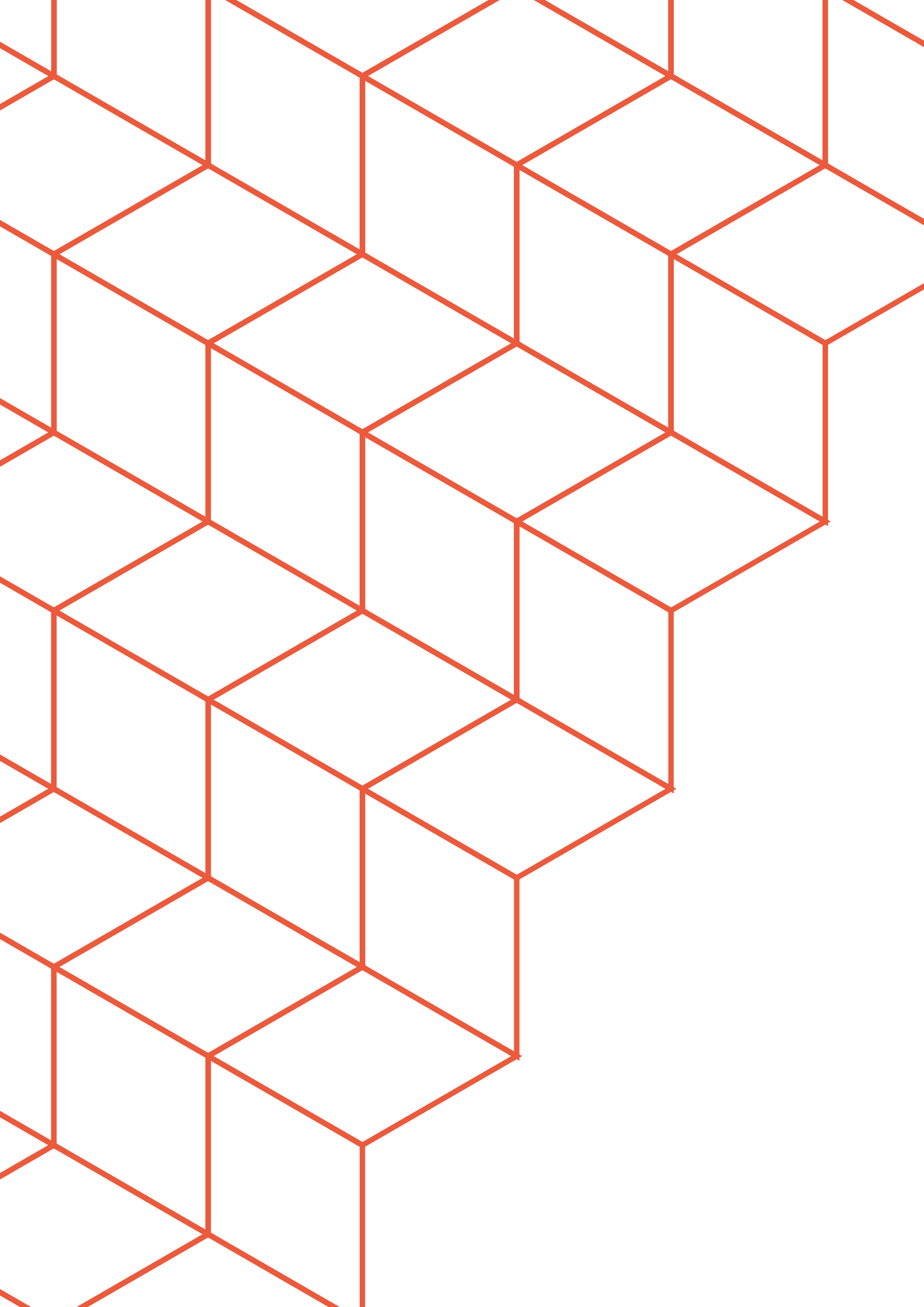


MAKING A BETTER FUTURE

A Strategic Plan
for Manufacturing
in Northern Ireland

August 2022







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FOREWORD



The history of manufacturing in Northern Ireland has been well documented: the ingenuity, invention and creations of famous names such as Dunlop, Ferguson, Mackie and Pantridge are recognised and used throughout the world.

The fortunes of our makers of ships, aircraft, buses, medical devices, microchips, food products and quarrying equipment may have ebbed and flowed over the decades, but the hugely positive legacy remains. The knowledge-based sectors of financial services, digital technology and cyber-security have all come to the fore in recent years, and yet manufacturing and engineering continue to underpin the local economy, driving exports, developing skills and contributing massively to our society.

The challenges of globalisation, the pandemic and war in Ukraine have brought a renewed focus on our ability to manufacture and feed, and to create greater self-sustaining capabilities. From health to agriculture, from energy generation to consumption, the economic imperative is to look at how we can best use our natural and physical resources in sustainable ways, maximising local supply chains and ultimately producing more for ourselves.

This strategic plan "Making a Better Future" sets out a vision and framework to enable our manufacturing sector to take ownership of the risks and opportunities that present themselves, while at the same time giving clear advice to wider stakeholders on how their engagement with manufacturers can be framed and improved.

The six key themes we have identified cannot be delivered or addressed in isolation. Skills and People, Productivity and Competitiveness, Technology and Innovation, Energy and Environment, Supply Chain and finally Infrastructure are interwoven and overlapping in terms of need, impact and outcomes.

City and Growth Deal projects will be drivers of innovation, and coupled with opportunities for green growth and digitalisation, have the potential for levels of investment and positive societal impact never previously imagined.

Makers Alliance was created to support alignment, prioritisation and greater engagement with local and national stakeholders and to deliver results for manufacturing.

What happens next, as we move from strategy into action, is a challenge for manufacturing business in Northern Ireland and for all who wish to see a positive and vibrant future. This future will be achieved through the development of technologies and skills, increasing our exports and creating wealth for all of Northern Ireland.

Sir Michael J Ryan CBE
Chair of Makers Alliance
Vice President, European Space and Defence, Government Affairs and Chairman Spirit Aerosystems UK

ACKNOWLEDGEMENTS





1 EXECUTIVE SUMMARY

Northern Ireland's manufacturers have long played a critical role in the economic wellbeing of the region, generating wealth and prosperity for the benefit of the wider community.

Our industrial heritage is woven into Northern Ireland's cultural fabric. It has helped define our place and our people. The challenge facing today's manufacturers is competing in a global economy which has witnessed the emergence of low cost, labour rich regions as manufacturing powerhouses, alongside the steady de-industrialisation and emphasis on service-based economy in the old industrial nations.

While Northern Ireland has had some very significant manufacturing successes, other regions have out-competed our traditional manufacturing industries on both scale and cost. We cannot match and beat them on cost alone.

We must therefore reinvent and refocus our manufacturing economy to become sustainable, attractive and internationally competitive. It must be built on our skills and talents, on our sustainable resources, in a healthy environment. This will require a prolonged period of bold and ambitious innovation.

Manufacturing matters: it drives innovation and exports, provides skilled and well-paid jobs, and has a significant multiplier effect throughout the economy. The Department for the Economy's 10X Economic Vision highlights advanced manufacturing as a key cluster which is pivotal to our economic growth over the next 10 years. If this is to be the catalyst for change, then we must engage our brightest and most creative talent.

This strategic plan is a statement of intent for the future, capturing and articulating the ambition of industry. The next phase will be the development of an Action Plan to bring the mission to life.





Our Vision – Making a Better Future

The long-term success of the advanced manufacturing sector in Northern Ireland lies in adopting digital production and materials technologies. We must revolutionise the way we design for customers and for our factories, and develop a talent strategy based on lifelong learning.

With determination and co-ordinated ecosystem of resources and support, Northern Ireland will become a globally renowned and competitive base for high value, niche and sustainable manufacturing.

Makers Alliance has identified six drivers for the development of a high-performing, yet sustainable manufacturing sector. These six drivers are:

Skills and Labour

Growth through increasing the capability of our people, leadership development and the creation of a pipeline of talent to fuel expansion.

Competitiveness and Productivity

Closing the productivity gap through skills, innovation and technology, becoming export-orientated and globally competitive.

Innovation and Technology

To be leaders in the creation and use of “design and made smarter” technologies, enabling our manufacturers to compete in the international arena.

Supply Chain

The development of high-performing, agile and resilient supply chains which are outward looking and globally competitive.

Energy and Environment

Harnessing our natural resources, developing and improving technologies and working with partners to deliver sustainable manufacturing and environmental improvements.

Infrastructure

Place-based capability and capacity, led by industry, in partnership with local government and academia.

A photograph of a modern cable-stayed pedestrian bridge over a river. The bridge has a prominent white A-frame structure and a curved walkway with a metal railing. In the background, a historic brick church with a green spire is visible, along with other buildings and a hillside under a cloudy sky. The text '2 WHERE WE ARE TODAY' is overlaid in white, with the subtitle 'A Burning Platform or Igniting Growth?' below it.

2 WHERE WE ARE TODAY

A Burning Platform or Igniting Growth?

2. Where we are today

Northern Ireland is home to over 5,000 manufacturing companies, together employing over 80,000 people (11% of all employees)¹, and supporting a further 120,000 jobs.

As a sector, manufacturing delivers around £10.6 billion per annum to the local economy, including exports of around £6 billion of products and services to international markets.

Burning Platform

Challenges faced by manufacturers are numerous, leading to a potential burning platform in the industry. The most significant challenges are:

- Labour and skills shortages
- Increases in the price of raw materials and limited local availability
- Supply chain disruption and vulnerability
- Underperformance in productivity and digitalisation
- Rising energy costs
- Infrastructure deficiencies such as land, roads, telecommunications and utilities

Most manufacturing sectors are now experiencing a strong recovery from the economic shock of the covid pandemic.

Even aerospace, a critical sector for Northern Ireland, which was also one of the hardest hit, is starting to show good signs of picking up. If this recovery is to continue and strengthen, the initial resurgence has highlighted the need to overcome a number of important

short-term issues. “Bridging the gap” is a phrase used by many manufacturers to describe the immediate challenges which need to be addressed.

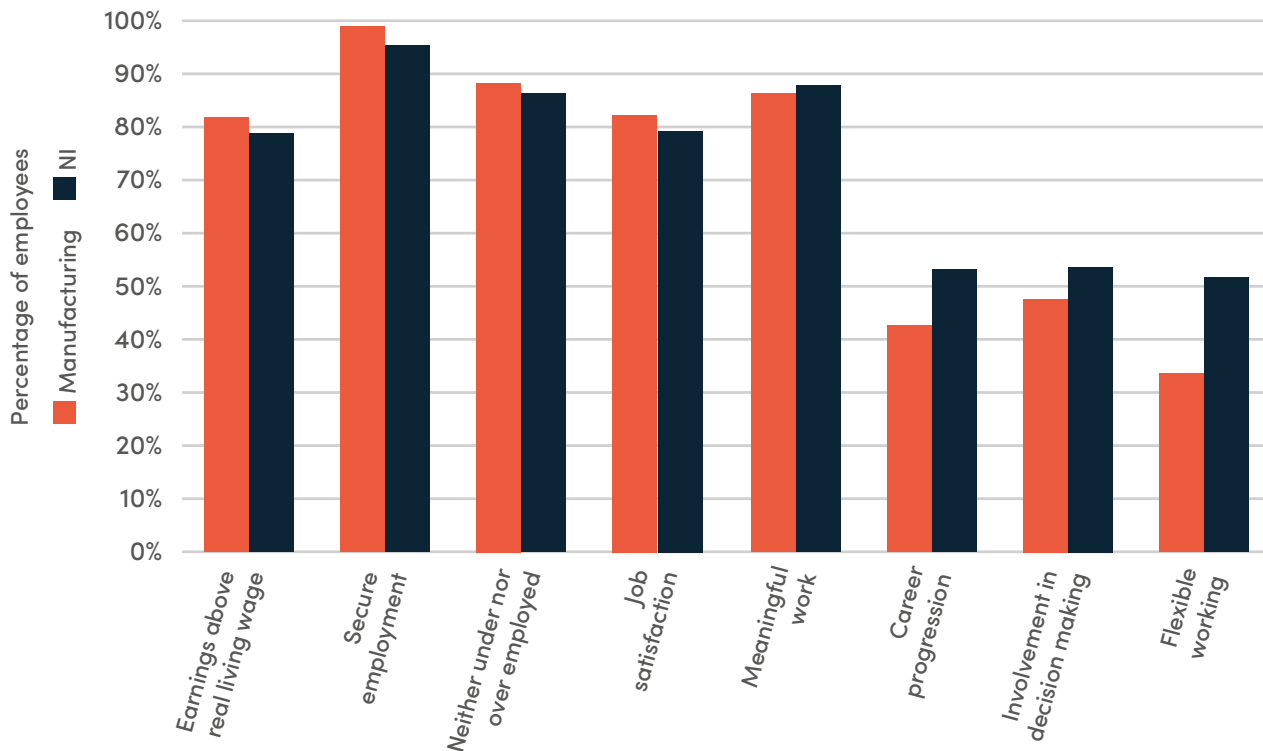
Resolving the labour and skills shortage is paramount. Rising vacancies at all levels in manufacturing has the inevitable effect of increasing wage costs; but more negatively, it has created an adversarial climate in which employers seek to hire qualified staff from their competitors. This scenario is unsustainable. Manufacturers recognise that digitalisation and automation are essential for improved productivity and competitiveness, and will progressively replace low value-added and repetitive operations; but the process will take years.

Recent NISRA statistics highlight some of the positive and negative perceptions of working in the sector. It is still predominately male (73%) but has a good age profile with a higher proportion of 18–39 (53%) than those aged over 40 (47%). As a sector it is recognised by those employed in it as “secure employment” at 99%, the highest in any sector.

Changes to migration laws, which make it difficult to hire from outside the UK, are taking their toll on many companies. Foreign-owned subsidiaries run the risk of failing to perform effectively and profitably, raising questions about their medium and long-term commitment to Northern Ireland. Fundamentally, manufacturing has a major problem of perception. It is not widely perceived as an attractive environment for young people, with concerns about working conditions and little opportunity for creativity or advancement.

¹ NISRA Quality of Work Report, March 2022 – <https://www.nisra.gov.uk/system/files/statistics/work-quality-ni-j20j21.pdf>

Burning Platform



This is a real challenge when compared to ICT, Life and Health Sciences and Fintech sectors and there is a need to attract the next generation of talented problem solvers and creators to manufacturing.

The other significant headache for NI manufacturers today is rising input costs. The cost of energy, which has already risen beyond the most pessimistic of forecasts, is set to increase significantly in the coming months. This will affect all manufacturers, just as it will affect households, with potentially catastrophic results for some. Inflation is rising and the trend will be more than tansitory. This puts pressure on wages, factory gate prices and supply chain competitiveness.

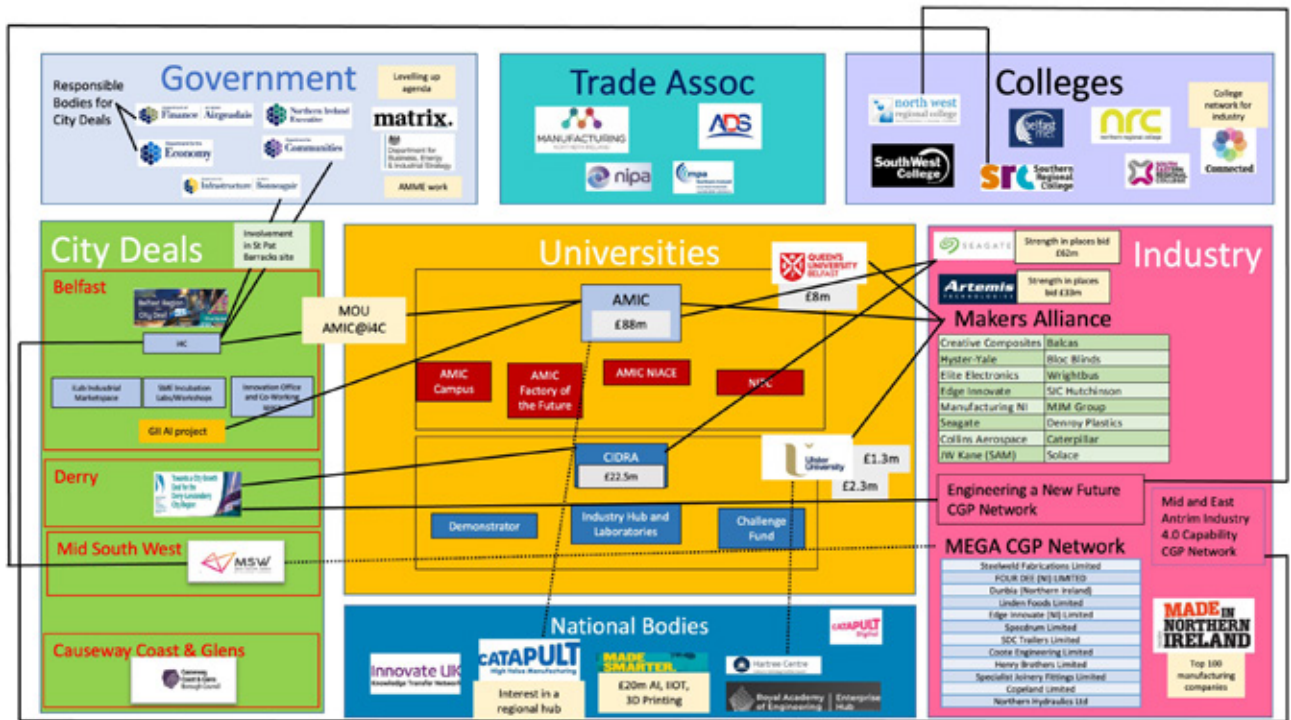
All manufacturers are conscious of the need to reduce their carbon footprint, minimise energy consumption and eliminate waste. However they are often operating in

older facilities, which are heavily dependent on electricity, oil or gas. This will change in the medium to long term as companies upgrade their infrastructure and alternative sources of energy come into play.

Figure 3: Input and output producer price inflation (PPI) have both seen a sharp and sustained rise since April 2020



Source: Office for National Statistics – Producer Price Index



In the short term, manufacturers will look for stability and certainty in energy costs, allowing them breathing space to adapt and evolve.

The recent disruption experienced by local manufacturing companies as a result of the pandemic and other economic shocks brought to light the vulnerabilities of being part of a globally interconnected supply chain.

Igniting Growth

Despite the challenges, Northern Ireland's manufacturers are optimistic about prospects for growth. Economies are continuing to open up and renewed interest in "near-shoring" or "re-shoring" all create opportunities.

The planned City and Growth Deal investments totalling over £150m over the next ten years provide a platform for generational change in our manufacturing infrastructure.

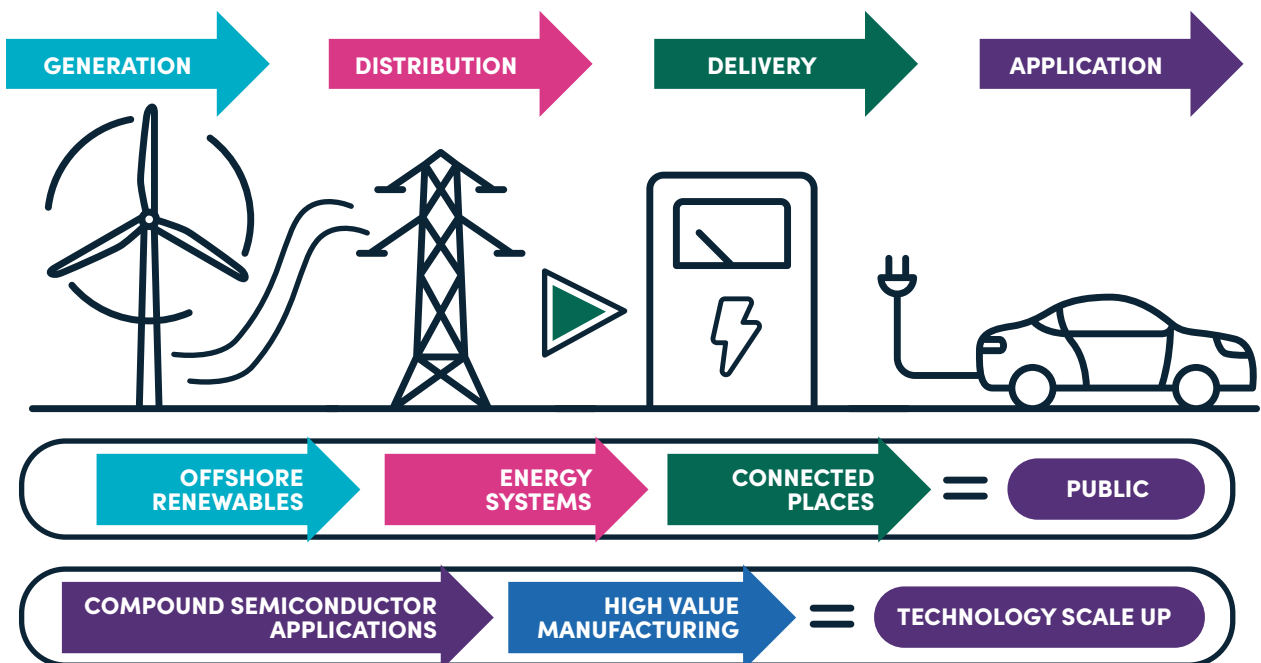
They include the Advanced Manufacturing Innovation Centre (AMIC), Centre For Industrial Digitalisation Robotics & Automation (CIDRA), i4C Innovation and Cleantech Centre, Agri-Tech Centre and Design Smarter Digital Twin. These projects have been promoted by our national and local governments.

These projects require the leadership, support and participation of industry to ensure their success. The recent relaunch of NIACE (in October 2021) was predicated on the need for any future centres to be industry centres rather than research centres and be seen through the lens of the customer, as opposed to academia.

A renewed ambition for Northern Ireland is to create stronger links with the High Value Manufacturing Catapult (HVMC) and the UK Catapult Network². This is linked to the growing investment by the UK Government in research and development and its Levelling Up agenda. The opportunity for sub-regional, place-based activity to add value is immense and advanced manufacturing is a key component. This is emphasised in the Department for the Economy's 10X Vision³

which highlights advanced manufacturing as a "priority cluster" during the next 10 years of economic growth.

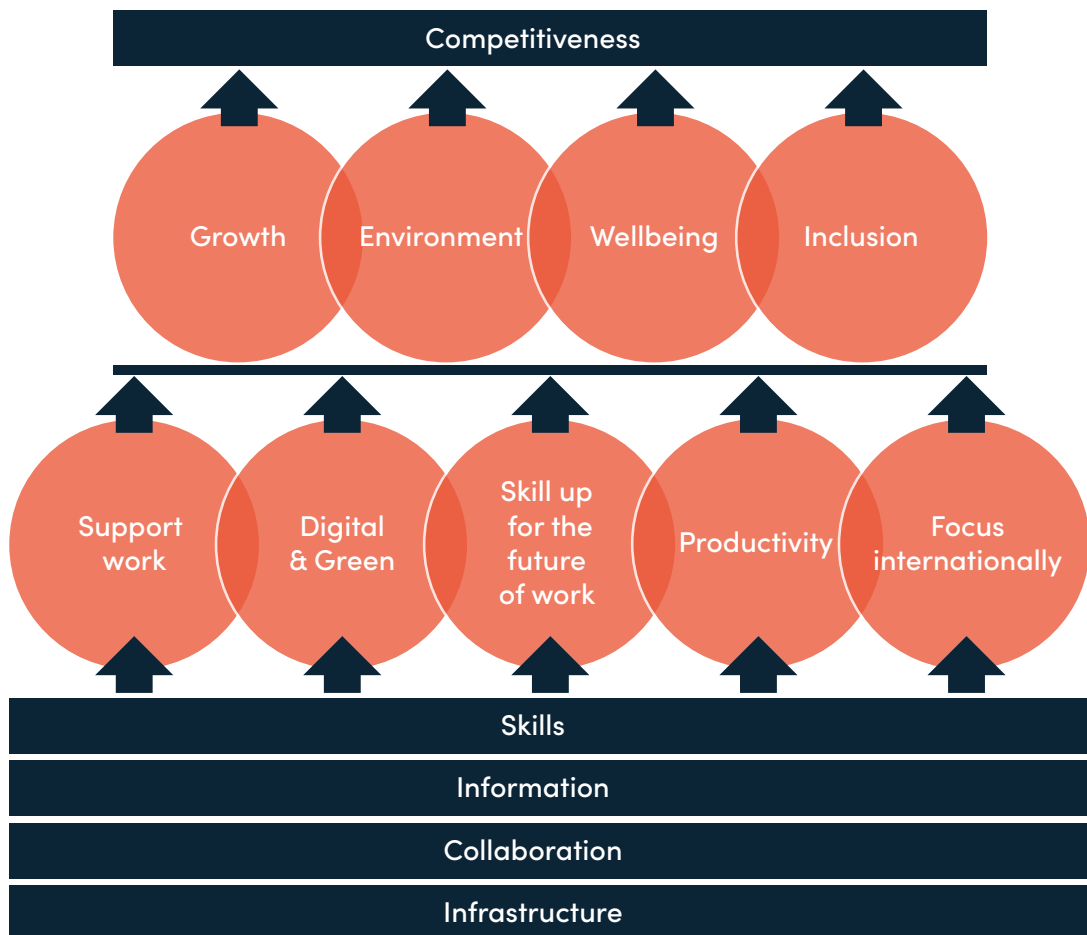
Developing a stronger, formal relationship with the High Value Manufacturing Catapult (HVMC) will help to transform our sector and raise the ambition and perception of manufacturing in Northern Ireland. Feedback from our engagement with national bodies is that the current NI ecosystem is too fragmented. Makers Alliance aims to provide a clear and consistent point of contact for HVMC and will act as an independent "honest broker" in diffusing the benefits of the HVMC and UK Catapult Network for the entire advanced manufacturing community. Digitalisation, electrification and hydrogen are three immediate priorities for potential collaboration with HVMC.



² Funded by UK Research & Innovation (UKRI) - <https://catapult.org.uk>

³ Department for Economy published the 10X Economic Vision in May 2021

<https://www.economy-ni.gov.uk/publications/10x-economy-economic-vision-decade-innovation>



Source: UUEPC

The competitiveness gap in the manufacturing sector is smaller than other parts of the Northern Ireland economy, but there are still significant opportunities for improvement. The 2021 Ulster University Economic Policy Centre report “Addressing NI’s Competitiveness Challenge”⁴ identifies a number of key opportunities for growth, namely:

- Digital and green potential
- Skill up for the future of work
- Raise productivity to boost incomes and standards of living
- Focus internationally

By engaging nationally and across the island of Ireland, working in collaboration while accepting and managing risk, the possibilities are significant. Across traditional parts of the sector, government policy is creating opportunity. The recently refreshed National Shipbuilding Strategy is one example. In another emerging sector the Department for Business, Energy and Industrial Strategy (BEIS) has published the UK Hydrogen Strategy. Northern Ireland has the resources and skills to make this a central part of its manufacturing renaissance.

⁴ UUEPC report – “Addressing Nis Competitiveness Challenges”
https://www.ulster.ac.uk/___data/assets/pdf_file/0011/948845/Addressing-NIs-Competitiveness-Challenges-final-report-6-September-2021.pdf



3 THEMES AND DRIVERS FOR CHANGE

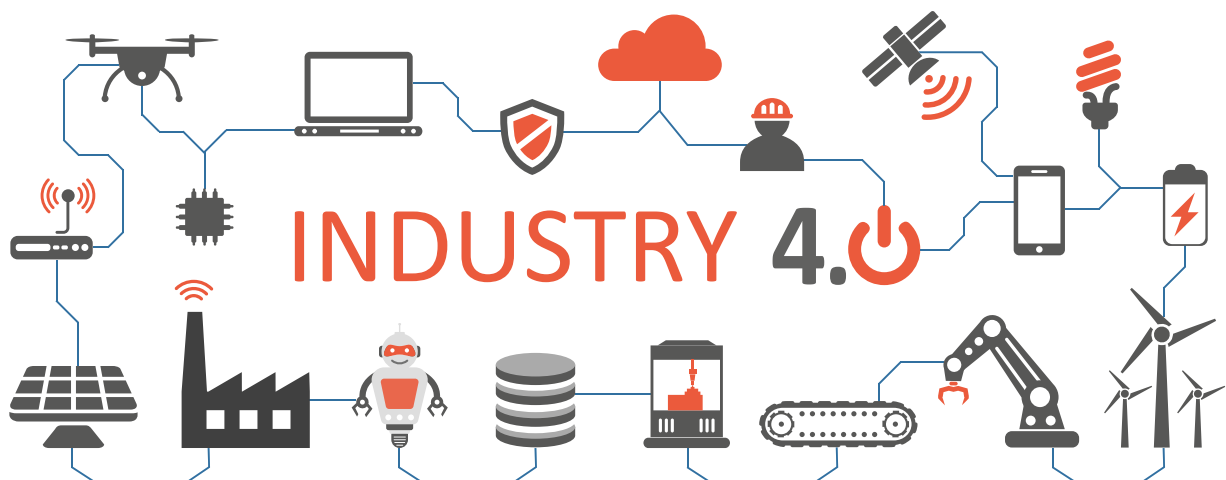
3. Themes and Drivers for Change

Six themes and drivers for change have been identified. The goals of sustainability, growth, competitiveness and exports are inherent throughout.

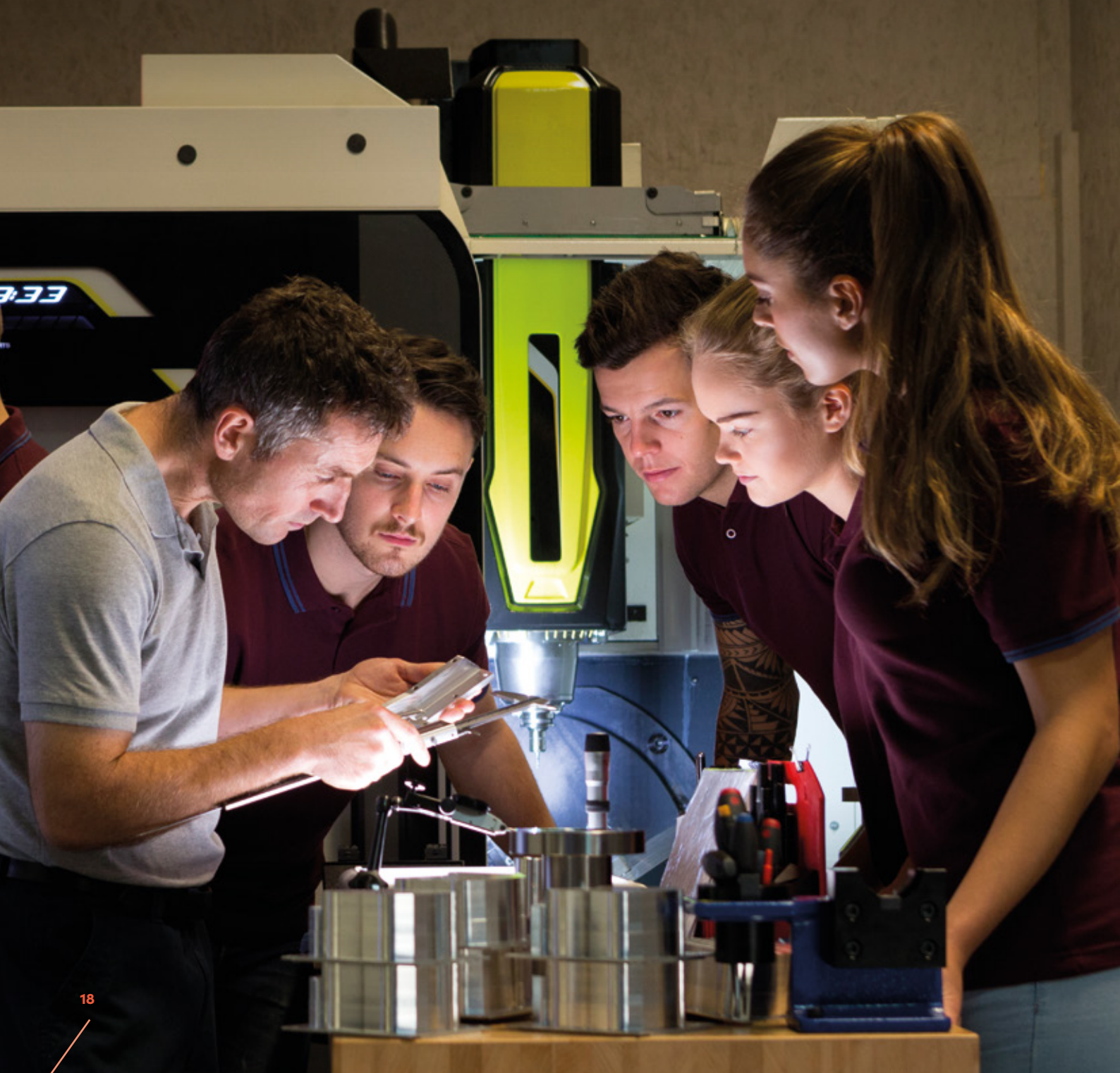
We have identified strategic risks and opportunities, priorities for consideration and specific areas for focus. Makers Alliance will build on the themes and drivers in developing an Action Plan and will consider these key questions:

- How do we ensure that the various City and Growth Deal projects deliver success for manufacturing?
- Is industry taking ownership of the strategic challenges and risks or is it in danger of placing short-term gain ahead of long-term growth?
- Are Northern Ireland's anchor institutions and government bodies sufficiently outward looking and engaged with industry, listening to and delivering for our sector?
- Do the huge number of interventions at local, regional and national level have the impact needed, or deliver the outcomes required for the long-term growth of manufacturing in Northern Ireland?
- Are there learnings we could take from high-performing advanced manufacturing industries in comparable economies which we could adopt locally?
- Is sufficient investment being made by industry in people, technology and processes to meet the challenges of increasing input costs, environmental impacts and global competitiveness?

The measure of who we are is what we do with what we have. These themes and drivers are a call for change that will add to the success, values and opportunities needed for a modern, prosperous and successful economy.



3.1 SKILLS AND LABOUR



3.1. Skills and Labour

Manufacturers have been challenged by skills shortages for many years, a problem compounded in more recent times by the lack of available labour. Under-investment by some elements of industry and especially by government left the sector reliant on migration to plug the gap. The 2021 Skills Barometer⁵ provides some key insights into the current situation with regard to skills and labour in Northern Ireland.

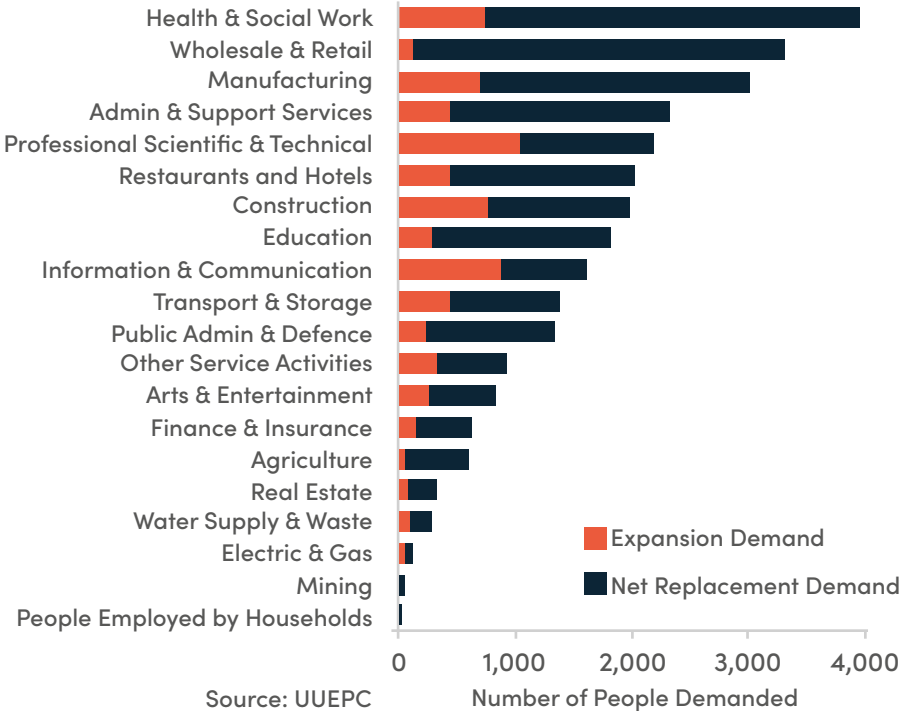
The manufacturing sector struggles to meet the needs of expansion as well as natural wastage. This extends to professional, scientific and technical roles. Broken down by role, the average net annual demand for roles critical to the sector is circa 6000 people per annum.

This is particularly acute across level 4, 5 and 6 qualifications (Foundation Degree, Higher Level Apprenticeship, HNC, HND, Degree or Degree Apprenticeship).

The long-term issues have been well documented:

- Undersupply – retention in full-time education, mandated to age eighteen, lack of opportunity to promote technical and vocational opportunities coupled with under-provision of STEM related places in both Further and Higher Education.
- Insufficient apprenticeship opportunities – a collective industry, education and government failure to deliver.
- Sector attractiveness – lack of promotion, coupled with misguided careers advice and good work experience opportunities.

These issues led to a reliance on migrant labour which is no longer accessible since our departure from the EU, causing significant labour shortages. This gap between industry demand and the availability of human resources is expected to remain an issue for the next 5 - 10 years.



⁵ 2021 UUEPC / Dept. for Economy Skills Barometer, published March 2022

3.1.1 Vision

Growth through increasing the capability of our people, leadership development and the creation of a pipeline of talent to fuel expansion.

3.1.2 Risks

The impact of the covid pandemic and post-Brexit limitations on the availability of labour has caused production bottlenecks for manufacturers seeking to recover lost ground and take advantage of opportunities for growth. Labour shortages are seen at all

levels across manufacturing, in practically every sub-sector and a good deal of frustration is expressed by manufacturers regarding the lack of intervention at a political level to relieve the pressure.

Labour shortages are compounded by the lack of adequate skills in key areas of today's manufacturing businesses, a position which will worsen as companies engage in Industry 4.0 digitalisation and automation programmes.



3.1.3 Opportunities

There are broad collaborative opportunities for manufacturers and government to address skills for the future of advanced manufacturing. We will not grow our manufacturing sector without the adoption of digital tools, or the ability to properly optimise manufacturing processes using data. This means developing new digital skills alongside those of traditional engineering and production.

Industry and government, working together, should promote the image and potential of the manufacturing sector to attract the best talent. Clearer education pathways would enable industry to have access to candidates who possess the right skills to start careers in manufacturing. To encourage young people into manufacturing, industry needs to transform the image of the working environment, from an outdated perspective of cold and dirty to a clean, comfortable and exciting place to work.

Traditional careers advice in a school setting does not inspire students to consider their future in manufacturing or engineering. New initiatives by Manufacturing and Engineering Growth and Advancement (MEGA) in Mid Ulster and 4C UR Future, a not for profit organisation, have shown that a collaborative approach between employers and education can deliver the experience of work in ways which engage and motivate young people.

As manufacturers seek to improve their competitiveness and productivity through digitalising and automating their factories, they will also need to retrain and upskill their existing workforce. The goal is to increase the value added by employees, improving their productivity and earnings, and setting them on a path of lifelong learning.

As we build awareness of what manufacturing has to offer new entrants, we can also increase the diversity of the workforce e.g. attracting more women, people with disabilities, the economically inactive and the long-term unemployed.

3.1.4 Short-term Priorities

Urgent reform of the skills ecosystem is required to unlock the potential of those either on an inappropriate educational pathway, or those who have not been made aware of the opportunities in the manufacturing sector.

Fundamental to a successful, innovative and entrepreneurial manufacturing economy are three basic skill-sets:

- People who can identify needs and opportunities
- People who can solve problems and design innovative solutions
- People who can deliver these ideas to market, and do so as cost effectively and efficiently as possible

Industry will take the lead, articulating the skills required for entry into the modern workplace, and also the retraining and development required to adopt new technology and improve productivity.

Leaders and senior executive teams within manufacturing companies should be urged to develop their own leadership and managerial skills, through an inspirational programme dedicated to the advanced manufacturing sector. The Enterprise Ireland / Invest NI programme “Leadership 4 Growth” is a good model.

We must promote the attractiveness of our sector at local and national levels as we seek to acquire new talent, and demonstrate how the workplace revolution of Industry 4.0 will challenge traditional stereotypes of manufacturing. Together with government, industry needs to shout loudly and proudly about its achievements and its exciting future.

3.1.5 Medium to Long-Term Goals

We should build on the shining examples of MEGA in Mid Ulster and the Manufacturing Task Force in Mid and East Antrim,

creating a network of skills hubs and links to Further and Higher education throughout the region.

As Industrial Digital Technologies (IDTs) and data driven decision making processes become more established across all of our manufacturers, we need our educational system to recognise, in particular, the digital skills needed by industry, and to integrate their development into curricula.

Areas of focus

Grow leadership and management capabilities:

1. Advanced Manufacturing Leadership Programme
2. International benchmarking and exchanges

Increase the capability of our people:

1. Upskill – enabling the manufacturing workforce to acquire new skills aimed at optimising performance and productivity
2. Reskill – training members of the workforce to adapt to new roles as manufacturing organisations change and develop

Build a strong pipeline of talent in manufacturing:

1. Market the manufacturing sector to boost its image and attractiveness to young people
2. Predict and manage talent shortages through statistical analysis of manufacturing sector turnover and anticipated future needs
3. Ensure City and Growth Deal projects (e.g. AMIC, NIACE, CIDRA, CARL) are grounded in the foresight and provision of future skills as well as technology
4. Promote apprenticeship programmes at all levels to foster future talent

3.2 COMPETITIVENESS AND PRODUCTIVITY



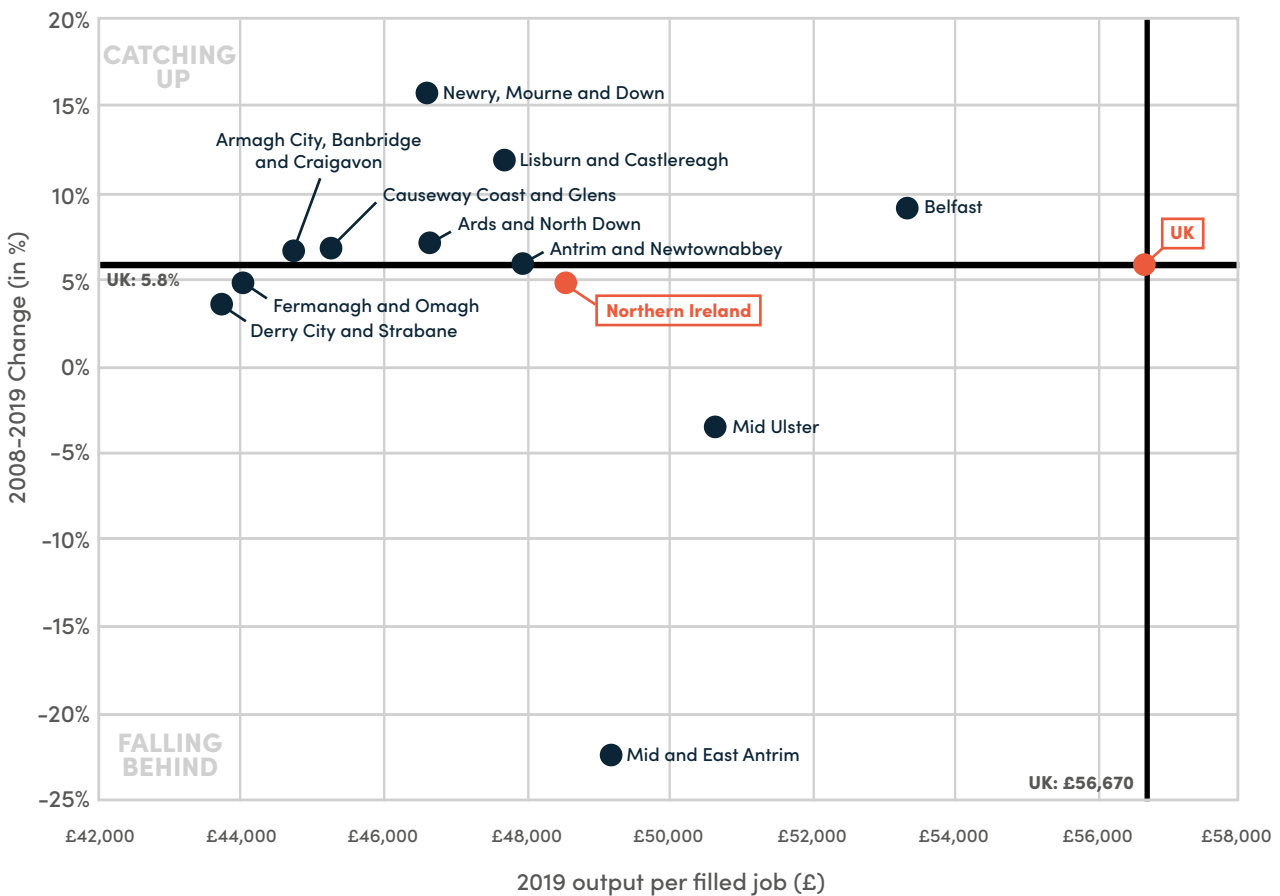
3.2. Competitiveness and Productivity

Northern Ireland’s competitiveness has been slowly eroded over the past two decades. The region has a long standing structural productivity gap. Manufacturing has consistently bucked that trend and, while on a par with the wider UK manufacturing sector, it lags behind global productivity and competitiveness.

The Productivity Institute published its detailed insight paper into Northern Ireland Productivity in October 2021⁶.

The graph above illustrates the extent of the problem by council district. Looking to the future the paper says, “While Northern Ireland’s productivity is affected by both structural and peripherality problems, neither mean the productivity shortfall is an inevitable outcome. The areas of investment, human capital, and infrastructure all display deficiencies, which suggests there is scope for policy to correct these failures.”

Labour Productivity Levels (2019 in £) and Change (2008-2019, in %) for Northern Ireland



⁶The Productivity Institute, funded by UKRI Economic and Social Research Council and in conjunction with the NI Productivity Forum / QUB published their Productivity Insights Paper 004 in October 2021. The Labour Productivity Chart is sourced from page 2 of the Executive Summary document - <https://www.productivity.ac.uk/publications/northern-irelands-productivity-challenge-exploring-the-issues/>

3.2.1 Vision

Closing the productivity gap through skills, innovation and technology, becoming export-orientated and globally competitive.

3.2.2 Risks

“Unfortunately, NI’s relative competitiveness has eroded over time as other countries have improved more quickly and outpaced NI.” This is an extract from Ulster University’s Economic Policy Centre (UUEPC) December 2020 report, “The Competitiveness Scorecard for Northern Ireland”. It clearly and plainly states the issues: we have challenges in skills, low productivity and innovation levels which inhibit our international competitiveness. Northern Ireland’s internal market is too small to sustain manufacturing companies with the ambition to scale and grow. They need to access and operate in external markets to increase sales, broaden their strategic base and achieve a long-term sustainable business model.

It is not sufficient for NI manufacturers to be locally or even nationally competitive: they need to be able to win business in the global marketplace. If we are not able to improve our manufacturing competitiveness, there is a significant risk that our manufacturers will be permanently overtaken by competitors in other regions of the UK and by overseas countries.

As manufacturers currently generate the greatest proportion of NI’s export sales (58% of total exports or £6.5bn p.a.), the competitiveness of the industry is crucial for the overall NI economy. Most of these exports are derived from a small number of externally owned manufacturers. Given the disruption caused by EU Exit, labour and skills shortages, and supply chain challenges; there is a risk that foreign owners could reduce or even close their NI manufacturing operations.

Northern Ireland’s productivity remains relatively low compared to other UK regions and Ireland. We acknowledge that measuring and comparing productivity is a complicated affair; but nonetheless, the UUEPC Report points out that NI lags the UK average in most sectors. In manufacturing, we are improving our productivity at a higher rate than the UK manufacturing sector as a whole, which is encouraging. However, historically, we have relied on an abundant and relatively low cost labour market to meet demand and increase capacity; but this has changed due to rising wages, resulting from labour scarcity.

Material costs are also rocketing as availability declines. Energy, transportation and waste costs are increasing. These all directly impact our productivity and ability to be competitive. We need to be able to do more with the resources available: people, energy and materials. This underscores the need for us to embrace sustainability and digitalisation, through better use of manufacturing data, machine-level decision making, automation and the reskilling and upskilling of our workforce.

3.2.3 Opportunities

The significant contribution made by manufacturing to the NI economy, and the ambition of the sector have already been noted. A vibrant NI manufacturing sector, which is expanding through external and export sales, will have a massive and positive impact on the local economy in terms of creating wealth and prosperity in the community, enhancing NI’s reputation as a destination for Foreign Direct Investment.

Improvement in the productivity and overall competitiveness of NI manufacturers will require upskilling of the workforce, and will ultimately lead to higher wages and standards of living.

To achieve this, we need to be able to benchmark and measure those factors which inform productivity outcomes. If companies can see it and measure it, then they can start to improve it; and in doing so, can improve their overall competitiveness.

International markets offer our manufacturers excellent opportunities for growth, driven by

innovation in design and production. The Northern Ireland Protocol has enabled NI manufacturers to retain access to the huge EU market, and also positioned them to take advantage of trade deals negotiated by the UK government. We are in a unique place, one which should be regarded as a significant opportunity for our manufacturing community.



3.2.4 Short-Term Priorities

Every manufacturer needs to be aware of its position regarding productivity and competitiveness, to enable benchmarking and the development of strategic business plans for growth and sustained profitability.

The 4Manufacturing assessment tool has a proven track record, having been developed in partnership with industry by the Knowledge Transfer Network and Innovate UK. It draws on the experience of the Made Smarter initiative and toolkit successfully rolled out in England.

We recommend accelerated ramping up of the 4Manufacturing programme with sufficient resources to make a meaningful impact across the breadth of our manufacturers. The outcome will be specific action plans for the adoption of digital technologies to improve competitiveness and productivity.

The simplification of support for manufacturing businesses, not just from Invest NI, but also from other government departments and local authorities, would also assist companies who are often confused by the range, source and relevance of support available. We recommend a single online portal for manufacturers which signposts support and facilitates company access to the appropriate tools and training programmes to de-risk and encourage technology adoption.

3.2.5 Medium to Long-Term Goals

We must continue to encourage and support manufacturers as they future-proof their businesses, making better use of their data and the intelligent automation of their processes, all within a secure environment.

In parallel, it is critical that opportunities for the advancement of manufacturers presented through the City and Growth Deals are seized and not wasted. For example, the Belfast Region City Deal contains provision for the Advanced Manufacturing and Innovation Centre (AMIC), the enhancement of activities at the Northern Ireland Advanced Composite Engineering Centre (NIACE), and refocusing of the current Northern Ireland Technology Centre (NITC) facility to help exploitation of academic research into industry. This combined project, hosted by academia, should allow manufacturing companies' access to research and development, prototyping and pre-series manufacturing engineering in an environment of innovation, digitalisation and automation.

We must ensure that decisions about investment and project scope within AMIC are relevant to the breadth of our companies, provide early and affordable access, and are focused on commercial exploitation.

The Derry and Strabane City Deal also offers huge potential benefits for NI's manufacturers. Its flagship project is the Centre for Industrial Digitalisation, Robotics and Automation, known as CIDRA. Its focus on the five core technologies of Artificial Intelligence, Robotics, Automation, the Internet of Things and Digital Technologies will enable companies to boost their innovation and productivity.

A smaller project to CIDRA, also led by Ulster University in the North West, is the Cognitive Analytics Research Lab, CARL. The scope here will be around data analytics and Artificial Intelligence (AI). The capabilities of the CARL project are anticipated to benefit the Advanced Manufacturing sector, as well as others such as Healthcare, FinTech and Energy.

The recent contract award to Ulster University for its Smart Manufacturing Innovation Data Hub (SMIDH) will also offer huge value to manufacturers wishing to capture digital information and turn it into a competitive advantage.

Makers Alliance urges open and participative governance of these and other projects, funded locally or by national government, ensuring there is a genuine partnership between industry and academia.

We also recommend high-level transparency and co-ordination between our two universities to ensure that the benefits of these investments are maximised and made available to the widest possible audience of manufacturers. No one wishes to see opportunities missed and “white elephants” littering the NI landscape, so it will be crucial for industry to inform and lead the scope and application of the new innovation and technology centres.

Areas of focus

Encourage uptake and use of the 4Manufacturing assessment:

1. Create a digital portal or app to encourage maximum uptake by manufacturers, providing resources, signposting and data for improving productivity
2. Use data to support the Smart Manufacturing Digital Innovation Hub and engage businesses in practical steps in improving productivity and competitiveness

Develop opportunities through partnership across United Kingdom and Republic of Ireland in productivity and competitiveness:

1. Maximise NI manufacturers’ access to academic and government-sponsored programmes and initiatives for improvements in productivity, competitiveness and export sales

2. Simplify the process for manufacturers to connect with local and regional government bodies to obtain information and support

Ensure that City and Growth Deals, Levelling Up and other related activities align with industry needs:

1. Amplify the voice of manufacturers and ensure those governing projects are both accountable and are delivering outcomes which improve productivity and competitiveness in Northern Ireland, driving exports and growth for the economy
2. Ensure that SMEs and micro-businesses also enjoy access to the City and Growth Deal centres of excellence

3.3 INNOVATION AND TECHNOLOGY

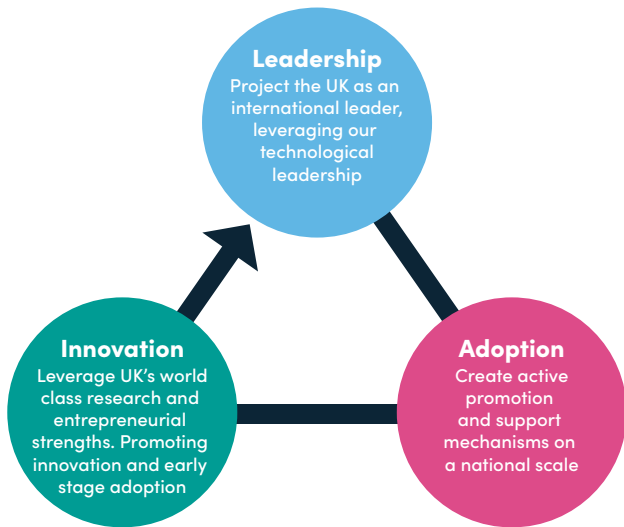


3.3. Innovation and Technology

The UK government’s most recent independent review of industrial digitalisation⁷ identified two specific goals for advanced manufacturing:

- More widespread adoption of technology across supply chains, especially amongst SMEs
- Faster innovation and creation of new technology, new companies or value streams and new capabilities to sustain competitive advantage

Strategic Goals of the Industrial Digitisation Review



By focusing on achieving the goals referenced above, we will increase exports through competitiveness, address sub-regional economic disparities, reduce environmental impact through more efficient manufacturing and optimise our local supply chains.

The importance of achieving these goals is evidenced in the Accenture Report on the subject.

“The work undertaken for the Made Smarter Review found that the positive impact of faster innovation and adoption of IDTs could be as much as £455 billion for UK manufacturing over the next decade⁸, increasing manufacturing sector growth between 1.5 and 3 percent per annum⁹, creating a conservative estimated net gain of 175,000 jobs throughout the economy and reducing CO² emissions by 4.5 percent¹⁰. Overall, from the data and evidence collated, we are confident that industrial productivity can be improved by more than 25 percent by 2025”.

3.3.1 Vision

To be leaders in the creation and use of “design and made smarter” technologies, enabling our manufacturers to compete in the international arena.

3.3.2 Risks

Northern Ireland’s advanced manufacturing sector recognises the opportunity presented by the various Industrial Digital Technologies (IDT), but is often uncertain which technologies will bring its strategic ambition to life. In the absence of adequate guidance and support, manufacturers are vulnerable to making purely internal decisions which have damaging opportunity costs. Equally risky, for companies without a clear and long-term digital strategy in place, is their increased exposure to third-party exploitation of their data.

⁷ Made Smarter Review – independent review of industrial digitalisation, commissioned by UK Government and led by Professor Jürgen Maier CBE, Co-Chair Made Smarter UK and Chair Digital Catapult <https://www.madesmarter.uk/about/the-made-smarter-review/>

⁸ ACCENTURE REPORT: 2017 Industrial Digitalisation Review Benefits Analysis

⁹ BCG; Is UK Industry ready for the Fourth Industrial Revolution. Jan 2017

¹⁰ MSR working group report on jobs and the economy

A recent assessment of available support for business highlighted over 100 innovation interventions across Northern Ireland. These programmes were promoted through Invest NI, InterTrade Ireland, local authorities, Further and Higher Education, and at a national level through Innovate UK. Public sector funding opportunities are often difficult for manufacturers to understand and access.

The vast majority of our manufacturers are SMEs who find the Northern Ireland support landscape very tricky to navigate, given the duplication of provision and confusion in signposting to the appropriate provider. SME's do not have the time or resources to conduct lengthy and complicated searches or interpret mixed signals. The danger here is obvious and simplification of the innovation infrastructure in NI is a high priority.

3.3.3 Opportunities

It is said “A rising tide lifts all boats” and the dawn of our City and Growth Deals offers a wonderful opportunity for our manufacturers. We must ensure that industry is engaged and influential in shaping the scope and direction of the innovative centres under consideration.

For example, AMIC will include a Factory of the Future and fresh investment in NIACE for composites and polymers. QUB has commissioned a Technology Road Mapping study which will reach across all of our manufacturing sectors, and which will be very influential when making capital investment decisions for AMIC, as well as informing R&D activity. Beyond road mapping, we would like to see industry representation in the governance structure of AMIC and other centres as they develop to reinforce the partnership with academia. This will promote the widespread diffusion of knowledge and benefit the broad manufacturing community.

The same principle should be applied to the proposed City and Growth Deals in Derry and Strabane, Mid-South West, and Causeway Coast and Glens. It is vital that sponsoring organisations engage with manufacturers now as they shape their plans and consider strategic investment options. From past experience, we believe this calls for a sincere and meaningful dialogue between industry, host academic institutions and local authorities. If we define our productivity metrics and manufacturers can demonstrate the value of collaboration with these facilities and resources, it will justify further investment and bring in more industrial partners seeking to gain similar benefit.

Without the commitment and integrity of these partnerships, the outcomes are likely to be transient and the long-term benefits will not be realised. Conversely, if we successfully forge strong local partnerships, we foresee an exciting path of innovation for manufacturers, improvements in productivity and overall competitiveness, and a future of sustained growth.

The greater utilisation of Digital Twin Technology in Northern Ireland will further enhance local capability to “Design Smarter”, both in how we design our products, reducing time to market, but also in de-risking manufacturing investment, production set-up and new process introduction.

By bringing together digital technologies, representative digital models and data for both product development and manufacturing, we will improve operating decisions, automate manufacturers’ route to sales, and help companies optimise their manufacturing processes.

3.3.4 Short-Term Priorities

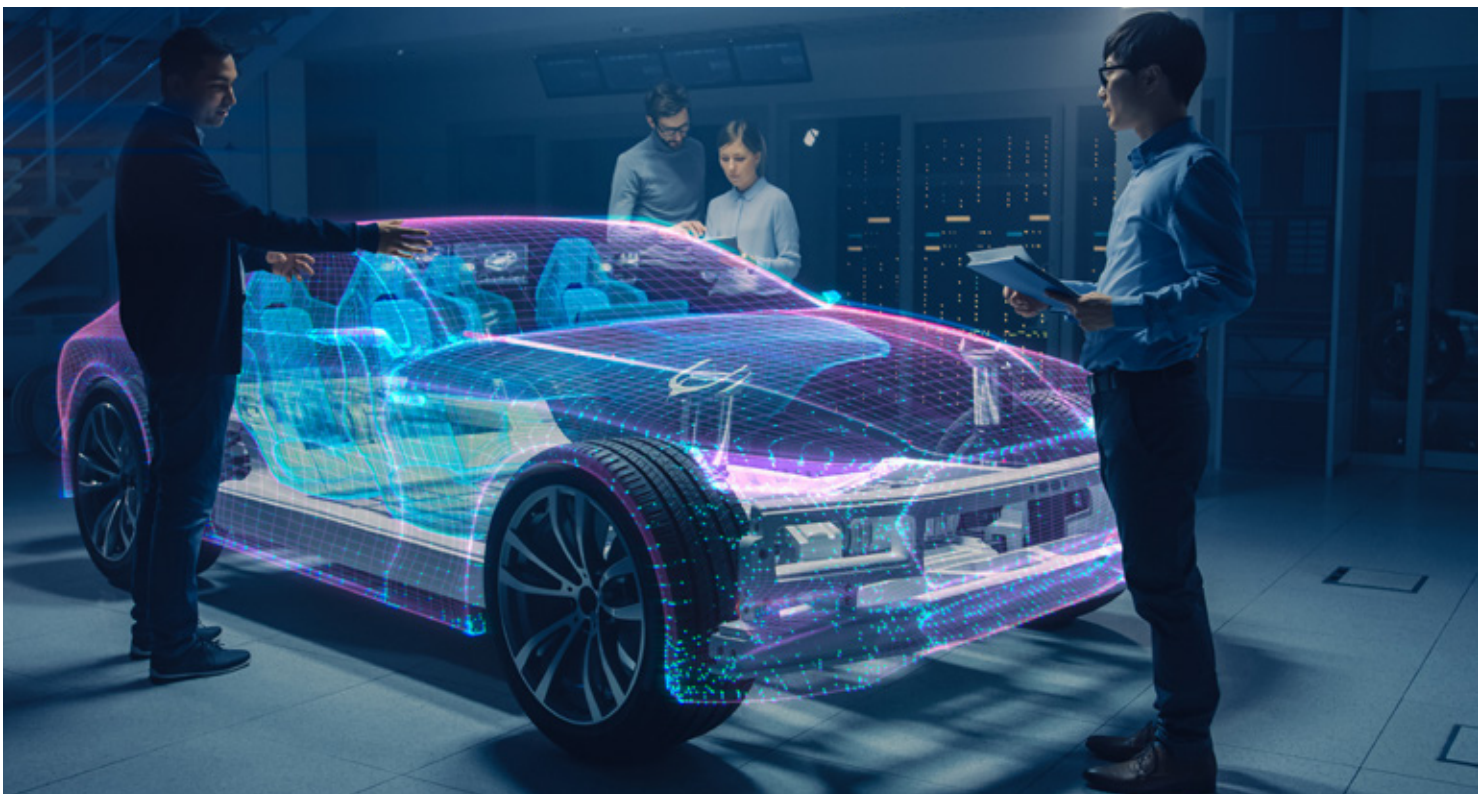
Accelerating the scope and application of the 4Manufacturing assessment will enable manufacturers to take stock of their ambition, competences, capabilities and strategies for growth. The Technology Road Mapping exercise led by QUB for AMIC will, by August 2022, present a detailed picture for each sector of advanced manufacturing in NI. Makers Alliance has helped to ensure strong industrial participation in the study, giving voice to the needs of SMEs as well as large companies.

Makers Alliance is also building links with the UK innovation ecosystem in the form of the High Value Manufacturing Catapult (HVMC) and the UK Catapult Network. We recommend a “Team NI” approach, which simplifies the engagement process, makes the points of contact clearer to all participants, and addresses the GB perception that Northern Ireland is

a complicated place and difficult to deal with. We will engage with other national bodies to ensure Northern Ireland is understood as a manufacturing asset and can benefit from UK-wide initiatives for the sector.

We also need to consider the release of publicly funded, undeveloped or unused IP from academia into industry as quickly and as easily as possible. This will help to commercialise technology, improve revenue and innovation levels within industry, and return investment back into academia via licence agreements.

We encourage the adoption of Life Cycle Analysis, not just into product development and the innovation process, but also in manufacturing processes. This will flag those areas in material selection, in manufacturing supply chains and in industrial processes where we are most vulnerable.



3.3.5 Medium and Long-Term Goals

Northern Ireland must become more active and effective in accessing UK innovation resources and support through the Shared Prosperity Fund, Levelling Up, Innovate UK and other challenge funds. This calls for a “Team NI” approach, which requires openness and transparency between our academic institutions, as well as meaningful relationships between industry, academia and the public sector.

We will build bridges with innovation bodies throughout the UK and develop similar

relationships with advanced manufacturing and innovation institutions in the Republic of Ireland.

Digitalisation of design and manufacturing, coupled with the power of Digital Twin capabilities, our location and potential to exploit renewable energy sources, will ensure that NI manufacturing develops a regionally dispersed super-cluster of unrivalled problem solving capability that is recognised nationally and internationally for its innovation and expertise.

Areas of focus

Grow investment by industry in research and development activity, including applied research from Northern Ireland's Further and Higher Education institutions:

1. Provide the space and opportunity to grow the intellectual property (IP) of Northern Ireland manufacturing
2. Focus support on collaborative activity, increased Research Council participation and on delivering across all Technology Readiness Levels (TRLs) 1-9, with specific emphasis on moving TRL 4-6 activity into commercial exploitation and exports

Provide resources, space and opportunity to test impact and benefit of innovation that enable collaboration and engagement beyond Northern Ireland:

1. Direct connection with the High Value Manufacturing Catapult and UK Catapult Network to maximise opportunities for collaboration and growth. Potential areas include digitalisation, hydrogen and electrification

Adopt a flexible and industry-led technology road map that drives growth and value, providing foresight and underpinning future opportunity:

1. Encourage the use of a Technology Roadmap for Northern Ireland that embraces current and future technology, is collaborative across local Higher Education institutions, supported by UK wide engagement (via the UK Catapult Network and UKRI) and reviewed for relevance and impact on a regular basis
2. Support from regional and national governments to support investment in the technologies identified and support for collaborative projects where academia and industry work together on high-value strategic opportunities

3.4 SUPPLY CHAIN



3.4. Supply Chain

The Northern Ireland manufacturing supply chain ranges from micro businesses and SMEs to ambitious mid-tier businesses. They are outward looking and as focused on global supply chain opportunities as they are on local or all-island markets.

Northern Ireland is home to some of the best vibrant, resilient and export driven businesses which support our larger companies including Prime Contractors and Original Equipment Manufacturers (OEMs). This has been recognised through merger and acquisition activity and through UK-wide accreditation.

SMEs are at the heart of driving local economic growth and supporting employment. They are excellent innovators with strong knowledge of their local markets. Procuring locally also minimises the impact on the environment while ensuring greater predictability of factors such as delivery times.

The UK government 2015 paper “Strengthening UK manufacturing supply chains”¹¹ identified the UK Catapult Network, collaboration, building capability and access to finance as keys to the growth of the supply chain. With increased global volatility this is more important than ever.

3.4.1 Vision

The development of high-performing, agile and resilient supply chains which are outward looking and globally competitive.

3.4.2 Risks

The covid pandemic revealed the vulnerability and fragility of international supply chains; we have witnessed disruption to trade flows, and volatility of raw material prices, not witnessed for decades.

There are lessons about risk and dependency of ‘Just in Time’ (JIT) to be learned from this experience, just as there are opportunities.

Supply chains to the manufacturing sector are diverse and have been increasingly driven by cost factors rather than strategic importance. Now that the shortcomings of this philosophy have been exposed, manufacturers are strengthening the resilience of their supply chains by adopting a more collaborative model of partnership.

For our SME manufacturing community, many of whom operate in the supply chain of larger companies, the challenge is to adapt their business model to avoid losing competitiveness. As the economy recovers from pandemic contraction, the manufacturing sector is under pressure to ramp up output to meet demand, and to balance the absorption of rising input costs with the risk of price rises in the marketplace.

The pressure is on SMEs to increase production at a time of labour and skills shortages, with the prospect of significant energy cost increases on the horizon.

Supply chain planning and implementation must consider the raw materials used, not just within the business, but by the suppliers of parts and components into our factories. We cannot ignore Northern Ireland’s vulnerability, as we have few material resources on our doorstep. We need to think how we can create alternatives, or recover materials for reintroduction into the supply chain. As we have already highlighted above, Life Cycle Analysis has an important role to play, and we need to ensure we develop the relevant expertise.

¹¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/407071/bis-15-6-strengthening-uk-manufacturing-supply-chains-action-plan.pdf

We must also recognise the double cost burden of rising costs for the transportation of goods inward, in the form of raw materials and components and in the shipping of finished goods to export markets.

3.4.3 Opportunities

Northern Ireland occupies a unique trading position between the EU and the UK's own trading partners which offers a very significant competitive advantage. We must maximise the potential for manufacturers to grow their access to export markets in Europe and those countries with whom additional prospects are being created through UK Trade Deals.

The supply chain disruption experienced by many companies during the pandemic has caused a fresh look at where they are vulnerable, and the real costs and benefits of "off-shoring" critical elements of their supply chain. As wages have gradually increased in low-cost manufacturing economies, experience of long lead times and poor delivery performance have called into question the viability of long-term reliance on distant sources. The conflict in Ukraine is causing many to reconsider previous assumptions about globalisation.

We need to support this desire for a more secure and reliable "local" supply chain, and encourage a more robust, but still cost-effective model; enabled through the transformation of product design, manufacturing processes and the materials we specify. We need stronger local SMEs, innovating and adopting digitalisation and new technology, collaborating with academia, to build strength that is recognised globally.

3.4.4 Short-Term Priorities

We must map the existing competencies and capabilities of our supply chain manufacturers to understand their strengths, weaknesses, vulnerabilities and their current raw material flows. We will not only be able to identify the big multi-sectoral needs, but also see individual company requirements for materials, skills and technologies.

We recommend a Supply Chain Excellence Programme to encourage best practice, upskill the workforce and bring digital tools into the workplace. We also believe that the ability of SMEs to access public sector procurement opportunities must be optimised by improving awareness and easing participation. A local Win : Win for both government and manufacturers is



possible, provided all parties share knowledge of the market and approach procurement projects on a partnership basis.

The need for improved skills has already been discussed, but in the context of supply chain we must emphasise the need to encourage ambition, entrepreneurship and leadership in the manufacturing community. A Leadership and Management Programme, designed and delivered specifically for the advanced manufacturing sector would be instrumental in improving business performance.

3.4.5 Medium to Long-Term Goals

The adoption of innovative practices and new technology has the potential to transform local supply chains. Improving the productivity and lead times of SMEs, through digitalising and automating business processes, will

enable them to compete for contracts that are being “near-shored” or “re-shored” due to logistical or environmental concerns. Becoming globally competitive in this way also opens the door to export markets.

As we progressively simplify the way SMEs obtain support and interact with local government and agencies such as Invest NI, we will avoid duplication of cost and effort. This will in turn accelerate the development of SMEs and, where appropriate, collaborative networking will further build capability in the sector.

The outcome of a high-performing agile and resilient supply chain will be an economic force to be reckoned with.

Areas of focus

Develop structures that support SMEs to build excellence:

1. Promote 4Manufacturing assessments, focused on supply chain SMEs understanding of their current capabilities and productivity, competitiveness and potential for adoption of new technology and digitalisation
2. Ensure access for supply chain SMEs to the City and Growth Deals and the wider UK Catapult Network

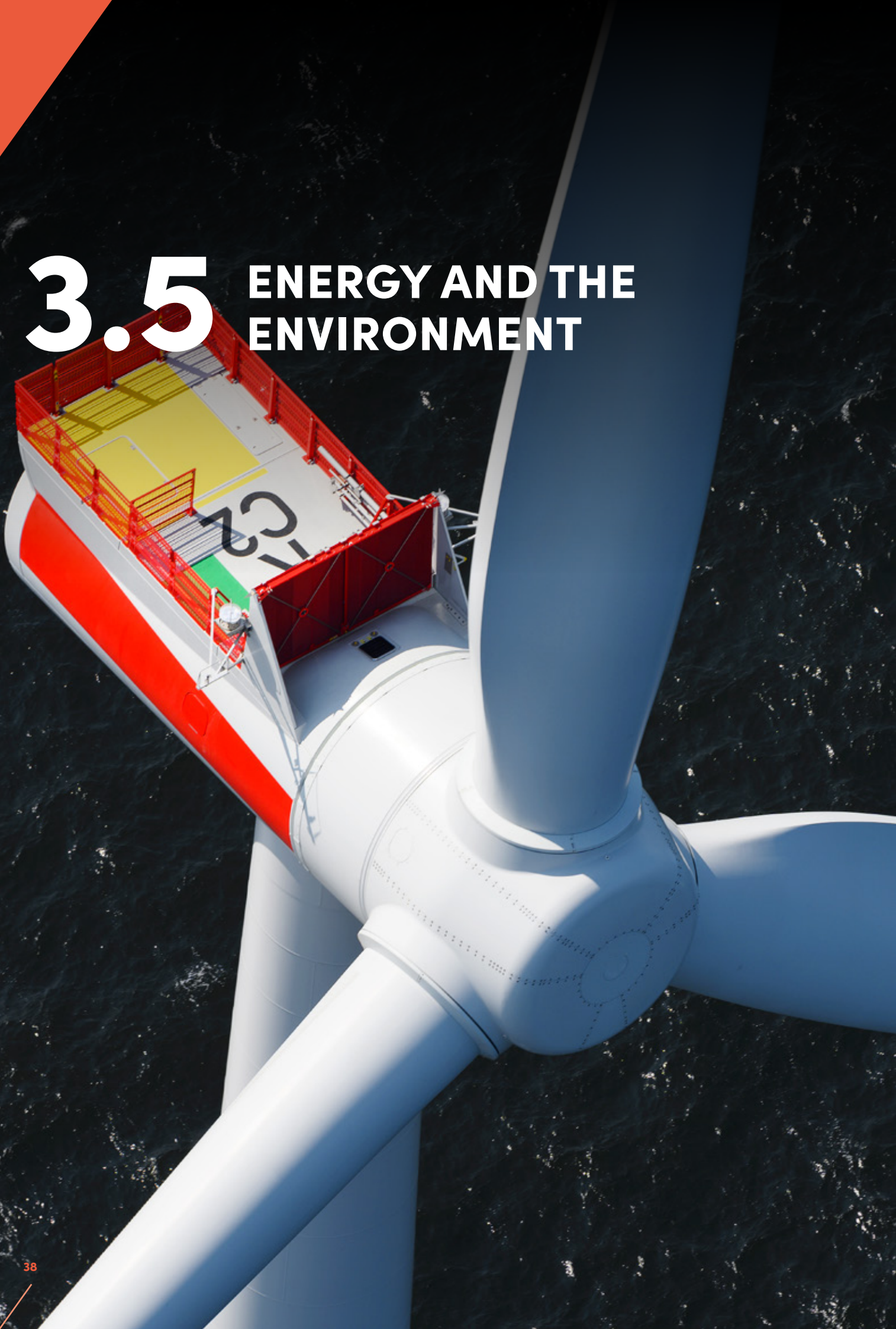
Encourage supply chain growth through support for skills, technology and export sales:

1. Simplify and align Invest NI and other local government interventions with SME strategic requirements

Foster SME supply chain growth by taking advantage of re-shoring or near-shoring opportunities:

1. Provide market intelligence of opportunities for supply chain businesses and make international connections
2. Encourage large companies and Prime Contractors, who need to build supply chain resilience through near-shoring or re-shoring, to look at Northern Ireland’s capabilities and capacity

3.5 ENERGY AND THE ENVIRONMENT



3.5. Energy and the Environment

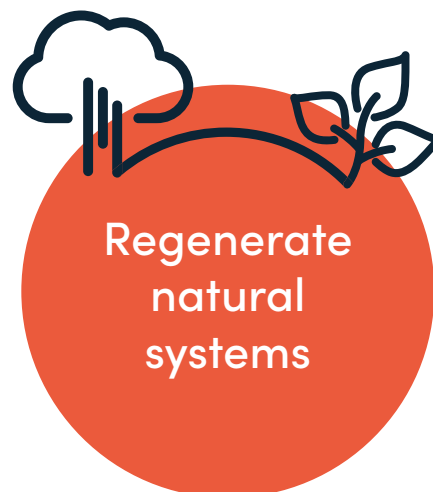
Northern Ireland's manufacturers have long experience of the challenges around the adequacy of supply and cost of the energy they consume. Today those challenges can be addressed. The natural resources of wind, wood (or biomass) and water can deliver sustainable energy solutions and a positive environmental impact. The region can become not just an innovator in the use of new and sustainable energy sources but also a creator and global leader.

From the exciting potential of hydrogen and other renewable sources of energy, to the growth of electrification, there is an early opportunity to change the dynamic and set this place apart in the creation and adoption of these technologies.

Behind the headlines, a number of objectives which will make green energy an integral element of manufacturing in Northern Ireland have already been established on a national level. These are:

- By 2050, offshore wind is expected to be the single largest source of electricity
- By 2030, EVs (electric vehicles) will form 50% of total new car sales and around 30% of medium and heavy duty trucks will be electric or use hydrogen
- Development of Carbon Capture and Storage is vital to decarbonising industry and will create new jobs and new facilities
- By 2030 the objective is for 10GW of low-carbon hydrogen production capacity

The challenges of energy cost and security do not need to conflict with the strategic longer-term focus and investment in green energy solutions and wider adoption of circular economy principles. Instead, manufacturers can choose to play a vital role in the strategic shift to renewable energy as well as becoming the beneficiaries of competitive energy pricing.



3.5.1 Vision

Harnessing our natural resources, developing and improving technologies and working with partners to deliver sustainable manufacturing and environmental improvements.

3.5.2 Risks

NI manufacturers are currently managing cost pressures on all fronts: raw materials, labour, payroll taxation, and now from energy. The price of electricity, oil and gas has risen significantly and is set to increase for the foreseeable future. This trend will negatively impact competitiveness, particularly in external markets.

Even before the recent round of energy price increases, NI has a long history of high energy costs and an over-reliance on fossil fuels. Manufacturing tends, by definition, to be energy intensive, and NI companies pay higher unit costs for electricity than competitors in the Republic of Ireland and elsewhere in Europe. This pattern is repeated in the case of oil and gas. These energy price increases are not restricted to the manufacturing operations, but also impact the inward and outward supply chains through increasing costs of transportation

If this natural disadvantage is not addressed, the risk will manifest itself in the form of decreasing competitiveness. This means NI manufacturers will struggle to match the cost and efficiency of their competitors, and in all likelihood, the loss of business will follow. High energy costs are also a factor in the evolution of NI as a competitive location for manufacturing, placing local subsidiaries of foreign-owned companies at risk of re-location or closure.

Following COP26 in Glasgow, there is growing enthusiasm in the international finance community for the cost of

borrowing and investment banking loans to be aligned to emissions and the achievement of environmental performance targets. Unless we prepare now, we will simply store a problem for the future.

3.5.3 Opportunities

The Department for the Economy's recent publication "The Path to Net Zero Energy" sets out a very welcome vision of reducing dependency on expensive fossil fuels; increasing the input from renewables such as wind, and doubling the size of the Green Economy to £2bn p.a. by 2030. The strategy also envisages new jobs and an appropriate skills base for a low-carbon economy; highlighting the hydrogen sector as being one opportunity in particular where NI has early momentum and the potential to become an international leader. This is an ambitious statement of intent and we support the Department's ambition to develop our own natural resources to create local wealth and employment.

The advanced manufacturing and engineering sector in NI is capable of becoming a creator, as well as a consumer, of green technology and energy. We have a burgeoning and exciting Clean Tech sector. Our manufacturers are already producing technologies for hydrogen creation, energy storage and building insulation. We do not always need to look far afield for solutions to local problems. The "Path to Net Zero Energy" is a strategy which could decarbonise our economy; and, at the same time, grow a highly capable Clean Tech sector with significant export potential.

Where we do not have the natural resources to fulfil our raw material requirements, we should consider securing, storing and re-using the raw materials required for our manufacturing supply chains.



As highlighted above and discussed at COP 26 in Glasgow, these stored and recovered resources become bankable assets and material reserves.

There is undoubtedly an upfront cost in embarking on a journey to net zero manufacturing. Buildings and equipment will need to be modernised and upgraded, though economies of scale can be achieved by clustering either at a local or sectoral level. However, the payback from the investment will be immense. An advanced manufacturing sector in NI, which operates on a low or zero carbon footprint, could become a driver for creation of green energy, as well as being an efficient consumer. It is a very compelling proposition.

3.5.4 Short-Term Priorities

Manufacturers must engage with the Department for the Economy and other public sector stakeholders to ensure we positively contribute to a Northern Ireland action plan for energy and the environment. The pathway envisaged for industrial decarbonisation requires significant shaping by manufacturers, in line with the sector's ability to replace aging infrastructure and to invest in energy-efficient technology.

We recommend a capability mapping study of NI manufacturers to identify gaps in moving towards net zero goals, and also to promote those companies with technologies

and competencies in energy, Clean Tech and the environment.

3.5.5 Medium to Long-Term Goals

We see sustainable energy, the environment, and the circular economy as intertwined elements of the future low carbon economy. Our goal should be that NI's location, natural resources and capabilities will support industrial capacity and growth.

Manufacturers recognise the virtues of becoming more efficient in their consumption of energy, reducing waste and minimising their impact on the environment. This makes good business sense as well as being good for Northern Ireland. Affordable, sustainable energy will benefit consumers across the community, including industry.

We strongly encourage government procurement services to widen participation in trials and pilots of low carbon energy, technology and infrastructure to local SMEs and micro businesses. Such trials could encourage local industrial participation, particularly for SMEs who often experience challenges in qualifying for public tenders. Our goal should be to encourage and enable NI companies to develop new technology for energy creation, storage and distribution. NI's natural resources of wind, wood and water make our location unique, and will act as fuel for the engine of change, in a very literal sense.

The UK Government launched its Hydrogen Strategy in August 2021; it estimates that by 2050 the hydrogen sector could be valued at up to £13bn annually, provide employment for 100,000 people, supply 20 – 35% of the UK's energy needs.

Northern Ireland has the potential to play a key role in the emergence of the hydrogen economy, and has the expertise and technical ambition, together with an abundance of offshore wind.

We applaud the Department for the Economy's ambition in its Energy Strategy, to seize the opportunity for the development of hydrogen capabilities in NI. We believe our manufacturers can play a pivotal role in realising this ambition by building on existing success stories and through collaboration in a hydrogen super-cluster.

Areas of focus

Provide tools and support to industry to reduce energy cost and consumption:

1. Assess industrial buildings, report on reducing energy usage, and connect with providers of technical assistance
2. Enable Northern Ireland creators of green energy solutions (insulation, energy monitoring, solar technology etc.) to engage directly with manufacturers and accelerate production in the local market, making a virtuous circle of creation and consumption

Accelerate the development of the Northern Ireland hydrogen economy:

1. Ensure Northern Ireland is fully embedded in the UK Industrial Hydrogen Accelerator Programme¹² with funded activity and demonstrator technology in place by 2025

2. Encourage and enable the transition of key manufacturing sub-sectors from reliance on fossil fuels to renewable sources, including hydrogen, with Northern Ireland leading UK and RoI technology creation and adoption

Support and grow opportunities to adopt and facilitate electrification:

1. Collaborate with HVMC to develop skills and resources to support electrification including PhD supported activity and degree apprenticeships
2. Encourage and accelerate collaborative R&D activity in electrification with emphasis on product creation and industry-led commercialisation

¹² <https://www.gov.uk/government/publications/industrial-hydrogen-accelerator-programme>
- March 8th 2022

3.6 INFRASTRUCTURE



3.6. Infrastructure

A common theme in background discussions with businesses across Northern Ireland in developing this strategic plan has been the importance of including infrastructure as an integral element of the manufacturing ecosystem. Any weakness in the supporting infrastructure will negatively impact the entire manufacturing sector.

Digital infrastructure, the flow of information and transfer of technology underpins the future development of the sector. The entire Higher and Further Education infrastructure is critical, from basic research to the deployment of innovation. Where local, regional and national government bodies fit within the manufacturing infrastructure needs closer consideration. At a local government level in Northern Ireland there is scarce recognition of the sector's role and importance in district council strategic or community plans.

The open questions in respect of our manufacturing infrastructure are:

- Does the current infrastructure support manufacturers in relation to digitalisation, design and made smarter thinking?
- Is our infrastructure agile and flexible enough to respond to industry needs?
- Is there an appropriate balance in our structures between industry need and academic participation?
- Is it simple for our manufacturers to develop their physical infrastructure and access local government support and finance?

The competition for a strong manufacturing sector is global. Initiatives to promote advanced manufacturing from other national governments have been much more convincing than that of the UK and the devolved nations.

Germany has its "Industrie4.0", France "Industrie du Futur" and China "Made in China 2025". We have some catching up to do.

The infrastructure required to stimulate, maintain and attract manufacturers is multi-faceted. From promoting R&D activity, skills and workforce development, planning and land, favourable trade policy and implications of tax there is much to consider. Government at a local, regional and national level can have a significant influence on the infrastructure to stimulate growth and the ambition of manufacturers, in a globally competitive environment.

3.6.1 Vision

Place-based capability and capacity, led by industry, in partnership with local government and academia.

3.6.2 Risks

Much of the work of Makers Alliance to date has been gathering the views of manufacturers, gaining an appreciation of their challenges and ambitions. Some of those challenges are perhaps short term, and almost tactical by definition, but without resolution they become strategic obstacles.

One of those challenges lies in NI's infrastructure, with shortfalls highlighted in elements ranging from the availability of land for industrial development, to the adequacy and coverage of broadband, plus transport links and utilities. For those manufacturers seeking to grow their operations in areas with gaps in the local infrastructure, these issues soon become major headaches.

We have already noted that the NI manufacturing landscape is predominantly occupied by SMEs. Our companies range in size, and also in their geographical location.



Outside the well-known clusters of our cities and towns, there are many SME manufacturers in less populated and rural areas. They provide employment, are often a focal point for their local communities, and in most cases are family-owned. These companies are every bit as deserving of good infrastructure as those located in industrial parks on the outskirts of our cities.

The advent of the City and Growth Deals and the development of centres of excellence across Northern Ireland will offer an abundance of manufacturing opportunities. However, if they are unable to build meaningful links with all manufacturers, demonstrating their relevance to companies of all sizes throughout the region, then they will fail in their mission, and deliver a poor return on investment.

Beyond the infrastructure investment already secured; there needs to be substantial investment in our energy infrastructure, our transportation systems and in new ways and means to store and recover the value of our raw materials. If we do not invest in this infrastructure, we will always be at a productivity disadvantage.

3.6.3 Opportunities

If we address infrastructure deficits in the short term, we will enable manufacturers to focus on growing their businesses, employing more people and creating wealth and prosperity in the community. The City and Growth Deals referred to above, offer enormous opportunities for the advancement of manufacturers.

An Industry 4.0 pathway, which takes companies from an initial 4Manufacturing assessment onto a “Competitiveness Escalator” linking to AMIC, CIDRA and other innovation centres, would benefit our industrial productivity and enable company scaling for growth.

With a collaborative approach from local government, Invest NI and academia, the new innovative, research and development infrastructure can reach all parts of our manufacturing community. Large companies and SMEs will be connected in a local network of support, and will have access to the High Value Manufacturing Catapult and the UK Catapult Network. Manufacturers will be able to harness world-class research and development resources and also showcase their own capabilities on a national stage.

3.6.4 Short-Term Priorities

The infrastructure challenges and deficits currently faced by NI manufacturers should be clearly identified, plans made to address them, and action taken for implementation. We would like to see a team effort with commitments from industry, local government, Invest NI and utility bodies to resolve long-standing issues within the next 12 months.

Turning to the City and Regional Growth deal projects (e.g. AMIC, CIDRA, CARL etc) plus those innovation projects funded separately (e.g. Design Smarter Digital Twin), we require a level of engagement with industry that ensures these projects deliver for industry.

Makers Alliance will represent the broad manufacturing sector in the project delivery bodies, acting as the voice of industry and articulating its needs and ambitions.

Makers Alliance urges a “Team NI” approach to the City and Growth Deal projects and other innovation centres, encourages an open and collaborative approach between academic institutions and industry, and will act as a champion for all manufacturers.

We envisage Northern Ireland as a great place for advanced manufacturing and engineering. Connectivity throughout the region should be fast and frictionless, with road and rail infrastructure meeting industry needs and matched by a competitive digital infrastructure.

Our manufacturing businesses should be able to communicate and innovate seamlessly throughout Northern Ireland and across the whole of the UK and Ireland. High-speed communication should be available in all locations where manufacturing takes place.

A longer-term infrastructure plan should consider transportation, buildings and utilities. It should encompass carbon reduction, sustainable energy production and distribution, and innovative approaches to manufacturing such as “micro-factories”, clusters, or specialist manufacturing hubs. If we are to become and remain internationally competitive, we will need the infrastructure to enable a truly circular economy which recovers and reintegrates raw and waste materials back into the supply chain.

Areas of focus

Simplify supporting infrastructure to enable all manufacturers to benefit from opportunities for growth:

1. Deliver City and Regional Growth Deal projects, ensuring they are business led, focused on outcomes, with methods of engagement to be both simple and effective
2. Improve local, regional and national government co-ordination of physical infrastructure to support growth and success – including transport, planning and utilities

Make digital adoption simple and effective through digital networks and connectivity:

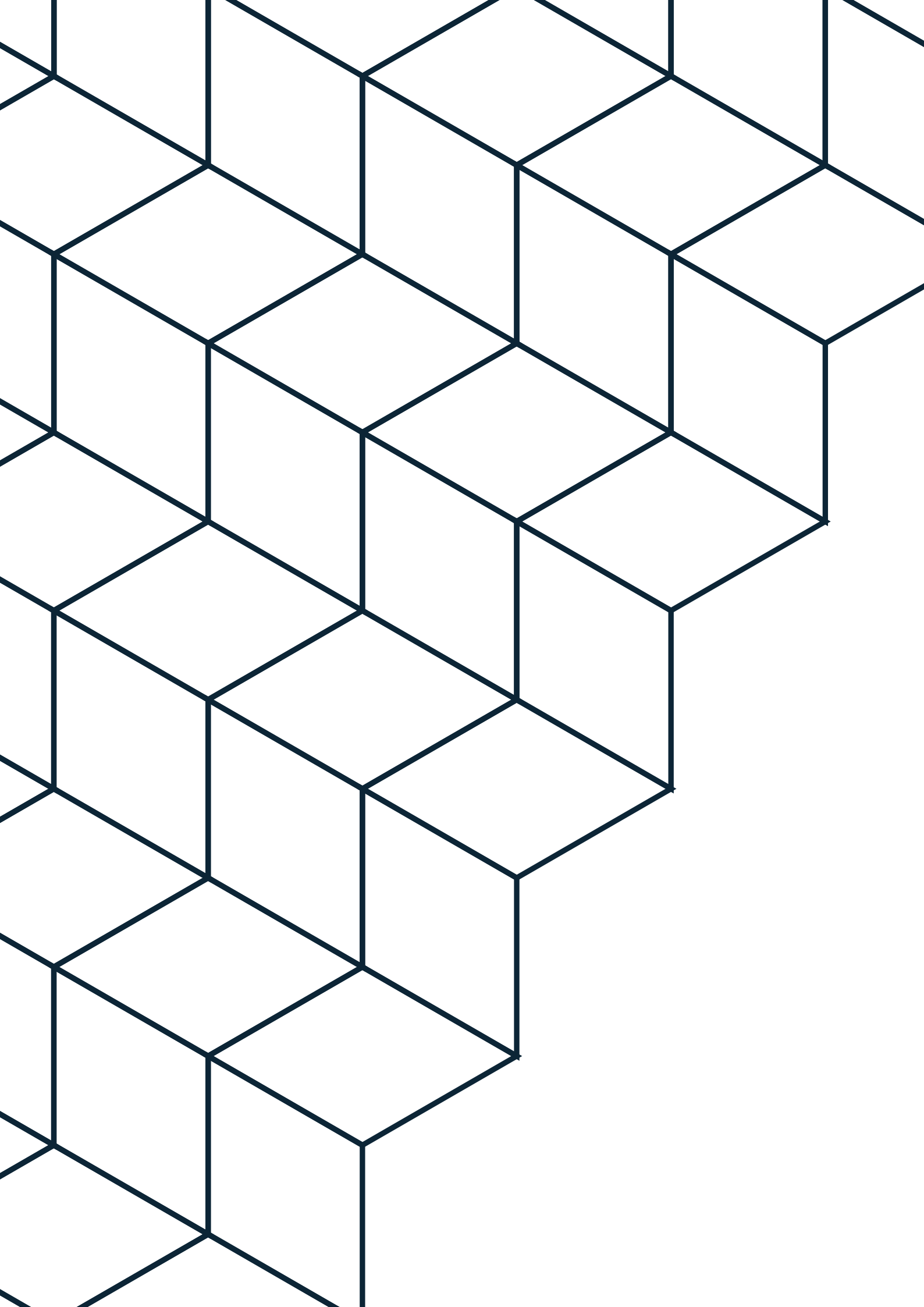
1. Implement full fibre integration and availability for manufacturing businesses supported by industrial 5G and associated digital infrastructure

2. Develop and focus on cyber security resources to ensure protection of intellectual property (IP) and knowledge

Recognise our sub-regional and cluster capabilities and capacity:

1. Explore the opportunity to create “micro factories” that can have rapid impact on local manufacturing
2. Ensure flexibility in approach, tailoring agile support rather than lengthy programmes which are often costly, tie up infrastructure and fail to deliver value for companies

Our aim will be a vibrant landscape for home-grown manufacturers, creating a healthy and enriching environment for our people, as well as an attractive and compelling location for Foreign Direct Investment.





APPENDICES

NI Advance Manufacturing Sector Profiles

- 1 **Aerospace**
- 2 **Construction**
- 3 **Food and Drink**
- 4 **Life and Health Sciences**
- 5 **Materials Handling**

AEROSPACE SECTOR

Introduction

Northern Ireland aerospace is an approx. £1.4bn sector, with over 80 companies employing over 6,200 people. These companies are engaged at the leading edge of advanced aerospace design and manufacturing. Every major commercial aircraft programme depends on structures, components and expert services from Northern Ireland and our companies form an integral part of the UK aerospace industry.

Key Sub-Sectors

Logistics & Warehousing, Advanced Manufacturing, Composites & Plastics, Materials, Components, Tooling & Treatments, Defence, Security, Airframes, Aircraft Interiors / Seating, Space, Design, Stress Engineering, Testing, Precision Machining, Advanced Metal Forming.

Trend Data

In 2020, as a result of Covid 19 restrictions, there was a significant decrease in aerospace exports, down from £1.5bn in 2019 to £936m in 2020 (-38%).

Previously it had been growing steadily year on year from 2014 (£1.024bn). 95% of sales are outside Northern Ireland with 71% exported outside UK.

Key Markets

GB 24%, The Americas 47%, EU & Russia 12%, Asia / Pacific 10%, India, Africa, Middle East 1%.

Key Facts

1 in 3 aircraft seats made in NI. 1/3 of the value of the A220 aircraft is designed, developed and manufactured in Northern Ireland. The region has a rich aerospace heritage, with the first contracts to manufacture aircraft awarded over 100 years ago. Today our businesses supply every major global aerospace programme.

Info Source

Based on ADS and Invest NI sector information.

Stakeholders, Third Party & Partner Organisations



**QUEEN'S
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CONSTRUCTION SECTOR

Introduction

The Northern Ireland construction sector includes companies engaged in the manufacture of value-added products and/or value added services supplied to the wider construction Industry.

The construction sector can be broken down into a number of sub sectors.

Key Sub-Sectors

Manufactured Products & Materials, Contractors, Specialist Joinery, Sub-Contractors (Supply & Fit), Kitchen, Bedroom & Bathroom, Mechanical & Electrical, Professional Services, Structural Steel, Off-Site, Marine Fit-Out.

Trend Data

In 2020 there was a decrease in the construction sector of £494 million (16.1%).

Construction's GVA had grown for the previous six consecutive years, up from £1.8 billion in 2014 to £3.1 billion in 2019.

But between 2019 and 2020 the measure slumped by 16.1% to £2.6 billion as turnover fell by 0.6% (£44 million) to £7.3 billion, although purchases were up 11.8% from £4.3 billion to £4.8 billion.

Key Markets

GB, Rol, USA, Canada, Denmark, Middle East, New Zealand and Australia.

Key Facts

The construction sector represents the second largest industry sector in Northern Ireland accounting for approximately 10% of Northern Ireland's GVA from non-financial services. Employment in the NI construction sector is currently 34,185 (with a peak of 72,000 in 2008). Northern Ireland has a strong background in construction expertise with some 10,800 firms achieving sales in excess of £7bn.

Info Source

NISRA & Invest NI sector information.

Stakeholders, Third Party & Partner Organisations



QUEEN'S
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BELFAST





FOOD AND DRINK SECTOR

Introduction

Food and drink is a £5.4 billion industry in Northern Ireland and is the region's largest manufacturer. Our pure, lush countryside, combines well with farmers and producers who are dedicated to traceability and passionate about quality. The industry is progressive, based on family farms and fishing businesses, as well as award-winning enterprising food and drink producers, focused on original products.

Northern Ireland boasts high-quality raw ingredients, state-of-the-art processing facilities and a world-class food security record which major retailers demand. Our award-winning food and drink comes with full traceability from farm to fork and we are home to the Global Food Security Centre at Queens University Belfast.

Key Sub-Sectors

Drinks, Beef & Sheep, Poultry & Eggs, Bakery, Dairy, Fish, Snacks & Convenience, Arable Crops, Fruit & Veg, Food Security, Animal Feeds, Agri Food and Horticulture.

Trend Data

In 2020 there was a decrease in the food and drink exports, down from £1.63bn in 2019 to £1.58bn in 2020 (-3%). Previously it had been growing steadily year on year from 2016 (£1.218bn). 77% of sales are outside Northern Ireland and 26% exported outside UK. GB accounts for 51% of sales, £3.049bn and 14% (£822m) goes to our neighbours in RoI. The sector is also currently impacted by labour shortages and low adoption of automation technology.

Key Markets

GB, RoI, EU and Russia, surprisingly the Americas only accounts for 1% or £64m in sales, behind Asia Pacific £185m and India, Africa & Middle East £123m.

Key Facts

The NI food and drink sector employs more than 24,000 people.

Info Source

Based on Invest NI sector information.

Stakeholders, Third Party & Partner Organisations



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LIFE AND HEALTH SCIENCES SECTOR

Introduction

The life and health science sector is a vibrant cluster of 250+ businesses, comprising of both international investors and indigenous companies, and employing over 18,000. Exporting globally to over 140 countries. We have over 17 world-leading research centres with more than 1,000 researchers and both our universities are ranked in the UK's Top 10 for bioscience research.

Key Sub-Sectors

Pharma & Bio-Tech, Medical Devices & Products and Health & Well-being. With specific expertise in Precision Medicine, Pharma & Biotech, Clinical Trials, Diagnostics and Med-tech.

Trend Data

There continues to be steady growth in the export of life and health sciences, from £548m in 2014 to £864m in 2020 (+57% growth).

91% of sales are outside Northern Ireland and 62% are exported outside UK. Sales worth close to £1.4bn with £1.26bn coming from outside NI.

Key Markets

GB, The Americas, EU, Asia / Pacific, India, Africa, Middle East and Australia.

Key Facts

Northern Ireland has a long history in health innovation dating back over 40 years to Professor Pantridge who developed the first portable defibrillator here. The Health Innovation Research Alliance Northern Ireland (HIRANI) offers a single point of contact for companies and investors. It is an alliance of universities, healthcare providers and industry, supporting the growth of the life and health sciences sector.

Info Source

Based on Invest NI sector information.

Stakeholders, Third Party & Partner Organisations



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MATERIALS HANDLING SECTOR

Introduction

The Northern Ireland materials handling sector includes companies engaged in the manufacture of products and/or services to decrease the size of raw and recovered materials, grade those materials into various sizes, separate one material from another, wash, dry and move materials onsite, in factory or for onward shipping. End customers are in mining, quarrying, demolition, construction, recycling and waste recovery/disposal industries.

Key Sub-Sectors

Crushing, Screening, sorting / separation, conveying / moving, washing, drying, mixing and batching of mined or recovered raw materials. Ports, Airports, Waste Systems, Electrical Control Systems, Conveyors, Sub-Contract Fabrication, Agri-Engineering, Hydraulics, Gen Sets, Forklifts and Warehousing.

Trend Data

In 2020 there was a decrease in materials handling exports, down from £1.2bn in 2019 to £834m in 2020 (-31%). Previously it had been growing steadily year on year from 2014 (£646m). 86% of sales are outside Northern Ireland and 61% of those are exported outside UK. The majority of SMEs operate through third party distributors with regional/in-country presence. The sector is also currently impacted by skills shortages in welding, fabrication and by the rising costs of raw materials.

Key Markets

GB, The Americas, EU, Asia / Pacific, India, Africa, Middle East and Australia.

Key Facts

Employment in NI materials handling sector is currently 7,725, employing more people than aerospace and defence combined, in more than 100 businesses. Northern Ireland is now globally recognised as a hub for materials handling equipment and innovation.

Info Source

Based on Invest NI sector information.

Stakeholders, Third Party & Partner Organisations



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