VTT Technical Research Centre of Finland 2010
GDP share of R&D expenditure in Finland

Source: Statistics Finland
R&D expenditure in Finland

Source: Statistics Finland, VTT
Public decision makers, financiers and R&D performers

Parliament of Finland

Council of State

Research and Innovation Council

Ministry of Education

Ministry of Employment and the Economy

Other ministries and research institutes

Academy of Finland

Tekes, the Finnish Funding Agency for Technology and Innovation

Sitra, the Finnish Innovation Fund

Finvera

Finpro

Finnish Industry Investment Ltd

Universities

VTT

ELY-Centres
VTT’s status as performer of R&D work

- Basic research
- Applied research
- Development

VTT, UNIVERSITIES, INDUSTRY
Knowledge flow between VTT and customers

VTT

Customer company

Commercial contracts
Pre-competitive R&D
Recruiting of scientists
Spin-off companies
Patents, licenses, publications
## Summary of VTT’s strategy

### Business foundations

**Mission**

VTT produces research services that enhance the international competitiveness of companies, society and other customers at key stages of their innovation process, and thereby creates the prerequisites for growth, employment and wellbeing.

**Values**

- Passion for innovation
- Support and respect to the core
- Together for the client
- One step ahead

### Target state

**VTT increases** the competitiveness of its customers’ businesses, promotes the creation of new business, and improves and speeds up the productivity of R&D.

**VTT exploits** its know-how by licensing technologies and spinning off successful technology companies.

**VTT strengthens** its top-class research in technology centres and creates new nodes for the global innovation network.

**VTT promotes** the development of industries and public services, the wellbeing of society, the health and safety of the environment, and improves the knowledge base for political decision-making.

### Means of achievement

**Strategic focus areas**

- Foresighting and impact
- Business from technology
- Strengthening of international activities
- Development and integration of competencies
- Efficient and effective project work

**Customer accounts and services**

- Emphasis on key customer accounts
- Larger international customer base
- VTT’s services cover all key stages of the customer’s innovation process

**Spearhead programmes**

- Industrial Biomaterials
- eEngineering
- Digital World and Ubiquitous Computing
- Printed Intelligence

### Vision

VTT creates business from technology for the benefit of its customers, partners and other stakeholders.
# VTT’s role in innovation environments

**VTT speeds up the creation of new technology-based business**

## Technology benefits
- Exploitation of technology foresight and identification of emerging technologies
- Creation of new technologies and innovation potential
- Applications development and expansion of the competence base
- Transfer of research results
- Global technology management through research partnerships

## Benefits for innovation environment and society
- Creation of foresight-based research strategies
- Renewal and development of industries/sectors
- Strengthening and expansion of knowledge base
- International networking
- Meeting energy, environmental, safety and security challenges
- Promotion of employment, wellbeing and everyday life
- Support for government decision-making

## Customer and enterprise benefits
- Innovation services and expertise
- New businesses and markets
- New companies and licensing
- International technology transfer
- International networks
- Expansion of the knowledge base
- Support for launching new products
Vision 2014

- VTT creates business from technology for the benefit of its customers, partners and other stakeholders.

Internationally recognised, synergistic and flexible partner → Customers

An engine of technological development in Finland → Owner and finance providers

Best investment option in the innovation environment → Owner and finance providers

The preferred employer for experts who want to develop their knowledge and succeed → Employees
VTT’s mission

VTT

- produces research and innovation services that enhance the international competitiveness of companies, society and other customers
- creates the prerequisites for society’s sustainable development, employment and wellbeing
VTT’s values and ethical standards

Our top-class and continuously developing knowledge and expertise is the foundation of everything we do. A creative and open-minded culture produces original combinations of competencies.

The wellbeing of our working community is based on trust and respect. We also learn from failure.

The important work that we do both as individuals and as an organisation is measured by the success of our customers and the development of society. Our work is productive and worthwhile.

Being in the forefront of development demands the sensitivity to detect changes in the operating environment, the agility to react to them, and the boldness to focus. We take controlled risks when venturing into new areas.

Ethical standards: • impartiality • reliability • integrity • responsibility
VTT Group in brief

Personnel 2,935 (1.1.2010) ■ Turnover 276 M€ (budget for 2010)

Customer sectors
- Biotechnology, pharmaceutical and food industries
- Electronics
- Energy
- ICT
- Real estate and construction
- Machines and vehicles
- Services and logistics
- Forest industry
- Process industry and environment

Focus areas of research
- Applied materials
- Bio- and chemical processes
- Energy
- Information and communication technologies
- Industrial systems management
- Microtechnologies and electronics
- Services and the built environment
- Business research

VTT’s operations
Research and Development ■ Strategic Research ■ Business Solutions ■ IP Business ■ Group Services

VTT’s companies
VTT Expert Services Ltd ■ VTT Ventures Ltd ■ VTT International Ltd
Way of action

The primary role of VTT is to carry out research and development work, technology transfer and testing. R&D work is performed as projects.

- VTT directs and develops its activities in close interaction with industry, research institutes and universities, as well as government authorities responsible for coordinating technology policy and the financing of R&D.

- VTT operates in accordance with Finland’s technology, industrial and energy policies, and plays an active role in their formulation.

- VTT is a not-for-profit organization.
Operating principles and quality management at VTT

Quality aspects
- We carry out our assignments to the scope, budget and timetable agreed upon in the contract.
- Our results are correct, reliable and unambiguous, and the findings are clearly and concisely reported.
- The main testing, inspection and calibration methods are accredited.
- We have a highly skilled and motivated staff as well as appropriate premises, facilities and equipment.
- We evaluate and develop our operating processes to guarantee an efficient and effective mode of operations.

Operating processes are the core of the quality management system at VTT.

Environmental aspects
- We take account of the principles of sustainable development in both our service operations and our internal activities according to our environmental policy and agreed objectives.
Research
Goals
- creating new ideas, technologies and innovation potential
- incubating applications and fostering competencies
- in research areas which have high impact for industries and society

Services
Goals
- producing integrated solutions for customers and managing customer relations
- enhancing the value of VTT’s IPR and managing IPR

VTT Expert Services Ltd:
- Management of customerships
- Producing following services to customers:
  - expert consultations
  - certification and product approval
  - testing, inspection, analysis and calibration

Supporting processes
VTT Group structure 2010

VTT Technical Research Centre of Finland
(State-owned research centre under the domain of the Ministry of Employment and the Economy)

R&D
- Research personnel
- Research resources
- Project execution
- Competence development

Strategic research
- Self-financed research
- Jointly funded research

IP Business
- IPR sales and licensing
- IPR portfolio management

Business Solutions
- Management of customer accounts
- Contract research
- Technology licensing as a part of contract research sales
  Separation of economic and non-economic activities.

Group Services
- Support functions

VTT Expert Services Ltd
- Specialist reports and assessments
- Certification and approval services
- Testing, inspection and calibration

VTT Ventures Ltd
- Management of spin-offs

VTT International Ltd
- Administration and development of international joint ventures and contact points
Solutions

Customised solutions are created in co-operation with customers

Services

VTT services are available to the customer in all stages of the innovation process from foresight to ensuring market access

Research infrastructure

Opportunity to utilize unique testing and research equipment

Technologies and expertise

Cross-disciplinary in-depth scientific and business expertise available to the customer

Partnership networks

Comprehensive, cross-disciplinary scientific and customer networks
Research infrastructure

Opportunity to utilise VTT’s unique testing and research equipment, for example:

- Research hall for demanding experimental studies
- Laboratory facilities for drug development
- Micronova cleanroom
- Fermentor hall
- Unique testing facilities and equipment
- Equipment for test production
- Facilities for field measurements
Partnership networks

VTT influences in the core of innovation ecosystem. Examples of partnership networks:

- Stabilized co-operation with the most remarkable research institutes and networks in all levels (e.g. EARTO, EU, Heterogeneous Technology Alliance)
- Strategic level customer partnerships internationally and in Finland
- Partnership agreements with several universities and research organizations
- Long-term co-operation with financers and public sector
Services

TECHNOLOGY PARTNERSHIP
Create business from technology

TECHNOLOGY AND INNOVATION MANAGEMENT
Leverage the technology benefits more effectively

TECHNOLOGY AND MARKET FORESIGHT
See the future

STRATEGIC RESEARCH
Be a forerunner

PRODUCT AND SERVICE DEVELOPMENT
Acquire competitiveness

IPR AND LICENSING
Exploit turnkey technologies

ASSESSMENTS, TESTING, INSPECTION, CERTIFICATION
Ensure your competitive edge
Research and development

VTT knowledge clusters

- Bio and process technology
- Energy and pulp & paper
- ICT
- Materials and built environment
- Microtechnologies and sensors
- Industrial systems
VTT Expert Services Ltd helps to speed up market launch of products and services

VTT Expert Services Ltd improves the competitiveness of its customers' production, products and services by verifying that they are suitable for the markets, users and authorities. VTT Expert Services Ltd assists in solving of acute technical problems in customer’s products and production.

**Company offers versatile**
- expert consultations
- certification and product approval services
- inspection services
- testing and analysis services
- calibration services
VTT’s IP Business

- manage and commercialize VTT’s IP Portfolio
- is responsible for packaging of IP based offering
  - ”From Research to Business (TULI)” program
  - Preparation of commercialization

Budget of 7.5 M€ (jointly and privately funded).
VTT’s staff profile

Staff structure
Research scientists 62%
Other research staff 21%
Administrative personnel 14%
Management 3%

Education of staff
Doctors 18%
Licentiates 6%
Other university degree 53%
College level and polytechnic 19.5%
Basic level 3.5%

Personnel: 2,935
### VTT staff and location (1.1.2010)

<table>
<thead>
<tr>
<th>Location</th>
<th>Staff</th>
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<tr>
<td>Espoo</td>
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<td>Oulu</td>
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<td>Lappeenranta</td>
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<tr>
<td>Other locations</td>
<td>31</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2,935</td>
</tr>
</tbody>
</table>
VTT’s innovation partnership model

Management and fostering of technology-based innovations

Integration of different R&D competencies (Partnerships)

Customer’s customers

VTT’s customers

R&D financiers

Integration of competencies

VTT Industrial Innovation Management

Business and HTI competence

Global markets and business environment

Technology competence
VTT’s innovation process
Integration of VTT’s and customer’s innovation processes

Industry’s innovation process
- Technology foresight
- Concept development
- Product and service development
- Commercialisation

Co-operation goals
- Future opportunities foresight
- Creation of business opportunities
- Development of products and services
- Commercial services

VTT’s innovation process
- Technology foresight
- Concept development
- Development of products and services
- Testing and consulting services

Offered by VTT
- Market, technology and business foresight
- Research services Business concepts Technology concepts Solutions Forums and networks
- Research services Products and services Outsourcing of R&D
- Consulting services Testing Certification Industrial rights New companies
VTT’s research projects

1. Commercial activities
   Commercial activities are performed according to direct demand from customers.

2. Joint projects
   Joint projects are initiated on the basis of need and typically jointly funded by VTT, companies, research financers (*) and/or other research parties.

3. Self-financed research
   Self-financed research consists of technology-based strategic research projects aimed at developing competitiveness and acquiring knowledge and expertise to meet the future needs of customers.

(*) R&D funding possibilities for example
- Tekes (The Finnish Funding Agency for Technology and Innovation)
- EU projects
Focus areas of research

- Information and communication technologies
- Industrial systems management
- Bio- and chemical processes
- Energy
- Business research
- Applied materials
- Services and the built environment
- Microtechnologies and electronics
- Energy
- Applied materials
Business from technology
VTT’s innovation process combines R&D and innovation activity

Innovative research
Creating new ideas, technologies, innovation potential; incubating applications and increasing competencies

Needs of customers and other stakeholders

Strategic research portfolio
Foresight & visions
Frontier research
Large programmes
Focus area projects

Accelerated beneficiation process

Licensing
Spin-offs
Partnerships
Contract R&D
Expert services

Added value for customers and other stakeholders

Business impacts
VTT’s research vision

Innovation processes, technology and service business

New materials
- biomass based products
- industrial biomaterials
- functional materials
- reinventing paper

Specialty electronics
- high-performance microelectronics
- printed intelligence
- optical instruments

Green ICT

Ambient intelligence
- digital services
- networked devices and environments
- human - technology interaction

Ecoefficient built environment
- ecoeffcient transport and community infrastructure
- ICT applications

ICT technologies
- cognitive communication systems
- next generation internet
- information security

Technologies for wellbeing
- health promoting food solutions
- drug development and diagnostics
- ICT for health

Intelligent products and production
- digital product process
- global distributed production
- intelligent machines and materials

Sustainable energy
- quantum leap solutions to climate change
- efficient use and saving of energy
- renewable energy sources

Sustainable development
Spearhead programmes

**Industrial biomaterials**
- High-performance biomaterial-based packing and building materials as well as consumer products and piece goods.
- Production value chains and business environments based on renewable, non-food raw materials will be developed.
- The key raw materials are side streams from the wood processing industry and agricultural non-food raw materials.
- The exploiters are companies in the forest, packaging, chemical, construction, food, and environmental technology industries.

**eEngineering – Digital product process as a success factor for technology industries**
- Design models, processes and computing
- The quality, flexibility and efficiency of design from concepts to industrial services will be improved.
- Modelling and simulation, management of design knowledge, multiple integrated technologies, project management, tools and their compatibility, business concepts and human-technology interaction will be developed.
- The exploiters will be the process, energy, electronics, construction and manufacturing industries as well as system vendors, software houses and engineering consulting firms.

**Open Smart Spaces – Digital world and ubiquitous computing**
- A business ecosystem constructed on the basis of the interoperability of ubiquitous devices and services will be developed in partnership with other actors. This will usher in the next ICT revolution.
- The exploiters will be ICT and electronics companies, equipment and sensor manufacturers, and companies making embedded software.

**Printed intelligence – Facilitating the economic production of new smart products**
- The creation of new industries combining ICT, electronics and printing technology will be promoted.
- The key areas for business development are packaged consumer products, media and ICT services, diagnostics, bioactive paper, as well as generic printed smart materials, technologies and processes.
Major innovation programmes

- Eco-efficient Intelligent Built Environment
- Energy Efficiency and New Fuels for Transport
- Fuel Cells
- Functional Surfaces
- Reinventing Paper
- Nutritech
- Technologies for Health
- Finnish Global Factory
- High-performance Microsystems
- Information and Network Security
VTT’s participation in international public research projects

Cooperation apart from EU-funding:
- ESA, Eureka, ERA-NET, RFCS, Nordic cooperation, Art 169, Art 172, bilateral cooperation etc.
Turnover by type of income

Turnover 269 M€ in 2009

- Income from the private domestic sector 28%
- Income from the public domestic sector 27%
- Income from abroad 14%
- Basic governmental funding 31%
Revenue from commercial activities in the domestic private sector

65 M€ in 2009 (*

*) Classification according to VTT’s customer segments

- Energy 21%
- Real estate and construction 16%
- Forest industry 15%
- ICT 12%
- Machines and vehicles 11%
- Biotechnology, pharmaceutical and food industries 9%
- Electronics 7%
- Chemistry and environment 5%
- Metal refining 3%
- Services and logistics 2%
Results

- 364 notifications of inventions and 25 notifications of software in 2009
- Over 1,100 patents and patent applications in VTT’s patent portfolio in the beginning of 2009
- VTT Ventures Ltd has partnership in 18 enterprises based on VTT’s technology in the beginning of 2009
- 2,000 publications yearly, most of them scientific articles and conference presentations
- 6,700 publications in VTT’s own publication series since 1943
- 118 publications in VTT’s own publication series in 2009
Research results

- Technology for social media applications
- New industrial uses for biomass and competitiveness for forest industry
- Energy and emission scenarios to support decision-making
- New methods for cancer research to accelerate drug development
- Wireless data transfer to improve reliability of work machines
- Efficiency for building sector from mobile technology
- Renewable energy and efficiency for traffic and transport
- Support for SMEs in patent and market data utilisation

For more examples see: www.vtt.fi
Impact of VTT’s projects

- 92% of the respondents to VTT’s customer survey reported that their knowledge base and expertise had improved.

- 67% had already commercially utilised the results of their VTT project or expect to do so within the next three years – of international customers 86%.

- 60% believed that a VTT project had speeded up or otherwise improved research and development work.

- 57% thought that a VTT project had promoted networking.

- 57% confirmed that new products, services or processes were created.

- 54% reported that competitiveness had been improved.

- 49% believed that a VTT project had contributed positively towards the opening up of new business opportunities.

- 46% said that a VTT project had promoted their marketing.

- 30% reported that a whole new technology was adopted.

Taloustutkimus Oy, VTT customer survey, 2009
VTT creates business from technology