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STUDY

TOOLS & METHODS OF PRODUCT DEVELOPMENT[(I)]

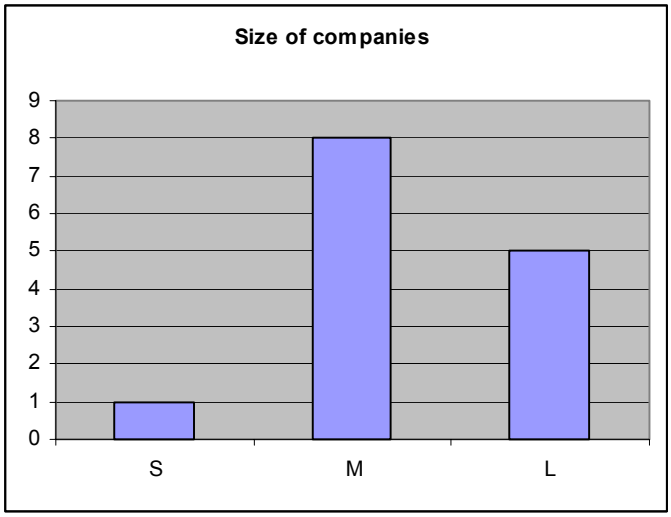
(IDEA GENERATION)

Innovation Management

ESTONIA

The following report gives an overview about experiences of Estonian companies with tools and methods of product development (innovation management), needs and restrains concerning the use of such tools and methods and a short description of environmental problems which the companies are facing.

The survey was carried out in November/December 2004. The summary is based on 16 filled in questionnaires from 15 companies. The biggest number of companies interested in tools and methods of product development from Estonia is from food **industry** – seven companies. It is followed by three companies from plastics and two from furniture industry. Also assembling, electronics and metal industry are present. Most of the companies, 57% are medium sized with 51-250 employees. 36% of the interested companies are large, and only one is small.



The largest number of companies is young, 0-10 years, 43%. It is followed by really old companies of more than 50 years, 36%. The smallest number, only 3, are in the age of 11-50.

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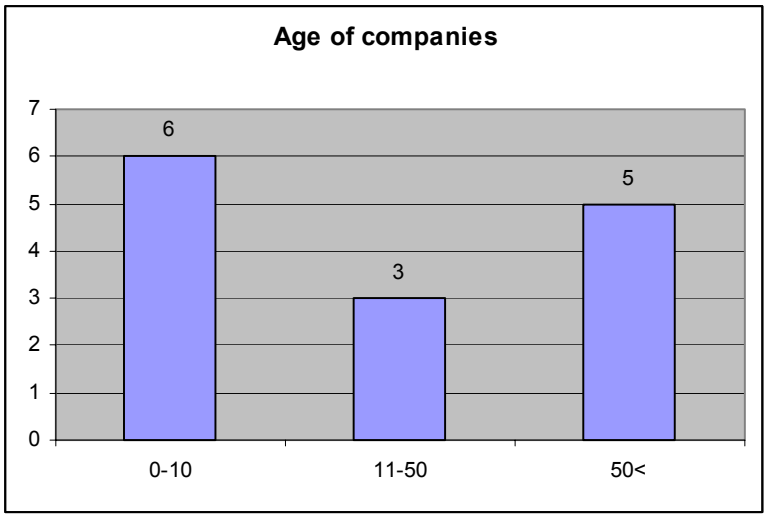
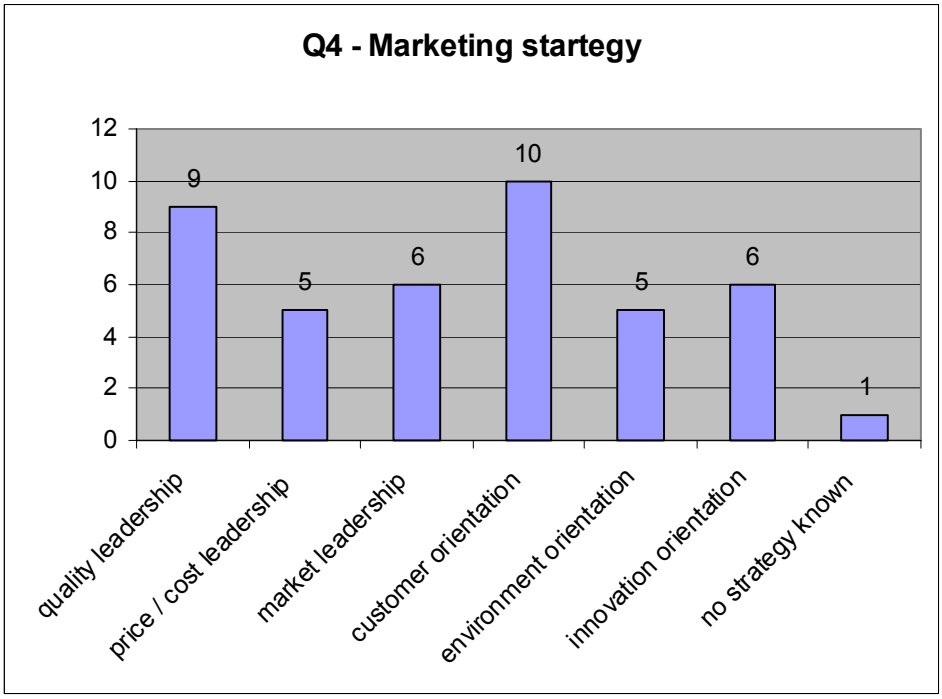


Estonian companies in the survey use mostly customer orientation **strategy** (10 out of 14) and quality leadership (9 out of 10) for success in the market. A large number, 43% of companies, claim to use most of the listed strategies, 4 or more of them. Three out of 14 use all strategies. The same proportion, 43% of companies still use one of the listed strategies.
Several production companies have acknowledge that customer orientation means quality. Innovation is the basis for long term development and here is the shortage of action till now. A lot, for example in metal and food industry, is done by copy-paste method.



Product development

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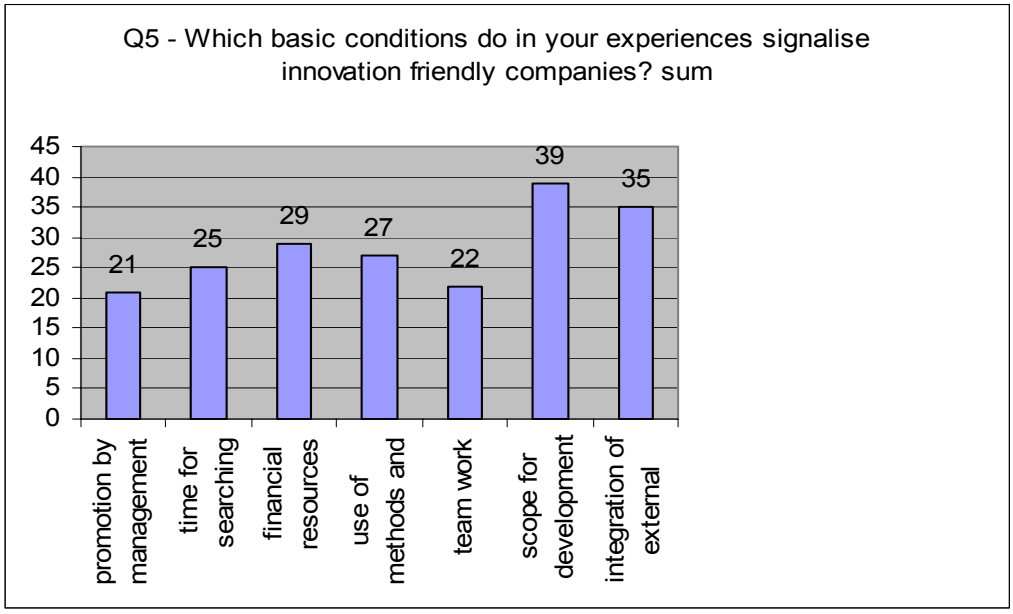
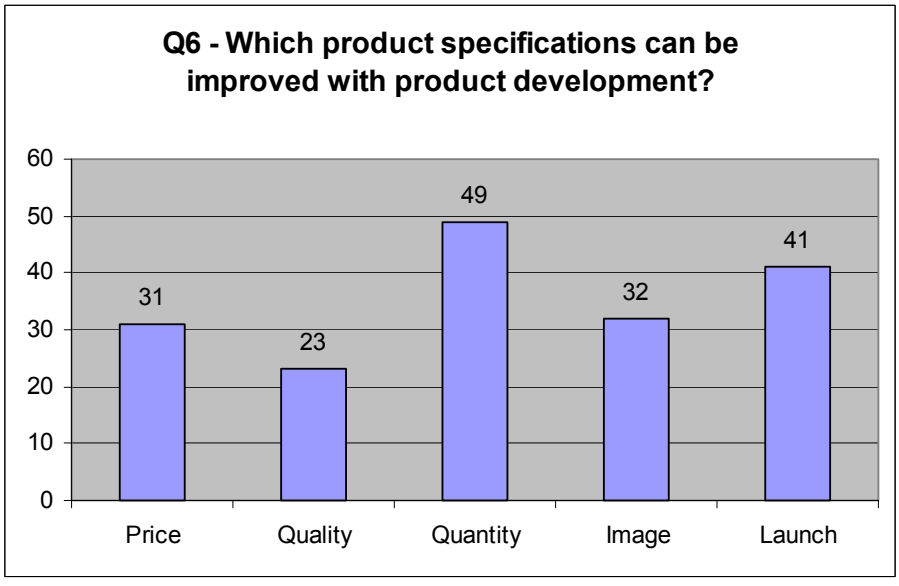
The most important conditions that signalize **innovation friendly companies** are promotion by management (colleagues' acceptance) and team work. The least important are scope for development of unorthodox ideas and integration of external experts.

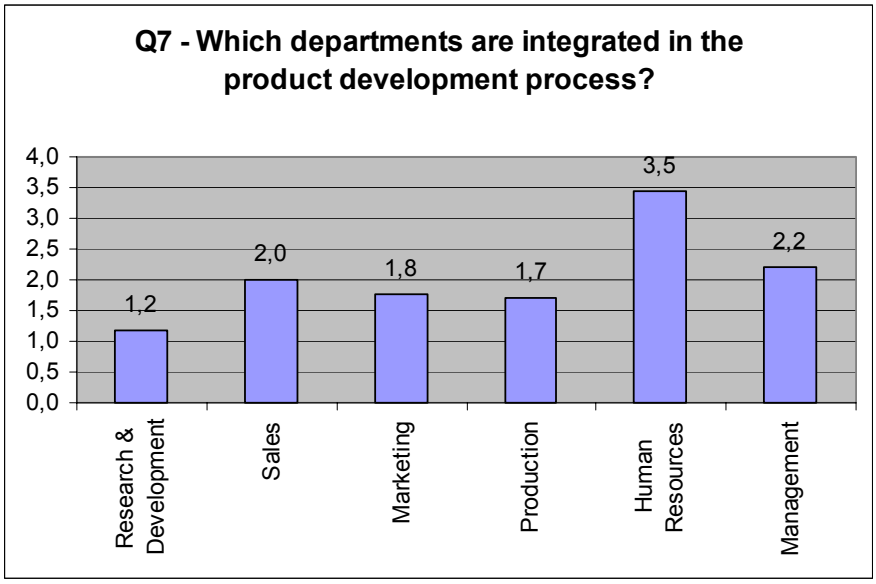


According to the opinion of Estonian companies quality of products can be **improved most with product development.** Quantity and launching can be least improved.

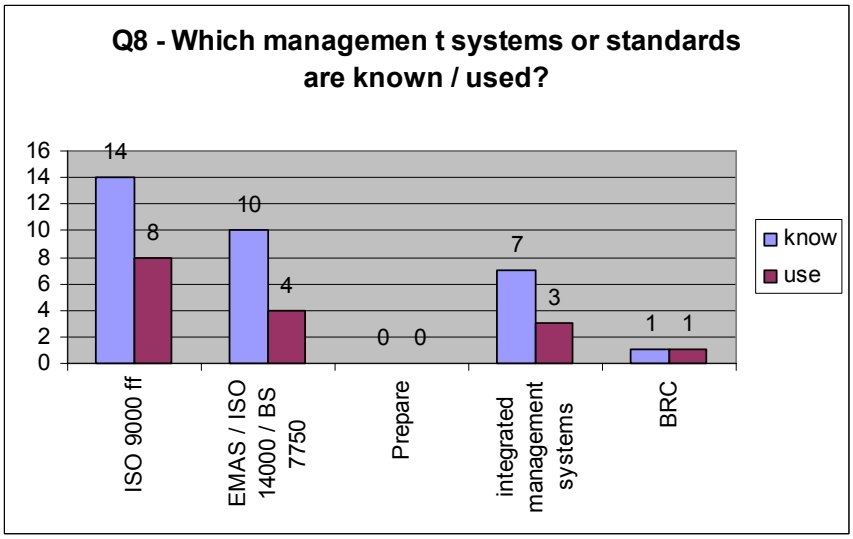


Production, sales and management **departments are integrated in the product development process** in all surveyed companies. In larger companies with R&D departments, this is the most highly involved department in the product development process. Production and marketing

departments are most highly involved in the product development process in companies. Human resource departments are hardly every involved.

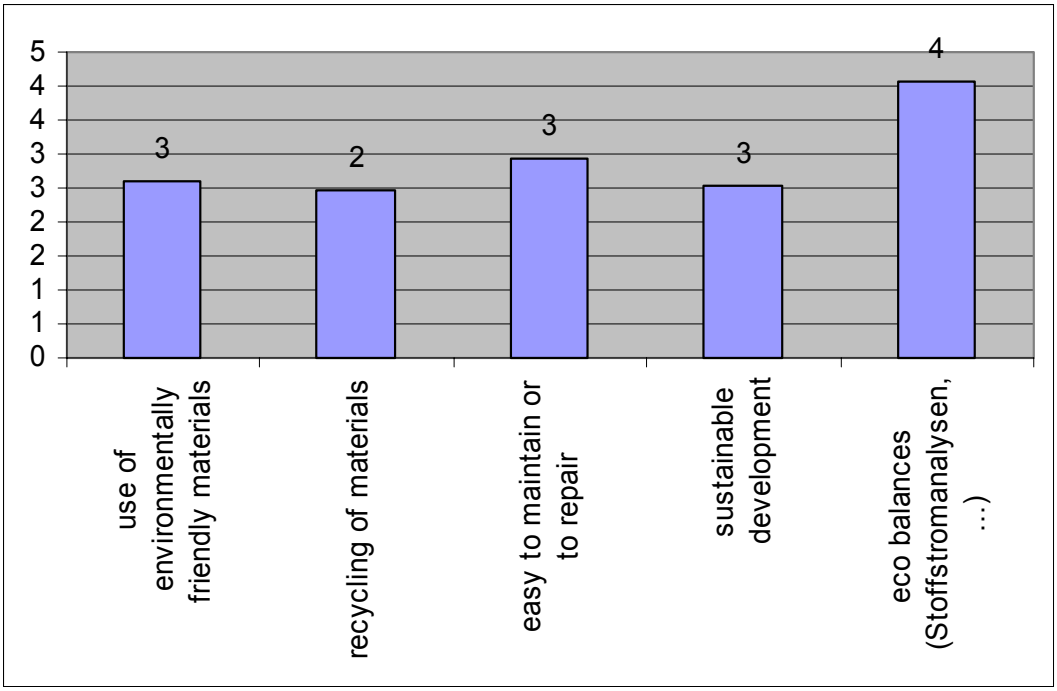


From different **management systems or standards** ISO 9000 ff are most widely known (by all companies) and also most widely used (by 8 out of 14). EMAS / ISO 14000 / BS 7750 and integrated management systems are also quite widely known, correspondingly by 10 and 7 out of 14 companies that answered the questionnaire. But these management systems/standards are less often really used, only in 3-4 companies out of 14. The management standard Prepare was not known by any company. One company is using BRC.
In Estonia, there is the trend of ISO 14000, as many companies have acknowledged its necessity and plan to launch it in near future. It is very important that the companies have understood the importance of environmental problems.



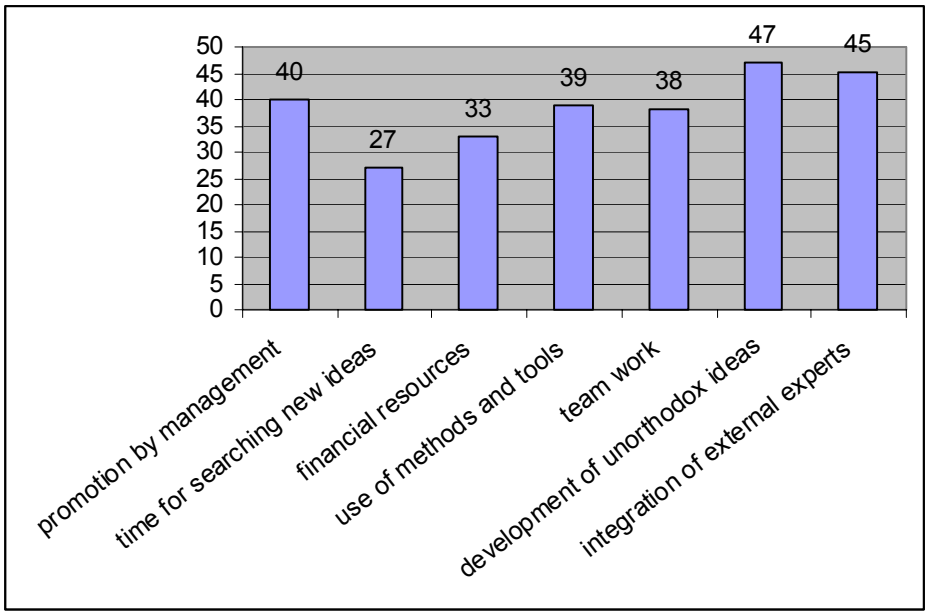
Most named **aspects of environmental product design** are considered quite equally important by Estonian production companies, except eco balances. The latter can be because it is not known. At the same time none of the aspects of environmental product are considered really important, most got an average of only 3 on the scale of 1-4 (one being the most important). The only one that was rates as 2 on the scale of importance was recycling of materials.

Q9 - Which aspects of environmental product design are considered by your company?

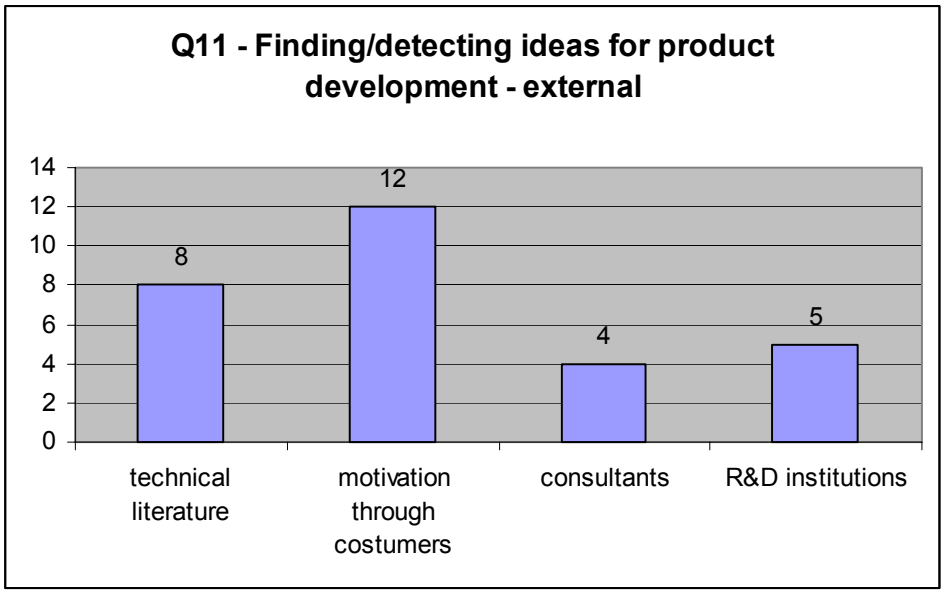


The most repressive **restrains for innovation** in Estonian production companies are time for searching new ideas and financial resources according to the opinion of companies. Scope of development of unorthodox ideas and integration external experts are not considered to be repressive.
The main restraint, lack of time for searching and creating new ideas, has been clearly brought out, which is natural as it is difficult to innovate parallel to dealing with everyday urgent tasks and problems. Estonian companies do not have enough trust to partners to cooperate with R&D institutions and use their potential. They also do not use enough the possibility for cooperation inside their sector which would assure more effective cost distribution. Also involving outside experts would be important but is less used than in most other countries.

Q10 - What do you think are the essential restrains for innovation in your company?



The most widely used internal **ways of finding/detecting ideas for product development** by the Estonian production companies are market and competition analysis and sales / customer statistics. But also team work and opinions of individuals are not much less used. Externally motivation through costumers is most used and consultants and R&D institutions are least used. Here the differences between different ways are bigger.
There is room for development in engaging all ideas and potential in a company (incl line workers) that is practiced quite little and always not possible. But in many cases it would give valuable results to engage workers and use their thoughts as well as the workers do it the work beside lines and products on daily basis.



The most important **criteria a "innovation method" should provide** to be used in Estonian production companies are structured description of customers requirements, fostering team work (creativity inside teams) and using knowledge from other industries. Development of the main contradiction, which have to be overcome, to achieve inventive solutions and database of physical effects were considered important by only 1 and 2 companies.

Q12 - Which criteria must a "innovation method" provide to be used in your company?

structured description of customers requirements	8
fostering team work (creativity inside teams)	7
using knowledge from other industries	7
description of my product/process with general trends of evolution	6
integrated validation tools	5
design of a "ideal product" to derive medium- and long term intentions for product development	5
early recognition of error risk of products and processes	4
abstractions of problems to increase creativity	3
database of physical effects (e.g. How can we move liquids?)	2
development of the main contradiction, which have to be overcome, to achieve inventive solutions	1

Creativity methods or tools that are most widely known and respectively **used for product development** in Estonian production companies are brainstorming and SWOT analysis. And these are known by all or most of the companies. Brainstorming is also used in 86% of the companies that participated in the survey. Usability of these methods for product development is considered to be quite medium. Morphology is not used in any of the companies that participated in the survey and known only by two of them. Synectics and bionics are also known by only two companies but both also used.
The reliability of methods depends quite a lot on its users and how seriously the user takes his goals and tasks. Method by itself will never make miracles. But e.g. a simple SWOT can sometimes work very effectively. So the solution could be in better self-motivation and willingness to achieve.

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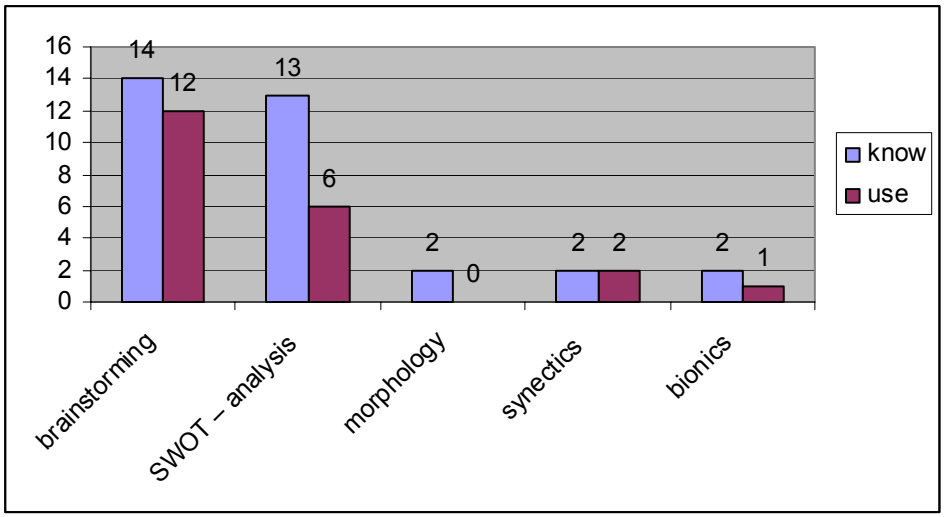

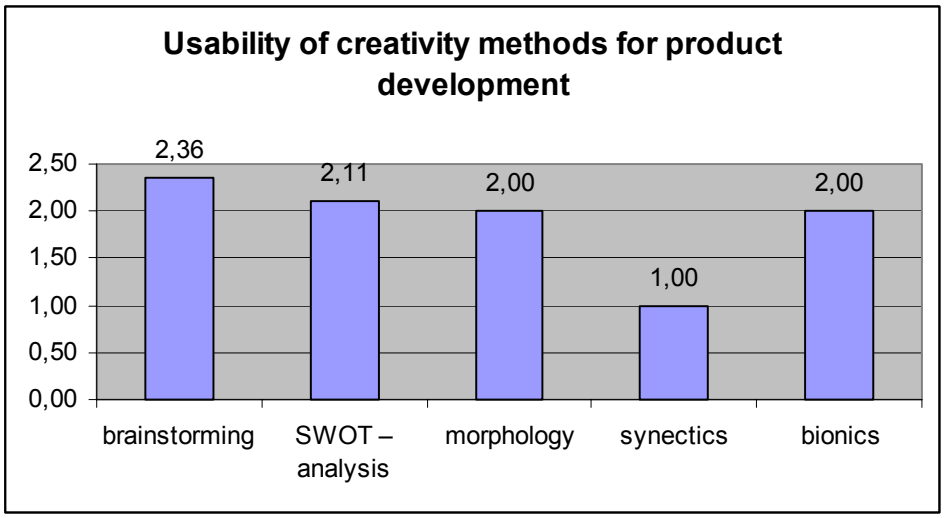

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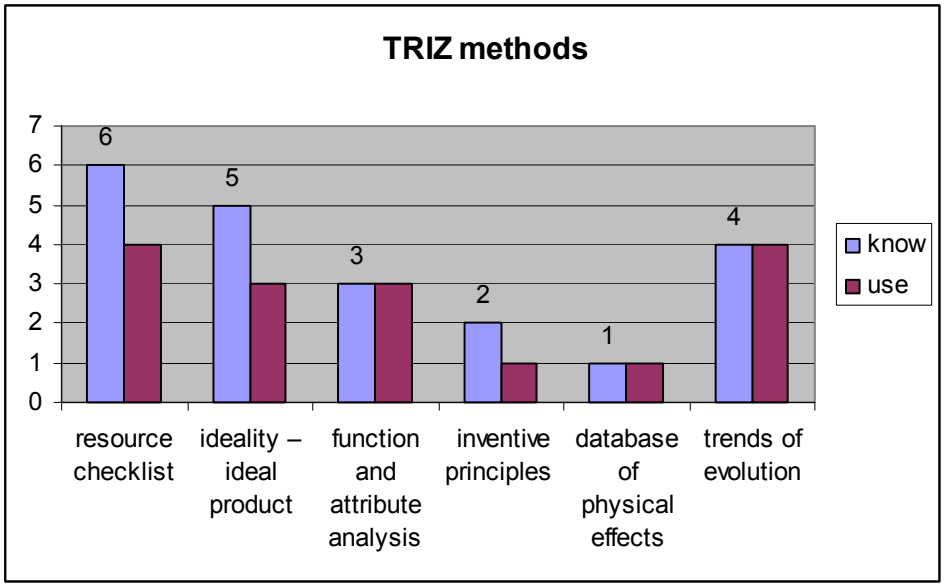
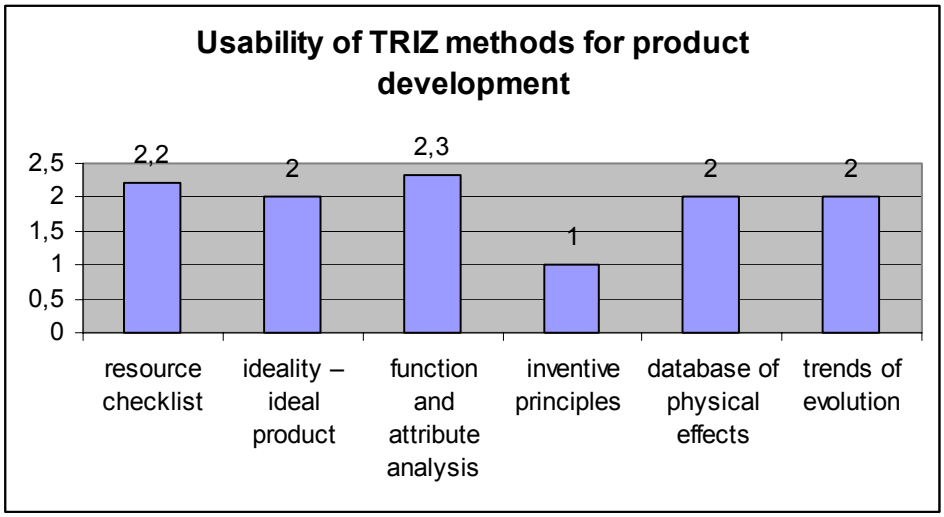
TRIZ methods or tools that are most widely **used for product development** in Estonian production companies are resource checklist and trends of evolution. But the most used TRIZ method is used only in 28% of the surveyed companies. Database of physical effects and inventive principles are least known and used.





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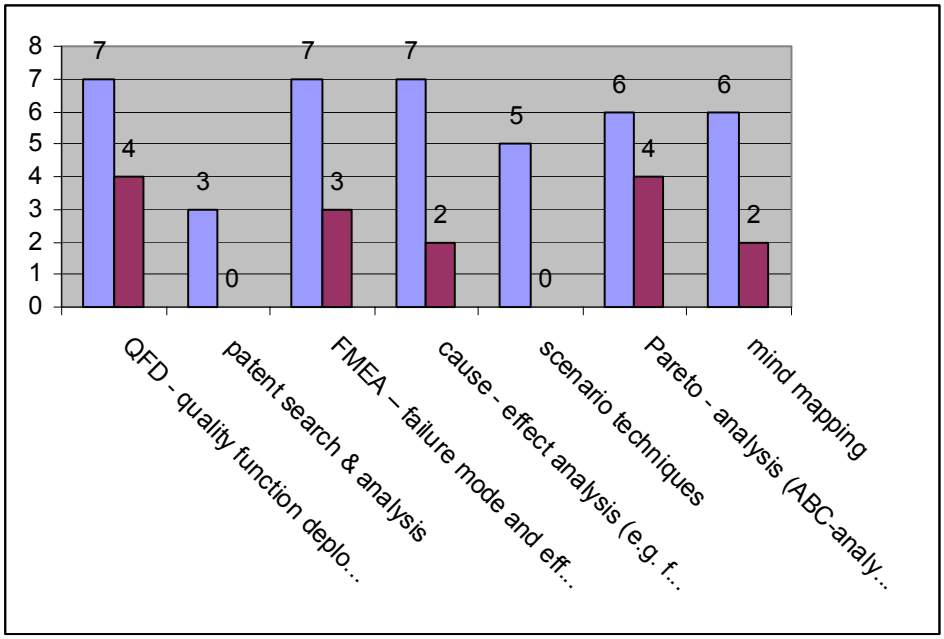
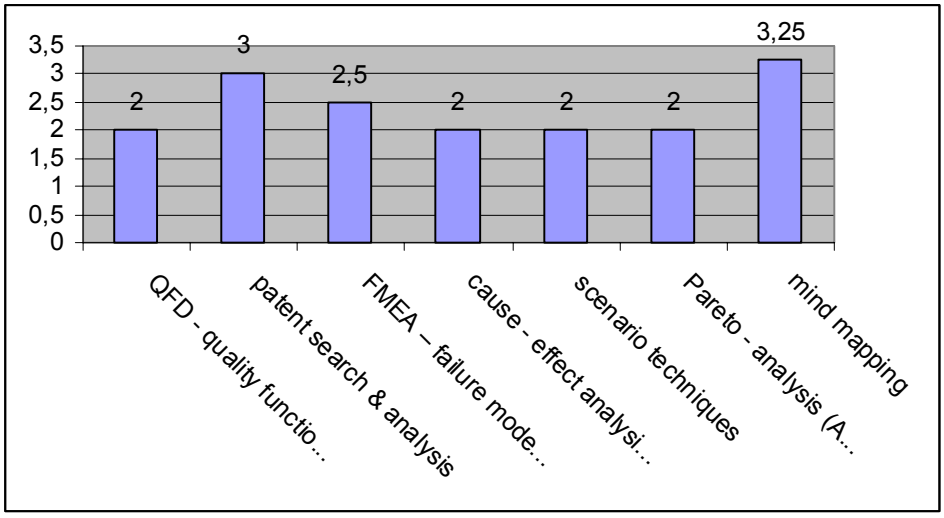
Other most widely known methods for product development are QFD, FMEA and cause effect analysis. The most widely used are QFD and Pareto-analysis. Patent search and analysis and scenario analysis are not used and are quite little known as well.



Usability of these methods for product development



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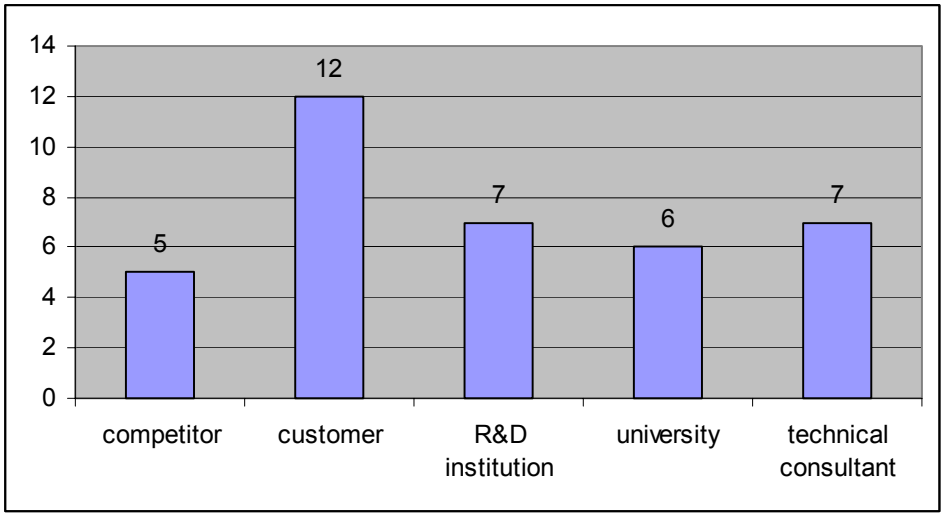
Estonian production companies include customers most often in their product development process, in 12 cases out of 14. Others are included only in 50% or less companies.

Q14 - Whom does your company include in the product development process?



Training

The most often offered **training possibilities by the surveyed companies to their empl**oyees are general knowledge providing trainings, like foreign language, computer course, technical courses, etc and team management courses. Personified guidance was offered in none of the companies. Also conflict management and creativity techniques are very rear offered.
General trainings are offered only for people above middle managers (masters). For workers training mostly urgently needed qualification courses are delivered by the company itself. But it would definitely be more worth to invest into qualification trainings of workers, and also in more general skills and competences. Workers are the second most important asset of a company besides its brands.

seminars/courses/workshops for	No of companies
general knowledge – foreign language course, computer course, technical courses etc.	10
team management – how to work in a team	8
communicating – increase the capability of communicating	6
presentation – structure, composition, performance of presentations	6
conflict management – get to know different conflict strategies	2
creativity techniques – impart creative thinking and acting	2
personified guidance structure – that brings my ideas out best	0

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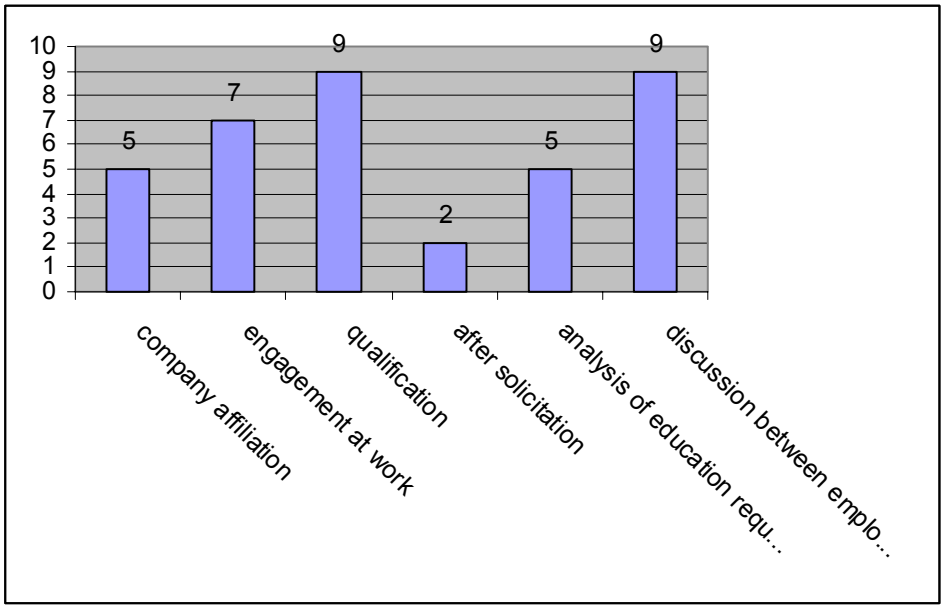
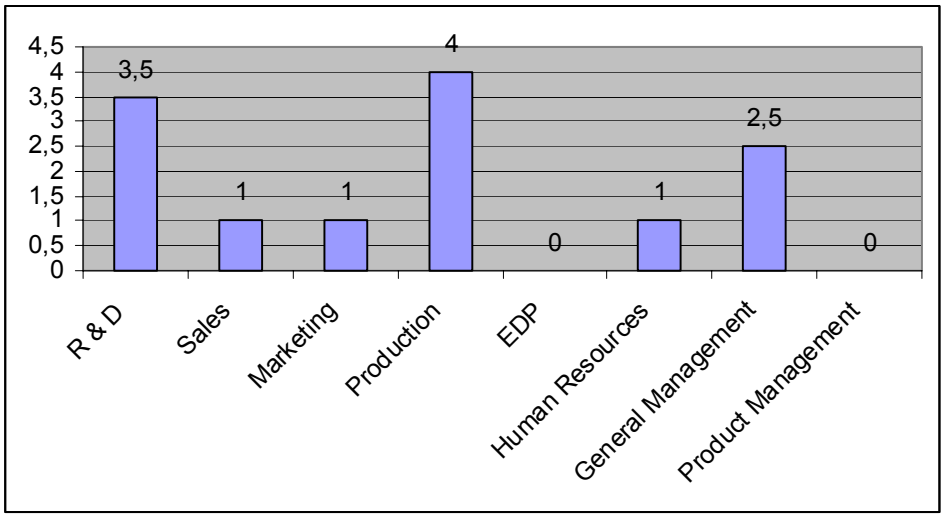
Qualification and discussion between employers and employees are most widely used **ways of selecting training participants**.



Respondents to the survey represent the following departments



Environmental problems

The following is a list of environmental problems of the Estonian production companies that participated in the survey described by themselves:

Tracking
Energy use
Transportation
Project work
Development process
The only environmental problem can be caused by our heating system (only!). In production we use only electricity.
General waste utilization

Some waste, which is taken care by utilization companies.

Problems with waste sorting and employees awareness
Solid waste

Our company is middle of the city and our biggest problem are waste water.

Damaging the ecosystem as a result of chemical-related fire. Volatile fumes deteriorate the quality of air and human health.

Soil pollution and threat to the groundwater as a result of chemical leakage.

Air pollution as a result of chemical treatment and its effect on human health.
Holophytic dust.
Packaging recycling (New law implementation for our customers in different countries i.e. for our long perspective success compare to other packaging types)

Excess heat during the production – but we use it secondarily - for heating our production premises

To comply with EU VOC-directive at the end of year 2005. Planned investment in UV finishing line

Resource management (raw material availability in very long run)

To improve raw material yealds and energy utilization efficiency
To introduce clues with higher solids

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Annex 1

	Company	**Industry**
1	Baltic Components	Assembling industry
2	Bestnet	Metal industry (making cargo and boat trailers)
3	Elcoteq	Electronic Manufacturing
4	Estonian Plastics Association	Plastics processing
5	Greiner Packaging	Packaging; Plastics
6	Hiiu Kalur	Fish products (culinary and can products)
7	Leibur	Bakery
8	Pagaripoisid	Confectionery, bakery
9	Rakvere Piim	Dairy industry
10	Rotosplast	Plastics industry
11	Standard	Furniture manufacturing
12	Tallegg	Food industry
13	Tallinn Dairy	Food industry
14	Thulema	Furniture production and sale
15	Werol Industries	Food industry