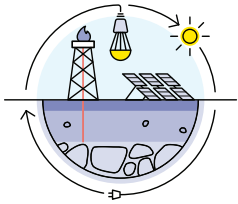


LIGHTING THE PATH TO A BRIGHTER FUTURE

How optics and photonics impacts the global economy in communications, energy, medicine, security, lighting and manufacturing.

Optics and photonics technologies use the emission, processing, and detection of light, or the information carried by light. This includes the spectrum ranging from the far infrared to x-rays.

The science of light improves most every facet of modern life.

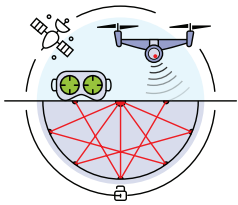


SOLAR

Photovoltaic systems convert sunlight into electricity.

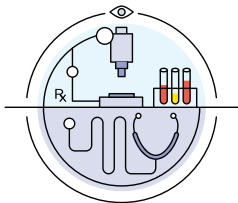
LED

LED lighting systems efficiently convert electricity into light. Advanced lighting products can even change the color on demand.



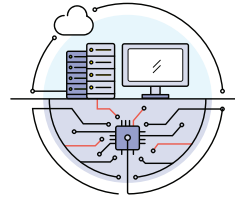
SCIENTIFIC TOOLS

Scientific tools probe materials ranging from the far infrared to x-rays, from the atomic scale and attoseconds to the cosmic scale of petawatts and laser-confined nuclear fusion.



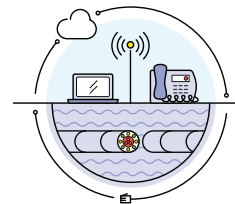
LIFE SCIENCES

Optics and photonics is used in medical imaging, cytometry, DNA sequencing, vision correction treatment, dermatology, plant science, pathogen detection, UV water treatment, and many other tools in the life science industry.



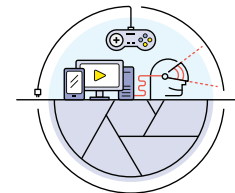
COMMUNICATIONS

Highly parallel gigabit fiber optic systems interconnect data traffic within supercomputers, data centers, and everywhere the Internet goes, even undersea cables.



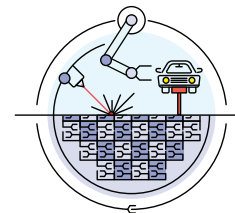
DISPLAY

Displays are larger and have greater resolution and better color quality than ever before. Displays can also be portable and can even be made of flexible materials.



IMAGING

Image sensors capture light for use in medical imaging, smart phones, night vision cameras, and many other products.



MACHINE TOOLS

Ultraviolet lasers and optics, each costing several million dollars, project lithographic patterns to create nanometer-scale electronic circuits. High power lasers cut and bond materials. Machine vision and industrial sensors manage manufacturing lines.

Steady growth of the laser industry for more than four decades.

CHART

Laser sales in US\$ for the past 50 years.

Laser sales have grown 1000-fold in 50 years, amounting to an annual compounded growth rate of 15 percent over the period.

Source: *Laser Focus World*

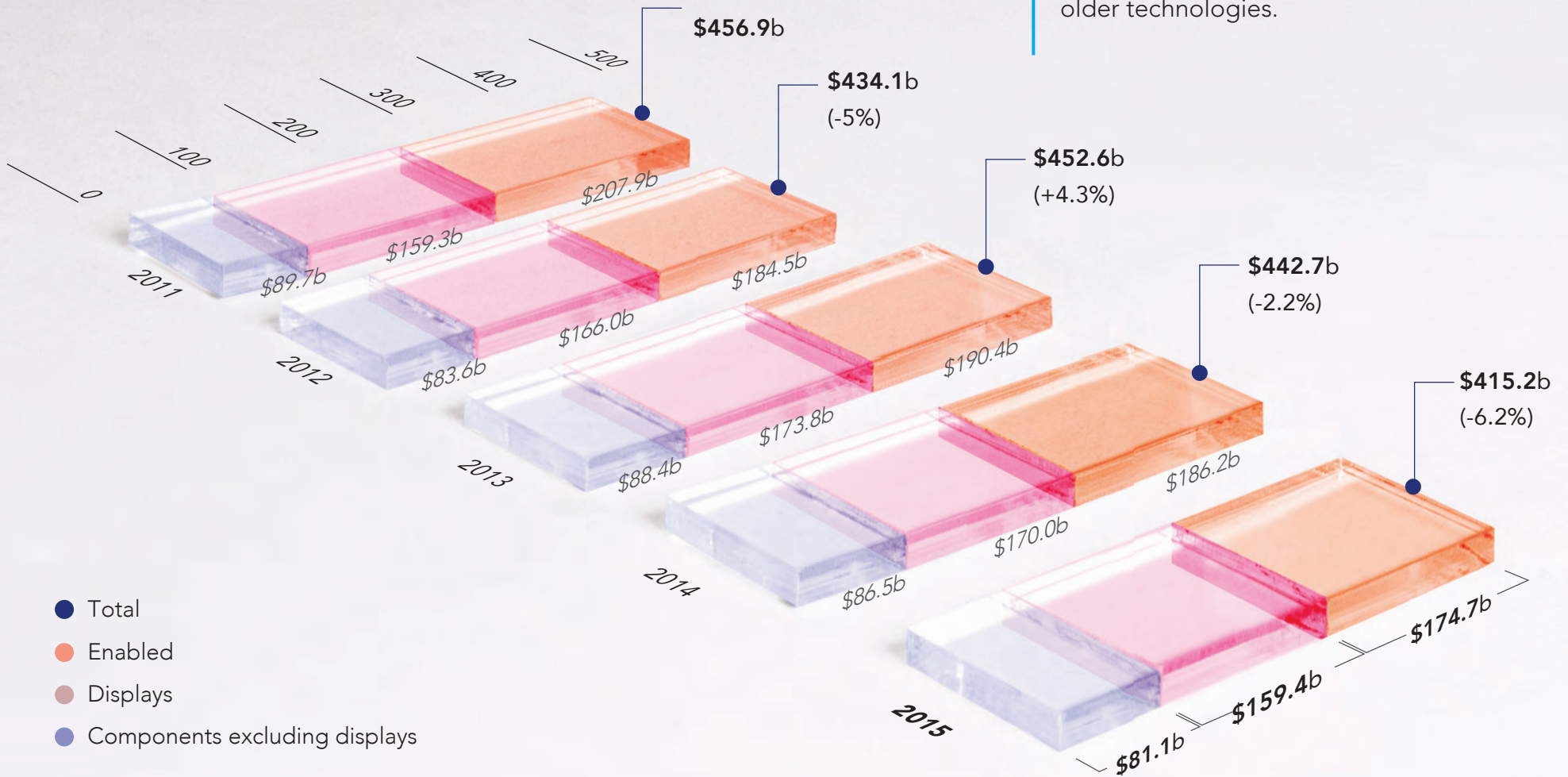


Optics and photonics annual revenues amount to more than \$400 billion.

CHART

Industry revenues in the last 5 years, by category, in US\$ billions.

Economic cycles in consumer electronics and industrial capital spending affect optics and photonics sales, but revenues over the long term continue to grow faster than global economic output as new optical technologies gain share over older technologies.

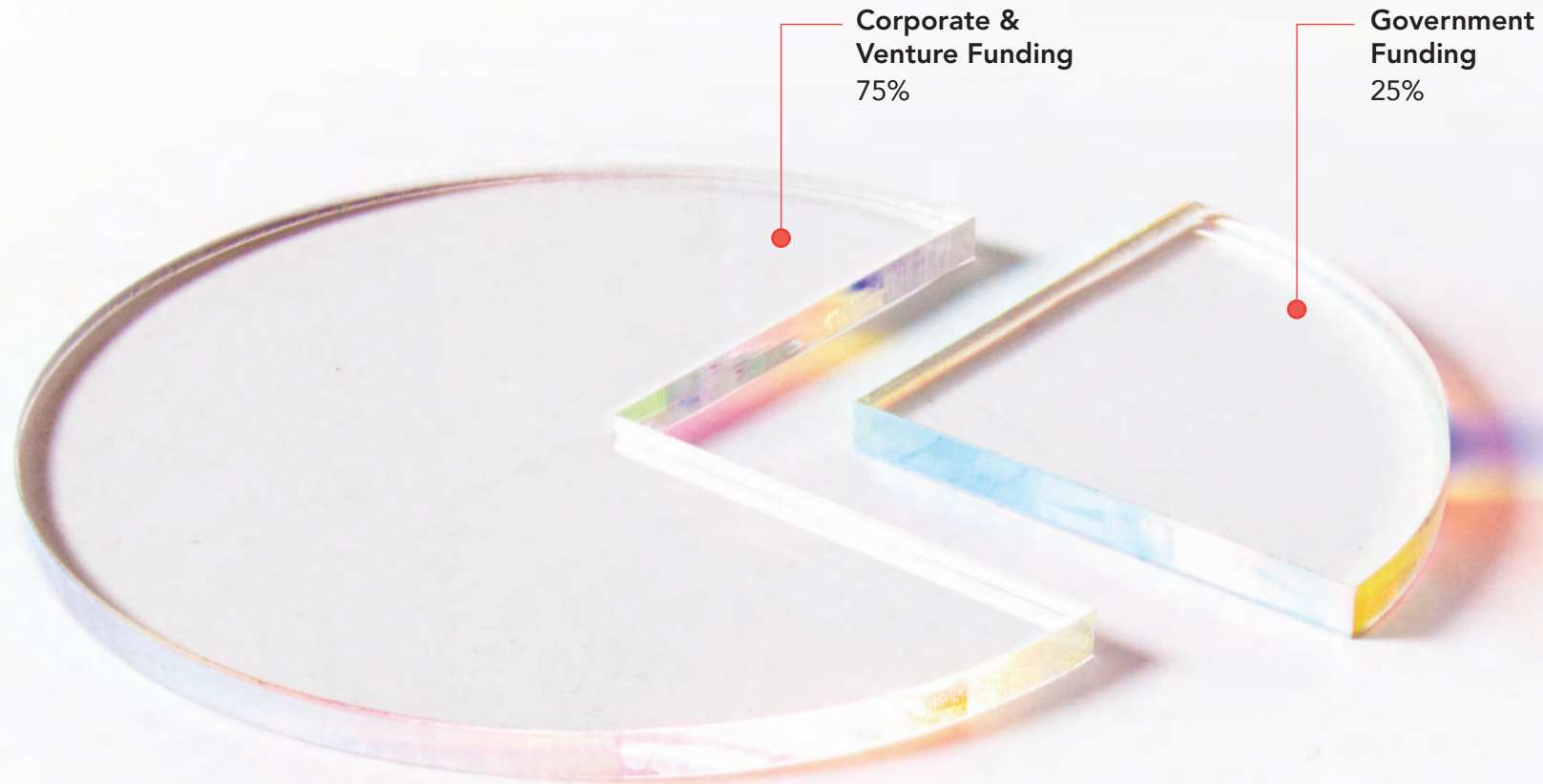


Government and industry worldwide must partner to accelerate innovation.

CHART

Source of funding in optics and photonics R&D by percentage.

OIDA estimates that about 75% of investment in optics and photonics R&D comes from corporate R&D budgets and venture funding. However, government R&D investment is essential to advance fundamental science and curiosity-driven research, and for training the next generation of technologists.

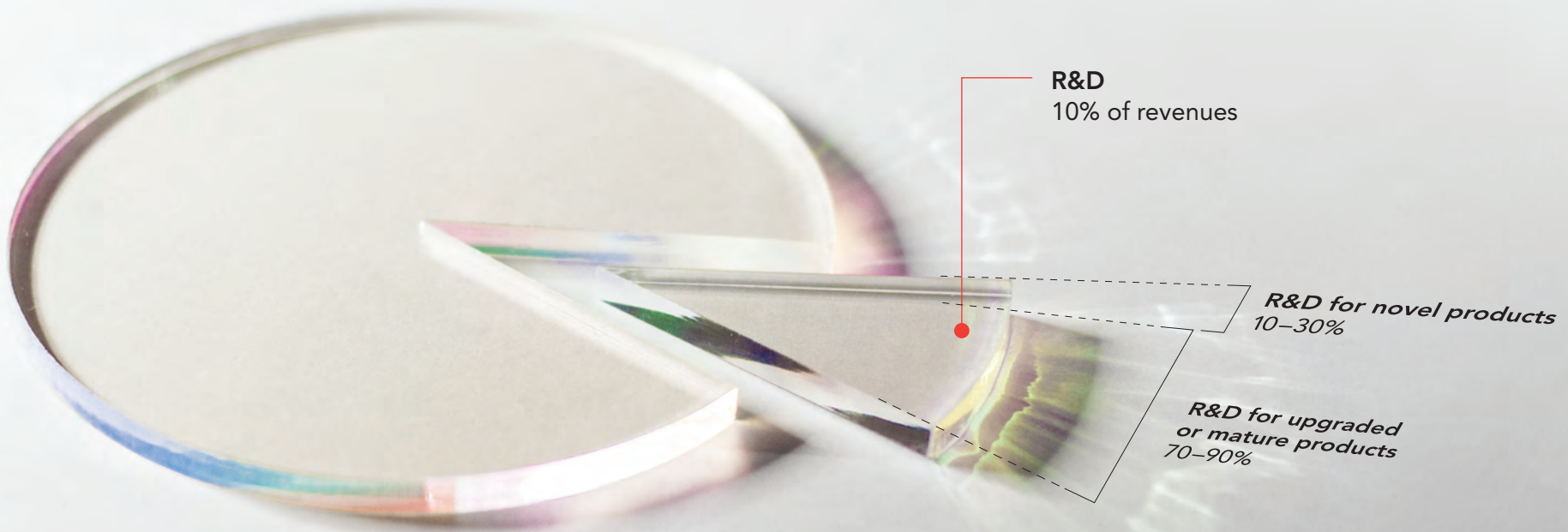


However, corporations invest relatively little in riskier development.

CHART

Percentages of corporate spending aimed at different types of R&D.

Most corporate R&D spending is aimed at extending existing production lines, such as conducting formal qualifications for incremental product improvements. Corporations invest relatively little in longer-range or riskier development.

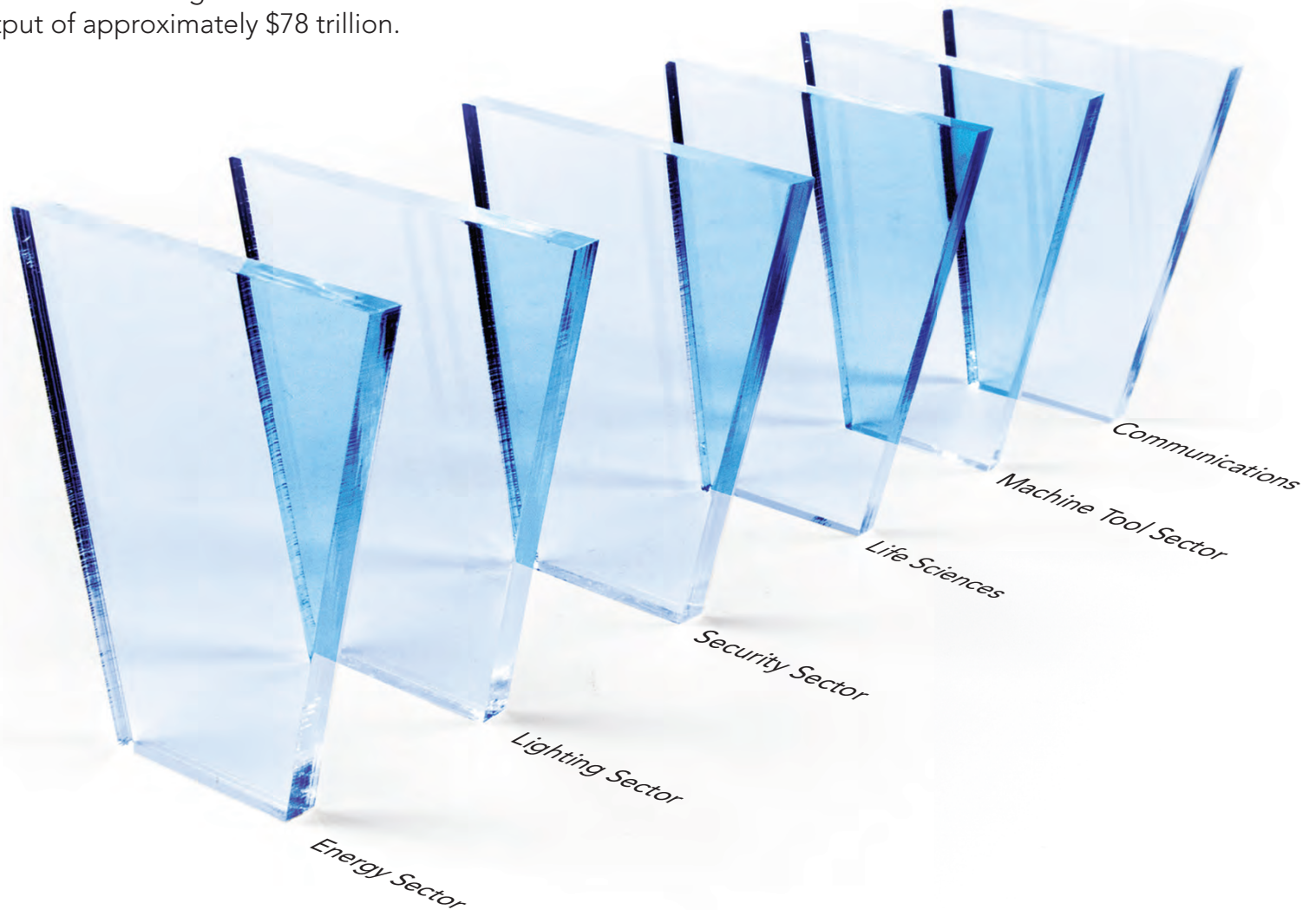


Optics & photonics fuel the global economic engine.

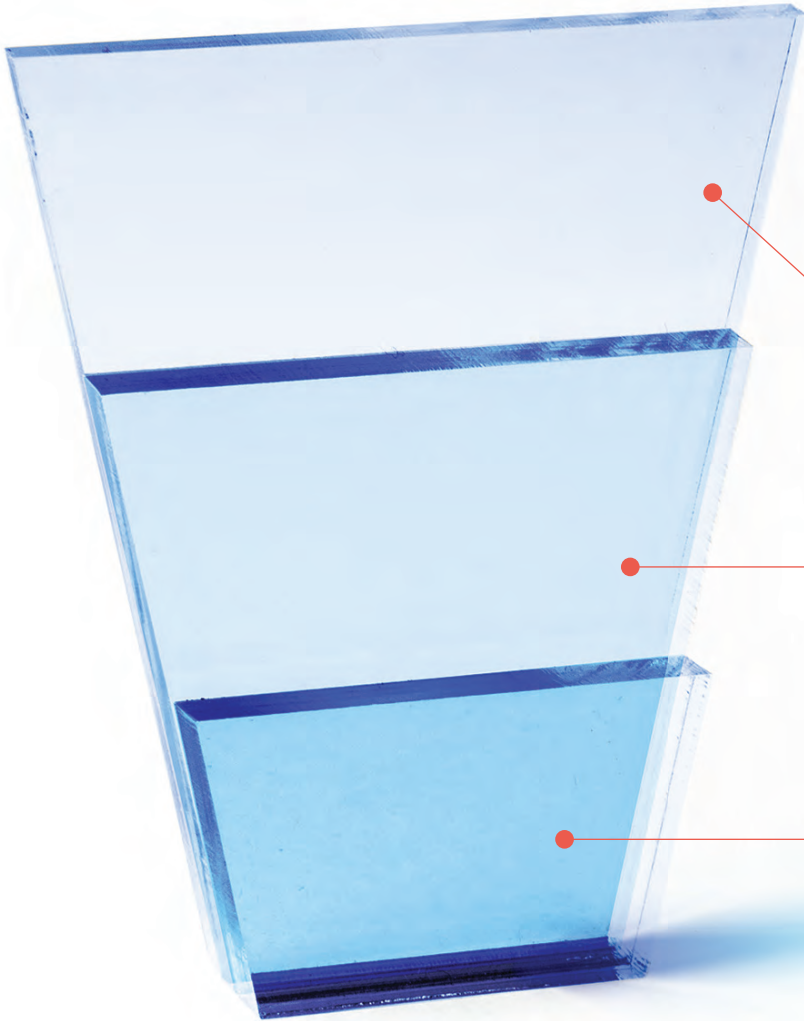
CHART

Examples of vertical markets enabled by optics and photonics technologies.

The combined optical components and subsystems businesses enable vertical markets each worth trillions of dollars per year. These vertical markets, in turn, enable the annual global economic output of approximately \$78 trillion.



Industry creates jobs and new businesses while improving society.



Telecom Services
~\$3.9 trillion

Telecom Network Equipment
~\$400 billion

Optical networking equipment, components, and fiber/cable
\$30 billion

CHART

The vertical layers of the telecommunications industry enabled by optics, in US\$.

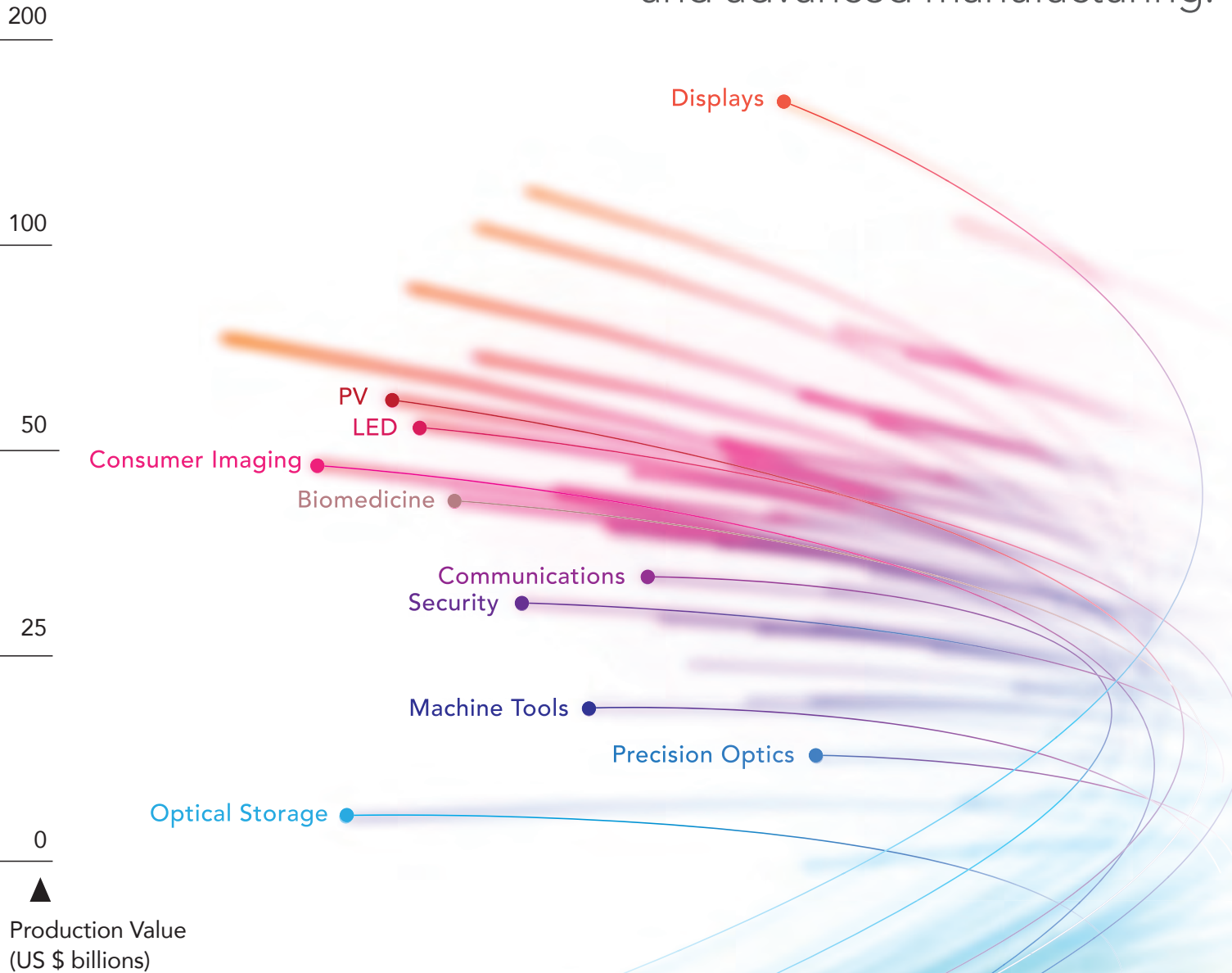
The \$30 billion optical network equipment, components, and fiber/cable business supports the critical “physical layer” for the \$400 billion networking systems business, which enables the \$3.9 trillion telecommunications services business, and more.

Optics' global ecosystem depends on low cost production and advanced manufacturing.

CHART

Production value of 10 vertical markets groups that are enabled by optics, in US\$ billions.

Optics and photonics enables many vertical markets, organized in this chart into ten groups. Some groups in this chart represent end-use markets, such as photovoltaic (PV) and communications. Others are enabling technologies, such as precision optics.



The optics & photonics ecosystem is truly global.

A manufacturer may source materials from one region, manufacture the components in another, assemble them in another and deliver them to an end-customer in yet another region.

Talent is also global. Universities and companies commonly collaborate and hire across borders to access the best talent in the world.

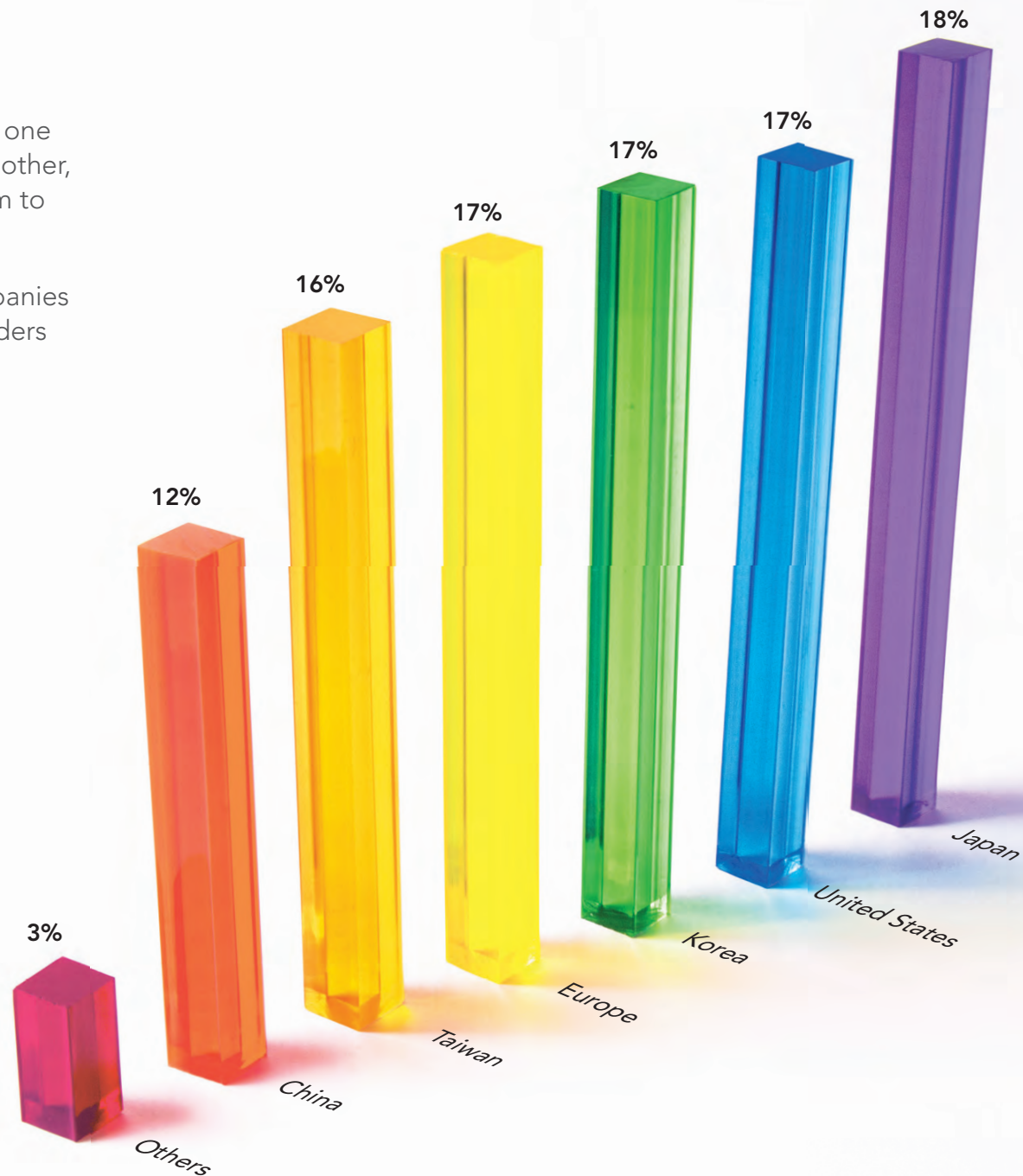
CHART

Production value of optics by regions by percentage.

Asia leads with nearly two thirds of the production, in terms of revenues.

Asia is strong in displays, PV and LED production.

When the display and PV segments are excluded, North America leads with approximately 30% share.



Global market
hosts small
companies
and large
corporations.

CHART

Many familiar (and not-so-familiar) global corporations manufacture optical components and systems.

Small companies have an important role in the optics and photonics ecosystem. They are sources of innovation, offer custom or specialized products and services, and serve niche markets that large companies choose not to serve.

OIDA estimates that small and mid-size companies comprise over 90% of the total number of companies in optics and photonics.

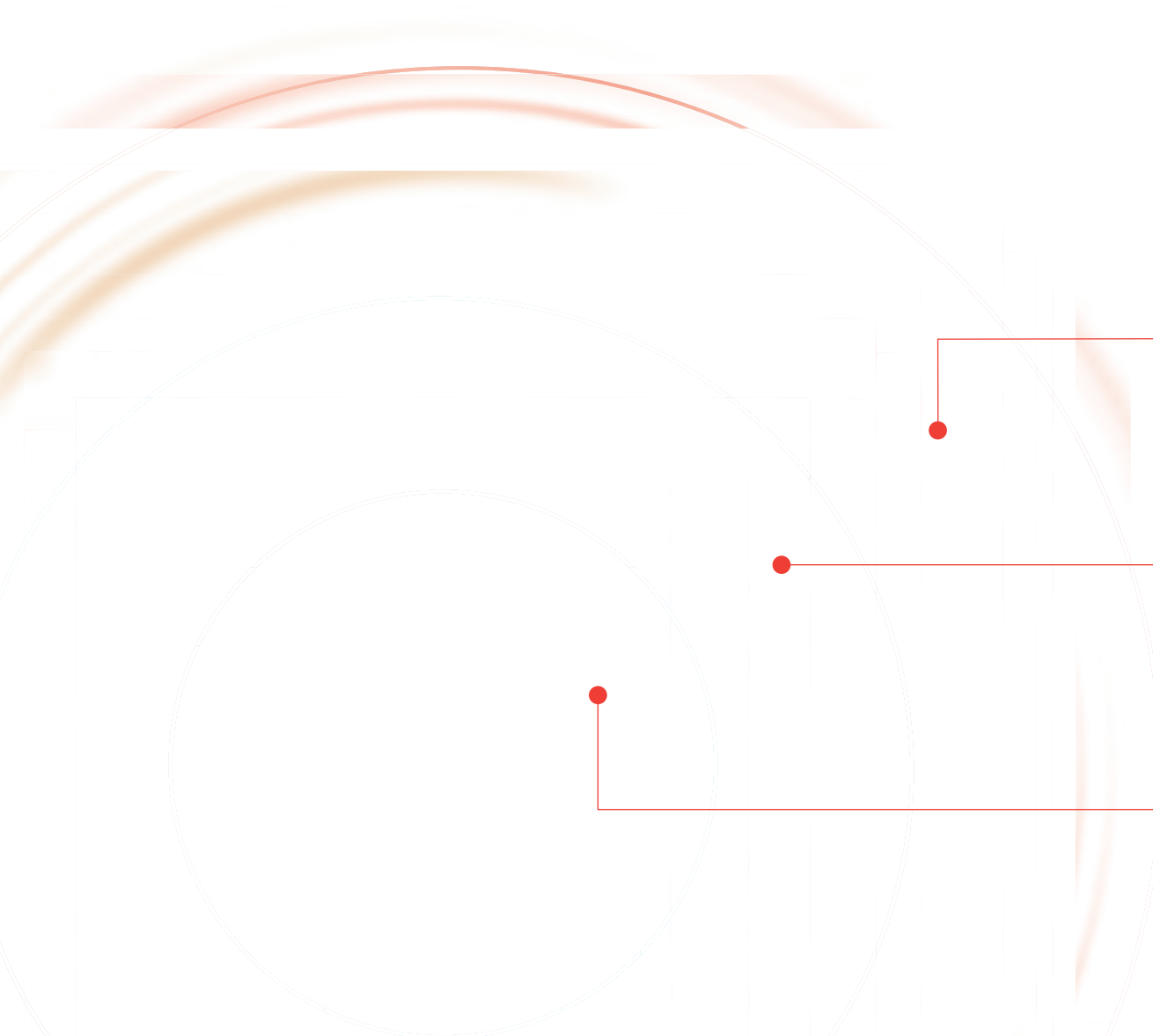


Optics and photonics creates jobs

CHART

U.S.-based employment engaged in optics and photonics components and enabled products.

In addition, the number of jobs using optics & photonics in the downstream vertical markets are in every part of the economy, from health care and manufacturing to defense and security. Global employment is several times what is shown here.



Downstream end-use markets
Millions of jobs

Components and products enabled by optics & photonics
385,000 jobs
3,300 companies

Optics & photonics components
125,000 jobs
900 companies

As a division of OSA and based in Washington, DC, OSA Industry Development Associates (OIDA) serves and represents the optics and photonics community, with over 265 corporate members.

It provides roadmap reports and market data for the industry, serves as the voice of industry to government and academia, acts as liaison with other trade associations worldwide, and provides a network for the exchange of ideas and information within the optics and photonics community.

Founded in 1916, The Optical Society (OSA) is the leading professional organization for scientists, engineers, students and entrepreneurs who fuel discoveries, shape real-life applications and accelerate achievements in the science of light.

Through world-renowned publications, meetings, and membership programs, OSA provides quality research, inspired interactions and dedicated resources for its extensive global network of optics and photonics experts.

The information contained in this brochure was compiled from OIDA's bi-monthly Market Update reports.

For more information, contact OSA Industry Development Associates at +1 202.223.8130 or visit osa.org/industry.



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