

NEXSYS: ROAD TO EXCELLENCE – 9 NOVEMBER



UK MANUFACTURING

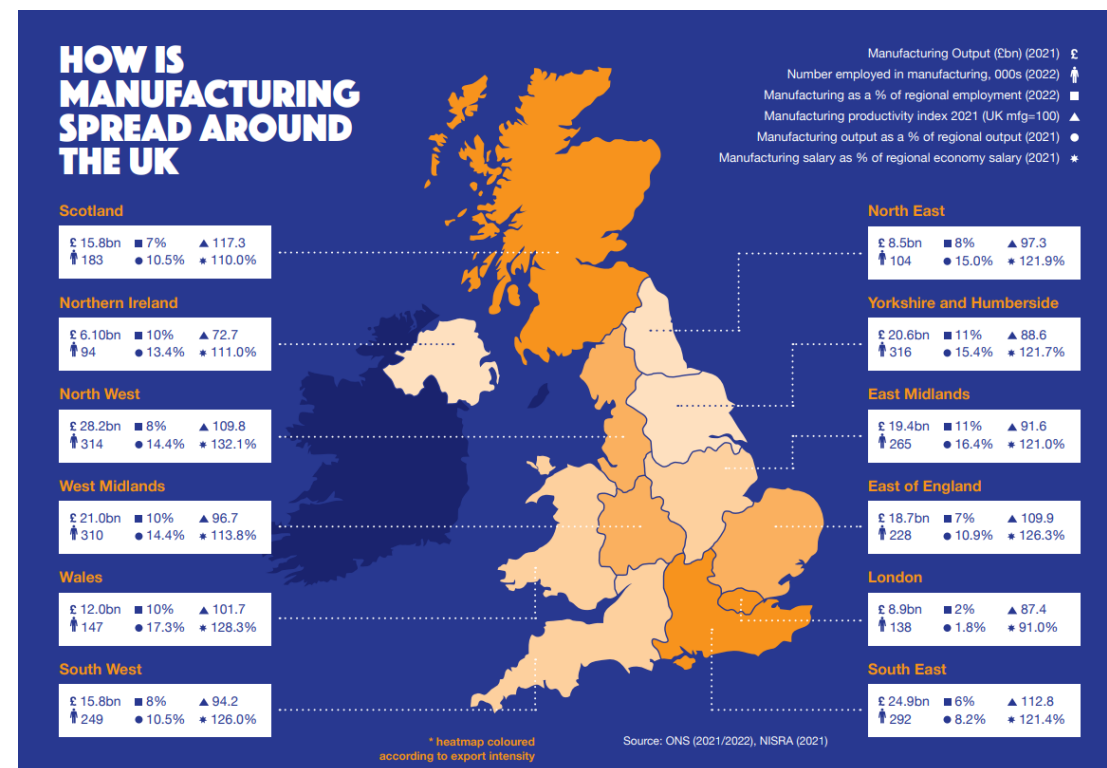
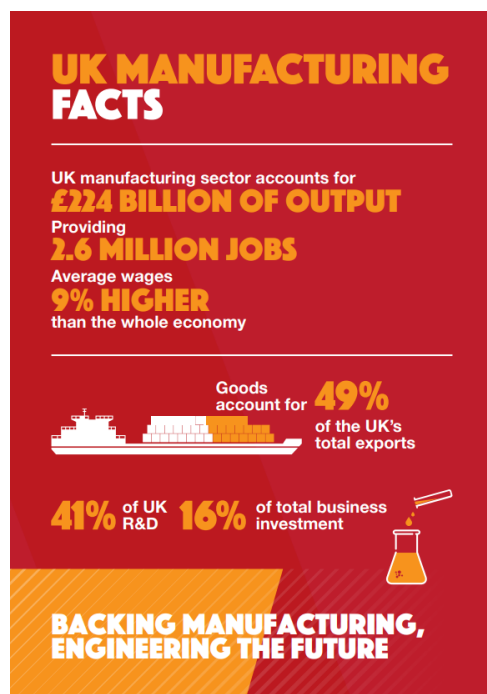
NexSys
Road to Excellence
9 November 2023



THE IMPORTANCE OF UK MANUFACTURING

UK MANUFACTURING: STATE OF THE SECTOR

MANUFACTURING – THE FACTS

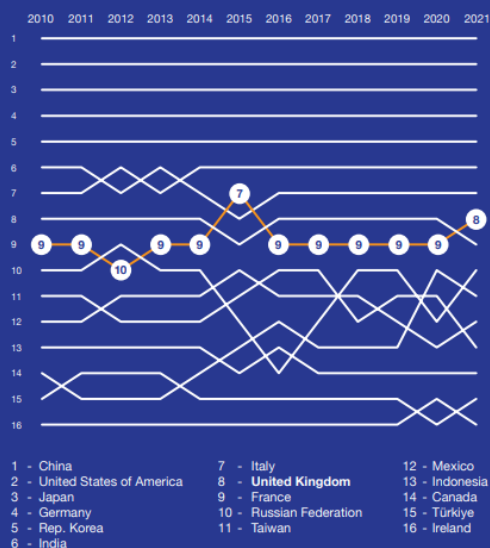


UK MANUFACTURING: STATE OF THE SECTOR

MANUFACTURING – THE FACTS

TOP 10 WORLD RANKING

UK moves up to the 8th largest manufacturing nation in the world



MANUFACTURING JOBS REMAIN BETTER PAID

Mean annual gross pay (£)



Manufacturing
£36,488



Whole economy
(all industries and services)
£33,402



Services
£32,676

Source: ONS - ASHE (2022)

WHAT SUBSECTORS GREW THE MOST IN EXPORT TERMS?

Export value growth 2021-2022

Food and Drink	23.0%
Chemicals and Pharmaceuticals	17.6%
Rubber, plastics and non-metallic minerals	10.0%
Metals	18.1%
Electronics & Electrical equipment	11.9%
Machinery	14.3%
Automotive	11.7%
Aerospace & Other Transport	27.9%

Source: UK Trade Info (2021-2022)

MANUFACTURING SECTORS THAT LEAD ON INVESTMENT

Total investment 2021 (£ billion real terms)

Manufacturing
£34BN

Food and Drink
£4.2BN

Chemicals and
man-made fibres
£3.8BN

Engineering
and vehicles
£13.7BN

Metals
£2.9BN

Other manufacturing*
£5.2BN

Source: ONS (2022)
*The sum of all sectors not included in the above

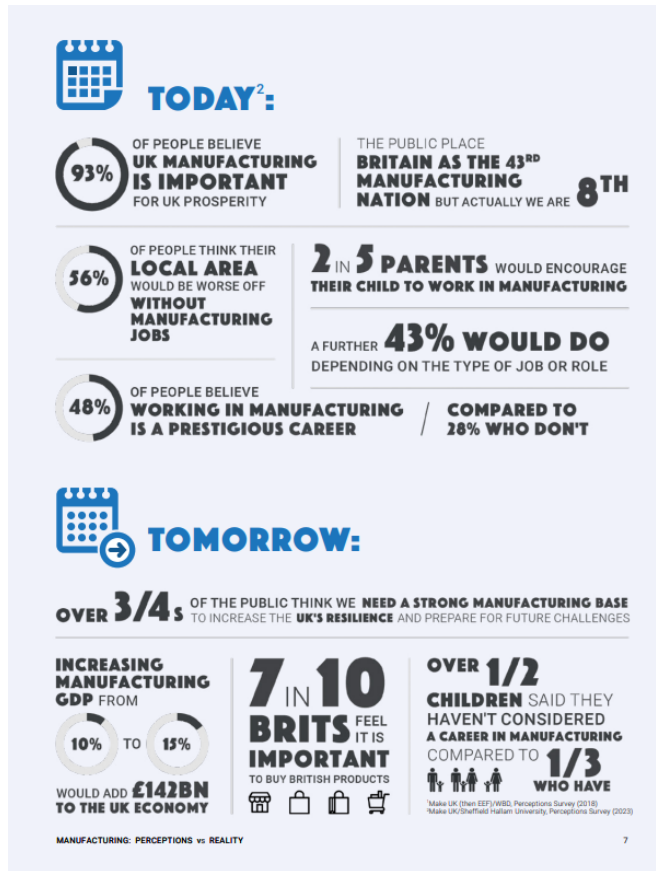
HOW THE UK COMPARES WITH OTHER COUNTRIES?

- UK 14th for export of goods
2.1% share of total merchandise exports
- UK 8th for import of goods
3.1% share of total merchandise imports
- UK 2nd for service trade
6.9% share of total services exports
- UK 6th for GDP 3.1trn US\$
- UK 31st for GDP per capita
45,850 US\$, current prices

Source: WTO (2022), World Bank (2022), WITS Database (2022)

UK MANUFACTURING: STATE OF THE SECTOR

THE PUBLIC CARE TOO



Although the public don't see the UK as a top 10 manufacturing nation

Five years ago, the public guessed the UK was 56th in the world, the position that was occupied by Kazakhstan.

We asked the question again this year and while the public have answered a bit more accurately, on average they assumed the UK is 43rd in the world, which in fact is the position held by the UAE.

2018:



The public put the UK in 56th place which was **Kazakhstan**

2023:



The public put the UK in 43rd place which is the **UAE**

Since 2018, manufacturing has moved up in the world rankings, climbing from the 9th manufacturing nation in the world to 8th today.



1. CHINA



2. USA



3. JAPAN



4. GERMANY



5. REP. KOREA



6. INDIA



7. ITALY



8. UNITED KINGDOM



9. FRANCE



10. RUSSIAN FEDERATION

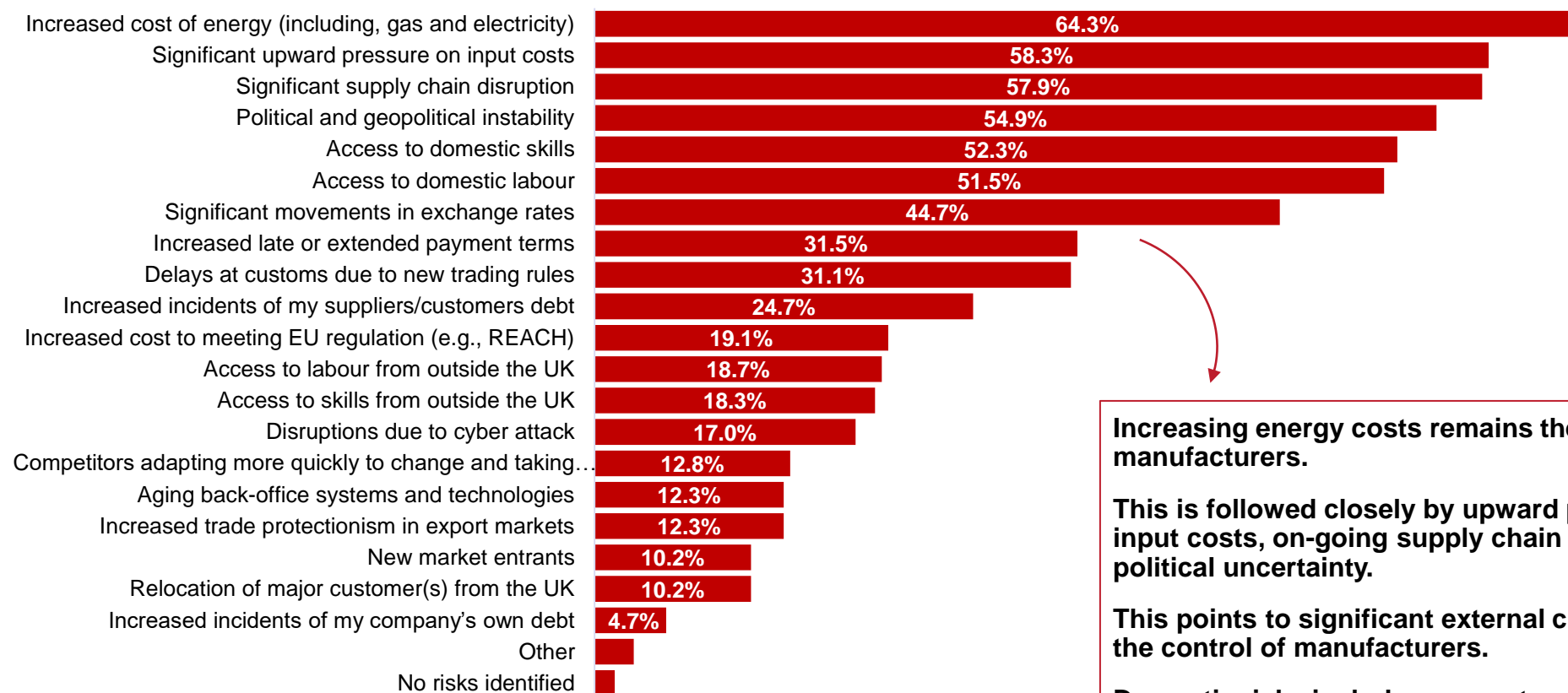
WHERE WE ARE TODAY

- Output and total orders turn flat, negatively bucking last quarter's expectation
- UK and export orders fall in tandem yet expectations for next quarter remain up
- Prices see significant cooling, margins still just in limbo
- Labour growth ceases, investment grows slightly
- Confidence steady and positive, small signs of divergence
- Manufacturing output growth for 2023 forecast 0.8%, and 0.1% for 2024

RISKS AND CHALLENGES FOR UK MANUFACTURERS

RISKS AND CHALLENGES

BIGGEST RISKS IDENTIFIED



Increasing energy costs remains the biggest risk to manufacturers.

This is followed closely by upward pressure from input costs, on-going supply chain disruption and political uncertainty.

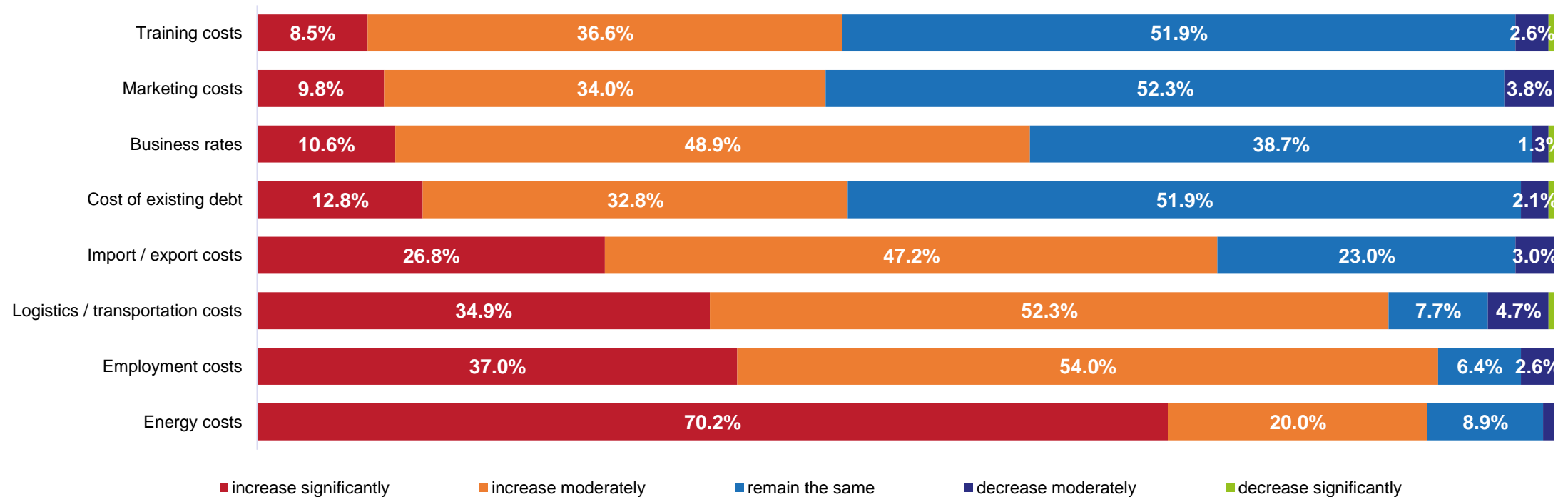
This points to significant external challenges, out of the control of manufacturers.

Domestic risks include, access to skills and labour.

RISKS AND CHALLENGES

COST OF DOING BIZ RISING IN 2023

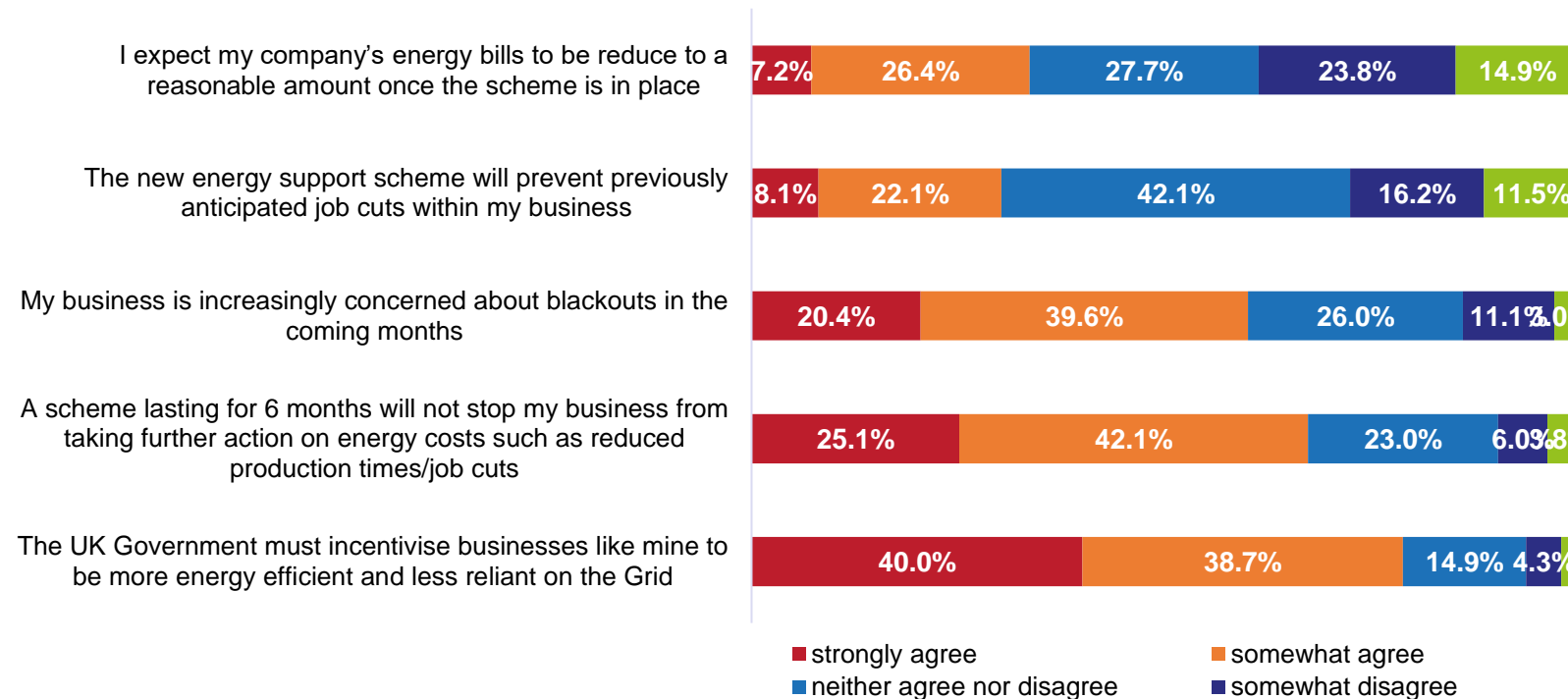
Energy costs dominate as the main factor in rising costs expected next year, followed by employment costs.



RISKS AND CHALLENGES

FOCUS ON ENERGY EFFICIENCY

Manufacturers are calling for greater incentives to become energy efficiency as the primary way to reduce costs.



Action taken by manufacturers to mitigate rising energy costs:

- 54% of manufacturers are adjusting business practices to reduce consumption.
- 53% are passing on the energy costs via products.
- Almost 4 in 10 planning on-site generation.

BEST PRACTICE EXAMPLES

The company:

Photocentric, the UK based inventor of LCD-based 3D printing and materials manufacturer is building on its vision of enabling custom mass manufacture with its innovative additive manufacturing technologies. Their client Phone Skope, a US-based manufacturer that makes precision engineered adaptors for smartphones.

Challenge:

The fast-moving nature of the market requires its products to be compatible with a huge number of new phone models released every year. To create a compatible adaptor for a particular phone, a mould would have to be created for each new case. As well as the time and cost involved in creating this mould there was always a chance that the phone itself may not be a commercial success. This inflexibility meant that Phone Skope had to choose which phone models to support, creating a significant risk for the business if those phone models were not a commercial success. A limited number of models also reduced Phone Skope's growth potential.

Solution:

Incorporating an LCD 3D printer allowed thousands of dollars in equipment costs to be saved on creating a mould as well as huge savings on the product development time - slashed from two months to just two weeks.

Key outcomes:

- ✓ Product development time slashed from two months to two weeks
- ✓ Business investment de-risked
- ✓ New markets
- ✓ Greater profitability

The company:

Agemaspark Ltd is a precision engineering company that serves industries including aerospace, Oil & Gas, and the food sectors. It assists many businesses to solve their engineering problems to produce many individual components for a wide range of sectors.

Challenge:

Conventional mould tool making has limitations, meaning the moulds are being designed larger and larger so they can take more impressions to increase numbers of components and keep up with demand. As a result, the moulding machines are being supplied as large operational units taking up significant factory space and requiring high energy for operation. Investing in new and pioneering 3D metal printing technique is resulting in major reductions in cycle times for multi-impression mould tools.

The current cooling channels are straight drilled and cause lengthy and uneven cooling, which often results in the formation of hot spots and high scrap rates. Conformal cooling works by creating a suitable cooling channel at a well-defined distance from the cavity—which is impossible using a conventional drilled cooling mechanism—thereby reaching areas where it is difficult to do so using conventional methods. The temperature sensors embedded on each cavity will enable effective control of the cooling.

Solution:

Agemaspark sought overcome these barriers by developing a highly efficient advanced manufacturing process for the production of laser sintered mould tools with a novel ceramic coating. The mould tools will make use of the breakthrough process utilising conformal cooling channels embedded with temperature control sensors enabling localised temperature control. This will overcome inherent deficiencies in the current plastic caps and closures mould tooling technology. The company has now completed extensive trials on conformal cooling of multi-impression plastic injection mould tools and is working with companies across Yorkshire using the technique to produce their components helping its customer to comply with new EU regulations.

Key outcomes:

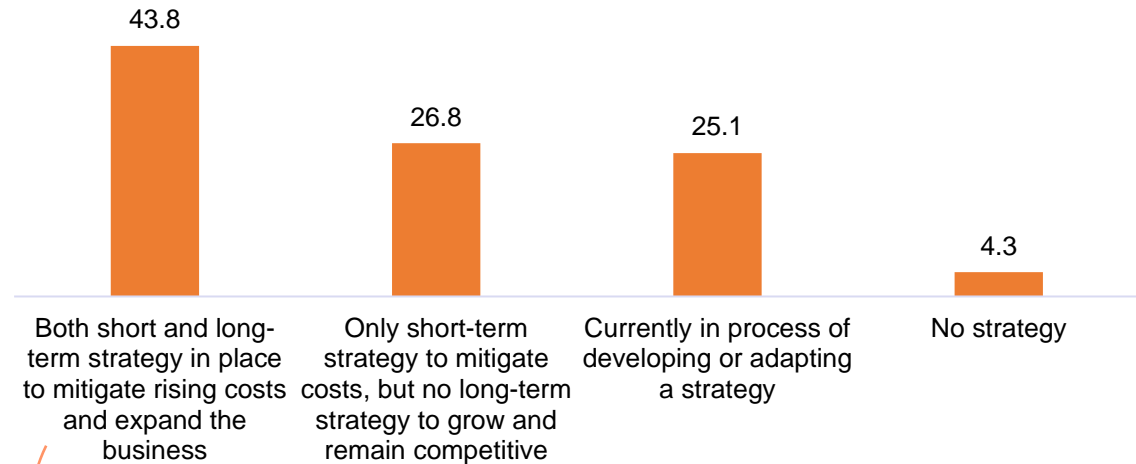
- ✓ Reduction in energy use with increased impressions, Environmental advantages with this method by increasing the impression on the same envelope or reducing the size of the tools and therefore the size of the mould press, reducing energy consumption
- ✓ Huge reduction in cooling water from tens of thousand liters in 24hrs to only 10-20 litres Environmental advantages with this method by increasing the impression on the same envelope or reducing the size of the tools and therefore the size of the mould press, reducing energy consumption.

OPPORTUNITIES FOR UK MANUFACTURERS

OPPORTUNITIES FOR UK MANUFACTURERS

BUSINESS STRATEGY IN PLACE

- 44% of manufacturers currently have a short and long-term business strategy in place to increase competitiveness.
- But our data shows that manufacturers are more worried about the immediate term, hence 27% only have a short-term strategy in place, with a further quarter developing a strategy.
- This suggests that manufacturers are maybe behind planning for what is expected to be a challenging few years ahead. Latest public data shows we are already in a recession, which expected to be shallow but last much longer than the Great Financial Crisis.



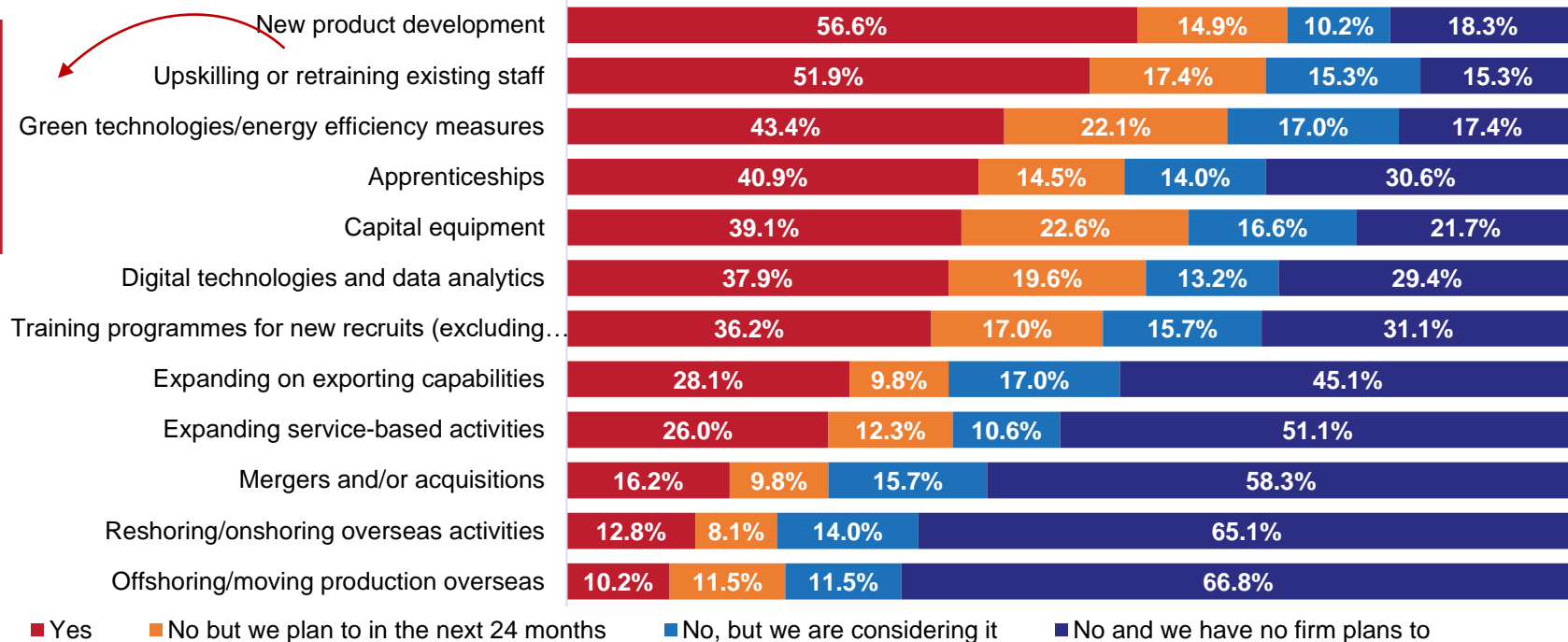
- A very small proportion of manufacturers have actually executed their plans (7.8%), the vast majority (51.2%) have somewhat executed.

OPPORTUNITIES FOR UK MANUFACTURERS

AREAS OF GROWTH

Almost 6 in 10 manufacturers planning to increase investment in new product development as a means to increase competitiveness.

... but also investing in the right people can give you a competitive edge.



Overall focus on **products, people and processes.**

Onshoring is a no longer a strategic priority.

OPPORTUNITIES FOR UK MANUFACTURERS

TRANSITIONING TO NET ZERO

- In 2019, the UK became the first major economy to set a legally binding target to achieve 'net zero by 2050', and manufacturers are rising to the challenge
- 92% of firms see net zero as a priority for their business
- Over two-thirds have already made investments to start their net zero journey and 22% plan to make these investments in the next 12 months
- Six in 10 firms see it as a commercial opportunity for their business
- Almost a quarter (23%) of manufacturers have already invested in digital technologies while 24% have a plan to do so in a bid to decarbonise their business



OPPORTUNITIES FOR UK MANUFACTURERS

BEST PRACTICE EXAMPLES



HYMID CASE STUDY – HOW A TYPICAL MANUFACTURING SME CAN SUCCESSFULLY EMBARK ON AN ENERGY EFFICIENCY JOURNEY

Who are Hymid?

Hymid Multi-Shot Ltd (Hymid) are a well established manufacturing SME based in Torquay, Devon employing 48 staff and are one of the UK's leading product development and manufacturing supply partners of technical single and two-shot plastic injection moulding components to the medical device, instrumentation, consumer and electronics industries.

The challenge

They mould components on energy intensive injection moulding machines under strict production protocols, but their production processes also involve other energy intensive activities including the drying of raw materials (plastic pellets) to remove moisture and prevent microbial contamination during the moulding process, the need to constantly cool water to control the temperature of the mould tools, the use of compressed air for moulding equipment, for lighting and air conditioning to provide a suitable work environment. All these demands make Hymid a relatively energy-hungry business!

Given the need to respond to soaring energy costs and to better manage their environmental footprint, Hymid decided to embark on a major energy efficiency journey, starting with an energy consumption and carbon emissions audit [with Inspired Energy] to help identify how much energy was being consumed and where.

Monitoring energy usage

This initial audit revealed the production facility consumed 90% of its annual electricity in support of operations, of which just over half was processing. Gas use comprised just under 10% of total energy consumption and was used for heating the building. Other significant energy consuming (SEC) equipment were the dryers (9%), cooling (7%), compressed air (6%), air conditioning and lighting (5% each).

Outcomes

Hymid was now able to identify which energy saving opportunities would provide the biggest return or quickest return on their investment, providing a matrix of options from which Hymid have already chosen to implement:

- With the co-operation of their Landlord, Hymid have **re-roofed the production facility**, increasing the amount of natural light available, increasing the levels of insulation and making the roof capable of holding Solar PV. This will reduce the use of artificial light sources, ensure better heat retention and therefore reduce energy bills, and allow the installation of Solar PV when required.
- Within the production facility, the **replacement of fluorescent tube lights with LED lighting** has saved 80% on their running costs, whilst the **replacement of industrial gas heaters with new ultra-efficient ones** in the toolroom has saved 30% on their running costs.
- Older, **less energy efficient injection moulding machines are being prioritised for replacement** with new, more energy efficient machines. **Existing material dryers are also being replaced by more energy efficient driers.** In the interim, existing production orders are being fulfilled on the more energy efficient machines whenever possible.
- The monitoring and collecting of energy, temperature and airflow data has enabled Hymid to reduce energy demands further by **determining the best production patterns to operate.** Work is now being scheduled to avoid using the use of high-energy consuming machines during peak hours.

The future

Amongst the other options identified by the audit, Hymid are also actively considering:

- An **automatic Monitoring & Targeting (aM&T) sub-metering system** would enable Hymid to automatically measure, record and digitally visualise their metered energy data, allowing them to both target improvements and to calculate accurate emissions data 'per product' in order to provide clients with a carbon footprint per unit to support their Scope 3 calculations, rather than having to estimate it. For a £20,000 investment (including technical support) Hymid would save over £8,500/year, or 7.5% of the site's total energy consumption, with a payback of just over 2 years.
- The **installation of solar PV** on their roof. Whilst this comes at a cost of over £100,000 it would save Hymid £27,000/year, or 20% of their total energy bill, with a pay-back time of just over 4 years (assuming Hymid can obtain a connection to the grid in good time).
- Other **low-cost measures**, which needed with no technical support, would enable Hymid to save between 10% and 50% on energy running costs; most having quick pay-back times of less than two years.
- The collection of annual data will also permit the **negotiation of a better energy contract** as Hymid will be able to purchase ahead of time with more certainty.

Hymid's experience to date has proven that whilst taking the first step may be daunting, **the benefits of actively engaging with subject matter experts, investing time and energy to understand where and why your business actually consumes energy, are essential pre-requisites to becoming more energy efficient.** Even the simple step of routinely collecting data on a spreadsheet is better than nothing, so Hymid would encourage every manufacturing SME to start this journey!

OPPORTUNITIES FOR UK MANUFACTURERS

ACCELERATING DIGITALISATION

- With generative AI firmly marking the advent of the fourth industrial revolution, manufacturers are making the most of opportunities to increase productivity through digitalisation
- 67% of manufacturers have invested in automation, with 60% citing an increase in productivity as the main benefit of investment
- Manufacturers are also investing in Industrial Digital Technologies, such as Additive Manufacturing (3-D printing), which is estimated to increase UK output by £3.5bn and contribute to more than 60,000 jobs by 2025



OPPORTUNITIES FOR UK MANUFACTURERS

BEST PRACTICE EXAMPLES

CASE STUDY



Artificial Intelligence to aid predictive maintenance. Senseye is a software provider for Predictive Maintenance from Southampton.

Nissan, Senseye's client, manufactures vehicles in 20 countries and areas, around the world. Its global vehicle production volume exceeded 5.6 million in 2016, with products and services provided in more than 160 countries. With an abundance of data and insufficient skilled resources to perform analysis, Nissan were keen to expand the benefits of using data to influence maintenance. It decided to embark on a condition-based maintenance programme to reduce production downtime by up to 50% across thousands of diverse assets. It was attracted to Senseye by its strong prognostics offering underpinned by machine learning.

Senseye is providing predictive maintenance capability across multiple Nissan global production sites where models such as the Qashqai, X-Trail, Leaf and Infiniti are produced. Over 10,000 connected assets including robots, conveyors, drop lifters, pumps, motors and press/stamping machines are remotely monitored using Senseye's proprietary machine learning algorithms. More than 450 maintenance users actively use Senseye to optimize maintenance activities and make repairs months before predicted machine failure.

- **MULTI-MILLION DOLLARS OF UNPLANNED DOWNTIME SAVED TO DATE**
- **RAPID RETURN ON INVESTMENT OF LESS THAN 3 MONTHS**
- **2 WEEKS TO 6 MONTHS ADVANCE WARNING OF ASSET FAILURE**
- **YEAR-ON-YEAR OEE IMPROVEMENTS**