

SPIN Country Report Finland





Sustainable Production
through Innovation in SMEs

Country report for Finland

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1 Overview of SMEs sector

According to the Business Register of Statistics Finland, approximately 321 000 enterprises operated in Finland in 2008. They provided jobs for 1,502,213 persons as either employees or self-employed persons. The total turnover of the enterprises was EUR 396.6 billion.

Ninety-nine per cent of all enterprises were small enterprises, i.e. employed fewer than 50 persons. The share of medium-size enterprises employing under 250 persons was 0.8 per cent while 0.2 per cent were large enterprises employing more than 250 persons. The small enterprises employed 46.4 per cent, medium-size enterprises 16.4 per cent and large enterprises 37.2 per cent of all personnel. However, the largest share, or 51.3 per cent, of the total turnover was generated by the large enterprises. The share of small enterprises was 32.6 per cent and that of medium-size enterprises 16.1 per cent. In relative terms the number of the very smallest enterprises employing fewer than five persons increased by most, or by 4.5 per cent, from the previous year. By contrast, personnel and turnover increased by most in large enterprises. The turnover of the medium-size enterprises contracted by good one per cent.

Around three per cent of the enterprises belonged to a group. These enterprises accounted for 53 per cent of the labour force and 74 per cent of the turnover of all enterprises. These shares were almost unchanged from the previous year.

According to the Business Register the total number of enterprise groups was 5,977. Among them, 1,709 were fully Finnish-owned, 597 were Finnish-owned multinational and 3,671 were foreign-owned. The groups provided jobs for 800,240 persons in Finland, of whom approximately 70 per cent worked for domestic groups.

Size of the enterprise	Number of enterprises	Share of all enterprises, %	Number of employees	Share of all employees, %	Turnover, M€	Share of total turnover
SMEs	320 296	99,8	942 831	62,8	193 148	48,7
*small size enterprises	317 855	99,0	696 944	46,4	129 195	32,6
*medium size enterprises	2 441	0,8	245 887	16,4	63 953	16,1
Large enterprises	656	0,2	559 382	37,2	203 444	51,3
Total	320 952	100,0	1 502 213	100,0	396 591	100,0

Finnish enterprises according to the size of the firm in 2008. Source: Business Register, Statistic Finland.

According to CIS study conducted by Statistic Finland 54 per cent of enterprises in industry and 43 in services practise innovation activity in Finland. In SMEs the share varies from 43 % to 68 % in industry and from 36 % to 62 % in services. It is notable that micro enterprises (<10 employees) are not included in the survey.

	Product innovations	Process innovations	Product or process innovations	Innovation projects	Innovation activity	All elements
Total	31	36	45	26	48	14
Industry, Total	34	40	50	31	54	16
10-19	23	33	40	19	43	10
20-49	33	39	50	32	54	15
50-99	39	41	54	32	60	14
100-249	50	51	63	42	68	26
250-499	66	64	80	70	86	44
500	82	73	91	85	96	63
Services, Total	29	32	39	22	43	13
10-19	22	25	32	19	36	10
20-49	36	39	46	21	48	15
50-99	26	26	35	20	40	6
100-249	44	48	59	35	62	21
250-499	40	44	51	38	54	28
500-	58	56	66	57	69	43

Prevalence of innovation activity by size category of personnel, 2006–2008, share of enterprises (Source: Statistic Finland)

2 Framework situation

2.1.1 Regulation/Legislation arrangements

Finland's Ministry of the Environment produces legislation on environmental protection, nature conservation, land use and building, and housing. Since Finland joined the EU in 1995, national legislation has been widely harmonised with community legislation, particularly where environmental protection and nature conservation are concerned. Legislation on waste, air protection and water protection was also renewed during the 1990s, and new legislation has been enacted on issues including environmental impact assessments and compensation for environmental damage.

Other extensive changes to Finnish legislation in the environmental sphere have included the major renewal of the Nature Conservation Act in 1997, and the drafting of a new Environmental Protection Act and the Land Use and Building Act, both of which came into force in 2000.

Finland's environmental legislation defines minimum standards of environmental responsibility, which apply to all businesses operating in Finland. The operators are obliged to be aware of their legal responsibilities, and organise their activities accordingly.

The Environmental Protection Act (86/2000) obliges all businesses operating in Finland to be sufficiently aware of the environmental impacts and risks of their activities - and of opportunities to reduce these impacts and risks. Environmental impact assessments (EIA) must be conducted wherever activities listed in Section 6 of Finland's EIA Decree (268/1999) are practised.

The following principles are applied wherever activities are associated with pollution risks:

1. Harmful environmental impacts are prevented beforehand. Where this is not possible, such impacts should be minimised (Prevention and minimisation of harmful impacts principle).
2. All activities should also otherwise be conducted with due diligence and care so as to prevent pollution and limit harmful impacts, according to the potential risks (Precautionary and due diligence principle).
3. Best available techniques (BAT) are applied (BAT principle).
4. Purposeful and cost-effective combinations of measures must be adopted to prevent pollution, such as safe working practices and suitable choices of fuels and raw materials (Best environmental practices principle).

Actors whose activities lead to a risk of pollution are legally obliged to prevent, minimise, correct and compensate for any harmful environmental impacts (Polluter pays principle).

All businesses that conduct activities associated with the risk of pollution are obliged to obtain environmental permits under the Environmental Protection Act. These permits define the permissible extent of such operations, the consequent emissions, and measures to limit them. Permits are only granted where activities do not lead to health risks, or the risk of significant pollution.

In addition to the permits required under the Environmental Protection Act, decisions are made and permits are granted also by the authorities for activities controlled under the Land Use and Building Act and the Nature Conservation Act. Various types of water services projects, the transportation of wastes, and the importing and sale of many chemicals are also subject to official permits.

Certain other activities should be cleared with the authorities, who are empowered to prohibit or limit them as necessary. Examples include limits on the use of off-road vehicles and water traffic.

Businesses must also register certain activities with the environmental authorities, even where they will only occur temporarily. Such activities covered by Section 10 of the Environmental Protection Act include activities that will lead to noise and vibrations, or experimental and exceptional operations that could have negative environmental impacts. Activities including the clean-up of contaminated soils must be duly registered according to Section 12 of the Act. In approving registrations the environmental permit authorities may set limits on such activities.

Fees must be paid for decisions on permit applications and the related reports, by the applicant or recipient of the permit. Securities must also be provided for certain activities.

The Environmental Protection Act does not cover physical or structural damage to the environment, or land use and nature conservation. These issues are covered in separate statutes. The Water Act controls the use of water resources and structures built along waterways. The Waste Act covers waste management and recovery. Other separate legislation covers genetic technologies, chemicals, protection of the marine environment, and environmental impact assessments.

Finnish waste legislation covers all wastes except certain special types of waste such as radioactive wastes, which are covered by separate laws.

Finnish waste legislation is largely based on EU legislation, but in some cases includes stricter standards and limits than those applied in the EU as a whole. Finland also has legislation on some issues related to wastes that have not yet been covered by EU legislation.

2.1.2 Market/ Business drivers

2.1.3 Financial Aspects (e.g. penalties)

2.1.4 Enforcement degree

3 Analysis

4 Needs (synthesis)

The next chapter of the report is based on a survey conducted by researchers from Turku School of Economics. The study was granted by Tekes and reported in publication Business development needs of SMEs in Energy and Environment sector.

The target group for the survey were Finnish SMEs in energy and environment sector. Energy and environment sector was defined based on the classification shown in the next table. The number of enterprises that was identified was 371 and 126 enterprises responded to the survey. Majority of the enterprises were micro firms. Enterprises represented almost equally all three sectoral groups (A,B, C in the next table).

Sectoral group	Sectors
A. Energy	1. The production of energy 2. The distribution and use of energy 3. Fuels 4. The machinery related to the production of energy 5. Electric equipment
B. Environment	6. Waste management 7. Recycling 8. Water and waste water management 9. The protection of air
C. Supporting services	10. Planning 11. Environment services and equipment 12. Information systems in energy and environment systems

Classification of energy and environment sector.

The survey was divided in three themes, namely in factors affecting inwards and outwards to enterprises, factors inside the enterprise and management of the change and management of activities in the enterprise. In the first theme the respondents find SMEs in energy and environment sector strong in the knowledge of their own sector and the customer needs. Weak points were marketing and sales of products and the knowledge of competitors and their activities. Obviously SMEs in energy and environment sector are R&D driven, therefore they have put their scarce resources e.g. personnel resources in R&D and therefore pay less attention on marketing. One reason for challenges in marketing and sales is that products/services are so innovative on the nature that the potential customers are not aware of all the features of products and cannot even "need" them. One important feature for the markets in energy and environment sector is that customers are not the only target group for selling new ideas and products, civil servants and regulators are important players in the market as well.

In Finland there exists financing tools for R&D of products and services, but not necessary for marketing, sales and commercialisation of products and services. Anti-trust policy is not the only and self-evident reason for the lack of these tools. The respondents thought that lack of innovative financing tools, bureaucracy and lack of co-operation are barriers to their business development.

When looking at the factors inside the enterprise the respondents felt that they are strong in business management (accounting, management) and in the management of equipment and machinery as well as in the management of financing. Quality control of products and R&D in SMEs were in a good level according to the respondents.

The challenges were seen in the management of logistics, the management of production and material flows, in the education of personnel and in the management of efficiency of the production.

Third theme was the management of the change and management of activities in the enterprise. Respondents thought that the strong points were goals of the activities, the management of the enterprise, and the efficiency in organisation.

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The challenges were how to get the relevant information for the enterprise (market information, customer feedback etc.) and the management of the internationalisation of enterprises.

To sum up, SMES in energy and environment sector in Finland are technology oriented enterprises and the public support for their R&D is in a good level. They have a lack of competences in making business out of technology and need support for commercialisation and marketing of their products.

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Theme	Needs/challenges
Regulations & public support	<ul style="list-style-type: none"> • The foresight of environmental regulation, • knowledge of international contracts • knowledge of environmental regulation and how to apply it in enterprises own activities
R&D	<ul style="list-style-type: none"> • financing of R&D • international cooperation • a persistent approach in R&D • IPR issues: resources to protect the patent (large enterprises vs. small enterprises)
Commercialisation	<ul style="list-style-type: none"> • commercialisation of inventions • the development of inventions to products • the marketing of innovations
Resources and competencies in enterprises	<ul style="list-style-type: none"> • skilled workers
Networking	<ul style="list-style-type: none"> • sources of new opportunities and resources • trust (information leaks)
Internationalisation and growth	<ul style="list-style-type: none"> • growth from international markets, 50 % of the enterprises already have international activities • challenges: legislation in target countries, • finding international partners • list of references, lack of national “demo plants” to experimental work and to get references for international markets

5 Barriers

5.1 Financing

Target SMES are often technology oriented enterprises and the public support for their R&D in Finland is in a good level. Usually they have a lack of competences in making business out of technology and need support for commercialisation and marketing of their products or services.

5.2 Competences

In regulated markets it is highly relevant that SMEs are well aware of the regulation process and the content of the regulation, lack of this information is a barrier for innovation. Failures in the quality of the product in the regulated markets can destroy the reputation of the product and, as well-known it is hard to gain back. Therefore the quality management of production process - including all the companies contributing in the chain of production – is highly relevant.

In some cases the lack of resources of authorities to enforce the regulation is a barrier for the adoption of their innovations.

5.3 Business and Market

5.4 Intellectual Properties Rights (IPR)

The expenses of patenting is a barrier for SMEs. Because of this SMEs carefully decide which part of their knowledge or know-how they protect. Some of the SMEs have had bad experiences with the patenting system e.g large enterprises have offended their patent purposely since they are aware of SMEs limited financial resources to protect their patent in time consuming and expensive legal proceedings.

5.5 Regulatory and normative framework

Regulations are divided typically in three categories (OECD 1997). Firstly there are *economic regulations* that intervene directly in market decisions like pricing, competition, market entry and exit. Secondly there exist social *regulations* that protect public health, safety, the environment and social cohesion. Third category includes *administrative regulations* that are administrative formalities through which governments collect information and intervene in individual economic decisions.

According to Blind the impact of regulations on innovation is difficult to assess because of the complex and dynamic nature of innovation (Blind 1994). Different market factors and new technological opportunities for example affect to the emergence of an innovation, and the development process of the innovation is typically a non-linear process where e.g. feedback from customers and new knowledge contribute in different phases of the development process and redesign the innovation. In addition Kemp (Kemp 1998) underlines in his paper this two-way relationship between regulation and innovation. The emphasis should be on the effects of innovation to regulations as well as on regulation's

effect to innovation. According to Kemp the political economy aspects of regulation and innovation are important as well. This refers to enforcement of the regulation where different actors like firms, industrial associations and authorities negotiate about the actual content of the regulation

Case studies undertaken in Finnish SMEs prove this latter issue. Some features related to regulative process usually foster challenges for SMEs. There exists often uncertainty related to the content of the regulation and to the schedule of introducing the regulation. Certain transition periods are common in order to let companies to react and to adjust their activities to a new regulation. Industrial associations are lobbying regulators in order to gain their targets and they usually represent mature markets and large companies. Those SMEs that are developing new technological solutions for emerging markets find this challenging since promising new market potential means investments in production capacity. Decision-making on investment in production capacity based on incomplete information about the content of the regulation is hazardous. SMEs should also have an infrastructure that meets the requirements of the regulated markets.

6 Incentives

6.1 Regulatory and normative framework

Regulation, at least a radical one, usually means new market opportunities for SMEs. Usually SMEs are already active in the markets where regulation takes place. In Finnish cases enterprises have been aware of the future need of environmental friendly products and discovered the problems of already existing products and processes. With new innovative product they have gain the first mover advantage. This advantage was based naturally on the nature of their products but also on the previous references of their products in the markets. Access to regulated markets was easier since they already had customers for their products, functioning distribution channels and production plants.

Environmental concerns and regulations related to these concerns are a global phenomena. Therefore the companies dealing with these issues are often global actors. For example in one of the cases in Finland the regulation was targeted to transport packaging in international trade. The company was already active in Europe but the regulation opened up opportunities for new growth in Asian markets. Global activities are crucial also in their business due to their customer's need to total packaging solutions. This means typically co-operation between different suppliers worldwide. In order to be part in these networks of suppliers one should have production plants globally.

6.2 Market-oriented schemes

6.3 Public procurement

6.4 Financial and institutional support measures

The national innovation system is an extensive entity comprising the producers and users of new information and knowledge and know-how and the various ways in which they interact.

At the core of the innovation system are education, research and product development, and knowledge-intensive business and industry. Varied international cooperation is a feature running through the system. A key task for science, technology and innovation policies is to ensure a balanced development of the innovation system and strengthening cooperation within it. Alongside this, increasingly important are also cooperation relationships with other sectors, such as economic, industrial, labour, environmental and regional policies or social welfare and health care services. The prerequisites for knowledge-based development are created within different policy sectors.

In Finland the formulation of national science, technology and innovation policies has been assigned to an expert body, **the Research and Innovation Council**, which is chaired by the Prime Minister. The foremost organisations responsible for science and technology policies are the Ministry of Education and the The Ministry of Employment and the Economy. The Ministry of Education handles matters relating to education and training, science policy, universities and polytechnics, and the Academy of Finland. The Ministry of Employment and the Economy is in charge of matters pertaining to industrial and technology policies, the Finnish Funding Agency for Technology and Innovation (Tekes), and the VTT Technical Research Centre of Finland. Nearly 80 per cent of the government R&D funding is channelled through these two ministries.

Tekes - the Finnish Funding Agency for Technology and Innovation boosts wide-ranging innovation activities in research communities, industry and service sectors. The Academy of Finland is the prime funding agency for core research in Finland. Its mission is to advance scientific research and its application, to support international scientific cooperation, to act as an expert in science policy issues, and to allocate funding to research and other areas of science.

Sitra, the Finnish Innovation Fund, is an independent public foundation that operates under the supervision of the Finnish Parliament. Its mission is to promote the economic prosperity and future success of Finland. Finnvera is a specialised financing company governed by the Finnish State.

Finnvera has official Export Credit Agency (ECA) status and it provides businesses with loans, guarantees, venture capital investment and export credit guarantees. At regional level, the national technology policy is implemented by so-called T&E Centres (Employment and Economic Development Centres).

The Finnish Funding Agency for Technology and Innovation (Tekes) boosts wide-ranging innovation activities in research communities, industry and service sectors. Tekes grants around EUR 600 million towards innovative projects aimed at generating new know-how and new kinds of products, processes, and service or business concepts. Funding is also available for developing work organisations. In 2009 331 million euros was granted to 1,093 companies. 61 percent of the funding for business R&D was directed towards SMEs and 82 percent towards companies with less than 500 employees. In 2009 Tekes funding for Energy and environment sector was 239 million Euros. One of the key targets of Tekes funding for companies is to enhance networking between enterprises and research community.

	2005	2006	2007	2008	2009
Public research projects	625	552	466	498	414
Corporate R&D projects	927	936	957	959	882
Feasibility studies or innovation services	540	473	517	497	239
Completed projects in total	2 092	1 961	1 940	1 954	1 535
Academic theses	1 109	947	976	1 044	775
Publications	2 660	2 377	2 072	2 171	1 811
Patent applications by research organisations	113	130	89	102	98
Patent applications by companies	572	617	606	672	611
New or improved products	487	486	504	492	458
New or improved services	315	346	402	447	459
New or improved production processes	301	312	333	386	328

Results of the completed Tekes-projects. Source: Tekes.

Tekes finances projects in all areas of technology and business. The funding is targeted at projected development work and the funding is intended to cover part of a project's expenses. Projects may involve development of products, services, production methods, business concepts or competence of organisations. Tekes funding covers part of the project's expenses. Tekes' contribution is determined by the nature of the project, the market distance and the size of the company.

Tekes funding for SMEs in development projects consists of either financial grant or a loan. Funding may also be granted as a combination of a loan and a grant. Grants will typically be given to challenging research and development projects laying a foundation for the development of products, services and work organisations. Loan is intended especially for projects that produce a marketable product or service, or create a new business concept. The loan is a risk loan that will be granted without a security.

An SME can also obtain funding solely for the procurement of innovation services. Eligible targets of procurement include, among others, consultation related to the development of company's business model and strategy, market and customer needs surveys, and studies on the rights to a product or service. In addition, eligible services include procurement of existing research-based information or transfer of technology, introduction of standards, IPR and their protection, or studies on usability and design.

Tekes offers also funding for young innovative companies for overall development of business operations. The purpose of funding is to boost the growth and internationalisation of the most promising small businesses.

Tekes's customers include companies, universities, research institutions, government organisations, local and regional authorities and other organisations operating in Finland. It facilitates collaboration and networking between small and large businesses, industry and academia, public and private sector and non-governmental organisations in global-national-regional level.

For companies Tekes offers funding and expert services for challenging development projects and the target is to help companies to promote international growth, rejuvenate their business, boost growth and success on the Finnish market and increase networking and international competitiveness.

Companies can build their own growth path from an idea to a growing business concept by including the following areas of development in their projects:

Customer and market analysis

- Analysis of customer needs and segmentation of target groups
- Evaluation of markets and competition, prognosis and monitoring
- Planning new market launches, profitability studies, cost estimates and feasibility evaluations

Marketing channels and customer relationship management

- Surveying distribution channels and order-to-delivery chains
- Creating new marketing and customer management concepts
- Brand concept design

Developing business models and strategies

- Growth and internationalisation strategy, business development plan
- Creating an operating model for R&D and innovation management

Finding business partners

- Surveying partnerships and networks in new markets
- Network-based management models for distribution, production and marketing

Identifying sources of funding

- Exploring various sources and models of funding

Designing new concepts

- Service concept development and pilot projects with customers
- Commercialisation of product concepts, revenue model and service process design

Research and development (R&D) of new products and services

- Exploring IPRs and standards and conducting novelty studies in target markets
- R&D of products and services and adaptation for target markets
- Design and usability, socially and ecologically sustainable solutions
- Service and product strategies, innovation and product development processes
- Making use of technological potential (e.g. ICT)
- Prototype development and pilot projects with customers

Developing production or service processes

- Strategic design of products and services
- Developing product and service concepts and methods and adapting them to suit target markets

Research cooperation

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- research subcontracting, cooperation with research teams
- utilisation of existing research results and technology transfer
- utilisation of research infrastructure (e.g. laboratory)

Developing know-how

- Growth-orientated personnel development and business expertise development
- R&D expertise development
- Multicultural management in target markets
- Transfer of international expertise, international networks
- Innovation management, knowledge management and making use of the same

Developing processes and organisational structures

- Revamping processes and organisational structures to fuel growth
- Improving productivity and quality
- Project management and change management

6.5 Awareness raising and demonstration measures

6.6 Strategic planning and foresight

6.7 Other incentives

7 Conclusion

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