REPORT

Photonics Ecosystem in Europe

Carried out in collaboration by EPIC and TEMATYS

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1 EXECUTIVE SUMMARY

Objective

The work carried out in collaboration by EPIC and TEMATYS aims to release European Photonics Ecosystem Report, Database, and Map.

Main results

European Revenue (2012)	*65,8 Billion €*
European Staff (2012)	*377 000*
Expected Staff Growth by 2015	*60 000*

The main results of the study are the following:

- **Small companies (<20 empl.) are the seed for the future.** They represent 60% of the total number of companies, 6% of the total employment but 15% of the expected growth.
- **Medium-size companies (20-500 empl.) are the most important source for employment.** They represent 36% of the total number of companies, 40% of the total employment but 55% of the expected growth!
- **Big companies (> 500 empl.) provide a stable base for the industry.** They represent only 4% of the total number of companies but 53% of the total employment and 30% of the expected growth.
- Turnover and Staff analysis highlights the high ratio in Photonics companies (between 150 and 250k€/employee) which is mainly linked to a **high skilled workforce**, and is homogeneous across all companies.
- Breakdown of European companies along value chains and markets are the nice surprises of the study: **Photonics industry in Europe clearly tends to diversify in terms of final markets and technologies**.
- Moreover, with manufacturing capacities mainly implemented inside Europe and sales outside Europe, Photonics industry presents a very competitive aspect, **offering strong potential for sustainable European employment**.

Expected benefits

This report highlights the importance and benefit of mapping and statistics on the entire European Photonics industry by providing:

- Shared results for employment, revenues, manufacturing and growth as well as positioning in key value chains and final markets,
- Decision & communication tools for European, national and regional authorities, and for companies to analyze market deployment, diversification and other new opportunities.

2 OBJECTIVES OF THE STUDY

The objectives of the Mapping of European Photonics are the following:

- Analysis of value chains and final markets in Europe,
- Statistics on European Photonics companies,
- Relevant data for European Policies.

The progress of the study is presented in Figure 1.

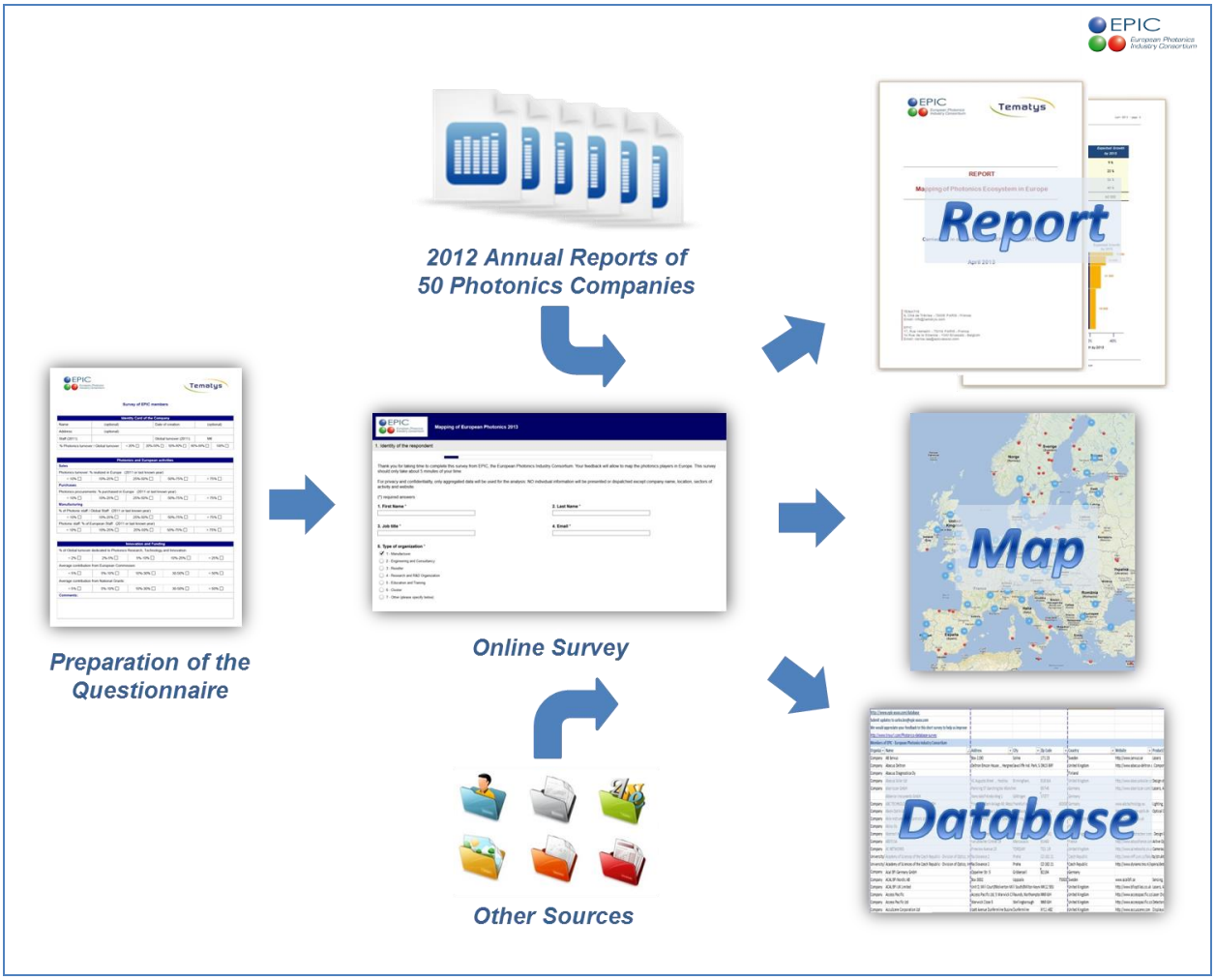


Figure 1 : Progress of the study

3 EUROPEAN PHOTONICS INDUSTRY

3.1 TOTAL REVENUE AND STAFF

For this analysis, we developed new tools for statistics and mapping partly based on previous studies. Using these tools and the survey results, we have been able to evaluate the total European Photonics Revenue and Staff and the Revenues by types of systems.

Photonics Industry in Europe	
European Revenue (2012)	*65,8 Billion €*
European Staff (2012)	*377 000*

The European Photonics industry revenues and staff continue to grow even during the last few years with economic downturn.

Types of Photonic Systems	Sensing & imaging systems	Communi-cation systems	Screens, displays, projectors, …	LED, OLED, lamp systems	Photovoltaic systems	Laser & production systems
Photonic Functions	Acquiring information	Transmitting information	Delivering information	Light providing	Energy providing	Manufac-turing
European Production (Billion €)	28,9	7,2	3,5	12,5	4,3	9,4
Examples						

*Figure 2 : Types of photonics systems with the corresponding European revenues**

**Note: for Photovoltaic, only modules are taken into account.*

3.2 COMPANY SIZE BREAKDOWN

We present in Figure 3 the breakdown of the total number of Photonics companies (estimated at 3500) and in Figure 4 the breakdown of the total number of employees by company size.

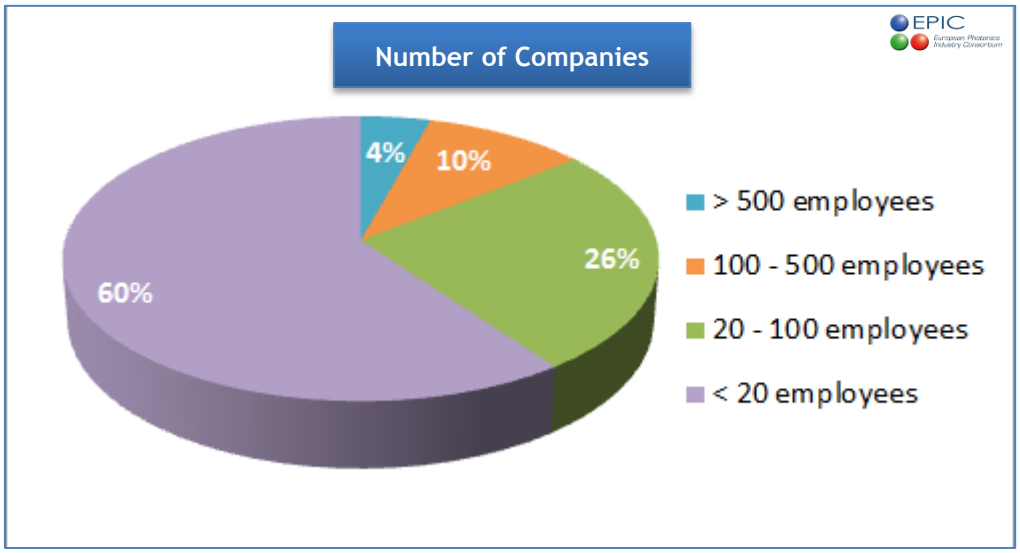


Figure 3 : Breakdown of the total number of companies by company size

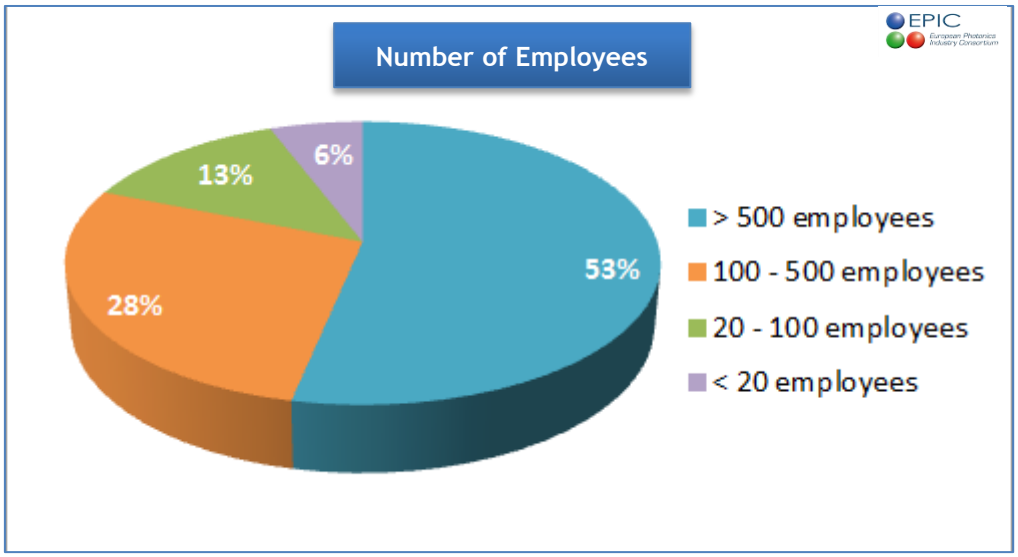


Figure 4 : Breakdown of the total number of employees by company size

Very small companies represent 60% of the total while their employees represent 6% of the total number of employees. On the other hand, big companies represent around 4% of the total while their employees represent 53% of the total.

3.3 EXPECTED STAFF GROWTH

The table below shows the total number of Photonics employees by company size.

Company size (employees)	Total Number of Photonics Employees (2012)	Expected Growth by 2015
< 20	22 000	40 %
20 - 100	49 000	26 %
100 - 500	105 000	20 %
> 500	201 000	9 %
TOTAL	377 000	60 000

Photonics industry will continue to create jobs at a high rate in the coming years. Note that the rate of job creation is inversely proportional to the size of the company. Considering the overall number of job creations, medium-sized companies' amount is the highest. In addition, small companies represent 6% of the total employment but 15% of the growth.

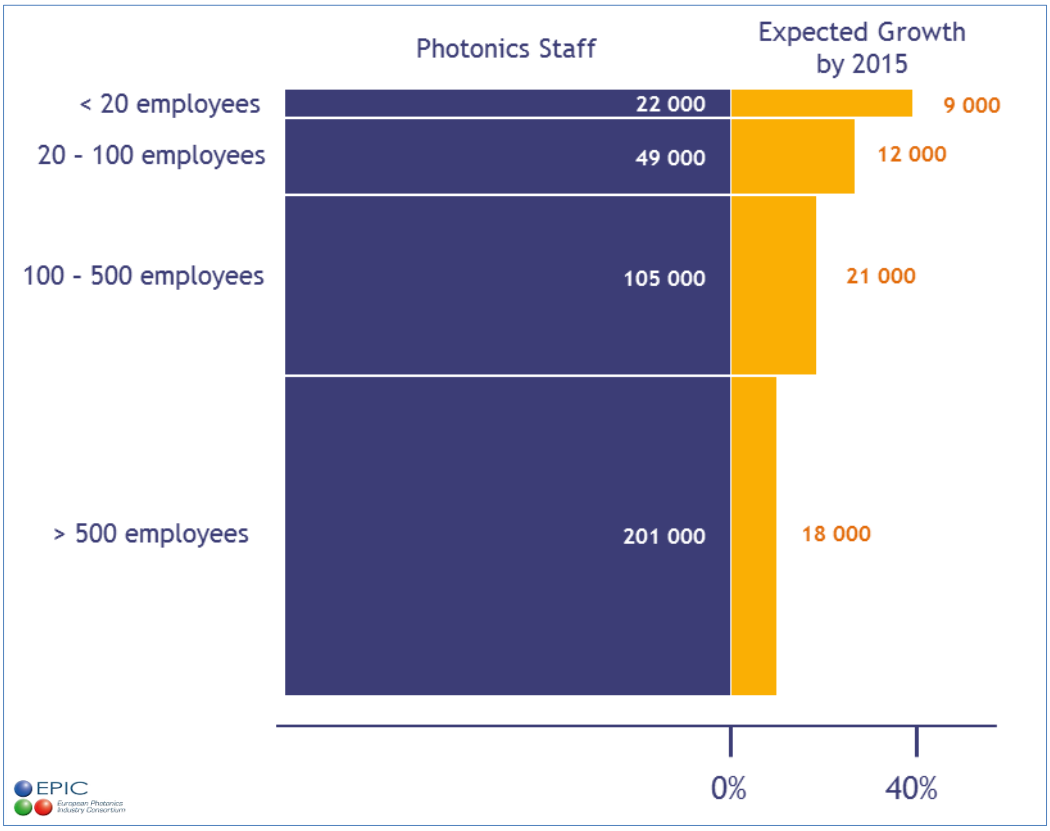


Figure 5 : Expected Photonics Staff Growth by 2015
(Surfaces are proportional to staff)

4 STATISTICAL ANALYSIS OF EUROPEAN COMPANIES

4.1 BREAKDOWN OF EUROPEAN COMPANIES ALONG VALUE CHAINS AND FINAL MARKETS

The results concerning the value chain are rather surprising. In particular, the share of Photonics components is greater than expected (see Figure 6).

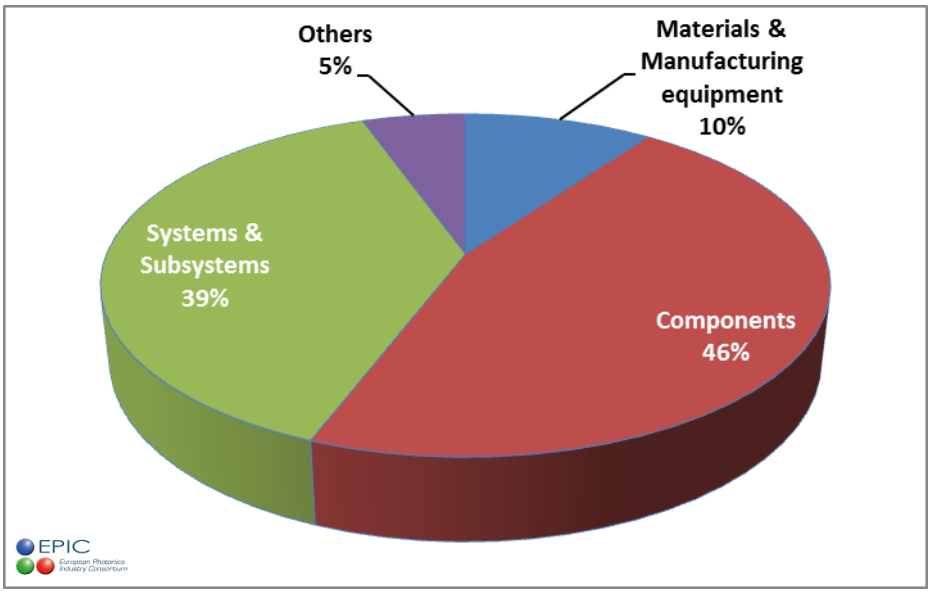


Figure 6 : European Photonics companies across the value chains

In Figure 7, we see that the share of sensing and imaging systems together remains the largest, away from other photonic systems. Moreover, the share of energy providing systems tends to decrease due to the economic difficulties in this sector.

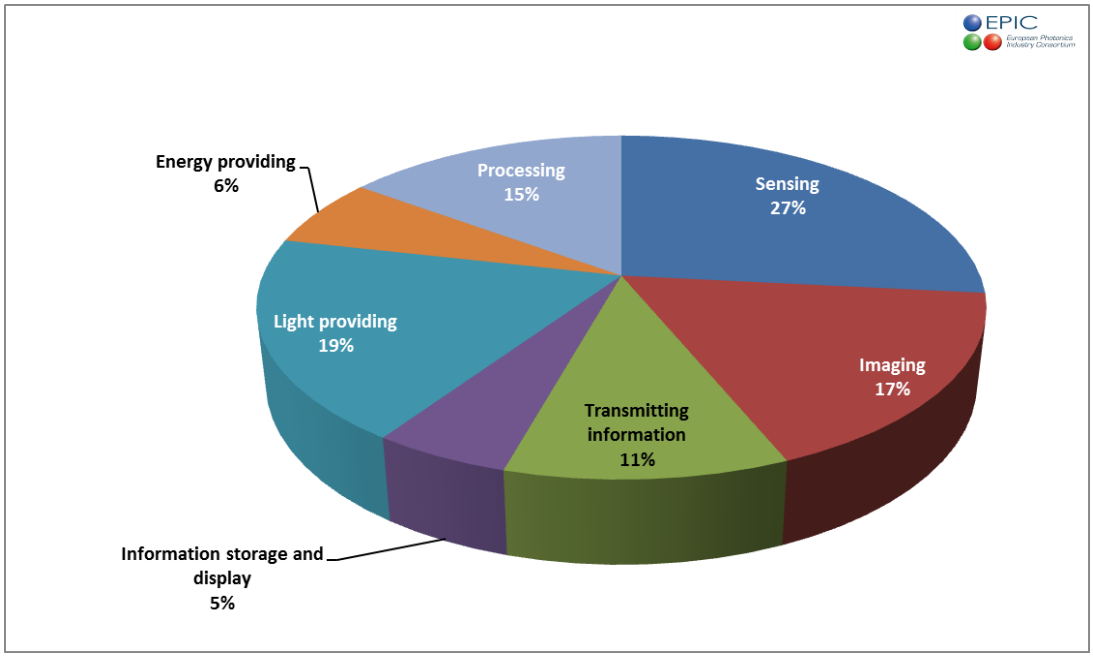


Figure 7 : European Photonics companies by type of systems

One of the nice surprises of the study is the breakdown of final markets with a fairly uniform distribution (See Figure 8). This is a clear difference with last results: **Photonics industry in Europe clearly tends to diversify**.

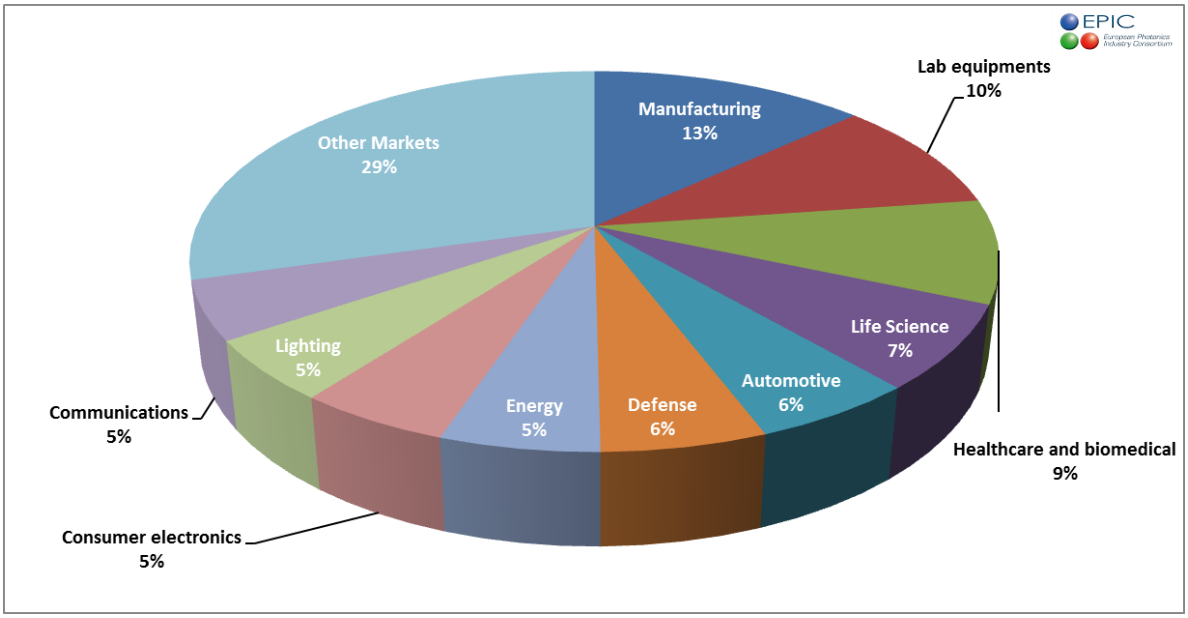


Figure 8 : European Photonics companies by final markets

Diversification is a reality for Photonics industry as a whole. But, most of companies stay few diversified in terms of market (their main market represents more than 50% of their business) and also in terms of technologies.

Moreover, 58% of companies are specialized in Photonics (>80% of revenues in Photonics). On the other side, Photonics is a small part of the revenue for 24% of the companies which corresponds to large and medium-large firms.

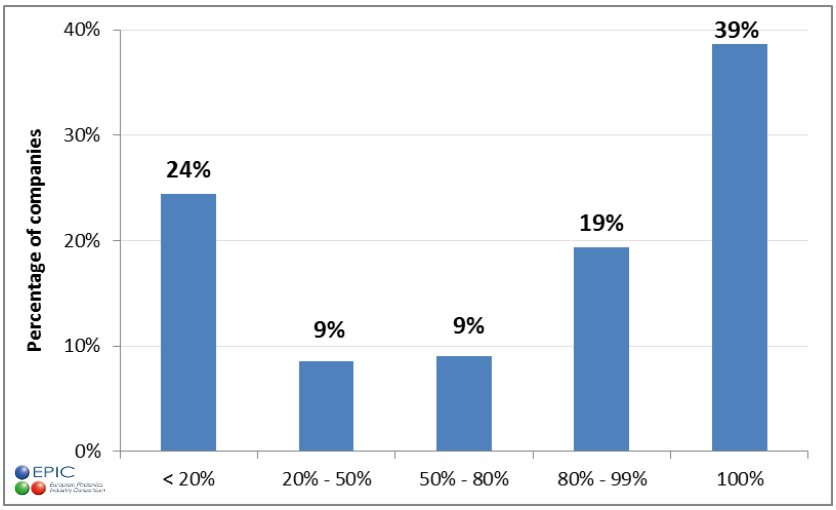
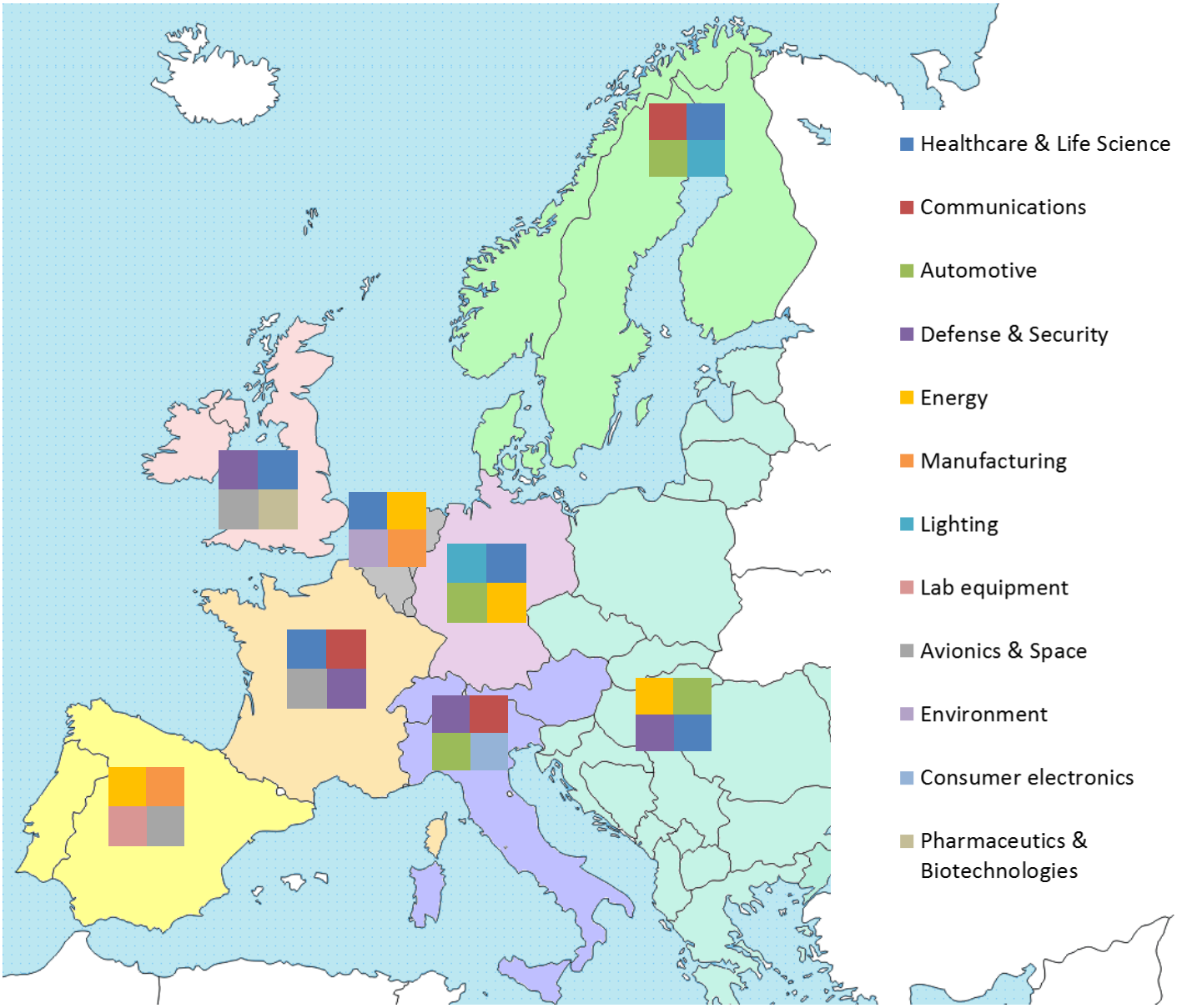


Figure 9 : Ratio of Photonics turnover over global turnover

4.2 BREAKDOWN OF FINAL MARKETS BY COUNTRY

We present in the map below the breakdown of final markets by country.



Map: Breakdown of European companies final markets by Country

4.3 TURNOVER AND STAFF ANALYSIS

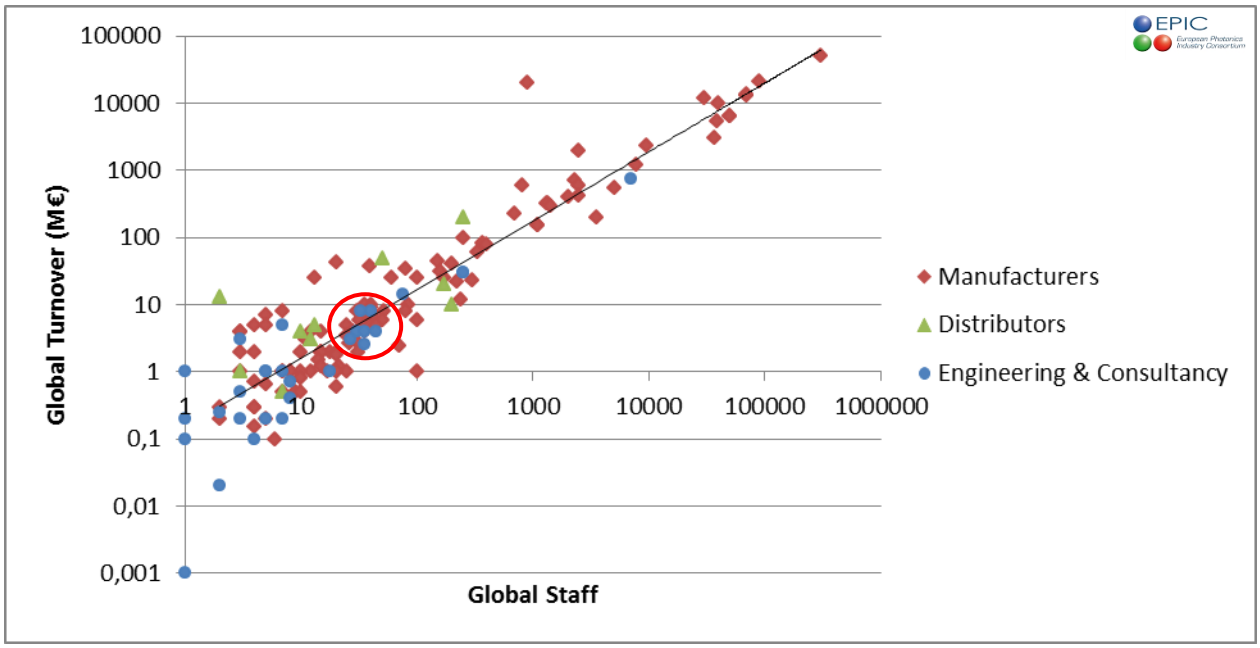


Figure 10 : Turnover vs. Staff for European companies

Figure 10 compares staff and turnover. We can draw 3 main conclusions.

Strong homogeneity in the turnover-over-staff ratio

The high ratio in Photonics companies (between 150 and 250k€/occupied people) is mainly linked to a high skilled workforce, and is homogeneous across all companies.

Aggregation point

One area clearly appears in Figure 10, around 30 employees and the corresponding revenues: 5 M€. This corresponds to a "value gap" in Photonics small companies, from European and techno-driven, to international and market-driven.

Three main areas

Considering the steps in the value chain, the analysis lay-out:

- Final integrators (> 300 employees till 5000, depending on the final market),
- Components and systems manufacturers (30 to 300 employees),
- Prototyping & test (under 30 employees).

4.4 PURCHASE, MANUFACTURING AND SALES ANALYSIS

We asked companies the percentage of purchase, manufacturing and sales implemented in Europe and outside Europe. The numbers confirm the high interest of Photonic industry for a sustainable local growth.

- Photonic products are mainly manufactured within Europe, (around 75% of manufacturing staff of the companies are working in Europe). As sustainable employment in manufacturing represents a key issue for European growth policies, Photonics industry could play a key role due to the high level of qualification of the Staff involved in Photonic products and photonic systems.
- Concerning purchases, even if low cost countries develop their market shares on basic materials and components (filters, glasses, …) even more sophisticated products (Photovoltaic modules…), around 50% of purchases done by European companies is still purchased in Europe, guaranteeing durable independency for this industry.
- Last but not least, Photonic companies are less exposed to European crisis due to their strong exposure to foreign markets (more than 50% of sales are done outside Europe in dynamic markets: mainly Asia and America).

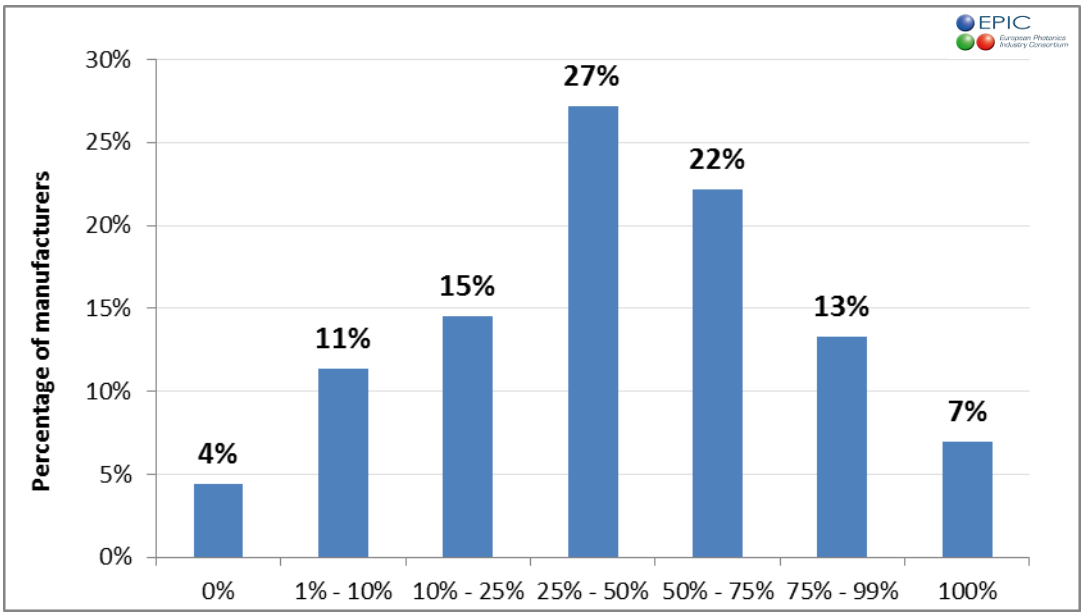


Figure 11 : Sales performed in Europe

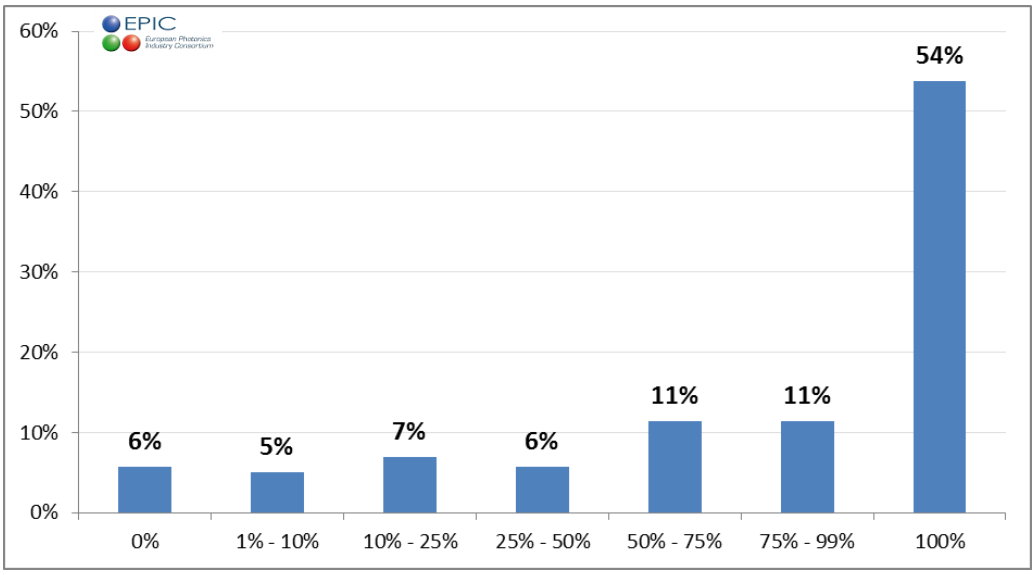


Figure 12 : Manufacturing in Europe

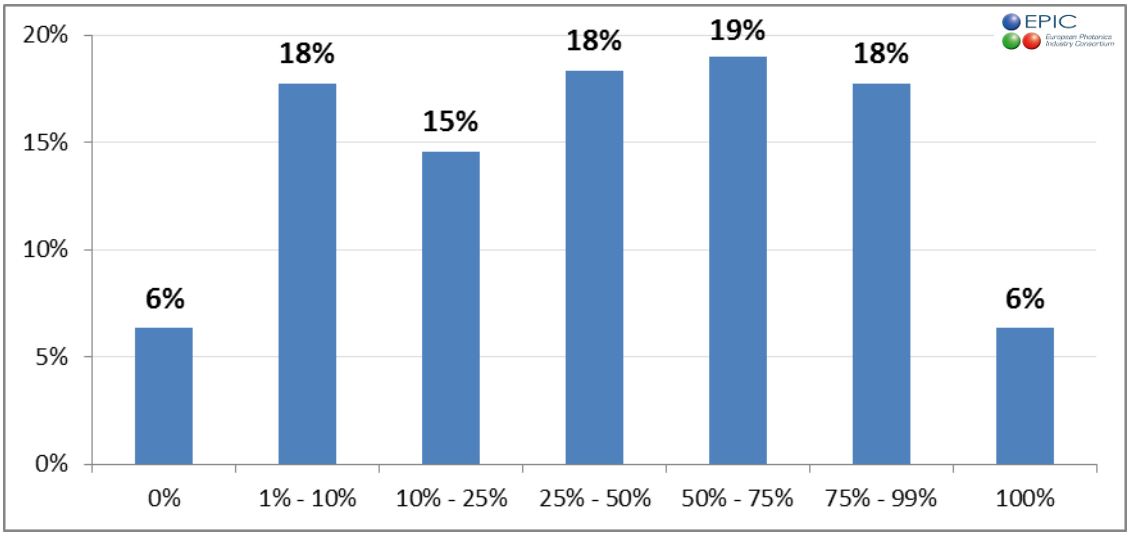


Figure 13 : Purchases in Europe

Figure 14 summarizes these data. Compared to older industries, whose manufacturing capacities and purchases are mainly implemented outside Europe and sales inside Europe, the photonic industry presents a very competitive aspect, offering strong potential for sustainable European employment.

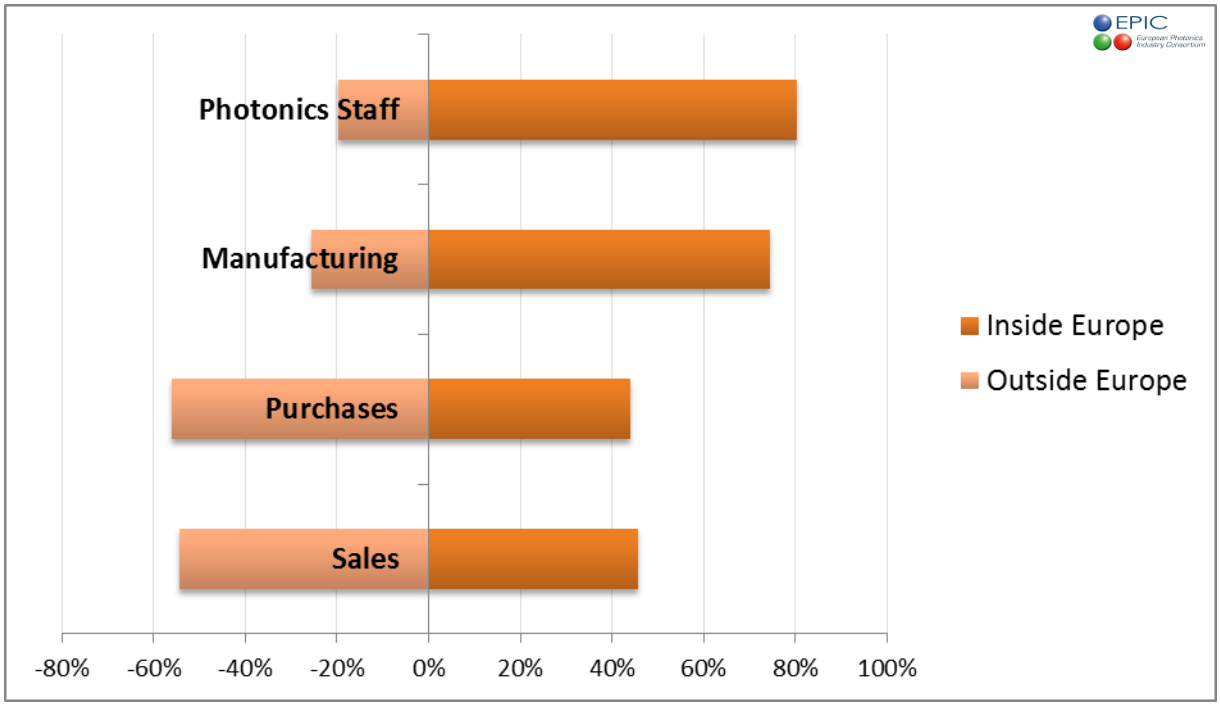


Figure 14 : Staff, Manufacturing, Purchase and Sales analysis

5 OTHER STATISTICAL RESULTS

5.1 PHOTONICS CLUSTERS

Figure 15 presents the percentage of organizations that are member of a cluster.

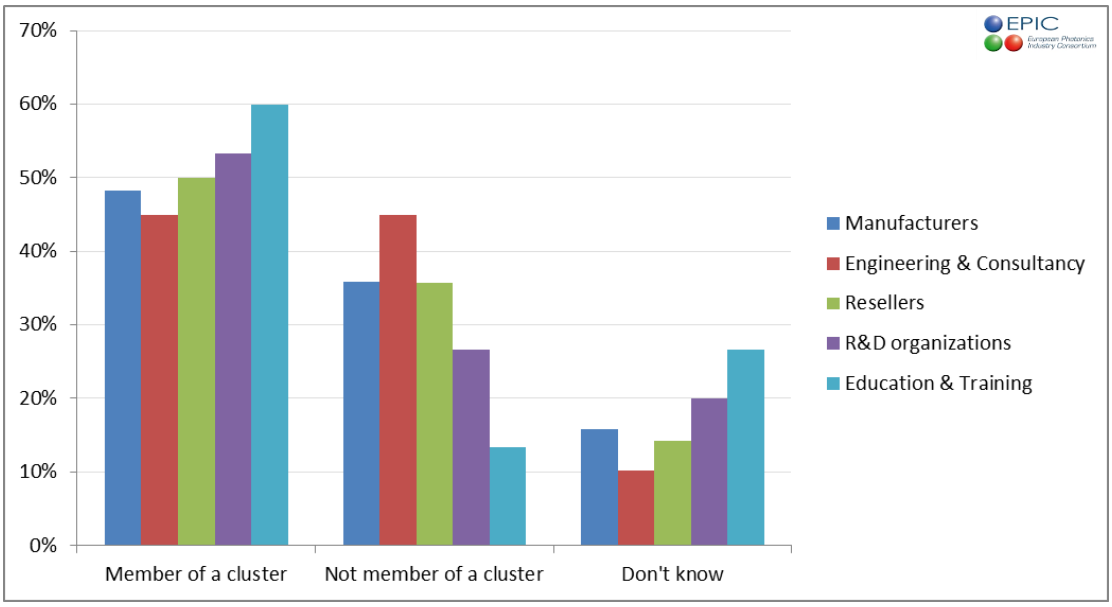


Figure 15 : Cluster membership

The cluster size breakdown is shown in Figure 16.

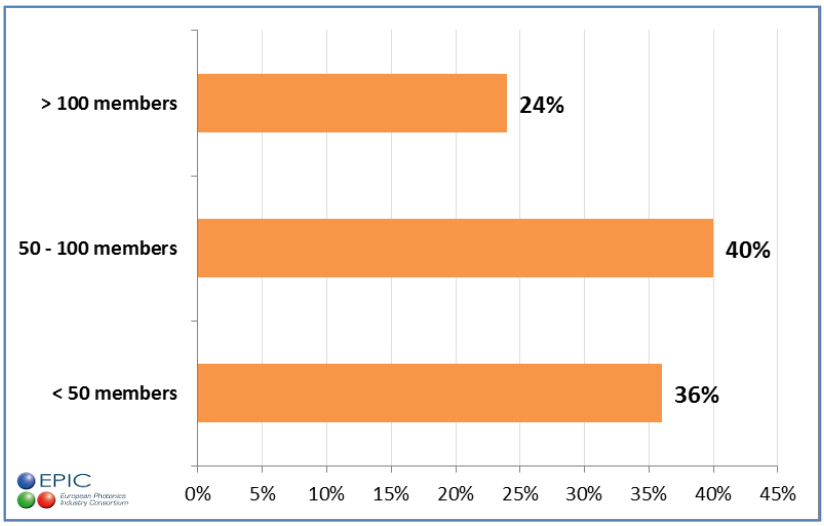


Figure 16 : Cluster Size Breakdown

Photonics clusters are much diversified: from big clusters to small (often recent) ones.

5.2 PARTICIPATION IN EU PROGRAMS

We present below in Figure 17 the percentage of organizations which participated in EU programs in the last 3 years and in Figure 18 the percentage which consider participating in EU programs.

The results show that less than one half of companies participated in EU programs while 90% of R&D organizations participated. More than 80% of organizations consider participating in EU programs except the resellers.

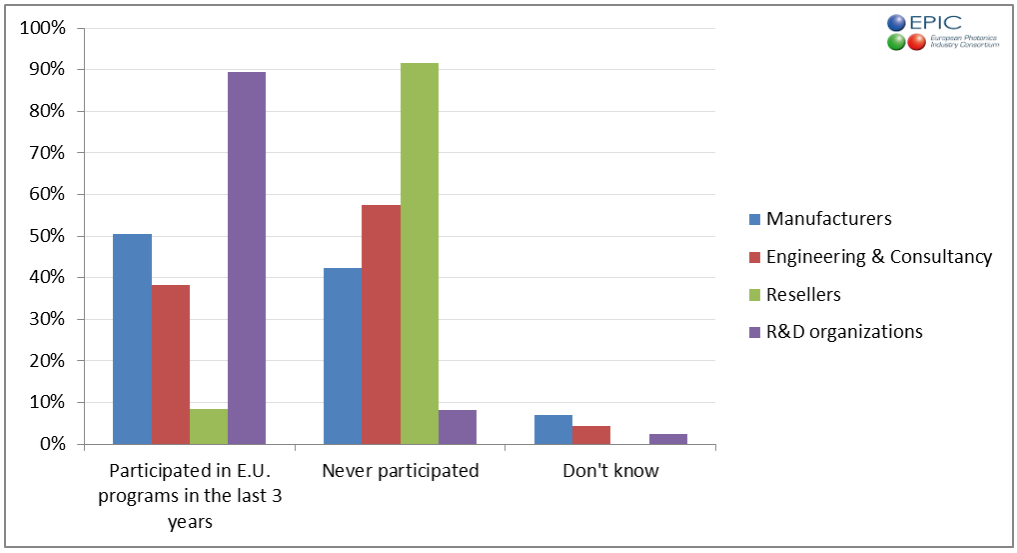


Figure 17 : Percentage of organizations participating in EU programs in the last 3 years

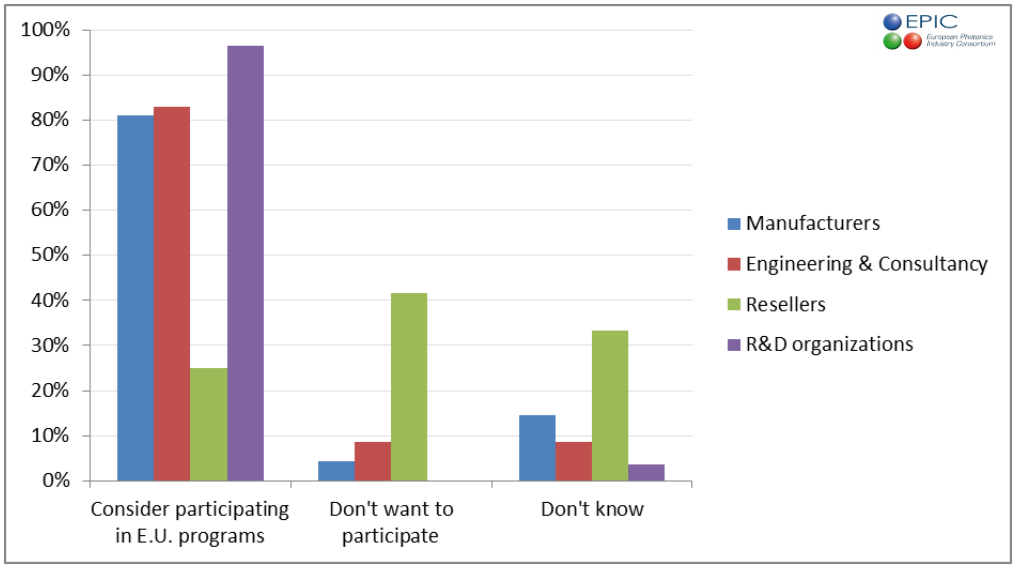


Figure 18 : Percentage of organizations which consider participating in EU programs

5.3 EDUCATION

We present below the results of the survey for the percentage of students expected to find a job within a year.

For 71% of respondents, more than half of the students find a job within a year. The situation is rather good considering that this survey takes place during an economic downturn.

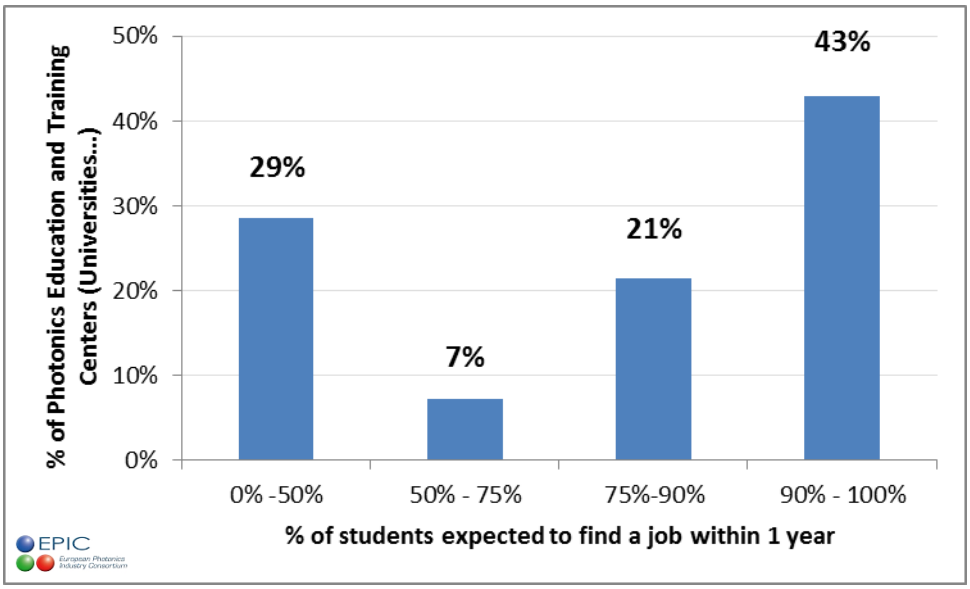


Figure 19 : Percentage of students expected to find a job within a year

6 CONCLUSION ABOUT THE SURVEY

With a short questionnaire, we were able to draft some perspective and key figures of the industry in terms of:

- Turnover, employment, growth,
- Manufacturing workforce, sales of the companies,
- Positioning in value chains and final markets.

This report highlights the importance and benefit of mapping and statistics on the entire European Photonics industry by providing very interesting results:

- Shared results at the European level for econometric analysis and monitoring of activities:
  - Data for Employment, Revenues and Growth from the whole industry,
  - Complete data to understand the key value chains and final markets in Europe,
  - The first attempt to map specialties by European regions.
- Decision Tools:
  - For European policy to support technologies considering the capacity of the European photonics industry to build sustainable jobs around these technologies,
  - For clusters towards national and regional authorities to draft strategic roadmap, considering local strengths,
  - For companies to analyze new opportunities for market deployment or diversification.
- Communication tools:
  - For European associations, to “market” Photonic companies towards end-users and integrators,
  - For clusters, to help them in policy partnership,
  - For companies, as the database and map can be used to improve the visibility of European Photonics industry.

7 ANNEX: DETAILS ABOUT THE SURVEY

We present below the breakdown of respondents by type of organization and by country. Note that the total number of answers is: 447.

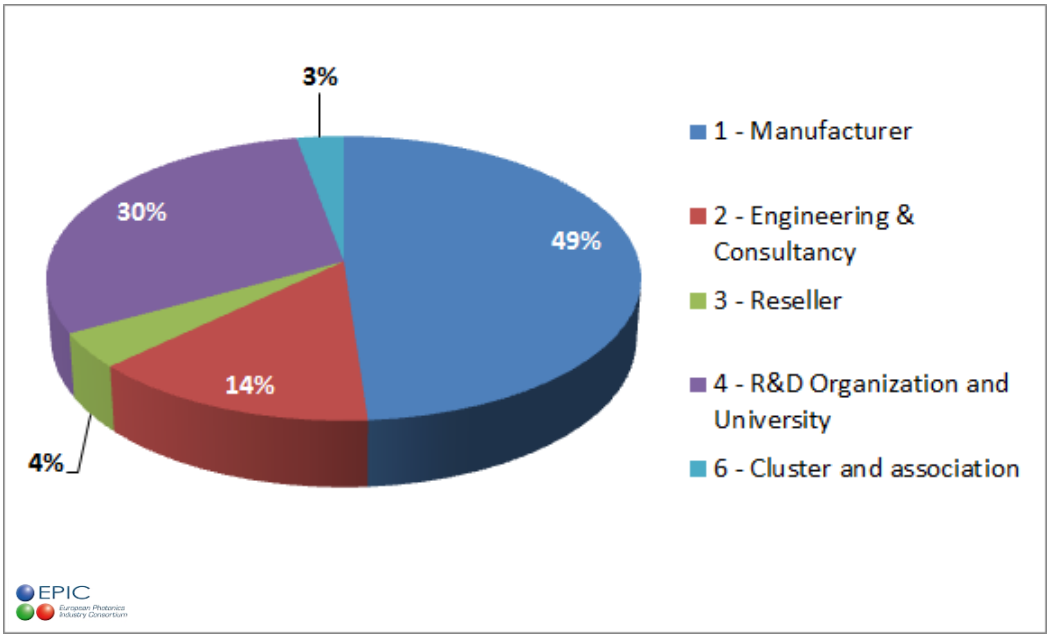


Figure 20 : Breakdown of respondents by type of organization

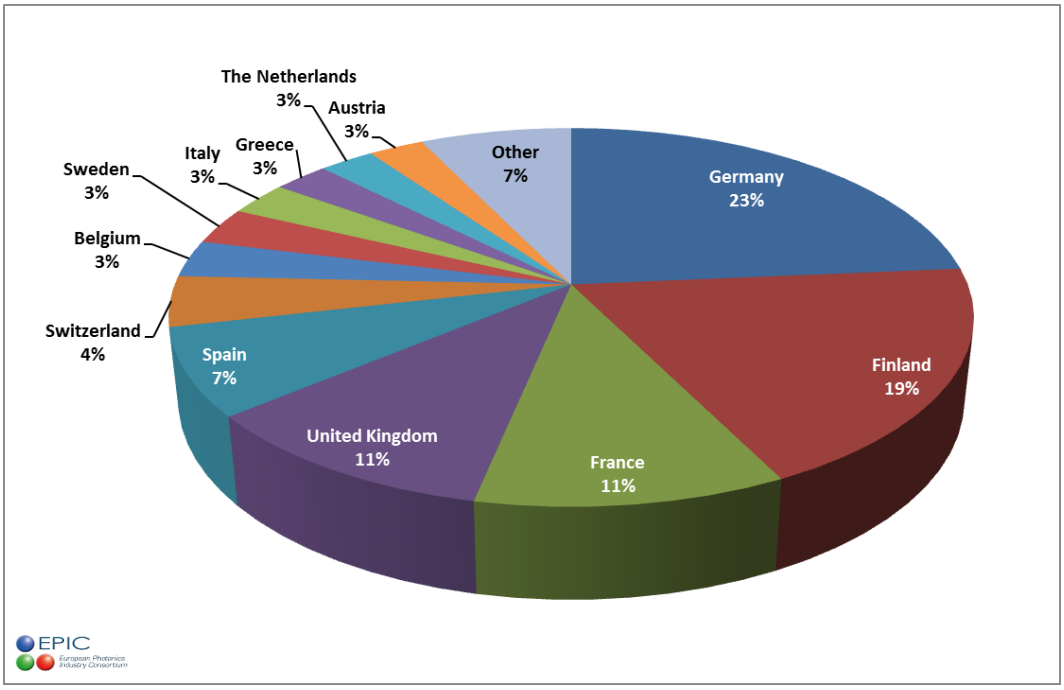


Figure 21 : Breakdown of respondents by country