

# PHOTONICS IN SCOTLAND 2024 REPORT

# 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, underpinning critical supply chains in advanced industries, from healthcare and communications to space and manufacturing.

Global markets for this critical technology have been remarkably resilient over the last 5 years and are set for significant future growth, catalysed by a burgeoning demand for photonics enabled products and services.

Scotland is ready to exploit these opportunities over the coming decade. Our world-renowned photonics cluster continues to grow, with revenues up by over 30% since 2019 and employee numbers rising by over 50% in the same period. With a current output of over £1.3bn, the sector remains on track to meet our 2019 ambitions to treble in size by 2030. At the same time, the sector is providing the foundation for Scotland's world leading quantum research capabilities, opening the door to the enormous potential of these technologies as they increasingly emerge from the lab and into commercial application.

These technologies (photonics and quantum), together with semiconductors, connectivity and sensing have recently been brought together as Scotland's Critical Technologies Supercluster. This initiative developed by Technology Scotland in partnership with Scottish Government, Scottish Enterprise, the University of Glasgow and the University of Strathclyde, has been created in recognition, not just of the technical overlaps between these technology areas, but also the shared supply chains, market areas and skills pipeline.

This constellation of expertise, unparalleled anywhere else in the UK, has been recognised by both Scottish and UK Governments who understand the importance of these technologies to our security, defence and economic independence, as well as our ambitions in areas such as net zero, smart transport, energy and our broader advanced industries.

Against this backdrop, it is more important than ever that we monitor the progress of these sub-sectors, and our Annual Photonics Scotland Survey continues to provide an important health check for our photonics capabilities.

This year's survey was conducted between August 2024 and October 2024, and includes data and sentiment gathered over the previous 12 months (2023-2024).

Despite ongoing geopolitical instabilities, continued supply chain issues and the lasting legacy of both the COVID-19 pandemic and Brexit, the sector continues to show positive signs of growth, with future sentiment also remaining optimistic. This is hugely encouraging and provides timely evidence that photonics (and the wider Critical Technologies Supercluster) is set to play an important role in Scotland's economic future.





# Sponsor statement



**SCINTILLA**

**Peter McBride**  
Founder and Patent Attorney  
Scintilla IP

We at Scintilla have been proud to continue our support for Technology Scotland and the enabling technology communities supported by their various networks, and we congratulate the team as they celebrate the 30th anniversary of Photonics Scotland!

The team is still laser focused on the future, as demonstrated by the recently announced Critical Technologies Supercluster. This shows Technology Scotland's key role in advocating for and promoting Scotland's strengths in photonics, quantum, semiconductors, connectivity and sensing.

In this fast moving world, a clear intellectual property strategy is more important than ever, with disruption caused by artificial intelligence and similar technologies well underway in every industry!

Scintilla is "where innovation thrives", and while we must of course keep our clients' information confidential, we can say that there is a lot of inspiring and groundbreaking innovation being undertaken right now which we are proud to support from our offices in Glasgow, Manchester and Aberdeen.

So we say a hearty thank you to the Technology Scotland team, and also to the disruptors and innovators who are enabling progress and improving our world!



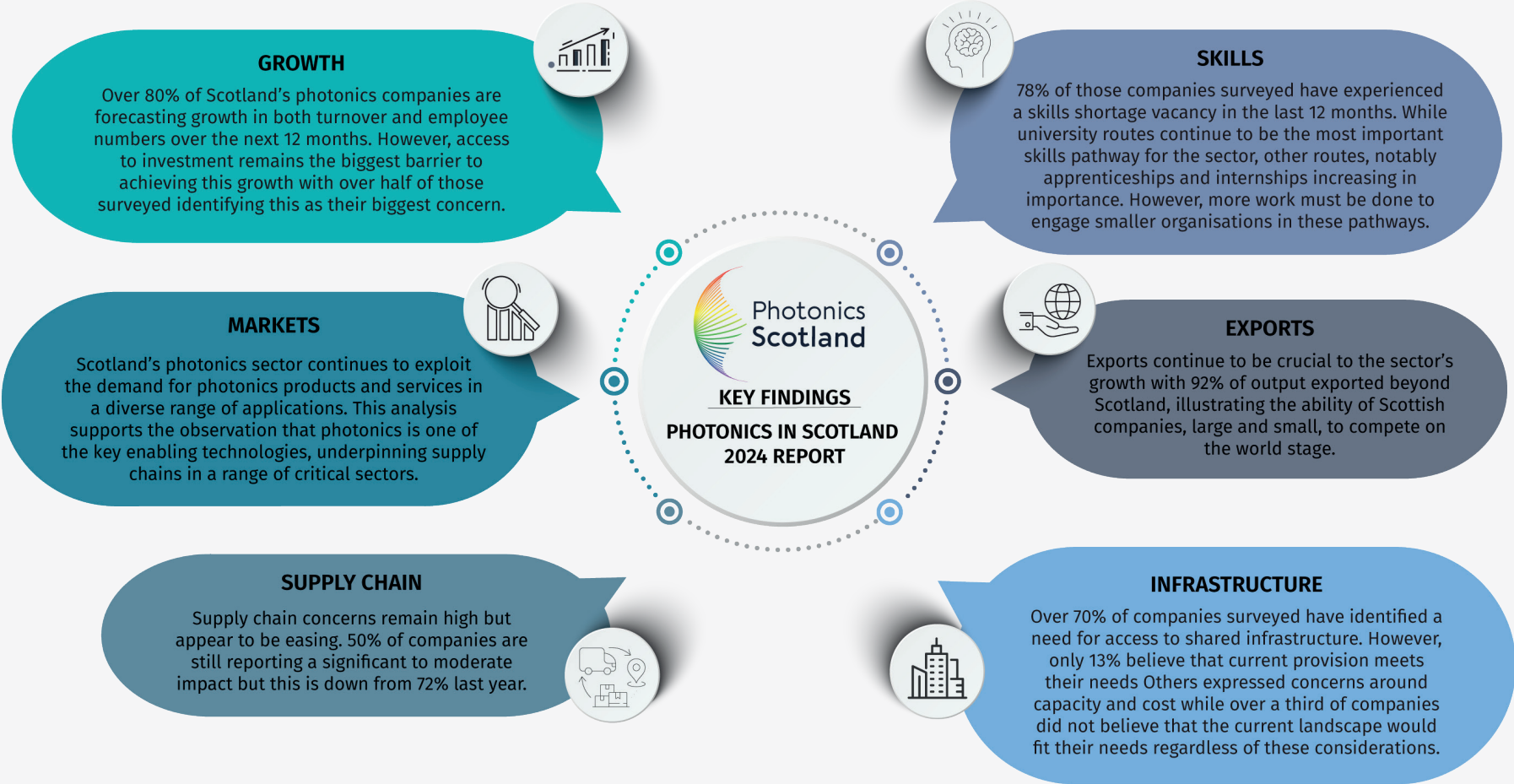
# Executive summary

This year's Annual Survey provides further evidence that Scotland's photonics sector remains in good health, despite the challenging global landscape, which continued throughout 2023-2024.

Over half of companies reported revenue growth over the last 12 months with a further 35% showing steady turnover. Outlook also remains optimistic with over 80% of companies surveyed forecasting increased revenues and head count over the next 12 months. Indeed, over two thirds of companies are forecasting double digit revenue growth for this period.

As in previous years, our companies report involvement in a range of market areas, illustrating the importance of photonics technologies across a range of critical supply chains. This diversity also underpins much of the stability we have seen in the sector over the last 5 years as companies exploit multiple different opportunities.

Exports continue to be crucial to the sector's growth with 92% of output exported beyond Scotland's borders. This is consistent with previous year's results and illustrates the ability of Scottish companies, large and small, to compete on the world stage. The largest single export markets remain as the USA, Germany and China.





# Executive summary

While optimism remains high, barriers to growth remain. For the second year on a row, access to investment has been identified as the key challenge, this time by over half of companies surveyed. This is perhaps unsurprising in a sector that requires frequent and expensive capital investment cycles to maintain state of the art, expand capacity and remain competitive in a global market.

Further challenge was identified when accessing markets (17% of respondents), a particular concern when navigating global supply chains and international opportunities is critical to success, even for our smallest companies. Scotland must raise its efforts to remain visible in this competitive environment and it is interesting to note that companies identified that support for coordinated Scottish presence at key international events should be prioritised in this regard.

Unsurprisingly, skills has also been identified once again as one of the key barriers to future growth with 78% of respondents experiencing a skills gap in the last 12 months. While a significant number of companies have identified gaps within research and development functions (65%), it is interesting to note that significant gaps have also been identified in manufacturing and operations (43%) and commercial functions (17%).

Addressing the skills challenge will require interventions across the skills landscape and it was interesting to note that companies identified the importance of multiple skills development pathways. As may be expected, university routes have been identified as most critical but there was also significant demand for alternative routes such as apprenticeships, internships and CPD training. Interestingly, appetite for these alternative routes was more evident among larger companies, reflecting not just their demand for such routes but also their own experience in utilising them. Smaller companies were less inclined towards non-university routes, indicating that work needs to be done to communicate the value of these pathways for all companies, large or small.

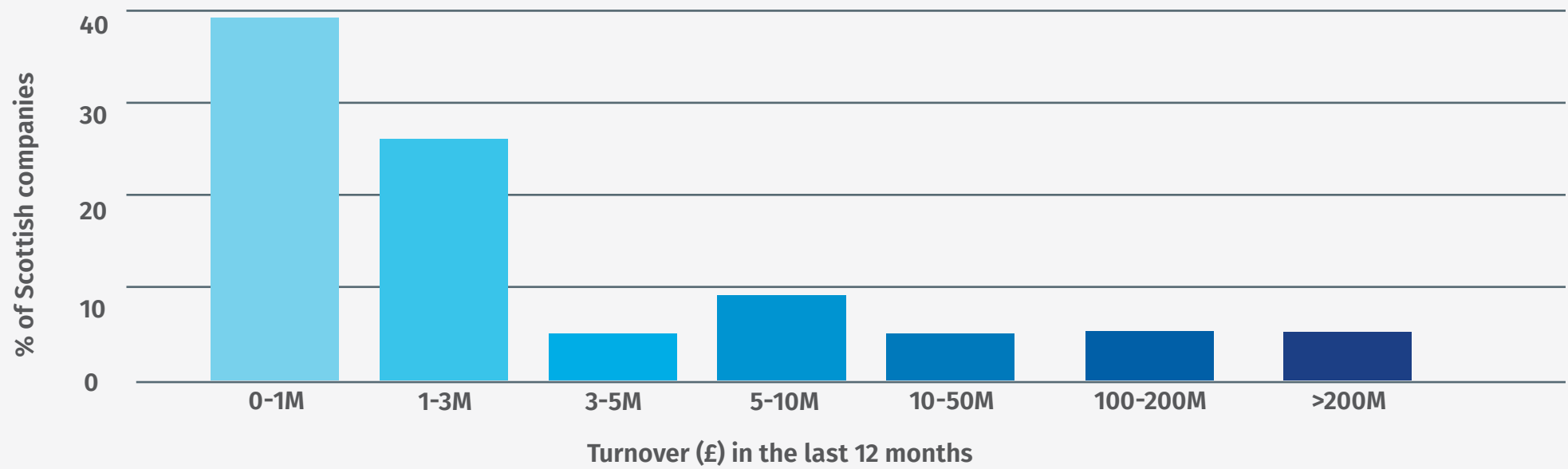
The survey has highlighted the importance of access to shared infrastructure, particularly for high growth and scaling companies. This provides such companies with facilities needed to undertake product development, produce proof of concept products and demonstrate ability to scale. Indeed, 70% of companies identified a need to access shared infrastructure.

Interestingly only 13% of companies in need of shared infrastructure believe that current provision meets their needs. Others expressed concerns around capacity and cost while over a third of companies did not believe that the current landscape would fit their needs regardless of these considerations. This observation will need further analysis in the context of the ongoing Scottish Government Deep Tech cluster review, an activity that will focus on infrastructure challenges related to scaling innovation.

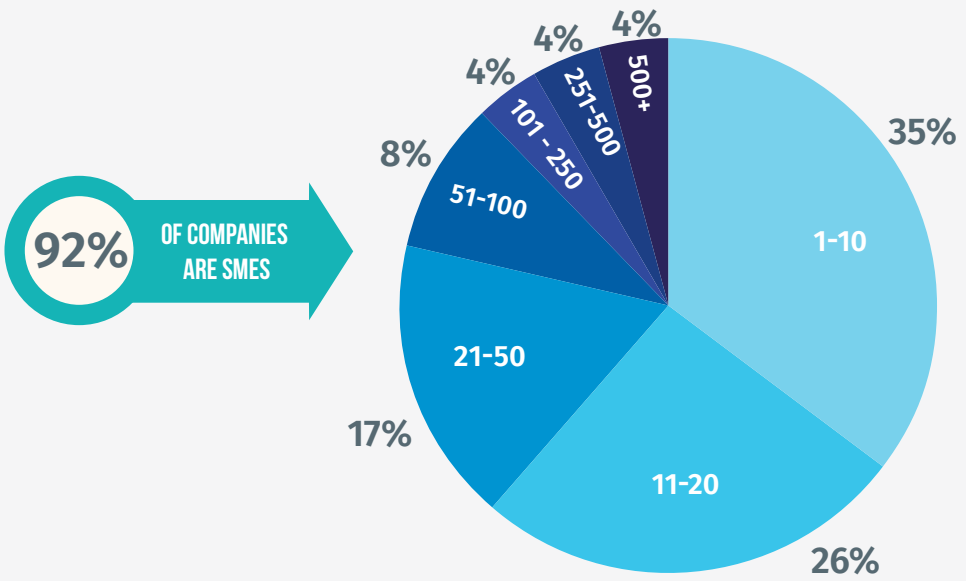
Finally, the survey once again highlighted the impact of COVID-19 and Brexit is not fully behind us. This is most acutely felt within the supply chain where over 50% of companies still report moderate or significant impact. However, this is down from 72% last year offering some hope that this particular challenge may be easing, albeit more slowly than we would like.

# Company landscape

## COMPANY SIZE - TURNOVER



## COMPANY SIZE - NUMBER OF STAFF



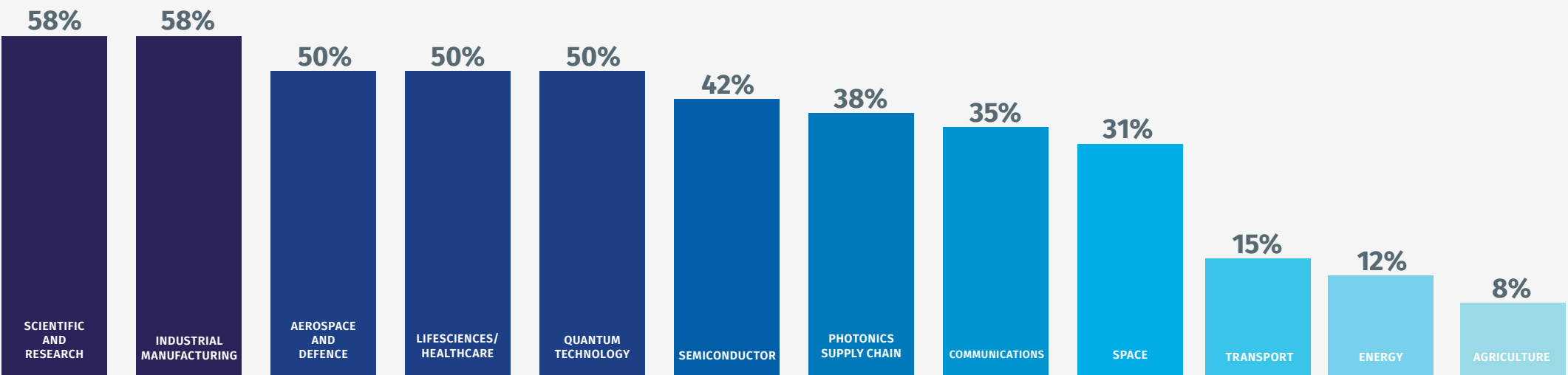


Scotland's Critical Technologies Supercluster provides an opportunity for our photonics sector to leverage Scotland's wider value proposition across the critical technologies. Positioned correctly, the supercluster will be a magnet for future investment and a platform to boost Scotland's photonics profile on the world stage.

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# Application focus

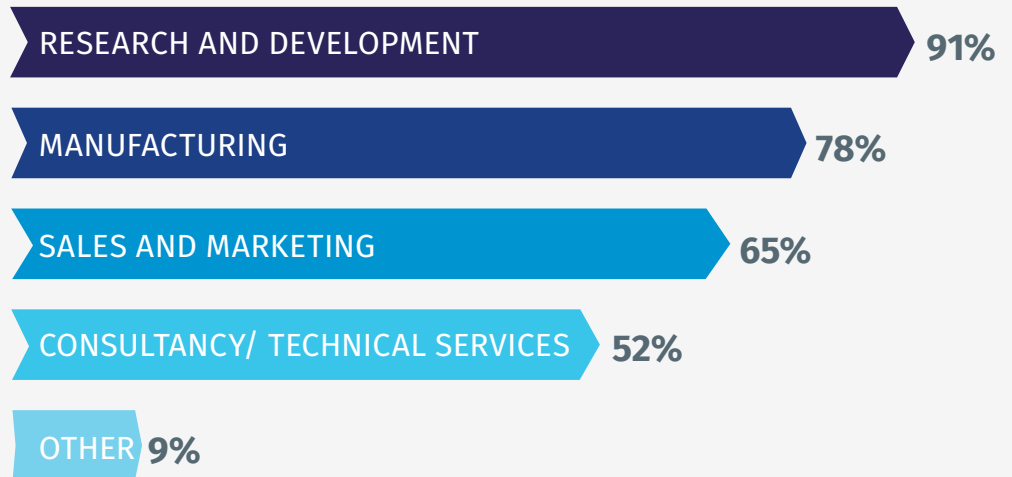
% OF SCOTTISH COMPANIES ACTIVE IN EACH APPLICATION AREA



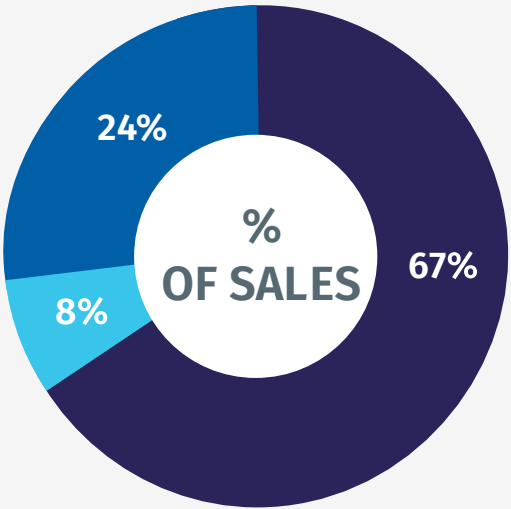
The breadth of application focus illustrates just why photonics and quantum are considered to be critical technologies, underpinning so many of our advanced industry supply chains. This will bring significant opportunity over the coming decade.

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## OPERATIONAL FUNCTIONS OF SCOTTISH COMPANIES



# International markets



■ Scotland
 ■ Rest of UK
 ■ Rest of World

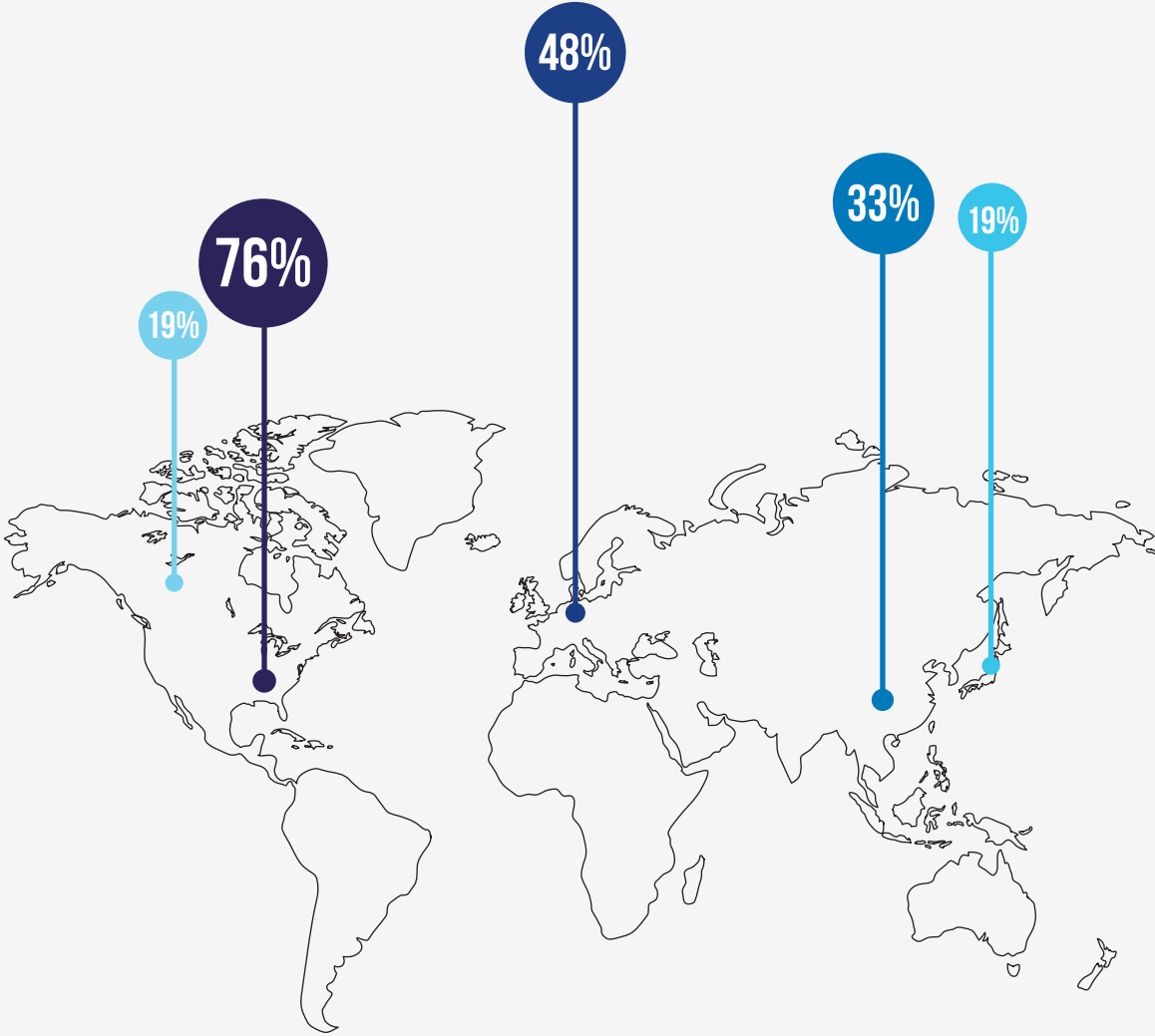
**i 92% OF OUTPUT EXPORTED OUTSIDE OF SCOTLAND**



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 to improve market access for SMEs and maximise the opportunity this global market represents.

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## TOP EXPORT MARKETS



■ United States
 ■ Germany
 ■ China
 ■ Japan
 ■ Canada



# International markets

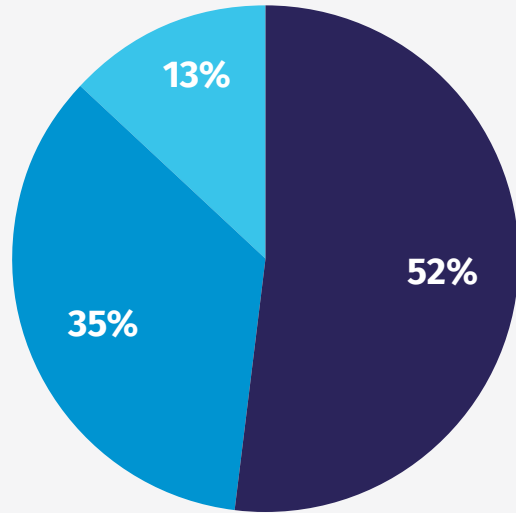
WHICH OF THE FOLLOWING ACTIVITIES DO YOU BELIEVE WOULD HAVE GREATEST POSITIVE IMPACT IN RELATION TO YOUR INTERNATIONAL ENGAGEMENT?

Most important Least important



# Growth

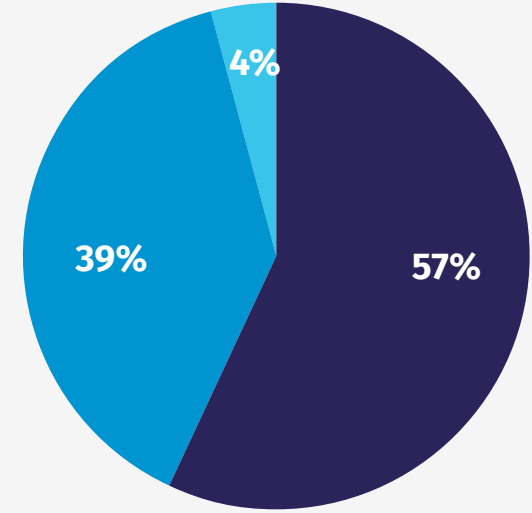
TURNOVER COMPARED TO PREVIOUS YEAR



>80%

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

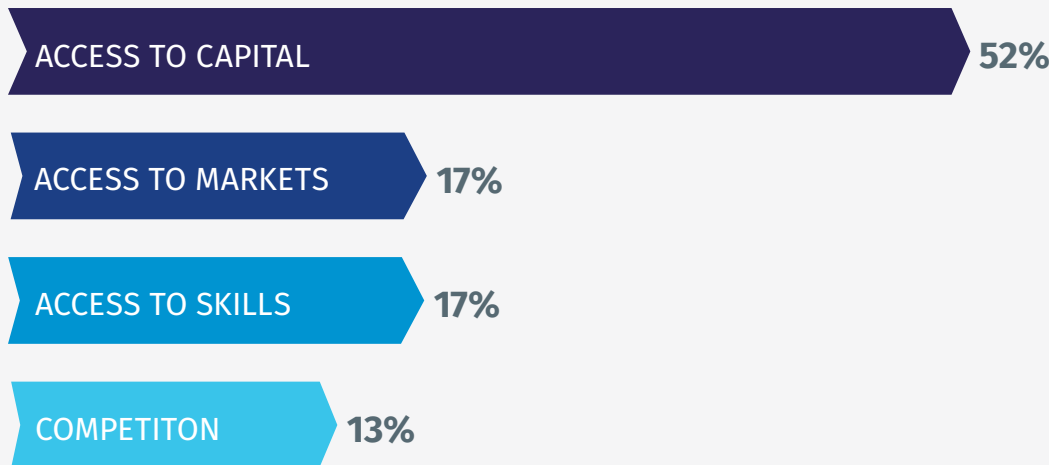
STAFF NUMBERS COMPARED TO PREVIOUS YEAR



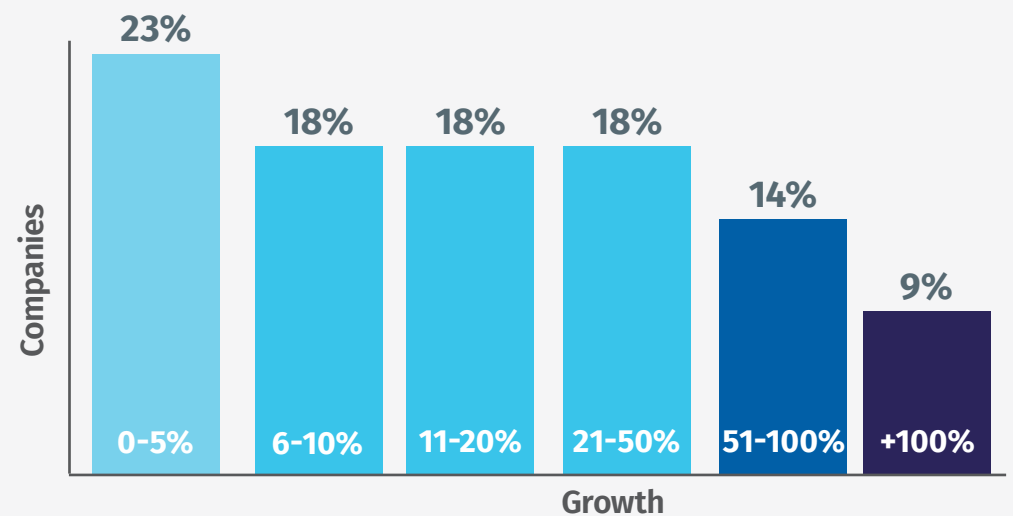
Greater The same Smaller

Greater The same Smaller

BIGGEST IMPEDIMENT TO GROWTH

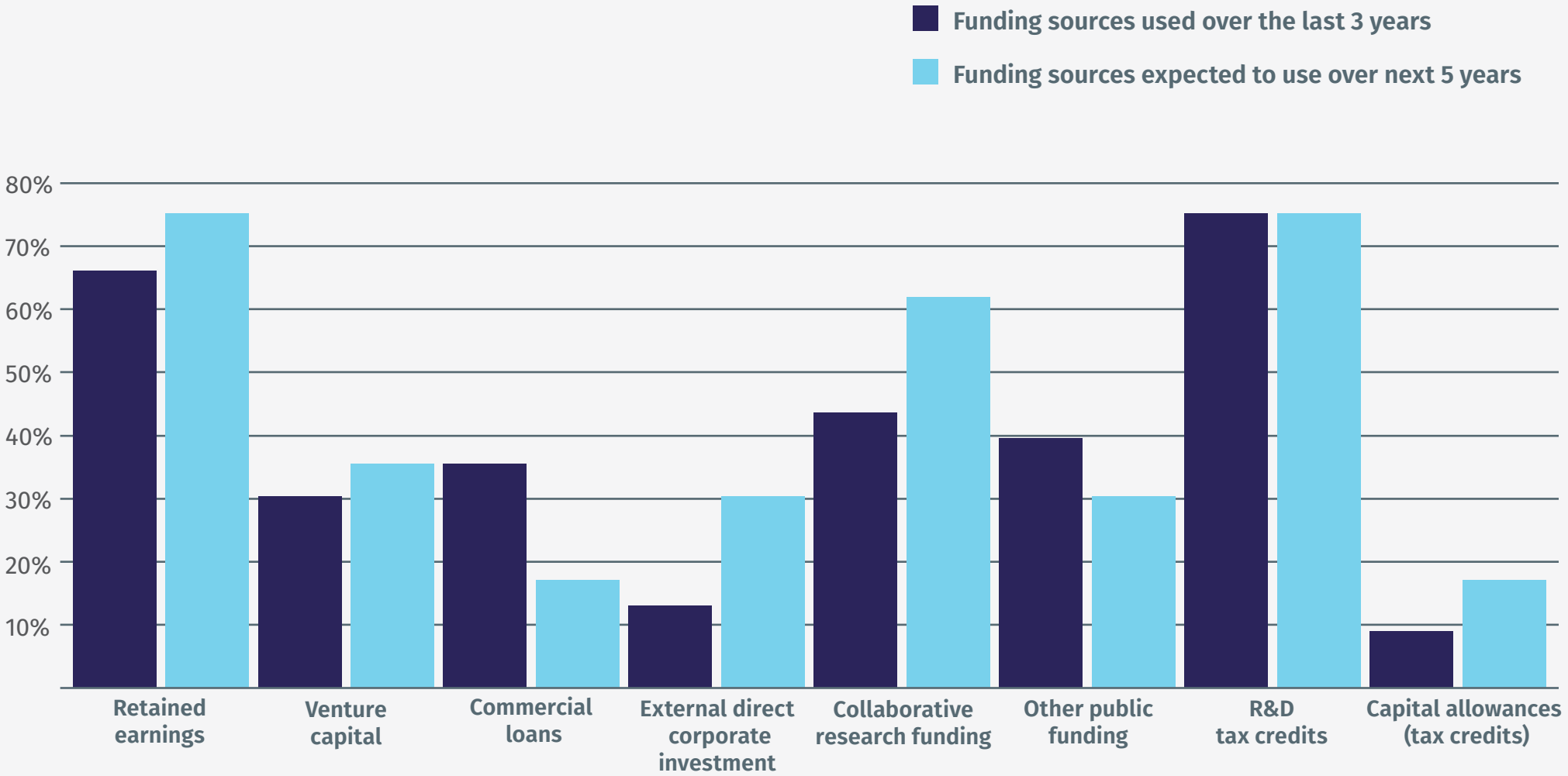


FORECASTED GROWTH IN NEXT 12 MONTHS



# Business Growth

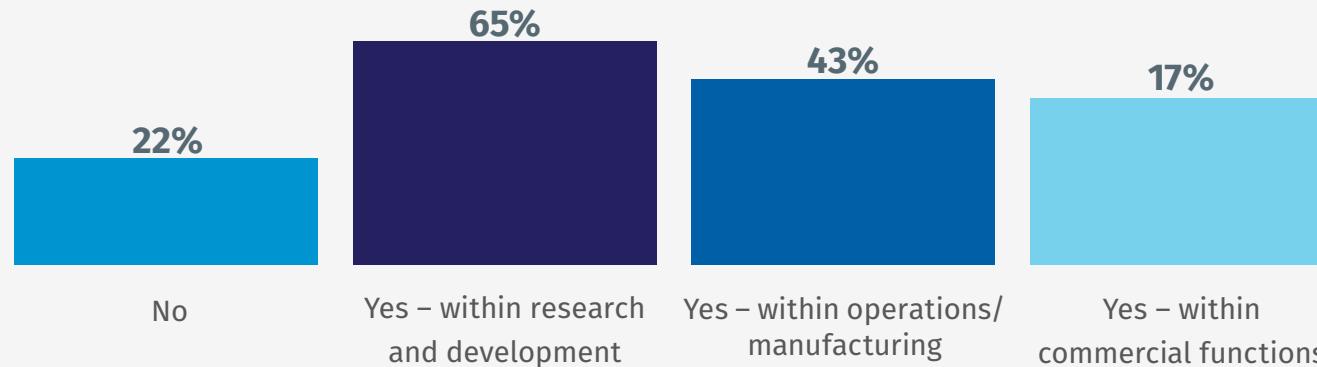
WHAT SOURCES OF FUNDING HAVE YOU USED (OR EXPECT TO USE) TO EXPAND YOUR BUSINESS?





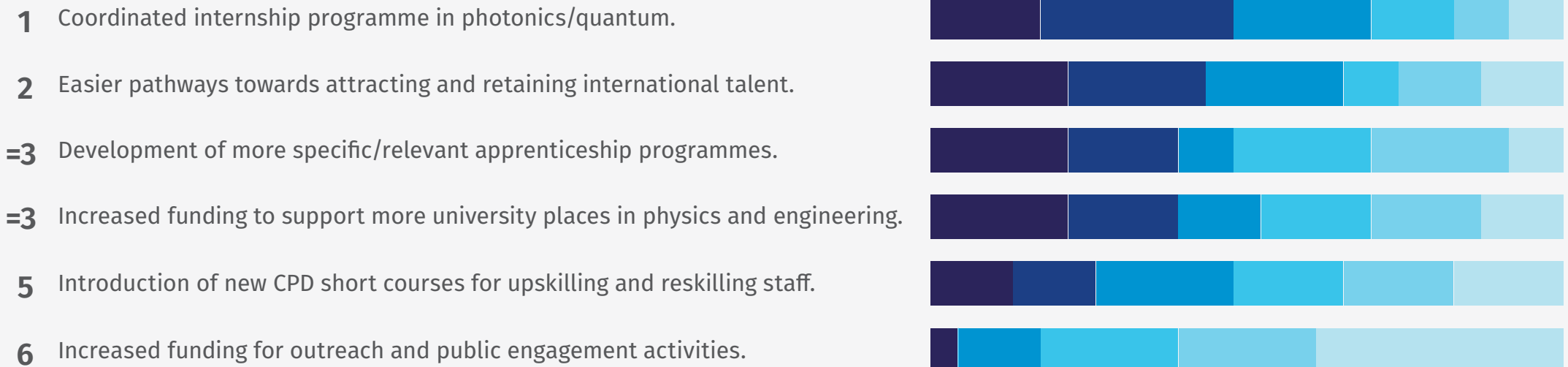
# Skills development

HAS YOUR ORGANISATION EXPERIENCED A SKILLS GAP IN THE LAST 12 MONTHS?



WHICH OF THE FOLLOWING INTERVENTIONS DO YOU BELIEVE WOULD HAVE THE BIGGEST POSITIVE IMPACT ON THE FUTURE TALENT POOL IN SCOTLAND?

Most important       Least important



# Skills development

HOW IMPORTANT ARE THE FOLLOWING SKILLS DEVELOPMENT PATHWAYS:

Vital
  Very important
  Somewhat important
  Not very important

TO MEET CURRENT NEEDS

TO MEET NEEDS OVER THE NEXT 5 YEARS

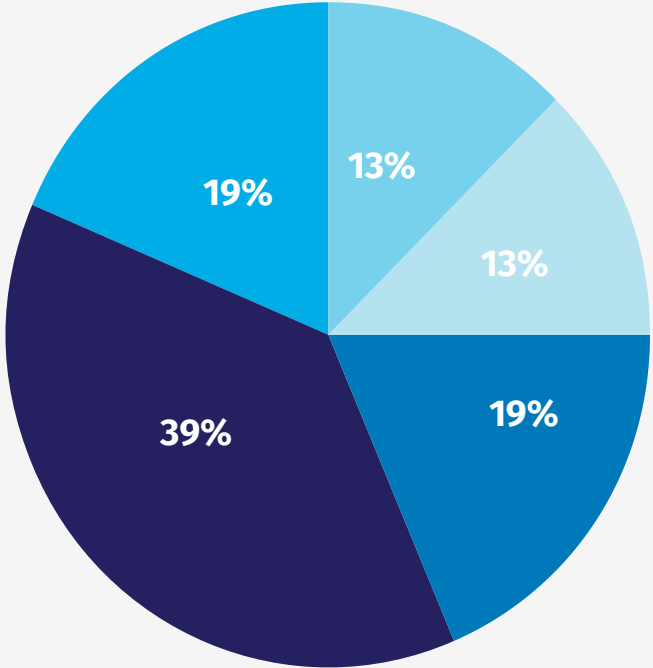


Scotland benefits from a rich talent pool in photonics and quantum but it is clear more work is required. University education will remain the key entry route to the sector but there is a big opportunity to encourage greater engagement with alternative routes, particularly for our smaller organisations.

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# Shared Infrastructure

WHICH OF THE FOLLOWING STATEMENTS BEST SUMMARISES YOUR ORGANISATIONS VIEWS OF THE SHARED INFRASTRUCTURE LANDSCAPE SUPPORTING SCOTLAND'S PHOTONICS/QUANTUM SECTOR?



- Shared infrastructure provision in Scotland meets our needs.
- Shared infrastructure provision in Scotland meets our needs but access is too expensive.
- Shared infrastructure provision in Scotland meets our needs but is limited in capacity.
- Shared infrastructure provision in Scotland does not meet our needs.
- Shared infrastructure provision in Scotland meets our needs in some areas but not in others.

70% OF COMPANIES SURVEYED HAVE A NEED TO ACCESS SHARED INFRASTRUCTURE



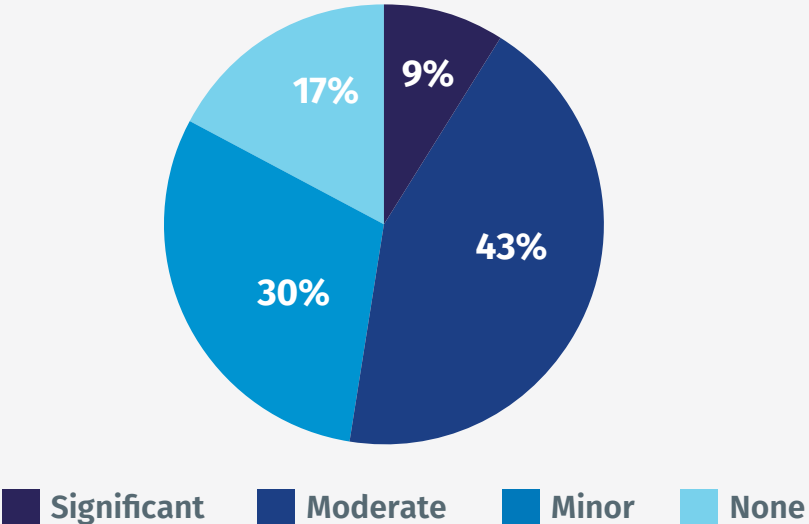
The Scottish Government's recently announced Deep Tech Cluster Review provides an excellent opportunity to assess Scotland's shared infrastructure in photonics and quantum, ensuring it meets the needs of our innovative, scaling companies.

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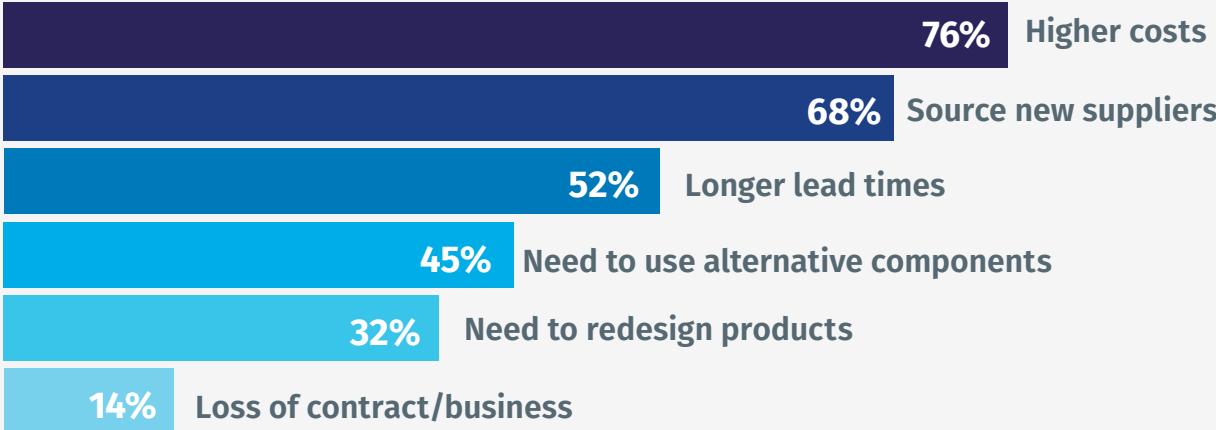


# Supply Chain

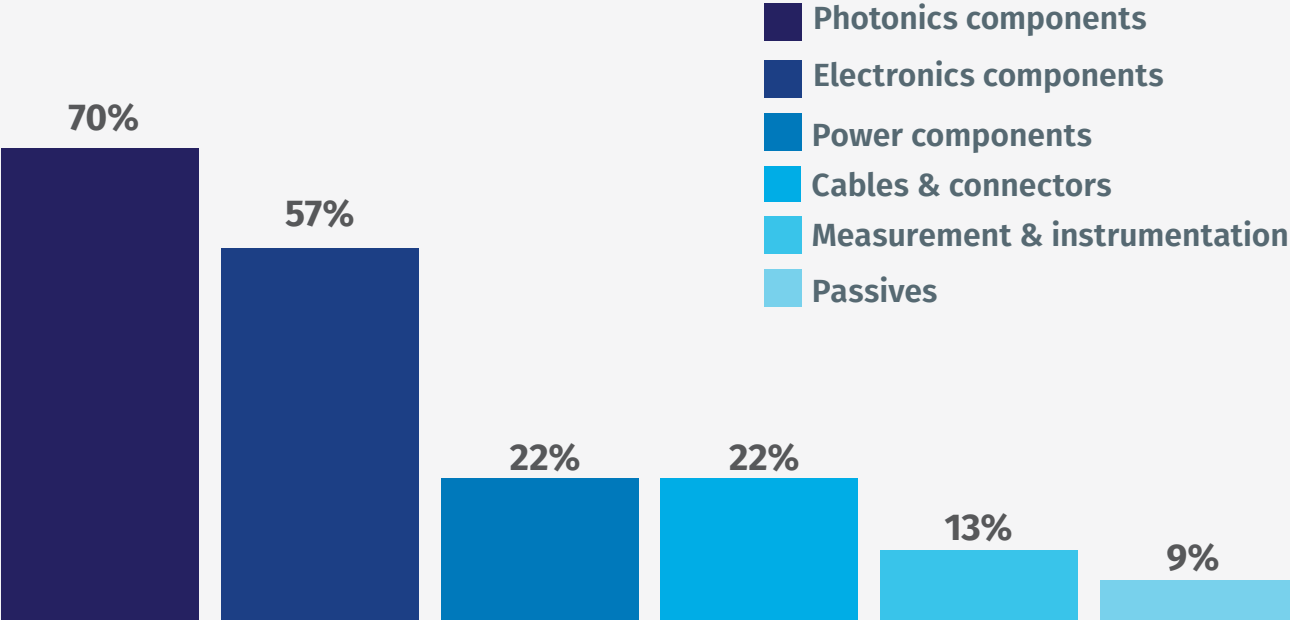
Supply chain disruption



Impacts of supply chain disruption



Component sourcing issues



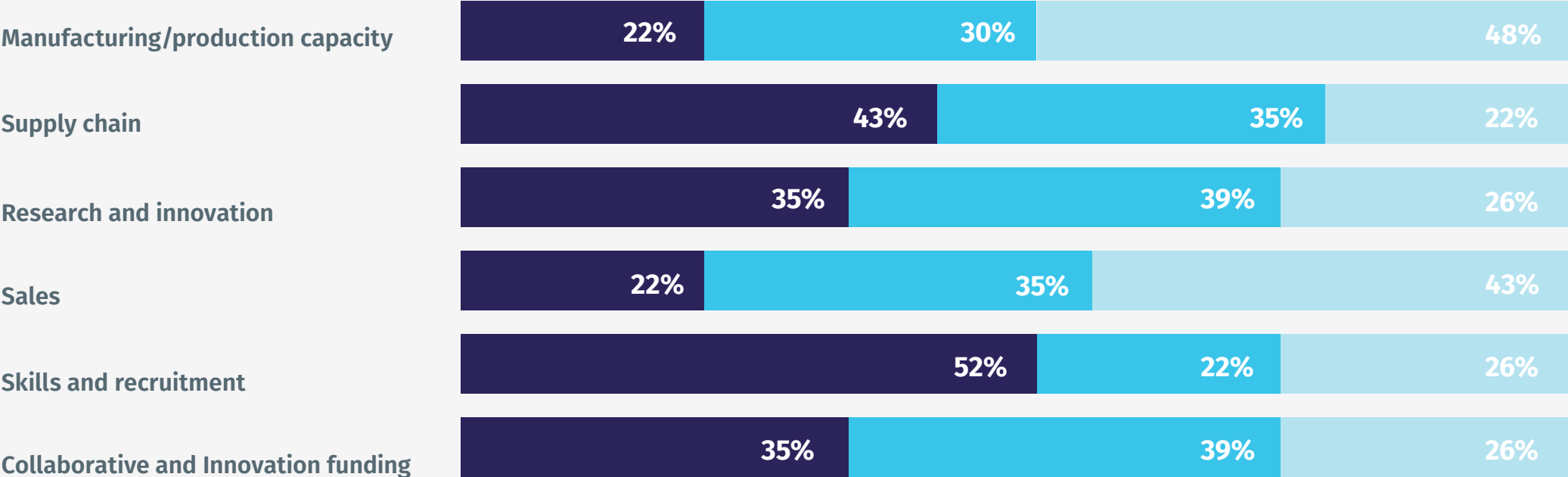
It is encouraging to note that supply chain concerns have eased significantly over the last year. With this trend set to continue, Scottish companies are well positioned for accelerated growth.

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# Brexit

## WHAT IMPACT, IF ANY, IS BREXIT HAVING ON YOUR ORGANISATION?

Manjor impact    Minor impact    No impact



# Community comments

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

Collaborative R&D support

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

More support for indigenous companies compared to inward investors

Photonics capability & skills both in engineering and in manufacturing

More access to investments/capital

Ensure lost EU funding is replaced with money from central government

Quantum sovereignty

Reduce the amount of red tape

Access to skilled labour and training packages for current staff

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

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

Support in grant application and recruitment

Investment in fab infrastructure and education

Greater skills base

Specific photonic graduate courses

Promote Scotland Photonics sector globally

Remaining within the UK

Grants to support capital equipment purchases