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Economic Impact of the Key Enabling Technology Photonics

First study published on "The Leverage Effect of Photonics Technologies" on the European economy/ Photonics sector can unleash massive economic potential /Study investigates the economic and societal impact of photonics on applications and markets along the value chain

The positive impact on value creation of photonics – one of five Key Enabling Technologies as nominated by the European Commission – by far exceeds the turn-over of the industry itself. This is one major result of the first study published on "The Leverage Effect of Photonic Technologies", which was recently published by a research consortium lead by TNO (Netherlands) with partners Technologia (UK) and the Electronics Sensors, Photonics Knowledge Transfer Network (UK). The study was commissioned by the European Commission DG Information Society and Media and carried out in close cooperation with the European Technology Platform Photonics21.

Photonic technologies incorporate all the technologies of emitting, detecting and processing light. Today photonics applications reach from optical fibers to modern luminaries such as LEDs and OLEDs, to bio-photonics in healthcare and disease prevention, sensors and surveillance technologies for safety, security and environmental control. Photonics also delivers the high-tech laser technologies used in many manufacturing processes.

Photonics markets showed a consistent annual growth of over 10% and have rapidly recovered from the recent recession. The recovery in photonics manufacturing

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technologies has been particularly strong indicating its pivotal role in increasing manufacturing efficiency. Using a new experimental survey methodology, the study concludes that photonics 'leverages' at least 10% of the European economy, as much as €3 trillion of EU trade and touches around 30 million jobs.

The "leverage effect" evaluated in the study is defined as the contribution photonics makes to the value of an end product or service through enhancing the productivity of the manufacturing process or by providing or enhancing the functionality of the end product. This leverage is generated by a European photonics industry worth €58.5 billion (21% of the world market) employing approximately 290,000 people in more than 5,000 companies and over 1,000 research organisations across Europe.

Broad Range of Industries and Impacts

The study identified strong positive photonics impacts on European economic growth and competitiveness in a diverse range of substantial markets including retail, medical and healthcare, the manufacture of electronics and vehicles and telecommunications.

A strong positive environmental impact also stemmed from the reduction of energy consumption photonics enables by offering greater energy efficiencies (i.e. lighting, optical fibers and components, organic electronics) and more effective ways of working (i.e. lasers and sensors) as well as from energy generation by such photonic energy systems as photovoltaics.

Social impacts assessed are broad and diverse: the scanning, imaging and sensing value chains have positive impacts on healthcare and security. Displays, communications, components and networks value chains have a positive social impact by enabling more

informed decisions; this is, however, coupled with the danger of social exclusion for those having no access to the latest technology.

Increasing Leverage Effect in the Future

A significant increase in photonics leverage in the next decade is foreseen by the authors of the study, especially in those areas where photonics currently has only a modest impact: The biggest change will occur in construction, with the increasing use of photovoltaic solar panels and solid state LED lighting. Photonics leverage will also increase rapidly in retail, with new lighting and display technologies, and in the increasing application of diverse photonics technologies in medical and healthcare. Alongside these growing impacts, photonics will maintain its high impact on, and support for innovation and growth in, telecommunications and scientific research and development (R&D).

Strong European R&D Position – Diverse Positions in Manufacturing

Analysis of six key photonics value chains revealed a strong European R&D position in all. Europe was also found to be particularly strong in high value globally exported photonics based products, including the design and production of manufacturing equipment and scientific instrumentation. One highlight in particular was the strength of the European high performance laser and laser systems industry which contains many significant global players.

However, high volume manufacturing is absent in areas such as displays and many high volume components. European economy in these areas gains mainly through sales of manufacturing equipment. Several value chains were also found to be threatened by raw material dependencies such as rare earth materials available only from a few global locations.

Prospects for a significant Key Enabling Technology

The European photonics market – so concludes the study - is significant on a global scale and has a significant impact on other industries ad markets. The authors forecast a bright future for photonics as the leverage on most markets and industries is set to increase substantially over the coming decade. They consider photonics to be in an early stage of development. However, the authors emphasise that the photonics industry is not homogeneous – neither technically nor structurally. Therefore a heterogeneous policy approach is needed whilst photonics develops from its early stages of development towards a ubiquitous technology.

To get to the full report go to the following link:
http://www.photonics21.org/download/Photonics21_news/Photonics_Leverage_Final_report_DEF_public.pdf

About Photonics21

In December 2005 the European Technology Platform "Photonics21" was set up as an industry driven platform to unify the community in the area of optical technologies. Today, more than 1,700 representatives of industry and science from most European countries are involved in it. Leading companies and research units have joined together to further advance Europe's position in optical technologies. Photonics experts from industry and research are working in seven teams to develop research priorities and recommended procedures for the European Commission as well as strategies and issues to promote European cooperation.

In September 2009, the European Commission defined photonics as one of five European Key Enabling Technologies (KET's). In January 2010 the second Photonics21 Strategic Research Agenda "Lighting the way ahead" was published defining research priorities and the photonics strategy forward. The recent publication "Photonics – Our Vision for a Key Enabling Technology" looks into the contribution photonics has – and will have in the course of the next ten years - on the key societal challenges of Europe