they are too narrow sighted. Organisations not working with “open innovation” do not take into account all the other innovation that takes place in the surrounding environment. The difference are shown in the table below:

<table>
<thead>
<tr>
<th><strong>Closed Innovation principles</strong></th>
<th><strong>Open Innovation principles</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The smart people in our field work for us</td>
<td>Not all the smart people work for us. We need to work with smart people inside and outside our company</td>
</tr>
<tr>
<td>To profit from R&amp;D, we must discover it, develop it and ship ourselves</td>
<td>External R&amp;D can create significant value; internal R&amp;D is needed to</td>
</tr>
</tbody>
</table>
A Model for Innovation Management

<table>
<thead>
<tr>
<th>If we discover it ourselves, we will get it to market first</th>
<th>claim some portion of that value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The company that gets an innovation to market first will win</td>
<td>We don’t have to originate the research to profit from it</td>
</tr>
<tr>
<td>If we create the most and the best ideas in the industry, we will win</td>
<td>Building a better business model is better than getting to market first</td>
</tr>
<tr>
<td>We should control our IP, so that our competitors don’t profit from out ideas</td>
<td>If we make the best use of internal and external ideas, we will win</td>
</tr>
<tr>
<td>We should profit from others’ use of our IP, and we should buy others’ IP whenever it advances our own business model</td>
<td></td>
</tr>
</tbody>
</table>

This table shows that companies need to be good at networking and must continuously “take stock”, as Chesbrough phrases it, of what is happening in a company’s environment. Chesbrough also argues for extensive use of venturing, both internal and external.

Some of the same arguments can also be found in the InnovationsKompass.

### 4. Working with Innovation management

From the different models it is imperative that managing innovation is about developing both the ability to “catch” signals indicating change and to have the ability and readiness to move into new areas. This is suggesting that managing knowledge is a primary task – developing and building distinctive competencies in particular fields, adapting and absorbing new and different knowledge when it becomes necessary and to let go of knowledge when it’s redundant.

The process model from Tidd, Bessant and Pavittfour introduced the key factors for managing the innovation process. These factors will be used for discussing how to manage innovation and create the innovative organisation. We’ll complement these factors with relevant contributions from some of the others authors.
4.1 Strategy

There is no simple solution for managing innovation. However, it is essential having the capacity to learn from experience and analysis in order to innovate. Consequently, three elements are required in order to build an innovation strategy:

- **The position** of the company, in terms of its products, processes, technologies and the national innovation system in which it is embedded. A national innovation system can influence a company’s strategy, it is not determined by it.

- **The technological paths** open to the company given its accumulated competencies. Companies follow technological trajectories (Supplier dominated, Scale-intensive, Science-based, Information-intensive, Specialised suppliers), each of which have distinct sources and directions of technological change and which define key tasks for strategy.

- **The organisational process** followed by the company in order to integrate strategic learning across functional and divisional boundaries. Effective learning requires strong feedback between decision and implementation, which again requires effective integration of information and knowledge across the company.

A key feature to an innovation strategy is the core competencies of the company. The core competence can be as described by professor Christensen both an advantage and hindrance to a company’s ability to innovate. It’s therefore imperative that companies understand their core competencies and seek to develop organisational processes to facilitate an environment for innovation. Companies are normally not able to develop and keep focus at more than approx. 5-6 fundamental core competencies (Gary Hammel). The better a company is at exploiting its core competencies in its day-to-day business and the better it is at managing innovation, the more likely it is that it’s competitive advantage increases as core competencies are hard to imitate for competitors.

4.2 Effective external links

Having effective external links is an important enabler for the organisation in order to identify, resource and implement innovations. To be successful at innovating companies must develop close and rich interaction with markets, with suppliers of technology, and other organisational players. The “InnovationsKompass” also stresses the importance of linking with
consumers, environmental groups, etc. These linkages offer great opportunities for learning – from tough customers and lead users (an approach widely used at 3M), from competitors, strategic allies and finally from alternative perspectives, e.g. NGO’s.

Having a good understanding of user needs and involving lead users will significantly improve the possibility of success. Having customers take part in a development process helps acquire knowledge and initial acceptance of an innovation. However, if an innovation is very novel or complex it can be difficult for the future user to actually express their real needs i.e. traditional market analysis will be worthless and the development team will have to “educate” users instead. Therefore, in developing and managing the innovation it is necessary to have an idea of the maturity of the market and technology in order to take the appropriate steps in both the development phase and commercialisation:

The above figure shows the different “types” of innovations. Each will require a different approach to managing the innovation process.

Tidd, Bessant and Pavitt four distinguish between these motives/reasons for collaborating or having other external links with regards to managing innovation:

- To reduce the cost of technological development or market entry (i.e. Jaguar XK8 development team had Nippondenso in Japan develop the engine)
- To reduce the risk of development or market entry
- To achieve economies of scale in production
- To reduce the time to taken to develop and commercialize new products

4.3 Effective Implementation mechanisms
An innovation does not come alive without effective mechanisms to move the innovation from idea to a sale. Getting an innovation to the market place involves systematic problem solving and works best within a clear decision-making framework that should help the organisation to stop as well as to progress development. Project management skills and control are important elements as well as the ability to develop both the market and the technology simultaneously. Whether an innovation is a product or process, change management is a crucial factor in achieving success, as an innovation affects a range of people.

A company must have effective mechanisms for all the steps in the innovation process. Especially within technology and resourcing it is becoming more and more common that one or a few persons in a company know-how, where and when to obtain external and complementary sources rather than having all resources in-house. Being able to manage this process of technological sourcing may also lead to competitive advantages for the company.

Most innovations will be organised as a project and most companies will use different tools for this at the different phases in the innovation process. A famous tool is Coopers stage gate model, where the project has to go through several reviews with go/stop decisions.

Most authors agree that cross-functional teams is the most powerful enabler for rapid development, provided that team members are trained and “supported” by the organisational context.

Clayton Christensen has developed a model for projecting an innovation within an organisation. As others he argues that the solution depends on the situation:

A heavyweight team consists of people taken from the normal organisation working full-time on the innovation. A lightweight team consists of people that may also keep their normal assignments during the innovation process.
Another option for organising innovation is venturing, which can be both internal and external. Corporate venture is a relatively new way of managing innovation in larger companies. Companies like Danfoss, Danisco, Novo and Radiometer use venturing as a means for bringing more innovation to their competitive advantages.

Venturing is mostly a method that is used for innovations that are “disruptive”, i.e. difficult to fit within the company’s existing values, processes and competencies. Some also use venturing because a certain innovation needs special focus that can’t be given within the normal organisation. For larger companies this also gives them the opportunity to source an innovation.

4.4 Supportive organizational context

The last key factor is having a supportive organisational context in which creative ideas can emerge and be effectively deployed, an environment where taking part in an innovation project that fails is not an issue, but a learning experience for both the team members and the organisation.

It is a critical part of being able to manage innovation that such organisational conditions are created and maintained. It involves working with structures, work organisation arrangement, training and development, reward and recognition systems and communication.

The attitude and behaviour of top management also has a significant impact on an organisation’s ability to innovate. The base requirement is to create conditions for an operational learning organisation, sharing problem identification, solving them and having the ability to capture and accumulate learning with regard to technology as well as managing the innovation process.

The components of the necessary support for the innovative organisation is shown below:

<table>
<thead>
<tr>
<th>Component</th>
<th>Key feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared vision, leadership and the will innovate</td>
<td>Clearly articulated and shared sense of purpose. Stretching strategic intent. Top management commitment</td>
</tr>
<tr>
<td>Appropriate structure</td>
<td>Organisation design which enables creativity, learning and interaction. Not always a loose “skunk works” model; key issue is finding appropriate balance between “organic and mechanistic” options for particular contingencies</td>
</tr>
<tr>
<td>Key individuals</td>
<td>Promoters, Champions, gatekeepers and other roles which energize or facilitate innovation</td>
</tr>
<tr>
<td>Effective teamwork</td>
<td>Appropriate use of teams (at local, cross-functional and inter organisational level) to solve problems. Requires investment in team selection and building</td>
</tr>
<tr>
<td>Continuing and stretching individual development</td>
<td>Long-term commitment to education and training to ensure high levels of competences and the skills to learn effectively</td>
</tr>
<tr>
<td>Extensive communication</td>
<td>Within and between the organisation and outside. Internally in three directions – upwards, downward and laterally</td>
</tr>
<tr>
<td>High involvement in innovation</td>
<td>Participants in organisation-wide continuous improvement activities</td>
</tr>
</tbody>
</table>
A Model for Innovation Management

<table>
<thead>
<tr>
<th>External focus</th>
<th>Internal and external customers orientation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative climate</td>
<td>Positive approach to creative ideas, supported by relevant reward systems – a “winners culture”</td>
</tr>
<tr>
<td>Learning organisation</td>
<td>High levels of involvement within and outside the company proactive experimentation finding and solving problems, communication and sharing of experience and knowledge capture and dissemination</td>
</tr>
</tbody>
</table>

5. Final remarks

As this research paper has shown, there is no offer of a silver bullet nor does one single model exist for use in managing innovation. The ability and willingness to change combined with the company’s current and future competencies determines its success in innovation management.

Tidd, Bessant and Pavitt have tried to capture some of the main points of innovation management:

- Learning and adaptation are essential in an inherently uncertain future
- Innovation is about the interaction of technology, market and organisation
- Innovation can be linked to a generic process which all organisations have to find their way through
- Different companies use different routines with greater or lesser degrees of success. There are general recipes from which general suggestions for effective routines can be derived – but these must be customized to particular organisations and related to particular technologies and settings
- Routines are learned patterns of behaviour that become embodied in structures and procedures over time. As such they are hard to copy and highly company specific
- Innovation management is the search for effective routines – in other words, it is about managing the learning process towards more effective routines to deal with the challenges of the innovation process.

From this it can be derived that innovation management is about good all-round performance, and to recall the four key factors for managing innovation successfully:

- Successful innovation is strategy based
- Successful innovation depends on effective internal and external linkages
- Successful innovation requires enabling mechanisms for making change happen
- Successful innovation only happens within a supporting organisational context
5.1 Implications for an Innovation Management Model

Consequently, the attempt to develop and implement a common model for innovation management in business needs to address two major challenges.

The first challenge is embedded in the quote by the quality guru W. Edwards Deming: “If you don’t measure it you can’t improve it”. Developing a measurement/audit tool is a unique, but not easy, opportunity to help Danish companies in understanding how they perform and manage innovation, as well as uncovering their knowledge gaps. Best practise, auditing and benchmarking can be very useful tools for this.

The second is closely related to the first challenge, i.e. creating, refining and educating different tools related to the innovation process (the what) and the managing of it (the how).

There might, however, also be a third challenge. Most innovation studies use multinational and larger companies as cases, which in fact doesn’t correspond with the Danish business culture at all. This implies that some of the existing models and recommendations most probably need to be adjusted to fit the Danish business infrastructure with many small and medium sized companies.

To summarise, a toolbox is needed for the “what” and the “how” in managing innovation, as well as a framework for measuring the actual practice in the companies and their progress.
Literature list


The Economist, Apr. 22nd 2004, “Rather than chasing wonder new products, bit companies should focus on making lots of small improvements.”
Tidd, Joe; Bessant, John; Pavitt, Keith, “Managing innovation - integrating technological, market and organizational change,” 2. ed. John Wiley and Sons Ltd, Chichester, 2001, 388 s.

Case studies

- Novozymes
- Radiometer
- Coloplast
- Danmarks Radio

1. Managing innovation at Novozymes

*Interview with Per Falholt (PF), CSO, executive vice president, May 17, 2004*

Novozymes (NZ) is the world leader in enzyme solutions. Based on an advanced biotech platform NZ produces and sells more than 500 enzyme products in 130 countries. Since 1941 NZ has introduced almost every new industrial enzyme on the market, making NZ the world's largest manufacturer of enzymes today.

Working in the biotech industry NZ needs to innovate and NZ has a clear strategy and a strategic framework for its areas of innovation, which are followed very strictly. According to PF, NZ has a very strong innovation culture within the R&D department where employees see it as natural behaviour to look for and submit proposals for innovations. This culture has been founded from the beginning of the enzyme development and production in Novo.

Within the R&D area NZ is working with an innovation model that consists of 3-4 phases depending on the type of project. The phases are “Idea”, “New Lead”, “Discovery” and “Development”.

For the Idea/New Lead NZ is operating with three types of innovation scanning.

- Customer/Market driven, where NZ seeks to get as much information about the customer’s needs from the customers themselves. This is typically within NZ’s existing business areas and technologies. NZ uses a standard software for collecting and dissemination ideas, specially customized for NZ - the software is integrated with sales/marketing.

- New industries/New enzymes for innovations where NZ typically is able to use its current competencies. To generate ideas NZ arranges an internal competition where teams can submit business plans for an innovation. Management approves the winning business plan(s) and then a development team commercialises the innovation. Not every round of competitions produces a winning project.
• At the edge, NZ tries to identify innovations that are at the boundaries of NZ’s own competencies. The sources for innovation are its own R&D culture, scientific research/conferences, magazines, etc.

PF allows “skunk” work for generating innovations as long as it does not affect employee’s normal tasks. In other words, R&D employees are allowed to work on their own projects outside normal working hours.

For all three types of input streams a business plan is required before the innovation is progressed. In the Discovery phases the innovation is tested against both market needs and technological possibilities. In sourcing technologies and competences NZ normally seeks to develop internally, or to create external partnerships that enables a transfer of the needed technology/competence to NZ.

Once an innovation has “proof of concept” it is progressed to the development phase. The purpose of the development phase is to take the innovation from the laboratories and market it.

Innovation projects at NZ often vary very much in size from small incremental development to the need of a completely new production line. To ensure a professional development NZ created a project management model with 10 milestones where the last milestone is reaching sales target from the business plan. Part of the milestones are measurements like NPV and “time to market” which have impact on the stop/go decisions.

NZ has a Project Management Group (PMG) that is responsible for running all development projects. A development project is staffed with a cross-functional core team with a project manager from the PMG. The core team is then supplemented with more members from a specific function when relevant.

Minimum one R&D employee will stay assigned to an innovation until it has become a “normal” product in NZ’s product portfolio ensuring that the knowledge developed can be applied if needed for adjustment or further development.

NZ uses a “termination report” for all its innovations whether it is a success or failure. The aim of the termination report is learning by not only the team members, but also the rest of the organisation. The Corporate Executive Board (Research & Technology Council, USA) has chosen this tool together with the Innovation Competition as “State of the art” within innovation.

For evaluating its innovation NZ is using main performance indicators. First, New products total percentage of sales, the products must be less than five years old. Second, the other performance indicator is NPV of the R&D portfolio. PF also follows all development project sales development closely.
2. Managing innovation at Coloplast

Interview with R&D Manager Lars Bo Madsen (LBM), May 10th 2004

Coloplast Consumer Products Division (CCP) is responsible for the development and manufacturing of the Compeed products that are sold throughout the world (branded as Band-Aid in the US market). The products are for aiding the healing process of i.e. wounds and blisters. CCP has one main customer, Johnson & Johnson, who’s responsible for the branding, sales and distribution of the products.

CCP seeks to be very structured in their approach to maintain a high innovation rate in order to deliver both continuous innovations and more radical innovations. Distinguishing between continuous and disruptive innovation is not a focus for CCP, through managing their innovation process as they do LBM is of the opinion that CCP is able to “catch” the signals indicating changes to technology and markets.

LBM argues that generating ideas is a process that must be helped along and that all people can be creative. Especially if only they are in the right environment and receive training in different creative methods. For this purpose CCP has installed an “Idea Room” which employees can use as inspiration, among other things the CCP innovation process is illustrated on a poster. The R&D department and CCP at large are currently working on creating a “new” organisational environments that comprises the processes and values that support the need for continuous innovation. CCP does currently not use any software tools aiding the innovation process.

The CCP has had an innovation audit by John Bessant, one the co-authors of “Managing Innovation”.

The innovation process at CCP consists of three main steps:

- Screening/Idea development
- Concept development
- Implementation

Screening/Idea development

CCP believes that quantity is an important element in being innovative. This is reflected in the set-up of their initial phase. The innovation process is very much market orientated and focuses on understanding market demands/needs, but also to push new changes into the market, creating new needs.

For CCP to catch and generate ideas for innovations CCP hosts a number of activities such as “Idea events” with customers, internal people (all functions), lead users, professionals, etc. Among other activities they have a process named “Hot-house” which is a structured idea process. CCP uses external
consultants to facilitate many of these workshops/activities. To be sure to
catch the real needs (which are not always depicted by the participants) of the
market CCP also uses depth-interviews and focus groups. All employees of
the R&D department are required to listen-in to enhance their understanding
of the market.

All ideas for innovation have to be validated against IBR, which are Insight,
Benefit and Reason (why it is relevant).

Testing an innovation at this stage may very well include the development of a
prototype.

**Concept development**

Once an innovation has been preliminary tested against the market it is
progressed to concept development. For this phase CCP has developed a
screening tool called “Pains & Gains” (obstacles and benefits). The Pains &
Gains have three sub-elements testing an innovation. First, potential
customers have to agree that the innovation could fulfill a need with them.
Second, technologically it must be possible to develop and manufacture the
innovation. Third, the innovation must have a certain market potential - be
profitable. For some innovations this will involve use of external agencies for
validating the market. For other innovations that are close to existing products
the market is validated using internal data.

Any innovation need to be approved at management level in order to progress
and have the necessary resources allocated.

**Implementation**

When a concept has been approved and the market potential is validated, an
innovation is progressed onto implementation. All implementations are run as
projects. In most cases the team is initially staffed with internal people. A
project team always resides within the normal organisation and LBM firmly
believes that for both continuous and more radical innovations this is the best
solution for CCP, as it enables more knowledge sharing and a closer focus on
the progress.

For managing this phase CCP uses a modified Coopers stage-gate called the
AIM (Accelerated Innovation to Market) model for progressing the
development of the innovation. This model is used throughout the whole
Coloplast organisation.

**Performance measurement**

As a rule an idea/concept does not progress from concept development to the
implementation phase unless a market potential has been proven.
Coloplast as a whole has a performance measurement system for innovation, where one indicator is the number of new products introduced to the market within the last 4 years. Within CCP this indicator is of little use as their innovation rate is very high. Within CCP another performance indication has been developed, which among other things consists of measuring products where CCP are able to secure IPR.

LBM emphasises that in terms of performance, he always communicates “things always have to be better tomorrow” and that this is a culture he is aiming to embody in his organisation. Further to this, LBM argues that one means of creating a dynamic and innovative environment is having the right organisational mix. Mixing employees’ culture, nationality, personality and professional profile.

Recommendations from CCP

LBM’s recommendation for other companies is that in order to create an innovative organisation the best way is to get a very good facilitator/consultant. Furthermore, to make good use the networks that most organisations have access to.

3. Managing innovation at Radiometer

Interview with Research Manager Frank Nielsen, May 14 and 17, 2004

Radiometer develops, produces, and markets blood gas solutions for central laboratories and point-of-care testing. Radiometer is selling their products worldwide.

Radiometer has clear strategy for being innovative. The company is involved in many activities that encourage business and scientific innovation. Radiometer has a Venture unit, Radiometer Innovation, and a R&D department.

The R&D department at Radiometer has three main steps in their innovation model. It’s divided into pre-project, project and implementation. The Project phase is sub-divided with a stage-gate model of two phases. Radiometer is not using any type of software to support the innovation process, other normal business software such Microsoft excel and project manager.

Getting an idea into the pre-project phase Radiometer is using a range of scanning methods such as Patent search, talks with customers and “lead-users”, review of scientific literature within their core and related business area. The task of both Radiometer Innovation and Radiometer Venture is to locate and catch the opportunities in complementary technologies/markets to Radiometers’ current core competences.
A possible innovation must very quickly show that there is a potential user need to progress in the pro-project phase, also in terms of showing a rudimentary financial business case. Once the pre-project team has proven that an innovation has potential it progresses to become a real project.

Projects are staffed with between 2 to 30-40 people depending of the type of innovation. If the innovation is an entirely new platform development, the project often is very large and cross-functional. Radiometer seeks to have people working full time on an Innovation project, and tries to have team members finish off a project/task before starting a new. A project typically runs in time periods of 6 months to 3-5 years.

In the project phase Radiometer operates with a two-step stage gate model. The first gate is developing a prototype that very clearly demonstrates the benefits of the innovation for Radiometer and in particular the customer. Once the innovation has passed this gate, the project team has to finalise the business concept/plan showing the overall implication for the getting the innovation into the market place.

When an innovation has managed to get through the two gates it progresses to the implementation phase, where the design is finalised, production is being set-up and the market development is started according to the business concept developed.

In sourcing the needed competences and technology for their innovations Radiometer uses their core competence as a measurement for how to do it. If it is close to their core competence they will develop it themselves or buy to integrate. In all other cases they find external partners to take part in the innovation.

Managing the innovation process at Danmarks Radio (DR)

Interview with Trine Nielsen (TR), Responsible for Innovation at DR, May 18, 2004

DR is the national broadcasting organisation in Denmark, responsible for public service within TV and Radio. In terms of innovation and meeting market demands, DR is a special situation as they also have public service responsibility and is financed primarily by licensing fee (90%). The market situation changed in 1992 as DR’s state monopoly was broken by the start of a competing channel TV2. TR is working in the Program department that is responsible for developing content and producing all programs for the TV and Radio. The program department is divided into several units like Documentary, Drama, etc.

Following the 1992 break up of the state monopoly and start up of metering TV/radio usage DR have worked with programs that are tailored towards certain lifestyle
segments – Green, blue, target groups etc on basis of the metering surveys. Though DR structures program development towards market needs it is not until recently DR have started to implement a structured approach to Innovation and it stills varies very much between the different departments. TR is responsible for the innovation process for existing media (Radio, TV, Internet) in the Program department.

The new structured Innovation process is still in its early days. The management has started a number of initiatives to increase the level of innovation and the awareness of how important innovation is. Three initiatives have been started:

- Organisational level, each department within the Program area must allocate approx 2% of their budget to innovation. This is or will be part of the yearly planning and will be followed closely.

- Individual innovation, top management has created a fund of DKK 2 millions for the employees to seek a “grant” aiding the development of an innovation. There is no criteria for choosing an innovation except its must be new to DR. If an innovation is developed successfully a department manager buys the innovation from the employee for a price equal to the grant keeping the innovation fund alive. Currently there is no learning from failed innovations.

- Network, TR has initiated a network of 35 people that are involved running or managing innovation at DR. The purpose of the network is educational and for knowledge transfer. Primarily the network is for enhancing the knowledge of managing the innovation process in general.

DR is not using any model currently for managing the innovation projects other than what project management tools that have been used so far. However, the Drama department is very structured in its approach at developing new programs using marketing and technical tools for creating the right story with the best possible feeling in the final program.

**Concept development**

Innovation is at DR is organised in a matrix. On the one hand are the channels (Radio/TV) and on the other Programs or “content” such as drama, documentary, etc. The Channels management develop a “channel strategy” each year determining the concept needed for delivering the right broadcast content to the audience of that particular channel. The Program area “sells” their innovations and programs to the channel management, only programs that are accepted by the channel management are produced though some innovation are test-produced before the final decision is made.

Creating and developing new programs for Radio/TV will almost always require new methods and approaches in a production. DR distinguishes between “normal production development” and innovation, innovation to DR is when the “end-product” have created something really new and challenged existing categories/knowledge within TV/Radio production.

In developing new productions DR are constantly trying to get closer to the customers, using focus groups, lifestyle analysis, analysis of complaints, dairies from customers. Not only are DR aiming to target the right audience for their innovations, the technological pace within media are rapid so DR also have to balance the use of
technological possibilities with the market demands and development. An example is the DAB radio (digital radio) that offers huge potential but the market penetration for the digital receiver is still limited reducing the scope for innovation for the time being.

Performance measurement

DR has not yet developed a set of performance indicators, however at the organisational level the departments will be measured on developing new “products” using their existing competences, such as Drama developing a game that can be played at DR’s webpage.
Appendix A

Foreign cases

Managing technological innovation at Cisco

Cisco is known for using M&A activities to stay ahead in the fast innovation race in the Internet infrastructure business. Rather than spending high amounts on R&D budgets Cisco scans the globe for interesting innovation that can complement their portfolio or enhance it further through the acquisitions of disruptive innovations.

For the most part Cisco integrates the M&A targets in their normal operation. However, as this case will show, there is another option for sourcing innovation to stay competitive.

Linksys is a networking and broadband hardware manufacturer, US based, whose low-priced wireless networking equipment has captured a huge market share of the home and small business segment. The consumer market has been a struggle for Cisco because its business model is not geared toward this high growth market segment. Rather than spending huge amounts in R&D and developing a new sales force to compete in the segment, Cisco bought Linksys, but left it almost alone – only a few people got transferred, no Cisco reporting was carried out and small “filtering teams” were established as responsible for technology transfer between the to firms. As a result Cisco got access to the technology and business model for a high growth market that posed a long-term disruptive threat to Cisco, and Linksys got access to Cisco’s huge innovation portfolio without the burdens of being an integrated part of a very large firm.

Innovation at Haier

Innovation does not always require huge R&D budgets or access to the latest technology, nor unlimited resources. A good starting point, which often is used in developing countries, is to know your customers’ mindset intimately.

An example of this is Haier, a major Chinese manufacturer of domestic appliances. Employees from Haier were visiting rural customers that frequently used the washing machine to clean vegetables. Through making a few minor modifications Haier was able to market their washing machine as versatile enough to handle both cloth and vegetables – this innovation has made Haier the market leader in the rural areas of China.

Innovation at CEMEX
A Model for Innovation Management

The leading manufacturer of cement in Mexico, CEMEX, decided in 2000 to create an Innovation Committee to stimulate creative thinking and innovation to serve its customers better. The committee consists of 3 VPs, three directors and one outside consultant they had three key responsibilities:

- **To define a small number of broad themes to guide innovation and ensure alignment with corporate strategy.** The themes all concentrate on issues regarding the core product cement such as ways to support regional development, making it easier to do business with CEMEX, etc.

- **To select four to six teams each year to identify three significant opportunities consistent with a broad theme, thereby producing 12 to 18 big ideas each year.** A team consists of up to 10 people who devote about one-quarter of their time to the project for three to four months.

- **To provide structure to the innovation process.** The team members all receive training. CEMEX has among other things developed a tool called “Ping-Pong”. The idea is that a team is divided into two groups. The first one proposes an idea, and then the second group improves on the idea. The groups knock back and forth until they can envision no further improvements. Each project follows a template for all relevant elements.

CEMEX has through building the supportive context developed a number of innovations that made the company even more competitive and financially strong. One of these innovations is about delivering time. Consider the challenge of delivering ready-mix concrete. Contractors often change their orders at the last minute, but CEMEX found that, on average, it took three hours between when a change order was received and when the order could be delivered. To decrease turnaround time in its Mexican market CEMEX equipped most of its fleet with GPS locators allowing dispatchers to arrange deliveries within a 20-minute window, versus the three hours by its competitors. The inspiration for the GPS system came from an emergency (911) centre where the dispatcher faced similar challenges. This part of the innovation is not traditional benchmarking, since the managers don’t simply copy something they see elsewhere. Rather they take a piece of practise or technology that they find and recombine them in novel ways to solve customer problems.
Appendix B

Abstracts

The innovator's solution

This text is based on five years of research into the innovative processes that shape disruptive technologies. It reveals that innovation is not as unpredictable as most managers have come to believe. While the outcomes of past innovations seem random, the process by which innovations are packaged and shaped within companies is very predictable. This book opens the black box of innovation to reveal the critical forces that impact the shaping of innovations from inception to launch within organizations, and shows what managers must do to avoid the preponderance of "me-too" innovations and increase the odds of creating truly disruptive growth.

Managing Innovation

Innovation is the process of bringing new ideas into use. Such new ideas could lead not only to the development of new products, but they could also result in the introduction of new systems or methods. Written in a comprehensive manner, this edition of "Managing Innovation" includes coverage of research on managing the process of bringing new ideas into use which could result in the development of new products and the introduction of new systems or methods.

Harvard Business Review on innovation

Harvard Business review is the place to learn about important management issues, bringing today's managers and professionals the information they need to stay competitive in a fast-moving world. From the preeminent thinkers whose work has defined an entire field to the rising stars who will redefine the ways we think about business, here are the leading minds and landmark ideas that have established Harvard Business Review as required reading for ambitious business people in organizations around the globe. This volume contains a collection of articles that examine where the next big ideas come from, and should help managers transform their organizations into "innovation factories". This is a collection of articles examining where the next big ideas come from, and it aims to help managers transform their organizations into "innovation factories".

Open innovation

This work provides a new paradigm for managing corporate research and bringing new technologies to market. It includes four case studies (Xerox-PARC, IBM, Intel, and Lucent) showing the open innovation paradigm in all its potential, and risk.
How breakthroughs happen

This work sheds light on familiar stories of inventors and their inventions and shows how innovators past and present have employed a strategy of technology brokering to source, develop, and exploit new ideas. It covers five ways in which technology brokering can be used as an innovation strategy.

The entrepreneurial mindset

This work can be regarded as a toolkit for creating a profitable strategy based on building a dynamic portfolio of the best business opportunities worth pursuing. It shows readers how to leverage uncertainty and rapidly changing marketing conditions to their advantage.
Appendix B

Working draft of the Innovation Management Model

The Innovation Management Model

The working model of the Innovation Management Model (IMM) is divided into the following major elements:

Fundamentals

Fundamentals are the basic building blocks for creating innovation in a company – i.e. structure, strategy, culture, linkages and learning loops. The organizational dimensions that enables a company to develop an idea and take it to the market.

The module Fundamentals of IMM is comprised by the following seven parameters:

- Strategy, corporate and innovation strategy
- Team
- Empowerment
- Culture
- Co-operation/Linkages
- Structure
- Monitoring
Each of the elements has a significant influence on the company’s ability to create successful innovation and managing the innovation process itself.

**Innovation process**

The innovation process in the company – i.e. the necessary steps needed in order to get an idea, evaluate it, test it and/or develop a prototype, write a business plan and implement the innovation. Some of these steps will in reality be overlapping, i.e. an initial business plan is often started when an idea is being evaluated.

The IMM model operates with the following fives phases:

- Idea generation
- Evaluation and planning
- Testing/prototyping
- Business planning
- Implementation

For each of the fives phases a set of 10 questions were asked, in addition to these questions several phase specific questions were asked.

**Market**

Customers, competitors and society influence the practises of how the company operates and innovates. The relationship with the customers, particular values and preferences, relations on the labor market and with knowledge institutions, the existance and nature of competition all influence the innovative activity within a company, both in quantity and quality.

Some of the linkages – especially customers, suppliers, competitors, and partners – have been included into the model in order to determine the level of external cooperation in general. However, to a large extent the market has been left neutral in this project, the focus of the research beeing the internal management processes of innovation.

**The original elements**

This is the original listing of all the elements identified as important to innovation management based on the preliminary study (appendix A). The new headings are displayed in brackets [   ] for comparison. The IMM framework has evolved since this initial listing, therefore it does not contain a one-to-one match of elements.

<table>
<thead>
<tr>
<th>Fundamentals</th>
</tr>
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</table>

**Strategy [Strategy]**

- Does to the company have a written and updated business strategy
- Does the company have a specific strategy for innovation
- Is there a formulated linkage between business and innovation strategy
- Is there a number of formulated key-performance indicators for innovation
- Are the goals innovation project formulated and communicated
• How adapt is the organisation for change

Sources of potential innovation/External linkages [Co-operation]
• Does the company have a formal procedure identifying potential innovations from
  o Lead-customers/suppliers
  o R&D
  o Basic research
• Is there formal procedure/process for external linkages with/for
  o Networking
  o Partnering
  o Suppliers

Innovation model [Structure]
• Has the company a defined IMM
• Is the IMM differentiated for different parts of the business
• Where is the responsibility for IMM placed

Is there a formal procedure for foresight and insights from the market, such as [Co-operation]
• Trend (market, technology)
• Regulatory
• Competitors
• Partners
• Lead customers
• Parallel industries

Commitment/leadership [Strategy]
• From top management
• Is there separate budget/focus on innovation training
• Clear communication
• Communicated and shared vision

How well are competences known and used proactively [Structure]
• Are the organisational competencies known and developed
• Are the technical competencies known and developed
• How is new competence identified and implemented

Are the organisation using tools to enhance/help innovation, such as [In the Phases]
• Software, which?
• Physical environments, what?
• HRM, professional profiles, test, etc.
• Project management tools such as stage gate, etc

Is the formulated reward/incentive systems [In the phases]
• Is innovation projects rewarded
• How is innovation rewarded, during and after the innovation process
Organisation [Empowerment]
- Are desirable innovation values defined
- Is there a climate for idea generation
- Is "skunkwork" acknowledged
- Is change management skills available and used

Phases

Idea - Idea generation [Idea generation]
- Is the idea generation phase a separate management issue?
- Are there objectives for idea generation?
- Are there measures for idea generation?
- Is benchmarking being done for the phase separately?
- Does top management follow up on this phase separately?
- Can simulation result in rejection of the innovation or iteration in the IMM process?
- Does the organisation work with creativity
  - Using specific tools such software, etc.
  - Using special physical environment such as an "Idea room"
  - Does all types of profile participate in the creativity phase
  - Are people trained in how to be creative
- Does the organisation scan the environment for ideas, using and linking with
  - Networks
  - Internal and External R&D environments
  - The internet
  - Competitors
  - Parallel industries
- Does filtering of signals/ideas take place
  - What criteria are used
  - Which profiles from the organisation takes part in this
- Does the organisations distinguish between types of innovation in this phase separately
  - Novelty to market
  - Novelty of technology

Desirable/Feasible - Idea selection & Concept [Evaluation & planning]
- Is the qualification phase a separate management issue?
- Are there objectives for this phase?
- Are there measures for this phase?
- Is benchmarking being done for this phase separately?
- Does top management follow up on this phase separately?
- Can evaluations result in rejection of the innovation or iteration in the IMM process?
- Are business cases formulated for the
  - Market
  - Customers
  - Strategy
• Which criteria/process are used for selecting concepts
  o Assessment of the market opportunity
  o Compared to existing and new technological competence
  o Compared to existing and new organisational competence
  o Defining the Customer value proposition
• What are the involvement in determining the desirability/feasibility of the innovation at this stage from
  o Different internal departments
  o Top management
  o External partners
  o Critical suppliers
• What type of planning is in place, such as
  o Formulating and following milestones
  o Carrying out risk assessment
  o Formulated measures for the innovation project
  o How is resources allocated
• Does the organisations distinguish between types of innovation in this phase separately
  o Novelty to market
  o Novelty of technology

Simulation early prototyping [Testing/prototyping]
• Is the simulation phase a separate management issue?
• Are there objectives for this phase?
• Are there measures for this phase?
• Is benchmarking being done for this phase separately?
• Does top management follow up on this phase separately?
• Can simulation result in rejection of the innovation or iteration in the IMM process?
• Is prototyping being done?
• Are there other tools for simulation?
  o Computer simulation
  o Models
  o Use cases
• Are there other tests of the concept
  o Function and internal test
  o Market test and comparison to customer value proposition
  o Competition
• Is user interaction part of the simulation?
• Does the organisations distinguish between types of innovation in this phase separately
  o Novelty to market
  o Novelty of technology

Analysis - Align with corporate strategy [Business Planning]
• Is the analysis phase a separate management issue?
• Are there objectives for this phase?
• Are there measures for this phase?
• Is benchmarking being done for this phase separately?
• Does top management follow up on this phase separately?
• Can analysis result in rejection of the innovation or iteration in the IMM process?
• Is there a plan for, and what sources of technology is used
  o Internal
  o External
  o Alliances
• How is the linkage with the overall business strategy determined
• How is linking in with existing knowledge and core-competencies handled
  o Cultural determined/embedded in the “every-day” life
  o Formal check procedure
  o Through the manning of the innovation project team
• Intellectual Property
  o Are full IPR sought
  o Is the framework to what extend the company wishes to have IPR
• How is the funding handled
  o Internally
  o Co-funded with external partners
  o Externally
• Model for implementation
  o External or internal Venturing
  o Internal Project team
• Does the organisations distinguish between types of innovation in this phase separately
  o Novelty to market
  o Novelty of technology

Investment [Implementation]

• Is the investment phase a separate management issue?
• Are there objectives for this phase?
• Are there measures for this phase?
• Is benchmarking being done for this phase separately?
• Does top management follow up on this phase separately?
• Can milestones/objectives result in rejection of the innovation or iteration in the IMM process?
• Business case,
  o Is there an evaluation at this phase
  o Which criteria are used for deciding to invest or not
    ▪ Financial
    ▪ Market
    ▪ Technology
    ▪ Combination
  o Who is responsible for the approval a business case/investment
• Project organisation and project management
  o What range of profiles from the organisation participates
  o Which type competencies are sought in the team members
  o Is HRM tools such test used for selecting team members
• Final development of the innovation
  o When is the innovation "frozen" for final development
At what stage is the market development started with what activities

- Implementation
  - Who is responsible for the Market activities (Project team, organisation, or??)
  - Are there specific change management activities at this phase

- Launch/Commercialisation
  - When is the shift from innovation environment to daily operation
  - Which success criteria is there for making the shift

- Does the organisations distinguish between types of innovation in this phase separately
  - Novelty to market
  - Novelty of technology

### Learning [Culture]

- Is learning acknowledged as an important dimension to the IMM?
- Are there objectives related to learning?
- Are there measures of learning and its results?
- Is there top management commitment to learning?
- Is the organisation learning from its IMM failures & successes?
- Are there formal mechanisms to capture and share learning in the IMM?
- Is the need for double loop learning as part of innovation acknowledged?
- Is there procedure/tradition internal learning between departments and persons involved in the IMM?
- Is there external learning with partners involved in the IMM?
- Is there training directly related to innovation?
- Is unlearning part of learning related to innovation?
- Is organisational change part of learning related to innovation?
- Is learning being benchmarked separately?
Appendix C

Without innovation jobs are at risk

Denmark risks loosing a million jobs within the next 10 years. New innovative culture must settle the score with current work culture and management. Poor management delays development projects.

Denmark risks losing close to 1 million jobs within the next 10 years – not just because of outsourcing but just as much because we are being overtaken on the inside by more innovative companies and products from other countries. This was one of legendary Haldor Topsøe’s striking messages to the audience at Center for Ledelse’s recent seminar on innovation and management. Here company executives and researchers presented their views on innovative management in the future and the need for prioritising new ways of thinking and innovation in Danish companies.

We must make full use of substantial, unexploited potential.

The seminar was part of a partnership which Center for Ledelse and Fremtidstanken have initiated in order to develop an actual model for innovative management in Danish companies. The need for increased focus on innovation is also present. “Current research indicates that in Denmark we talk a lot about innovation as opposed to doing anything about it”, states Center for Ledelse’s CEO Poul Blaabjerg. “There are not nearly enough Danish companies pursuing any specific innovation strategy. This means that profit from this significant competitive parameter seems random. But if we turn this into something positive, it also means that the Danish companies have enormous, unexploited potential for innovation, which is certainly worth making full use of.”

This means making a virtue of resistance

Some call innovation creative destruction and undoubtedly there is a little bit of truth in this because innovation is bound to bring about change and with it a sort of destruction of established habits and routines. That is why people often resist change. Many view this resistance as the most serious obstacle to systematic innovation within a company. But it does not have to be this way according to several of the speakers at the seminar.

Professor Sören Salomo from Berlin’s Technical University thus claims that some resistance is necessary – not least to prevent new ideas getting out of hand and the companies from forgetting to make money. So an increasingly systematic approach to innovation is very much about accepting immediate resistance, making a virtue of it and finding a balance with the significantly but currently somewhat hidden reserve of inventive wealth which can be found in the individual company.

We must create an innovative culture

How then do you incorporate wealth of ideas and resistance to change through constructive and profitable interaction? According to Microsoft’s Scandinavian manager, Klaus Holse Andersen, it is vital to have a culture and basic values where innovation is the focal point permeating the entire organisation. This point of view is supported by Jesper Bove-Nielsen. The degree of and need for innovation will of course vary from company to company but there has to be suitable innovative
scope in any case so that it is possible to search the final creative frontiers. It also takes time as well as back-up to think beyond your core business and your core product.

“When it comes to the research and development that we carry out, we only expect up to 20% of the ideas to become commercially viable”, explains Klaus Holse Andersen. “If this share is bigger, it is because our developers have not been thinking radically or creatively enough. There has to be room for some mistakes. But generally we find that the best results are brought about by those employees who did not do exactly as they were told.”

“It is also important to point out that innovation is not exclusively a specialist or management function within the company”, adds director Jesper Klit, ideaPilot AS. “Innovation concerns everybody in the company and it is everybody’s responsibility to contribute new ideas, and in this connection it is very much a question of ensuring that all employees are heard and taken seriously — given that everyone understands that not all ideas can lead to actual projects.”

**Ideas must be transformed via systematic and strategic focus**

Precisely the point of making innovation lead to positive results which can be read on the bottom line is very important for Center for Ledelse. “It is important to support a company culture which may generate a continuous flow of new ideas. In a business and competitive perspective it is at least equally as important that the company is capable of transforming the best ideas successfully”. Poul Blaabjerg continues. “That is why we have embarked on developing a management model for innovative management. We are firmly convinced that focus, strategic thinking and a systematic approach are elements which are needed in order to get as much as possible out of the Danish companies’ innovation potential. It is of course important to apply a systematic approach which supports innovation instead of stifling it with red tape. We are working on being able to present such a systematic approach in the coming year and we are aiming high because it is our wish that the new Innovation Management Model can contribute to establishing Danish companies’ innovation as being world-class.”

**Dispelling myths**

There are many myths associated with commercial innovation. The seminar attempted to dispel a number of them. For instance that radical innovation is incompatible with the basic infrastructure of a particular company and thus should be separated into an external and more autonomous organisation. According to Sören Salomo this is just a myth as his research shows that there is no difference with respect to time consumption, costs or result whether you do it one way or the other.

Management, however, plays a vital role when it comes to the use of time and resources as poor project management more than doubles the time with which innovation projects exceed their time frame.

Regardless of an organisational placing in or outside the ‘parent company’, you must pay attention to the structures. With very rigid stage-gate processes there is a risk that innovation may be hampered or the developers may be forced to adjust their results and expectations in an inappropriate manner to rigid stage-gate criteria.

Research manager Leif Kjærgaard, Danisco questions whether you can apply innovation by means of plans and strategies and assumes that many companies are incredibly innovative in that way ‘without knowing it’. But that was probably mostly underplay in Jutlandish. Because Danisco focuses on employees who cannot stop sampling the table decorations at dinner parties, it indicates a different conscious attitude to employees' creativity and basic attitude, which is very similar to the examples presented by Klaus Holse Andersen and Jesper Bove-Nielsen.
The need for a formalised management model of innovation was perhaps unwittingly emphasised best by Sören Salomo who asked himself where innovation begins. He also answered his own question: Most often with a ‘random’ employee who gets an idea and sets a process in motion. It requires a high degree of creativity, motivation and knowledge to maintain innovation that way.

… but it is supposedly also too random to leave Denmark’s future competitiveness to sheer coincidences?!
Diagnosticising the Innovation Process

This is a preliminary framework for diagnosticising the innovation process in Danish companies. The framework consists of questions to critical innovation drivers. The questions and drivers are to be evaluated by a peer-group to ensure relevance and balance.

When the framework has been established we will perform a comparative qualitative and quantitative field study across main industries in Denmark. The outcome of this study will contribute to a generic Innovation Management Model (IMM).

The IMM concept will hereafter consist of the following

- Questionnaire framework for the model – diagnostic tool (this document)
- Hard and soft data from participating firms (to be resolved)
- A general model to communicate the essence of the IMM (to be designed)

Innovation Management Model – IMM

The premise of the IMM model is to help manage business related problems from idea to implementation. The Innovation Management Model is a general process model not taking into account the specific type of innovation or change to a specific company. It is perceived that the model can be applied in general to incremental, radical and disruptive change, though some of the elements will need more or less attention depending on the type of innovation.

The model is generic, meaning it can be used to solve various innovation related challenges in an organization. The model is based on the generally accepted 5 Strategic Stages Model below, covering the phases from idea to implementation.

<table>
<thead>
<tr>
<th>5 SSM- From idea to market</th>
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</thead>
<tbody>
<tr>
<td>1. Idea</td>
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<tr>
<td>2. Evaluation</td>
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<tr>
<td>3. Simulation</td>
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<tr>
<td>4. Analysis</td>
</tr>
<tr>
<td>5. Implementation</td>
</tr>
<tr>
<td>Idea generation</td>
</tr>
<tr>
<td>Idea selection and concept</td>
</tr>
<tr>
<td>Early prototyping</td>
</tr>
<tr>
<td>Alignment with corporate strategy</td>
</tr>
<tr>
<td>Actual implementation .e.g. investment</td>
</tr>
</tbody>
</table>
The prerequisites of the model are the following:

- Environment and settings (please observe note 1)
- Fundamentals
- Learning loop
- Understanding and management of each step:
  - Idea
  - Evaluation
  - Simulation
  - Analysis
  - Implementation

**Innovation Fundamentals**

The innovation fundamentals are the basic building blocks needed to manage innovation in its entirety. This includes the following – that should be monitored, managed and evaluated in each of the five stages.

**Strategy**

- Does the company have a written and updated business strategy
- Does the company have a specific strategy for innovation
- Is there a formulated linkage between business and innovation strategy
- Is there a number of formulated key-performance indicators for innovation
- Are the goals for innovation projects formulated and communicated
- Is the organization adapt for change
- What are the sources of potential innovation
- Does the company have a formal procedure identifying potential innovations from
  1. Lead-customers/suppliers
  2. R&D
  3. Basic research

*Are there formal procedures/processes for external linkages with or for*

- Networking
- Partnering
- Suppliers

**Innovation management**

- Has the company a defined innovation management model
- Is the innovation management differentiated for different parts of the business
- Where is the responsibility for innovation management placed

*Is there a formal procedure for foresight and insight from the market, such as*

- Regulatory
- Trend (market, technology)
Competitors
Partners
Lead customers
Parallel industries

Commitment/leadership
- Is there a clearly communicated commitment from top management
- Is there a separate budget/focus on innovation training
- Communicated and shared vision
- How well are competencies known and used proactively
- Are the organizational competencies known and developed
- Are the technical competencies known and developed
- How is new competence identified and implemented

Is the organization using tools to enhance/help innovation, such as
- Project management tools, such as stage gate, etc
- HRM, professional profiles, test, etc.
- Software
- Physical environments

Is there a formulated reward/incentive system
- Are innovation projects rewarded
- How is innovation rewarded, during and after the innovation process
- Is the company using warrants, options, stocks etc

Organization
- Are desirable innovation values defined
- Is there a climate for idea generation
- Is "skunkworks" acknowledged
- Is change management skills available and used

Learning loop
During the entire process, it is crucial to ensure learning and feedback. This is an absolute necessity, to ensure the process becomes better continuously. Questions to ask the firm could be:
- Is learning acknowledged as an important dimension to the IMM?
- Are there objectives related to learning?
- Are there measures of learning and its results?
- Is there top management commitment to learning?
- Is the organization learning from its IMM failures & successes?
- Are there formal mechanisms to capture and share learning in the IMM?
- Is the need for double loop learning as part of innovation acknowledged?
- Is there internal learning between departments and persons involved in the IMM?
Phase 1
Idea - Idea generation

The idea phase is the first step where ideas are generated and gathered. Ideas can be both new product ideas, ideas to save costs, distribute in ways, enhance internal processes etc.

Questions gauging the quality of the idea process:

- Is the idea generation phase a separate management issue?
- Are there objectives for idea generation?
- Are there measures for idea generation?
- Is benchmarking being done for the phase separately?
- Does top management follow up on this phase separately?
- Can simulation result in rejection of the innovation or iteration in the IMM process?
- Does the organization work with creativity
  - Using specific tools such software, etc.
  - Using special physical environment such as an "Idea room"
- Does all types of profile participate in the creativity phase
- Are people trained in how to be creative
- Does the organization scan the environment for ideas, using and linking with
  1. Networks
  2. Internal and External R&D environments
  3. The internet
  4. Competitors
  5. Parallel industries
- Does filtering of signals/ideas take place and if so, what criteria are used
- Which profiles from the organization takes part in the idea generating phase
- Does the organizations distinguish between types of innovation in this phase, i.e.
  1. Novelty to market
  2. Novelty of technology

Phase 2
Evaluation - Idea selection & Concept

The evaluation phase is the acid-test of the ideas. This is the first reality check after the creative phase. Here the bad ideas must be removed and give place for the best ideas.

Questions gauging the quality of this phase:
Is the qualification phase a separate management issue?
Are there objectives for this phase?
Are there measures for this phase?
Is benchmarking being done for this phase separately?
Does top management follow up on this phase separately?
Can evaluations result in rejection of the innovation or iteration in the IMM process?
Are business cases formulated for the
  1. Market
  2. Customers
  3. Strategy
Which criteria/process are used for selecting concepts
  1. Assessment of the market opportunity
  2. Compared to existing and new technological competence
  3. Compared to existing and new organizational competence
  4. Defining the Customer value proposition
What is the involvement in determining the desirability/feasibility of the innovation at this stage from
  1. Different internal departments
  2. Top management
  3. External partners
  4. Critical suppliers
What types of planning is in place, such as
  1. Formulating and following milestones
  2. Carrying out risk assessment
  3. Formulated measures for the innovation project
  4. How resources are allocated
Does the organizations distinguish between types of innovation in this phase
  1. Novelty to market
  2. Novelty of technology

Phase 3
Simulation (early prototyping)

The simulation phase takes the reality check a bit further. Here products are prototyped, initially tested in realistic situations.

Questions gauging the quality of this phase:

  - Is the simulation phase a separate management issue?
  - Are there objectives for this phase?
  - Are there measures for this phase?
  - Is benchmarking being done for this phase separately?
  - Does top management follow up on this phase separately?
  - Can simulation result in rejection of the innovation or iteration in the IMM process?
Is prototyping being done?
Are there other tools for simulation?
  1. Computer simulation
  2. Models
  3. Use cases
Are there other tests of concept
  1. Function and internal test
  2. Market test and comparison to customer value proposition
  3. Competition
Is user interaction part of the simulation?
Does the organizations distinguish between types of innovation in this phase
  1. Novelty to market
  2. Novelty of technology’

Phase 4
Analysis (Alignment with corporate strategy)

The analysis phase is where “the shit hits the fan” – hypotheses are tested against the idea in general, and financial figures are developed.

Questions gauging the quality of this phase:

Is the analysis phase a separate management issue?
Are there objectives for this phase?
Are there measures for this phase?
Is benchmarking being done for this phase separately?
Does top management follow up on this phase separately?
Can analysis result in rejection of the innovation or iteration in the IMM process?
Is there a plan for analysis and what sources of technology is used
  1. Internal
  2. External
  3. Alliances
How is the linkage with the overall business strategy determined
How is linking in with existing knowledge and core-competencies handled
  1. Cultural determined/embedded in the “every-day” life
  2. Formal check procedure
  3. Through the manning of the innovation project team
Intellectual Property
  1. Are full IPR sought
  2. Framework to what extent the company wishes to have IPR
How is the funding handled
  1. Internally
  2. Co-funded with external partners
  3. Externally
Model for implementation
  1. External or internal venturing
Phase 5
Implementation

The implementation phase is the realization phase, where e.g. a initial investment in a particular innovation domain takes place. From here on, the e.g. new business area, is considered a start-up.

Questions gauging the quality of this phase:

- Is the implementation phase a separate management issue?
- Are there objectives for this phase?
- Are there measures for this phase?
- Is benchmarking being done for this phase separately?
- Does top management follow up on this phase separately?
  Can milestones/objectives result in rejection of the innovation or iteration in the IMM process?
- Project organization and project management
  1. Participants and their competencies
  2. Composition of team
  3. Role of top management
- Development task
  1. Mature innovation
  2. Market development
  3. Technological development
- Implementation
  1. Market activities
  2. Change management
- Launch/Commercialization
- When is the shift from innovation environment to daily operation
- Does the organizations distinguish between types of innovation in this phase separately
  1. Novelty to market
  2. Novelty of technology

¹ Competition, educational system, culture, research & development facilities, financial markets and many other factors may have a significant impact on a company’s ability and way to innovate. They are, however, excluded presently. The reason is that most of these factors are difficult to influence or change by a single company. Businesses have to operate in a given environment and/or take advantage of it.
Appendix D

Innovation in Danish companies
Final questionnaire
DK2004-429

Introduction and background:

The purpose of this study is to gather practical information about innovation in Danish workplaces and to create a picture of where Danish companies are in relation to the innovation process at this time.

The study is a part of a project focusing on innovation which is carried out as a partnership between the Center for Ledelse and Fremtidstanken with support from a number of Danish and foreign experts and a network group consisting of chosen companies and institutional representatives.

The project deals with innovation in a broad sense, i.e. both with respect to product, process, service, etc. It is therefore important that you fill out the questionnaire as a whole and that you consider all types of innovation when you answer the questions on behalf of the company you work for.

Single answer
Q. 0 Do you work with, or do you have knowledge of the daily development of new ideas, products or processes in the company?

1. Yes
2. No

If Q. 0= 2 -> Terminate, 50 points

Background questions

Open
Q. 1 What is your job title or occupation?

Note: ______________

Single answer
Q. 2 When was the company you work for established in Denmark?

1. Before 1900
2. 1900-1949
3. 1950-1969
4. 1970-1979
5. 1980-1989
6. 1990-1999
7. In the year 2000 or after
8. Don't know
Numerical – 4 digits
Q. 3 Where is the company’s Danish head office located?

Please provide postcode: ____________

Semi-open single answer
Q. 4 What sector best describes the company’s main activity?

1. Agriculture and raw material extraction
2. Production industry
3. Pharmaceuticals and chemical industry
4. Electronics industry
5. Electricity, gas, heat and water supply
6. Construction
7. Trade, transport and hotels
8. Finance and insurance
9. IT and data company
10. Consulting company
11. Service company
12. Public company, defence and health
13. Other
14. Don’t know

If other, please specify: ____________

Single answer
Q. 5 How would you characterise the company’s primary area of focus?

1. Knowledge
2. Production
3. Service
4. Consulting
5. Sales
6. Other area
7. Don’t know

Half open multiple answers
Q. 6 Which of the following development activities are performed by the company?

1. Products
2. Processes
3. Service
4. New business areas
5. Other development activities
6. Don’t know

If other development activities, please specify which: ________________________

Single answer
Q. 7 How many people are employed by the company in Denmark?

1. Less than 50 employees
2. 50 – 99 employees
3. 100 – 249 employees
4. 250 – 499 employees
5. 500 – 999 employees
6. 1000 employees or more
7. Don't know

If q. 7=1 -> Terminate, 50 points

Single answer
Q. 8 Is the company a.....

1. Group company with only Danish subsidiaries
2. Group company with Danish as well as foreign subsidiaries
3. Subsidiary of a Danish group
4. Subsidiary of a foreign group
5. Independent company (without subsidiaries)
6. Public company
7. Don't know

Single answer
Q. 9 How big was the company’s turnover in Denmark in the last accounting year?

1. Less than 75m
2. 75 – 149m
3. 150 – 249m
4. 250 – 374m
5. 375 – 499m
6. 500 – 999m
7. 1 – 5bn
8. More than 5bn
9. I prefer not to say
10. Don't know

Single answer
Q. 10 How has the company’s income generally been over the last three accounting years?

1. Increasing
2. Stable
3. Decreasing
4. Don’t know

The subsequent questions deal with the company as a whole. It is therefore important not to answer based on specific departments or positions.

Battery Single answer - randomise
Q. 11 Please state for each of the following statements to what extent the statements apply to the company.

1. To err is to learn
2. We have fixed procedures for the evaluation of our innovation projects
3. In our company mistakes are not acceptable
4. In the company, questioning processes and products is valued
5. In our company there are no stupid questions
6. We have organised special physical boundaries to support the innovation process
7. We emphasise having employees with different professional and personal backgrounds
8. The management implement guidelines which give the employees responsibility and powers so that they can act independently
9. The organisation encourages and supports participation in improvement activities
10. In our organisation we have an actual model for innovation which we follow
11. There are clear and written procedures for innovation processes in the company
12. When we put together a team, it is primarily based on who is available
13. When we put together a team, it is primarily based on competences and personality
14. All employees know where to go if they have comments and new ideas
15. All employees who bring ideas receive constructive feedback regardless of whether further work is done on the idea
16. There is a good overview of what everybody does in the organisation
17. In our company we work well together across departments
18. In our company we are not bound by rules and formal procedures
19. The company places a high degree of emphasis on innovation
20. We co-operate with universities, research centres, etc.
21. We work in a structured manner with the company’s interested parties (customers, suppliers, etc.)
22. We continuously compare ourselves with relevant companies
23. The company highly emphasises participation in external networks
24. The company has an updated and communicated company strategy
25. The company has a written and updated innovation strategy
26. Innovation is an important part of the company’s strategy
27. It is taken into consideration whether an innovation project is new in relation to the company’s existing technological knowledge
28. It is taken into consideration whether an innovation project is new in relation to the company’s existing knowledge of the market

Scale:
1. Does not apply
2. Does not apply often
3. Applies
4. Applies often
5. Applies to a high extent
6. Don’t know

Imagine that the innovation process is divided into 5 phases
We suggest:

Phase 1: Idea generation – Ideas are created and collected
Phase 2: Idea evaluation – Ideas which cannot be used are separated from the good ones
Phase 3: Idea testing - Innovations are tested as prototypes, in scenarios etc.
Phase 4: Analysis – Innovations are tested against the company’s strategy and financial reality
Phase 5: Implementation – Innovations are implemented as new products, procedures etc.

**Numerical – add up to 100**

Q. 12a In relation to the company’s *use of resources* in the innovation process, how is this use distributed among each of the 5 phases?

State the distribution in percentage terms. Note: the total score must add up to 100 %

Scale:
1. Idea generation
2. Idea evaluation  
3. Idea testing  
4. Analysis  
5. Implementation

**Numerical – add up to 100**

Q. 12b How much influence does each of the 5 phases have on the *final result* of the innovation process in the company?

State the distribution in percentage terms. Note: the total score must add up to 100 %

Scale:
1. Idea generation  
2. Idea evaluation  
3. Idea testing  
4. Analysis  
5. Implementation

**Battery – Single answer – Show link to the 5 phases**

Q. 13a You are asked to state to what extent the following statements apply to the company, based on the first phase of the innovation process *idea generation*:

1. The management’s responsibility is clearly fixed  
2. There are clear objectives  
3. Results are specifically measured  
4. The area has the management’s attention  
5. Specific tools, e.g. software, models, etc, are used.  
6. Employees from the whole organisation are involved  
7. External people/companies are involved  
8. There is a clear uncovering of the competencies required  
9. There is specific training for competences  
10. There are specific rewards in the area

Scale:
1. Does not apply  
2. Does not apply often  
3. Applies  
4. Applies often  
5. Applies to a high extent  
6. Don’t know

**Battery – Single answer – Show link to the 5 phases**

Q. 13b You are asked to state to what extent the following statements apply to the company, based on the second phase of the innovation process *idea evaluation*:

1. The management’s responsibility is clearly fixed  
2. There are clear objectives  
3. Results are specifically measured  
4. The area has the management’s attention  
5. Specific tools, e.g. software, models, etc, are used.  
6. Employees from the whole organisation are involved  
7. External people/companies are involved  
8. There is a clear uncovering of the competencies required
9. There is specific training for competences
10. There are specific rewards in the area

Scale:
1. Does not apply
2. Does not apply often
3. Applies
4. Applies often
5. Applies to a high extent
6. Don't know

Battery – Single answer – Show link to the 5 phases
Q. 13c You are asked to state to what extent the following statements apply to the company, based on the third phase of the innovation process *idea testing*

1. The management’s responsibility is clearly fixed
2. There are clear objectives
3. Results are specifically measured
4. The area has the management’s attention
5. Specific tools, e.g. software, models, etc, are used.
6. Employees from the whole organisation are involved
7. External people/companies are involved
8. There is a clear uncovering of the competencies required
9. There is specific training for competences
10. There are specific rewards in the area

Scale:
1. Does not apply
2. Does not apply often
3. Applies
4. Applies often
5. Applies to a high extent
6. Don't know

Battery – Single answer – Show link to the 5 phases
Q. 13d You are asked to state to what extent the following statements apply to the company – based on the fourth phase of the innovation process *analysis*

1. The management’s responsibility is clearly fixed
2. There are clear objectives
3. Results are specifically measured
4. The area has the management’s attention
5. Specific tools, e.g. software, models, etc, are used.
6. Employees from the whole organisation are involved
7. External people/companies are involved
8. There is a clear uncovering of the competencies required
9. There is specific training for competences
10. There are specific rewards in the area

Scale:
1. Does not apply
2. Does not apply often
3. Applies
4. Applies often
Battery – Single answer – Show link to the 5 phases
Q. 13e You are asked to state to what extent the following statements apply to the company – based on the fourth phase of the innovation process implementation

1. The management’s responsibility is clearly fixed
2. There are clear objectives
3. Results are specifically measured
4. The area has the management’s attention
5. Specific tools, e.g. software, models, etc, are used.
6. Employees from the whole organisation are involved
7. External people/companies are involved
8. There is a clear uncovering of the competencies required
9. There is specific training for competences
10. There are specific rewards in the area

Scale:
1. Does not apply
2. Does not apply often
3. Applies
4. Applies often
5. Applies to a high extent
6. Don’t know

Battery – Single answer - randomise
Q. 14 To what extent do the following statements apply to the company?

1. There are fixed and well-known structures for the collection of ideas in the company
2. We systematically scan our external surroundings (e.g. via the Internet, networks, competitors, other trades, etc.) to find new ideas
3. We have fixed structures for the evaluation of ideas
4. We always test our innovations by means of prototypes, test runs, scenarios, etc.
5. We check the innovation’s accordance with the company strategy in what is equivalent to the analysis phase
6. We have clear and structured procedures for the transition from the innovation phase to daily operation
7. We measure the success of innovations after the transition to operation
8. Those innovation projects which have been commercialised have contributed positively to our financial result (bottom line)
9. Over all we have seen a positive financial result from both successful and rejected innovation projects

Scale:
1. Does not apply
2. Does not apply often
3. Applies
4. Applies often
5. Applies to a high extent
6. Don’t know

Semi-open Multiple answers - randomise
Q. 15 Which of the following elements are included when the company formulates business cases?

1. The company does not formulate business cases
2. The market
3. Customers
4. Strategy
5. Finance
6. HR
7. Other
8. Don’t know

If other, please specify: ______________

Semi-open Multiple answers - randomise
Q. 16 Which of the following tools are used by the company when testing new ideas?

1. The company does not test ideas
2. Computer simulation
3. Models
4. Test/focus groups
5. Customer evaluations
6. Supplier evaluations
7. Other
8. Don’t know

If other, please specify: ______________

Semi-open Multiple answers - randomise
Q. 17 What can checking the alignment of an idea with the company strategy entail?

1. We do not check ideas against the company strategy
2. Rejection of the idea
3. Re-evaluation of the strategy
4. Rewording of the strategy
5. Joint venture/external co-operation
6. New venture/subsidiary
7. Other
8. Don’t know

If other, please specify: ______________

Numerical – Max 3 digits – plus filter q. 6
If q.6 = 1 or 3 show alternative 1
If q.6 = 2 show alternative 2
Q. 18 How many innovation projects result in success, i.e. contribute positively to the company’s competitiveness?

1. Product/service innovations %
2. Process innovations %
Single answer
Q. 19 Do you measure the financial return of your innovation projects?

1. Yes
2. No
3. Don’t know

Battery Single answer – If q. 19=1
Q. 20 Typically, how much do innovation projects affect the company’s result in terms of....

1. Savings (on the entire cost side)
2. Extra turnover

Scale:
1. 0 – 5 %
2. 6 – 10 %
3. 11 – 20 %
4. 21 – 30 %
5. 31 – 50 %
6. More than 50%
7. Don’t know

Single answer
Q. 21 How long does the company financially follow a given innovation?

1. Has no follow-up
2. 0-1 year
3. 2-3 years
4. 4-5 years
5. More than 5 years
6. Don’t know

Semi-open Multiple answers
Q. 22 Which of the following separate steps does the company have in the transition from innovation process to market?

1. Has no separate steps for the transition period
2. The innovation is made ready for use
3. Maturing of the market before the innovation finally is commercialised
4. Maturing of the organisation through for instance change management
5. Other
6. Don’t know

If other, please specify: ____________

Open
Q. 23 What is your/the company’s biggest problem with the development process?

specify: ________________

Open
Q. 24 what is most important in a good development process?
specify: __________________
### Appendix F

#### Frequency Table

**To err is to learn**

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We have fixed procedures for the evaluation of our innovation projects

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In our company mistakes are not acceptable

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In the company, questioning processes and products is valued

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In our company there are no stupid questions

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The organisation encourages and supports participation in improvement activities

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There are clear and written procedures for innovation processes in the company

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When we put together a team, it is primarily based on who is available

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All employees know where to go if they have comments and new ideas

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All employees who bring ideas receive constructive feedback regardless of whether further work is done on the idea

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In our company we work well together across departments

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In our company we are not bound by rules and formal procedures

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We co-operate with universities, research centres, etc.

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We work in a structured manner with the company’s interested parties (customers, suppliers, etc.)

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### We continuously compare ourselves with relevant companies

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### The company highly emphasises participation in external networks

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### The company has an updated and communicated company strategy

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The company has a written and updated innovation strategy

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Innovation is an important part of the company's strategy

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It is taken into consideration whether an innovation project is new in relation to the company's existing technological knowledge

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It is taken into consideration whether an innovation project is new in relation to the company's existing knowledge of the market.

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Q. 14 There are fixed and well-known structures for the collection of ideas in the company.

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We systematically scan our external surroundings (e.g. via the Internet, networks, competitors, other trades, etc.) to find new ideas.

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We have fixed structures for the evaluation of ideas

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We always test our innovations by means of prototypes, test runs, scenarios, etc.

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We check the innovation's accordance with the company strategy in what is equivalent to the analysis phase

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We have clear and structured procedures for the transition from the innovation phase to daily operation

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We measure the success of innovations after the transition to operation

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Those innovation projects which have been commercialised have contributed positively to our financial result (bottom line)

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Over all we have seen a positive financial result from both successful and rejected innovation projects.

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Appendix G

Meeting notes – Workshop 7th October 2004

Participants

Experts
Anders Drejer, professor of innovation at the Aarhus Business School  
Jesper Bove-Nielsen, venture investor at Innotek, innovation consultant

Practitioners
Lars Bo Madsen, director R&D, Coloplast  
Frank Nielsen, research manager, Radiometer  
Trine Nielsen, innovation manager, Danmarks Radio  
Tommy Rex Christensen, Senior Director for Project Management, Novozymes

Project team
Henrik Larsen, chief analyst, Fremtidstanken  
Mikael Lindholm, director, Fremtidstanken  
Jens Holmgren, senior management advisor, Center for Management  
Julie Marie Andersen, analyst, CfL  
Ruth Zneider, management advisor, Center for Management

Summarised comments regarding the model

- The term analysis in the model must be changed as it implies that analysis only takes place in a separate steps, whereas analysis is undertaken during the entire innovation process.
- The customer or market feedback must be made more clear in the model.
- The ability and need for iteration must be illustrated in the model, though iterations also can delay an innovation project as too much time is used revising the project.
- Leadership is a very important “ingredient” in innovation management, both in terms of progressing an innovation and in terms of terminating an innovation.
- Each of the phases needs to reflect that all professional disciplines (marketing, finance, etc) must be involved to have a successful innovation.
- There is a risk that the present model can be viewed as being too linear, limiting the possibilities for continuous learning and iteration in the process. Fremtidstanken and CfL will design a new model that seeks to take these elements/considerations into account. In doing so it important that each of the phases have a starting and end point to ensure the right progress in an innovation project.
- The magic is leadership that ensures that the phases are followed through and projects are stopped at the right time in the process.
• It should be considered to include leadership, market, analysis and learning in the current model element “Learning”

• The model can be used for both incremental and disruptive innovations

• Innovation management needs to be a merger of culture, organisation and strategy. There must be an understanding of “Innovation & Efficiency” in order to be good at managing innovation

• An innovation or company strategy can be a barrier for disruptive innovations, but at the same time strategy secures continuity

• A strategy must be flexible enough to allow “playground” for disruptive innovations

• The “playground” for disruptive innovation must be embedded in the structure in a company

• The phase “Investment” should rather be termed “Implementation”

• Disciplines such as market/customer evaluation, analysis and financial issues are normally taken into all of the different phases, and to a larger and large degree the further an innovation is progressed

• All innovation projects must have milestones, deadlines and other measurements, especially for taking an innovation from idea to evaluation. It might even be that the model needs an extra element “project plan” between “Idea” and “Evaluation”

**Summarised comments regarding the survey results**

• The division of “High performers”, “Strivers” and “Poor performers” makes sense

• According to the panel the soft results from the survey are somewhat interesting, but the real impact and new possible “eye opener” of the survey is the ability to link the findings with real financial data

• Private/Public
  
  o Public organisations are becoming better at innovation, hence the small difference

  o The base level of understanding/ambitions can be different in private/public

• Production/Service
  
  o One of the major explanations for the differences between production/service is that “innovation” as a term has not been used in the service sector for as many years as within production and not been on the agenda within the service sector
- The difference between production/service companies ought not be as big as the analysis shows

- Service companies are much more innovative than the analysis illustrates, the service sector is most likely just not naming development activities as innovation, though that is what they are doing

- The model is suitable for both production and service companies as both sector needs a systematic approach

- The service industry may not recognise the need for a system/structures approach to innovation, using a model as their investment, scope of an innovation in most cases are relative simple illustrated by "an afternoon of brainstorming followed by a quick write up of the concept and the innovation is done"

- Academia and the education system does not get credit for research in the service sector, which could be one of the explanations as to why so little is known about innovation in this sector

- There is a global trend towards outsourcing of R&D tasks, especially in area outside the core competences. Another trend is outsourcing of specific development tasks for sub-process within the core product if the external companies posses highly special skills that will provide a better solution

- Network innovation and outsourcing contracts are things we'll see much more of in the near future.

- Innovation can be divided into competence and user driven innovation, i.e. Novozymes represents competence based as they have a technological platform from which they seek to innovate contrary to i.e. Coloplast that is much more user driven in their approach to innovation.

- Fundamentals

- A good measurement for how innovative an organisation is the level of “skunk work” or how much time employees are allowed to “play and explore” their own ideas for innovations (the survey does unfortunately not measure skunk work)

- The learning culture in Denmark is not very well developed so far, the score in the analysis ought to be higher if companies are to learn from the innovation projects

- Physical structures/surroundings can be an important thing for the innovation process, however it is a fine balance as some of the rooms that have been implemented today are overdone. On the other hand rooms have a significant “signal” value for the organisation that innovation is a priority
A room is good for “transformation” from the day-to-day environment, once you enter you leave your normal roles outside and drop the “suit”. A room can lose its value if it is overdone, and not really designed to support the innovation process. What’s important is to have a locality where a team can meet and share ideas, facts etc. putting them on the wall etc.

It is very difficult to have a structured method for collecting ideas and to give feedback in i.e. a software tool. An idea mostly also needs to be bounced around a few times prior to submitting it for evaluation and for this process human interaction are very crucial. Using “pit-stop” workshops is a very good method for screening ideas as it also enables dialogue and instant feedback.

- **Phases**
  - That reward comes out low can probably be related to the Danish culture
  - The reason that Phase 2 is the weakest may be because of the fact it’s difficult to gather people from the different professions within the company, and that the innovation process still is very immature hence difficult to get a grip of. The problem is that this can be very expensive for the company if the wrong innovation isn’t stopped at this time
  - The innovation culture in Denmark is still very immature, this influences the companies approach to competences/training, rewards, etc.
  - Top management/management attention/responsibility is high in phase 5 because among other things most companies have formalised structures for approving e.g. a new plant. Another issue is that once an innovation is being implemented it becomes visible for the public eye.

**Tasks for the IMM team**

- Give each of the different statements a score/weight in each of the headlines in fundamentals i.e. score the four different statement in Learning
- Do a cross tab on use of innovation model and innovation strategy against the role of respondents (knowledge of innovation, taking part in innovation)