

PHOTONICS IN SCOTLAND 2022 REPORT

A NETWORK OF



CORPORATE SPONSORS



Foreword

Photonics - the technical application of light - is the key enabling technology of the 21st century.

Although largely an unseen technology, it has a wide presence in our everyday lives and is applied across a myriad of market sectors, from healthcare and communications to space and manufacturing.

The diverse application of this technology has led to a rapidly growing global photonics market, valued at £670bn in 2021, and predicted to reach £1tn by 2027¹. It is a market Scotland is well positioned to exploit.

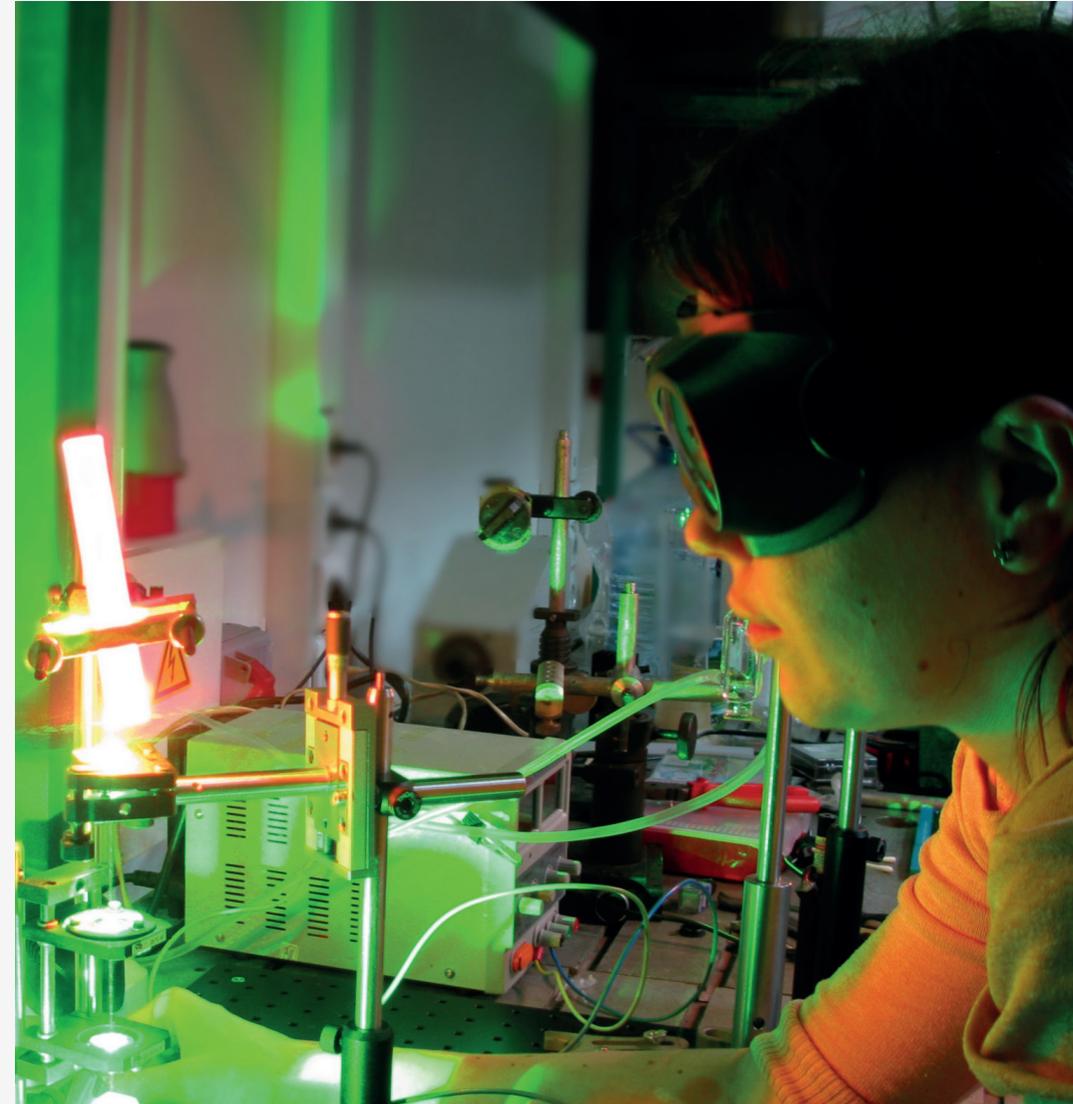
With a current output of £1.2bn², over 6,400 employees and an internationally recognised academic base, Scotland's photonics sector is recognised the world over, punching well above its weight in a globally competitive market. In 2019, Photonics Scotland published its vision to treble the size of Scotland's photonics industry by 2030, detailing recommendations that will support this growth and maintain Scotland's globally recognised and respected position in the field.

To further inform these recommendations, Photonics Scotland is committed to running an annual survey, providing an important health check for the sector and generating vital insight to the progress and challenges towards our 2030 growth ambitions.

This year's survey was conducted between June 2022 and August 2022, and includes data and sentiment gathered over the previous 12 months (2021-2022). As such, data presented here reflects the lasting impact of the global pandemic, the continued fall-out from the UK's departure from the European Union and the early effects of the war in Ukraine. Perhaps less evident in this report is the impending crisis caused by recent significant rises in energy costs. The impact of these is not necessarily reflected in this year's report but we acknowledge that this will have a significant impact on a number of our member companies.

Our survey once again highlights the resilience of Scotland's photonics sector. Against a backdrop of unprecedented uncertainty and challenge, the sector continues to show positive signs of growth, with future sentiment also remaining optimistic.

It is clear therefore that the sector is set to play an important role in Scotland's economic future but only with the recognition and support of the Scottish Government and its agencies. Photonics Scotland will continue to help our members and the wider sector realise its growth ambitions and secure the support it needs to do so.



Sponsor statements



ENIGMA
PEOPLE SOLUTIONS

Ben Hanley
Founder and Director
Enigma People Solutions

Talent shortage and increased costs has yet to stifle the growth and ingenuity of the Scottish photonics sector, but there are warning signs. There is significant pressure on salaries and companies need to account for this both in regards to recruitment but arguably more importantly regarding staff retention. More frequently than not, we are finding that our clients are under-estimating the salaries for roles they are recruiting into often by around 20%. So, if you think you will be recruiting someone at a salary of £45k-£50k often the salary actually paid is closer to £60k. We are seeing this as a trend as candidates leverage their bargaining position, recognising that this is the market in which to do so.

I urge companies in the sector to be mindful of this.

We are seeing graduate salaries rise from c£26,000 to upwards of £30,000 and graduates who are choosing to enter the workplace rather than move on to PhD courses. For them the jobs are available, attractive, interesting and the salaries are too good to resist.

Whilst this salary pressure is a challenge for employers it is also an excellent indication of a buoyant and thriving sector which I am sure we all feel is good news.

For our part, Enigma People Solutions has continued to work closely with our clients to help them identify key technologists and technical leaders to bolster their businesses and have experienced positive trading and results over the past year.



SCINTILLA

Peter McBride
Founder and Patent Attorney
Scintilla IP

The Photonics industry is at the forefront of many key technologies that will be used to tackle the most pressing issues of our society.

From bespoke sensors for monitoring our environment to innovative diagnostic tools to improve health management or encrypted technologies to secure our communication, the need for innovation and the speed to deliver those changes have never been greater.

Scotland keeps pushing the boundaries of the photonics world with an ever growing community that Scintilla is proud to be supporting.

If power is nothing without control, innovation is not much without a sound IP strategy. Yet there is no magic formula, and every company will need to develop its own. At Scintilla, we help innovative companies get a grip on their intellectual property. We work with companies to develop and implement IP strategies that align with their business goals. This can include advising on registration of IP rights, such as patents, designs and trade marks; providing innovation and competitor analysis in relation to third party IP rights; and advising on the implementation of IP management procedures within organisations. Our unique commercial approach ensures that IP can be a springboard for business growth. We at Scintilla are proud to support the photonics community in Scotland and look forward to its ongoing success in the years ahead.

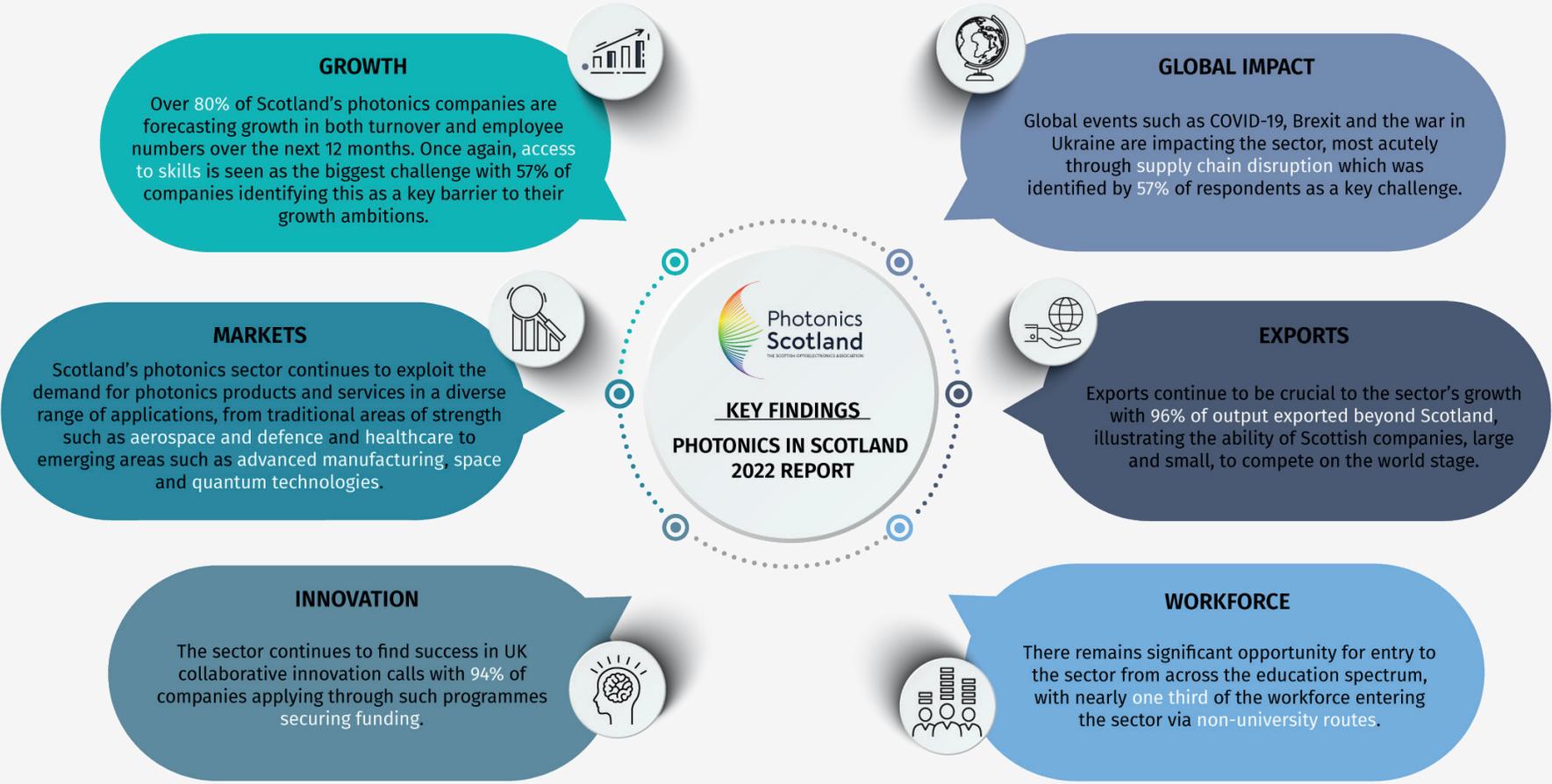
Executive summary

Since our first Photonics Scotland survey was conducted in spring 2020, the UK has faced a number of economic shocks, the result of an unprecedented series of events here in the UK and across the globe. From the global pandemic and the UK's departure from the European Union, to the war in Ukraine and disrupted global supply chains, it is hard for many of us to remember a more challenging backdrop to our growth ambitions.

Yet, despite this, the results of this year's survey continue to reflect an extraordinarily resilient sector, with nearly 40% of companies reporting revenue growth over the previous 12 months and a further 45% showing steady turnover.

Perhaps even more optimistically, over 80% of companies surveyed are forecasting increased revenues and head count over the next 12 months. Indeed, over 50% of companies are forecasting double digit growth for this period. No mean feat against such difficult global economic conditions.

Exports continue to be crucial to the sector's growth with 96% of output exported beyond Scotland. This is consistent with previous years' results and illustrates the ability of Scottish companies, large and small, to compete on the world stage. It will be important to support our companies in their internationalisation efforts and the recently published Technology Sector Export Plan³ must provide the framework from which to do so.



Executive summary

The diversity of Scotland's photonics sector continues to be its strength, with companies exploiting the demand for photonics products and services in a multitude of application areas. Once again, our survey highlights those traditional areas of strength, notably aerospace and defence and healthcare. However, consistent with previous years, our results also show applications in emerging areas such as advanced manufacturing, quantum technologies, communications and space.

For the third year running, access to skills has been identified as a major challenge, with 57% of respondents identifying this as a key barrier to growth. It is now well established that building the talent pool will be vital to achieving our 2030 growth targets and initiatives like the Practical Photonics Skills Course – delivered by the NMIS Manufacturing Skills Academy and developed with support from Photonics Scotland and industry partners – will be increasingly important.

The survey also re-emphasised the opportunities for entry to the sector from across the education spectrum. While high level education in the form of graduate and post graduate degrees remains critical (nearly two thirds of the workforce has benefited from university education) there is also significant opportunity available through other routes. Our survey showed that nearly one third of the sector's workforce has entered with no formal qualifications (19%) or via apprenticeship/college education (13%). It is clear that the skills focus must be as diverse as the talent pool we hope to build.

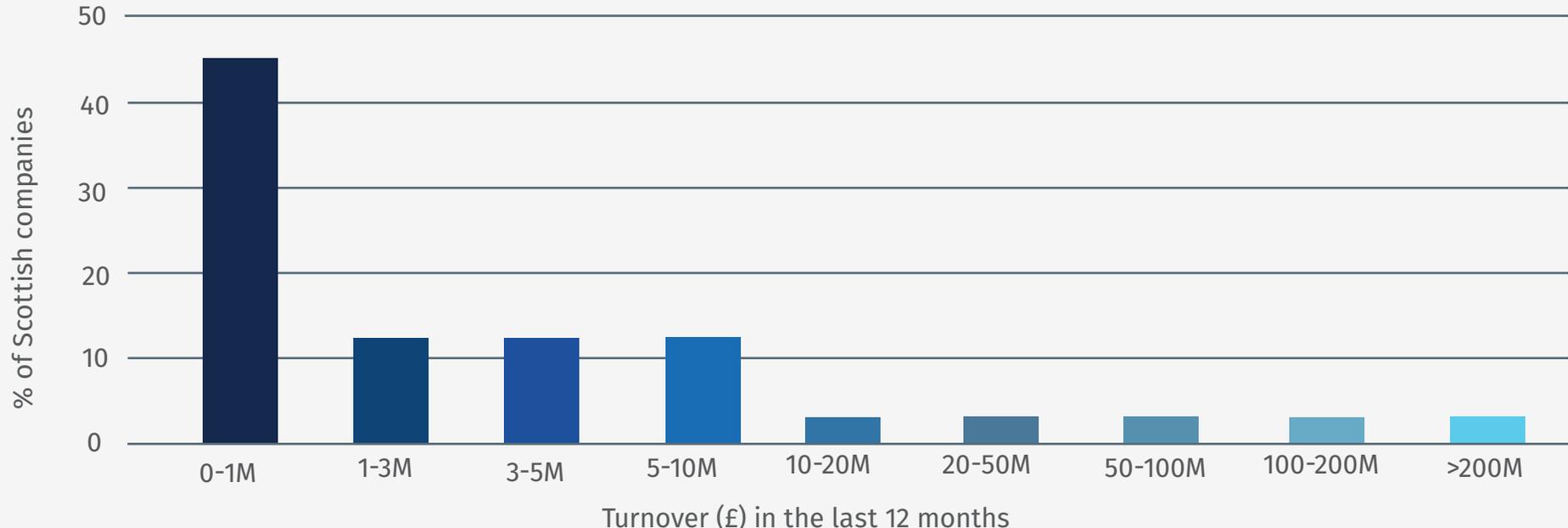
While skills have remained a constant challenge for the sector over the last decade, it is clear that global events of the last few years are also having an effect. While the direct impact of COVID-19 appears to be reducing (nearly 30% of respondents now report no direct impact), there is still a legacy effect most acutely felt in the supply chain.

Indeed, this impact, coupled with the ongoing impacts of Brexit and the war in Ukraine, have resulted in 57% of our respondents identifying supply chain disruption as another key barrier to growth. While we continue to hope that this disruption will reduce over the coming months and years, it is clear that we must support our organisations to negotiate this difficult time.

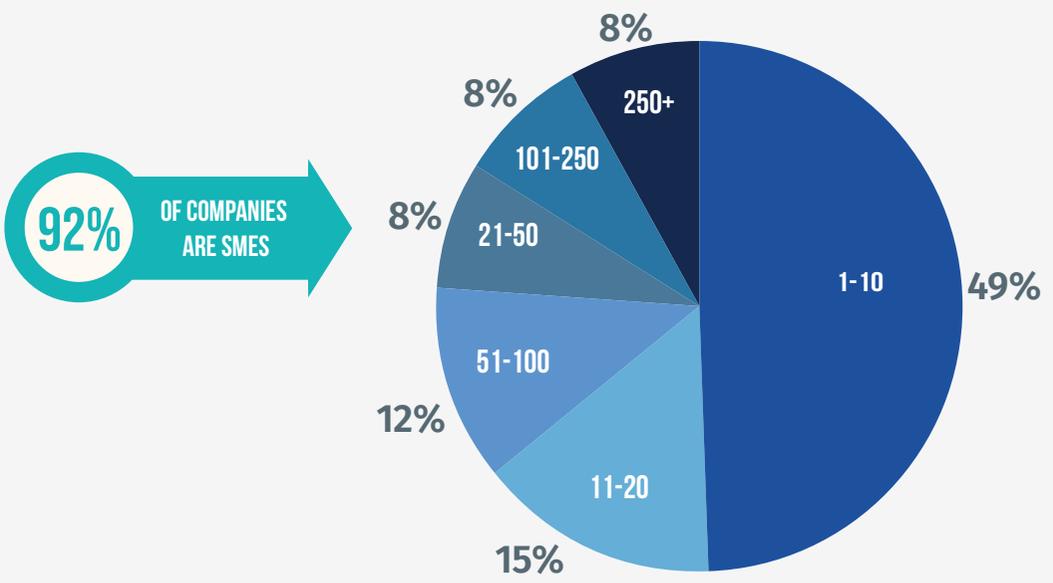
Finally, it is once again encouraging to note the innovation success associated with the sector. The last 12 months has seen over 75% of survey respondents engaging with UK innovation funding opportunities and an extraordinary 94% of those companies finding success. It is clear that the innovation skills and expertise in the sector are valued by our key funding bodies. Perhaps less positively, it is unfortunate to note a decrease in engagement with EU funding programmes, with over 50% of companies reporting reduced activity over the last 12 months. The uncertainty around Brexit and the UK's involvement with such programmes is clearly having an impact and it is crucial for the sector (and the UK's wider innovation ecosystem) that clarity is provided soon.

Company landscape

COMPANY SIZE - TURNOVER



COMPANY SIZE - NUMBER OF STAFF





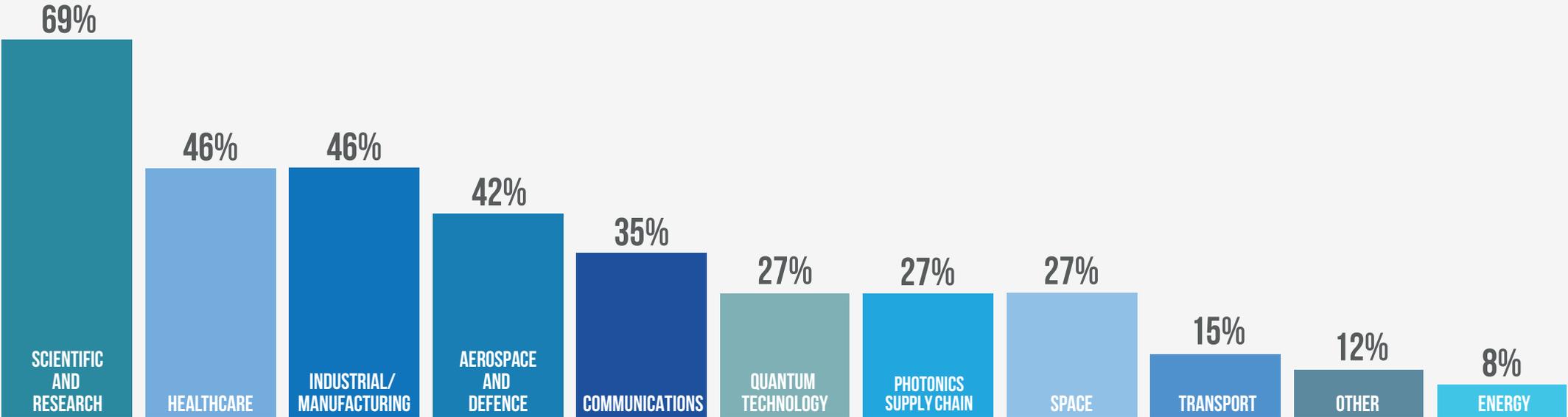
Scotland's Photonics Sector represents the blueprint for an active, vibrant cluster. The Scottish Government's focus on developing strategic clusters through the National Strategy for Economic Transformation⁴ must recognise this and provide a framework for future support.

OPPORTUNITY

⁴Scottish Government, Scotland's National Strategy for Economic Transformation

Application focus

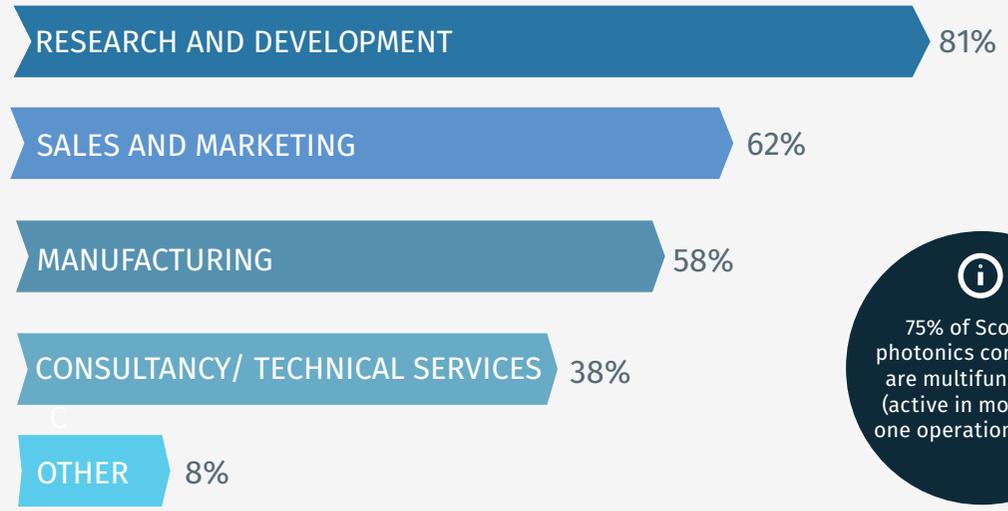
% OF SCOTTISH COMPANIES ACTIVE IN EACH APPLICATION AREA



The diversity of Scotland's photonics sector continues to be its strength, with companies exploiting the demand for photonics products and services in a multitude of application areas. This puts Scotland in an excellent position to exploit a rapidly growing global market.

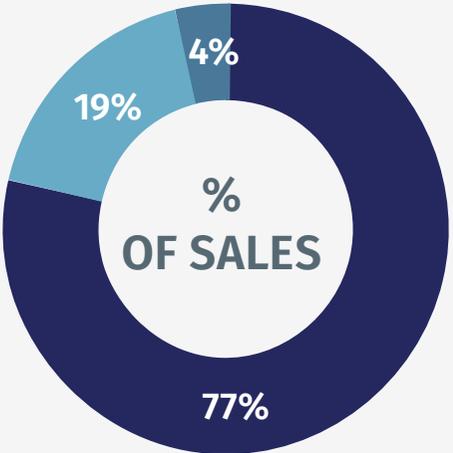
OPPORTUNITY

OPERATIONAL FUNCTIONS OF SCOTTISH COMPANIES



i
75% of Scottish photonics companies are multifunctional (active in more than one operational area)

International markets



■ Scotland ■ Rest of UK ■ International

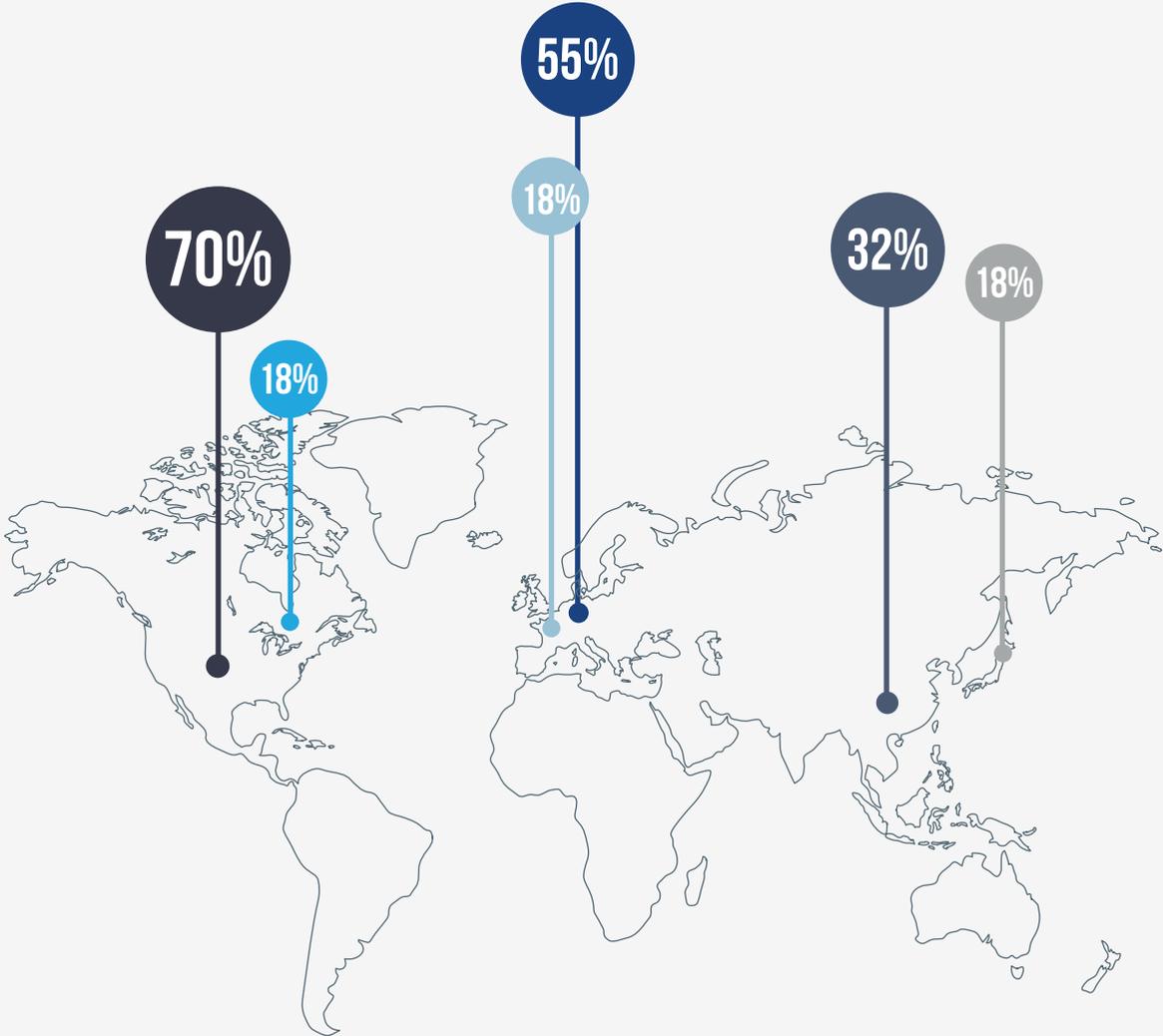
i 96% OF OUTPUT EXPORTED OUTSIDE OF SCOTLAND



Scotland’s export strength illustrates the ability of Scottish companies, large and small, to compete on the world stage. However, further support will be required in order to maximise the opportunity this global market represents and the Technology Sector Export Plan⁵ must provide the framework for this.

OPPORTUNITY

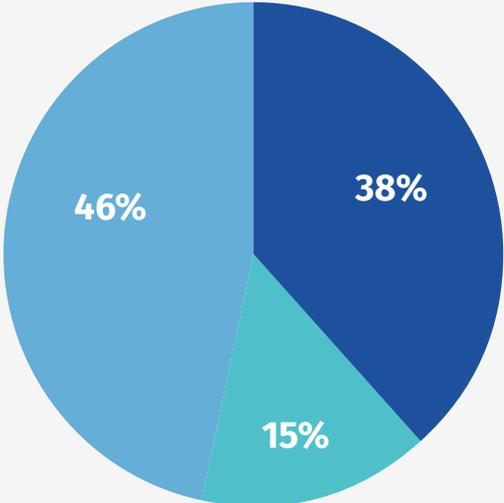
TOP EXPORT MARKETS



■ United States ■ Germany ■ China
 ■ Canada ■ France ■ Japan

Growth

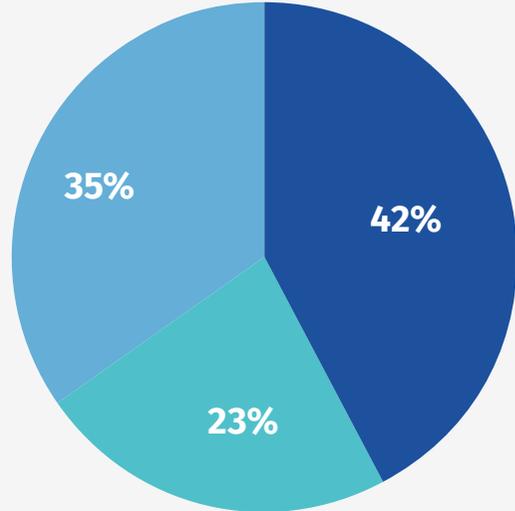
TURNOVER COMPARED TO PREVIOUS YEAR



80%

of companies project further growth in turnover and employee numbers over the next 12 months

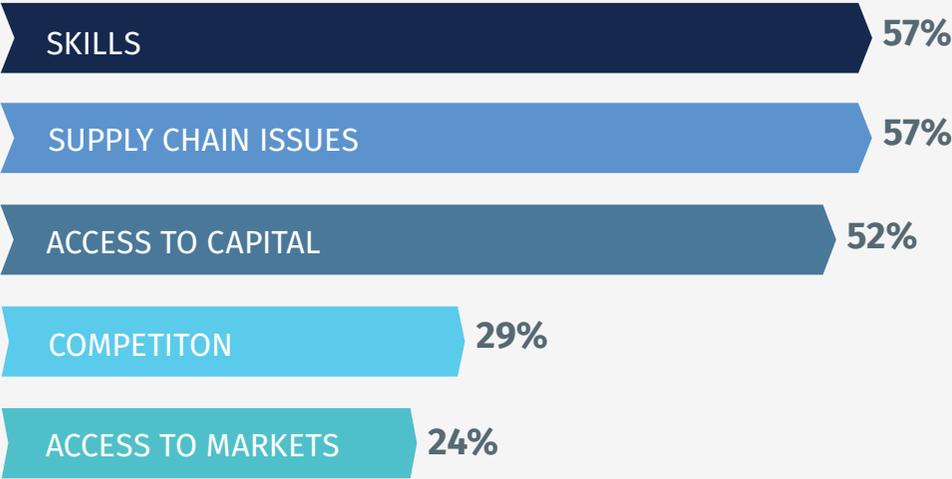
STAFF NUMBERS COMPARED TO PREVIOUS YEAR



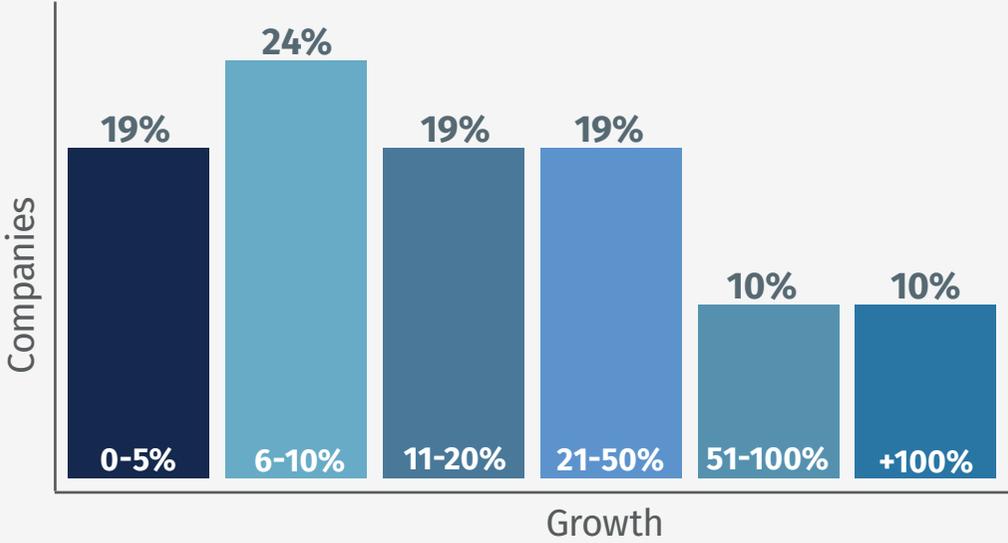
Greater The same Smaller

Greater The same Smaller

BIGGEST IMPEDIMENT TO GROWTH



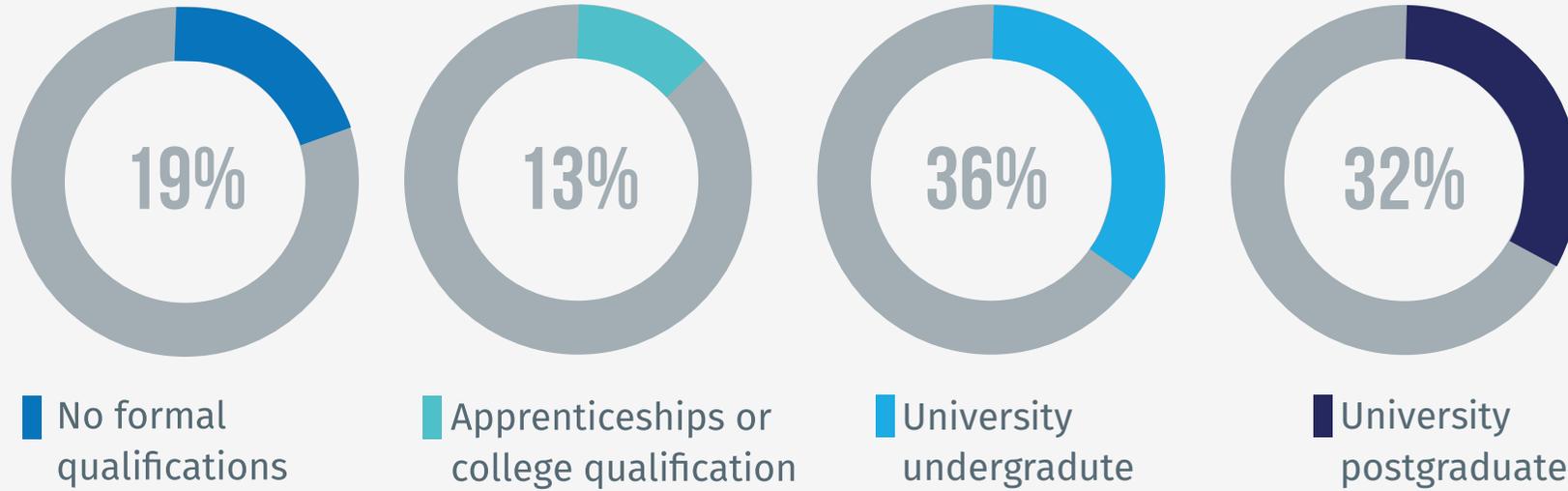
FORECASTED GROWTH IN NEXT 12 MONTHS



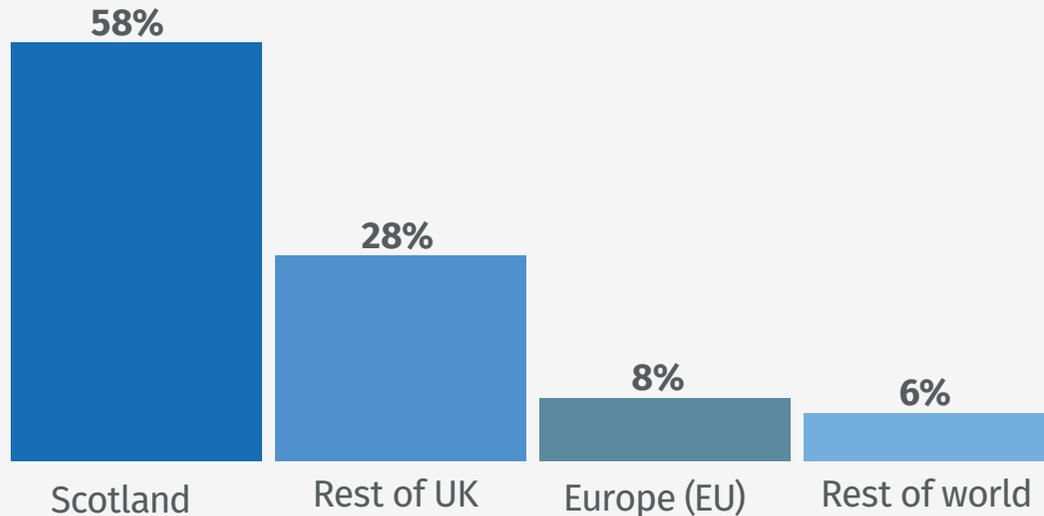
Workforce

i
20% of staff identify as female

QUALIFICATION LEVEL OF SCOTLAND'S PHOTONICS EMPLOYEES



GEOGRAPHICAL ORIGIN OF NEW RECRUITS OVER THE LAST 24 MONTHS



This survey has re-emphasised the opportunities for entry to the sector from across the education spectrum. It is clear that there is a significant opportunity to build the talent pool from multiple sources. Further efforts to diversify the sector, with particular focus on the gender balance, will also support growth.

OPPORTUNITY

Innovation and research

UK Grants



have **applied for UK grants** in the past 3 years



have been **successful** in their grant applications

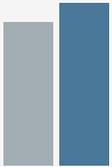
European Grants



have **applied for European grants** in the past 3 years



have been **successful** in their grant applications



54%

said that their engagement with EU funding programmes has been lower compared to pre-Brexit levels

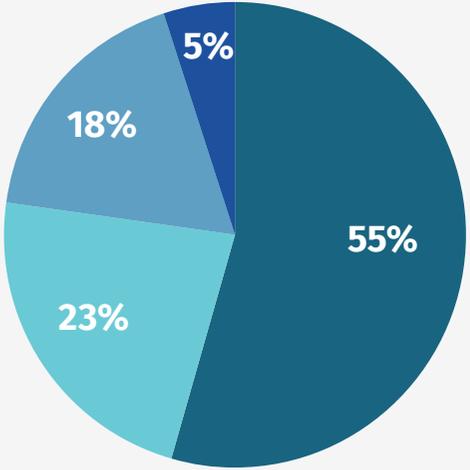


Scottish companies continue to excel at securing UK based innovation funding. There has been an understandable drop in engagement with EU programmes but this could be easily remedied via further clarification on the UK's position in such programmes.

OPPORTUNITY

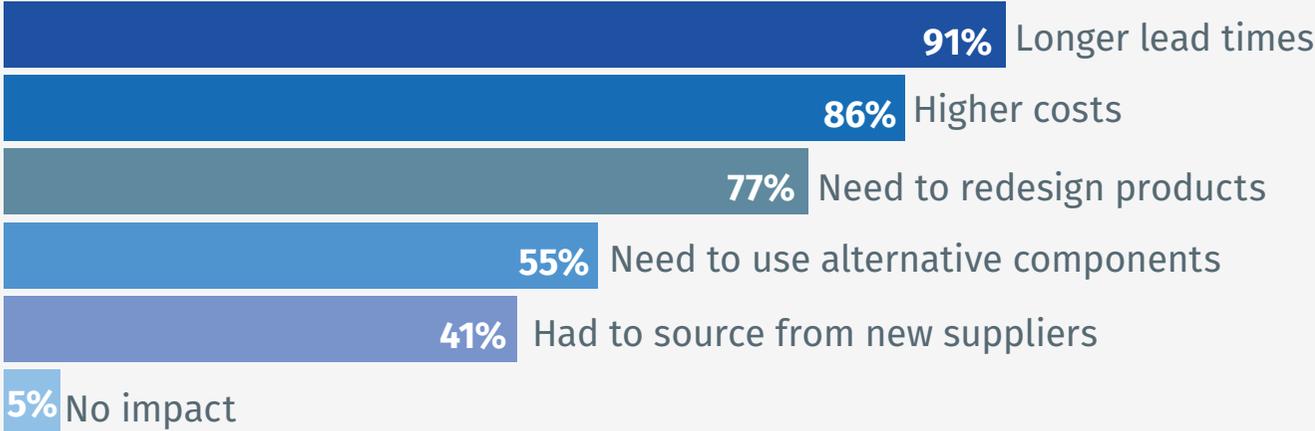
Supply Chain

Supply chain disruption

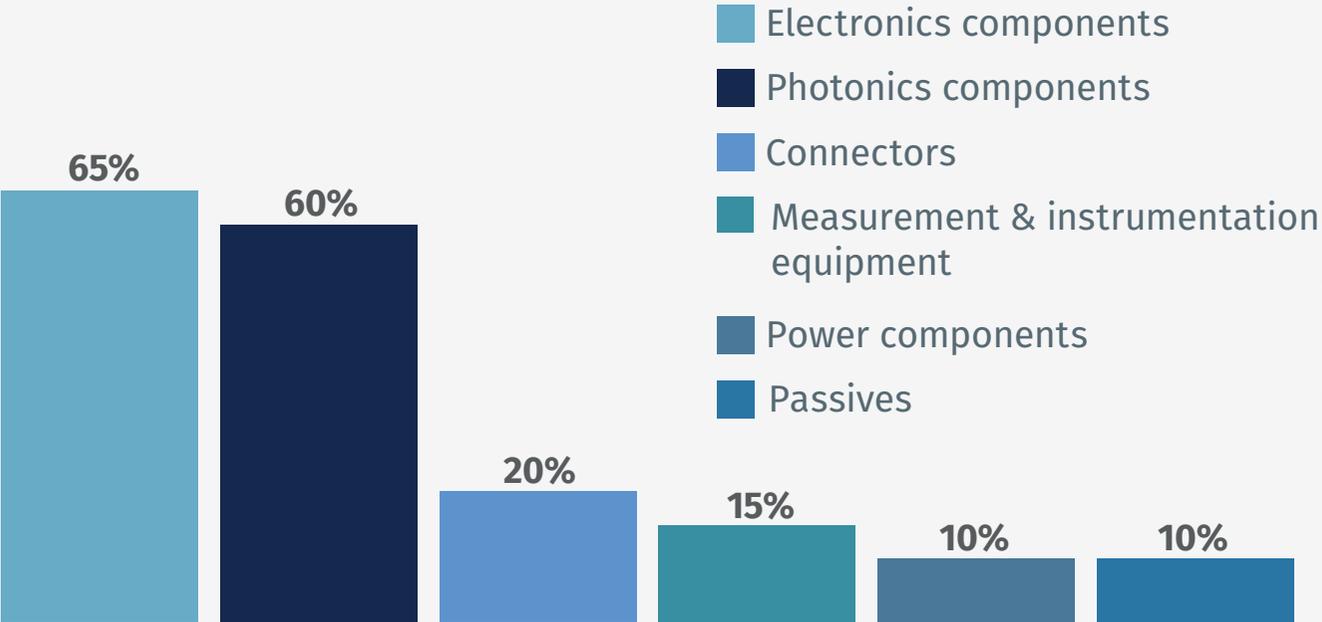


■ Significant ■ Moderate ■ Slight ■ None

Impacts of supply chain disruption



Component sourcing issues



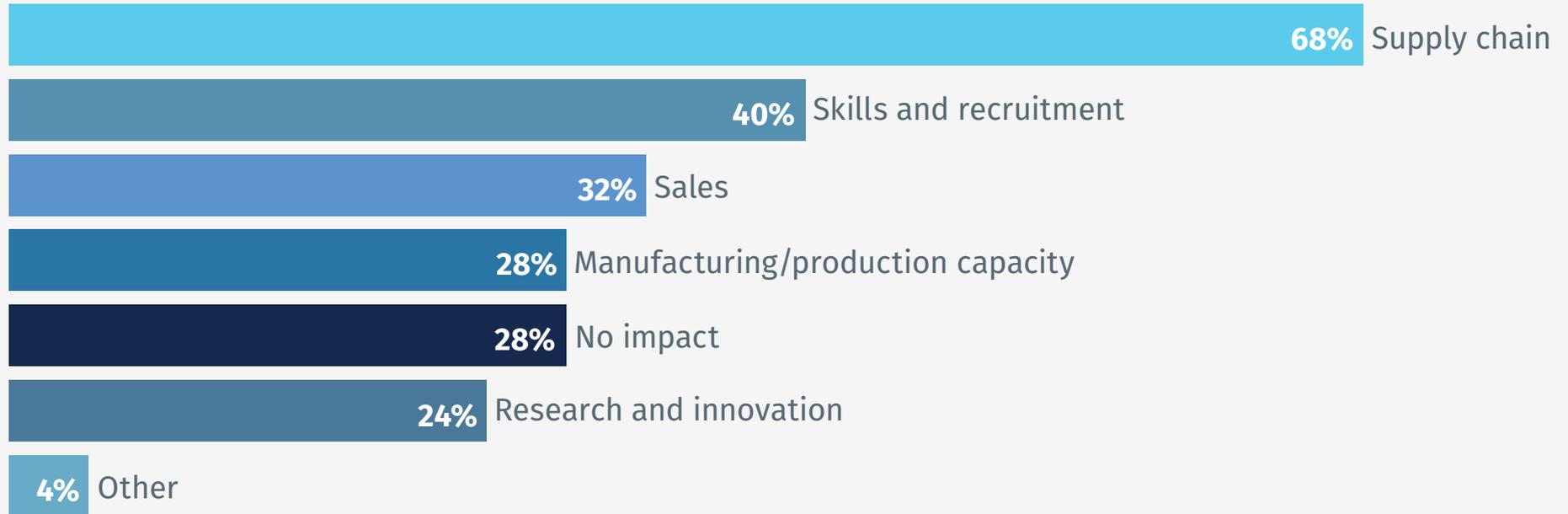


Scotland's photonics companies have had to negotiate unprecedented supply chain disruption leading to longer lead times and higher costs. Yet, despite this, growth and sentiment remains positive and it is hoped that the impact of this disruption will be reduced as supply chains stabilise.

OPPORTUNITY

Impact of COVID

Continuing impact of COVID-19

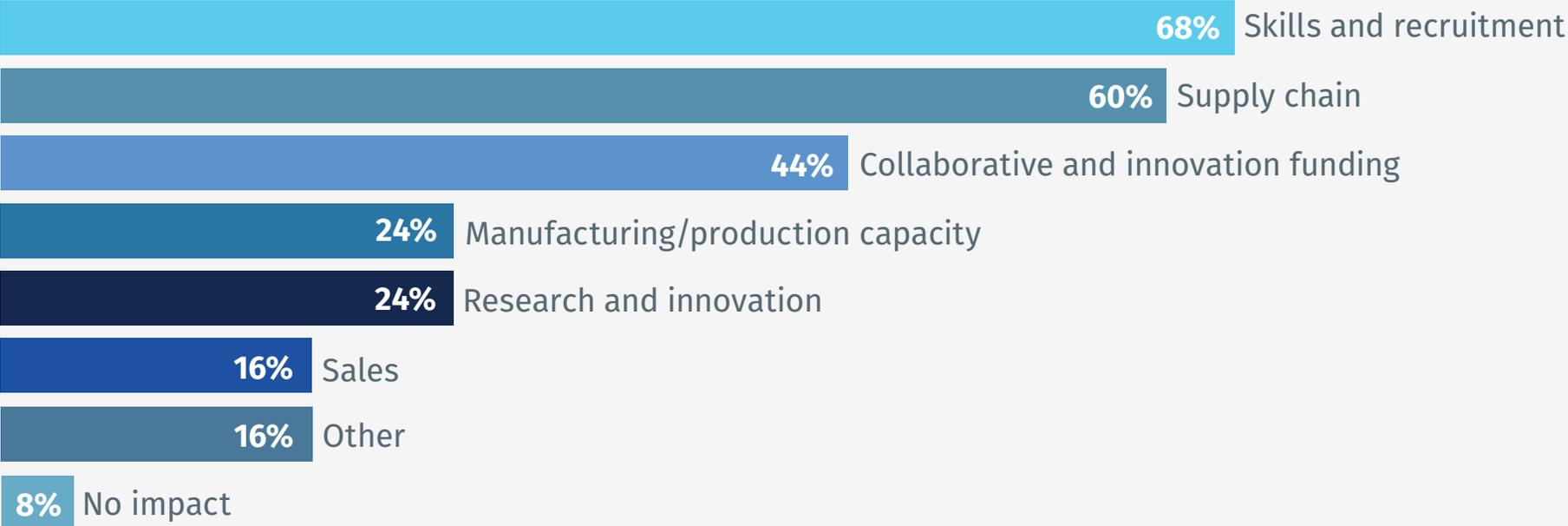


It is encouraging that nearly 30% of Scottish companies now report no direct impact from COVID-19. It is forecast that global supply chains will settle over the coming 12 months providing an excellent opportunity for the sector to accelerate growth after showing extraordinary resilience throughout the pandemic.

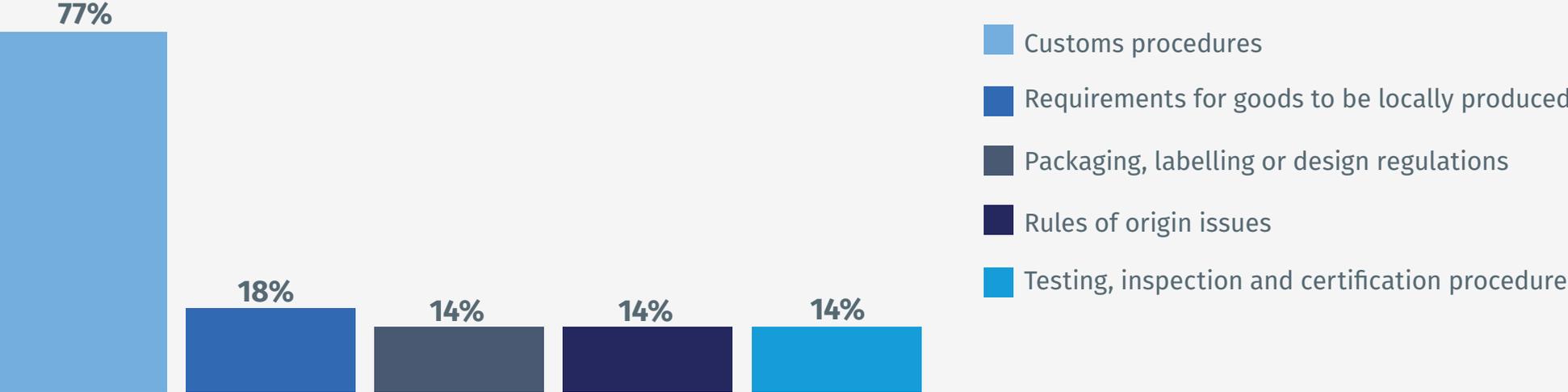
OPPORTUNITY

Trade and Brexit

Continuing impact of Brexit



Top 5 trade barriers experienced



Community comments

WHAT ONE THING SHOULD THE GOVERNMENT AND ITS ENTERPRISE AGENCIES PRIORITISE TO SUPPORT SCOTLAND'S PHOTONICS SECTOR?

"Grants to support capital equipment purchases"

"More support for indigenous companies compared to inward investors"

"Access to skilled labour and training packages for current staff"

"Investment in fab infrastructure and education"

"Promote stable, medium sized businesses rather than unsustainable high growth businesses"

"Skills"

"Ensure lost EU funding is replaced with money from central government"

"Further access to low interest rate funding to support small company capex"

"Promote Scotland Photonics sector globally"

"Reduce the amount of red tape"

"More access to investments/capital"

"Quantum sovereignty"

"Greater skills base"

"Proactive, speedy, account assistance in a wide range of ways"

"Specific photonic graduate courses"

"Photonics capability & skills both in engineering and in manufacturing"

"Collaborative R&D support"

"Support in grant application and recruitment"