

Experience with Innovation Checks: A Case Study with 46 Companies in Denmark

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Abstract

During a two year period DELTA has performed 46 Innovation Checks in Small and Medium-sized Enterprises (SME) with great success. In addition to reported benefits experienced by the companies, the Innovation Checks have given us extensive knowledge of the companies' difficulties in having success with innovation in relation to the following 5 topics: Product, Processes, Production, eBusiness (use of IT for business proposes), and Marketing.

This paper presents the method behind the Innovation Checks and conclusions reached from this important project carried out in cooperation with DI (the Confederation of Danish Industry).

The main conclusions are:

- Companies don't have the necessary time to invest in innovation
- Companies lack a business strategy that includes innovation
- Without the time and focus, innovation will be ad-hoc rather than a mastered discipline
- An Innovation Check does help companies with innovation here and now, but without a mastered innovation process it is likely to become a one-off event.

This paper presents our experience from data and observations collected during the Innovation Checks. As the population is fairly small (46 companies) the results are to be taken as observations and guidelines rather than scientific facts.

Keywords

Maturity, product innovation, process innovation, production innovation, marketing innovation, eBusiness innovation, SME.

1 Introduction

The Danish Employers' Association (Provsindustriens Arbejdsgiverforening (PA)) with more than 800 company members expressed a wish to support their members to become more innovative and competitive. Thus, they decided to invite their members to apply for an Innovation Check, 50 checks in total sponsored by PA. ITEK (the Danish ICT and electronics federation for it, telecommunications, electronics and communication enterprises under DI) and DELTA were assigned to develop and implement the Innovation Check concept. The project name is Intelligent Steel, which signalizes the introduction of innovative, intelligent products within the steel and metal industry.

The overall goal is to encourage the member companies to focus more on innovation and become more competitive through innovation, and the success criteria are:

- All companies will report new ideas for innovation activities
- More than half of the companies will initiate one ore more new innovation activities based on the Innovation Check.

The project was launched in February 2005 until November 2007. During that period, 52 companies applied for an Innovation Check and actually 46 Innovation Checks have been completed. This paper is based on data input from the 46 Innovation Checks.

The participating 46 companies represent a very heterogeneous group with a number of employees ranging from 13 to 1000. Their line of business varies significantly: road signs and control panels, beverage dispensers (e.g. for draught beer), greenhouses, steel and metal work, diesel engines for boats, pumps, transport and logistics, cranes etc.

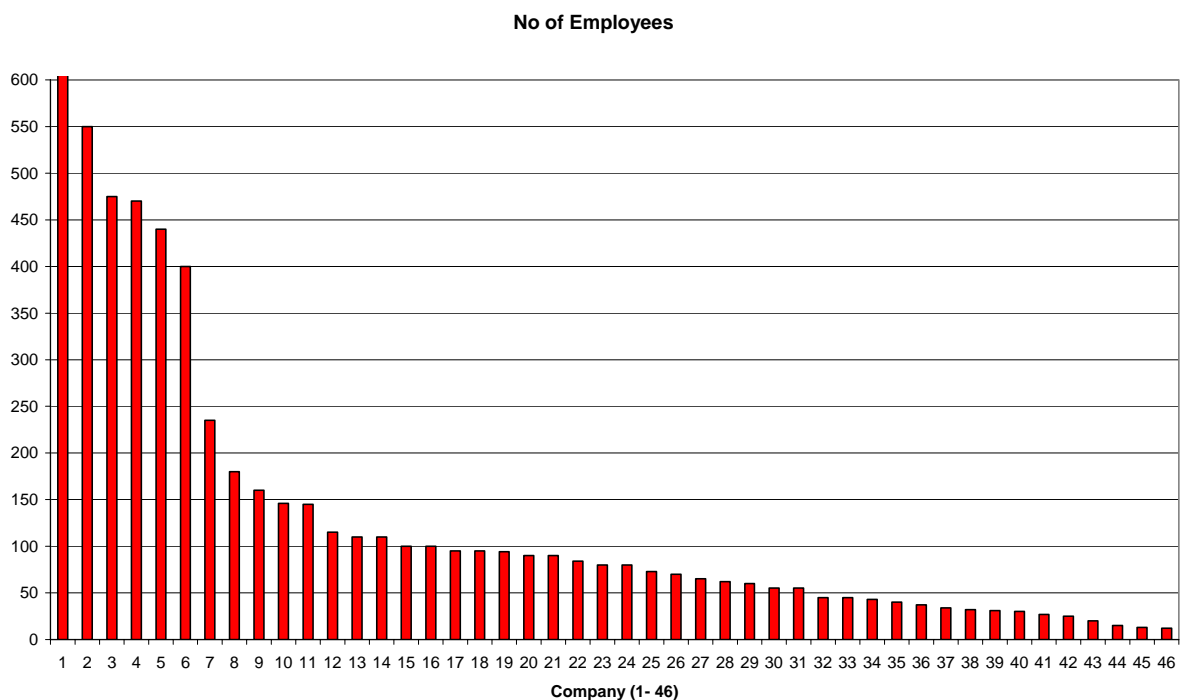


Fig. 1 - The distribution of employees in the 46 companies

2 The Innovation Check concept

When designing the Innovation Check concept it was important to:

- Provide the participants with a positive and beneficial experience
- Involve senior management at the highest organizational level in the company
- Involve the right competences, external as well as internal.

The data collection during the Innovation Check was a great opportunity to conclude on the effect and to improve the concept in becoming a standard SME service for the future.

We have developed a 3 phase model which will be presented below.

2.1 Phase 1 – Identification of ideas for innovation

The Innovation Check starts with a kick-off meeting in order to inspire the company to focus on potential and relevant areas for innovation, whether product, process, production, eBusiness or marketing innovation. The first meeting that takes between 5 and 8 hours and involves the top management and selected key employees of the company, is a mix between interview and discussion of the company's actual conditions.

All five innovation topics are covered by external senior experts, who also attend the meeting:

- A product and production innovation expert from DELTA (actually the CEO)
- A process and process innovation expert from DELTA Axiom
- A business and marketing innovation expert from DI

An additional benefit from these meetings was the presence of DELTA's CEO. The implementation of any changes usually needs the support and sponsorship of the CEO – therefore the CEO has to be present. However, CEO's are often very busy and reluctant to spend an entire day on a meeting, especially if they consider it a nice offer rather than a necessity. If DELTA's CEO could invest a full day it was easier to convince the companies to turn up with their strongest team as well.

The meeting will be followed by a written 20 page report including approx. 30 new ideas for innovation. The final topic on the agenda is to select two ideas for further processing during Phase 2.

2.2 Phase 2 – One or two days expert assistance

The processing of the selected ideas usually requires expert assistance to provide sufficient knowledge of e.g. new technology, project competence, maturity, user driven innovation, eBusiness solutions, before any decisions can be made. During Phase 2, one or more experts arrange a meeting with the company and setup a proper agenda and timeframe. The idea is not to implement a solution (which can't be done in such a short timeframe anyway), but to provide more information about the selected issues in order to be able to make better decisions. The experts were typically experts in application, process, business or development from DI, DELTA and their network. It was not that important to promote DI and DELTA as it was to promote our knowledge of how to find any expert within our network. Normally, the Development Manager and key employees participated in these meetings, the top management as well when relevant.

Depending on the selected ideas, a one or two day programme was designed with various activities e.g. seminars or workshops with topics such as innovation methods and techniques, project management, sensor technology, selecting the right microchip design solution, wireless technology, eProducts (i.e. putting products on the Internet), marketing, maturity and process improvement, light maturity assessment, intranet demonstration, *ImprovAbility*TM [1], and LEGO Serious Play [2].

During Phase 3 the existing report was added with another chapter concerning achieved results, knowledge and experience.

2.3 Phase 3 – follow up and closing the Innovation Check

The idea of this phase is to support the companies with an “external pressure” urging them to continue their innovative initiatives, to present the report and to close the innovation check with a follow-up on the entire sequence of activities.

This meeting lasts for approx. two hours with the CEO and employees involved as well as one representative from DELTA.

A questionnaire with both quantitative and qualitative data is completed in an interview form. These data form the basis for this paper.

3 Example Cases

Company A is a manufacturer of sewer cleaning equipment e.g. slurry pump vehicles. The company is family owned and established in 1915. The number of employees is 115 and they export to 28 countries with an export rate of 77%. They consider themselves a market leader.

The Innovation Check came up with the idea of adding a number of sensors, using GPS technology and putting the slurry pump vehicle on the Internet. The sensors are used to measure e.g. toxic content and send data to a database with information on time and place. Thus, the company has been transformed from a sewer cleaning equipment manufacturer into a complete environmental service provider. The GPS provided a tool for better route planning allowing the customer to measure the driven route.

Adding new measurements to the existing PLC provided the possibility to see number of revolutions and running hours for the high pressure pump and the vacuum pump in order to benchmark vehicles and optimize usage. Finally the system introduced the possibility of transmitting time sheets to the ERP system at the office.

Company B develops and produces robot based systems for e.g. welding machines to garages, light industry and all-round welding machines. The company is established in 1970, has 40 employees and an export rate of 65%.

The innovation check came up with the idea of using wireless communication technology to monitor the robot and welding machines. Data from the automated welding process are transmitted to a hand-held PDA via the wireless internet. If a process measurement exceeds preset limits, or the process is running out of material etc., the operator automatically receives an alarm on his PDA.

4 Results

Phase 3 includes interviews with the management about general business information relevant for

innovation; e.g. turnover, number of employees and percentage of export and process focus. Based on the data material we will present some interesting findings below:

Table 1: Process focus versus innovation and export.

Number of employees	Data	Existence of process focus			
		Low	Medium	High	Grand Total
Medium (> 50)	Importance of innovative products	2,00	2,20	2,64	2,32
	Development cost in % of turnover	1,7%	3,1%	5,0%	3,6%
	Number of new products with innovative elements	1,60	1,93	2,40	2,03
	Average of Export in %	49%	76%	68%	69%
Small (< 50)	Importance of innovative products	2,00	2,11	2,67	2,20
	Development cost in % of turnover	5,2%	2,6%	7,0%	4,1%
	Number of new products with innovative elements	1,67	2,00	2,67	2,07
	Average of Export in %	27%	41%	66%	43%

Importance of innovative products: Unimportant: 0, Less Important: 1, Important: 2 and crucial: 3

Number of new products with innovative elements: <10%: 1; 10%-25%: 2; 25%-50%: 3; >50%: 4

Table 1 illustrates the correlation of innovation activities and export to process focus in the organization. Some comments on the data:

1. Regardless of company size, the existence of process focus increases with the importance of making innovative products. In other words, there seems to be a good correlation between focus on innovation and process – innovative companies also have focus on processes. The number of new products with innovative elements also increases with the existence of process focus.
2. Small companies spend a higher percentage of their turnover on development than larger companies. This seems fair, since development costs represent an invariable element and turnover is increasing with company size.
3. Small companies with little focus on processes are likely to be local actors with only limited export.

Table 2: Innovation importance versus process focus, innovation and export
(Note: small limit 50 employees)

Number of Employees		Importance of being innovative			
		Less important	Important	Crucial	Grand Total
Medium (> 50)	Process focus	1,50	2,23	2,36	2,19
	Number of new products with innovative elements	1,25	1,82	2,43	2,03
	Average of Export in %	74%	75%	61%	69%
Small (< 50)	Process focus	1,50	2,00	2,20	2,00
	Number of new products with innovative elements	1,00	2,13	2,40	2,07
	Average of Export in %	2%	48%	53%	43%

Process focus: Low 1; Middle 2; High 3

Number of new products with innovative elements: <10%: 1; 10%-25%: 2; 25%-50%: 3; >50%: 4

Table 3: Innovation importance versus process focus, innovation and export
(Note: small limit 100 employees)

Number of Employees		Importance of being innovative			
		Less important	Important	Crucial	Grand Total
Medium (> 100)	Process focus	2,00	2,50	2,71	2,57
	Number of new products with innovative elements	1,00	2,00	3,00	2,46
	Average of Export in %	75%	84%	65%	74%
Small (< 100)	Process focus	1,40	2,00	2,08	1,94
	Number of new products with innovative elements	1,20	1,93	2,08	1,87
	Average of Export in %	45%	57%	56%	55%

Process focus: Low 1; Middle 2; High 3

Number of new products with innovative elements: <10%: 1; 10%-25%: 2; 25%-50%: 3; >50%: 4

It appears from Table 2 and 3, which are basically the same apart from different limits in company size, that:

1. Small companies (< 100 employees) have less process focus in average (1.94) compared to larger companies (2.57). If small companies have less than 50 employees, process focus is less evident. This leads to the conclusion that process focus becomes interesting when companies reach approx. 100 employees. The exact number is not derived from our material due to the fact that the number of companies is quite small and the group is very heterogeneous.
2. Process focus increases with the importance of being innovative regardless of company size. The question is, however, what comes first: Are process focused companies more innovative or do innovative companies have to focus on process to be innovative. Or is it a combination?
3. Small companies have a lower export rate than larger companies. Being on the export market is very demanding, but there is a tendency towards small and more innovative companies having more success with export. Looking at the two tables, it seems as if the very small companies with very little focus on innovation will not succeed with export (only 2%). These data are only based on 2 companies, which is why conclusions cannot be drawn without more data.
4. Fortunately, there seems to be a good relation between companies saying that innovation is important and the number of products with innovative elements they develop.

We have not been able to see any correlation between innovation and turnover, profit and profit margin nor have we seen any correlation between process focus and turnover, profit and profit margin.

Some answers to the qualitative part of the phase 3 interview are found below.

Question 1: What is most important to focus on when innovation is the goal?	
Top 10	Percentage
Employees (competences and involvement in innovation)	57%
Product development (increase investment and improve)	50%
Production technology (increase investment and improve)	46%
Customers (involvement in innovation)	26%
Partners and suppliers (involvement in innovation)	22%
Management (involvement in innovation)	22%
Finance (internal financing and new external funding possibilities)	13%
Market and marketing (possibilities)	9%
Product technology (investment in new technology for new products/solutions)	4%
Logistic (increase and improve)	4%

Table 4: Percentage of companies (management) addressing the topic as an important focus for innovation (text in brackets represents the authors' interpretation of the addressed topic).

Observation 1: Employees, development and production are essential

Management ranges employee's competences and involvement, product development and production technology as the most important focus for innovation. It seems natural because these are the basics for running a company – effective development and production of products executed by competent employees. **But** it is a bit of a puzzle why topics as business development and strategy are not mentioned at all, perhaps because the companies are not used to work with these?

Observation 2: Involvement of external and internal relations is important

It is a fact that involvement of people and competences both internal (employees and management) and external (customers, partners and suppliers) is important. External experts e.g. designers, business consultants and other consultants, however, are not considered necessary for innovation. Companies seem to believe that they have all competences they need internally or in their closest network.

Observation 3: Market and financing are not important issues

Surprisingly it seems as if the companies don't consider knowledge of the market as an important topic for innovation. Some markets are conservative and develop slowly, which makes the companies consider their knowledge of the market to be sufficient. It is worrying that knowledge of a market is not considered important for innovation. Companies do find their customers important for innovation, i.e. they can make innovative solutions for the specific customer. It seems more complicated, however, to innovate for the broader market. Finance does not seem to be a big issue.

Observation 4: New technology is not an innovation driver at all

New technology has never been as multifarious as it is today. Every day brings several new technological solutions, however management does not see this as a focus area for their innovation and in use for new innovative products. In this study, new technology is really the last topic companies think of.

Question 2: What is important for establishing an innovative environment?	
Top 10	Percentage
Management commitment (use time and resources on innovation)	57%
Creative employees (able to find solutions)	41%
Interdisciplinary collaboration (across professions and departments)	33%
Open about problems (we can learn and innovate from problems in general)	28%
To have time and resources (which is a problem in day-to-day work)	20%
Collaboration with customers (solutions to their problems = innovation)	17%
Knowledge and knowledge sharing (Interdisciplinary)	15%
Other (such as culture, readiness for change, economy and facilities)	13%
A reward (new solutions or ideas will release a reward)	7%
Confidence (in general)	4%

Table 5: Percentage of companies' (management's) addressing the topic as important for the establishment of an innovative environment (text in brackets represents the authors' interpretation of the addressed topic).

Observation 5: Management commitment is essential

It is important and positive to notice that management acknowledges the importance of their commitment to fund and support an innovative environment and culture in the company. They know they are responsible and without their support, attention and involvement innovation will not have a chance.

Observation 6: Collaboration, creativity, knowledge sharing, time and resources are important

Interdisciplinary collaboration between creative employees and knowledge sharing are identified as important. This sounds logical, but it does not fit well with the lack of time and resources having the most restrictive influence on innovation (from question 4).

Observation 7: Rewards are not considered important

Management does not consider it important to reward employees when they provide new and innovative ideas. We cannot see if the employees agree or would consider a reward as an argument to put forward more innovative ideas, since only the management group has answered this question.

Question 3: Where do new innovative products, solutions and ideas come from?	
Top 5	Percentage
Customers (initiated by collaboration or solution to their problems)	91%
Employees (initiated by solution to problems – products or customer problems)	74%
Partners and suppliers (initiated by collaboration or solution to problems)	28%
Competitors (ideas from their products)	24%
Other (e.g. from management, market, authorities or salespersons)	22%

Table 6: Percentage of companies' (management's) answers to where the innovative products, solutions and ideas come from (text in brackets represents the authors' interpretation of the addressed topic).

Observation 8: Customers and employees are the source to new innovative products

Customers and employees are acknowledged as the most important sources for new innovative products, solutions and ideas. Ideas from partners, suppliers, competitors and management are considered equally but less important. The reason why might be that innovation is seen more as a solution to problems than a strategic basis for the future of the company.

Question 4: What are the most restrictive influences on innovation?	
Top 9	Percentage
Lack of time and resources (daily work and daily problems prevent innovation)	39%
Lack of qualified employees (no one to hire)	28%
Lack of knowledge of market and technology (weak basis for decisions)	22%
High costs and lack of capital (lack of capital for investment)	17%
Market resistance (market does need the product)	17%
Uncertainty about investment (risk in relation to investment in new products)	15%
Other (such as wrong or missing strategy, product complexity, politics and taxes)	11%
Internal resistance (new requirements, new tasks and maybe change of job)	9%
Risk (in general)	7%

Table 7: Percentage of companies' (management's) addressing the topic as the most restrictive on innovation (text in brackets represent the authors' interpretation of the addressed topic).

Observation 9: Lack of time and resources block the way for innovation

Lack of time and resources are the most frequently mentioned reasons for lack of innovation effort in the companies. A well-known scenario is that the daily work (e.g. upcoming problems) takes all spare time allocated for innovation because fire extinguishing is considered most important – the dilemma being what is urgent and what is important. “If only we had enough time and resources (creative and fiery souls), then we would have the time to be really innovative”.

Observation 10: It is difficult to pinpoint the most restrictive influences on innovation

These questions are answered less strikingly than the other ones. The answers are scattered and it is difficult to generalize, perhaps because innovation is not in focus and management therefore has not reflected sufficiently on the reason why innovation is limited.

Observation 11: Risk is secondary – lack of basis for decision making is primary

Risk both in relation to investment and to other type of risks (success with development, use of technology, market resistance) is well acknowledged. But is this the main reason for mentioning risk as a restrictive influence on innovation? The risks could be derived from a more considerable risk – lack of basis for decision making in relation to innovation investment.

Observation 12: Outsourcing / Insourcing is missing

Many companies talk about outsourcing (and some also about insourcing) during the Innovation Check. The companies did have some good, but mostly bad experiences with outsourcing. However, data show that no company sees outsourcing as part of innovation. Strangely enough, outsourcing is often regarded as an innovative way of improving business (production, subsuppliers and even development), but not in this context.

The sourcing problems have led to a new 3 year project "SourceIT", where Roskilde University (RUC) and DELTA together with three companies will carry out research into companies' ability to innovate in a context with optimal outsourcing.

5 Conclusion and Discussion

It seems obvious that management typically is very open and favourable to innovation, especially if innovation is related to solving problems and improving existing products. When it comes to new products, it seems easier to fit them into the existing product range rather than to try to expand business with new and innovative products.

Many companies seem to lack a business strategy that includes innovation. The excuse for lack of innovation is lack of time and resources with the right competences, lack of knowledge of market and technology as well as high costs. The real problem, however, seems to be the lack of a business strategy that includes innovation.

Being present on conservative and/or slowly developing markets may lead the companies to rely on employees getting a good idea or on customers requesting solutions that require innovative thinking as the primary sources of innovation. Developing innovative new products based on market knowledge, market needs and new technology, which can introduce new business areas such as services, seems more difficult. In most companies the presence of innovation as a systematic discipline including market needs and technology opportunities for developing new businesses is non-existing.

A questionnaire was sent to all participating companies upon completion of the Innovation Check. The result of this survey shows that

- 82% of the companies have benefited from the Innovation Check
- 86% have got new ideas
- 73% have initiated one or more of the recommended innovative initiatives.

Comparing this to the project goals makes the Innovation Check a very successful project. However, it is unlikely that the companies will participate, if they have to pay for the Innovation Check themselves. The Innovation Check has helped, but only this time. Without a business strategy that includes innovation and a mastered innovation process, we doubt that innovation in these kinds of businesses will ever be more than incremental and occasional.

6 References

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Author CVs

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Jørn Johansen is Manager of the DELTA Axiom department at DELTA. He has an M.Sc.E.E. from Ålborg University and more than 28 years experience in IT. He has worked in a Danish company with embedded and application software as a Developer and Project Manager for 15 years. Mr. Johansen has been involved in all aspects of software development: specification, analysis, design, coding, and quality assurance. Furthermore he has been involved in the company's implementation of an ISO 9001 Quality System and was educated to and functioned as Internal Auditor.

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