

Photonics21 and the Photonics PPP: Support to SMEs and technology roadmap

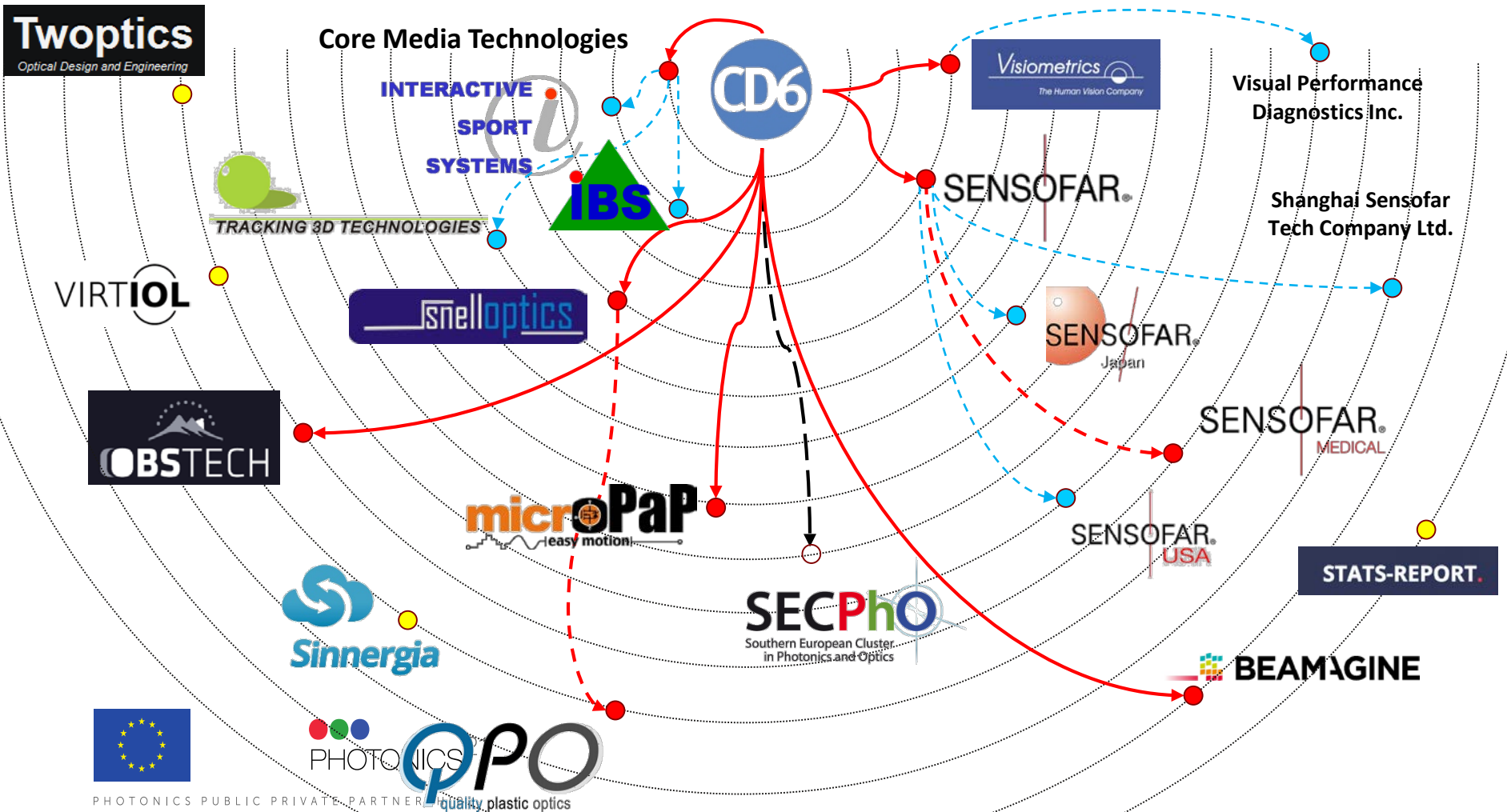
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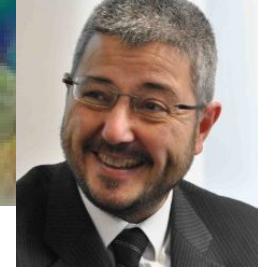




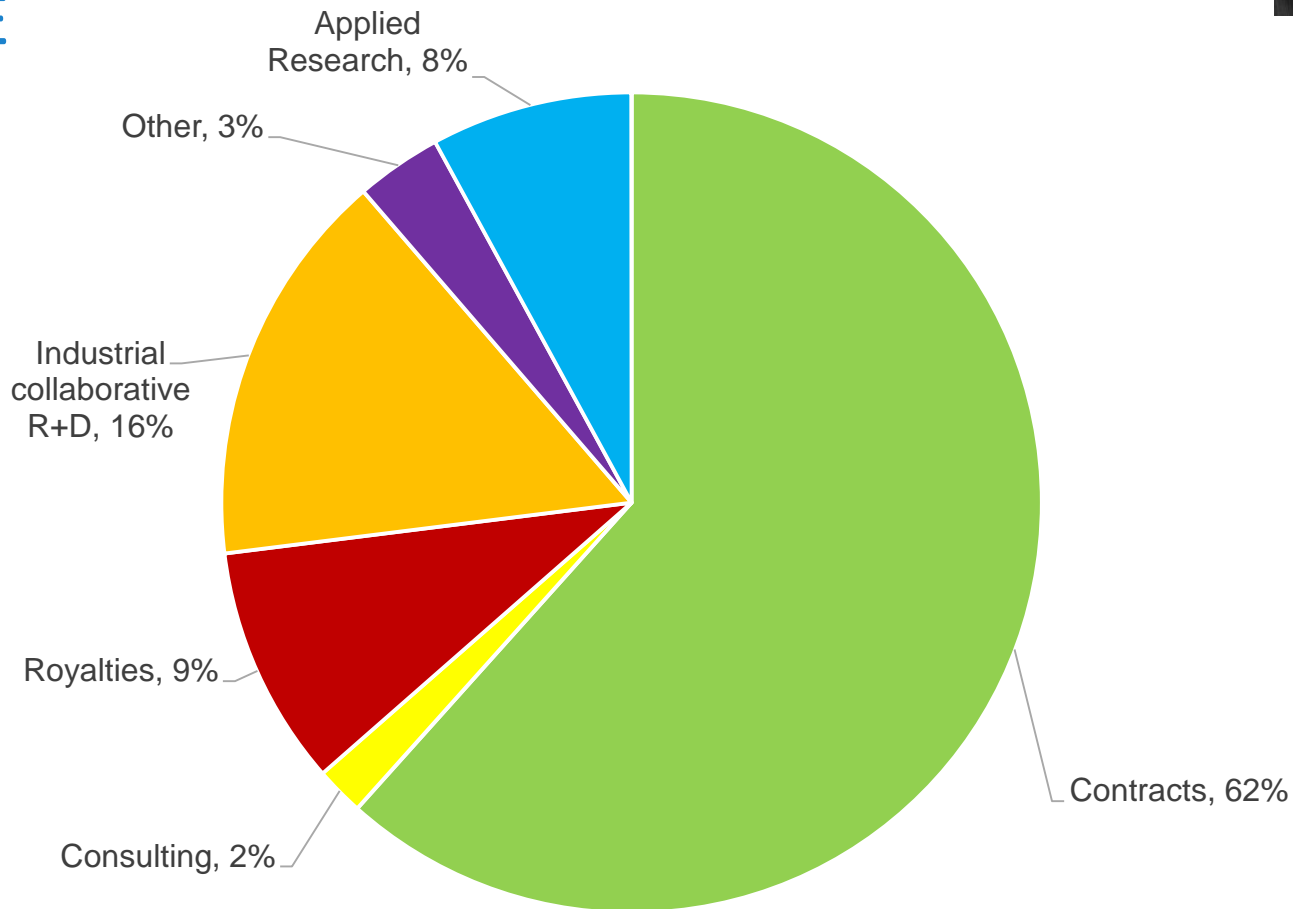
ENTREPRENEURIAL VENTURES HISTORY

1997 1999 2000 2001 2003 2004 2005 2006 2009 2011 2012 2013 2015 2016 2017






INCOME



2016 Turnover: 1,3M€

 **2016 Projects Ratio: 73% Private / 27% Public**



Photonics21 and the Photonics PPP

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Photonics PPP and ETP

The Photonics ETP: EU Photonics Industry at a glance

Investment

Nearly **€10Bn** – In 2015 European Photonics Industry pledged €9.6Bn to Innovation (R&D spending and Capex)

R&D intensity in the Photonics industry amounts to nearly **10%**

Photonics industry is leveraging public investment in the PPP projects by a factor of **4.3**

Industry participation in Horizon 2020 PPP projects increased to **45%** compared to 35% in FP7

7 Prototyping and Pilot Manufacturing services to help end user industry to speed up product development

€49M invested by the EC in the PPP Pilot manufacturing services (Pilot lines)

67 Projects started so far under the frame of Horizon 2020 with a public investment of a total of **€278M** EC funding over the first 3 years of Horizon 2020: 2014–2016

Market

The European Photonics market amounts to **€69Bn** per annum

European Photonics Production has increased by over **62%** over the last 10 years

The European Photonics Production has grown with an average CAGR of **5%** since 2005

European Photonics Production Growth rate is more than **3.5** higher than EU GDP Growth rate

50% global market share for European Photonics for Production Technology

35% global market share for European Photonics for Optical Measurement & Image Processing

32% global market share for European Photonics for Optical Components and Systems

People

19,000 new jobs created in the European Photonics Industry

Forecast: **42,000** new jobs could be created by 2020

9 PPP Projects explicitly devoted to promoting Research, Education & Training in Photonics

More than **1700** Photonics companies and research organisations back the Photonics PPP.

More than **3000** registered personal members in the platform Photonics21

About **1000** attendees in Photonics PPP strategy development workshops and meetings



Photonics21 – Our Mission

Unify the European photonics community & advise the European Commission on research innovation needs

- Establish links between industry, science and politics in photonics research, development and innovation
- Define a joint photonics strategy for Europe: the PPP and beyond
 - Photonics Multiannual Roadmap
 - Research and Innovation priorities for the *Horizon 2020* calls

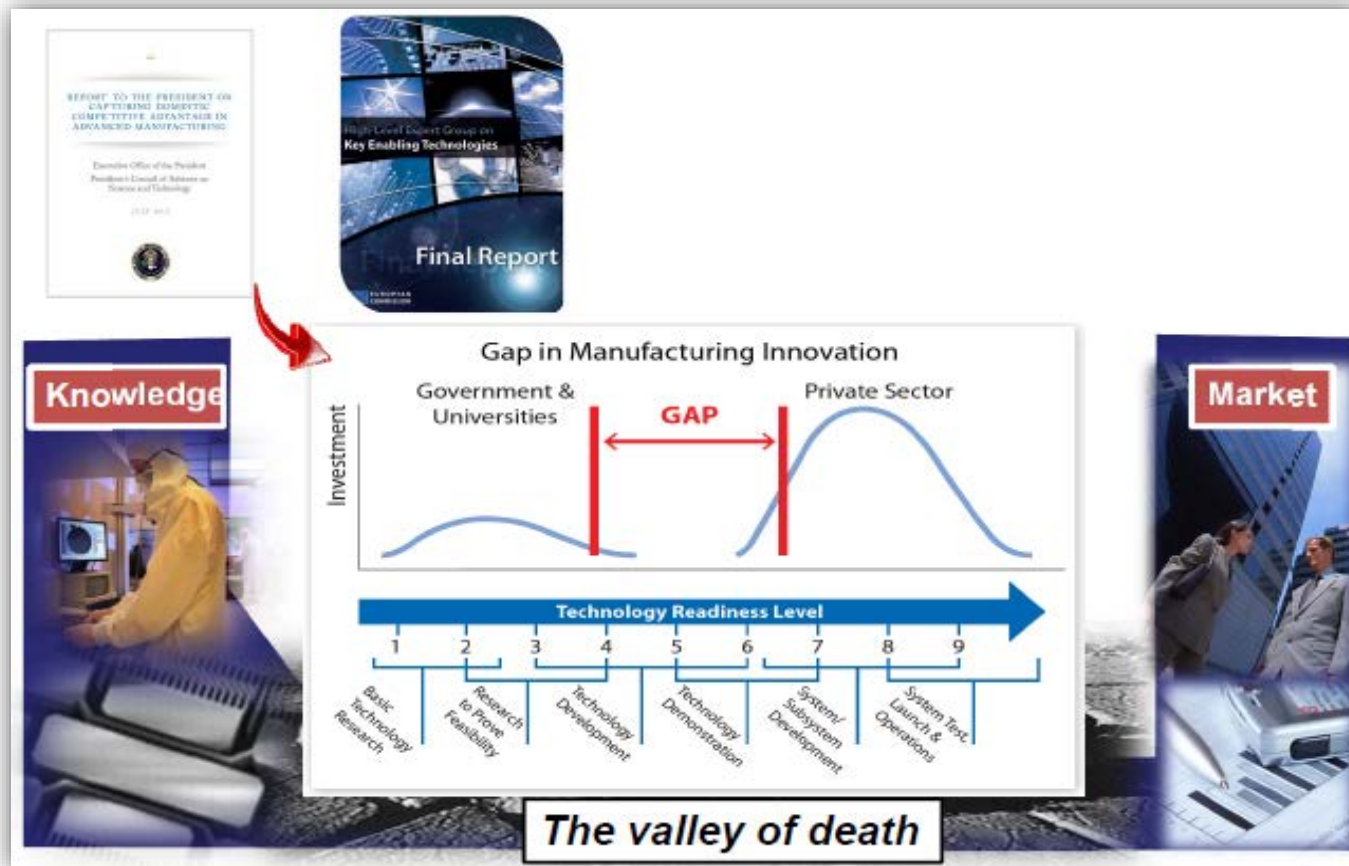
Membership:

- More than 3000 members (representing >1000 affiliations) from all over Europe:
 - Balanced share of industry and Research & Technology Organisations, associations, clusters, national technology platforms
 - Throughout the value-chain (components-systems)
- Membership is free of charge and open to everybody involved in the field of photonics.



Why a Photonics PPP in Horizon2020?

Speed up from Lab to Fab – Overcoming the Valley of Death



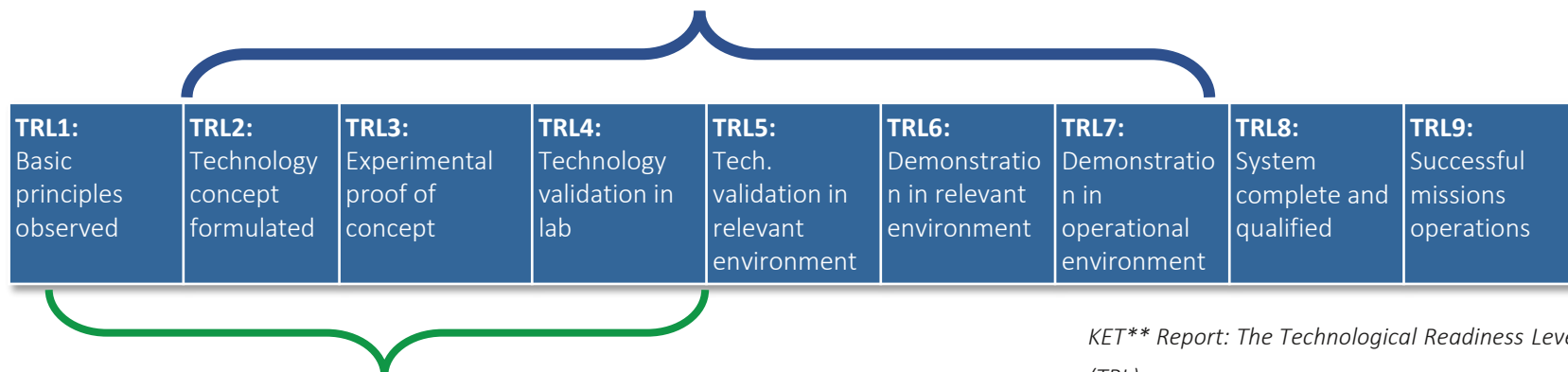
Source: High Level Group on KETs – final meeting (24/06/2014)



Overcoming the Valley of Death

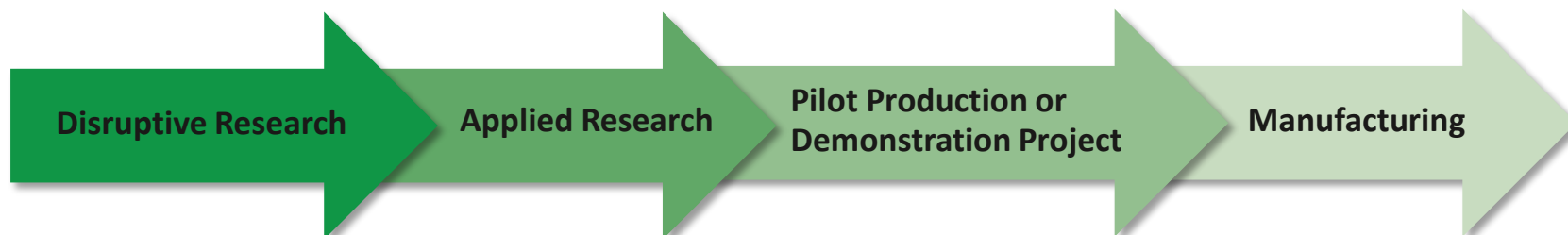
Closer to the Markets - PPP projects move up to TRL 7

Focus of Photonics PPP Projects



*KET** Report: The Technological Readiness Level (TRL)*

FP7 funding



Challenge: Activities closer to the market are often 10 times more expensive



Photonics PPP and ETP

Photonics PPP – more than four Years of common Efforts to realize the Potential of Photonics for Growth & Jobs in Europe



Source: Photonics21/VDI Technologiezentrum GmbH, Photographer: Bea Uhart

Towards Horizon 2020 - Foundation of the Photonics PPP in 2013

Photonics21 Vice Presidents Bernd Schulte and Giorgio Anania and EU Commission Vice President Neelie Kroes (from left to right) officially signed the Photonics PPP contract in the frame of a Signing Ceremony for the eight contractual PPP's under Horizon 2020 in Brussels 2013



Source: Photonics21/VDI Technologiezentrum GmbH, Photographer: Vivian Hertz

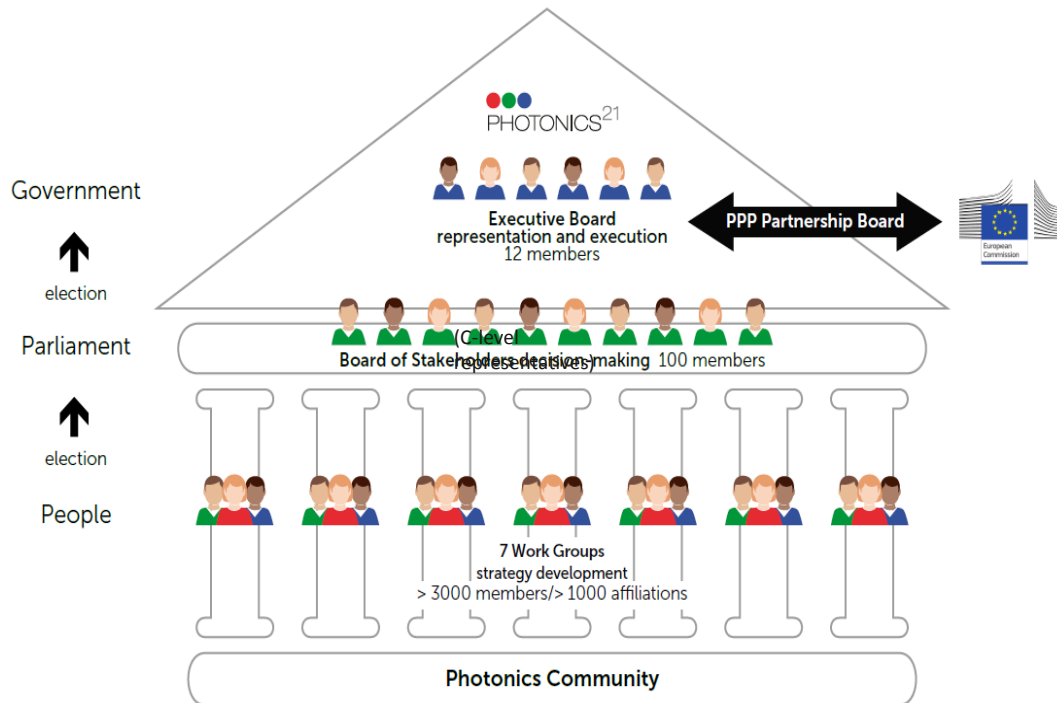
Towards New Horizons – Photonics for Digitization of European Industry

Commissioner Günther H. Oettinger opened the plenary session of the Annual Meeting 2016 with his keynote speech "Photonics for the successful digitization of European Industry"



Photonics PPP and ETP

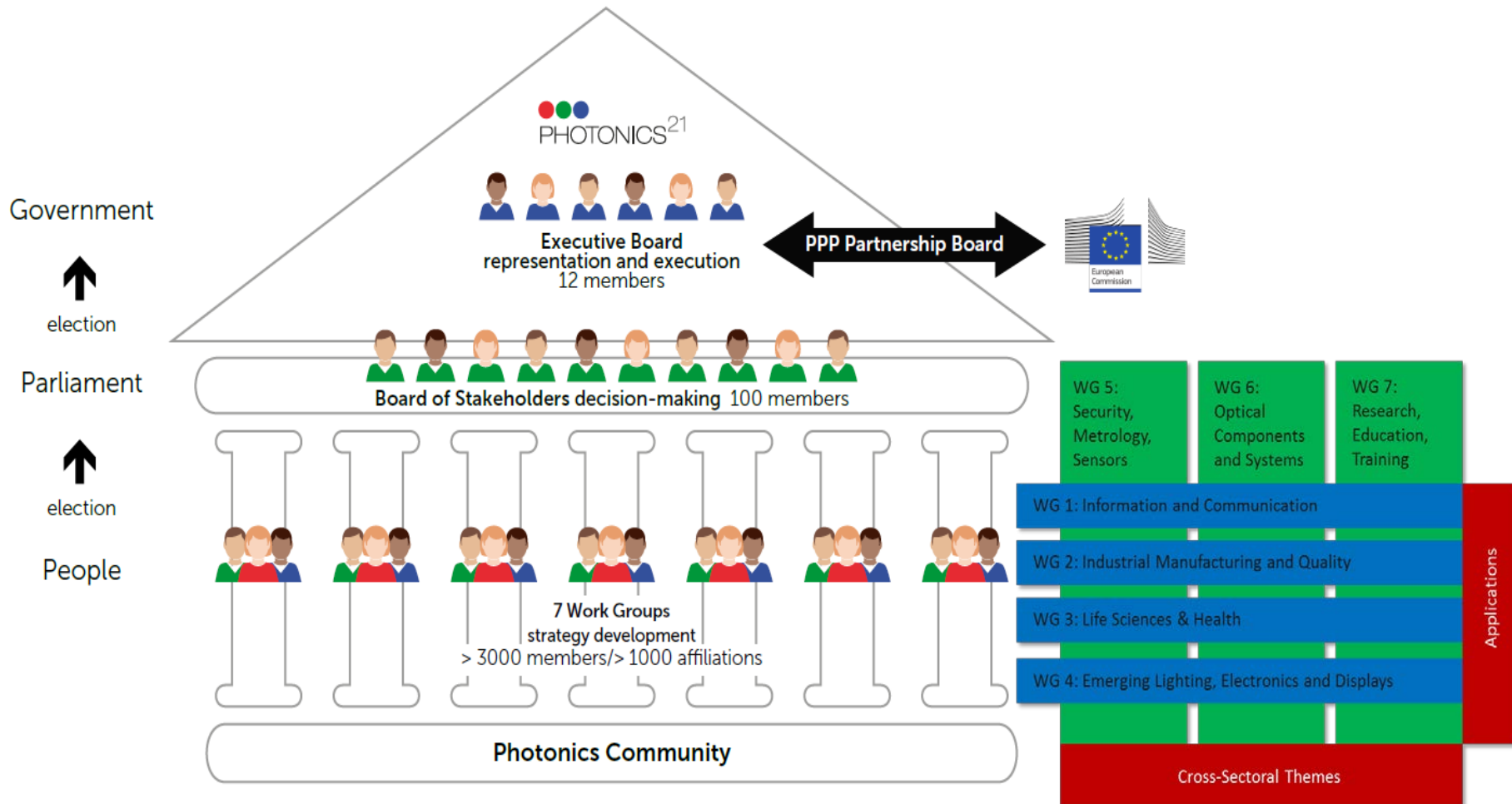
Our Basis: A broad Photonics21 Community drives the Photonics PPP – fully democratic Structure & Decision Making



- European photonics strategy implemented by Photonics21 and European Commission
- Photonics21: More than **3000 members** (representing **>1000 affiliations**) from all over Europe:
 - Balanced share of industry and Research & Technology Organisations, Associations, Clusters, National Technology Platforms
 - Value-chain covered
- Photonics21 stakeholders (business representatives, researchers, scientists) engage on a voluntary basis
- Membership is **open to all and free of charge**



Photonics21: Bottom-up Organisation and Structure of the Photonics Public Private Partnership



Photonics PPP and ETP

Composition of the Photonics21 Executive Board

President:

Aldo Kamper, CEO Osram Opto Semiconductors GmbH

Vice Presidents:

Giorgio Anania, President & CEO Aledia

Jaap Lombaers, Managing Director Holst Centre

Hugo Thienpont, Director of Research Brussels Photonics Team, Professor VUB

Bernd Schulte, COO Aixtron

Work Group Chairs:

**Information &
Communication**

Jean-Luc Beylat,
President Alcatel Lucent
Bell Labs France

**Industrial Produc-
tion/ Manufacturing
& Quality**

Thomas Rettich,
Head of Research
Coordination TRUMPF

**Life Science &
Health**

N.N.

**Emerging Lighting,
Electronics &
Displays**

Heinz Seyringer,
Head of Research
Collaborations Zumtobel
Group

**Security, Metrology
& Sensors**

Peter Seitz,
Managing Director
Hamamatsu Photonics –
Applied Research Europe

**Design & Manu-
facturing of Compo-
nents & Systems**

Mike Wale,
Director Active Products
Research Oclaro

**Photonics Research ,
Education & Training**

Roberta Ramponi,
Institute of Photonics and
Nanotechnologies



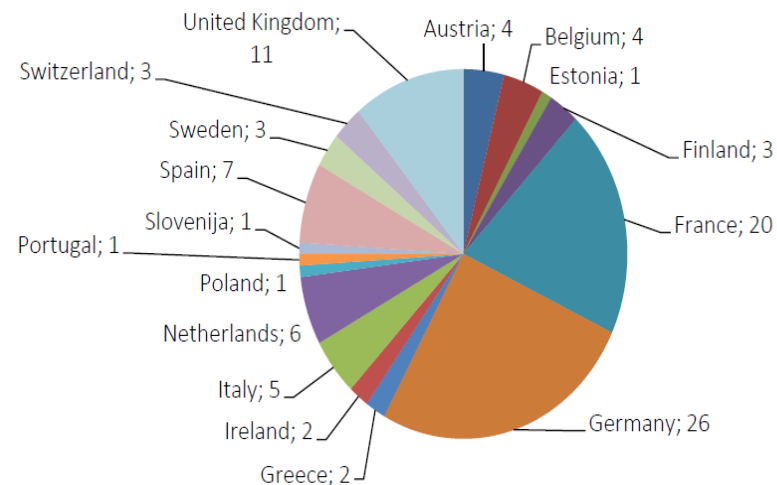
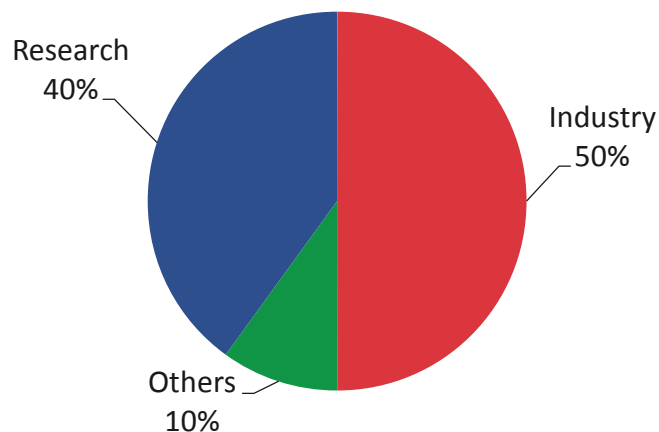
PHOTONICS²¹

Photonics PPP and ETP

Function and Structure of Board of Stakeholders

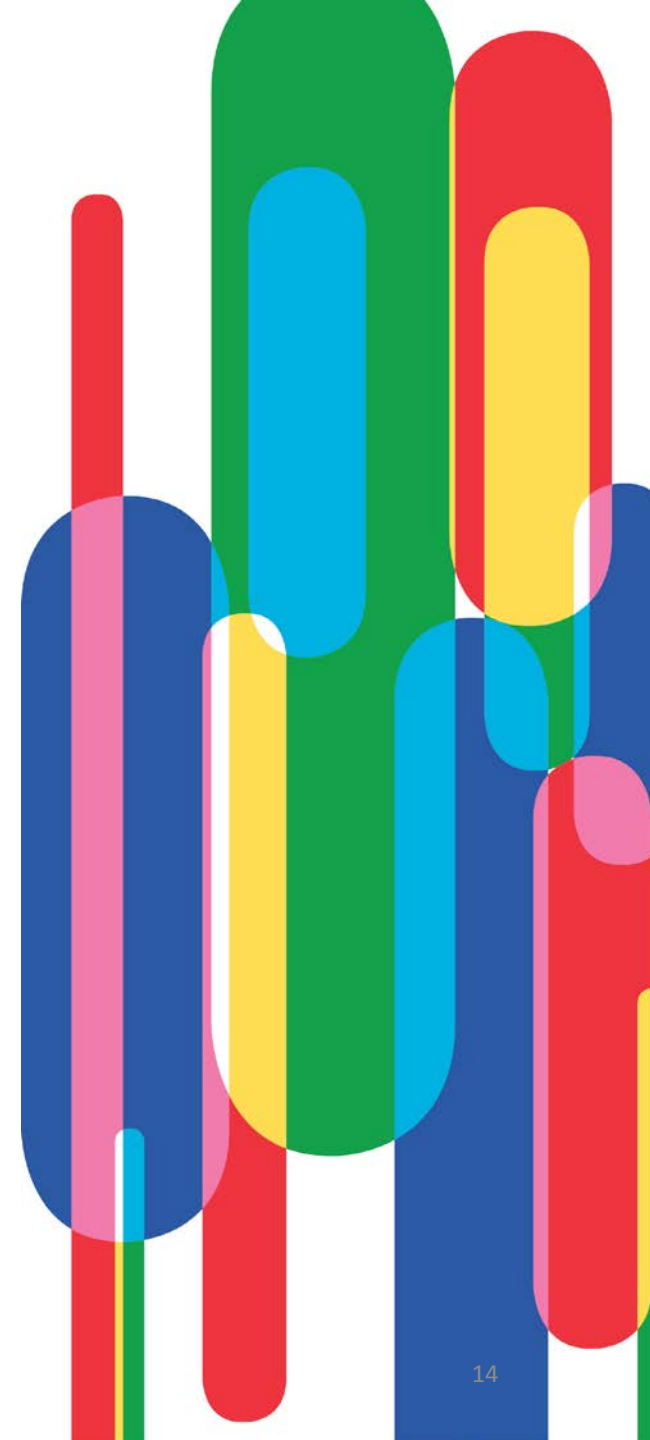
- Main decision making body of Photonics21 (C-Level)
- Elected by Photonics21 members in democratic election
- Balanced representation of Industry and Research Organisations
- Wide geographical coverage
- Driver on strategic issues: Task Forces
 - Establish Photonics Innovation Hubs in Regions
 - Financing Innovation beyond H2020
 -

Balanced Representation



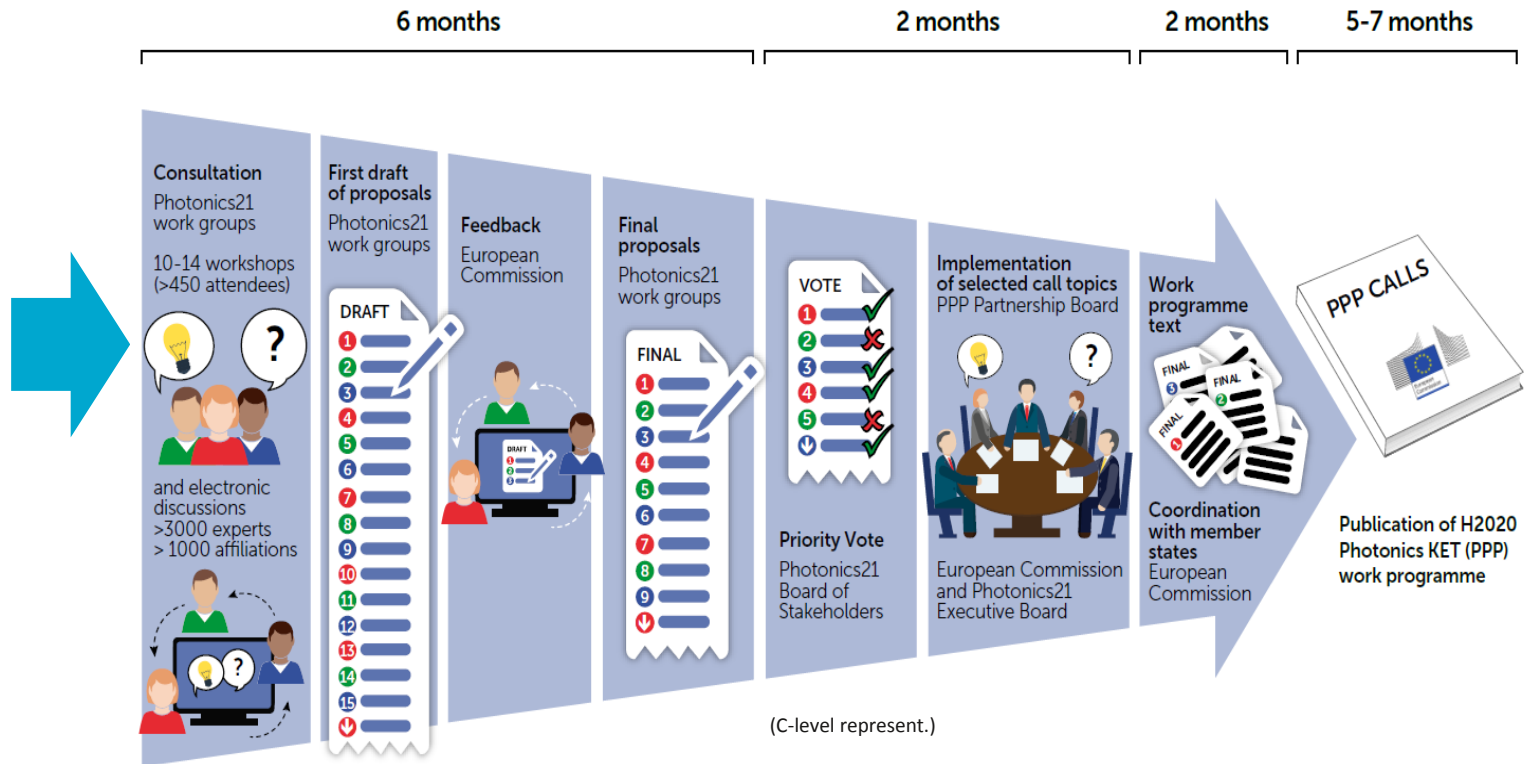
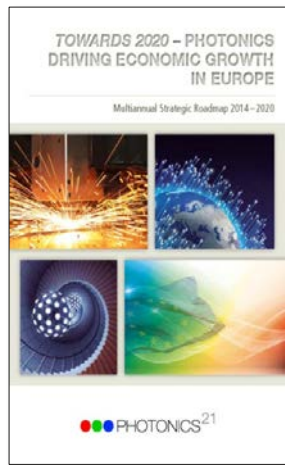
Photonics PPP R&I Priority Setting

Technology roadmap: Horizon 2020 Work Programme 2018/2020

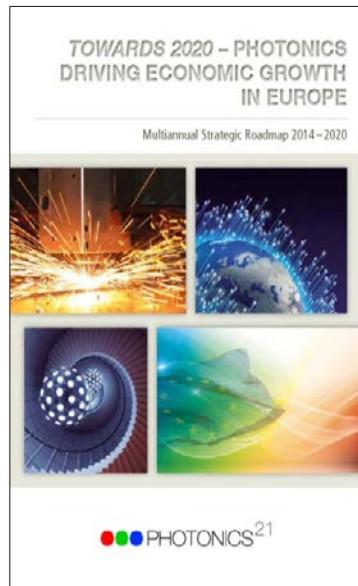


Photonics R+I Process

Horizon2020 Photonics PPP (KET) calls derived from the Multiannual Roadmap

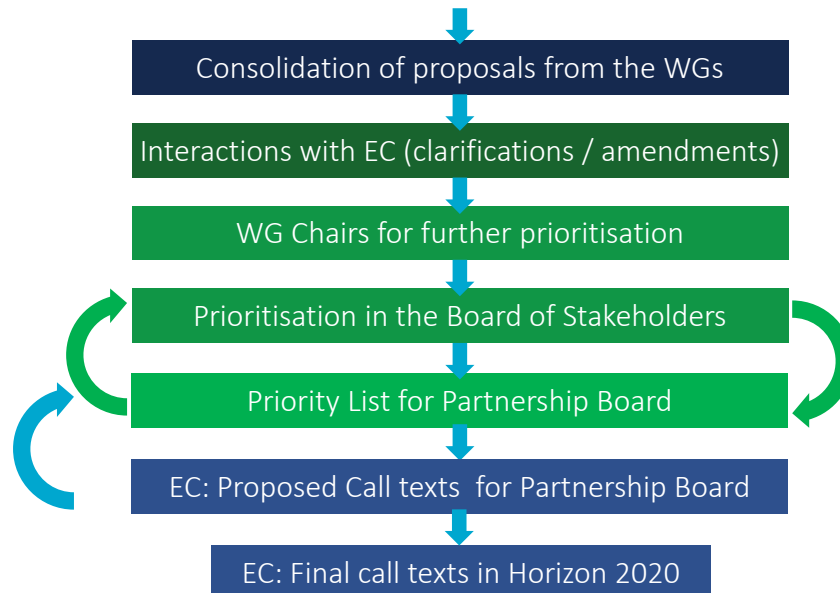


Priority Setting for Horizon 2020 Work Programme



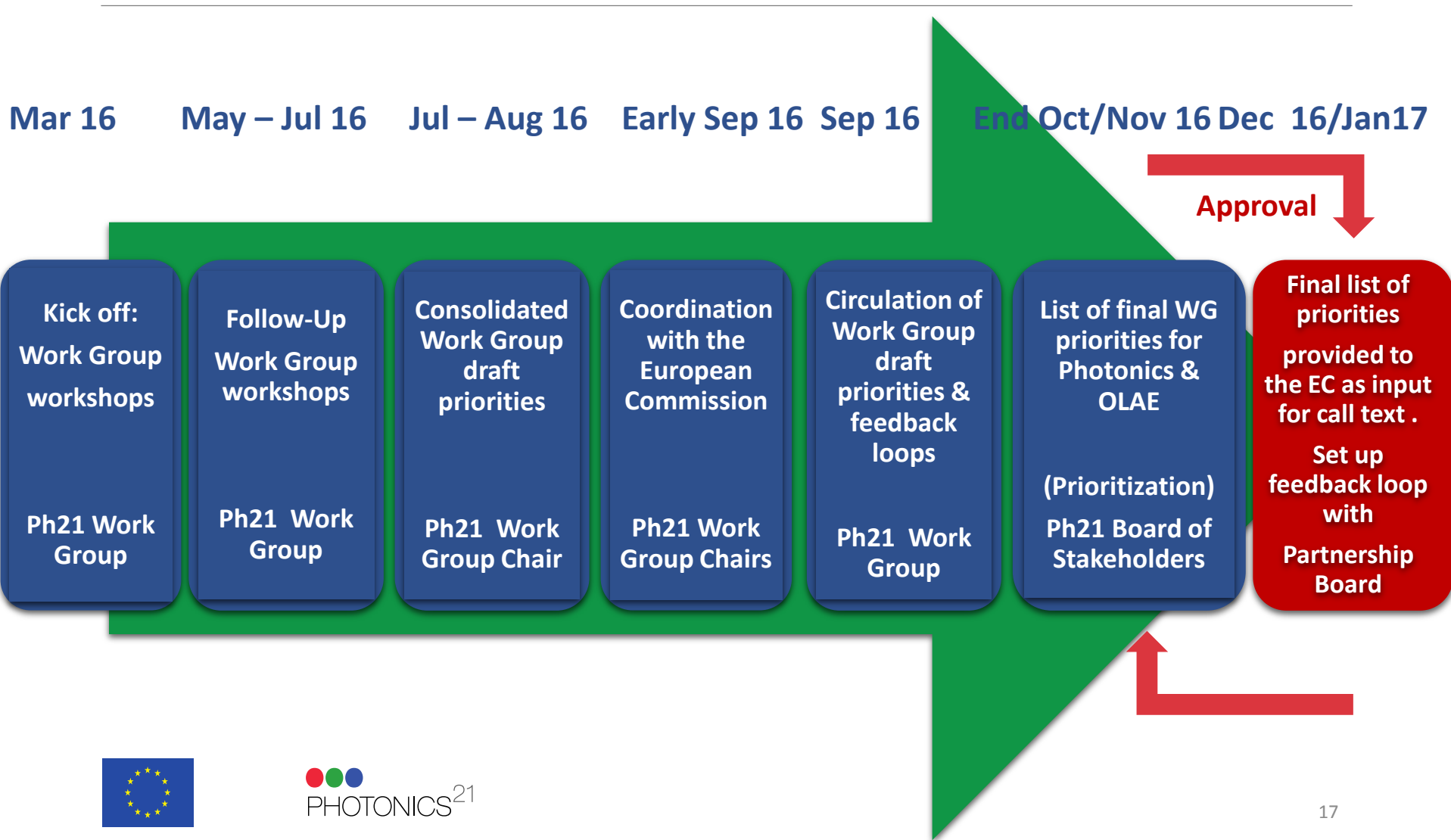
Proposals for R&I priorities from WG Members

- Description of the topic, objective, TRL
- Relevant Research & Innovation present in Europe
- Impact on European economy, employment
- Impact on societal challenges
- EU added value
- EU Funding (justification)



Photonics R+I Process

Timeline Horizon 2020 Photonics R&I Priorities 2018-2020



Photonics PPP R+I Priorities

Horizon 2020 Work Programme 2018-2020 Results of Voting

Research Topic (RIA)

	Work Group	Topic	Weighted votes
1	Work Group 3	Photonics enabled, more accurate quantified diagnosis during interventions and treatment - Research actions	150
2	Work Group 5	F3S - Flexible farm-to-Fork Sensing	148
3	Work Group 6	Photonic Integrated Circuit Technology	141
4	Work Group 3	Next generation of biophotonic methods and tools to understand the cellular origin of diseases	127
5	Work Group 6	Photonic System on Chip/ System on Package	126
6	Work Group 2	Highly Productive Ultra-Short Pulse Laser Systems for Fast Material Processing	123
7	Work Group 2	Manufacturing with Tailored Laser Beams	108
8	Work Group 4	3D Light Field and Holographic Displays for Natural Visualization	80
9	Work Group 1	Photonics for intra data center and consumer applications	78
10	Cross Cutting	Photonics Research-for-Innovation Hub (PR4I Hub)	77
11	Work Group 4	Connected Lighting	68
12	Work Group 4	Beyond Classical Lighting	64
13	Work Group 6	Assembly and Packaging Technology	64
14	Cross Cutting	Light to Fuel; photonic devices for the production of solar fuels	60
15	Work Group 7	2D materials on 3D structures for new device architectures	56
16	Work Group 1	Private Optical Networks for Vertical Markets	50
17	Work Group 4	Robust materials for OPV and OPD performance	46
18	Work Group 7	Nano-opto-electro-mechanical systems	43

Innovation actions (RIA)

	Work Group	Topic	Weighted votes
1	Work Group 5	myCloudSense - Hyperspectral VIS-NMIR Sensing and Deep Learning	116
2	Work Group 6	Photonic integrated Circuit Pilot Line	106
3	Cross Cutting	Open access to Photonics Innovation Hubs	105
4	Work Group 3	Photonics enabled, more accurate quantified diagnosis during interventions and treatment - Innovation actions	97
5	Work Group 2	Digital Innovation Hubs (DIH) for Laser-based Equipment in Advanced Manufacturing	93
6	Work Group 3	Pilot lines for advanced optical medical devices - in-vivo diagnostics	89
7	Work Group 5	SensOPro - Sensor-Based Optimization of Production Processes	84
8	Work Group 7	Free Form Optics Pilot Line	81
9	Work Group 1&6	Enabling automated mass manufacturing of datacom photonics Europe	75
10	Work Group 1	Photonic networking for the cloud intensive solutions	71
11	Work Group 4	Innovation in Ubiquitous Wearable Visualization for Citizens in a Digitized Society	71
12	Work Group 3	Pilot lines for advanced optical medical devices - in-vitro diagnostics	70
13	Work Group 4	Large volume OPV application	56



Photonics PPP R+I Priorities

Research and Innovation Topics for the Horizon 2020 Work Programme 2018/2019/2020 – Call Topics and Budgets

ICT-03-2018 Photonics Manufacturing Pilot Lines

Innovation Actions [30M€]

- Providing low entry barrier access for industry in particular SMEs, low and medium production volumes
 - i. Indium Phosphide
 - ii. Silicon Photonics

ICT-04-2018 Photonics based manufacturing and production of advanced photonics

Innovation Actions [25M€]

- Access to advanced photonics for researchers
- Enabling automated mass-manufacturing of Datacom photonics products
- Connected Lighting

Research & Innovation Actions [30M€]

- Highly productive ultra-short laser systems for fast materials processing
- Tailored laser beams

ICT-05-2019 Application driven photonics components and Photonics Manufacturing Pilot Lines

Innovation Actions [60M€]

- Photonics devices for advanced imaging to support diagnostics driven therapy
- Sensor-Based Optimization of Production Processes
- Maturing a technology platform and providing low entry barrier access for industry in particular SMEs, low and...

Research & Innovation Actions [60M€]

- Photonics System on Chip/ System in Package for optical interconnect applications
- Photonics devices for advanced imaging to support diagnostics driven therapy
- Flexible Farm-to-Fork Sensing Photonics

Coordination and Support Action [1.5M€]

- Fostering Careers in Photonics
-



Photonics PPP – EU Funding

Horizon 2020 Projects: More than € 270 Mio. Funding / 654 Project Participants / mainly from Industry / > 50 % of them are SMEs

Horizon 2020 Projects – Key Figures

Subject	2014	2015	2016	3 years period
Total Funding for Projects (in €)	87,861,568.12	95,306,838.23	94,800,954.01	277,969,360.36
Number of Participants in Projects	215	209	230	654
Industrial Participation (# of Companies)	111	106	118	335
<i>% of total participants</i>	51.60%	50.70%	51.30%	51.20%
of which are SME's (# of SMEs)	62	58	67	187
<i>SME % of Industry participants</i>	55.90%	54.70%	56.80%	55.80%
<i>SME % of total participants</i>	28.80%	27.80%	29.10%	28.60%
Budget for Industry (in €)	45,846,170.94	33,306,845.17	45,219,997.46	124,373,013.57
<i>% of total funding</i>	52.20%	34.90%	47.70%	44.70%

Source: European Commission, DG CONNECT



Support to SMEs

Currently available instruments



Collaboration and Platform Activities: Pilot Line Activities and other CSA Projects supporting Jobs and Growth



Bridging the Gap between Lab and Fab:

4 PPP Pilot Lines and 3 PPP Prototyping Services help End-User Industry to speed up product development (TRL3-TRL7) ²²



Photonics PPP

Collaboration and Platform Activities: Pilot Line Activities and other CSA Projects supporting Jobs and Growth



Promoting Education, Training & Skills

9 PPP Projects mainly contribute to promote Education, Training & Skills in Photonics & raise awareness about its potential



Photonics PPP

Plus other direct support instruments for more jobs and growth

SME Instrument

- Support Innovative products backed by a solid business plan (Phase 1+Phase2)

Financing instruments

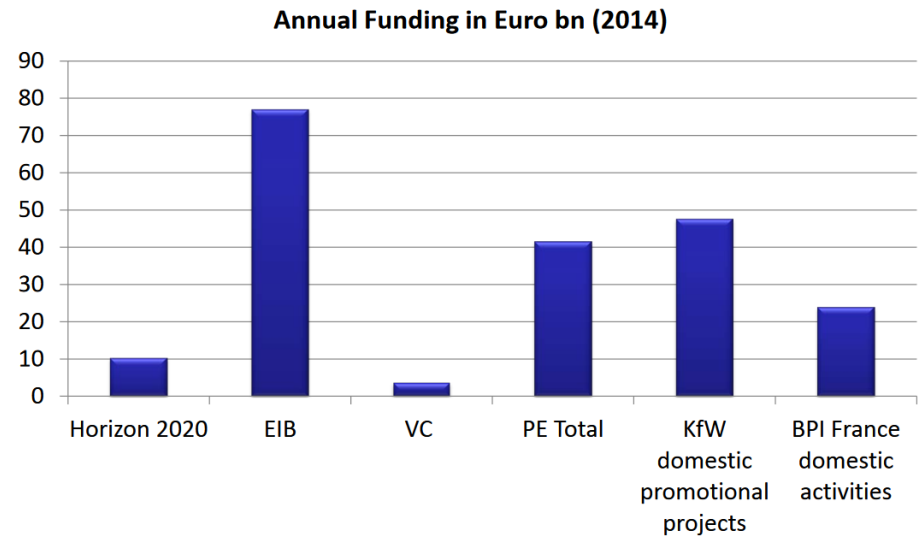
- Access to VC capital (dissemination + mapping)
- European Photonics Venture Forum
- Financing instruments in coordination with BEI

Collaborative projects

- Research and Innovation Actions backing companies (Specific Fast Track to Innovation call)



Europe: Funding of Businesses by various Institutions/Programs



Source: EIB Statistics / EVCA Yearbook / KfW Website www.kfw.de / BPI France Annual Report 2013

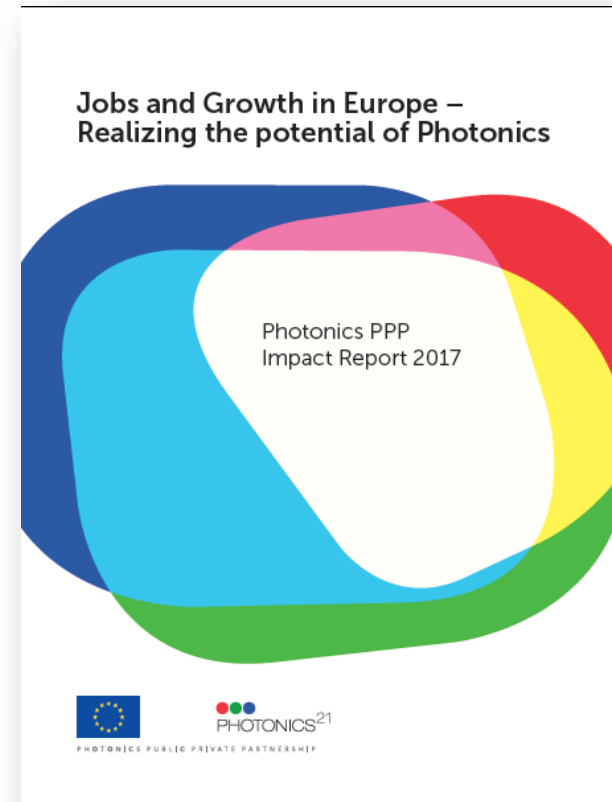


Photonics PPP – Read More

Online Report – Read about how the PPP realized the Potential of Photonics for Growth & Jobs in Europe

The Photonics PPP Impact Report 2017 gives insights on

- More than 3 years close cooperation of the public and private side in the Photonics PPP
- PPP Performance as defined in our Key Performance Indicators (KPIs)
- Collaborations and Partners
- Future Challenges and how we will get prepared
- Can be viewed as Online edition under <http://www.photonics21.org>



Thank You for Your Attention

