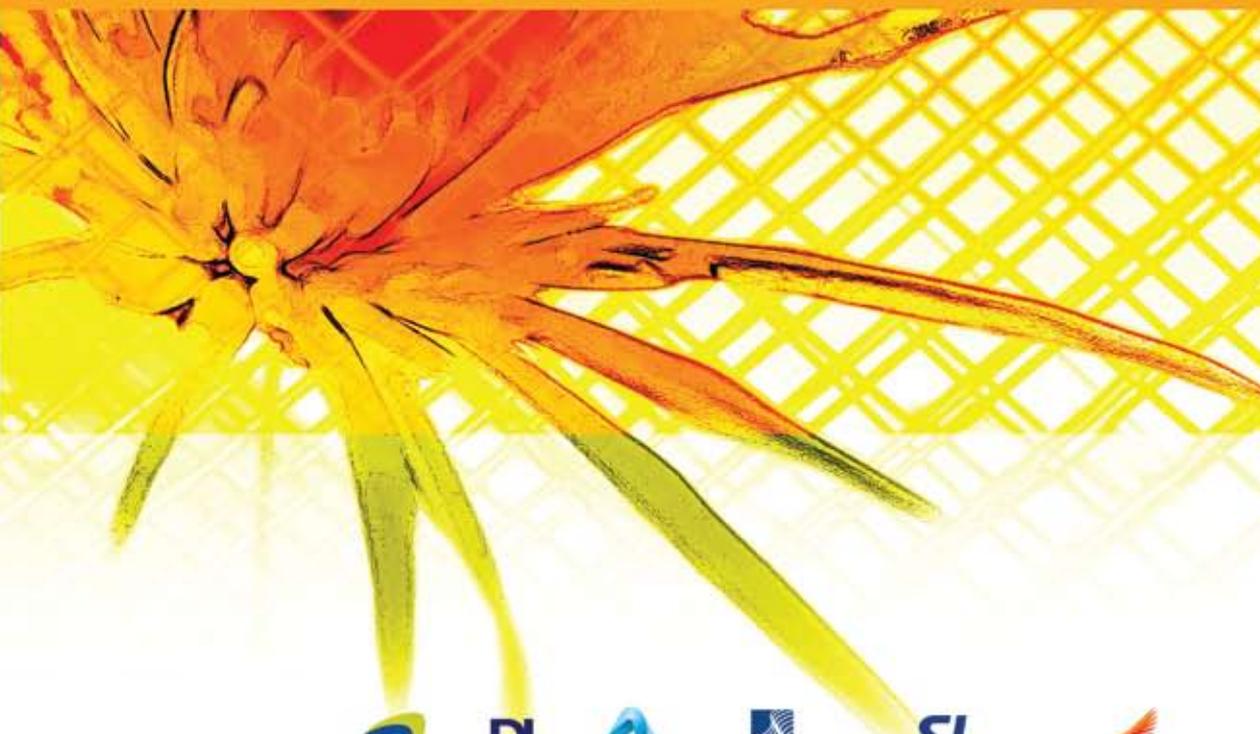




# THE NORDIC RECIPE FOR SUCCESSFUL INNOVATION



Confederation of Finnish Industries



**DI**  
DANSK INDUSTRI  
Confederation of Danish Industries



**SAITÖK** ATVINŪLĪBĪNS  
Saitök Atvinnuljúsins



**SI**  
Svenskt näringsliv

**SVENSKT NÄRINGSLIV**  
Svenskt Näringsliv



# THE NORDIC RECIPE FOR SUCCESSFUL INNOVATION

August 2007

Confederation of Finnish Industries



**DI**  
DANSK INDUSTRI  
Dansk Industri



The logo is a square with a blue and white geometric pattern.  
SMTDK ATYNNLEISIS  
Svenska Metallarbetare

**SI**  
Sveitsi töðleijarnir  
Sveitsi töðleijarnir



*“Innovation is the specific instrument of entrepreneurship  
... The act that endows resources with a new capacity to create wealth.”*

Peter Drucker, *Innovation and Entrepreneurship*, 1985  
American (Austrian-born) management writer (1909 - 2005)

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# PREFACE

Innovation is a necessary tool for successful companies in a globalised economy. To create niches in the global market and to maintain their advantage on their competitors businesses have to constantly seek new solutions, new products and new services. The emerging economies are placing ever more emphasis on innovation and businesses wanting to succeed have no option but to respond accordingly.

The Nordic countries have a population of approximately 25 million and the home market potential for specialised products and services is therefore limited. The Nordic economies are successful and in many ways provide fertile ground to foster new ideas and new solutions. Strong industrial base, highly educated workforce, attention to the individual, world renowned research facilities and long history of export have created the mental attitude that the world is but a single market. Innovative spirit is a key factor in the competitiveness of our economies. Young people no longer feel the hinder of long distances and protectionism. Nothing is impossible!

This report contains a collection of stories from a number of highly successful companies in all the Nordic countries. They provide inspiration on how innovation can provide long term success and create wealth for individuals and societies. Even though the cases are all different, many common themes emerge when reading about them.

These themes repeat themselves - case after case. They provide the ingredients for the Nordic recipe for successful innovation.

August 2007

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## INTRODUCTION

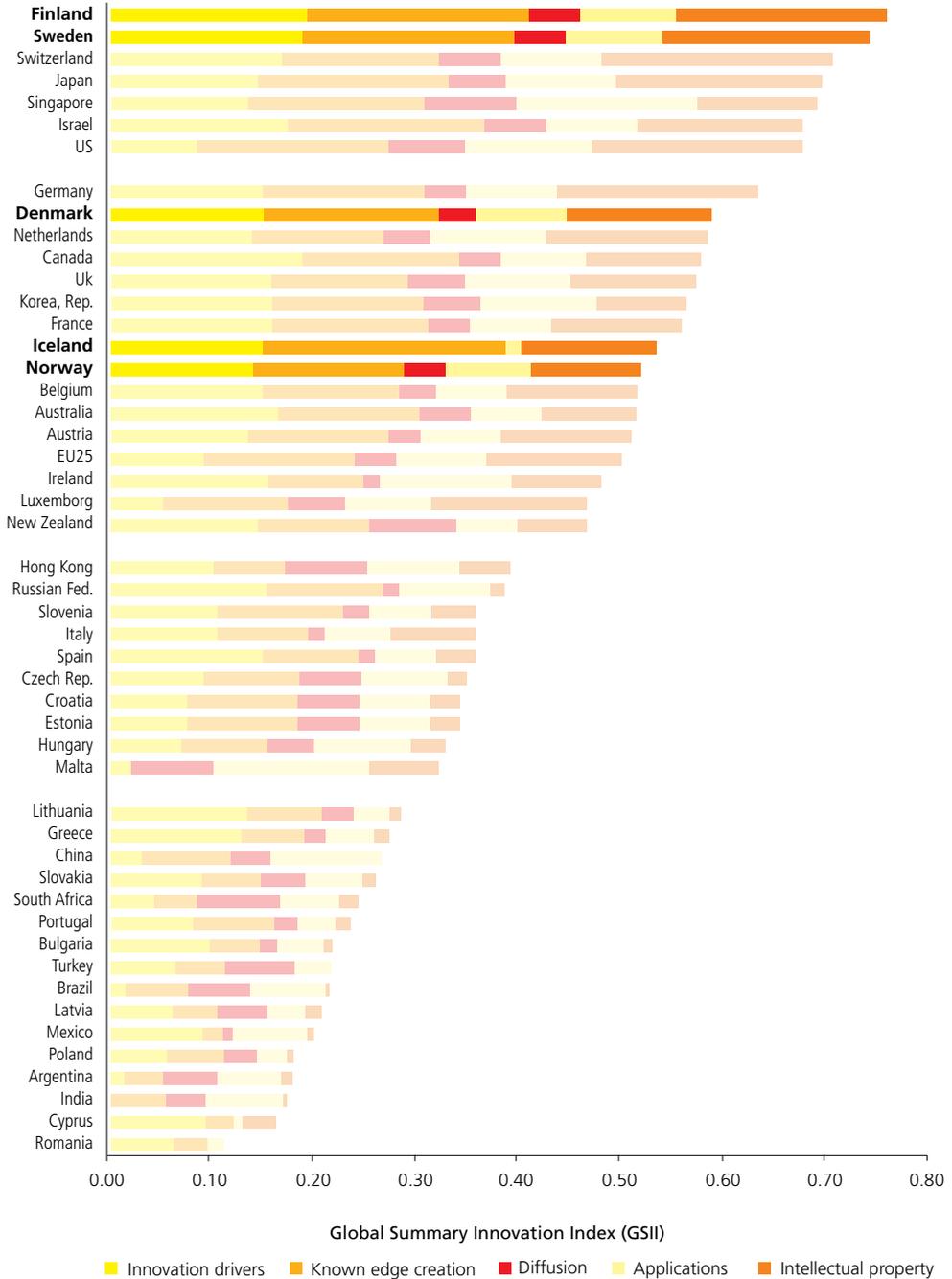
This report published by the Nordic confederations of enterprises is the third in a series. Previously *The Nordic Recipe for Global Success* was published in August 2005 followed in August 2006 by *In Search of Best Nordic Practice – A case Study on how to Adjust to Globalisation*. These reports have their origin in the fact that the Nordic countries have attracted international attention for creating wealth and prosperity. The countries are all small and their societies and economies are open to external influences and competition. Import and export are important and the whole world is their playground for investment, outsourcing and exchange of labour and knowledge. The Nordic countries all rank high when comparing expenditure on research and development as percentage of GDP, public spending on education and the utilisation of modern communication technology.

The Nordic countries are characterised by having similar managerial traditions. Barriers between leaders and employees are low and free flow of ideas provides important ingredient for creating engaged, independent and innovative spirit among the employees.

The European Innovation Scoreboard is published once a year and the latest edition carries the following picture which gives an overview of the global innovation performance.\*

\*Published in February 2007, available at <http://www.proinno-europe.eu/>

# GLOBAL INNOVATION PERFORMANCE



The picture shows Finland and Sweden as being global innovation leaders with the other Nordic countries following not far behind. The top countries score high on all parts of the index, which is composed of several indicators. Innovation drivers measure the structural conditions. Knowledge creation measures investment in research and development. Diffusion reflects the efforts towards innovation at firm level. Applications describe the value-added factor in innovative sectors and intellectual property measures know-how in terms of patents and trademarks. In general the Nordic countries share a similar structure of the index even though Iceland scores high on knowledge creation but low on applications.

Sweden, Finland and Denmark are grouped as innovation leaders in Europe with Norway and Iceland following in the second tier.

This scoreboard is but one way to look at innovation and maybe there is no definite and right way to measure innovation performance in general. Traditional industries have gone through enormous development over the last couple of decades but the products of the food, wood and metal industries rarely fall into the category of high tech products. All kinds of innovative service play a steadily greater role in traditional businesses; however, measuring it in detail is very difficult.

The emerging economies of Asia are expected to significantly increase their investment in research and development in the coming years. China, for example, is expected to invest 2.7% of GDP on research and development in 2020 as compared to the current 1.35%. Given the expansion of the Chinese economy this ratio translates into virtual surge of innovative products and services. The conclusion for the Nordic economies is that they have no option but to increase their focus on innovation if they want to maintain their position.

As stated above, this report contains case studies about successful companies in the Nordic countries. They clearly illustrate how innovation lays the foundation enabling companies to meet the needs of demanding customers. The origin of the companies is diverse and they belong to different business sectors. Some of them have sprung from research at universities, some are spin offs from large multi-national corporations, some from collaboration between industry and research centres and there are furthermore examples of innovative companies that have been in existence for a very long time. The report even carries a story about a businessman who had his Eureka moment while taking a shower.



The stories are told in different manner, each giving a fascinating insight into important factors behind the development and success of these companies. All of them base their success on creative innovation or rather on creating the correct and fertile atmosphere for innovation. Their products are different, the markets are not same, their backgrounds vary significantly, yet they all share a number of common characteristics that have been accumulated in the Nordic recipe for successful innovation!

## THE NORDIC RECIPE FOR SUCCESSFUL INNOVATION

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- Innovation does not happen – it needs to be actively sought, encouraged and promoted
- Build an innovation structure and spirit – and create the necessary facilities and tools
- Top management dedication is fundamental
- Long term strategy and vision are key ingredients
- Innovation needs to be managed and systemized
- Bring together individuals with different background – various disciplines and experiences selected according to needs
- Internal openness is essential – free flow of ideas across business areas – freedom to experiment
- Transfer technologies between industries
- Transfer technologies between industries and research institutions
- Good relations to universities and research institutions provide knowledge, people and expertise
- Create and maintain solid links to customers and a long-term focus on customer needs
- Fast response to customer needs is essential
- See the world as a single marketplace
- Growth should be an every day priority
- Seize the opportunities!



## SUCCESSFUL DANISH INNOVATION

DEIF

# POWER IN CONTROL

Danish DEIF was founded in 1933 as a manufacturer of electromechanical instruments. Today, DEIF is active on the international markets of engine and gen-set controls, marine bridge instrumentation, switchboard instrumentation, and renewable energy controls. Through hard work and the ability to exploit synergies across business areas, DEIF has succeeded in becoming an international player within the company's fields of business.



**Number of employees:** 300

**Turnover:** EUR 32 million

**Investment in R&D:** 10% of turnover

**Business areas:** Engine & gen-set controls, marine bridge instrumentation, switchboard instrumentation and renewable energy controls

**Further information:** [www.deif.com](http://www.deif.com)

## HOW IT ALL STARTED

DEIF (Danish Electro Instrument Factory) was established in Copenhagen, Denmark, in 1933 by Erling Foss and a few other partners. In the beginning, the factory manufactured electromagnetic measuring instruments which are rather simple products. The focus was precision and robustness and the measuring instruments were assembled and mounted by hand. In 1977, engine and gen-set controls also became a business area for DEIF. Since then the number of business areas has continued to expand and today includes marine bridge instrumentation and renewable energy controls in addition to switchboard instrumentation and engine and gen-set controls. Furthermore, the product range within each business area has become much more sophisticated.



*Christian Nielsen  
Director of Business  
Development and Technology*

## YOU CAN'T CREATE INNOVATION, BUT YOU CAN PROMOTE IT

Overall business concept has not changed

Today, DEIF is owned and managed by the founder's son, Toke Foss, and development and production has moved from Copenhagen to Skive in Jutland. Even though the company has changed a lot since its founding in 1933, the approach to quality, reliability, robustness, and extensive service remains the same.

No more than ten years ago, DEIF mostly provided solutions for the Danish market. Today, the Danish market only represents a minor part of the company's turnover and DEIF sells and services its products worldwide. "The ability of the management and the employees to keep focusing on the long term visions and missions of the company even in less prosperous times has been essential for DEIF's success," says Christian Nielsen, Director of Business Development and Technology.

Innovation is about mindset and business structure

Even though DEIF today is considered an innovative company, innovation in itself has not been the primary focus of the company. "Innovation and creativity is not something you can create. It is something you can promote if the employees have an innovative spirit," Christian Nielsen says. In this way, innovation is more about mindset and business structure than concrete development of new products. But the focus on innovation remains clear when looking at the development of the number of people employed in the R&D department: during the last 11 years DEIF has increased the number R&D employees from 5 to more than 50.

## CREATING AN INNOVATIVE ENVIRONMENT

Honesty and flexibility

Christian Nielsen stresses the mindset as crucial for staying innovative. But what is the best mindset for innovation? Honesty and flexibility in relation to the customers is essential. "We are not hard-nosed businessmen but instead we are open and honest and make an effort in being flexible towards the customers. We want to understand their needs. Furthermore, we say what we mean in a direct way so that misunderstandings are minimized," Christian Nielsen says. Also the desire to understand the culture of customers from all over the world is crucial for the international success of DEIF.

When it comes to the inward mindset of the company, the long term strategic thinking is central. This enables the company to pursue long term goals in a focused way. Internal openness in the company is also an important factor in creating an innovative business environment. This is reflected through the business structure of DEIF.





The open business structure is an essential part of the company. It is extremely important that all employees feel that communicating new ideas is easy and that speaking openly with the management is a natural thing. "Every employee must know that the words of the management are not definitive but rather an opening for discussion," Christian Nielsen says. This is a characteristic of our Danish business culture that is rather unique compared to other parts of the world. Christian Nielsen stresses the Danish management style with short distances between employees and employer to be a very central part of a dynamic and creative environment in the company.

Open business structure

To ensure the continued openness in the company using a formal framework, management groups that communicate across business areas have been established. Each of them addresses certain areas of concern for the entire company. One example is the Quality Group that works with product quality within the company's four areas of business. The management groups consist of all types of employees thereby creating an informal and innovative environment. The members of each group are selected on the basis of their knowledge and abilities, and not on their titles in the company. "Focusing on the titles of the employees can seriously harm the innovative environment. Therefore it is important to create proper forum where everyone feels that they can say whatever they like," Christian Nielsen says.

Management groups across business areas

While the business structure is important for an innovative environment, the most essential part of staying innovative is to attract and keep good and creative employees. Having a good reputation is crucial in attracting new employees. "50 percent of the newly employed applied for a job at DEIF due to a recommendation from someone they knew in advance," Christian Nielsen says. Therefore, the level of satisfaction of the employees not only affects the ability to keep them at DEIF, it is also crucial for attracting new people. The high degree of satisfaction is obtained through the open structure of the company and a high degree of communication. "Everybody should feel as an important part of the company," Christian Nielsen says.

Employees the most important resource





## UTILIZING SYNERGIES

Synergies across  
business areas

The history of DEIF is a history about expanding business through synergies from existing business areas. Starting up as a manufacturer of electromechanical switchboards, DEIF has gradually expanded the areas of business to include engine and gen-set controls, marine bridge instrumentation, and renewable energy controls in addition to switchboard instrumentation. Entering these new business areas the company has relied on the expertise and knowledge acquired in existing business areas. "In particular, knowledge from the marine area has been useful in our other areas of business since this area is a forerunner when it comes to how sophisticated the products are," Christian Nielsen says.

Wind as a new  
business area

The latest new business area, renewable energy controls, was added in 2004, where DEIF took over West Control, a Danish company which by then had 100 years of experience within the wind industry. With this acquisition DEIF took a step further in the direction of becoming a complete supplier of controllers and instrumentation for decentralised power plants, including marine applications, and wind, hydro and gas/diesel plants. Again, the ability to exploit knowledge from other areas has been crucial in making the wind area a success. There is a lot of synergy on the technology side, where the wind controllers can benefit from DEIF's skills in design and manufacturing of advanced products for very tough environments, e.g. offshore installations. Furthermore, by merging the know-how of DEIF and West Control, DEIF today possesses second-to-none know-how on all aspects of wind turbines. And they use it to provide the best complete solutions for the customers.

Wind turbine controllers fit very well into DEIF's existing product programme which by then included controllers for diesel and gas driven power plants as well as for smaller hydro power stations. CEO Toke Foss has a clear ambition: to maintain and expand DEIF's position as one of the most trusted suppliers within the company's field of operations - also within wind.



"Another important issue is the fact that the customers in the wind industry, including wind turbines, are getting increasingly larger. The suppliers must be able to match them in size and sheer "staying power". Having been in the power business for almost 75 years, DEIF is in a very good position to fulfil this demand," Christian Nielsen says.

Taking the best from one world and exploiting it in another context has also been an area of concern for DEIF in another way. DEIF has found it useful to combine the best of the Danish company and a Japanese collaborator when it comes to business practice. "Denmark has a strong position in innovation, flexibility, and project management skills whereas Japan is characterised by well-functioning control systems and a high quality level," Christian Nielsen says. Recognising the strongholds of other cultures and combining them results in a strong business concept with innovative products of very high quality.

Combining strongholds across cultures

Whereas many people see innovation as being the invention of a new product, DEIF focuses not that much on patenting specific products. Instead, DEIF concentrates on creating solutions that work all the way from the definition of the customer needs to the implementation of a solution and maintenance of the products. The products are specifically oriented towards the particular customer, thereby creating a unique solution depending on the demands of the customer. In the process of identifying the customer needs it is extremely important to be in close contact with the customer. Therefore, DEIF makes an effort in being present when deals are made and spends means on being in close contact with the customers all over the world. "It takes time, but time is paid back many times in terms of satisfied customers," Christian Nielsen says.

Creating complete solutions

## FUTURE CHALLENGES

Even though DEIF is experiencing success today, the company is aware that realising the challenges of tomorrow and being able to meet them is crucial for maintaining this success.

"Since price is not a direct parameter where we are able to compete, we must deliver a better solution to the customer," Christian Nielsen says. This should be done through the continuous development of customer specific products combined with a high service on delivered products. Delivering an entire solution that ranges from the development of the product to maintenance service is what makes DEIF superior to its competitors, and this is important in order to ensure the company's position in the future. A very central part of DEIF's business concept is that the company takes full responsibility of the quality of the products and makes sure that each and every customer experiences smooth implementation, including subsequent service and support.

Not competitive on price

The challenge of growth

To be able to provide competitive customer specific products, it is furthermore important to stay innovative on the product side. DEIF's innovation strategy aims at ensuring this.

Finally, the business mentality of DEIF is a major ingredient for the company's ability to innovate. Until now, the mentality of DEIF has remained that of a small company where communication is easy and where everybody's voice is heard. "As the company grows, keeping this business mentality is a challenge that must be addressed. Creating formal frameworks, as the management groups, is a way of ensuring communication and openness in the company that we want to keep as the number of employees increases," Mr. Nielsen concludes.

#### LESSONS LEARNED

- Close cooperation with customers - detailed insight in their needs and wants.
- Involve views and ideas of the employees in working groups and by low-distance management to promote creativity and innovation.
- Investing a minimum of 10 percent of turnover in R&D - staying ahead of the competition by offering better products.
- Being a frontrunner in IT and logistics and minimising costs by optimising all processes in the supply chain.
- Worldwide organic growth - ensuring future options and independence by continuously consolidating financial strength.



## SUCCESSFUL DANISH INNOVATION

DANFOSS

# WHEN INNOVATION MAKES MODERN LIVING POSSIBLE

You may not notice it. But when you switch on the air-condition at your hotel room in Bangkok or turn on the heat in Santiago, you probably activate a remote sensor or a thermostat from Danfoss.



**Number of employees:** 20600. In Denmark: 6100

**Net sales 2006:** EUR 2.6 billion

**Operating profit - EBIT:** EUR 215 million

**Net growth 2006:** 14%

**Number of new business acquired in 2006:** 12

**Further information:** [www.danfoss.com](http://www.danfoss.com)

## THE DANFOSS CASE ON INNOVATION

The Danfoss Group is an international group, and a leader in research, development and production of mechanical and electronic components and solutions. With an assortment containing products within refrigeration, air conditioning, heating, water pumps, and industrial automation the company's competence spreads wide.

This is the story of a large company, which, in the recognition of innovation as a complex and difficult discipline, has systematized the innovation process and has set up organisational structures to encourage and ensure powerful business development to meet the global challenges.

*"Steering an industrial corporation to greater global success is much akin to piloting a jet aircraft. Both tasks require a cool head, a comprehensive overview and a clear goal."*

**President and CEO Jørgen Mads Clausen, The Danfoss Group**



*Jørgen Mads Clausen  
President and CEO  
The Danfoss Group*

On the world leading edge

The Danfoss name might not be familiar to the average man on the street, but on the factory floor, in manufacturing and engineering, the brand is ubiquitous. Every day, Danfoss' 60-plus factories around the globe pump out thousands of precision components.

Being on the world leading edge is a result of visionary business strategies and a systematic approach to developing and improving core competencies and innovation.

Efficient use of resources

The success as a producer stems from its ability to combine traditional mechanical based technologies with electronic solutions. Through innovative mechanical design and electronics, often including embedded software, they provide robust products of high quality, reliability and versatility. Danfoss strives to meet its goals with minimal consumption of raw material and energy, the least possible impact on its surroundings, and the most efficient use of resources.

## INNOVATION IN DIMENSIONS

To understand the Danfoss excellence in developing new products and entering new business areas one will have to understand the strategy to innovate. This is at least three-dimensional:

- The employees are encouraged to generate and pursue new ideas and innovation.
- The Danfoss Company has established systems, projects and institutions in order to manage, assist and subsidize innovation.
- Involvement in society: The top management is involved in developing the society and mindset of entrepreneurship and innovation. The activities spread from joining the Global Compact Initiative to facilitating projects for students.

Innovation leads to new products and business areas

Innovation leads to new products and business areas. Danfoss has always committed considerable resources to product innovation and development. From 2002 to 2006 the net sales increased from 2 billion EUR to 2.6 billion EUR.

The "over all" innovation perspective is expected to generate an even greater growth, and Danfoss has furthermore locked its compass on China. The goal is to build a second home market in China. In the course of this onward march, the focus is on innovation and on broadening the scope to be a truly global player.





## MAN ON THE MOON

With the aim to promote innovation and entrepreneurial spirit broadly in the company as well as in society as such Danfoss has launched a number of initiatives.

“Man on the Moon” is an initiative to develop entrepreneurial mindset, innovation and competencies throughout Danfoss. The aim is to find, test and systemise new ideas in the company.

It all begins with an inspirational and idea generating phase based on the company’s challenges in the years to come. After that, competing teams are put together to develop their ideas within the next 3-4 months.

During this period there are workshops about specific topics to develop team-based and individual business skills related to innovation in order to qualify, test and systematize the ideas.

The ideas are then presented to a jury, which includes the company’s top management, and the winners receive a considerable award. The best ideas are then to be realized and incorporated.

Within a limited time period the Man on the Moon concept can mobilise the employees’ enthusiasm, give them an educational boost, develop and mature ideas and not least create a culture which encourages amendments and innovation.

The employee as an innovator

Entrepreneurial mindset developed

The company’s top management included

## INTERNAL AND EXTERNAL VENTURING PROJECT IN DANFOSS

Danfoss Ventures invest in business ideas and early-stage companies to create growth for the Danfoss Group.

Danfoss looks for investment opportunities with the potential to make a significant impact on their targeted market, and they look for entrepreneurs,

Innovation creates growth





Emphasis on renewable energy and water

who can benefit from Danfoss' global presence, know-how and experience. Focus is on technologies, products and services of strategic relevance to the Danfoss Group.

Danfoss is specifically interested in CleanTech opportunities, with particular emphasis on renewable energy and water. CleanTech is defined as knowledge-based products or services improving operational performance, productivity or efficiency while reducing costs, inputs, energy consumption, waste or pollution. Danfoss also looks at new ideas for industrial products, which have a potential to complement their present lines of business.

The company should offer innovative product or service opportunities. It should have a potential for gaining a large share of an attractive market, and an experienced, dedicated and ambitious management team.

The geographic scope is global in Danfoss' venturing projects

Danfoss primarily provides equity financing. Most of their investments are seed and early stage. Danfoss considers later stage investments on a case by case basis, and they provide follow-up investment, if they think the situation warrants it. The geographic scope is global.

The goal is to build a portfolio of emerging companies providing strategic options for innovation and the future development of Danfoss.

## DANFOSS INNOVATES THE SOCIETY

Play and learn in a world of science

Danfoss' headquarters is based in Nordborg in southern Denmark. But even being situated on the outskirts of the country, Danfoss is one of the most present and active companies at the national institutions on education, knowledge and research.

Key-employees are concerned to help students and institutions to develop and accelerate innovative skills.



## DANFOSS UNIVERSE

Danfoss Universe is Denmark's only science and experience park. It is located next to Danfoss headquarters.

Danfoss Universe is a 10-acre park with over 150 activities for children, curious and inquisitive individuals. The 150 attractions are developed around a shared objective: to give children access to learning while having fun. A long-term perspective in this matter is to regain interest and confidence from the youth in science and engineering as creative and innovative skills and professions.

Gives rise to the youth's interest in technology

The park is built around the Blue Cube, Iceland's pavilion from the world exhibition, EXPO 2000, in Hannover. The 23-meter high Blue Cube is located beside the artificial lake, Eureka Lake. The cube's central eye catcher is a geyser that shoots water into the air once every minute, while water trickles down the cube's outside wall. In the cube the many visitors will come in contact with the forces of nature. Each of the cube's three stories features one of the forces of nature.

The park is divided into three main elements: The Outdoors Park with over 100 activities, Mads Clausen's Museum and the indoors, Explorama.

The Outdoors Park with over 100 activities was created from the idea that even the most complicated associations can be understood through play and fun experiments. Ready-made answers and results are replaced by one's own adventures and experience along with the courage to discover and invent.

The indoors, Explorama, has 50 activities, and is the place where visitors are invited to play with the concepts of creativity and intelligence. Here, they will have the opportunity to discover their own form of intelligence based on Howard Gardner's theory of Multiple Intelligences.

### LESSONS LEARNED

- Great ideas can be found and generated anywhere in the organisation.
- Innovation is not "by chance". It can be systematized, escalated and executed both practically and strategically.
- Strategic innovation must be prioritized by the top management.
- Innovation takes time and money, but can have a staggering Return On Invest.
- You do not have to start from the beginning on how to systematize innovation. There are plenty of best practices to explore.





## SUCCESSFUL FINNISH INNOVATION

KONE

# FROM ONE SPOT TO ANOTHER

**KONE is one of the world's leading elevator and escalator companies. In Finnish KONE means "engine". KONE helps people to get from one place to another vertically or horizontally in an efficient way and provides daily safe and easy access for hundreds of millions of people in all parts of the world. Elevators are as KONE knows an essential part of modern day housing; they make buildings functional and link them with their surroundings. KONE has also recently invented the new "travelator", which can help people to move faster around e.g. at airports.**



**Number of employees:** 29000 - worldwide

**Annual net sale:** EUR 3.6 billion (2006)

**Profit:** EUR 360 million (2006)

**Investment in R&D:** EUR 50 million (2006)

**Business areas:** Elevators and escalators

KONE is a family-run enterprise. Its class B shares are listed on the Helsinki Stock Exchange in Finland

**Further information:** [www.kone.com](http://www.kone.com)

## INNOVATIVE SOLUTIONS

KONE was established in 1910 as a unit of a company called Strömberg. In 1924 it was sold to Harald Herlin, a member of its advisory board. The company concentrated on selling and maintaining elevators. Today KONE provides its customers with industry-leading elevators and escalators and innovative solutions for their maintenance and modernization. KONE also provides maintenance of automatic building doors. The company guarantees local service for builders, developers, building owners, designers and architects in 800 locations in over 40 countries. KONE has continued as a family-run enterprise.



*Jussi Oijala  
senior vice president of KONE*

## NEW BUSINESS OPPORTUNITIES

In 1964 Pekka Herlin took charge of the company and began to search new business opportunities from abroad. He made big acquisitions in elevator business, but also diversified into other business areas, e.g. wood handling systems and shipboard cargo access equipment to compensate the cyclic nature of the elevator business. He started the era of internationalisation and growth.

In the beginning of 1990's Finland fell into a deep recession. The recession hit the company hard as the demand for elevators and escalators declined and prices eroded. As a result, the financial performance of the company was

Era of internationalisation and growth

getting worse. The business idea of KONE had been "short distance transport", but the problem was that KONE after acquisitions consisted of a large number of independent companies and branches without a common corporate culture. This resulted in an inefficient cost structure.

New technology required high R&D investments

One key question was how to proceed with radical new technologies developed in the company (Eco Disc™ and MonoSpace™)? The company had done well in technology, but could it afford such a big effort and all the risks involved? The times were bad and new technology required high R&D investments.

Elevators can be divided into three major categories according to the size and the nature of the building; low-rise, mid-rise and high-rise. Because house-building styles vary from country to country, elevator types are also different in different parts of the world. In Europe, the low-rise type is common and high-rise elevators are concentrated in some areas, like in major cities in the USA and South-East Asia.

The elevator business was global with big companies, though there were also small local actors. New elevator industry in general followed business in the construction industry. Globally, all markets behaved differently and the demand for various elevator types and sales volumes fluctuated. The competitive situation in new elevators was tough and price was almost the only decision criteria.

KONE was one of the first Finnish companies to grow internationally

"The company has always been innovative and growth oriented. Already from the early years the goal of KONE was to raise the level of its technology and expertise to a global level. KONE was one of the first Finnish companies to grow internationally. It has over the years expanded its business by acquisitions, also buying companies bigger than itself in days when it was not usual in Finland," says Jussi Oijala, senior vice president of KONE.

## ELEVATOR BUSINESS IS SERVICE

Because the value of the maintenance business was more than half of the total sales in most full scale companies, all manufactures tried to achieve large maintenance contracts. Competition was hard and it increased the need to make both new elevator business and service business as profitable.

The competitive situation was affected also by new technology, because systems had become more complex and required more skills and specialized equipment than before. Therefore, if the new product technology of a company deviated from the mainstream it also affected the maintenance business. The customers were cautious if there were fewer suppliers for maintenance services. On the other hand, the ratio was higher if the technology was more specialized.

The division between new elevator business and maintenance and service was not rigid. In the mature markets, like in Europe, modernizations of old elevators were an important part of the business. Many of the old cities had lot of old elevators which required updating. Those modernizations had to be designed usually case-by-case. Therefore they were more suitable for a local maintenance organization than for a new elevator sales office.

Complex market and hard competition

## ELEVATOR HOISTING TECHNOLOGY

Lifting people and goods was one the earliest applications of engineering and the means for serving that need are numerous. Three main hoisting technologies were dominant in the market and most major elevator manufacturers had them in their selection. There were also many component factories selling parts to companies which only installed elevators locally.

The hoisting technology of a low-rise elevator consisted of two basic alternatives: hydraulic and traction. Hydraulic elevators were used only in the lowest buildings. Their space utilization was rather good because the machine room could be in the basement. However, their low speed and restrictions in lifting height limited their use.

The other alternative was a conventional traction elevator, where the cabin and the counterweight were suspended on both ends of a rope and moved by a traction sheave of the hoisting machine. The machine usually consisted of a gearbox and an induction motor. It was also possible to locate the machine in the basement of a building, but then some additional pulleys were needed in the ceiling of the hoist way for the suspension of the counterweight and the cabin.

Searching for new technology to lift people and goods

Until the turn of the 90's, a traction machine with a worm gear was the dominating technology for the mid-rise.

In the highest-end, only direct drive machines were used. They were traction machines without a gearbox. These direct drive motors were demanding from technical point of view, because their efficiency was high enough to require regenerated energy to be fed back to the electrical mains.

At those days a patenting boom took place. It seemed that there might be lot of new technologies available. On the other hand, a number of patents had not proceeded to commercial products.

## ELEVATOR SAFETY REGULATION

Various safety codes and standards

Elevators had been under various safety regulations since their early applications. Most countries had their own safety codes. It was also common to have official inspection by authorities before allowing an elevator in public unattended use. The importance of the standards varied, too. In some countries, standards were only engineering recommendations, while in others they were part of the legislation. Inside the EU there were already Harmonized European Standards but they were optional. A new directive was under development and it was to be obligatory for EU member states only by the end of 1997.

## DEVELOPMENT HISTORY OF THE MONOSPACE

In the early 90's competition was hard and several projects were going on in the Research Center of KONE in Finland. As part of cost cutting efforts, new hoisting technologies were studied. A new type of hoisting motor was found.

Innovation cuts off the machine room

The basic idea was to build a machine so flat that it could be located anywhere in the rope system, in the counterweight, inside the shaft or in the machine room. The new kind of hoisting machine had many extraordinary features: there was no gearbox in the machine but the motor was integrated directly in the traction sheave. The lack of a gearbox enabled excellent efficiency due to the fact that gearbox's heat losses disappeared. Therefore, the energy bill and supply size were halved. The simpler machine also resulted in good ride comfort. The new elevator type was named MonoSpace™ and the new machine EcoDisc™.

R&D resources were needed and several patents were applied. Unique sales arguments were offered, e.g. savings due to the nonexistent machine room, energy and space savings throughout the life span of an elevator as well as environmental aspects and reliability.



The benefits of MonoSpace™ for customers were obvious: architects got an increased degree of freedom because the machine room was not required anymore, the builder saved in construction costs and users in the energy bill.

Construction costs and energy bills lowered

There were also many uncertainties as regards marketing, which made the decision of the marketing approach difficult. In low-rise, safety codes did not recognize MonoSpace™ as an elevator, because it did not have a machine room. It was clear that there were significant uncertainties in the future of elevators without a machine room.

The test procedure seemed to be necessary for each country. In Europe, the new lift directive was to make approval easier from 1998, but before that regional approval was required. In building design machine room was drawn and accepted as a part of the building before elevators were quoted for, and that was a challenge.

## CUSTOMERS ACCEPTED THE NEW INNOVATION

From a customer's point of view, MonoSpace™ was found to be a certain risk. If the machine room was left out, MonoSpace™ was in practice only elevator to be fitted in the building without major changes. Thus, competition was limited in the bidding stage. Also later on, in the case of a possible failure of the new concept of KONE, there was no cheap alternative. And, thirdly, some customers were afraid to be bound to only one supplier in the maintenance.

Competitors left behind

However, nearly all customer groups contacted found MonoSpace™ to be a great innovation and agreed with the benefits. The problem was the novelty of MonoSpace™ and the unexpected reactions of authorities in various countries. But in 1998 it was possible to sell MonoSpace™ in Europe without discussions with national authorities.

"At the beginning of 1996, KONE faced great opportunities with the new technology, but also big risks and pitfalls. How to tackle them and win a new position among the competitors," remembers Jussi Oijala. "The fact was that the new KONE product did not fit the business environment as it was then, because of the non-compliance with the existing safety code and required changes in the builder's construction process. So KONE had to do something in order to create demand for its innovation. The change of technology was huge. And KONE took it seriously and committed to it."

KONE changed the elevator industry in 1996 with its innovation

"In 1996 KONE introduced an elevator innovation that changed the industry," says Jussi Oijala.



## AUTOWALK INNOVATION

The world flattest technology

In 2006 KONE achieved a similar breakthrough in the escalator industry by introducing the world's flattest technology for autowalks, KONE InnoTrack™. It does not require a pit but can be installed on top of the existing floor.

“KONE InnoTrack™ can be installed in places where traditional auto walks were not possible. It suits to almost any location. It is also possible to modify - shortened or lengthened - or re-use it on another location,” says Jussi Oijala. “It also offers lower total costs.”

The new smart autowalk (travelator) makes designing and planning of large public areas such as airports, stations, shopping centres and exhibition halls much more flexible and efficient. Due to its modular design and light-weight technology, installation is also considerably quicker and easier. Its innovative pallet return mechanism and new motor solution create the world's flattest autowalk.

### LESSONS LEARNED

- New innovations are necessary.
- Internationalisation and growth give more possibilities to success.
- Liberalisation of business environment is a prerequisite to successful business.
- Global standards and safety codes needed.
- Public R&D financing is needed to share risks.



## SUCCESSFUL FINNISH INNOVATION

THERMOWOOD

### OLD IDEA – NEW PRODUCT

ThermoWood® trademark is a sign of wood products manufactured by a unique method developed in Finland. By thermally modifying the timber the durability against decay is improved and therefore it is well suited to applications involving demanding weather conditions. Thermally modified timber is an alternative to impregnated wood and endangered rain forest species. It is environmentally friendly and a natural choice because only heat and steam are used in the manufacturing process – no chemicals or other additional constituents are applied. The beautiful, finewood-style look and dimensional stability make the products suitable for interior decoration and outdoor structures. The Finnish Thermowood Association was founded in 2000. The aim of the association is to generally promote the usage of ThermoWood® products and to cooperate in standardisation, quality control and research, in order to enhance the use of the products.

FINNISH  
**ThermoWood**  
ASSOCIATION

**ThermoWood Association:** Founded in 2000, 13 member companies, membership open to all companies that fulfill the prerequisites

**Annual sale of ThermoWood:** 72000 m<sup>3</sup>. About 75% of the production is exported - mainly to EU countries

**Business areas:** Increasing the knowledge and the methods related to heat treatment of timber production

**Further information:** [www.thermowood.fi](http://www.thermowood.fi)



*Jukka Ala-Viikari*  
General manager

## TO MAKE SOMETHING NEW

The idea of thermally modified timber is old and globally studied. Modification methods of wood have been scientifically studied and developed at many research institutes during the years, already in the 1930s. The aim of the research and development projects has been to improve properties of wood.

Thermal modification of timber means a method where the composition of the cell wall material and physical properties of wood are modified by the exposure of temperature higher than 160 °C. ThermoWood® is an EU registered trademark owned by the association. The members of the association are either thermally modified wood producers or kiln manufacturers.

The initiative came from a research center

On industrial scale thermal wood modification process, ThermoWood® process was developed in Finland. Initiative came from research at VTT, Technical Research Centre of Finland. The joint research organisation of wood industry, Suomen Puututkimus Oy, was then engaged to research and development work. R&D work was simultaneously carried out at VTT, The Institute of Environmental Technology in Mikkeli and Technical University of Tampere. Many research projects were carried out in intensive cooperation between research organizations, wood industry companies and kiln manufacturer companies.

## FOCUS ON THE INDUSTRIAL SIDE

Research organizations and companies worked together

Basic research work took place in the 1993-1999, after that came the applied research period of 1996-2001. Now the focus was on the industrial side. Stora Enso Timber Oyj Ltd, Metsäliitto Osuuskunta Finforest, UPM-Kymmene Oyj and Valutec Oy were the industrial partners who were ready to catch the idea. Large companies were the motors, but there were also active SME's in the developing work. The history of research consists of several large research projects, two research installations of laboratory scale and several actors both in research and industry, large and small companies, private financing as well as public financing from Tekes, The Finnish Funding Agency for Technology and Innovation and immaterial property rights. The result was a commercial product.

The Finnish ThermoWood Association, FTWA was then established in 2000 to enhance the use of thermally modified timber, to administer the quality control of production, product classification and R&D activities. In the early years of the Finnish ThermoWood Association some focused functions were launched to increase the credibility of ThermoWood® in the wood product market. The



first activity was to collect all usable research information and report it. The ThermoWood® handbook was published in 2003. The planing manual and surface coating manual were published after the handbook. The aim of the published manuals was to give information about the product and how it should be processed and coated.

All research information was published

Nowadays the entirety of focused functions is called ThermoWood® Concept. It consists of many functions like patented process, registered trademark, quality control, life cycle assessment (LCA), certified raw material, standardisation and continuous R&D.

## SUCCESSFUL COOPERATION BETWEEN COMPANIES

Creation and implementation of the ThermoWood® Concept is a good example of successful cooperation between different companies. Many activities were carried out in co-operation between ThermoWood® producers and kiln manufacturers. The activities are coordinated by the association. The aim of the implemented concept is to enhance the use of thermally modified timber. The ThermoWood® Concept ensures that the product is safe choice for authorities, customers and end users.

Beneficial networking

“One can say that the development of ThermoWood® Concept is an excellent example of beneficial networking, cooperation between large companies and SME’s, research institutes and private and public financing,” says Jukka Ala-Viikari, the general manager of the Finnish ThermoWood Association. “A long lasting research work has been commercialised successfully. This is remarkable in the wood industry sector which is often considered as low tech industry, and is not known for high R&D investments.”

Wood industry was not known for high R&D investments

## NEW PRODUCT – NEW CHALLENGES

Thermally modified timber is a relatively new product in the wood product market. New product always meets difficulties during launching. Customers do not have long term experience about the product and in the case of building material the authorities and building sector stipulate standards and certificates.

Environmentally friendly

ThermoWood® is an innovation that can be used in indoors panelling, saunas, flooring, windows and doors, patios, garden structures and furniture, fences etc. It is an alternative to impregnated wood and endangered rain forest species. It is environmentally friendly and natural choice. Only heat and steam are used in the manufacturing process, no chemicals or other additional constituents are applied in the process. The decreased equilibrium moisture content of the wood improves its stability, which in turn reduces the cracking

and flaking of the surface coating in changing environmental conditions. ThermoWood® waste can be handled as any other normal wood waste. In the end of its life cycle ThermoWood® can be burned for energy production or it can be taken to the waste dump.

## THE THERMOWOOD CONCEPT

The purpose of the ThermoWood® Concept is to solve problems that thermally modified timber meets as a new product in the wood product market. The concept consists of following functions:

- Patented wood modification process
- Registered trademark
- Audited quality control system including receiving and inspection of the quality of the raw material, process parameters of thermal modification process and quality control of wood after modification
- Life cycle assessment (LCA) which proves that ThermoWood® has potential of being very ecological building material when considering the production as well as the use and disposal at the end of the life cycle of the material.
- Certified raw material including requirements for forest management and use and chain of custody verification as well as the qualification criteria for external auditing.
- Standardization. Preparation of CEN standard for thermally modified timber is now in process.
- Continuous research and development activities.

“Development of the ThermoWood® Concept has been a part of the long term plan of the Finnish ThermoWood Association to enhance use of thermally modified timber. Now the concept creates the entirety that ensures the technical and ecological quality of products sold under the trademark ThermoWood®. All parts of the concept are essential,” emphasises Jukka Ala-Viikari. “The implementation of the concept has been successful. People both in big companies and SMEs have made it possible. Nowadays ThermoWood® is an established product in the market and the concept ensures that the product is safe choice for customers and end users. The future looks good for the products, the demand is growing rapidly alongside with the global interest. Value added of ThermoWood® is considerable,” says Jukka Ala-Viikari. “The development work is continuing and we are allocating resources to R&D activities annually.”





## LESSONS LEARNED

- Cooperation between research institutions and manufacturers vital.
- Public R&D financing important.
- The development of a new product is a long process and includes also failures.
- Targets must be ambitious but realistic.
- Cooperation between production, sales and R&D personality vital.
- Cooperation with customers vital.
- Partnership critical with different parties when beginning the production.
- The challenges and opportunities of IPR's must be taken into consideration right from the beginning.
- Audited quality control is a must.
- Product classification and standardisation is necessary.



## SUCCESSFUL ICELANDIC INNOVATION

MAREL FOOD SYSTEMS

# RETURN ON INNOVATION

Marel Food Systems supplies a complete range of processing equipment to all sectors of the food processing industry. The company innovates solutions for all food processors, which then directly and positively affect the quality and value of fish, meat, poultry, cheese and prepared food products around the world. The company consists of four main segments that are complementary to each other: Marel hf in Iceland, Carnitech A/S in Denmark, AEW Delford Systems Ltd in the UK and Scanvaegt International A/S in Denmark. Marel Food Systems is a leader in its field with subsidiaries in 22 countries. Most of the company's products are manufactured in Iceland, Denmark, and Slovakia with smaller production facilities in Singapore and Brazil. In addition, the company operates a network of 60 agents and distributors in about 40 countries that market, sell and service the company's products around the world. Over three-quarters of overall sales are achieved through subsidiaries.



**Number of employees:** 2000 in 15 countries

**Annual sales:** Approximately EUR 280 million

**Profit:** EUR 7.5 million (2006)

**Investment in R&D:** 7% of turnover

**Business areas:** Producers of processing equipment to all sectors of the food processing industry

Over 97% of the Group's revenues are derived outside Iceland

Marel shares are listed on the OMX Nordic Exchange

**Further information:** [www.marel.is](http://www.marel.is)



*Hördur Arnarson  
CEO of Marel*

## WINDOW OF OPPORTUNITY

Marel has a history that goes back to 1977 when two civil engineers at the University of Iceland began examining the possibility of developing and manufacturing scales for the effective control of production in fish processing plants. At this point in time the computer technology was reaching a level of becoming accessible for use in industry, yet there were no major indications that these initiators of Marel would succeed in their efforts. The external conditions were unfavorable, for example, capital and support systems were non-existent, but despite these obstacles they did not give up; instead they established a company in 1983 to realize their ideas. Hördur Arnarson is the CEO of Marel and has

Computer technology was reaching new levels

been working for Marel since 1985. He said the establishment of the company was unique in many ways, not least because this was the first time in Iceland that a high-tech company was especially founded on grounds of such ideas.

Unfavorable external conditions

“Certain windows of opportunity opened because of new technology that was becoming accessible. In fact, it was not possible to establish a company like this one five years earlier, however, the Science Department of the University of Iceland had very progressive personnel – major pioneers who decided during their student years to seize the opportunity when it materialized and established a company.” Hence, Marel derives from the academic environment at the same time as having solid links with industry – links that proved highly important for the company during its initial years. “The fish processing plants in Iceland were progressive, wanting to do new things,” said Hördur, emphasizing the importance of Marel’s home market. The freezing plants have furthermore given support to Marel because they felt this to be their social responsibility. “In the long run, such support certainly proved fruitful for the freezing plants in Iceland as they were the first to enjoy new and economical technology.”

Solid links to industry were highly important

## SALES IMPORTANT

Venture capital was not available in Icelandic trade during Marel’s initial years and there were no research funds; hence structuring the company was largely financed with the sale of Marel products. The CEO acknowledged that the company’s products were too highly priced; however, pointing out that this was necessary in order to finance the company. Hördur said it is actually quite interesting that the company survived its initial years for which there are a few reasons: “I think that primarily we succeeded because of the pioneers who were involved in the establishment of the company. Pioneers do not always

The pioneers did not see the problems



see the problems ahead - problems that others see. Also, the positive attitude of the customers in Iceland towards the company was extremely important. They believed in us and purchased our items - even though they were not always ready! They could even have broken the company had they read the sales contracts and compared them with the items delivered to them! The main thing to Marel, however, was that only two or three years after its establishment, namely quite early in the process, we succeeded in manufacturing our marine scale, which subsequently became our first cash-cow. It was in fact quite unique that we succeeded this early, because in the following five years this item proved very important and actually financed both the company's product development and expansion."

Marel's first cash-cow

## ENTERING NEW FIELDS

Notwithstanding the importance of the home market, the management of Marel realized that if the company were to grow and prosper larger markets had to be focused on. Hence, they launched exporting Marel products only one year after the company was established, or in 1984, which was deemed unheard of by many. "There was no experience in exporting high-tech items from Iceland and embarking on such a venture was actually crazier than the establishment of the company," said Hördur. Entering new markets and embracing new fields have been the main theme in the history of the company, constituting key factors in its success. Marel has steadily developed new knowledge and has left no stone unturned for expanding the company's activities.

New knowledge  
steadily developed

## COMPUTER VISION GIVES LEAD

Around 1990, Marel took yet another giant leap when the company decided to enter the poultry industry with the use of new technology, computer vision, which opened doors for Marel into this field. Marel was the first undertaking to utilize computer vision, which is based on connecting cameras to computers that process graphic information and on grounds of such information actually make decisions for the machinery. This was considered as revolutionary at this time and created a special position for Marel, as well as giving it a lead which the company used to foot itself in the meat market back in 1994. This facilitated Marel multiplying the market for the items manufactured by the company. "The scale economies are so important in this respect, i.e. being able to sell hundreds instead of tens of machines," emphasized Hördur. The entry into the new markets also provided the company with valuable information. "We learned various things both in the meat and poultry industries, which we could utilize and build on even more for the fishing industry."

Revolutionary  
computer vision  
opened new doors

## CONSTANT SEARCH FOR EXPANSION

Expanding the company was highly important

Growing and expanding puts everything to the test. Success following in the wake of growth should not be taken for granted. The CEO of Marel acknowledged that there were some in the company stating that perhaps it would be better to slow down and focus on the market the company knew well. This might have been the sensible thing to do; nevertheless, expanding the company was highly important. "The opportunity you have for entering a new market is only there for a limited period of time and if you don't seize the opportunity when it stares you in the eyes it disappears! You cannot say that you want to wait until the time suits you. You must be a bit of an opportunist and seize the opportunity when it materializes on the market. If you do not, the customers will go elsewhere and their needs will be met by others."

Opportunity to enter a new market is there only for a limited period of time

## LISTING AT THE STOCK EXCHANGE IMPORTANT

Marel's operating environment has changed dramatically from the company's first years of existence, not least through the increased liberalization in the Icelandic business environment and the structuring of a financial market in Iceland. The company's CEO is of the opinion that the listing of Marel at the stock exchange played an important role in its progress. "Having extensive access to capital, particularly in recent years, has facilitated Marel being in the lead in external growth."

## PUBLIC SUPPORT LIMITED BUT IMPORTANT

Research fund had a very positive impact on the company

No public grants for which undertakings could apply existed in Marel's first years of operation. The company's management therefore had to seek other ways to structure the company, whereas later on Marel sent in applications to research funds which had a very positive impact on the company and its product development. Marel received its first grants 5-6 years after its establishment. These were no major amounts compared to the operation of the company, yet they yielded good results. Marel received grants, for example, from the Nordic Industrial Development Fund to develop its computer vision technology, and from RANNÍS, the Icelandic Center for Research, and European grants, especially for R&D projects. "The grants certainly resulted in Marel placing more emphasis on product development than it would otherwise have done. Increased product development was justified because parts of it received grants. But, the amounts were not high, in fact very small compared to the operation of the company."



## IMPORTANCE OF R&D

Marel places major emphasis on research and development (R&D) and some 6-7% of the company's turnover is invested in innovation, which is above the average expenditure of competitors in the field. It is clear to Marel that such efforts certainly yield return, which is crystallized in the company's slogan, Return on Innovation. Marel furthermore strongly focuses on always being in good contact with its customers when developing new products. This has translated into one of the group's largest strengths, i.e. its capacity to respond quickly to emerging needs. The result is an 18% turnover ratio of new products on average.

Around 200 of the company's employees worked in product development during 2006, however, the company's R&D efforts apply to more factors than direct product development. Marel Food Systems employs a highly qualified-team of researchers and technicians whose primary task is to increase knowledge of new technologies, which strengthen the company technological base. This research work is an addition to product development, which continues to play a key role in the company's operations.

Marel Food Systems maintains strong connections with the scientific community by participating in international research projects, welcoming research guests, and by providing scientists with research facilities for special projects that are applicable to the company's operational fields. It also supports the teaching of science and mathematics.

Patent protection is vital to the Marel Food Systems, as its value and strong position are to a large degree built on technological innovation and employee experience. The company's investments are primarily embedded in the knowledge and expertise of its employees. For this reason, the company is very involved in protecting the proprietary rights of its product development activities. In 2006, Marel Food Systems applied for about 15 patents. On average, the company applies for five to ten patents yearly. Marel Food Systems has 20 registered trademarks on all of its main markets, and 62 patents in 20 countries.

Invest more in R&D than the competition

A highly qualified team of researchers and technicians

Strong connections to the scientific community

The company applies for five to ten patents yearly



## STABILITY IMPORTANT

Many changes have occurred during the 30 years since the founders of Marel were laying the groundwork at the University of Iceland for a new revolutionary undertaking. Parallel to these changes, major changes have also taken place in the Icelandic and international business arenas since 1985 when Hördur Arnarson started working at Marel. Looking back, what could have been done differently or better in his opinion? "The fluctuations in the Icelandic economy, particularly the fluctuations of the Icelandic currency, have concerned us greatly and frequently prevented growth. When the position of the Icelandic currency strengthens we clearly see the growth of the company slowing down for 2 to 3 years. Then, when the exchange rate changes again, the growth increases. Obviously the company has lost opportunities in recent years because of this, as we have had to slow down in terms of growth because of worse competitiveness. When the Icelandic currency strengthens by 20-30% the company is not as competitive in prices as the payroll becomes very high, but then again, even when the rate of the Icelandic currency is correct, undertakings are still paying very high wages in Iceland. Just to mention one factor, the currency should have been steadier towards our primary marketing areas."

## VERY EXCITING FUTURE

Opportunities for growth never as great

Annual growth 25% over 10 years

When the CEO of Marel was asked to look into the future and share his vision with us, he reiterated how the company's growth is his primary goal. "I am convinced that we have never seen as great opportunity for growth as today, even though we have certainly grown extensively over the last 10 years. The average growth has been about 26% per year and then we experienced 100% pro forma growth last year, which was by mainly external growth. The opportunity for growth has never been as great and the company's current capacity and financial strength enable the company to grow even more. We have clear goals in this respect. At the beginning of 2006 the annual turnover was EUR 300 million, and the objective was an annual turnover of EUR 400-500 million in the following three to five years. Most people regarded this as optimism after seeing about 25% annual growth for 10 years. They thought our goal was not realistic but then, when we purchased two companies last year where we doubled the turnover, we proved that we were dead serious! It is very likely that this goal will be realized sooner; moreover we have set the goal of EURO 1000 million before 2015. I firmly believe this will happen sooner – both by internal and external growth. The market where we operate is very attractive, in fact its total growth is 5.5% per year, which is a very fast growth (all sales of equipment and machinery in the food industry), however, the market where we are operating is growing by about 8-10% per year. We intend to grow faster than the market."





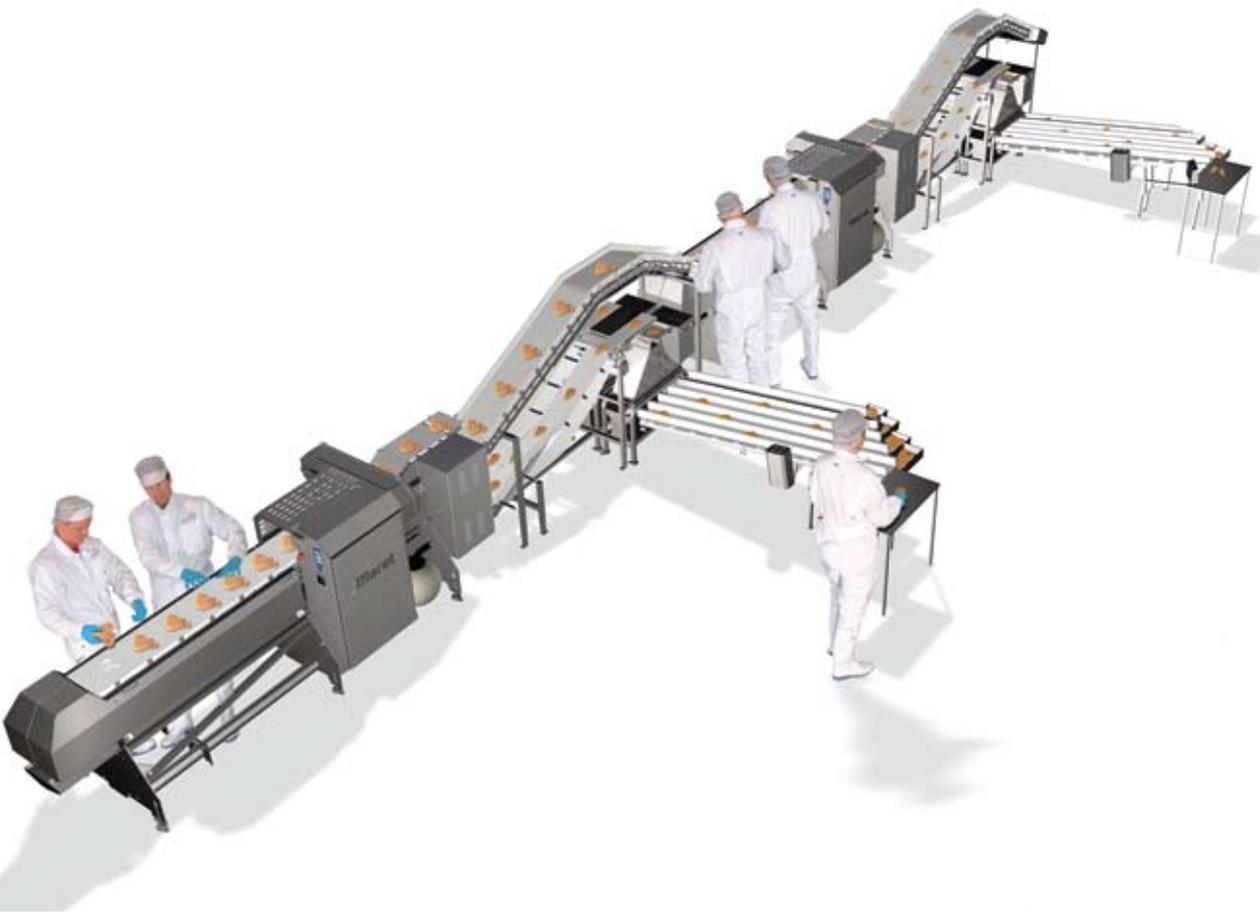
## SIMPLE IDEOLOGY – COUNTLESS OPPORTUNITIES

In actual fact, the vision and ideology of Marel's CEO is simple and clear: he foresees continued growth with the expected growth pains. "This is what we know and growing is a good thing. We say there are only two kinds of undertakings in the world – growing undertakings and dying undertakings. As soon as you stop growing you begin to perish, because there is always someone out there ready to seize the opportunities you allow to pass you by."

But, where are the opportunities? Has Marel's CEO the answer after decades of work in a high-tech company that was built from scratch in quite primitive conditions? "If there is something staring us in the eyes, it is the fact that the opportunities are literally countless. I do not think people generally realize what has happened, for example, in Iceland. Looking back to 1990, Marel had 30 employees in Iceland and we were then a flagship in Iceland. Today, we have 350-400 employees in Iceland, but some 2000 in the Group, yet we are only an average-sized company in Iceland. We have seen new and strong enterprises materializing, for example, Össur, CCP and Actavis with no home market. This proves that the opportunities are literally countless."

"I would like to point out something we must learn from, namely I firmly believe that it serves no purpose at all to centralize innovative activities. Had this been the case the aforementioned enterprises would not have been born. This is about having the right people ready at the right time. I find it essential that one realizes the great importance of timing. There are people all over the world getting the same ideas as you - the same ideas because of the technological changes and the new opportunities, because of changes in people's needs and pattern of consumption. The world is full of bright people who see the same opportunities as you; however, if the appropriate circumstances are not created and if education and know-how are not structured in the correct fields of expertise, we lose the opportunities. New opportunities will materialize, however, the ones we lose will never come back - never!"





## LESSONS LEARNED

- Innovation is not foreseeable – enterprises occur where least expected.
- Centralization of innovative work must be avoided. The authorities should focus on structuring solid education and know-how in the correct fields of expertise to enable pioneers seizing the opportunities when they materialize.
- R&D is highly important to new enterprises and the product must be marketed as soon as possible in order to generate revenues.
- Public grants can be considerably helpful – particularly in R&D – although the grants are relatively small.
- Enterprises must seek all ways to conquer new markets and to generate more income. Do not accept the current market share – that is the beginning of the end.
- People all over the world are getting the same ideas as you - be first to carry them out!



## SUCCESSFUL ICELANDIC INNOVATION

### BAKKAVÖR GROUP & KAUPTHING BANK CROSSING THE BORDERS

Bakkavör Group is a leading international food manufacturing company specializing in fresh prepared foods and produce. The Group operates around 50 factories in eight countries and the Group's headquarters are in Reykjavik, Iceland. Bakkavör Group was founded in 1986, employing only three people. During its 20-year history, the business has grown extensively, and today Bakkavör Group is the largest provider of fresh prepared foods and produce in the UK. Bakkavör Group makes over 4700 products in 17 product categories, which are developed and sold predominantly under its customers' own brands. In addition to the UK and Iceland, the Group also has business operations in France, Belgium, Spain, South Africa, China and the Czech Republic, and is well-positioned for further expansion.



**Number of employees:** 17000

**Turnover:** Pro-forma turnover in 2006 of over GBP 1.2 billion

**Profit:** GBP 113.9 million (2006)

The Group is listed on OMX Nordic Exchange in Iceland

**Further information:** [www.bakkavor.com](http://www.bakkavor.com)

Kaupthing Bank is currently the seventh largest bank in the Nordic region in terms of market capitalization. Through sound organic growth and strategic acquisitions like the UK Bank Singer & Friedlander in 2005 and FIH Erhvervs Bank in Denmark in 2004, Kaupthing Bank has fortified its position to provide outstanding services to its client base in the UK, the Nordic countries and elsewhere in Northern Europe.



**Number of employees:** 2719

**Total assets:** EUR 42.9 billion (as of 31 December 2006)

**Profit:** EUR 972 million in 2006

Kaupthing Bank is listed on OMX Nordic Exchange

**Further information:** [www.kaupthing.com/ir](http://www.kaupthing.com/ir)

## PROGRESSIVE ENTERPRISES

Unbelievable growth  
and expansion

Progressive pioneers

Bakkavör Group and Kaupthing Bank are among Iceland's most progressive enterprises. Their growth and expansion over the last few years is perhaps best described as being unbelievable, however, although they originate in different fields they have much in common. Both have their roots in a somewhat homogenous environment which had not changed over a long period of time, and both started as small units having to tackle various obstacles to begin with. Both companies had progressive pioneers and efficient personnel who had a clear vision of where they were heading. These were people who wanted to find new ways and to swim against the stream; people who wanted to find new horizons, even cross borders that initially seemed impossible to cross.

Additionally, both companies have succeeded in selecting partners that have strengthened their respective enterprises. The paths of Bakkavör and Kaupthing crossed back in 1998 at which point Kaupthing refinanced Bakkavör, supporting the company in entering new markets outside of Iceland. And today the founders of Bakkavör are among the largest shareholders of Kaupthing Bank. This is a story about successful collaborators who decided to do things their way!



*Ágúst Gudmundsson  
CEO of Bakkavör Group*

### BAKKAVÖR IS BORN

There are probably not many people who know the street Bakkavör at Seltjarnarnes, a small municipality that constitutes a part of the capital area in Iceland. This is the street where the two Gudmundsson brothers, Ágúst and Lýður, were raised. When they decided in 1986 to establish a company together with their father the logical thing was to name the company after the street that was their playground as young boys. The new company processed and exported roe from Iceland. "The roots of our company are in the fishing industry as most businesses in Iceland around and after 1990," said the CEO of Bakkavör Group, Ágúst Gudmundsson. He said the family trio, father and sons, had

a certain future vision that gradually developed and changed as the company grew and prospered. Bakkavör changed over relatively few years from being a small manufacturer of roe products in Iceland to being a large seafood company in a number of countries. The year 2000 represented a turning point for Bakkavör Group. The company was listed on the Icelandic Stock Exchange and announced that it would change its strategic focus from seafood to fresh prepared foods. The fresh prepared foods market was the most dynamic segment of the food industry and therefore represented an excellent growth opportunity. The final step in the transition was taken in 2003 when Bakkavör sold the seafood part of its operations.

Today the vision of the owners is global, namely the whole world is their market! Bakkavör Group is the UK's market leader in its key market areas of ready meals, pizzas, convenience salads and leafy salads and will continue to lead consolidation on the UK market. Furthermore, the Group places a specific emphasis on strengthening its position further outside the UK to secure the future growth of the business. Bakkavör Group, which has yielded profit since 1991, has always focused on product development and quality control, as well as constantly introducing new and better products on the market.

Clear global vision

## BROKE NEW GROUND

Building an enterprise from scratch and breaking new ground certainly requires much discipline, but also a considerable amount of courage and strength. What was the key to the company's steadily-growing success? CEO, Ágúst Gudmundsson, said Iceland's membership of the EEA Agreement and the generally favorable changes of the business environment in Iceland, including the tax environment, had a positive impact, however, if focusing only on the company and the corporate decisions, a number of things come to mind. First, is the essential fact that the company created a special situation for itself. "We implemented the strategy of selling our products ourselves, not through any sales organizations that were leading at this time, selling everything that came from the ocean, either through legally-protected monopoly or actual monopoly. Identifying the opportunity of controlling the whole supply chain was crucial for the company at the time." Ágúst also mentioned that a clear future vision was of course an essential factor in the company's success, as they always knew the next point of destination in the company's growth and development. He also emphasizes the importance of adopting an effective quality control system in the company at a very early stage.

Effective quality control system

## PRODUCT DEVELOPMENT ESSENTIAL

During the initial years of enterprises, focal points that seem fairly lightweight turn out to be essential factors regarding the future of the undertakings. In the case of Bakkavör, the emphasis on product development was highly important. "We received a few grants during 1989 to 1995 for special product-development projects. This was very encouraging for us and yielded several products that literally drove the company ahead. We also received a grant for recruiting an employee solely for product development. We hired the employee in 1992 and the grant covered about 50% of his salaries and enabled us to hire him full-time. There is absolutely no doubt that this grant, modest as it may have been, was very important for the then small company. In fact, this recruitment played an essential role in the company's growth potential, and I can without hesitation point this out as a principal factor in the structuring of Bakkavör."

## PERFECT RELATIONSHIP

The principle of yesterday no longer applied

Last but not least, Ágúst refers to the cooperation between Bakkavör and Kaupthing, which refinanced the operation of Bakkavör in 1998. "All enterprises in the fishing industry and Icelandic manufacturing companies were more or less financed through a complex loan system. Our company was 12 years old at this time, i.e. when Kaupthing enabled us to get out of a system that seemed to override everything in Iceland at the time."

For Bakkavör a new financing party meant new opportunities for the company. The principle of yesterday no longer applied – the path ahead was straight and wide. "They were ready to join the group of shareholders through increased share capital, refinancing the company at the same time as directly participating in the expansion projects, not only as advisors; instead as direct participants. This was in fact tailored to the needs of an Icelandic company that was expanding abroad. Kaupthing brought a new vision and fresh breezes into the Icelandic economy at this time, introducing concepts that had not even occurred to the other banks, and thus prepared real competition. There had been no competition in the Icelandic banking system, which was more or less owned by the Icelandic State," said Ágúst, pointing out that the management of Bakkavör decided to establish strong ties with Kaupthing and to invest in the bank which cleared the path for them. They do not regret this move today.



*Hreidar Már Sigurdsson  
CEO of Kaupthing Bank*

## KAUPTHING ARRIVES

Like Bakkavör Group, the history of Kaupthing is very interesting. The roots of Kaupthing Bank were conceived in 1982 at the dawn of the emergence of the free capital market in Iceland. Originally Kaupthing Ltd. was established as a small agency for financial advisory and securities brokerage. In 1994, Kaupthing Bank was a securities house with some 30 employees, struggling with bad finances. However, after the initial restrictions on the Icelandic financial markets were lifted, other legislation controlling financial activities in Iceland began to open up rapidly and encourage a more active market. Kaupthing was at the forefront of these changes, for example, was the first to offer managed funds,

Pioneering spirit  
a central force

one of the five founding partners in the Icelandic Stock Exchange and the first Icelandic financial institution to launch a company abroad. This pioneering spirit has remained a central force as the Bank continues to chart out new frontiers in the global financial markets.





The CEO of Bakkavör mentioned how Kaupthing provided Bakkavör with new opportunities in offering new and flexible financial services that perfectly suited the goals of Bakkavör. Hreidar Már Sigurdsson is the CEO of Kaupthing Bank, in fact employee number 27. He said the business model of Kaupthing is unique: "This manifests itself in two ways: as the bank provides capital, advice and equity, its employees develop a level of trust and partnership with its clients that is hard to find elsewhere. Consequently, clients are more likely to reward the bank with the full range of their personal and corporate business, creating synergies across its entire banking portfolio. The bank's passion is to build businesses. Kaupthing Bank has invested in its clients' success and has risked its own capital in assisting clients to expand into great international companies like Bakkavör Group, Össur, and Mosaic Group just to mention a few examples. Unlisted investments made by the Bank from now on will be held in a separate private equity fund, Kaupthing Capital Partners II."

Passion to build businesses

Hreidar admitted, however, that there is nothing new under the sun. "The success of Kaupthing Bank is the result of capable management, good thinking and a sound business model. It has all been done before and if one looks at the income structure and diversification of assets by geography, sector and activity, Kaupthing Bank's income profile is much more like progressive international banks than most other banks in the Nordic area."

A sound business model

## RIGHT PEOPLE PARAMOUNT

The world of banking is symbolized by figures and graphs, frequently illustrating a complex reality, however, behind such statistics are people who matter stated Hreidar Már. "In Kaupthing's operations it has become more and more apparent that getting and keeping the best people onboard and in the right positions is of paramount importance to the Bank. From the start of the company's internationalization, the focus has always been on employing highest skilled people to realize the new opportunities arising from liberalized capital markets and Iceland's entry into the European Economic Area. Employees of Kaupthing own a significant part of the bank and every employee is granted stock options. Through this, we align the interest of the shareholders and our people."

First to offer  
new products

Kaupthing soon earned its reputation in Iceland for being a step ahead in offering new products and bringing their customers the greatest value for their money.

## QUESTION OF BALANCE

Risk management  
a central feature

It should occur to no one that building a company at the international arena is an easy task. Management makes mistakes and comes across hindrances, however, the secret is for management to try to foresee them and do all in their power to avoid them. Kaupthing Bank's management is well aware of the risks. "Kaupthing Bank made risk management a central feature in the operation of the bank, not only to monitor and control all risks, but also to be central in the decision making and the income generation of the bank. The Risk Management Division used prudent banking principles along with proprietary research to minimize risk and advised Kaupthing Bank to mix market risk and credit risk in order to generate higher return on equity and a more reliable risk profile," said Hreidar Már.

The CEO of Bakkavör Group is equally as concerned with risk. He acknowledged that looking back there are millions of things he would have done differently. "We have made a lot of mistakes, however, this is a question of balance - there are more correct decisions than incorrect ones. This is first and foremost about being able to assess risk and never to take more risk than the company can tackle. Even though the company's management has big dreams, any risk-taking must be carefully considered and grounded."



## AIMING AT CONTINUED GROWTH

Even though it is fair to say that Bakkavör Group was established relatively a short time ago and also that the growth has been adventurous, the CEO is aiming at continued growth. "The company may be large by Icelandic standards; however, it is not particularly large in an international context. The food market is probably the largest industry to be in and we visualize continued growth. A great change in lifestyle has taken place in recent years which is influencing people's eating habits. We see that people are increasingly demanding healthy, convenient and interesting foods that are quick and easy to prepare. And they are ready to pay more for foods that meet these needs. This is where we come in - we are here to meet such demands," said Ágúst Gudmundsson.

The future vision of the CEO of Kaupthing Bank is equally as clear and to the point: "Kaupthing has focused in its area of operation on the group of customers and service that have yielded the best performance and returns. We will continue doing so," said Hreidar Már Sigurdsson.

### LESSONS LEARNED

- Take new paths and do not allow stagnated business environment determine how you run your business.
- Extensive focus on product development in the company's first years of existence may determine its growth opportunity in the future.
- Well defined public support to product development may be significant even though it is but small.
- Clear future vision is necessary and you must be prepared to develop and adjust it to new circumstances.
- Carefully choose your financing partner and turn to those with whom you can grow and prosper.
- Even though you start small, the entire world can become your market arena over a fairly short period of time.
- Risk-taking must be carefully considered and foreseeable.
- Broadminded and well educated employees are essential – employees who are prepared to cross borders and enter new fields of business.



## SUCCESSFUL NORWEGIAN INNOVATION

EMGS

### HIGH-TECH RACE TO THE BOTTOM

**EMGS' business is seabed logging (SBL) – an innovative survey technology, which has brought the oil and gas industry a completely new way of finding oil and gas. The technology can find offshore oil and gas reservoirs by sending electromagnetic energy into the rocks beneath the seabed. Unlike conventional seismic technology, the electromagnetic waves can differentiate between hydrocarbons (oil & gas) and water. The technology is reducing oil companies' risks and offers significant savings in the cost of exploration.**



the seabed logging company

**Number of employees:** 180 (of which 30+ Ph.Ds)

**Turnover:** EUR 110 million (2006)

**Profit:** EUR 10 million (2006)

**Investment in R&D:** 7% of turnover

**Business areas:** Sea bed logging

**Further information:** [www.emgs.com](http://www.emgs.com)

### PHENOMENAL GROWTH

EMGS is one of the many successful start-ups in the Norwegian oil & gas industry. The company has experienced phenomenal growth since its foundation four years ago. Revenues increased with 167% and passed 110 million euros in 2006. When EMGS was listed on the Oslo stock exchange in March 2007 it reached a marked capitalisation of one billion euro.

It all started in 1997 as an idea on the drawing board at Statoil's (the Norwegian oil & gas major) research center in Trondheim. The first patent application was filed in August 1998. After simulations and scientific peer review a full



*Terje Eidesmo*  
CEO of EMGS



field test took place in the Norwegian Sea. Then in February 2003 the company was established by Statoil. Statoil Innovation, the group's company for commercialising technology and expertise through new start-up companies, was the majority shareholder.

The technology as such was not new. But the entrepreneurs behind EMGS reinvented it by radically increasing the scale. This paved the way for brand new seismic results with large commercial potential. The fact that EMGS has assembled the largest computing network in Norway to process the data, gives a picture of the scale we are talking about.

EMGS assembled the largest computing network in Norway

Statoil invests every year in technology start-ups

Almost 1000 jobs have been created

## CORPORATE INCUBATOR FOR SPIN-OFFS

Statoil invests some 15-25 million euros every year in technology start-ups to help develop and commercialise good technical solutions. Almost like a venture fund it nurtures and holds interests worth roughly NOK 300 million euros in 40 companies. The company has also contributed to 150 different supplier development projects, and invests several millions annually in their supplier development programme. Almost 1000 jobs have been created since Statoil began working systematically with external technology commercialisation and development in the early 1990s. Statoil contributes specialist expertise and funds to help develop ideas. Entities in the group which would use them are always involved to ensure that these concepts meet a need. The Innovation unit pursues various approaches in bringing good practical applications. Statoil promotes good ideas from the groups own employees systematically and nurture potential spin-offs through this "corporate incubation" activity.

Large companies are crucial for the development of new start-up companies. Corporate incubation is a type of activity that addresses this specifically. Some corporate incubation programs focus on entrepreneurs from inside and others on entrepreneurs from outside their corporate realms, and some on both, like Statoil. Whether the corporations or their incubators operate venture funds, take equity stakes, license technology to or from client companies, or develop other kinds of strategic partnerships with client firms, the deals that are struck are as individual as the companies involved.



## PROMINENT EXAMPLES

In Norway this kind of corporate venture/incubation activity has become an important vehicle for overall business innovation performance. The most prominent examples, besides Statoil Innovation, are Norsk Hydro Technology Ventures, Telenor New Business, Sintef Sinvent and recently Aker Innovation. Dozens of large and medium sized Norwegian companies have their own entrepreneurship programs today, where new ideas that can support core business or expand business scope are fostered. This is a development that by no means is unique for Norwegian business. But the nature of the Norwegian business structure makes this type of innovation very important for the economy through its constant renewal "from within".

An important vehicle for overall business innovation performance

Constant renewal from within

## LESSONS LEARNED

- The case of EMGS illustrates the importance of being close to the customer in the innovation process: as a matter of fact the innovative company was part of its lead customer before it was spun off.
- Large companies corporate R&D can create new, non-core businesses with a massive value creation potential.
- Public innovation policy should target corporate incubation as much as university R&D and campus based incubators, as these corporate activities are very efficient innovation vehicles.

## SUCCESSFUL NORWEGIAN INNOVATION

REC

# GROWING THE POTENTIAL OF THE SUN



**REC**

In December 2006 the inhabitants of Herøya, an industrial community in the southern part of Norway, got a fantastic gift for Christmas.

Renewable Energy Corporation (REC) announced its 400 million euro investment in a new solar energy factory that will become the largest in the world, resulting in 220 new jobs.

**Number of employees:** 1400

**Turnover:** EUR 550 million (2006)

**Profit:** EUR 250 million (2006)

**Business areas:** Solar grade silicon (world's no.1), solar wafers (world's no.1) and solar cells

**Further information:** [www.recgroup.com](http://www.recgroup.com)

## DECADES OF RESEARCH



*Alf Bjørseth  
Entrepreneur behind REC*

It all started in 1994, based on decades of research and technological know-how from the two Norwegian industrial giants Norsk Hydro and Elkem. The first production unit was established in Glomfjord north of the Arctic Circle in 1997. In less than 10 years the company has grown from zero to almost one billion euros in turnover per year (forecast 2007) and 1400 employees on three continents.



## A SOLAR-POWERHOUSE

REC is a pioneer in a young industry and is today the world's largest producer of so called solar grade silicon, the essential raw material for production of solar cells. The company holds all rights to its proprietary production technology that boosts productivity compared to other existing techniques. REC's facilities are among the most automated plants in Europe.

The aim is to play a leading role and be a key contributor in shaping the future of the solar energy industry. The future looks bright as the potential for solar energy is virtually unlimited.

Should they succeed with their vision Norway will become a solar-powerhouse. Ironic to some, as the country has months of the year with absolute minimum of sunlight!

The world's largest producer of solar grade silicon

The most automated plants in Europe

Shaping the future of the solar energy industry

## CREATE SUPER PROFITS

What's behind REC's success? As with most technology-driven innovation the story goes like this: A specific resource with high technical potential but lack of purpose turns out to be important key to a new product for which there is a global mega-demand. On top of that, this specific resource turns out to be a very scarce one, boosting the price to ever higher levels. Innovation mission: develop proprietary technology to produce this resource, expand activity into to the whole value chain of solar power, create super profits and growth for years!



New ideas are developed further by local entrepreneurs

The REC-story illustrates some of the true strengths of the Norwegian innovation system. Technology and competence from 100 years of industrial development that is no longer core business for large industrial corporations often spin off new ideas that are developed further by local entrepreneurs. The key seems to be recombining different types of established knowledge into new knowledge that can be applied in an established industrial context. In the case of REC: new knowledge about old technology applied in an established industrial facility, building on production skills that have existed for decades.

The entrepreneur behind REC, Alf Bjørseth, says: "Instead of searching for measures to stop structural changes and conserve businesses and jobs without a real future, policymakers should focus on incentives to grow new business from the obsolete." Public R&D and innovation schemes that match private/corporate risk capital should be accessible for these kinds of start-ups. Schemes have to be designed in such a way that they provide predictable funding over at least 5 years, and allow the entrepreneurs to be in the driving seat.



## LESSONS LEARNED

- REC is a story about industrial renewal.
- It illustrates the fact that entrepreneurship based on established industrial science, technology and skills has a large potential. This potential is sometimes ignored by policymakers.
- Entrepreneurship is too often perceived as a man in the street with a brilliant idea that starts up with two empty hands. The real potential for value creation and competitiveness can however be found when innovation processes is focused on leveraging the commercial potential of existing intellectual capital.
- In the case of REC, the aluminium and materials industry experienced a phase of structural change in Norway. This paved the way for REC: two entrepreneurs, a couple of obsolete plants, technology and highly skilled people was the perfect foundation for a new future.



### AXIS COMMUNICATIONS

# THINK BIG FROM THE START

Axis Communications is a Sweden based IT-company founded at an university incubator in 1984. The company is based on an idea by two young entrepreneurs and founders who laid the foundation for the company culture promoting creativity and innovations. Some twenty years later the company has grown tremendously and is a world leader in network video solutions with a strong position in print servers. The company has been global from the start. Axis Communications has today offices in 18 countries and sales via partner cooperation in over 70 countries and 95 percent of the sales are abroad.



**Number of employees:** 504 (2007)

**Turnover:** EUR 130.4 million (2006)

**Profit:** EUR 23.9 million (2006)

**Investment in R&D:** 15% of turnover

**Business areas:** Network video products for systems communication, network cameras, video servers, application software and accessories and products for print server solutions

**Further information:** [www.axis.com](http://www.axis.com)

### THE HISTORY OF AXIS COMMUNICATIONS

Mikael Karlsson and Martin Gren both studied at the university when they started their first company. They then got the idea to build print servers and together with Keith Bloodworth they formed the Axis Communications of today. Mikael Karlsson was the visionary business administrator with a vision of thinking big and making sure that every employee could grow with the company. Martin Gren built the products and made sure they met with the customers as well as the distributors needs. Keith Bloodworth was the salesperson who had experience in international sales. He introduced the motto "the salesman is the customer's ambassador in the company". All three were heavily involved in the sales activities.



*Martin Gren*  
*One of the founders of AXIS*

The company was located at the incubator IDEON at the Lund University in the start-up phase and is still located in the area. It is surrounded by other global and world-leading high-tech companies, with the University within reach.

## GLOBAL MINDSET FROM THE BEGINNING

Axis had the ambition to be a global company from day one. "We were in the fortunate position of being able to choose our first customer. We decided to go for a pan-European distributor in order to be able to get an international kick-start," Martin Gren, one of the founders says.

Profitable during  
the first 15 years

Already in the second year Axis had more than a 50 percent export share and quite early Germany, but not Sweden, was treated as the home market. Axis Communications was internally funded in the early days and during the first 15 years Axis was always profitable. In the dot com days Axis invested a lot of money and time into mobile internet and the Bluetooth, as many other IT-companies did. Axis Communications was almost turned into bankruptcy and forced to the Stockholm Stock Exchange.

## OPEN MINDED PEOPLE

Axis has employed a great diversity of people from important future markets from the start. "We have today some twenty nationalities represented here in Lund. This deepens the understanding of our markets," says Martin Gren. The support functions for the European market are centralised to Lund, where people from all around the world work with their home markets. The company received an international Best Place to Work Award in the Category of Diversity in 2003.

Challenge to find  
open minded  
people with the  
right education

A stimulating working climate is important for the creative process and the whole company has been involved in the process of establishing the core values of the company. "In a company like ours you have to create a climate where it is okay to experiment, to test new ideas," Ray Mauritsson, President and CEO says. The atmosphere of the company is very casual and non-hierarchical. "It is a great challenge to find the right and open-minded people without prestige. We employ people that naturally become a member of a team."

## HEAVY INVESTORS IN RESEARCH AND DEVELOPMENT

Two thirds of the company's employees have a university degree. Axis Communications employs around forty new engineers a year and good contacts with the students is prioritized.

Axis offers students the opportunity to carry out their degree project work at the company. "This is a way to test wild ideas together with the students and to attract some of the students for a future career at Axis," Martin Gren says. Each year the Axis Award for the best dissertation in the network video area is handed out.

Axis Communications has worked actively in partnership with universities and colleges from day one and has longstanding relationships with research teams at several Swedish universities. The company is an active partner in The Competence Center for Circuit Design at Lund University, where research in the image processing area is carried out in cooperation between industry and academy.

Axis cooperation with Lund University on a research project on how the security surveillance industry will develop in the future, gives Axis Communications the opportunity to have an open and advanced discussion with other companies and at the same time learn more about the market. "We need to think ten years ahead in this area and hope to find new employees through the cooperation," Ray Mauritsson President and CEO, says.

Wild ideas are tested

Active partners with universities and research teams

## FIERCE COMPETITION

Almost fifteen percent of the turnover was invested in research and development in year 2006. Twenty new products for professional applications are launched yearly.

In five years there has been a significant strategic repositioning of the company, from print servers to network videos. Axis' video sales represented almost 30 percent of the total sales in year 2000, in 2005 the share was slightly over 80 percent.

Axis Communications has succeeded in changing and rebuilding the business based on new product offers on several occasions during the years. The company's first focus on IBM printer interfaces has been followed by network print servers, storage and now network video products.

Investment in R&D  
15% of turnover

Strategic  
repositioning





## GREAT POTENTIAL FOR GROWTH

Investment in  
new ideas  
secured growth

The technology shift from analogy to network video solutions is in its infancy and opens up a great potential for growth. The market for network video products is expected to grow with 40 percent over the next five years, which will lead to increasingly fierce competition. "If the company had not dared to invest in new areas such as network video, we would only have had ten percent of the sales of today," Ray Mauritsson says. "The ability to see the potential and invest in products new to the market has given us an important advantage."

Close cooperation  
with the customers

Close cooperation with the customers and a market focus has always been crucial to the company. Axis Communications is putting much effort into deepening the relations with its local and global partners. By educating the suppliers about the technical shift from analogy to network cameras Axis intends to keep the position in the lead.

You have to think big to survive on a fast growing market with fierce competition. "The overall goal is to maintain and further strengthen Axis position as the market leader supplier of network video products," Ray Mauritsson concludes.



## LESSONS LEARNED

- A team of people with complementary skills founded the company; a technician, a visionary organiser and a person with market-knowledge.
- The entrepreneurs and founders play a crucial role for the innovative climate of the company. Their informal and non hierarchic leadership together with a focus on the customers needs has shown to make out a good foundation.
- Axis Communication has chosen their first customer with care and cooperates closely with their customers in developing their products.
- The company has gone global from day one, the Swedish market being too small for its ambitions.
- The company invests heavily in R&D and makes significant use of new technology.
- Axis Communications collaborate closely with other actors on innovation. Cooperation with universities offers arenas for meeting with other companies as well as generating new ideas, knowledge and being a good basis for recruitments.
- To encourage new ideas, to be flexible and rebuild the business based on new product offers is important to stay in the market lead.
- The organisation is non-hierarchic and people cooperate closely across departments.

ORTIC AB

## SHOWER OF IDEAS



Ortic AB was founded in year 2000 in Borlänge, Sweden by Dr. Lars Ingvarsson. With a soap in his hand when taking a shower Dr. Lars got his best idea ever – he turned things around and hasn't regretted it ever since. His unique technique has made a whole new architecture in steel possible.

The founder's experience as a company leader and researcher gave the company a flying start and an interest in growing globally. One third of Ortics products are exported to the Nordic market, one third to Germany and one third to The United States.

**Number of employees:** 32

**Turnover:** EUR 5.4 million (2007)

**Profits:** Breakeven (2007)

**Investment in R&D:** 10% of turnover

**Business areas:** Ortic offers qualified competence and machines for rollforming of steel for customers with high demands on special design and performance

**Further information:** [www.ortic.se](http://www.ortic.se)

### THE INVENTION BEHIND ORTIC

In 2001 Ortic was contacted by BEMO in Germany who wanted to order an arched roofing in steel. When thinking about how to meet this request Ortic's founder Lars Ingvarsson made a unique invention which made it possible to produce tapered panels direct from coil in a roll forming machine. "When standing in the shower the soap slipped from out of my hands and all of a sudden I saw how – instead of letting the steel move within the machine – the machine should move around the steel," Lars Ingvarsson explains.

Lars won the prestigious Polhem Award by the Swedish Engineering Association and was awarded the Swedish Steel Honourable Mention for this innovative technique, which made a whole new architecture in steel possible. The technique was first used on the roof of Charlotte Airport, NC, USA. On the Budapest Arena a year later the roll-formed panels were curved in both directions. In year 2003 several Olympic Games Arenas in Athens were built by Ortic machines.



*Lars Ingvarsson  
Founder of ORTIC*

## A SPIN OFF FROM A MULTINATIONAL COMPANY

Dr. Lars Ingvarsson started his career as a researcher at the Royal Institute of Technology in Stockholm. He did research on residual stresses due to cold forming of steel, when he was contacted by Swedish Steel who wanted to develop their roll forming. Eventually Lars Ingvarsson became employed by Swedish Steel where he worked with their roll forming processes.

In the 1980ies Swedish Steel signed a joint-venture agreement with the English company Rollsec – a specialized manufacturer of roll forming machines since 25 years. As a result of this cooperation an unique CAD/CAE/CAM software for roll forming technology with the name Ortic was developed.

Swedish Steel was in a period of concentration and Lars Ingvarsson felt that the potential of roll forming was underestimated by the company. In 1984 the engineering company ORTIC AB was established as a subsidiary of Swedish Steel. In 1990 ORTIC left Swedish Steel and merged with AKV, a company specialized in coil slitting and winding. An investment company founded partly by Swedish Steel invested in the company. In year 2000 Dr. Lars Ingvarsson bought the roll forming part and restarted ORTIC AB. He had the customers and the competence. "I had no idea at that point in time that it would be that difficult to borrow the capital needed to get started," Lars Ingvarsson says. "A personal friend believed in the company and lent me the capital needed together with the State Agency Almi. Without them I would never have got started," Lars Ingvarsson emphasizes.

## IMPORTANT STEPS TOWARDS GROWTH

New vision

If it had not been that Lars and the director at AKV had very different views of the potential of roll forming, Lars would never had started a company of his own. At first his ambition was to start a small business. "But the Polhem Award and being mentioned in a Swedish Steel journal exposed Ortic to customers in the United States and elsewhere," Lars Ingvarsson says. Lars saw that the business was running and wanted to expand to meet the demands of the customers. Once again his network of friends and former industrialists made the vision possible. "The banks did not want to take the risk. Eventually it was the local bank in the small village of Kopparberg that dared to believe in me."

The turnover doubled in one year

Lars now started to see the potential of the company. In 2006 the former President of the big multinational automotive company SAAB Peter Augustsson became the president of Ortic. This opened many doors, both to the banks and to new customers. "The turnover doubled in one year by the simple fact that the bank raised the check credit from three to seven million Swedish Crowns when Peter joined us," Lars emphasizes.

Important business angels

Business angels have been very important to the growth of the company. "When we today want to expand I have been contacted by several persons wanting to invest in the company, who have read articles on Ortic. But when you let business angels in, than of course you have to be prepared to let go of the control of the company," Lars Ingvarsson says.

## COOPERATION WITH THE ACADEMY

Ortic invests ten percent of the company's turnover in research and development and cooperates with the regional University and a Swedish Research Institute. The company cooperates with big multinational car companies and researchers in a network at the Borlänge University. One of the employees at Ortic just recently received a Technical Licentiate degree. Ortic has invested 815 thousand EUR in a roll forming machine at the University, which is used in the University's education as well as by Ortic. Ortic also cooperates with the Swedish Research Institute IVF in product development.





## STUPID TO SELL GOOD TECHNIQUE ONLY ONCE

The goal is to double the turnover two times in two years, having made a shift from selling the machines that make the roll forming to produce new products and find new markets. "It is stupid to sell good technique only once," says Lars Ingvarsson. The next step is to sell safety components to the car industry and street lightning.

Success multiplied  
by ten

In five years Lars predicts that the company will have a turnover ten times that of today, with ten times more employees. Crucial in this process is to attract capital and the right people. "The challenge is to attract engineers to Borlänge. I have a vision to start an Ortic Academy to educate my employees and attract talents."

### LESSONS LEARNED

- The entrepreneurs technological and market knowledge and leadership-experience has given the company a flying start and an interest in growing.
- Ortic has from day one gone global.
- The first customer was chosen with care and Ortic cooperates closely with the customers in developing their products.
- Ortic invests heavily in R&D and cooperates with the local university in a network including other companies, which raises new ideas and knowledge.
- To attract money has taken much time and effort. Friends and industrialists willing to invest in Ortic has enabled the start-up and growth of the company. The public agency Almi contributed with some money in the early start-up phase.

## SUCCESSFUL SWEDISH INNOVATION

RADI MEDICAL SYSTEMS

# THE HEART OF INNOVATION



Radi Medical Systems was founded in 1988 by a team of four; an entrepreneur, an organiser, an engineer and a researcher. Today the company has 9 subsidiaries and representation in more than 40 countries worldwide. By heavy investments in research and development and in close cooperation with demanding and skilled customers Radi Medical Systems has developed its innovative product portfolio. The company's main products are sensors for measurement of pressure in the coronary arteries and products that stop bleeding after arterial puncture during catheter-based intervention.

**Number of employees:** 325 employees globally, whereof 150 at headquarters in Sweden

**Turnover:** EUR 46.9 million (2006)

**Profit:** EUR 2.6 million (2006)

**Investment in R&D:** 12% of turnover

**Business areas:** Radi Medical Systems develops, manufactures and markets medical devices in the field of interventional cardiology and radiology

**Further information:** [www.radi.se](http://www.radi.se)



*Dan Åkerfeldt*



*Johan Von Heijne*



*Thomas Engström*

## THE HISTORY OF RADI MEDICAL SYSTEMS

With the proceeds from the sales of an ergonomically designed sled for children a radiologist at Uppsala University Hospital, Kjell Bergström, and his colleague Håkan Jorulf started Radiplast AB in the 1970's. The company developed catheter kits for pediatric X-ray examinations. Eventually Kjell's daughter Ann and her boyfriend Thomas Engström, were involved in the business as students at Uppsala University.

There was a team of four that in 1988 started Radi Medical Systems. Thomas Engström, a lawyer and entrepreneur and Ann Engström, the organizer, teamed up with Dan Åkerfeldt, an engineer, and Lars Tenerz, a researcher at Uppsala University.

Thomas Engström brought with him the distribution of medical devices from RadiPlast into Radi Medical Systems, which financed the development of new products. Today Radi Medicals main products are sensors for measurement of pressure in the coronary arteries and products that stop bleeding after arterial puncture during catheter-based intervention.

## STRONG SELF-FINANCED GROWTH

Both Dan Åkerfeldt and Thomas Engström had started companies before and brought some money with them into Radi Medical Systems. "Building innovative companies requires a long-term mind-set," one of the founders and Vice President for Special Projects Dan Åkerfeldt, says. "Short-term minded risk capitalists and managing innovation is not always a good match, especially not in health care where it takes time to introduce new products." In the early stages the company received some financial support from the public authority Swedish Technology Board (STU) for development of two of their products. "The money from STU contributed to the decision to continue investing in both Bonopty® and PressureWire®, which found their markets as late as in the late 1990's," Dan Åkerfeldt says.

Though being a fast growing company, Radi has since the start grown organically and funds for reinvestments have been generated from its strong operating cash flow. The first product FemoStop has been a cash-cow all along. Sales have continued to grow at an average of 25 percent over the last five years. "An important experience was the tough days in the early 1990's when we were in the hands of the banks. Since then we have developed a financing strategy that allows us to decide over our future ourselves," Dan Åkerfeldt says.

A long term mind-set

It takes time to introduce new products

A cash-cow all along

Financing strategy developed



## EDUCATION AT THE HEART

An educational website developed

Half of the staff at Radi have a senior high school level, almost one third have a master degree from the university and two per cent of the employees have a Ph.D. Many of the employees at Radi Medical Systems have a clinical background and Radi's clinical and sales representatives participate in internal education built on theory and hands-on clinical practice. Radi Medical Systems works with physicians to promote the education of healthcare providers in cardiology. Radi also provides hospital staff with courses and workshops. The company has established an educational website to provide detailed information and educational material on the products and their clinical use.

"By helping out with training and education of hospital staff we achieve a mutual beneficial and close relationship with customers and are able to meet their needs," Executive Vice President & COO Johan von Heijne emphasizes. This enables Radi Medical systems to utilize the customers' experience for future development of new products.

## MANAGING INNOVATION

A portfolio of innovative products

R&D is carried out at Radi's plant in Uppsala. Investments in R&D amounted to 5.6 million EUR in 2006, representing twelve percent of the turnover. Radi's portfolio of innovative products contains self-made resorbable biomaterial and mechanical design of products and prototypes combined with advanced electronics and micro mechanics. The development work is carried out in collaboration with medical and technical experts at hospitals and universities worldwide. Teams of doctors from Stockholm, the Benelux and other countries are involved to discuss technical aspects of the development.

Radi Medical Systems cooperates in clinical studies with Universities in Sweden and Europe. The cooperation fosters idea generation and recruitment and gives access to complementary equipment. Radi Medical Systems also cooperates with research institutes on material development. A polymer laboratory has been set up at Radi Medical Systems involving analytic instrumentation and resorbable biomaterial.

The team is important

When developing new products Radi Medical Systems form teams of people with complementary skills on physics, software, electronics and material sciences, as well as with market, development and production knowledge. The projects are often driven by an entrepreneurial person with commercial knowledge, together with a "doer" and an "idea carrier". "We give a great deal of freedom in the laboratory demanding the team to continuously report how the work is proceeding," Dan Åkerfeldt says.





## CLOSE COOPERATION WITH CUSTOMERS AROUND THE WORLD

The close cooperation with customers in the different markets is crucial and it was an important step to lift sales from the distributors indoors. "This was decisive. Now we control the way our products are marketed and get a close contact with our customers around the world," Dan Åkerfeldt emphasizes.

Radi Medical Systems is expanding on the Asian market. When the Tsunami had caused great damage and injuries in 2004 Radi Medical System set up a Rescue Center in Thailand.

A journey to Japan arranged by the Swedish Export Council, where a meeting with the Japanese Emperor was arranged, facilitated the entry on the Japanese market. "Delegations arranged by the Swedish Export Council, with the Swedish king participating, have been extremely successful," Dan Åkerfeldt says.

The development of new products starts in the market. The marketing & sales team make five-year plans based on customers' demands. "One of our big challenges is to draw the right conclusions from our close contact with the customers and define their exact needs. The development of the products is easy in comparison," Dan Åkerfeldt says.

Swedish health care has a reputation of being in the technical forefront. "It is of major importance to us that Sweden does not lag behind in this area. The close contact with demanding and skilled customers is crucial to us," Johan von Heijne says.

Expanding in the  
Asian market

Swedish healthcare in  
the technical forefront

## LESSONS LEARNED

- A team involving complementary competence, an entrepreneur, an engineer, an organiser and a researcher, founded the company.
- Radi Medical Systems cooperates closely with the academy. The company invests heavily in R&D and makes significant use of new technology and design.
- A minor amount of public capital in the early phase of the company facilitated long-term investment in the very early product stages of successful products.
- The development work is carried out in close collaboration with medical and technical experts at hospitals and universities worldwide.
- The organisation is non-hierarchic and people cooperate closely on innovation across departments.
- The employees take part in continuous education and much effort is put into the employees well-being.











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