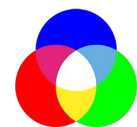


Photonics in Finland

Wednesday 29 March 2023

Juha Purmonen



Photonics Finland

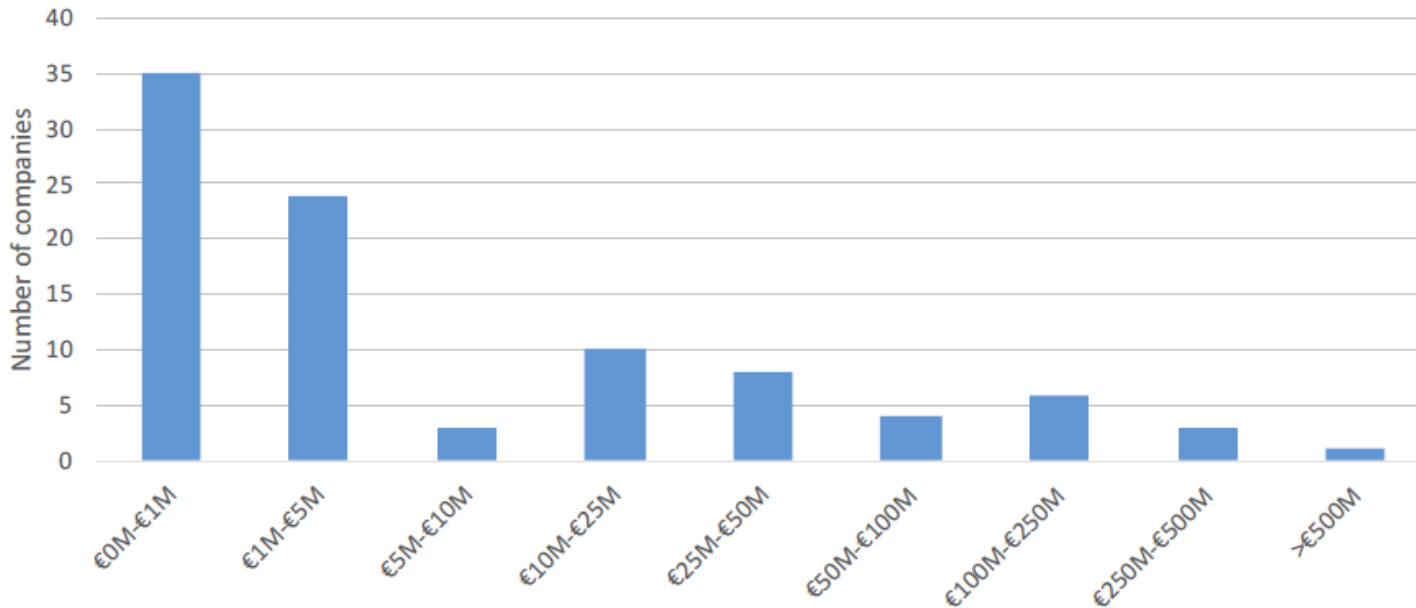


Topics – Photonics in Finland

- Some numbers and facts from Photonics in Finland
- Photonics Finland and services (shortly)
- Key Photonics Competences in Finland
- Remarks & Takeways

Total annual revenue of photonics business in Finland is over 1 200 million euros, and the photonics business directly employs more than 4 200 workers in Finland

Total annual turnover of photonics companies in Finland

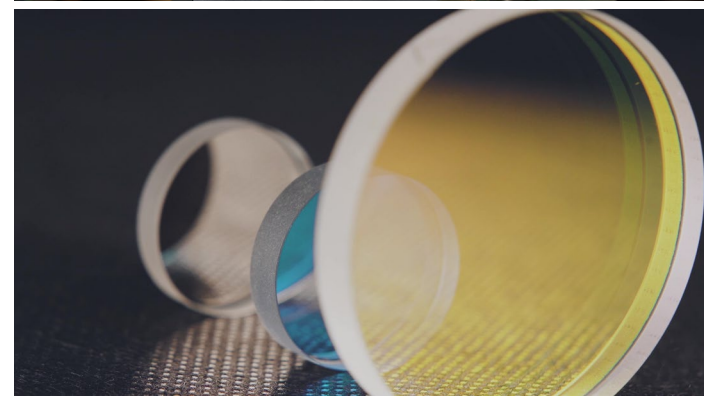
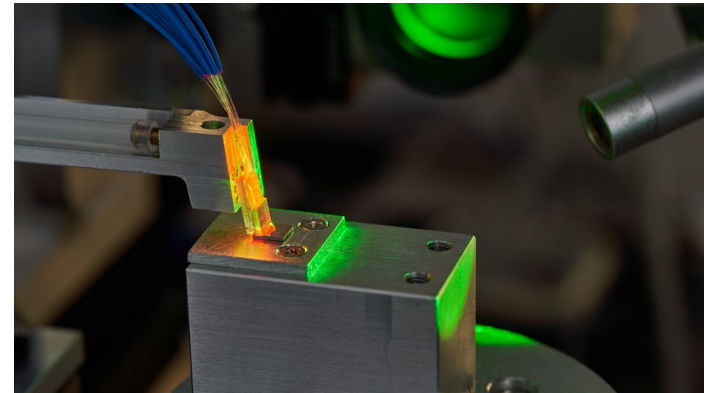
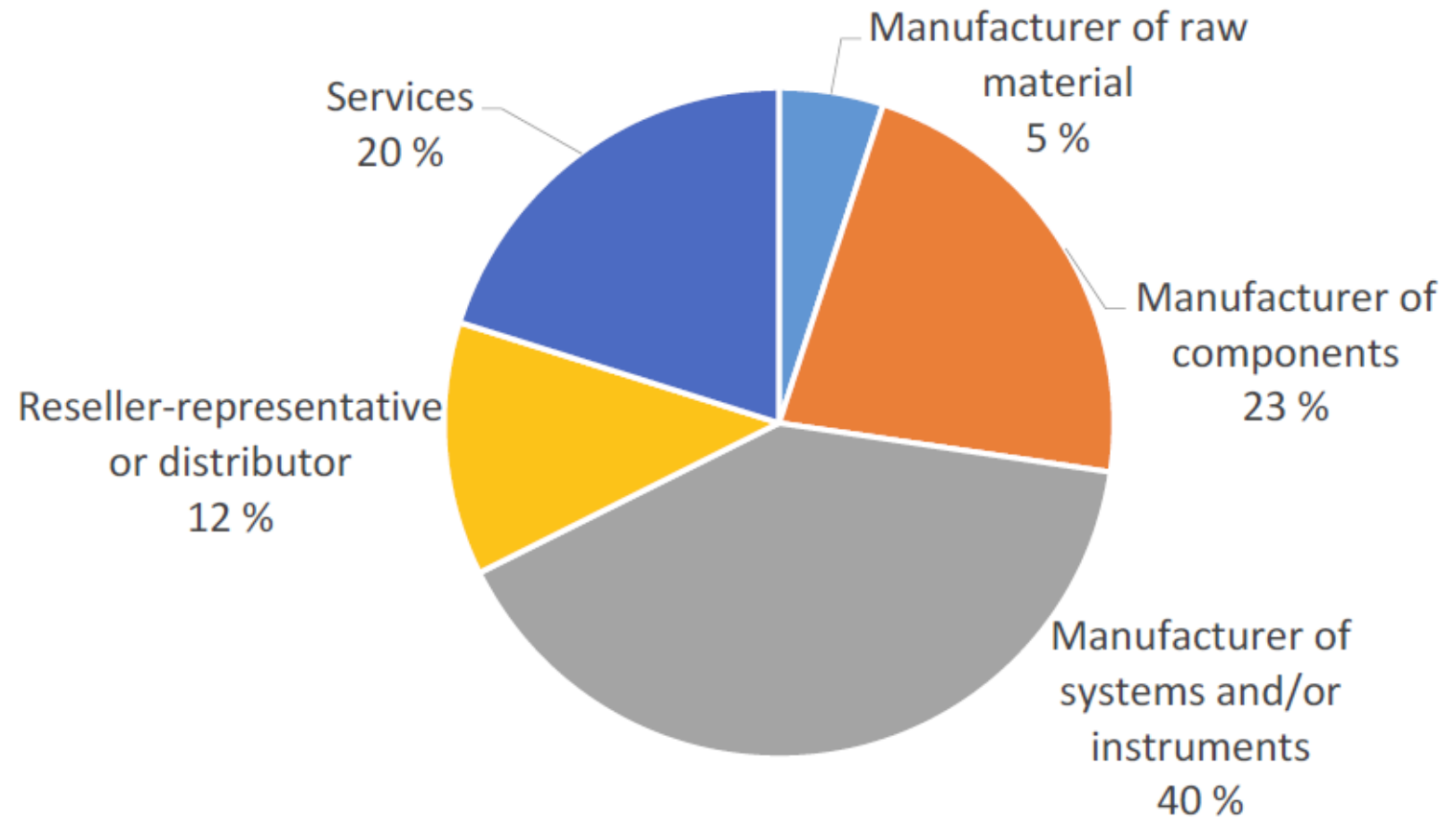


- **Finland has at least 260 companies with photonics activities based on survey results**
 - Compared with the results from 2016 survey, the number of active companies has increased by approximately 60 companies
 - Majority of photonics companies (62%) are small with less than 5M€ annual turnover
 - Median Finnish photonics company has 10-15 employees
- **The estimated total revenue of photonics business in Finland is 1 200 – 2 300 meur**
 - Compared to the results from the 2016 survey, the industry has grown more than 40%
 - The annual growth rate of the industry has been approximately 12%
- **4 200 - 6 000 employees of Finnish photonics companies are directly working with photonics. In total, the photonics companies employ 28 000 – 35 000 workers**

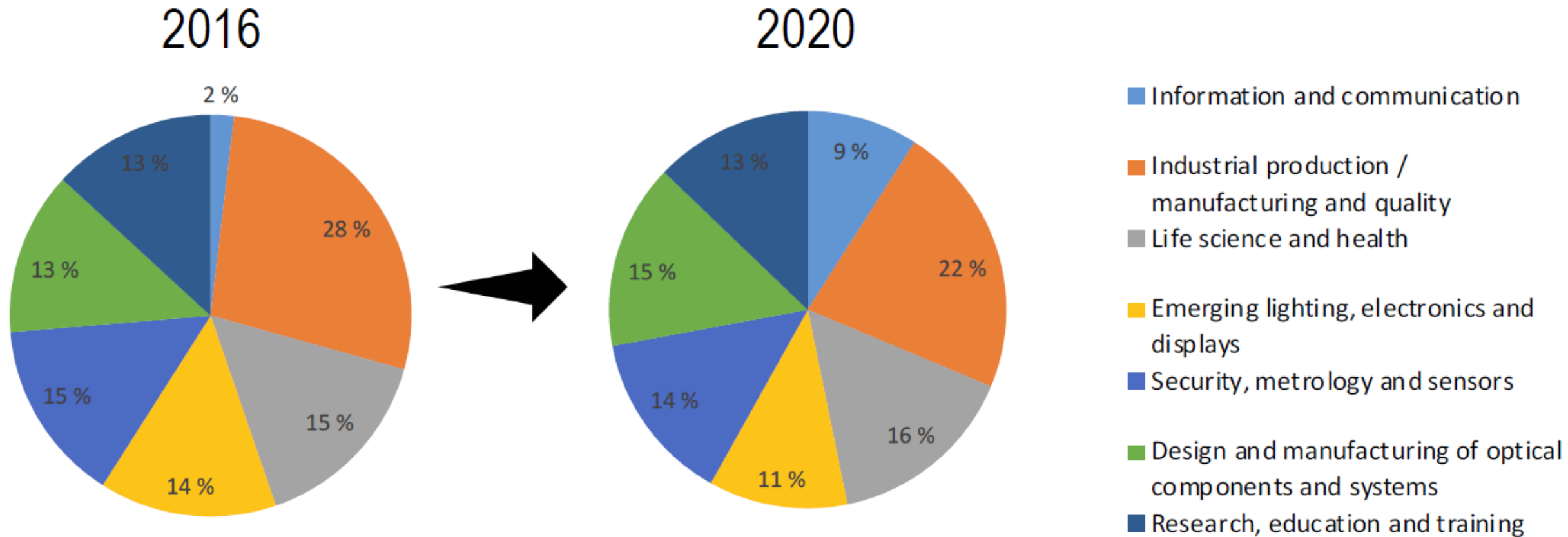
Most photonics companies in Finland are manufacturing systems, instruments and components



Current offering of Photonics companies in Finland

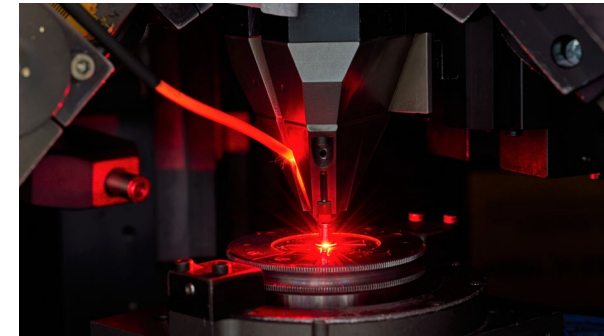
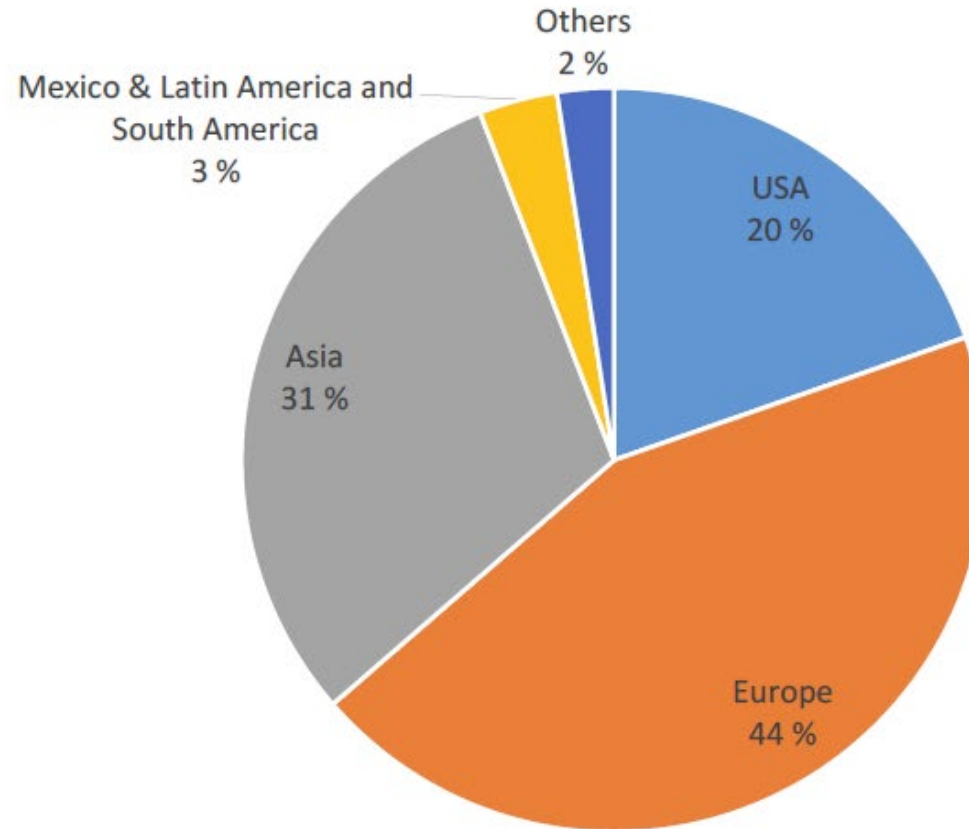


Industrial manufacturing continues to be the most important market for photonics companies



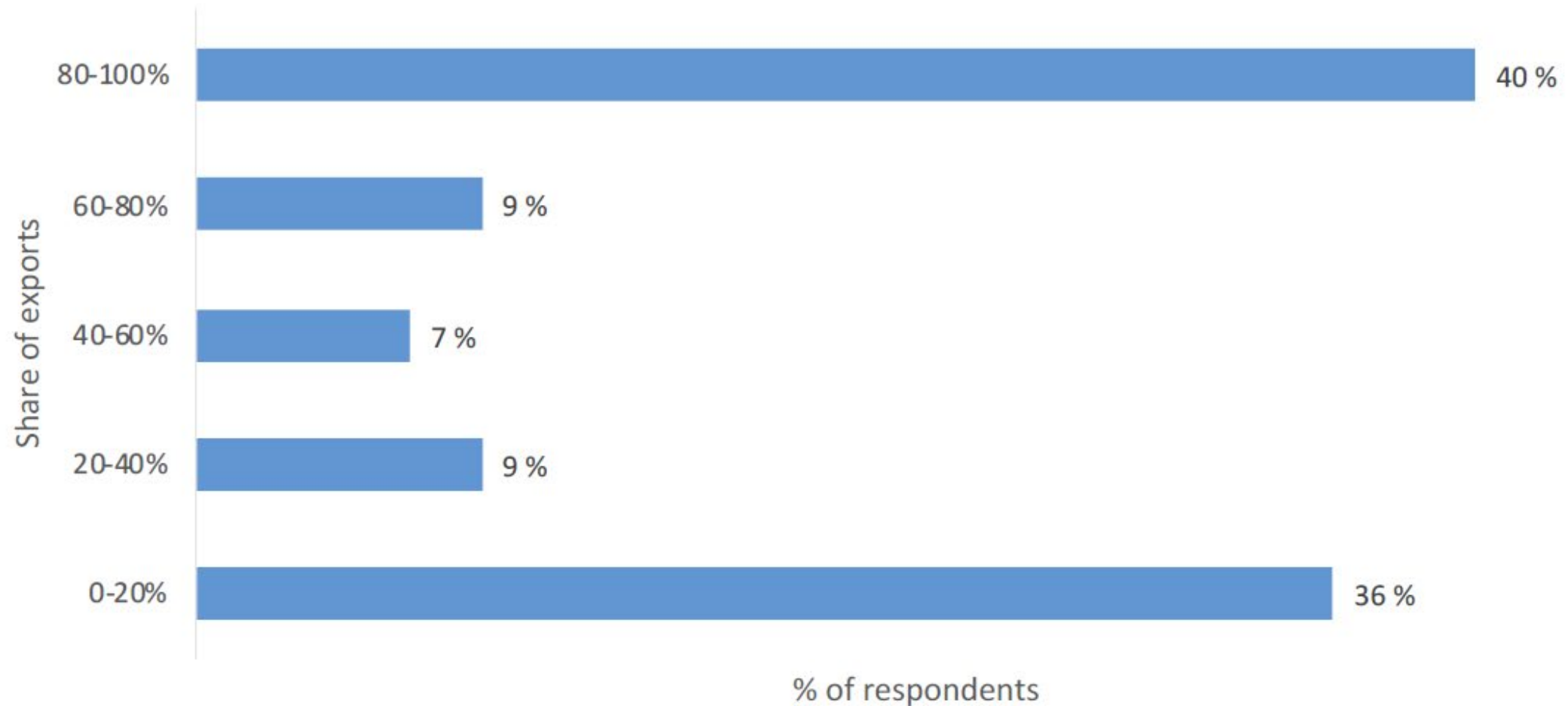
The key export markets for Finnish photonics companies are Europe, Asia and USA

Key export markets for photonics related products and services



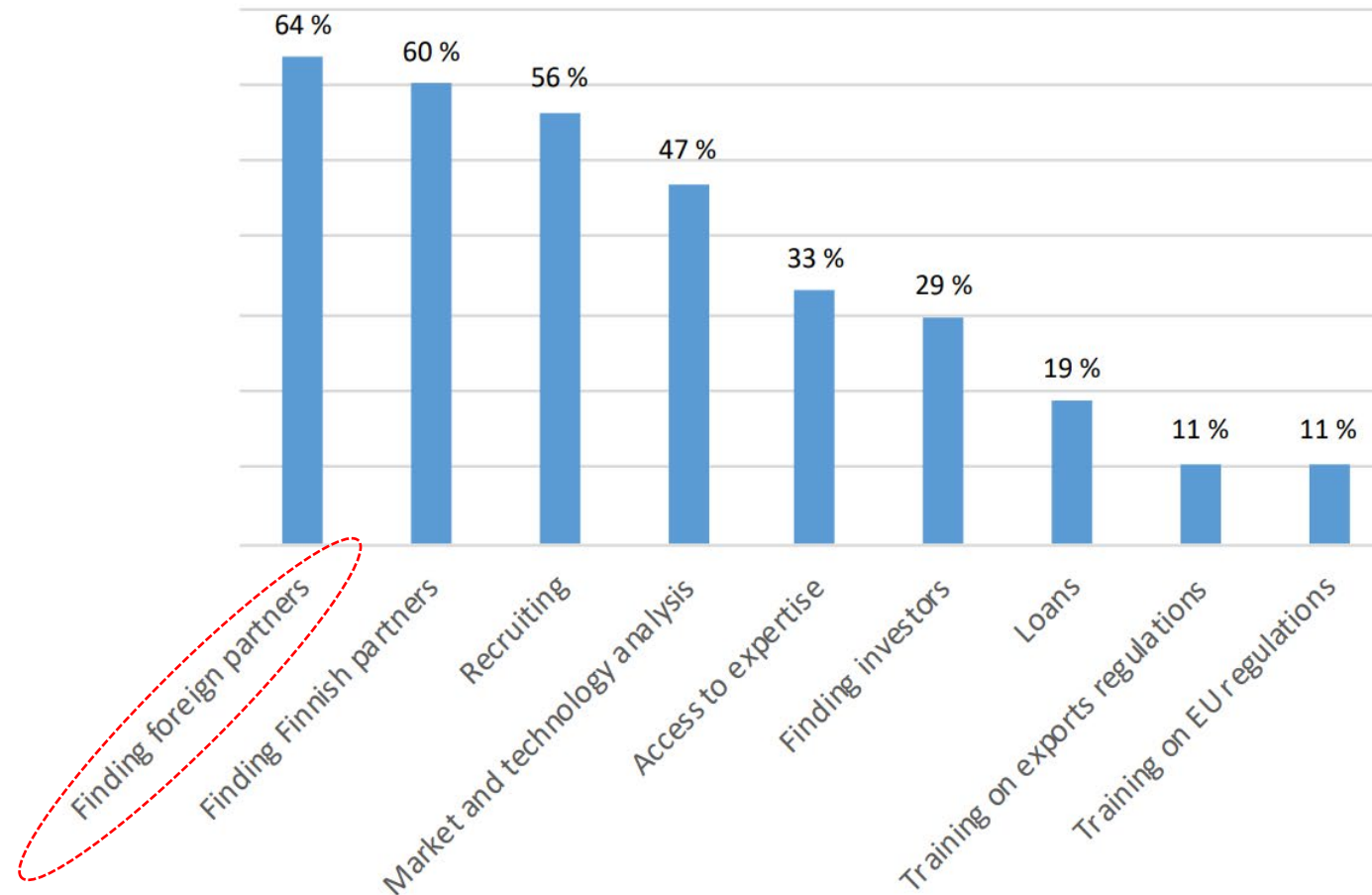
Finnish photonics companies are extremely export-intensive i.e., over 40% of the companies reported that their revenue is generated almost entirely from exports

Share of exports of your company's photonics related products and/or services of your company's turnover currently



Finding domestic and foreign partners, recruiting and market & technology analysis are the most important facilitators of growth of photonics companies

What kind of assistance would facilitate the growth of your company



PHOTONICS IN FINLAND 2020

COMPANIES



- ✓ TOTAL 260 COMPANIES
- ✓ +60 COMPANIES / +30% SINCE 2016
- ✓ NEW COMPANIES FOUNDED +9% YEARLY

TURNOVER



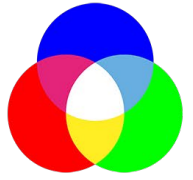
- ✓ TOTAL 1,2 BILLION EUROS
- ✓ +350 MILLION EUROS / +40% SINCE 2016
- ✓ COMPANIES TURNOVER GREW +12% YEARLY

EMPLOYEES



- ✓ TOTAL 4 200 EMPLOYEES
- ✓ +700 EMPLOYEES / +20% SINCE 2016
- ✓ AMOUNT OF EMPLOYEES GREW +7% YEARLY





Photronics Finland



Photronics Finland is a technology oriented association that drives the photronics industry in Finland. It gathers Finnish photronics companies, academia, industries that apply and adapt photronics and public authorities under the national network.

Photronics Finland develops practices to coordinate and develop Finnish photronics internationally by working closely with other European photonic clusters which are sustained by European Union Photronics Platform (Photronics21).

Photonics Company of the Year



2021 Dispelix Oy

2020 Varjo Technologies Oy

2019 Modulight Oyj

2018 Oplatek Group Oy

2017 OptoFidelity Oy

2016 Gasera Oy



modulight



dispelix



The Academy of Finland's Flagship Programme is an instrument that supports **high-quality research** and **increases the economic and societal impact** emerging from the research. The Finnish Flagships represent an effective mix of close cooperation with business and society, adaptability and a strong commitment from host organisations.



FLAGSHIP PROGRAMME

2018–2026

The northern fleet of excellent science, successful collaboration and solutions for tomorrow

The Finnish Flagship Programme provides a new, unique way of doing R&D&I in Finland. Substantial, long-term funding is granted for large ecosystems, Flagships, each operating in their specific field.

The Programme promotes active collaboration between research, business and society in the field of each Flagship. This supports future knowledge and know-how, and helps to create solutions to societal challenges, develop new business opportunities, and contribute to sustainable growth.

Attractive, large ecosystems and hubs for excellent people with high ambitions

THE FINNISH FLAGSHIPS REPRESENT

- effective mix of **cutting-edge research**
- **long-term plan**
- versatile **societal impact** e.g. in support of sustainable growth and development
- close **collaboration** with business, industry and society
- high ambition level
- excellent working facilities, infrastructures and **strong commitment** from host organisations
- **high-quality research and proven impact**, peer-reviewed by an international panel of experts and selected by the Academy of Finland, Research Council of Finland.



FLAGSHIP PROGRAMME

FLAGSHIPS – High-impact competence clusters

- ▶ Six flagships selected
- ▶ Each flagship has a long-term plan for eight years
- ▶ Flagship term: 2019–2026
- ▶ Collaborators include large corporations, SMEs and startups, educational institutions, hospitals and other public organisations

8 years of activity within the flagships areas, with an estimated total worth of 9 billion euros.

Most of this is financed by business companies.



ACADEMY OF FINLAND

LEADING EUROPEAN PHOTONIC ECOSYSTEM

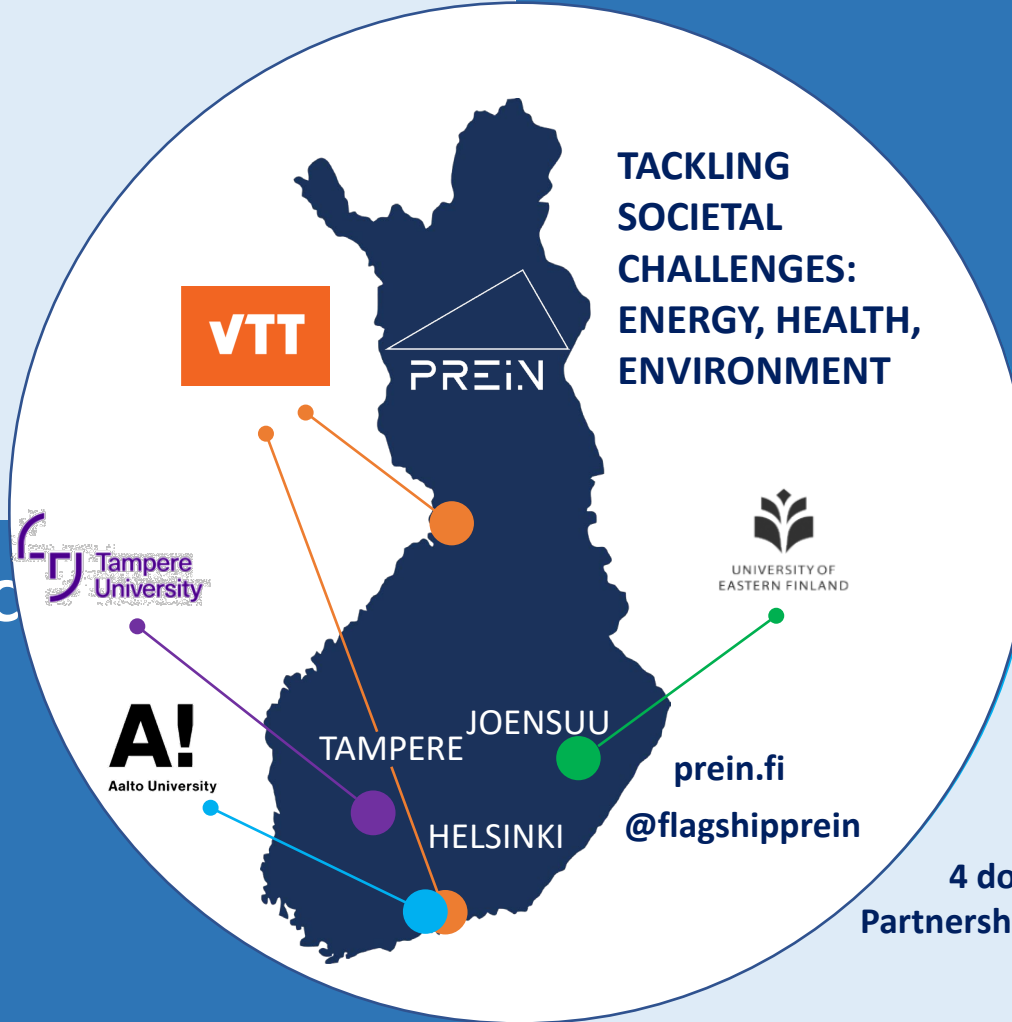
- 4 partners
- 400+ staffs
- 50+ collaborating countries and 280+ institutions
- 150+ industrial partners
- National roadmap Infrastructure network

WORLDCLASS RESEARCH

- 250+ journal publications annually
- 40+ high impact publications annually
- Highly cited researchers
- 8 ERCs
- Multiple awards
- Various positions in international societies, industry clusters, and other stakeholders

GLOBAL HUB OF PHOTONIC EXPERTISE

- Silicon technology
- Optoelectronics
- Plasmonics
- Organic materials
- Lasers
- Nonlinear optics
- Spectroscopy
- Photovoltaic
- Nanostructures
- Nanomaterials
- 2D materials
- Quantum optics
- Waveguides
- Fiber-optics
- Diffractive optics
- Printed optics
- MOEMS



LARGE EDUCATION NETWORKS

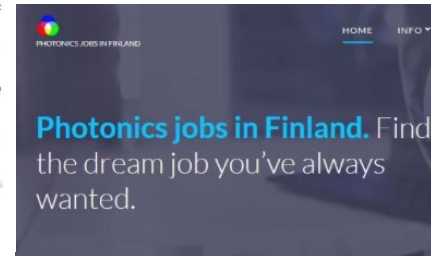
- 2 international MSc programs
- 4 Erasmus Mundus joint degree programs
- 4 double-degree programs with foreign universities
- Partnership program with the science education network of Finnish universities

STRONG ENGAGEMENT WITH SOCIETAL ACTORS

Industry



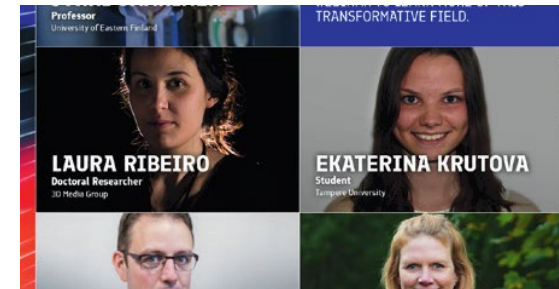
- Partnership with Photonics Finland (Industrial cluster and academic society)
- *Photonics for X* seminars
- National recruitment platform
- IP transfer and collaboration



Education



- Joint courses between Academic partners
- Photonics Explorer Kit campaign



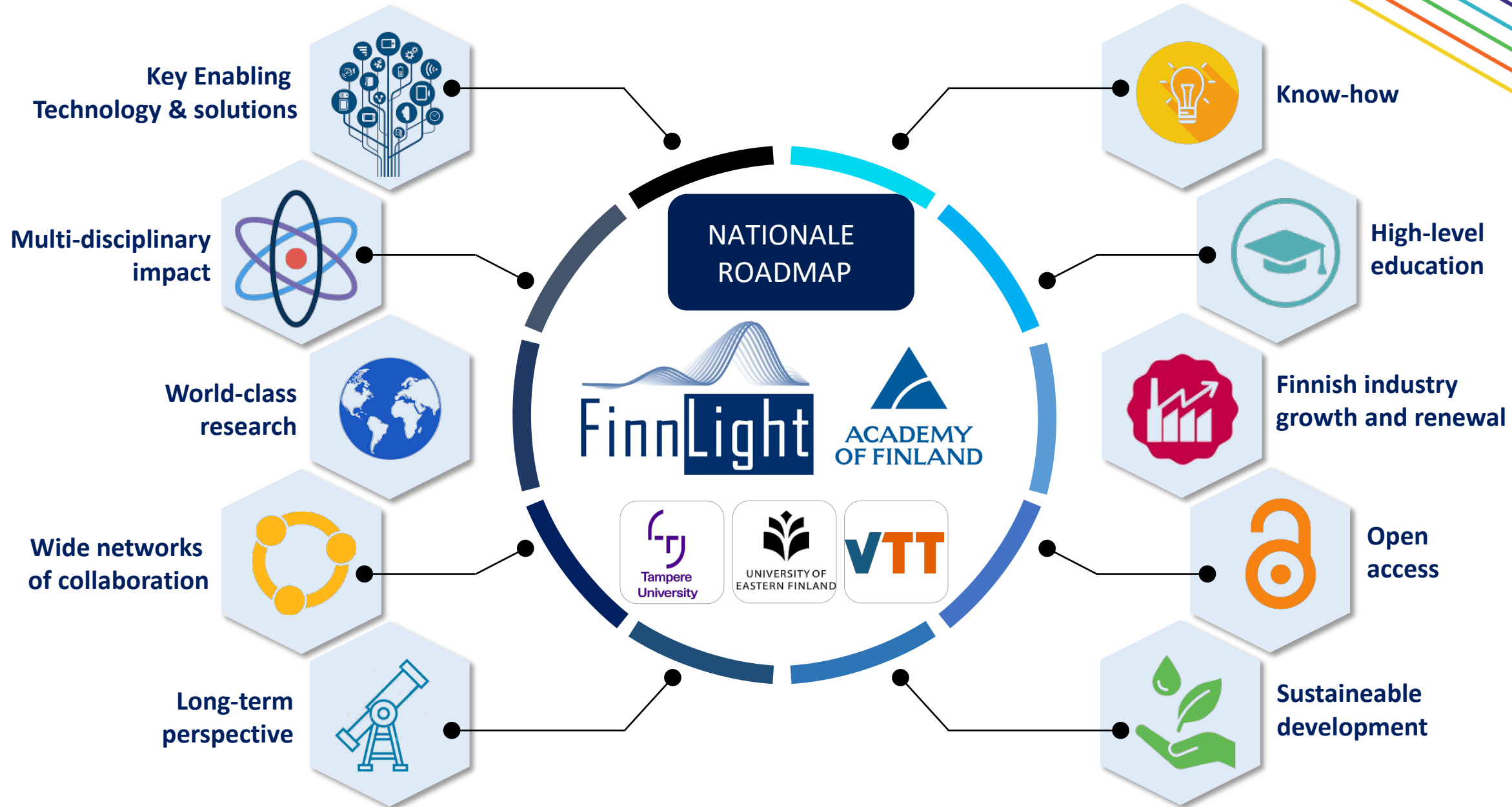
Outreach



- International week of light in May
- Girls in Science
- National schools competition
- Suomi Arena

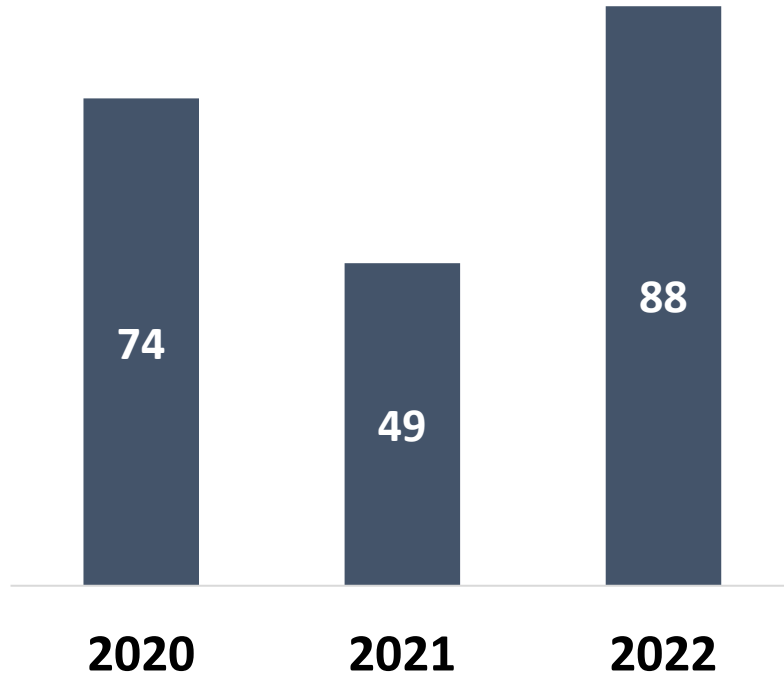


FINNISH INFRASTRUCTURE FOR LIGHT-BASED TECHNOLOGIES - FINNLIGHT



DEVELOP INNOVATION CULTURE

Invention disclosures and patent applications



- Identify business opportunities from research results
- Smooth process from invention disclosure to patent application and patent
- Research-to-business projects (Business Finland)
- Licensing to existing companies
- Startups



Key Photonics Competences in Finland

➤ Optical sensing and imaging

- Machine vision, spectral imaging, ...

➤ Micro- and nanophotonics

- R2R, 3D printed optics, MOEMS, silicon photonics, VR/AR optics, ...

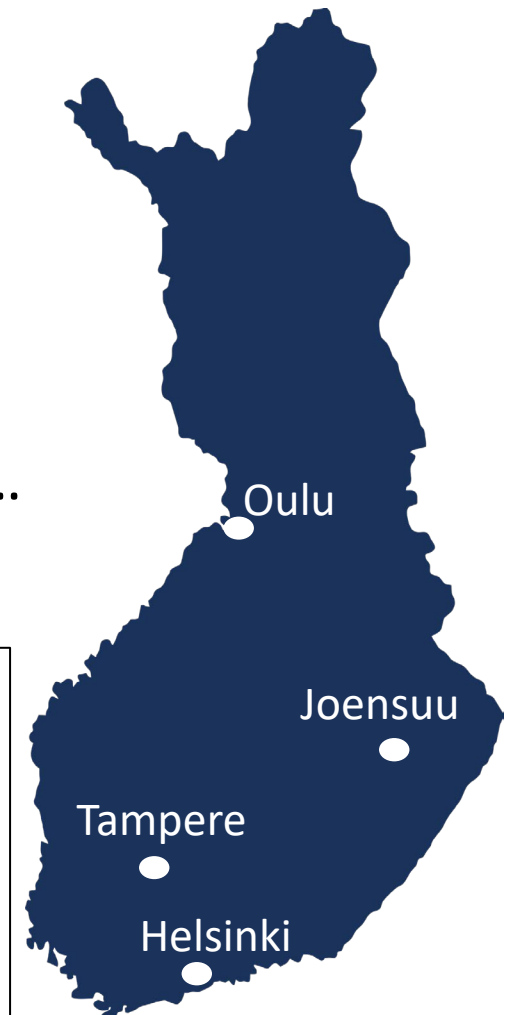
➤ Lasers and fiber optics

- Fiberlasers, laser, ...

➤ XR, VR, AR, MR

Ecosystem including

- *Leading companies*
- *SMEs*
- *Research groups*
- *Facilities*
- *Government support*



Networks

National Photonics Cluster

PhotonicsNL, Netherland

Photonics Sweden

Photonics Austria

Photonics France

Fotonika21, Spain

PCO, Photonics Platform Poland

Swissphotonics, Photonics Platform Switzerland

AIET, Photonics Platform Italy

FORTH, Photonics Platform Greece

Regional Photonics Clusters

Optics Valley, Tucson, US

Rochester Photonics, US

Photonics Hub, Wetzlar, Germany

Optonet, Jena, Germany

Optitec, Marseille, France

Route des Lasers, Bordeaux, France

SecPho, Barcelona, Spain

Photonics Bretagne

OpTecBB, Berlin, Germany

Quebec Photonics, Canada



<https://www.photonics.fi/jobboard/>

Photonics jobs in Finland. Find the dream job you've always wanted.

Keywords

Location

TUOTEKEHITYSPÄÄLLIKKÖ-/JOHTAJA

FULL TIME Eko-Aims Oy

Ylämylly, Liperi
Posted 6 days ago

Product Manager, life cycle management

FULL TIME SPECIM

Oulu, Finland
Posted 2 weeks ago

OPTICAL ENGINEER

FULL TIME Nanocomp Oy

Lehmo
Posted 2 weeks ago

Laboratory Technician/Engineer - Nanoimprinting

FULL TIME Inkron Oy

Espoo, FINLAND
Posted 2 weeks ago

Junior Laser Engineer

PART TIME Picophotonics Oy

Tampere
Posted 3 weeks ago

Photonics job board – open positions

Photonics jobs in Finland - <https://www.photonics.fi/jobboard/>

Photonics Jobboard Finland – LinkedIn Group for Photonics professionals

<https://www.linkedin.com/groups/9046550/>

Events

Optics&Photonics Days (OPD)

The main event in Photonics in Finland

OPD2023 – Joensuu, 30. May - 1. June 2023

<https://www.photonics.fi/opd2023/> (This year)

<https://www.photonics.fi/events/>

<https://prein.fi/home/news-and-events>



Photonics 4 X events

- Photonics for Forestry (Forest&Photonics)
- Metrology for XR & freeform Optics
- Funding for Photonics
- Photonics for Medical
- Photonics for Healthcare
- Photonics for Mining
- Photonics for XR
- Photonics for Sensing
- Photonics for Agri-Food
- Photonics for Maritime
- Photonics for All

IN 10 YEARS FINLAND HAS BECOME ONE OF THE MAJOR EUROPEAN PLAYERS IN PHOTONICS



FinnLight
Finnish national infrastructure for light-based technologies

Photonics Finland
100 companies



PREiN ACADEMY OF FINLAND
Flagship for Photonics Research and Innovation




Photonics Finland
launched 19
companies

2015

2018

2020

2010
Finland is not even mentioned

An Overview of Photonics Innovation Clusters and National Technology Platforms in Europe
June 2010



2014
First joint Finland pavilion for companies in large international photonics exhibitions

Participation to European Photonics21 PPP strategy for H2020 program

Photonics report published by Parliament of Finland



EDUSKUNNAN TULEVAISUUSVALIOKUNNAN JULKAISU 5/2018
 FOTONIIKASTA VALOA SUOMEN HYVINVOINTIIN
 Selvitys alan vaikuttavuudesta ja kasvunäkymistä

2019

2022
Finland is one of the five "lighthouses"



Photonics Finland Board of Stakeholders of Photonics 21




Juha Purmonen

Executive Director
Photonics Finland

juha.purmonen@photonics.fi

+35850 354 3832



@PhotonicsFin

@prein @JuhaPurmonen

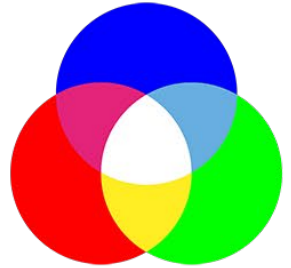


[linkedin.com/in/juha-purmonen/](https://www.linkedin.com/in/juha-purmonen/)



Photonics Finland





Photronics Finland

Remarks - Takeaways

- Vibrant startup scene including Photonics
- "Niche" Photonics companies – small but high technology level
- Application driven business environment
- One of most advanced Photonics ecosystem in Europe
- Universities and companies are doing close collaboration

