



XAAR

Group

XAAR
Aquinox

Welcome to our 2022 Annual Report



**A world where you
can print anything
you can imagine**

About us

We are a world leader in the development of digital inkjet technology. We design and manufacture printheads which we sell globally to Original Equipment Manufacturers (OEMs) and User Developer Integrators (UDIs).

Our technology drives the conversion of analogue printing and manufacturing methods to digital inkjet, which is more efficient, more economical and more productive than the traditional methods it replaces.

In addition to printheads (Xaar), we develop print systems for product decoration (EPS) which use our inkjet technology, as well as fluid management systems (Megnajet) which are robust, reliable, easy to integrate. We also produce high performance digital imaging technology (FFEI) for two main applications – inkjet printing and digital pathology.

We put innovation and collaboration at the core of our global partnerships, helping our customers to unleash the true power of our technologies and open up a world of opportunities for their business, today and into the future.

Sustainability at the heart of our business

We are investing for sustainability and long-term growth



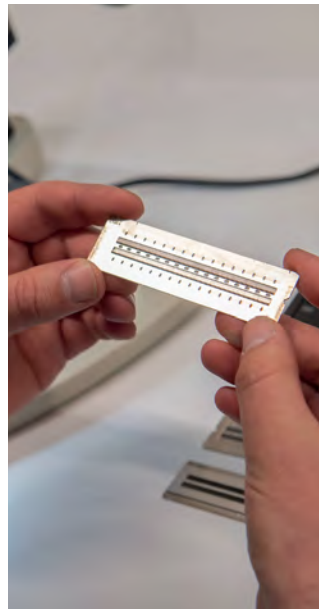
+ Environment

Leading the way in environmental sustainability for the industrial inkjet technology sector.



+ People

Be employer of choice by putting our people, their potential and wellbeing at the heart of all we do.



+ Innovation

Encouraging more sustainable approaches to design, manufacture, technology and collaboration across the whole product lifecycle.



+ Community

Actively engaging with our communities to provide practical, effective, lasting support that benefits society.

What's new?

New acquisitions

In March, Xaar completed the acquisition of Megnajet, one of the market leaders in the design and manufacture of industrial fluid management systems for digital inkjet.

New products

In November, we launched our revolutionary printhead – the Xaar Aquinox – delivering exceptional reliability, creativity, and sustainability for printing aqueous fluids.

New technology

We also launched aQ Power Technology which provides a radically new approach to how water-based fluids are jetted reliably, delivering a truly transformational industrial printhead.

Our business units

Printhead

Xaar

Our Printhead business unit focuses on the design, manufacture, marketing and sales of printheads and associated products which are used in a variety of applications such as Ceramic Tile Decoration, Graphics, Décor, Textiles, Labels and Packaging as well as 3D Printing and Additive Manufacturing.

Highlights

- Xaar Aquinox launched successfully with excellent customer response
- New technology centre opened in Sweden; new inkjet printing lab in China

 [Read more about Printhead on page 20](#)

Fluid Management Systems

Megnajet

Fluid management systems specialist Megnajet provides robust, reliable, easy to integrate products so that OEMs can get to market quickly with reduced development costs.

Highlights

- Integration into the Group completed successfully
- First phase of site improvements completed

 [Read more about Megnajet on page 23](#)

Digital Imaging

FFEI

Our digital imaging company, FFEI Ltd, focuses on high performance digital imaging solutions – from digital inkjet label presses to digital pathology scanners.

Highlights

- Growth in demand for printbars for label embellishments
- Life Sciences Microscan and Sierra showing strong demand

 [Read more about FFEI on page 24](#)

Product Print Systems

EPS

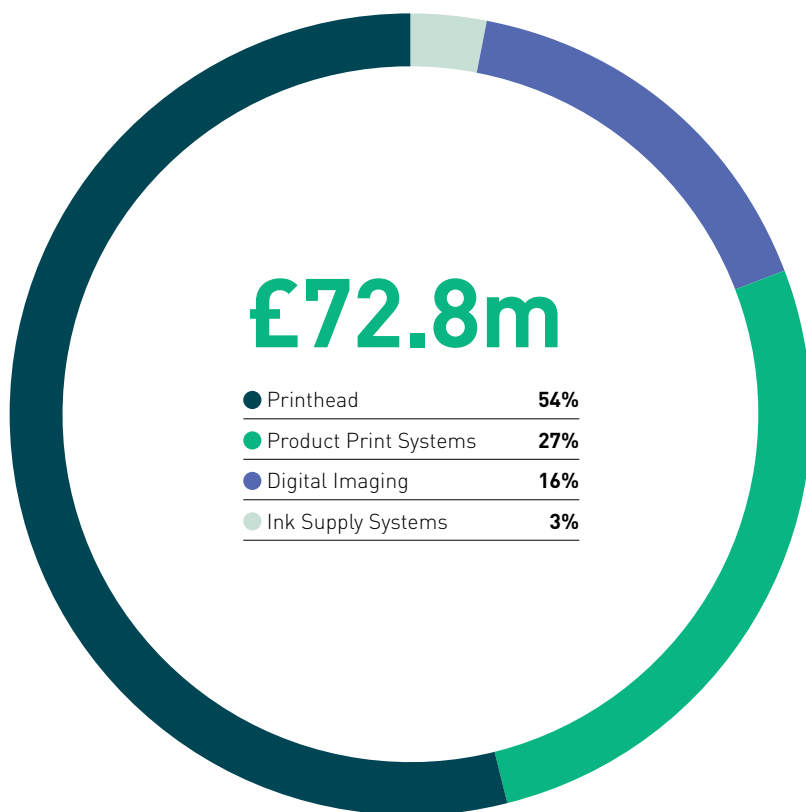
Product Print involves printing all kinds of industrial and promotional objects such as medical equipment, automotive parts, tools, apparel, appliances, sports equipment and toys. Xaar company EPS manufactures and sells a range of highly customised print systems for these applications, including some using Xaar's inkjet printheads.

Highlights

- New and strong leadership
- Excellent growth in sales

 [Read more about EPS on page 25](#)

Our performance



Revenue – continuing operations

£72.8m

2022	£72.8m
2021	£59.3m

Achieved through both strong organic growth and new acquisitions

Gross margin – continuing operations

39%

2022	39%
2021	34%

Increased from 34% in 2021, benefiting from operational leverage in the business

R&D spend

£6.7m

2022	£6.7m
2021	£5.7m

By continuing operations of £6.7 million, up £1.0 million on 2021 with investment focused on the ImagineX platform and product roadmap

Net cash (outflow)/inflow

(£16.5m)

2022	(£16.5m)
2021	£5.0m

Current year includes £5.3 million outflows for business acquisitions and 2021 benefited from £9.3 million of inflows from the sale of subsidiaries.

Refer cash flow statement on page 120

Cash & Treasury Deposits

£8.5m

2022	£8.5m
2021	£25.1m

Strong closing balance sheet with net cash including benefit of invoice discounting facility of £0.4 million (2021: nil)

Strategic Report

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Our progress in 2022

Our business strategy for Xaar plc is to sell more printheads – by extending our range of products to access all digital print markets, and by making it easier for customers to use our printheads by supplying the supporting systems components.

To ensure we are successful we carefully manage how we invest resources in the business and take a proactive approach to handling external challenges.

Extending our product range

In March we launched the Xaar Versatex print engine which provides users who have limited inkjet experience with the ability to fast track the digital inkjet development and integration process, allowing a speedy, cost effective and agile way for manufacturers to explore new potential applications.

The product is manufactured by FFEI and sold under the Xaar brand. Also launched in March was the Xaar Nitrox Elite GS3 printhead, a small drop variant delivering improved print uniformity and drop placement, creating high-definition image resolutions for smoother skin tones, gradients and colours. This product was produced for OEMs developing print systems for label and graphic applications, and also functional fluid applications, such as PCB printing.

The acquisition of Megnajet, also in March, has given Xaar easy access to a much wider range of fluid management systems which make it easier for OEMs and UDLs to adopt Xaar as a long-term development partner.

During the second half of 2022 customer feedback guided the development of the Roadmap for the Versatex print engine to ensure that we develop and manufacture according to customer requirements. In October we released an updated inkjet development kit which included new components (such as bracketry) which make it easier to use for first time developers.

In November, we launched the most significant new printhead for around 20 years – the Xaar Aquinox. The Aquinox is the latest development from Xaar's ImagineX platform, with revolutionary aQ Power Technology which provides a radically new approach to how water-based fluids are jetted reliably, delivering a truly transformational industrial printhead.

 **See page 10 for a full overview**

With its unique technologies, exceptional print speeds, a high native resolution of 720dpi and compatibility with multiple aqueous fluid types, the Aquinox is a versatile printhead, which is ideal for printing textiles, highly absorbent substrates, or thick film coatings. In addition, thanks to Xaar's Ultra High Viscosity Technology the Aquinox is capable of jetting fluid viscosities of up to 100cP. By enabling a wider colour gamut and fluids with larger particles and more pigment for higher opacity, colours are more vibrant and whites and blacks stronger, ensuring the Xaar Aquinox can bring the latest imaginative designs and finishes to life.

In November, in Shenzhen, China, Xaar opened a state-of-the-art inkjet printing laboratory, comprising the latest printhead test equipment and print process experimentation platforms. Utilising Xaar's printheads, fluids and fluid management systems, the new lab focuses on providing our customers and partners in China, including scientific research institutions, with a variety of services such as sample printing, application development, printhead nozzle status detection and waveform adjustments for new applications. The lab also provides a way to showcase applications and provide technical consultations to drive a greater use of inkjet technologies. Sectors supported include ceramics, glass, PCB, textiles, 3D printing, packaging and labels. A key priority is to provide support to our customers in China, helping them to develop more targeted application solutions and achieve faster innovation cycles, all whilst reducing their R&D investment.

New markets and customers

The new products launched during 2022 open up a number of new markets for Xaar's printhead business including textile printing and packaging, and have broadened our opportunities in existing markets such as ceramics, where there are new opportunities to explore such as printing glazes.

We have also been working with customers in PCB markets (legend printing in particular, with an opportunity to explore solder mask printing in the future) and our Ultra High Viscosity Technology gives us advantages for 3D printing which are of interest to new OEMs in China.

 **See pages 12 to 15 for more information**

In addition, we have added 91 new customers this year across a broad range of applications, most of whom are in early stages of development, with five launching new machines this year.

Printbars manufactured at FFEI, which use Xaar 2002 printheads, delivered growth in the labels embellishment market in Italy.



Reshaping R&D

The acquisition of Megnajet (2022) and FFEI (2021) presented an opportunity to review our inkjet R&D capabilities across the Group. With a rich new product and technology roadmap, ensuring that our inkjet Group R&D operates at high output in an efficient and innovative manner is key. The consequent reshaping has delivered a new Group R&D structure of Technology, Print Head and Print Systems. R&D within the FFEI Life Science business unit remains important to us, as does the R&D team within the EPS business unit.



By enabling the sharing of R&D best practice and technologies across the Group, our team will continue to develop best-in-class printheads and systems to meet our customers' needs for today and tomorrow.

Focused investment in the business

We have invested in our senior leadership team to strengthen our capabilities and drive strategy in Operations, HR and R&D and the team has a proactive focus on delivering on our profit goals which drives decision making across the Group.

During the year we invested £10.0 million in inventory for the Printhead business to successfully secure materials to meet 2022 production requirements and to increase our holding of finished goods. This enabled us to deliver on customer demands throughout 2022 and also into 2023. We believe we are winning business through a competitive advantage of offering shorter lead times than our competition. We have taken further proactive actions to adapt product designs to accommodate alternative components, increasing our resilience to supply chain constraints.

We have continued to actively manage costs and take appropriate action in response to the significant cost inflation that is prevalent globally. Our electricity unit costs are fixed into H2 2023 and we have invested in raw materials to further mitigate against rising costs. Where possible we have passed cost increases on to our customers through increased sales prices.

Substantial time has been spent planning for the upgrade of our Huntingdon facility which started in January 2023, now reopened and involves a significant modernisation of our manufacturing capabilities. Benefits will be much improved efficiency, yields and reduced product costs in the longer term.

The investment in working capital we have made ensured we are able to meet fully all customer demands whilst the factory was closed for the work to be carried out.

With the launch of our Sustainability Roadmap in March, Xaar has committed to achieving some key sustainability goals which will determine the focus of our investment in the business over the coming years. The Roadmap was covered in the 2021 Annual Report and Accounts, and can be found here:

ESG
Xaar plc Annual Report and Accounts 2021



With one pillar of our Roadmap centred on 'Community', we announced our charity partnership with Break in the UK and Manchester Machines in the US. See ESG update on pages 30 to 41. To drive the fundraising for our chosen charities, we put in place a cross functional team of charity champions who have volunteered to create and drive our fundraising activities, working in close partnership with charities. To date, in the last nine months the UK business has raised almost £11,539. The Company will match the funds raised by Xaar UK employees. In the US, Xaar company EPS has donated \$2,500 to a 4-H club that competes in a robotics competition. We provide additional support such as engineering, project reviews and internships for older students. EPS also recently started donating food to the local community food cupboard.



Chairman's introduction

Strong performance and good momentum



Strategic and operational highlights

- + Customer engagement accelerated due to expanded vertically integrated product range
- + Phase 1 of operational efficiency programme with factory re-organisation completed on time and on budget
- + Ongoing delivery of product roadmap with successful Aquinox product launch
- + Investment in working capital has allowed Xaar to successfully mitigate supply chain constraints and deliver on customer demand
- + Further operational progress made in Engineered Printing Solutions (EPS), delivering strong revenue growth
- + Expanding business capability and vertically integrated product offering: acquisition of Megnajet and successfully completed FFEI integration
- + Sustainability Roadmap embedded in business with clear strategy to reach 'net zero' by 2030

Into my third year as Chairman, I am delighted with the progress that the business has made, operationally, commercially, and strategically.

We are well positioned in growing markets, with a high quality leadership team, strong R&D and manufacturing capabilities, and with technology that differentiates us from our competitors. In addition, strong capital discipline is enabling continued investment in growth opportunities.

Our central focus remains on our core competence of designing and manufacturing world leading printheads. The continued rebuilding and strengthening across all areas of our business has resulted in a platform from which we can deliver reliable business performance and meet the requirements of our customers.

We also have a clear focus on the value chain, placing our customers at the centre of our business. We offer integrated solutions in a wide number of market sectors, enabling more consistent financial performance. The technical and competitive advantages of the Xaar Bulk piezo product range has progressed well with the launch of our latest printhead, Aquinox. This product opens new markets to Xaar with its water-based capability, and we were pleased to see the product launched to plan and on time, reaffirming the expertise and focus we have across different teams in the Group.

The Board is delighted with the progress that the management team has made in re-energising the business and would also like to thank our teams and partners worldwide for their commitment and adaptability.

Continued strategic progress

This year's strong trading performance has been driven by all elements of the business and momentum continues to build. A clear strategy is now embedded across the Group with a focus on customer needs and a drive to highlight the benefits delivered by adoption of Xaar digital print technology.

This focus, along with our well-defined product roadmap, has increased the quality and responsiveness of the business, and meaning we are well placed for further performance improvements. We believe a significant opportunity exists in market sectors and applications where Xaar technology provides commercial and technical performance advantages.

Operational improvements have also been made. We have previously discussed investing in our manufacturing facilities to improve efficiency and lower costs, and the first phase of this programme has now been completed. The Huntingdon factory reorganisation was completed in early 2023 on time and on budget. This will enable us to operate more efficiently, increase capacity and crucially generates significant cost savings, especially in reducing our energy consumption.

The acquisitions of FFEI and Megnajet have been successfully integrated, adding capability and broadening our product range. This has increased our market opportunity and means Xaar is better placed to support customers with the integration of our printhead technology.

Our product print systems business, EPS, has had an excellent year, with increased customer engagement leading to significant revenue growth, higher gross margins and strong profitability.

Strong financial results

In what has proven to be another challenging year for the global economy, the Group delivered strong sales growth of 23% (8% organic) and achieved profitability for the year. We have taken actions to build organisational strength and resilience, while focusing on cost control and careful cash management.

Additionally, there has been investment to increase efficiency and ensure consistency of operational performance. This will mean the business is well placed to further deliver on the significant opportunities ahead as external pressures ease.

As has been the case for many businesses, over the past year we have been faced with unprecedented supply chain issues coupled with rising global inflation. Through taking proactive measures with a focus on managing our supply chain, investing in both raw materials and higher levels of finished goods, we have been continually strengthening our business resilience and maintaining uninterrupted supply to our customers.

The Printhead business made good progress both commercially and operationally during the year despite the ongoing impact of COVID-19 related restrictions in China. Whilst sales volumes have grown in the USA and remained stable in EMEA, they declined significantly in Asia. The Printhead business has nevertheless performed well and responded to these difficulties in a proactive and controlled manner.

As I discussed in my report last year, following challenges in market demand and performance, a new management team was appointed in EPS. This has led to a recovery in performance during 2022 with a strong order book profile and excellent results. Revenue grew 41% (24% in local currency USD), gross margin is back at pre-pandemic levels and a full year profit delivered.

We are pleased with the progress made at FFEI and Megnaget. Having only joined the Group in July 2021 and March 2022 respectively, the integration of each business has been completed, and performance is in line with our expectations.

Cash of £8.5 million and a robust balance sheet provide a platform for further investment. This is after investment in working capital movements of £12.2 million as we managed supply chain constraints and ensured continued customer supply throughout the factory shutdown in Q1 2023.

The Board has not declared a dividend in 2022. We continue to believe that prioritising cash for investment in the business will deliver more compelling returns for shareholders in the medium term.

Committed to sustainability

We have made significant progress on ESG and the Group's Sustainability Roadmap. The Board remains committed to the business being carbon net zero by 2030. The Sustainability Roadmap demonstrates clear industry leadership and establishes a firm pathway for a more sustainable future. Decarbonisation remains a key objective and we have started work on Scope 3 and TCFD Climate Modelling for all Xaar Group sites which will be completed by early 2023.

We are passionate about delivering solutions and products for our customers that are cleaner and healthier. Our products are well placed to deliver significant benefits environmentally for our customers through greater efficiency in power consumption and reduction in water usage.

The continued rebuilding and strengthening across all areas of the business has generated a strong platform for reliable business performance.

Andrew Herbert
Chairman

We also seek to have a wider positive impact on society by understanding and prioritising employee needs, doing business responsibly, and reaching out to our local communities. The majority of our sites in the UK have moved to 100% renewable energy. We aim to switch all contracts in the UK to renewable electricity by the end of 2023. All printhead product packaging is fully recyclable. Our Apprentice Programme is well developed across the business, and we continue to support activities promoting STEM (Science, Technology, Engineering and Maths) subjects amongst young people as well as several sponsorship programmes supporting young university students and industry placements.

Driven by our people

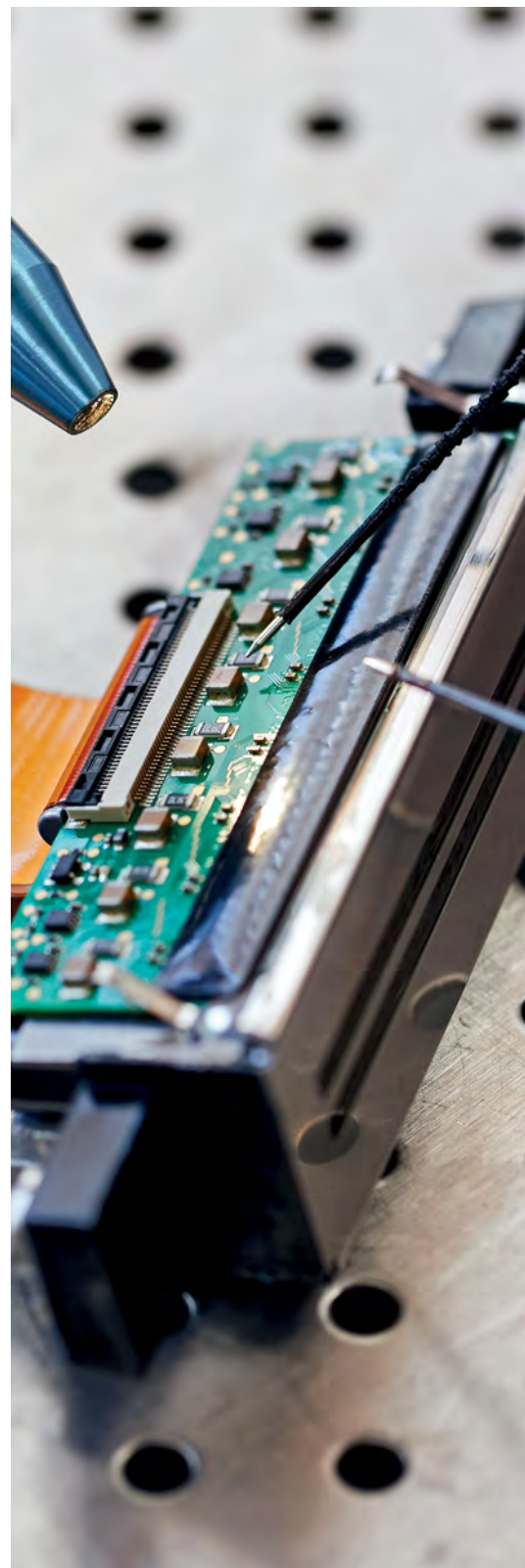
The Board is delighted with the progress made by the Group this year, in the context of a volatile external environment for both businesses and individuals. I would like to thank all our employees who have worked tirelessly to innovate, deliver for our customers, and inspire and support each other with passion and integrity. Xaar is a great company, and I am excited about what we can achieve in the future.

Outlook

With strong foundations in place as a result of the progress in our strategy over the last three years, the Board is optimistic about the opportunities that lie ahead for the Group and for all our stakeholders including employees, customers, and shareholders.



Andrew Herbert
Chairman
27 March 2023



Why invest

1 Market opportunity

We focus on markets where we have a competitive advantage, where we can offer a number of benefits over incumbent technologies.

- A unique recirculation technology past the back of the nozzle as well as inside the nozzles which offers substantially better printhead reliability and nozzle open time
- Patented technology which enables printing fluids which have a high pigment content and high viscosity. This gives us a wider window of opportunity because we can handle a wider range of fluids to deliver richer, more vibrant colours, or add functionality like scratch resistant or anti-slip surfaces, or value add embellishments and print effects
- An open internal printhead design which produces industrial levels of printhead reliability and consequently higher production uptime.

Sectors where we focus include Ceramics and Glass, Coding and Marking and Direct-to-Shape, 3D and Advanced Manufacturing, Packaging and Textiles, as well as Graphics and Labels.

2 Proven technology and product roadmap with a strong value proposition

We have a product roadmap based on our new generation ImagineX technology platform that will develop our range to offer advantages over the competition and open new markets. Our unique technologies and products are the leading enabler for innovation and creativity, and for driving production efficiencies for many industries.

3 Experienced and focused management team

As the only leading independent printhead manufacturer we are able to have a flexible, collaborative approach. Our experienced management team is committed to remaining customer-centric with a focus on Xaar's profitable growth strategy of offering our customers a vertically integrated solution.

4 A clear strategic vision


Our customer-centric business model places the OEM and UDI at the heart of everything we do. We continue to execute on our plan to become more vertically integrated to drive printhead sales. Our ability to supply electronics, software, fluid management systems and print engines alongside application support, combined with a disruptive technology, sets us apart from our competition.

5 Roadmap to deliver the opportunities

Our ImagineX platform (launched September 2020) is driving our progress, enabling the business to increase its addressable markets whilst establishing market leading products across all our sectors. ImagineX has already delivered significant enhancements to the current portfolio; these include substantially improved speed and throughput as well as high throw distance and viscosities of over 100cP at jetting temperature. We have now launched three new printheads on this platform (Xaar Aquinox, Xaar Nitrox and Xaar Irix). Future product launches focus on increased robustness to improve the life of the printhead and even higher resolutions.

6 Strong balance sheet position

We have the resources necessary to implement our strategy. This provides the platform for security and a great foundation for future growth.



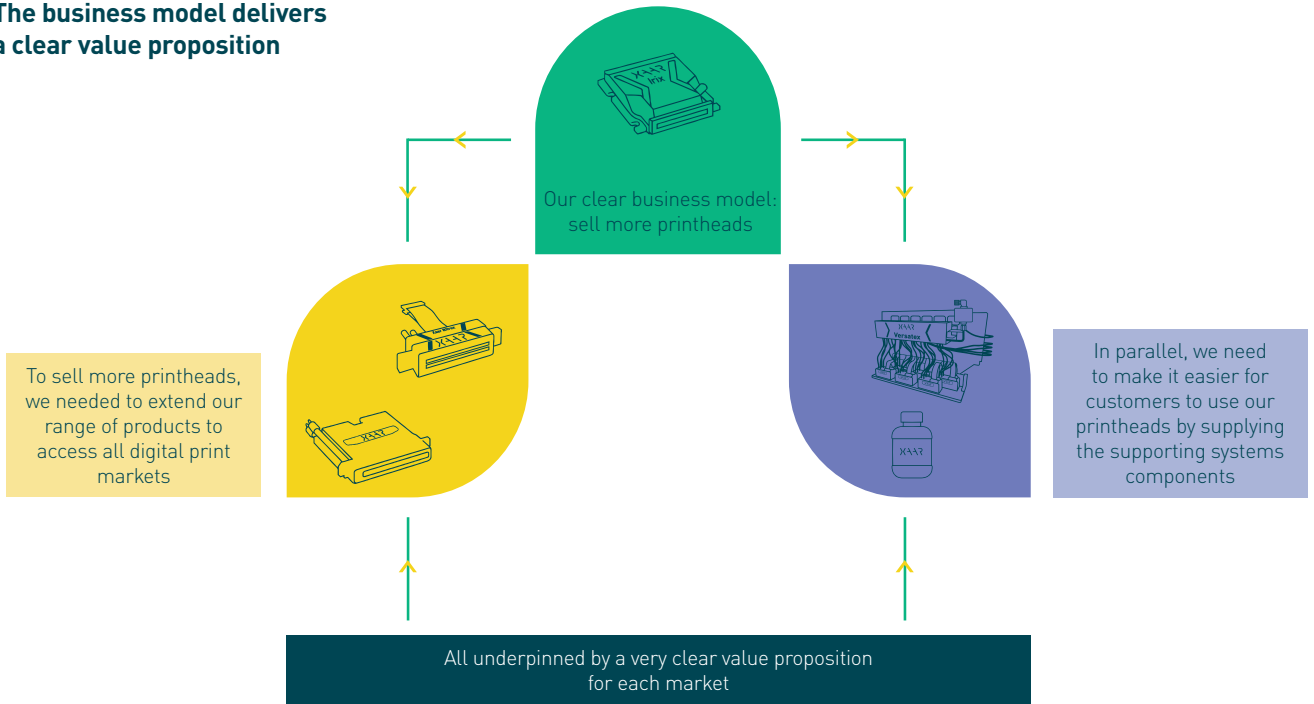
We have great technology, great people and a large market opportunity. We will be successful.

John Mills
CEO

Our strategy is to sell more printheads

For this to occur we need to extend our range of products to access all digital print markets, as well as make it easier for customers to use our printheads by supplying the supporting systems components. To drive this we need to ensure that our customers understand what Xaar has to offer and why it is the right choice for them.

The business model delivers a clear value proposition



Business model and strategy

Xaar's business is focused on inkjet technology, which together with our partners and customers, we have been transforming for over 30 years.

Xaar plc is structured into business units: Xaar Printhead, the largest BU, focuses on printhead technology; our other three business units concentrate on fluid management systems, product print systems and digital imaging.

Our printhead business sells our inkjet technology in component form (the printhead, branded Xaar) to OEMs who produce and sell the complete digital printing solution. We also work with User Developer Integrators (UDIs) who are building their own digital system. We work collaboratively with leading fluid manufacturers to fully optimise the fluids beyond a lab setting to ensure optimum print performance in real world applications. We also sell Xaar branded fluids to UDIs (manufactured by our ink partners) which helps to build a long-term relationship with our customers. In addition, we actively partner with hardware and software integrators as well as substrate suppliers to deliver a robust and attractive total solution to our customers.

In March 2022 we completed the acquisition of Megnajet, market leader in the design and manufacture of industrial fluid management systems for digital inkjet. The company provides robust, reliable, easy to integrate products which are sold to a range of OEMs in USA, Europe and Asia. Our digital imaging company, FFEI Ltd, manufactures high performance digital imaging solutions – from digital inkjet label presses to digital pathology scanners. Its inkjet products (print engines) use Xaar printheads. Our product printing business, EPS, designs and develops complete industrial printing machines which are sold to end users.

Our business model

Xaar designs



We have R&D facilities in Cambridge and Stockholm (printhead business), and Hemel Hempstead (print systems) and Vermont (EPS).

We invest a substantial proportion of our product revenue in R&D to remain a world leader in inkjet technology (2022: approximately 12%).

We continually add to our Intellectual Property (IP) portfolio, and currently, across the Xaar Group, we have around 355 patents and patent applications. Our R&D staff totals 85 which is approx. 20% of the total workforce (at the end of 2022).

Xaar manufactures



Xaar manufactures its printheads in Huntingdon, UK. Xaar's manufacturing is capital intensive.

The Group has invested over £70 million in assets and production facilities in Cambridgeshire, UK since the plant opened in 2007.

EPS, our product printing business, manufactures customised and bespoke printing solutions in Vermont, USA.

FFEI, our digital imaging business, manufactures imaging solutions in Hertfordshire, UK. Megnajet manufactures supply systems in Northamptonshire, UK.

Xaar markets



Xaar offers a wide range of industrial inkjet printheads and print systems which are designed and produced to meet the customer-driven requirements for a range of manufacturing applications.

Primary markets include:

- 3D Printing
- Ceramic Tile Decoration
- Coding & Marking
- Decorative Laminates
- Direct-to-Shape
- Functional Fluid Deposition
- Glass Printing
- Graphics
- Primary Labels
- Packaging
- Product Printing
- Textiles.

Xaar sells



Xaar's printhead business sells direct to OEMs and UDIs around the world through its global sales team. Xaar's highly skilled application engineers offer technical support to assist OEMs and UDIs in the successful design, build, commissioning, and ongoing maintenance of printing systems.

We export over 95% of our printheads to customers around the world, within the Europe, Asia and North America regions.

Xaar company EPS sells product printing equipment, services and consumables. The majority of sales are to US customers.

FFEI sells via three routes to market: as a full system to one OEM, as a ready to integrate print engine via distribution, and as a Xaar branded print engine for our UDI customers. Megnajet sells its products directly to customers and via Xaar.

We create value for all our stakeholders

Customers

OEMs, User Developer Integrators and end users are able to innovate in their manufacturing methods and their products as well as benefit from a shorter distribution chain; they can take products to market more quickly, implement more precise and efficient processes, easily produce short batches, improve productivity, reduce waste and deliver more creativity.

Shareholders

A key goal at Xaar is to maximise the long-term growth in value delivered to shareholders via sustained, consistent growth in earnings per share. This is delivered through continued investment in R&D and producing a pipeline of new products which deliver a sustained return on capital employed.

Our employees

Our success depends on the skills, capability and engagement of our people. We want to create an environment where everyone can come to work and share our values and passion for developing and manufacturing world leading technology.

We are building a culture where our employees are passionate about what they do, and where integrity, innovation, creativity and collaboration are a way of life. To foster this, we have a cross-functional project team which is committed to embedding our values throughout the whole Group, looking at ways to highlight our EPIICC values awards and driving the Company-wide acknowledgement of the nominated employees. During 2022 we had 572 nominations across the Group for our values awards.

To build up team collaboration and provide an opportunity for employees to socialise away from their desks, we regularly provide a coffee van or lunch. In addition, we have continued with forums where employees have the opportunity to meet and chat with all our Non-Executive Directors along with the Exec Xchange where our employees get to meet members of the senior management team in smaller groups to ask questions and exchange ideas.

We like to build long-term relationships with all our employees by helping them grow and develop and by making Xaar businesses interesting places to work as well as great companies to be involved with. Internal promotions are an important part of this, and in 2022 we promoted over 32 people.

Environment

Digital print methods are inherently more environmentally friendly than the analogue techniques we seek to replace. Our research shows that, compared to analogue alternatives, digital has a huge impact in reducing energy consumption (by up to 55%), water consumption (by up to 60%) and CO₂ emissions (by up to 95%), but also in reducing pollution and waste materials. Xaar is committed to reducing its impact on the environment wherever possible. Our actuator technology consumes less energy than competitor alternatives and our industrial printheads can remain in use for many years. In addition, we use a continuous improvement methodology and we have adopted a manufacturing ethos of 'reduce, reuse and recycle'. Environmental best practice and our investment in sustainable manufacturing and operational efficiencies remain key areas of business focus.

Our Sustainability Roadmap, launched in our 2021 Annual Report, continues to drive and shape all business decisions via the ESG Committee. The Roadmap has four key pillars – Environmental, People, Innovation and Community; its purpose is to drive our ESG goals beyond the energy reduction scope to a Group-wide activity. We continue our focus on moving to solar energy. One more of our buildings in Huntingdon will be switched over to green energy in January H1 2023, and our Megnajat facility in Northamptonshire will move over to green energy in September 2023 once the current contract expires. Whilst we have more work to do, over 99% of our UK consumption is already green. We completed the installation of our planned EV infrastructure, with ten new 22 kW chargers installed across the Huntingdon and Waterbeach facilities, joining the 27 kW chargers that were already in place at FFEI. We are planning to undertake a major energy reduction project through January and February 2023 leading to an expected 40% reduction in electrical energy consumed in the Huntingdon manufacturing facility from the end of Q1 2023. This includes the installation of LED lighting. Planning for solar installation continues for the Huntingdon factory and our goal is for installation to start end of Q3 2023, assuming successful contractual discussions.

Digital printing compared to analogue reduces consumption by up to:

CO₂ emissions

95%

Energy consumption

55%

Water consumption

60%

Source: Xaar.

A radically new approach for jetting water-based fluids reliably

In November we launched our new and revolutionary industrial aqueous compatible printhead, the Xaar Aquinox. Built on our ImagineX platform, this printhead has been developed to respond to market requirements for a truly reliable, robust printhead that can print a much wider range of inks including high viscosity and high pigment loading.

This is our first printhead to feature our new, patented aQ Power Technology to deliver enhanced reliability when printing with water-based inks. aQ Power is a combination of technologies, which work together to increase lifespan and durability:

- an updated internal printhead architecture
- a new advanced material set
- a novel technique for ejecting the ink droplets.

The Xaar Aquinox offers a radically new approach to how water-based inks are jetted. It also incorporates our industry-leading TF Technology fluid recirculation and Ultra High Viscosity capability. This means that Aquinox can reliably jet inks at viscosities at ten times more than a typical printhead allows.

Fluids of up to 100cP at jetting temperature can be reliably jetted therefore overcoming current constraints on ink formulations, so our customers can develop and print with the ink they want.

Xaar Aquinox

Markets

The Xaar Aquinox and our Ultra High Viscosity Technology is of interest to OEMs developing machines for a broad range of applications, which include:

Textiles

- Being able to jet high pigment loaded inks with high viscosities means water usage, energy consumption and CO₂ emissions can be reduced
- These benefits, combined with the long-life span of the printhead, increase the efficiency of end user businesses while delivering a more sustainable solution at a lower total cost of ownership.

Packaging

- The Xaar Aquinox enables a new generation of inks that achieve the required colour saturation with less fluid, allowing increased print speeds
- Xaar's Ultra High Viscosity Technology opens new possibilities for ink formulation, improving adhesion, reducing drying time and energy consumption whilst controlling dot spread on even the most challenging of substrates.

Ceramics

- Aquinox supports printing aqueous glaze as well as colour, providing the opportunity for a truly digital end to end aqueous solution.

Across many markets we see Aquinox and our Ultra High Viscosity Technology breaking new ground, enabling new applications that were previously not possible with inkjet.



X442
Aquinox

Marketplace

Xaar's digital inkjet technologies are transforming print processes in a wide range of markets.

Industrial markets

Ceramic Tile Decoration

The majority of the tile decoration market uses digital inkjet technology because, compared to traditional analogue techniques, it is superior in terms of image quality and is lower in cost. In addition, it offers the advantages of flexibility, inventory reduction and larger tile size capability. This is a mature market for Xaar with strong competition. However, with an average useful life of five to six years, several hundred new ceramics printers are required each year for the foreseeable future. Xaar's unrivalled 720 dpi print resolution is starting to attract the attention of tile manufacturers looking to print large slabs for kitchenware (such as table tops).

Decorative Laminates

Realistic wood finishes or creative design are the key features which sell the board/ plank/ finished item. The digital quality that can be produced with Xaar printheads matches the quality produced by the analogue process, thereby offering the opportunity for more economic short run work to be undertaken whilst reducing inventories and improving time-to-market.

Functional Fluid Deposition

Xaar's focus on functional fluid is to promote our inkjet technology, which offers an unrivalled method of non-contact, fluid deposition with incredible precision, control and speed. Typically applications are challenging, pushing our technology to and beyond known limits in markets such as Flat Panel Display, Semiconductors, Printed Electronics and Optics.

3D Printing

3D Printing is a manufacturing methodology that encompasses a range of processes and applications, with a common theme of building parts up, usually layer-upon-layer. This additive approach ultimately enables manufacturers to eliminate the need for tooling. There are significant advantages, including superior geometric freedom, giving designers much more capability, and a substantial reduction in lead time for products. In addition 3D Printing provides the facility to tailor unique products to consumers, enable de-centralised manufacturing and shrink spare part storage.

Glass Printing

Architectural glass is increasingly used to complement ceramic tiles in modern commercial design, and is starting to be used in residential projects also. Functional glass, such as car windscreens or glass tops used in induction hob cookers, is predominantly printed using analogue screen techniques, but is increasingly moving to digital to provide production flexibility and inventory reduction. This is an emerging sector for digital inkjet and the Xaar 2002 is the leading printhead for this market due to technology advantages.

Packaging markets

Coding & Marking

Coding & Marking is an application which relates to printing product identification codes such as batch numbers, use by dates and barcodes. Xaar's technology is used to print barcodes and logos on outer case/secondary packaging of consumer goods. This is an established and stable business, and competes with alternative technologies including print and apply, and thermal inkjet.

Labels

Labels are used for many different applications, including product identification, name tags, warning and hazard identification, promotions and as decals for product decoration. There is a large range of substrates and inks in this application which adds complexity to the conversion process. Xaar excels in two areas of label printing: colours (including white) and varnish based finishing effects using Xaar's High Laydown Technology.

Direct-to-Shape

Direct-to-Shape is the application where bottles and containers have the image printed directly onto their surface without the need for a label. The solution is aimed at reducing unit costs versus the application of a label. This approach can also be used as part of the identity of a brand, and provides differentiation versus other products that use paper or plastic labels. Xaar printheads are the best at printing in a vertical mode (a frequent requirement for these applications), thanks to TF Technology.

Packaging

The Packaging market is a broad sector covering flexible packaging, bottles, pouches, sachets, food packaging and more. Most packaging is printed using conventional analogue methods, but digital inkjet has the potential to revolutionise this part of the manufacturing process. Xaar printheads for the packaging industry facilitate cost-effective print runs and rapid production turnaround in what is a fast-moving industry. In addition, Xaar's unique Ultra High Viscosity Technology helps customers to print bright bold colours, ultra-thin layers for more flexibility, and a wider range of fluids and textures.

Other markets

Product Printing

Product Printing covers printing onto all kinds of industrial objects, including consumer and promotional items, packaging, medical, automotive, apparel, appliances, sports equipment and toys. Xaar's printheads are particularly suitable to these applications because the printhead design enables the use of a wide range of fluids as well as configurations options. In addition, Xaar company Engineered Printing Solutions (EPS) is a leader in this sector, providing best-fit custom printing solutions for many different applications, including promotional, packaging, medical, automotive, apparel, appliances, sports equipment and toys.

Grand- and Wide-Format Graphics

Grand- and Wide-Format Graphics includes both indoor and outdoor signage and advertising, including billboards, posters and point of sale advertising. It is the most mature industrial inkjet market, active for over 15 years. Xaar's early product range was instrumental in the growth of the digital graphics industry around the world.

Textiles

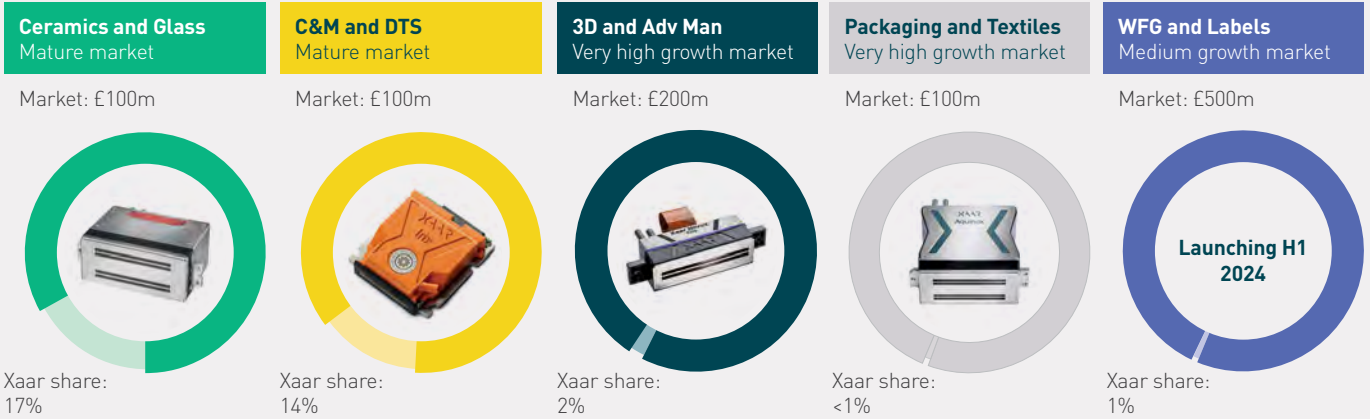
The Textiles sector is a growing market which covers a broad range of applications from fashion, sports, signage and display textiles, to home furnishings and technical textiles, for example for automotive or medical use. Sustainability is becoming a significant consideration, with industry challenges which include supply chain and raw materials pressures and a shift away from Asia ('near shoring'). Other drivers for a move to digital include desire for economic short print runs for faster and more frequent design changes as well as an increased demand for customisation. Whilst Xaar is later to the market than some competitors, the Aquinox has been developed to fix the need for a more reliable inkjet solution. In addition, Xaar technology offers the capability to lay down more pigment and reduce the carrier fluid, meaning richer, more vibrant colours can be printed reliably and more sustainably, and less energy is used in the drying process.

New inkjet applications

Xaar's Ultra High Viscosity Technology enables jetting of fluids around 100 centipoises (cP) at jetting temperature, equating to approximately 1000cP at ambient temperature – going well beyond average jetting capabilities of 10-12cP. This opens up inkjet to a wider range of applications including printing adhesives and solder masks.

Product roadmap delivers a significant total addressable market

We focus on a number of core market sectors where our technology offers a competitive advantage. We group these sectors together as shown here because they require the same functionality from the printhead. This is largely driven by requirements for ink type, speed, resolution and robustness.

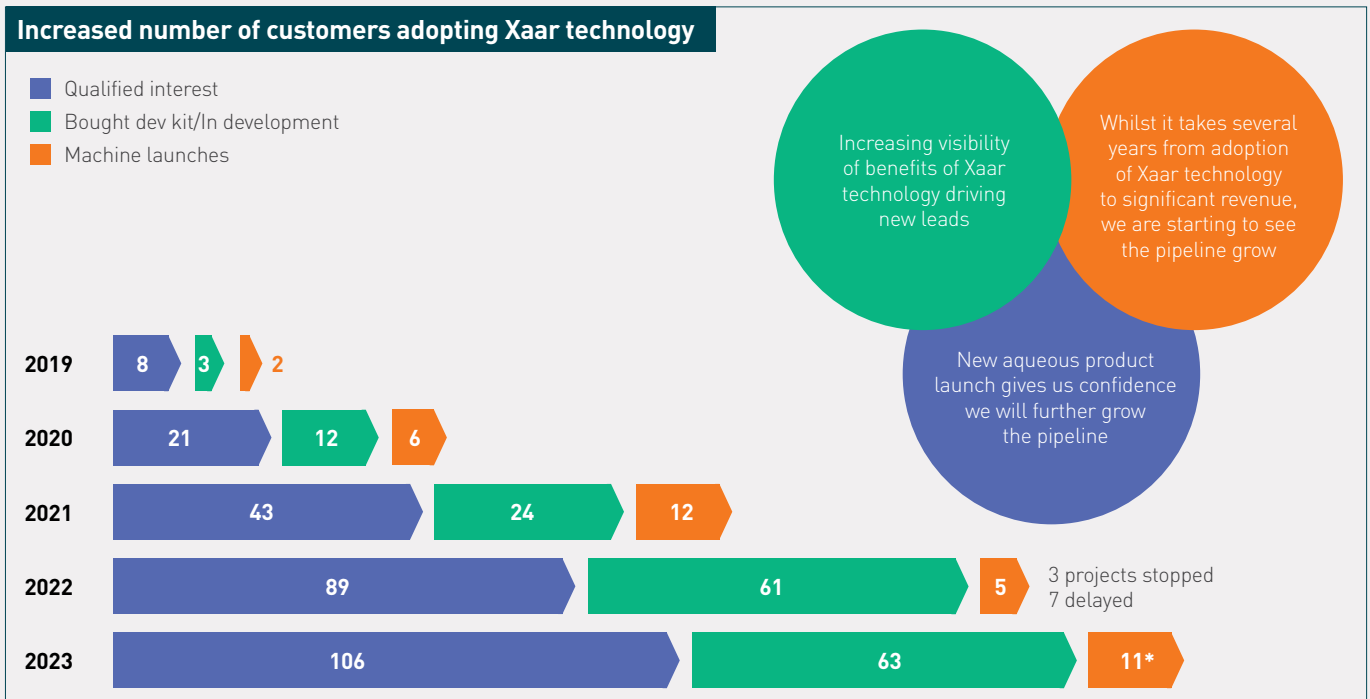


Source: Xaar's internal market sizing model built using data from range of market reports looking at markets up to 2027 including from PIRA: The Future of Inkjet Printing to 202, Smithers: Global Industrial Inkjet Printhead Market Insights, Forecast to 2028, Information Center: The Future of Digital Textile Printing to 2026, Smithers.

Increased number of customers adopting Xaar technology

Our new business model, product roadmap and value proposition have already had a very positive impact on our customer engagement.

It can take several years from adoption of Xaar technology to significant revenue as you can see in the table below. Since 2019 the pipeline has grown substantially, and future pipeline growth will be driven by us having the right products in our core markets (which you can see in the diagram above). With the recent launch of our aqueous printhead and the next launch to help us re-enter the Graphics market, we expect to see an acceleration in the pipeline with revenue growth following 1-3 years behind.



Source: Data taken from Xaar's CRM software reports

*Projected machine launches in 2023.

3D printing is an important focus for Xaar's printhead business with the needs of the sector supported by our extensive product portfolio and strong partnership approach to working with customers.

Xaar works with OEMs in three different types of 3D printing: Material Jetting, Binder Jet and Powder Bed Fusion.

Material Jetting

Material jetting creates objects in a similar method to a two dimensional inkjet printer. Liquid-based 3D material is jetted onto a build platform using inkjet printheads.

Example: Xaar customer dp Polar manufactures 3D printing systems which use Xaar 1003 printheads to produce parts on a continuously rotating print platform with a build area of just under 1 square metre. This system was designed to deliver scalability and productivity and has been developed for the automotive, aerospace and consumer markets.

▶ www.dp-polar.de

Binder jetting

The binder jetting process uses two materials; a ceramic or metal powder-based material and a binder. The binder is usually in liquid form and the build material in powder form. A printhead moves horizontally along the x and y axes of the machine and deposits alternating layers of the build material and the binding material.

Example: Linc Solution is in the process of developing a system for metal binding for manufacturing of automotive parts.

▶ www.linc solutions.com

The Powder Bed Fusion

Of the different types of Powder Bed Fusion, Xaar's involvement is with High Speed Sintering which uses polymer powder-based 3D materials, with Xaar printheads jetting the infra-red absorption fluid into the powder bed, which is exposed to infra-red energy. The printhead causes the powder to melt and fuse together.

Example: The H350 from Stratasys uses Xaar 1003 printheads within its SAF technology to reliably produce end-use production parts with a wide spectrum of part properties.

▶ To learn more visit: stratasys.com/en/3d-printers/printer-catalog/saf/h350/

Dive deep into 3D printing



Why is inkjet so relevant for 3D printing?

Inkjet technology offers some significant technical and commercial advantages for 3D compared to the standard manufacturing methods.

- Inkjet can be used to make parts with a range of materials – polymers, metals and ceramics. This means that once a manufacturer has learned how to jet, there are a wider range of applications they can address
- There are sustainability advantages too – you only print the fluid you need to use. Also as it is a contactless technology standard digital advantages apply – less breakages and less waste. And, it is possible to design a whole solution since consolidating many parts into one 3D part is possible. This saves time to market, reduces the materials needed and saves on tooling costs for multiple parts
- Additive manufacturing with inkjet provides the opportunity to use a single process but has multiple material types: materials of different properties can be used in different areas of a product, for example tough and flexible, (mimicking bone and cartilage). Mixing material families (metal and plastic) is not impossible but not usual
- Distributed manufacture: parts can be made customised to the local market in the local market using local market economies of scale. Key know how/components are shipped. Everything else is logistically optimised
- Spares can be created for obsolete equipment from legacy drawing
- Mass customisation: similar to Ceramic tiles or graphics, if you want one part or one million parts, it is the same unit price and each part can be different.

Why does Xaar have unique advantages in this market?

- Materials: Xaar's Ultra High Viscosity Technology widens the range of material properties that can be introduced because Xaar's printheads can reliably jet fluids with high viscosities and high particle loading. For the end user this means that material properties can improve, such as toughness, flexibility and elasticity, so that, for example optically clear parts (such as lenses) can be printed, or part breakages can be reduced. This is a significant advantage
- Xaar's TF Technology ensures our printheads are extremely reliable; they self prime and their open architecture means that blockages are minimised
- Xaar printheads have the highest nozzle open time which means less purging at startup and therefore less wastage of expensive 3D material.

High Laydown

High laydown enables the same technology that can produce very detailed, high resolution models to address low resolution, large scale models, such as investment casting models (motor housings or large scale framework). This increase in productivity results in reduced build time. Where resolution is not required, we offer the same benefits (particle and viscosity) but with up to five times the productivity.



Financial highlights

£72.8m

Revenue – Continuing operations
in line with management expectations
(2021: £59.3 million)

39%

Gross margin – Continuing operations
increased from 34% in 2021, benefiting
from operational leverage in the business

£6.7m

R&D spend
by continuing operations of £6.7 million,
up £1.0 million on 2021 with investment
focused on the ImagineX platform and
product roadmap

(£16.5m)

Net cash outflow – Total operations
During 2022 we acquired businesses
resulting in an initial net cash outlay
of £3.5 million as well as a further
deferred payment for FFEI of £1.7
million. Additionally, we invested £5.4
million on key infrastructure and product
development and a further £9.5 million
in inventory.

2021: £5.0 million inflow – benefitting
from an inflow of £9.3 million on the
sale of Xaar 3D.

Introduction

Over the last three years the Group has been transformed, implementing a new strategy across the business, with a new commercial model shifting our focus to very attractive end markets; expanding our technology capabilities; and creating a growth platform. This strategy is now delivering growth across the business, and we are delighted the Group has returned to full year profit.

At the same time we have also invested significantly in expanding our product and technology capabilities and updating our infrastructure, strengthening our key resource – people – and ensuring we have a robust platform to deliver future profitable growth.

Despite the external macro challenges, we have delivered an impressive performance in 2022 which is borne out in the financial metrics. Our core Printhead business grew in all regions except China which was impacted by COVID-19 restrictions for much of the year, and we have successfully launched our new product Aquinox with a commercial response that has exceeded our expectations.

During the year our US product print business, EPS, delivered its best ever result and with the acquisition of Megnajet we now have a resilient, diverse business well placed to meet the significant market opportunity that exists.

Excellent strategic progress

The turnaround we have described is now at the end of the first phase. We have established a clear strategy and we are ready for the next stage to achieve enduring profitable growth.

The first phase was focused on stabilising the business and establishing a clear strategy. Commercially this has seen the Printhead business reduce complexity in its routes to market by eliminating third party distributors and selling directly to OEMs and UDIs. Our principal objective is to sell more printheads. We provide an integrated solution for customers whereby they can access more of the printing ecosystem, to include supporting elements such as fluid management systems and the electronics required for printing. We help our customers take advantage of the inkjet opportunity, demonstrating to them that working with Xaar means a higher chance of success by being faster to market, making our customers' investment more profitable.

Our strategy is working, we are delivering on what we promised, and the future remains exciting. With phase 1 of the business transformation now complete, the business is stabilised, with a strong management team, delivering profitability and a strong platform on which to build.

Strong revenue growth, improved margin and full-year profitability

We have delivered a strong performance in 2022 in line with our expectations, further demonstrating the operational and strategic progress across the Group. We have improved resilience and have achieved the key milestone of delivering an adjusted profit before tax for the year.

Despite the global macroeconomic and political uncertainties, we are successfully mitigating external challenges, principally the cost of inflation and the ongoing COVID-19 impact in China.

Revenue for the year was £72.8 million representing growth of 23%. Organic growth, before the impact of FFEI and Megnajet acquisitions was 8%.

Revenue grew in the US region by 54% and in EMEA by 20%. This demonstrates the resilience we are developing in the business and helped offset the decrease in revenue from Asia of £3.8 million (32%).

Reduced revenue in China has impacted our Ceramics sector printhead sales, however, we are confident in returning to previous levels of trade with our customers in the region as COVID-19 restrictions continue to be lifted. Our commercial and technology proposition still remains compelling, and we have not lost retained market share in the region.

We have been able to demonstrate the strength of our technology in markets sectors beyond Ceramics and continue to see strong customer engagement in these areas where we have a competitive advantage by enabling customers to reduce their own development times.

Our new product, Aquinox, was launched in November 2022. We have received excellent feedback and significant customer engagement, and early promising success indicators through strong sales of development kits.

EPS has delivered an excellent performance. Revenue increased 41%, with growth across all its product lines, and digital inkjet sales at the core of the success growing 54%. The proactive decisions taken in the last two years to strengthen the management team and rationalise the product range are delivering excellent results and demonstrate the continued importance of the business.

Our recent acquisitions, FFEI and Megnajet, are performing ahead of our initial expectations. We are delighted with these acquisitions and as a result we have an expanded product range providing us real traction and opportunity in the printbar and print engine markets, along with Fluid Management Systems.

With this revenue growth and the strong operational performance, we have increased gross margins in Printhead and EPS, and overall for the Group to 39% (2021: 34%).

While profit before tax from continuing operations of £0.8 million includes some underlying business unit losses (consisting of Printhead £0.3 million loss, EPS £2.8 million profit, FFEI £0.3 million loss and Megnajet £0.4 million profit) we can report positive adjusted EBITDA in each of our businesses for 2022. Group adjusted EBITDA of £6.2 million consists of Printhead adjusted EBITDA of £2.0 million, EPS adjusted EBITDA of £3.1 million, FFEI adjusted EBITDA of £0.5 million, and Megnajet adjusted EBITDA of £0.6 million. This has enabled delivery of full year profitability for the Group.

Investing for future growth

There has been further investment in capability and capacity enabling us to take advantage of the opportunities which we expect to drive our future growth ambitions.

During the year we acquired our fluid management system business, Megnajet, for an initial consideration of £5.1 million. The net cash outflow on acquisition was £3.5 million. This acquisition further strengthens our ability to deliver to customer needs, enhances our technology capability and expands the vertically integrated product offering. It is already delivering profitable growth ahead of expectations, enabling a quick payback on the original investment.

We have invested in inventory, holding higher levels of both raw materials and finished goods. This investment has been undertaken in a controlled, proactive manner to enable continued production of our products and customer supply. This is a vital part of our strategy to ensure we meet customer demand.

As supply chains improve, we can look to reduce our raw materials holding although we will do so in a cautious, well-managed way. Higher levels of finished goods have enabled us to meet customer demand whilst the factory is closed for reorganisation and will leave us well placed to meet any increase in market demand.

R&D investment is critical to the ongoing success of the business, and we will continue to invest in our R&D capabilities across the Group to ensure our technology remains market leading. During the year we increased R&D investment by £1.0 million.

Our underlying positive cash generation in the core business has also enabled us to spend £5.4 million on maintenance and asset improvement across the business during 2022.

Additionally, we have invested approximately £1.2 million in our factory reorganisation project in Q1 2023. We expect a rapid return on this investment due to the energy savings it will provide, coupled with increased manufacturing efficiency.

This is the first phase of our transformation programme which will result in modern, efficient and more environmentally beneficial manufacturing facilities across the business.

Significant market opportunity

We have a strong proposition across our five key market sectors. Our digital inkjet technologies provide compelling propositions to transform print processes across a wide range of applications, and the medium and long-term opportunity for the business remains significant. Whilst we have already grown market share in core, mature markets such as Ceramics and Coding & Marking, further growth opportunities exist as our technology is best-in-class and we have a clear competitive advantage over our competitors.

We can capitalise on a number of sectors which need further digitisation of printing to secure increased market opportunities. These opportunities are typically in areas where fluid applications are challenging, such as Flat Panel Display, Semiconductors, Printed Electronics and Optics. We are well placed to succeed in these markets as Xaar technology offers an unrivalled method of non-contact, fluid deposition with incredible precision, control and speed.

Other markets that already use digital printing such as architectural glass printing and 3D printing are tremendously exciting as our technology has unique benefits that can give our customers commercial advantage in reducing costs and lead times for their products.

By providing an integrated solution for customers whereby they can access more of the printing ecosystem, we help our customers take advantage of the inkjet opportunity and working with Xaar means a higher chance of success by being faster to market, and therefore making our customers' investment more profitable. Ultimately this will help us in our overriding strategy to sell more printheads.

We have seen increased customer engagement as our printhead product range has expanded and our ability to offer a broader solution to customers with fluid management systems and printbars, which is evidenced by the increasing number of customers developing machines with our products. Both our current product offering and our product development programme will help drive our success in meeting customer demand in these fast growing sectors.

Expansion of vertically integrated product offering

The acquisition of FFEI in July 2021 and Megnajet in March 2022 further widened our product offering for our OEM and UDI (User Developer Integrator) customers with a broader product range including print engines for adding effects and embellishments digitally. FFEI has been successfully integrated and strengthens Xaar's capabilities and skills and has seen the launch of a new print engine product, the Xaar Versatex. This will accelerate Xaar's existing growth strategy and widen the product portfolio further engaging UDI customers. We have a growing pipeline with a significant number of opportunities thanks to our technology advantages. This platform provides further opportunities for vertical integration, and we will strengthen our offering with more products in the pipeline for 2023.

Megnajet is a global leader in the manufacture of ink supply systems. We are delighted with the acquisition of the business which has been successfully integrated into the Group, and we are already benefiting from the expansion of our product offering.

The latest product powered by our ImagineX platform, our aqueous printhead, Aquinox, was launched in November 2022. This is a significant and tremendously exciting product for the Group and enables us to compete in new sectors, such as Packaging and Textiles, with a product that we believe will deliver superior performance to any currently on the market. We have received positive feedback from customers, evidenced by high engagement and good sales of development kits.

EPS, our product print system business, is performing well, delivering high quality products to a variety of customer sectors. As we explore further opportunities in the US, EPS can play an increasing part in our strategy.

This approach has seen us deliver a more vertically integrated product offering to a wider group of customers in more market sectors.

Significantly improved operational capability

We have made further progress in building a world class leadership team, making key appointments which will drive the business in the next phase of our transformation. This has strengthened our capability and experience across the business, most notably in our Operations, R&D, Finance and Human Resources functions. This improved operational capability also includes further and continued investment in infrastructure such as IT, manufacturing, and supply chain management. Our strong and experienced leadership throughout the organisation is focused on delivering a clearly articulated strategy.

During the year we have continued to work on ensuring our values are embedded into our culture. This ongoing focus on our values is important to ensure we have a supportive culture with employees who are engaged and empowered to succeed.

Continued commitment to sustainability

Xaar has made significant and positive progress to drive forward its ESG commitments across our operations. We uphold the highest of standards across our business and comply with all relevant regulations in the territories in which we operate whilst enhancing the working environment for our employees and minimising the environmental impact of our products and operations.

During the year, Xaar launched its Sustainability Roadmap to 2030 which is a principal driver for positive change and investment within the business. Led by our ESG Committee and a Sustainability team which is comprised of colleagues from across our business operations, chaired by the Group Sustainability Manager, we have been working hard to achieve our goals and ambitions across all four sustainability pillars: Environment, People, Innovation and Community.

Environment

Decarbonisation remains a key objective for us as we move towards our goal of net zero operations by 2030. We are pleased to report that we are working with an external partner to support us with Scope 3 and TCFD Climate Modelling. This year we have offset our regulatory Scope 1 and 2 carbon impact, making the Group a carbon neutral inkjet manufacturer in 2022. We are committed to continuing this practice on our journey to achieve complete carbon neutrality in line with our 2030 goal.

We set a target to source 100% of our power from renewable sources by the end of 2023 and excellent progress has been made. Our move to green energy is now complete in the UK, and we are pleased to confirm that EPS is now also supplied with power generated from renewable sources. We will continue to assess ways to bring our remaining office locations in line with green tariff power.



With the fundamental advantages our products possess, I believe that within the next decade Xaar will be the number one supplier of industrial inkjet printheads.

All printhead packaging is now fully recyclable and we are working towards complete packaging recyclability. Xaar is committed to supporting decarbonisation of staff and visitors' vehicles. In early 2022 we launched a salary sacrifice scheme, supported by the UK government, to allow all UK staff the ability to order electric vehicles (EV) through a company scheme. We have also completed the installation of EV charging infrastructure across our sites.

People

Supporting young people and nurturing their skills is key to our ESG strategy and for this reason we have placed significant emphasis on our Early Careers programme. As part of this, Xaar's new Apprenticeship scheme is operational and our first intake is working within our Logistics team. Further efforts are underway to connect with local schools and colleges to allow future work experience programmes to be developed. In the UK, Xaar supported Learning at Work Week in May, which attracted 109 attendees across nine events and resulted in 131 hours of learning.

We will further strengthen this approach in 2023 and plan to hold Xaar Group workshops bringing together a cross functional group of people with the aim of understanding what makes Xaar an 'employer of choice'. This will help to inform and shape our talent attraction and retention strategies feeding into our wellbeing programmes.

Innovation

We are currently researching ways to use biodegradable structural parts in the manufacture of our products. An area of focus is to find an alternative, more sustainable material than Polylactic Acid (PLA) which is a biodegradable plastic used to print the majority of our jigs and fixtures. Our Operations team has successfully trialled the use of recycled PLA filaments generated from returned and waste PLA. These are supplied in 100% plastic-free sustainable packaging with easy to recycle cardboard spools.

Digital inkjet printing is inherently more sustainable compared to traditional analogue printing with a smaller carbon footprint. It reduces and prevents excessive waste and uses less energy due to the ability to print short runs or Direct-to-Shape. With TF Technology ink recirculation, Xaar printheads are capable of printing very viscous fluids, which in the Textiles sector, for example, results in a reduction in energy used in intensive drying processes. We are passionate about continuing further adoption and understanding of the environmental benefits our products can bring to customers.

Product development and increased capability

Overall, the market opportunity for Xaar printheads is significant. We have a unique roadmap of product development to ensure we offer an increasingly vertically integrated commercial strategy to capitalise on this market opportunity.

The, already successful, ImagineX platform will deliver a number of features over the next few years which will provide significant enhancements to the current portfolio, including:

- substantially improved speed and throughput (frequencies up to 150kHz, equivalent to a threefold increase in speed compared to current products),
- increased throw distance to improve image quality on curved surfaces,
- increased robustness to improve the life of the printhead and maintain image quality,
- higher viscosities enabling a broader range of fluids to be printed (above 100cP), and
- higher resolutions (up to 1440 dpi).

These features will help strengthen our position in markets where we are already well represented and will drive improved adoption in several markets where we are currently not, such as Wide Format Graphics and Labels. The recently launched Aquinox is positioned to drive our adoption in Packaging and Textiles. The performance enhancements in our product roadmap give a clear path for OEMs to upgrade their products and maintain their product differentiation.

We have made strategic bolt-on acquisitions to the Group that enable us to strengthen our customer offering and we will continue to adopt this approach in the future as we look to continue increasing our capability and become a fully integrated inkjet product provider.

The strong operational gearing that exists in the business, which has already delivered good margin growth, has greater capacity to support further margin improvement in the medium term. The business is well placed to move into the next phase of its transformation and to deliver sustainable profitable growth in the medium term.



Outlook

We have maintained our policy of increased investment in inventory during H2 2021 and throughout 2022 which means we are well placed to satisfy customer demand in 2023 and we believe we have the supply chain resilience to withstand most disruption. We are continuing to invest in the business adding skills, capability and capacity and continue to work on delivering efficiency gains aimed at improving gross margins and business profitability in the medium term.

Sales volumes in the Printhead business continue to be affected by the uncertainty in China, which is expected to continue in the short term as COVID cases increase. At this stage it remains unclear when normal levels of business will return, however we can look forward to the medium-term future with confidence.

There is a positive momentum in the business, as is reflected in our 2022 results. Customer engagement and sales orders have been maintained in the first quarter of 2023, in line with our expectations. As previously communicated, we expect the Huntingdon factory reorganisation to impact the first half, however, given continued progress and exciting product launches ahead, the Board remains confident in delivering an outturn for the full year in line with its expectations.

John Mills
Chief Executive
Officer

27 March 2023

Ian Tichias
Chief Financial
Officer

27 March 2023

Our business units

Printhead

Our Printhead business unit focuses on the design, manufacture, marketing and sales of printheads and associated products which are used in a variety of applications such as Ceramic Tile Decoration, Graphics, Décor, Textiles, Labels and Packaging as well as 3D Printing and Additive Manufacturing.

Revenue segment



Markets

● Industrial	54%
● Packaging	33%
● Graphic Arts	12%
● Royalty	1%

“
The Xaar Aquinox launch is a significant achievement for the Company.



2022 update

A significant amount of time and resource across the Printhead business has been dedicated during 2022 to the launch of the Xaar Aquinox, Xaar's first bulk aqueous printhead which represents a great achievement for the entire Company.

The enabling technologies, grouped together under the aQ Power Technology brand, aQ Power, work together to increase printhead lifespan and durability when printing water-based fluids. Every single process in the production line, for example, has required some change or investigation of change to be able to manufacture the printheads. Investment in the launch campaign was focused on delivering impact, targeting three main sectors – Textiles, Packaging and Ceramics. The commercial team used a deep dive into the industry drivers in these sectors, alongside market research to determine the key players to underpin the launch strategy and campaign messaging. As a result we achieved over 450 sign ups to watch the launch presentation, with early engagement and lead generation metrics from the launch campaign much higher than those from previous launches.

 **See page 10 for fuller information on the Xaar Aquinox**

Over the course of the year, the printhead business has made good progress, for example, our customer base has increased by 91 customers, and the launch of the Xaar Aquinox gives us access to new markets, particularly textiles and packaging (such as corrugated packaging), and will help us to develop existing markets such as ceramics (printing water based glazes).

We have also been working with customers in PCB markets (legend printing in particular, with an opportunity to explore solder mask printing in the future). Our Ultra High Viscosity Technology gives us advantages for 3D printing and we have projects ongoing with new OEMs in China.

 **See pages 12 to 15**

In addition to the Aquinox, we have also launched the Xaar Versatex print engine, for inexperienced UDIs, and the small drop Xaar Nitrox Elite GS3 printhead for OEMs developing print systems for label and graphic applications, and also functional fluid applications, such as PCB printing.

The upgrade of our printhead manufacturing facility in Huntingdon has also been a major focus in the second half of the year. Substantial time has been spent planning for the upgrade which started in earnest in January 2023 and will deliver modernisation of our manufacturing capabilities as well as improved efficiency, yields and reduced product costs in the longer term as a result. We have invested in working capital to ensure we are able to meet fully all customer demands whilst the factory is closed for the work to be carried out.

Other developments in the Printhead business included opening a new Technology Centre in Sweden which houses our Advanced Applications and Technologies team.

Based at Campus Solna in Stockholm, and at nearly 400 m², it is twice the size of the previous facility and houses a state-of-the-art laboratory with new equipment, offices, and meeting spaces for engineers, scientists and visitors to work within. The expansion provides Xaar with the ideal environment for its continuous research into the transformative potential of inkjet technologies and opportunities.

Xaar's base in Sweden has played a key role in its R&D projects for many years, as well as supporting customers in the development and use of inkjet technologies. From their new site, the team will continue to work closely across both internal and external projects, liaising with manufacturers, fluid formulators and specialist printer makers to help bring new processes to market using Xaar's printheads and technologies across numerous markets.

In China, we opened a new state-of-the-art inkjet printing laboratory in Shenzhen, comprising the latest printhead test equipment and print process experimentation platforms. The focus of the lab is to provide Xaar's customers and partners in China, including scientific research institutions, a variety of services such as sample printing, solution development, printhead nozzle status detection and waveform adjustments for new applications, providing a printing solution showcase and technical consultation for the greater use of inkjet technologies. Sectors supported include Ceramics, Glass, PCB, Textiles, 3D printing, Packaging and Labels, with inkjet printing support provided locally to help customers develop more targeted application solutions and achieve faster innovation cycles, all whilst reducing their R&D investment.

Our business units continued

Printhead continued

The Inkjet Opportunity

The principal focus of our strategy is selling printheads. We can do this more effectively by providing an integrated service to our UDI and OEM customers.

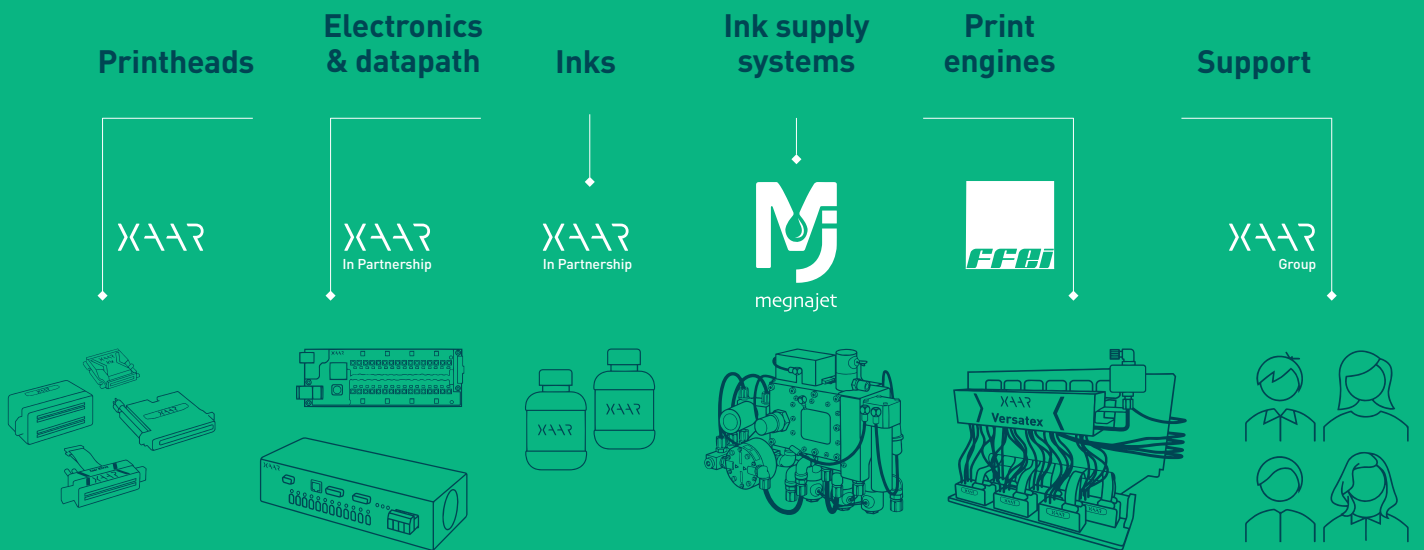
Their success depends in part on a cost effective product development process, getting their products successfully and quickly to market, and maintaining product stability throughout the product lifetime.

Customers who have less experience of inkjet development projects, such as the User Developer Integrators, or OEMs moving into a new application area, are looking for a dedicated, experienced inkjet partner for printheads, sub systems (electronics, software and ink supply systems) and ink, as well as for print engines right up to fully customised solutions.

We are therefore focused on providing an integrated solution whereby our customers can access more of the printing ecosystem (the supporting elements such as ink supply systems and the electronics required for printing) – as well as the print technology (the printheads). This will help us to sell more printheads.

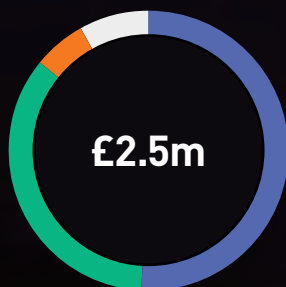
Through a combination of organic growth and acquisitions, we now have the capability to supply all of these components to our customers.

With the acquisitions of Megnajet and FFEI, alongside close strategic partnerships with electronics and ink suppliers, we have become a one-stop shop for our customers, making Xaar the best choice for performance and also ease of adoption, helping to shorten OEMs' development time.



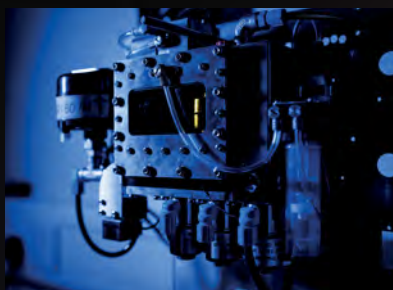
Based in Northamptonshire, UK, fluid systems specialist Megnajet provides robust, reliable, easy to integrate products so that OEMs can get to market quickly with reduced development costs.

Revenue segment



Revenue by region

Americas	51%
EMEA	35%
Japan	6%
Other	8%



HV LFR fluid management system is for wider printing applications, capable of supplying fluid for up to five individual outlets.



Labjet Gravity is a syringe-based gravity fed fluid management system, ideal for evaluating small volumes of fluids in a laboratory environment with industrial components.

2022 progress

Since acquisition by Xaar in March 2022, Megnajet has made good progress, despite supply shortages for the first half of the year. This was proactively managed through a combination of build prioritisation and setting customer expectations.

We also embarked on the first phase of the site improvements, with the focus on the employee facilities. Phase 2 is currently underway moving our assembly operation into a larger space at the rear of the facility, increasing our future capacity and efficiency in preparation for 2023. We recovered the backlog of work caused by supply issues, hitting record production volumes and revenues in Megnajet's 11-year history.

Collaboration with the wider Xaar Group has been key for Megnajet this year as we aligned ourselves with Group systems, software and methodologies.

IT infrastructure changes enabled wider communications; operational processes allowed for better planning, team awareness and training; Epicor integration has given us increased control and structure to our business; and centralisation of R&D within Group allows Megnajet to focus on customer requirements, product management and service. We presented our first Monthly Operations Review in April thereby aligning with Company reporting fairly early after acquisition, supported by regular commercial and financial updates to track the health of the business.

Our business units continued FFEI

Our digital imaging company, FFEI Ltd, based in Hemel Hempstead, UK, focuses on high performance digital imaging solutions – from digital inkjet label presses to digital pathology scanners.

Revenue segment

£11.6m

Markets

Inkjet

52%

Life Sciences

48%

2022 progress

This year has seen a significant amount of change for FFEI not least in the leadership team, following the departure of Andy Cook and Julian Payne, after many years of much valued service to the company.

FFEI spent much of the year making good progress with adopting the Xaar Group business practices such as embracing the Company values, the adoption of the Tier 1 & 2 meetings which has improved the communication across teams, management reviews with the leadership team, Monthly Operating Reviews and delivering on a product sales plan to more than double the number of units being built and sold by the team compared to 2021. We are delighted to see that the printbars manufactured and sold by FFEI continue to deliver growth particularly in the labels embellishment market in Italy.

On the Life Sciences side of the business, the digital pathology scanner manufactured at FFEI surpassed a milestone of more than 12 months of successful installations and with demand continuing into 2023. In addition, Microscan has shown strong demand in 2022 vs 2021, with Sierra on-boarding new customers across the digital pathology and AI market whilst engaging with return business.

In October 2022 FFEI celebrated its history with a 75th Anniversary celebration of the inception of Crosfield Electronics. FFEI can trace its roots back through FujiFilm, Dupont and De La Rue to 1947 and the formation of Crosfield Electronics. A great day was had by all, including some past employees, and over £900 was raised for the Xaar charity partner, Break.

Xaar company EPS manufactures and sells a range of highly customised print systems for product print applications, including some using Xaar’s inkjet printheads. Examples of product printing include all kinds of industrial and promotional objects such as medical equipment, automotive parts, tools, apparel, appliances, sports equipment and toys.

Revenue segment



Markets

● Digital	66%
● Analogue	34%

2022 progress

2022 has seen great progress at EPS, with excellent growth in sales, stronger margins, and excellent profitability.

Under new leadership since April 2021, EPS has this year focused on building a new and strong leadership team.

Restructuring also took place with the Tech Services functions being split into three distinct groups – Production Techs, Field Service Techs, and Applications teams. As part of this plan, the company is developing its team of regional service technicians based strategically across the US to provide better service to customers.

From August EPS added a second production shift for the Machine Shop and Assembly teams to keep up with our growing production volumes, turning around custom build projects faster to minimise the impact of space constraints.

We have been able to significantly invest in the business this year; we added a new Haas CNC machine, a new digital cutter for the plate room, and invested in our XD70 sampling equipment, and many systems upgrades. We’ve added a new computer server, upgraded our Sage 100c financial software to the 2022 version and implemented the MS Project for our production planning system.



Business performance

Revenue

Revenue for the Group of £72.8 million is an excellent performance for the year, representing a year-on-year increase of £13.5 million (2021: £59.3 million) of which organic growth was 8% (£4.8 million).

This result demonstrates momentum across the business, mitigating short-term challenges due to the ongoing restrictions in China arising from COVID-19. Printhead revenue was down £1.1 million year-on-year, although outside China it increased 10%, and EPS increased revenue by 41% (24% in USD). This performance across the business demonstrates the positive customer engagement and trust that is being regained across our customer base.

Group revenues were £36.6 million in the first half of the year and £36.2 million in the second half. This reflects the consistent performance of EPS, which has offset the impact on Printhead revenue of the restrictions in China in the second half of the year.

Revenue from the Americas grew year-on-year across the Group, rising £12.6 million (2022: £36.2 million, 2021: £23.6 million). The increase, driven by the recovery in EPS revenue, along with strong growth in US printhead sales demonstrates the wider geographic opportunity that exists for the business.

Performance in Asia, and China in particular, has been impacted by the ongoing COVID-19 restrictions in China, which has resulted in revenue declining from £12.0 million in 2021 to £8.2 million. The restrictions have delayed product development and sales for our customers and consequently sales of printheads for Xaar. As this region has been a key driver for growth in Printhead in the previous two years, the impact in the second half of 2022 has been significant. However, the work we have done in the last two years to re-engage Chinese Ceramics OEM customers means they understand and are interested in our new products and roadmap. Accordingly, we are well placed to meet the high demand in the region as the COVID restrictions are lifted.

Revenue in EMEA has increased from £23.7 million to £28.4 million driven by our wider product offering through FFEI and Megnajet, contributing to an increase for the Group of £4.7 million (20%).

Table A – Group revenue growth

£m	2022	2021	Var %
Printhead	39.0	40.1	-3%
EPS	19.6	13.9	41%
FFEI	5.5	5.3	4%
Organic growth 2022 vs 2021	64.1	59.3	8%
FFEI	6.1	-	-
Megnajet	2.6	-	-
Inorganic growth 2022 vs 2021	8.7	-	-
Total growth	72.8	59.3	23%

Printhead revenue for the year fell by £1.1 million to £39.0 million (2021: £40.1 million). The second half of 2022 saw revenue decrease by 8% (£1.6 million) compared to H2 2021 (£19.9 million), following growth of £0.5 million in the first half of the year. This is due to the impact of customers based in China predominantly in the Ceramics sector. Our technology offering proved successful in a wider number of other sectors, which has partially mitigated this decrease.

Growth in the year was achieved in 3D Printing, Coding and Marking (C&M) and Décor sectors. This is pleasing as it further proves our core technology can be successful in many applications and our customers increasingly benefit from the advantages our technology brings. Despite revenue in the Ceramics and Glass sector declining £2.0 million (11%) we have not lost market share during the year as the fall can be attributed to the reduction in orders received by our OEMs in China themselves. We have been able to consistently demonstrate our clear technology advantages in the Chinese Ceramics market, where we have regained trust with our customers. We have also established a market leading position in the Glass sector. Together with our extended product portfolio we expect to return to growth in this sector during 2023 as the negative external market factors subside.

Coding and Marking (C&M) and Direct-to-Shape (DTS) revenues have grown by £1.5 million (14%), further demonstrating our ability to expand our market reach with a wider product offering.

An increasingly exciting opportunity for us is the 3D printing market, and we expect this sector to grow significantly in the future. Revenue in 3D Printing and Advanced Manufacturing (AVM) together grew £1.5 million (62%) in 2022.

Both 3D Printing and AVM are markets where we are well positioned to take advantage of growth opportunities, and although development cycles can be long, which means extended timescales for a customer to reach full production, the market opportunity is significant.

Wide Format Graphics (WFG) and Labels revenue fell in the year from £6.2 million to £4.8 million. This is an area which has also been impacted with delays in orders, largely COVID-19 related, and we also need further product development.

Revenues from Packing & Textiles remain modest. Our ability to target this sector effectively has been somewhat limited by our product range, although the launch of the Aquinox printhead will start to address this. However, advancements in the product portfolio driven by the ImagineX platform should make this large sector more accessible in the future. Full year revenue of £0.5 million was down year-on-year (2021: £0.8 million).

Revenue from the EPS business increased by £5.7 million to £19.6 million (2021: £13.9 million) as the new commercial approach has seen some significant customer order wins.

Growth has been achieved across all product groups with a particularly strong performance in the core area of digital inkjet machine sales which have grown £4.4 million (54%). This is particularly pleasing as it continues to be the focus for the business in the future. Pad print machine revenue has also risen 22% and the increased focus on consumables and accessory sales have also contributed to the growth as a result of the change in commercial approach, with increased revenue from ink, plates and parts. The order book remains strong and we are well placed to deliver further growth in 2023 as companies increasingly invest in capital equipment.

Table B – Group revenue by geographic region

£m	2022 H1					2022 H2					FY 2022					FY 2021			
	PH	EPS	FFEI	Meg*	Total	PH	EPS	FFEI	Meg*	Total	PH	EPS	FFEI	Meg*	Total	PH	EPS	FFEI	Total
Americas	5.0	9.2	2.4	0.4	17.0	5.8	10.1	2.4	0.9	19.2	10.8	19.3	4.8	1.3	36.2	7.3	13.9	2.4	23.6
Asia	4.5	-	0.1	-	4.6	3.0	0.2	-	0.4	3.6	7.5	0.2	0.1	0.4	8.2	11.9	-	0.1	12.0
EMEA	11.2	-	3.6	0.2	15.0	9.5	0.1	3.1	0.7	13.4	20.7	0.1	6.7	0.9	28.4	20.9	-	2.8	23.7
Total	20.7	9.2	6.1	0.6	36.6	18.3	10.4	5.5	2.0	36.2	39.0	19.6	11.6	2.6	72.8	40.1	13.9	5.3	59.3

* Megnajet was acquired on 2 March 2022, figures reflected in the table above are ten months of post-acquisition revenue.

Gross profit

Gross profit for the year increased by £8.4 million to £28.6 million (2021: £20.2 million) with an increase in the gross margin to 39% (2021: 34%). This was primarily the result of an improvement in the Printhead business unit's gross margin which grew from 38% to 43%, and EPS which moved from 23% to 40%.

In Printhead we increased utilisation of the factory as production volumes were increased during the year resulting in better overhead cost recovery, supporting margin gains.

There was also continued investment to secure raw materials to reduce further supply chain risks. Although there are indications of easing in the global supply chain, we remain cautious and have continued to focus on meeting customer demand. We have increased our working capital with inventory rising £10.3 million (2021: £9.1 million increase in inventory). The higher level of finished goods will ensure continued supply to customers during our factory reorganisation shutdown and enable us to capitalise on any uplift in demand across all our market sectors. This higher level of both raw materials and finished goods is a deliberate, prudent approach which we believe will see us well placed to both manage customer requirements and further insulate the business from external supply chain risks.

We remain focused on cost saving initiatives which will continue to deliver efficiency gains and support our gross margin.

Gross profit for the EPS business grew £4.6 million in the year to £7.8 million (2020: £3.2 million). The actions taken to refocus the business which impacted 2021 results (non-cash write down adjustments totalling £0.7 million), left the business in a good position to meet the increased market demand for capital equipment in the US which has driven this much improved performance.

Both FFEI and Megnajet have performed ahead of our expectations made when we acquired the businesses. They are strong contributors to the performance of the Group, with FFEI delivering gross profit of £3.5 million (at 30% gross margin), and Megnajet £0.8 million (gross profit of 33%).

Research & Development spend

R&D spend of £6.7 million was up £1.0 million on 2021 (2021: £5.7 million). This spend reflects further investment in the ImagineX platform which continues to be central to our long-term growth and ongoing product roadmap. We increased spend in FFEI to £1.2 million (2021: £0.4 million) which enhances the support for our vertically integrated product offering. The total increase maintains our spend/revenue ratio in the desired range of 8-11% and is broadly in proportion with our revenue growth.

Table C – Printhead revenue by sector

£m	2022 H1	2022 H2	FY 2022	FY 2021	Var	Var %
Ceramics & Glass	9.8	7.2	17.0	19.0	(2.0)	(11%)
C&M and DTS	6.8	5.8	12.6	11.1	1.5	14%
WFG & Labels	1.8	3.0	4.8	6.2	(1.4)	(23%)
3D Printing & AVM	1.9	2.0	3.9	2.4	1.5	62%
Packaging & Textiles	0.1	0.4	0.5	0.8	(0.3)	(38%)
Royalties, Commissions & Fees	0.2	-	0.2	0.6	(0.4)	(67%)
Total	20.6	18.4	39.0	40.1	(1.1)	(3%)

Figures (£m) and percentages (%) are subject to rounding.

Table D – EPS revenue by sector

£m	2022 H1	2022 H2	FY 2022	FY 2021	Var	Var %
Digital inkjet	5.7	6.7	12.4	8.0	4.4	54%
Pad printing	3.3	3.4	6.7	5.5	1.2	22%
Other	0.2	0.3	0.5	0.4	0.1	34%
Total	9.2	10.4	19.6	13.9	5.7	41%

Figures (£m) and percentages (%) are subject to rounding.

Operating expenses

Sales and marketing spend for the year was £6.7 million (2021: £6.3 million). The increase in spend of £0.4 million year-on-year reflects the increased business size along with the focus on sales and business development in the Printhead business. This has seen some increase in commercial travel expenses although we are taking a focused, targeted approach to managing these costs.

General and administrative expenses increased £4.0 million from £10.1 million in 2021 to £14.1 million in 2022. The increase largely relates to planned investment in key areas of the business and infrastructure, including Operations, IT and Finance, partially offset by £1.2 million related to trading foreign exchange gains in 2022. This largely relates to key appointments in the senior management team and infrastructure upgrades.

Restructuring and transaction costs of £0.5 million (2021: £1.4 million) predominantly relate to reorganisation costs and acquisition-related professional fees.

Profit for the year

The profit before tax from continuing operations under IFRS was £0.8 million in 2022 (2021: £1.0 million profit). Basic earnings per share from continuing operations was 2.3p (2021: 0.9p).

The performance of the Printhead business moved from a £2.2 million profit in 2021 to a £0.3 million loss in 2022. Despite a much-improved gross margin, and a close control in operating expenditure, the revenue reduction and external inflationary pressures resulted in a small loss. The EPS business moved from a £0.9 million loss in 2021 to a £2.8 million profit in 2022 due to the improved performance.

FFEI delivered a loss of £0.3 million (2021: profit of £0.4 million).

Megnajet contributed a profit before tax of £0.4 million since acquisition on 3 March 2022.

In calculating the adjusted loss before tax we have adjusted for gains on derivative financial liabilities of £nil (2021: £2.9 million) and fair value loss on financial assets of £8,000 (2021: £1.0 million gain) alongside restructuring costs of £0.5 million, foreign exchange gains on intra-group loans of £0.8 million, and share-based payments of £1.7 million with an R&D expenditure credit of £0.4 million and amortisation of acquired intangible assets of £1.0 million.

The adjusted profit before tax from continuing operations was £2.8 million, compared to £0.6 million loss in 2021. This is a significant step forward for the business, emphasised by the delivery of adjusted profit in the year.

The adjusted EBITDA for continuing operations in the year was £6.2 million (2021: £3.2 million).

The Group profit for the year was £1.6 million (2021: £14.2 million profit) all of which is attributable to the owners of the Company, (2021: £16.2 million profit with a £2.0 million loss to non-controlling interests). Group profit for the year from continuing operations was £1.8 million (2021: £0.7 million). The total basic earnings per share attributable to shareholders is 2.1p (2021: profit 20.9p).

Cash generation

The Group retained a healthy cash balance of £8.5 million at the year end, representing a decrease of £16.5 million during the year. Operating cash flow, before working capital, was positive by £6.6 million driven by the improved aEBITDA across the business of £6.2 million.

As a result of the managed investment in inventory, working capital saw an outflow of £12.2 million, mainly due to the £9.5 million increase in inventory.

During 2022 we purchased Megnajet for an initial net cash outlay of £3.5 million as well as a further deferred payment for FFEI of £1.7 million. This investment in the business is enhancing our capabilities and supports the strategy of selling more printheads through offering a more vertically integrated solution to customers. Additionally, we invested £5.4 million on key infrastructure and product development.

The business has a clear plan and strategy which the strong balance sheet and cash position will support. There remain external development opportunities which, if they can expand our capabilities and expertise, we will look to potentially add to the Group. We will also continue to invest internally to ensure we have the operational capacity and efficiency to meet future demand, alongside investment in our product roadmap development.

The Group maintains a strong disciplined focus on cash, and this will continue throughout 2023.

Strong balance sheet

Non-current assets increased £5.2 million in the year from £46.8 million to £52.0 million. This was driven by the increase in goodwill following the acquisition of Megnajet of £1.3 million, along with an increase in intangible assets of £4.7 million. The recognition of financial assets at fair value arising from the sale of 3D assets was £11.1 million (2021: £11.9 million). Additionally, there was a £0.1 million reduction in property, plant and equipment as new purchases were controlled in with line with the Group's cash focus and a decrease in right-of-use assets of £0.8 million.

Current assets decreased £4.1 million from £54.6 million in 2021 to £50.5 million. A significant proportion of this decrease is attributable to the decrease in cash and cash equivalents holding of £16.5 million. The increase in inventories of £10.3 million to £29.1 million (2021: £18.8 million) was associated to the managed investment in our supply chain capability. Trade and other receivables increased by £1.3 million to £11.5 million (2021: £10.2 million).

Table E – Cash flow – total operations

	2022 £'000	2021 £'000
Operating cash flows before movements in working capital	6,571	(2,240)
Movement in working capital	(12,188)	36
Taxes received	112	150
Net cash (used in)/provided by investing activities	(8,634)	7,813
Net cash used in financing activities	(2,915)	(674)
Effect of foreign exchange rate changes on cash balances	549	(110)
Net (decrease)/increase in cash and cash equivalents	(16,505)	4,975

Overall, current liabilities of £20.5 million (2021: £20.5 million) remained flat year-on-year. A reduction in trade and other payables of £1.1 million to £14.9 million (2021: £16 million) was offset by increases in provisions for restructuring and warranties by £0.1 million, an increase in current lease liabilities of £0.3 million to £1.0 million (2021: £0.7 million) and a £0.3 million increase in contract liabilities. The Group also arranged an invoice financing facility in the year and as at 31 December the balance borrowed was £0.4 million.

Non-current liabilities reduced by £2.0 million to £10.2 million (2021: £12.2 million), which mainly relates to lease liabilities recorded under IFRS 16 for property which reduced by £0.7 million to £7.8 million (2021: £8.5 million) in the year. Additionally, further deferred consideration payments due in 2023 have now become current, reducing the balance of other financial liabilities from £3.4 million to £2.1 million.

Dividend

No dividend has been declared for 2022 as the Board believes that prioritising cash for continued investment in the business will deliver more compelling returns for shareholders in the medium term.



John Mills
Chief Executive
Officer

27 March 2023

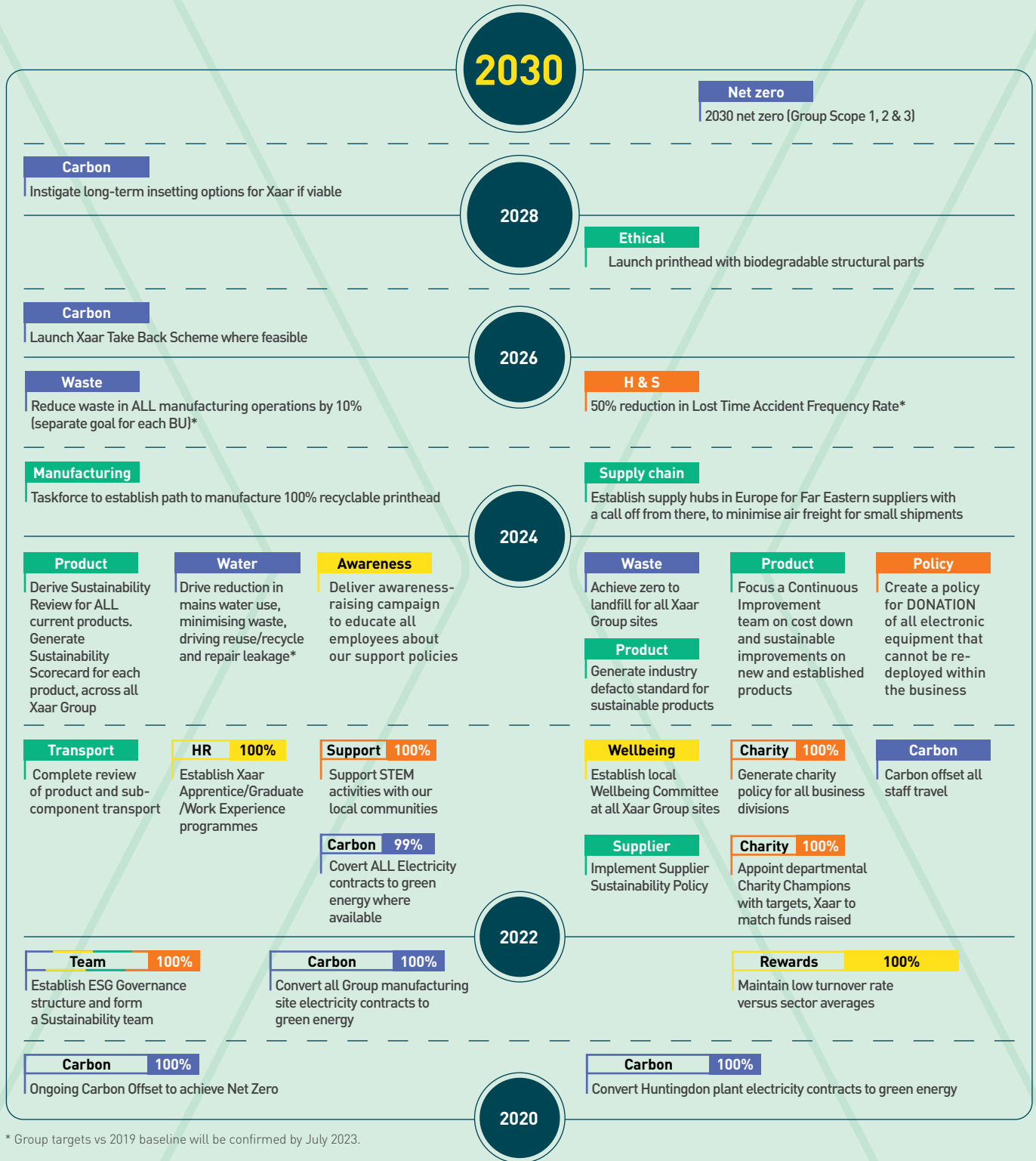


Ian Tichias
Chief Financial
Officer

27 March 2023

Sustainability Roadmap

We all need to play our part to reach our goals



* Group targets vs 2019 baseline will be confirmed by July 2023.

Our Sustainability Pillars

Environment

Leading the way in environmental sustainability for the industrial inkjet technology sector.

People

An employer of choice by putting our people, their potential and wellbeing at the heart of all we do.

Innovation

Encouraging more sustainable approaches to design, manufacture, technology and collaboration across the whole product lifecycle.

Community

Actively engaging with our communities to provide practical, lasting support that benefits society.

Sustainable and responsible business

The Group strongly believes that effective management of the ESG agenda is integral to business success.

The Group is not only compliant with all relevant regulation and legislation but has increasingly focused on enhancing the working environment for our employees and minimising the environmental impact of our manufacturing processes.

There is internal reporting of key metrics to ensure continuous improvement throughout the business, and each member of staff is expected to take individual responsibility for their contribution and to work together to achieve shared goals.

Digital print methods are inherently more environmentally friendly than the analogue techniques we seek to replace.

Our research shows that, compared to analogue alternatives, digital has a significant impact in reducing energy consumption (by as much as 55%), water consumption (by up to 60%) and CO₂ emissions (by up to 95%), in addition to reducing pollution and waste materials.



Sustainability governance structure

Xaar benefits from a strong ESG governance structure. Our cross-functional Sustainability team has accountability to the Board. This group brings together a wide range of skill sets as well as a shared determination and passion for a more sustainable future. This team developed our ESG Roadmap and continues to take a leading role in driving internal change and progress to ensure we meet our ambitions by the timeline we have set ourselves.

The Roadmap has four key pillars – Environment, People, Innovation and Community; its purpose is to drive our ESG goals beyond the energy reduction scope to a broader Group wide activity. Our Roadmap will provide an essential backbone for much of Xaar's future investment and activity.

Xaar is committed to reducing its impact on the environment wherever possible, with Senior Independent Director Alison Littley having specific responsibility for ESG matters.

Board and Executive Management

Alison Littley, Senior Independent Director

Define corporate strategic vision for ESG and sustainability, approving Group goals

ESG Committee

Global Operations Director, Group People Officer, Company Secretary & Legal Counsel, Head of Marketing, External Sustainability Comms Advisor Group Quality Systems & Sustainability Manager

Review, assess and track Roadmap and established goals

Sustainability team

Selected cross function team, meetings as required to identify, develop and update Roadmap, with external support

Carbon Net Zero team

Cross functional team tasked with looking at opportunities and executing these

Energy Efficiency team

Facilities and EHS site team which drives completion of projects

Environment


Environmental best practice, our investment in sustainable manufacturing and improving operational efficiencies remain key areas of business focus.

The Group fully complies with local and national regulatory requirements in respect of the environment relating to its use, storage, handling and disposal of materials, chemicals, and waste products.

Xaar maintains a Certified Environmental Management System that meets the requirements of ISO 14001:2015, helping us to manage our environmental aspects and impacts, which complements our commitment to continual improvement. It is readily available to view for interested parties. We carry out environment management reviews and audit programmes designed to measure our progress in relation to our policy statement and objectives.

Climate change

We have escalated climate change from an emerging risk to a principal risk as part of our risk management process. Working with an external partner we have investigated, and now understand the climate risks at all Xaar sites and our top ten critical supplier sites. Our Corporate Risk Register has been updated with mitigation plans based on this new understanding.

 [See Risk management on pages 48 to 57](#)

Our aspiration is to lead our industry in environment and sustainability, in order to minimise the impact we and our products have on the world around us. We have set the aspiration to be 'Net Zero by 2030' and to drive sustainable growth and innovation for the zero carbon economy.

 [See Innovation on pages 38 and 39](#)

In 2022 we started the process of assessing the risks and opportunities of climate change to deliver activities that improve our resilience by either mitigating or adapting against physical and transitional risks. We are pleased to report that with our appointed external partner to support us with Scope 3 and TCFD Climate Modelling, we have now completed climate assessments and expect to complete Scope 3 assessments by early 2023.

Our ESG Roadmap has been evaluated against the UN Sustainable Development Goals (SDG) and we believe we touch almost all of the SDGs through our operations, our research and development and our sustainability vision and have mapped and ranked our focus to the SDGs to where we have the greatest potential to positively contribute.

Our major contributions are to SDGs 9, 12 and 13, however we have significant impacts on SDGs 3, 4 and 8.



In 2023 we will review our decision on making a commitment to an external validation methodology such as Science Based Targets initiative, UN Global Compact, B-Corp or Climate Disclosure Project (CDP).

Carbon/greenhouse gas emissions

A key Group activity at Xaar has been to identify opportunities and drive continual improvement in energy efficiencies. We have seen reductions in non renewable energy usage and the related greenhouse gas emissions of the Company recorded in Scope 1 and 2 since 2015.

 [See Greenhouse gas emissions statement on page 45](#)

In 2021 Xaar entered into a supply contract for the supply of green electricity from a renewable source in the UK. The target was to achieve 100% from renewable sources in the UK and to investigate methods to roll this out to other subsidiaries and locations throughout the Group.

All Group UK manufacturing locations with the exception of the newly acquired Megnajet facility are now supplied with certified carbon free electricity. All UK locations, along with the Megnajet site, are expected to move over to a single green power contract in September 2023. EPS, our US manufacturing site, is supplied with power generated from renewable sources.

Energy resilience

We are very conscious that social and political factors are impacting the energy markets. To help mitigate the increase in energy prices and enhance our business resilience, we are working hard to implement projects that will deliver a reduction in electricity demand. This includes a major reconfiguration of our PHBU cleanrooms in Huntingdon. This should yield a 40% electricity reduction by end of Q1 2023, and an overall Group reduction of around 35%.

To further reduce our reliance on the Grid, discussions have been initiated to drive the installation of a solar array at Huntingdon before September 2023.

Sustainable and responsible business continued

Carbon offset

In our printhead business, we are extremely proud to be a carbon neutral inkjet manufacturer, thanks to the offset of regulatory 2020 Scope 1 & 2 carbon impacts (1,815 tCO₂e). We continue to offset our residual 2021 Scope 1 & 2 carbon emissions (212 tCO₂e) and are committed to offsetting our Scope 1 & 2 emissions for 2022 whilst we investigate the full extent of our Scope 3 emissions, which may be added to the offset in the future.

As outlined above, to achieve carbon neutrality for 2021 we offset supported biomass power generation in Brazil and solar power generation in India.

We are pleased to confirm the appointment of an external consultant to support us with Scope 3 and TCFD Modelling. This has helped us to identify key hot spots for action, we have also started a programme of Supplier engagement on Scope 3.

Decarbonisation

A major win for our decarbonisation journey this year has been to switch our UK pool cars to electric. In addition we are facilitating the same electric vehicle switch for employees through a salary sacrifice scheme which is proving popular. At the time of writing, ten electric vehicles (EV) have already been delivered and eight more are on order.

As more of our staff move to EVs, we recognise the need to invest in charge-points infrastructure. We now have ten chargers in place at our printhead sites. The two charge-points available at FFEI are under review for upgrade in 2023.

Waste

We have set out to set, measure and disclose a zero waste to landfill target – with any waste not recycled being sent to a waste to energy recovery process.

Our PHBU and FFEI operations are certified zero waste to landfill by our waste treatment partners Veolia/Crawleys, with any non-recycled waste being sent to waste to energy recovery.

In 2023, we will undertake a review of our other business units to drive this goal. We are aware that the new acquisition, Megnajt, is not a zero to landfill site and it will be a priority to correct this situation in 2023.

Waste diverted*

34,320 kg

Waste recycled*

21,540 kg

* These are the combined figures for Printhead and FFEI businesses.

Plastics and packaging

Reducing plastics in our packaging was achieved in 2022; and all secondary printhead packaging is now fully recyclable. We removed plastic adhesive tapes and have removed plastic bubble wraps, replacing these with recyclable paper alternatives. As a result, plastic consumption has reduced by more than 1.2 tonnes since 2020.

In 2023 we are going to eliminate as much as possible of the primary printhead protection while maintaining Electrostatic Discharge (ESD) protection in the packing. In doing so, we hope to remove more than 50% of the plastic ESD packaging in 2023 and are looking for alternatives that do not use plastic.

Biodiversity

We recognise the relationship between biodiversity and the wellbeing and health of our colleagues. We are looking to support and promote local employee campaigns, starting with the introduction of beehives on site in Huntingdon, UK, and the distribution of wildflower seeds to employees.

In 2023, having introduced two beehives on site in Huntingdon, UK, we hope to offer a training course in managing bees to a few of our employees. We also look forward to the production of Xaar branded honey by summer 2023.

In the coming years, as part of the Great Place to Work scheme, we will develop outside spaces and garden areas for employees to actively promote physical and mental health.

None of our sites are located in or adjacent to protected areas.

Water

Our operations are considered as low water usage, and we do not have any operations in any regions with high water stress. However, within our Huntingdon factory location we need to be cognisant of the risk of flooding in the North of the Cambridgeshire region and the Fens, as well as the stress on the chalk streams and water aquifers in the South Cambridgeshire region. Xaar therefore considers water management throughout all activities of the Company and that water should be treated in a manner that will protect it for future generations.

We regularly monitor and record water usage and utilise water efficient taps and cisterns.

- **Emissions:** Xaar has a permit to discharge issued by Anglian Water; the effluent discharge is checked monthly by external consultants to ensure conformity to site discharge levels and content and reports show discharges are below permitted levels. There are no reported incidents in the last 12 months with regards to emissions to water.

Air

- **Quality:** We regularly monitor the air quality, temperature and relative humidity levels within the Huntingdon cleanroom facility. All cleanroom air supplies are fitted with HVAC filters. Xaar also remains conscious of the need for good indoor air quality, working hard to ensure adequate air circulation and routine maintenance of the systems.






There are smoking areas located away from Huntingdon building entrances.

- **Emissions:** Xaar has a permit issued by Huntingdon District Council due to the business using more than two tonnes of solvent for surface clean down each year. To comply with the permit any waste gases must not exceed total VOCs per room of 75mg/Nm³. This has been audited and confirmed via an external UKAS accredited company. There are no reported incidents in the last 12 months with regards to emissions to air. There are no significant air emissions in relation to NO_x/SO_x.

Printhead water usage	2022	2021	2020
Freshwater usage (m ³)	6,180	5,000	5,087
Intensity ratio (m ³ /£m turnover – excl. royalties)	158	127	146
Effluent and waste water (m ³)	4,649	4,542	4,984

Hazardous materials

All substances handled and used by Xaar are in accordance to the CoSHH regulations and industry best practice, by risk assessment and evaluation in their usage, storage and disposal. Care is taken to look for any less harmful alternative substances where possible to minimise any potential impacts in their use beforehand.

Environmental summary	
Focus, commitments and action	Progress in 2022
Offsetting: Offset all UK regulatory Scope 1 and 2 carbon impacts	In 2022 we completed the offset of the Scope 1 and 2 emissions of our 2021 footprint and we plan to do the same next year.
Climate risks: Identify targets, metrics and climate risks applicable to Xaar Group	Travel Scope 3 emissions are now being tracked monthly. SBTi and other validation methodologies are being considered for 2023 implementation. Climate risks have been assessed for all Xaar Group sites, and at our top ten critical supplier locations.  Please see Risk section on pages 53 to 54
Scope 3 GHG impacts: Examination of Xaar Scope 3 emissions	We have undertaken an examination of Xaar Scope 3 emissions from our supply chain by identifying key Tier 1 suppliers and their GHG emission disclosures. Travel Scope 3 emissions are now being tracked for the Printhead business unit (PHBU). Plans are in place to offset the travel carbon impact as part of the booking process for PHBU and Megnajat travel. We are delighted to add the option of booking train travel for business use, thereby lowering impacts from traditional air or road travel options. Modelling of our Scope 3 impact is underway. This will help us to identify key hot spots for action, and we have also started a programme of supplier engagement on Scope 3.
Xaar Product Return Policy: Assessment of opportunity for used printheads to enable reclaim	We aim to enable responsible consumption in production and remanufacturing of products, reduction in plastic use, reclaiming raw materials, recovery of any heavy metals, copper, lead etc. This was identified as part of Sustainable Roadmap activities and these significant actions are planned as part of sustainable product development and circular economy. A focused activity will define actions in 2023.
Waste management: Set, measure and disclose a zero waste to landfill target	We have set out to set, measure and disclose a zero waste to landfill target – with any waste not recycled being sent to a waste to energy recovery process. PHBU and FFEI operations are certified zero waste to landfill by our waste treatment partners Veolia/Crawleys, with non-recycled waste being sent to waste to energy recovery. In 2023, we will undertake a review of other business units to drive this goal.
Energy efficiency: Upgrade(s) to LED lighting & reconfiguration of cleanroom spaces	Energy reduction projects at our PHBU facility in Huntingdon include a conversion from fluorescent tubes to LED lighting in all buildings where this is not already completed. We expect a 70% reduction in energy associated with lighting. A major energy reduction project at the PHBU facility in Huntingdon is planned for January/February 2023. This should yield a 40% electricity reduction by end of Q1 2023, and an overall Group reduction of around 35%.
Energy resilience: Investigate solar panel installation in Huntingdon	A renewable energy project to install roof mounted solar panels is expected to add resilience and further reduce reliance on grid generated power through a planned PPA. Discussions have been initiated with District Network Operator (DNO) and contract discussions have started between our landlord, PPA supplier and Xaar to drive the installation of a solar array before September 2023.
Greener fuel use: Remove natural gas as an energy and heat source	We have worked with our landlords to complete an assessment of opportunities to reduce gas consumption for heating of our UK sites. At FFEI, the central heating controllers have been updated to allow more efficient use of the system to control temperature in the offices in Hemel Hempstead.
Greener transport: Launch EV charging & incentive schemes	We have installed ten new EV chargers at our Huntingdon and Waterbeach sites. This adds to the two charge-points already in place at FFEI. Our Salary Sacrifice EV scheme continues to grow in popularity – with ten EVs delivered and eight more on order for delivery in 2023/24.
Plastics and packaging: Identify and eliminate non-product based single use plastics	Reducing plastics in our packaging was achieved in 2022; and all secondary printhead packaging is now fully recyclable. We removed plastic adhesive tapes and have removed plastic bubble wraps, replacing these with recyclable paper alternatives. As a result, plastic consumption reduced by more than 1.2 tonnes in 2022.
Focus areas for 2023	<ul style="list-style-type: none">  Drive all UK sites to a single green energy framework deal, minimising cost increases and maximising energy flexibility.  Install solar at Huntingdon facility to reduce reliance on the grid.  Achieve 10% reduction in mains water use.  Plan Bee: Beekeeping training for in-house volunteers.

People

Human rights

The Group respects all human rights and regards those rights relating to non-discrimination, fair treatment and respect for privacy to be the most relevant and to have the greatest potential impact on its key stakeholder groups of customers, employees and suppliers.

The Group undertakes extensive monitoring of the implementation of all of its policies and has not been made aware of any incident in which the organisation's activities have resulted in an abuse of human rights.

Xaar is committed to only supplying products that contain conflict free materials. Suppliers of parts containing tin, tantalum, tungsten or gold to Xaar are sent and required to complete an EICC- GeSI declaration providing evidence that parts supplied do not contain minerals sourced from areas of conflict – DRC or adjoining areas.

The Board has overall responsibility for ensuring that the Group upholds and promotes respect for human rights. The Group seeks to anticipate, prevent and mitigate any potential negative human rights impacts as well as enhance positive impacts through its policies and procedures, in particular, through its policies regarding employment, equality and diversity, treating customers fairly and information securely. Group policies seek both to ensure that employees comply with the relevant legislation and regulations in place in the UK and other operating locations and to promote good practice. The Group's policies are formulated and kept up to date by the relevant business area, authorised by the Board and communicated to all employees.

Code of Conduct


All new employees complete an induction process that outlines the expectations of the Company, its employees, customers and suppliers for the way in which business is conducted and helps to avoid situations that might lead to adverse legal issues or damage to our reputation.



The Group's most important corporate policies are incorporated into the Xaar Code of Conduct, and should be complied with at all times:

- Anti-bribery and Corruption Policy
- Confidential Information Policy
- Corporate Criminal Offence Policy
- Data Protection Policy
- Employee Share Dealing Code
- Email and Internet Policy
- Gifts, Entertainment and Hospitality Policy
- HS&E Policy Statements
- Sanctions Policy
- Whistleblowing Policy.

Each year the Group requires all employees to read and confirm that they understand and comply with these policies.

 See Group policies outlined in the Non-financial information statement on page 58

Whistleblowing

We have a Whistleblowing Policy that encourages open and honest communication where incidents of non-compliance are seen in our business. Whistleblowing issues are reported directly to management, and any significant issues, should they arise, are reported to the Audit Committee. In each instance, cases are investigated in detail and appropriate action taken. There have been no whistleblowing incidents or reports by senior management to the Audit Committee.

Modern slavery

The Group is committed to acting ethically and with integrity in all our business dealings and relationships, implementing and enforcing effective systems and controls to ensure modern slavery in all its forms (including human trafficking, forced labour and child labour) is not taking place anywhere in our Group businesses or in any of our supply chains. The Group has published a Group-wide Modern Slavery Policy and a statement on the steps taken to prevent slavery, which is available on the Group's website.

Health & safety and environment

Xaar has manufacturing sites in Huntingdon, Hemel Hempstead, Kettering and the USA, supported by R&D laboratories in Cambridge and Sweden, alongside head office functions in Cambridge, plus sales offices worldwide.

It is always Xaar's intention to conduct business in a manner that protects the public, the environment, and employee safety.

Xaar's Environmental and Health and Safety policies provide a framework for the setting and reviewing of Occupational Health, Safety and Environmental Objectives. This demonstrates Xaar's continued commitment to the prevention of injury and ill health and also the continual improvement in our Environmental and Occupational Health and Safety Performance. Xaar believes that the combination of a safe place of work and safe working practices, together with a productive and innovative environment, are critical to the continued success of the Company.

UK Health & Safety reports	2022	2021
RIDDORs*	0	0
Accidents	22	9
Incidents	11	11
Near misses	8	5

* Reporting of Injuries, Diseases and Dangerous Occurrences Regulations.

The Group undertakes R&D activities and manufactures products in the UK and the USA. The Group complies with all local and European legislation. The Group's manufacturing facility in Huntingdon is both ISO 9001:2015 and ISO 14001:2015 certified and as a minimum complies to HSG65. It is the Group's policy to maintain this level of certification for its Huntingdon manufacturing facilities and to comply at all times with all relevant environmental and other legislation in the territories in which the Group operates. The Group is compliant with REACH ('Registration, Evaluation, Authorisation and restriction of Chemicals'), WEEE ('Waste Electrical and Electronic Equipment') and RoHS ('Restriction of the Use of Certain Hazardous Substances') directives, as required under UK and European legislation. The Group has a proactive Health and Safety System modelled on OHSAS 18001/HSG65 in Cambridge, Huntingdon and Hemel Hempstead.

Equality and diversity

The Group is committed to providing a working environment in which employees feel valued and respected and are able to contribute to the success of the business. Employees are requested to co-operate with the Group's efforts to ensure that the policy is fully implemented.

The Group's aim is that its employees should be able to work in an environment free from discrimination, harassment and bullying, and that employees, job applicants, customers, retailers, business introducers and suppliers should be treated fairly regardless of:

- race, colour, nationality (including citizenship), ethnic or national origins;
- gender, gender reassignment, sexual orientation, marital or civil partnership status;
- religious or political beliefs or affiliations;
- disability, impairment or age;
- real or suspected infection with HIV/AIDS;
- membership of a trade union;
- pregnancy, maternity and paternity;

and that they should not be disadvantaged by unjust or unfair conditions or requirements.

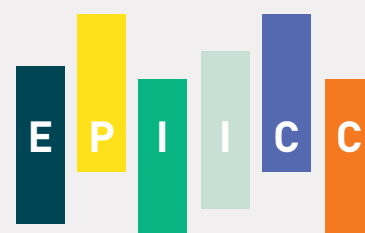
The Group aims to ensure that applications for employment from people with disabilities, and other under-represented groups, are given full and fair consideration and that such people are given the same training, development and job opportunities as other employees. Every effort is also made to retrain and support employees who suffer from disabilities during their employment, including the provision of flexible working to assist their re-entry into the workplace.

The Group places considerable value on the involvement of its employees and has continued to keep them informed of the various factors affecting the performance of the Group. This is achieved through written communications shared through the Company intranet and email, and formal and informal meetings. All employees participate in a bonus scheme based on individual performance and Group business targets and, in the UK, have the opportunity to participate in an HMRC approved Share Save Scheme.

Based on the closing headcount at 31 December the split of employees (excluding the Non-Executive Directors) by gender was as follows:

	2022 Male/Female	2021 Male/Female
All employees	346/98	350/105
Executive Directors	2/0	2/0
Managers	39/15	39/7
Employees	305/83	307/97

A value-led culture



Everything with Passion

We care about our technology, our products, our partners and each other.

Innovative

We always look for new, better solutions.

Integrity

We deliver on our promises.

Creative

We push the boundaries of what's possible.


Collaborative

We work together as a team and with our clients.

CEO pay gap ratio

The following table sets out the ratio of the CEO's total remuneration in respect of FY22 (taken from the single figure table on page 96) to the 25th percentile, 50th percentile (i.e. the median) and the 75th percentile full-time equivalent (FTE) of the Group's UK employees. In line with the applicable regulations, the corresponding ratios for 2021 are also included.

	2022	2021
Method	Option A	Option A
25 th percentile	61:1	16:1
Median pay ratio	40:1	11:1
75 th percentile	28:1	7:1

 Further information is provided in the Remuneration Committee report on pages 101 and 102

Gender pay gap

Gender pay reporting is required for companies with over 250 employees. Xaar is reporting as Xaar plc, including all UK subsidiaries. The snapshot date for Xaar's data is 5 April 2022. At that point Xaar had 320 relevant employees: 255 male and 65 female.

It is fundamentally important to understand that a gender pay gap does not necessarily mean men are paid more money for doing the same job. At Xaar we are committed to ensuring we pay based on merit not gender and we regularly monitor our pay awards to ensure that we pay the same rate for similar roles.

Sustainable and responsible business continued

Gender pay gap continued

Xaar's mean gender pay gap stands at 13.61% (2021: 14.38%). As with many companies we do have a gender pay gap, though our results are consistent with other companies who operate within the technical, manufacturing or engineering sector.

There has been a shift across the quartiles with more movement for female employees from lower middle quartile to higher middle. This is a reflection of more female employees being promoted and appointed to senior roles.

We appreciate that improving our diversity will improve our results, and we continue to work on improvements over the longer term. A large part of Xaar's gender balance gap is due to the challenges of recruiting women into science and technology roles. Nevertheless we are continuing to work on increasing our gender balance in the following ways:

- Xaar operates in a male dominated industry and we are working to ensure that our hiring managers are trained to understand and recognise gender bias. We do, however, receive significantly fewer applications from females for technical roles.
- Our Talent Acquisition team assists hiring managers by giving practical advice, support and monitoring for gender bias. We seek to have both female and male candidates as part of the hiring pool whenever possible and we constantly review our processes to ensure we are encouraging more female applicants.
- Xaar is supporting Cambridgeshire *Engineers of the Future* by sponsoring local schools' Imagineering Clubs, which is designed to introduce children to engineering and hopes to inspire young people and especially girls to take up STEM subjects. A number of our women from Engineering participate in these endeavours.
- We support all employees to achieve their potential with a talent management programme and we offer flexible working arrangements to support working parents.

Pension

The Group Personal Pension scheme is administered by Scottish Widows. The Company pension contribution for Directors (or cash allowance equivalent) does not exceed the contribution available to the majority of the workforce, currently 6% of base salary.

All the equity assets in the Pension Portfolio Funds now track indices, which exclude certain stocks on environmental, social and governance (ESG) grounds.

The funds, managed by their strategic partners State Street Global Advisors (SSgA) and BlackRock, track new benchmarks, which reflect exclusions policies, aligned with Scottish Widows' own policy introduced in 2020. The new benchmarks are amended versions of existing FTSE indices. They incorporate all of the stocks in the original indices, for example the FTSE All-Share, minus the excluded stocks.

Companies excluded from the indices include those that are severely violating international standards in relation to human rights, labour rights, the environment and corruption, known as the UN Global Compact (UNGC), controversial weapons manufacturers and those involved in thermal coal or oil sands.

Flexible benefits

In addition to the pension contributions, employees are also offered a range of flexible benefits each year, against which they can obtain individual and family cover including income protection and life assurance. Within the UK, there are a number of salary sacrifice schemes for employees including an electric vehicle scheme for employees to lease a new electric vehicle and a cycle to work scheme where employees can obtain finance and discounts on new bikes including electric options.

Employee health and wellbeing

Employee health and wellbeing remains a keen priority for the Group.

In line with this approach, the businesses within the Group have prioritised different initiatives that best reflect their workforce, such as volunteering and employee wellbeing policies, regular wellbeing weeks, step challenges, weekly Yoga sessions, qualified mental health first-aiders and other activities to encourage and promote a healthier workforce.

As part of the Flexible Benefits programme, employees have access to:

- **Health Shield**, a health benefit solution offering access to discounts and reimbursement of healthcare costs such as dentists, opticians, physiotherapists and health checks.
- **Fitness**, employees can pay for gym membership or gain access to gym discounts via a website, that also offers discounts on items such as fitness trackers, experience days and sports clothing.
- **Wellbeing** via an **Employee Assistance programme**, a positive preventative programme of information, advice and services that can help individuals deal with events in their everyday work and personal life, including bereavement assistance, manager consultation and coaching, and immediate crisis intervention, through telephone counselling teams 24/7.

Training, development & retention

The role of Training and Development Manager was added to the HR function in 2022 with key enhancements to the offering including:

- An updated suite of Learning and Development tools being developed to ensure key skills are developed and enhanced.
- 1,850 hours of professional development being undertaken.
- Internal courses are developed in conjunction with the Institute of Learning and Management (ILM) to support key manager development.

- An Apprenticeship Programme was embedded with four engineering apprentices joining the programme across the Group.

The Group operates an online performance management and appraisal system providing opportunity for individual discussions on training needs and career planning. This is supported by a talent management and succession planning process from which the Executive Management Team assesses the outcomes, formulates action plans and reviews progress. Two talent Development Cohorts have been established with individual and group learning planned for 2023.

The Board is kept informed of the results. The loss of key personnel is identified by the Board as a key risk and is set out in further detail in the principal risks and uncertainties table on page 51. Voluntary labour turnover was 10.4% across the Group in 2022 (2021: 5.5%).



People summary

Focus, commitments and action	Progress in 2022
<p>Early years engagement Proactive engagement with young people</p>	<p>We continue to support activities that promote STEM subjects amongst young people. Next year, we plan to expand our activities to reach out to multiple schools (primary, secondary and higher education).</p> <p>Our Apprenticeship Programme in PHBU, FFEI and EPS is working well – and we can report that we now have a Framework across the Group. We enrolled four new apprentices onto programmes in 2022 bringing our total to 13 live apprenticeship programmes in Xaar Group.</p> <p>Our graduate framework is in place, however we have no active graduate participants this year.</p> <p>We have three new industry placements across the Xaar Group in 2022 from Huddersfield University, Queen Mary University of London and Leipzig University.</p> <p>We have entered into three Sponsorship Programmes, supporting an A-Level and two PhD level individuals at Kings school, Peterborough, Oxford and Sheffield respectively.</p>
<p>EPIICC: Relaunch of Xaar Values across the Group</p>	<p>Following the launch of our EPIICC values in 2021, these were further embedded across the Group during 2022.</p> <p>During the year there were 598 peer nominations for an EPIICC award with the winning employees receiving Group-wide recognition for their commitment to living the values.</p>
<p>Talent attraction & retention: Prioritising our focus on people</p>	<p>Attraction and retention remain critically important in a challenging employment market. In 2022 voluntary turnover remained low at 8.2% which resulted in relatively low levels of external recruitment. In 2023 we will be updating our employee value proposition, refreshing our careers website and looking at using additional channels to attract future employees. To focus on retention, two future talent cohorts have been launched to support the development of future leaders and managers. Throughout 2022 we have continued to engage with our employees by running Exec Exchange sessions and Meet the NEDs sessions to ensure all employees have the opportunity to discuss areas of the business and the strategy directly with leaders.</p>
<p>Wellbeing: Supporting our employees' physical & mental health</p>	<p>We continued through 2022 to embed a positive intervention programme with advice and support available to all employees.</p>
<p>Health & Safety: Ensure zero harm across our operations</p>	<p>New accident and near miss reporting process has been integrated into all the Xaar Group locations.</p> <p>No RIDDOR level accidents have been reported this year.</p>
<p>Investing in our people: Learning, development & skills building</p>	<p>We supported Learning at Work Week in May 2022 through several initiatives - which were attended by 109 of our colleagues across the nine events. This resulted in 131 hours of learning.</p> <p>We have achieved 1,850 CPD (continuous professional development) hours for Xaar. Tracking of the wider Group hours will start in 2023.</p>
<p>Communications: Establishing regular dialogue with internal stakeholders</p>	<p>We continue to use a wide range of channels to communicate with our internal stakeholders. This includes:</p> <ul style="list-style-type: none"> • Xaar Connected (fortnightly) • CEO's email update (weekly) <p>We plan to undertake an Employee Survey in 2023 as part of the work we are doing for the Great Places to Work Programme.</p> <p>We also communicate our sustainability and ESG progress through a regular series of blogs (shared internally and externally). We have commissioned a Group level sustainability video which will be completed in Q1 2023.</p>
<p>Equality, Diversity & Inclusion</p>	<p>We continue developing policies and practices in all areas of our business to ensure that our values in this area are fully embraced.</p>
<p>Focus areas for 2023</p>	<ul style="list-style-type: none"> ✔ Complete Great Place to Work Programme and roll out key actions. ✔ Continue to amplify internal communications around our Roadmap. ✔ Examine Xaar Group working patterns to drive a more diverse applicant pool.

Innovation

Xaar recognises that innovation is key to achieving many of the sustainability goals across all four pillars that support our Sustainability Roadmap. For 30 years, we've been reinventing inkjet and reimagining what's possible for printheads.

In 2022 we relaunched the Product Lifecycle Management process in all parts of the Xaar Group. It is used to develop new and innovative print related products; this now includes Design for Environment as part of the development considerations. Eco-design is the systematic application of environmental lifecycle considerations at the product design stage. The aim of eco-design is to avoid or minimise significant environmental impacts at all stages of the lifecycle of a product, from sourcing of raw materials and purchased components, design and manufacture, to distribution, use and end-of-life disposal.

We are researching ways to use biodegradable structural parts in the manufacture of our products. An area of focus is to find an alternative, more sustainable material than Polylactic Acid (PLA) which is a biodegradable plastic used to print the majority of our jigs and fixtures. Our Operations team has successfully trialled the use of recycled PLA filaments generated from returned and waste PLA. These are supplied in 100% plastic-free sustainable packaging with easy to recycle cardboard spools.

We are also examining the properties of Fishy Filaments, a printing filament manufactured from end of life fishing nets recovered from Cornish fishery fleets.

In addition, we have high hopes that a new material in development at Fishy Filaments may be resistant to ink fluids, and therefore be a candidate for manufacture of printheads.

Precautionary principle

The Company supports the precautionary principle by avoiding materials and production methods that pose environmental and health risks when suitable alternatives are available.

Xaar continues to review changes in the Restriction of Hazardous Substances Directive (2011/65/EU). As a result we are working hard to eliminate Substances of Very High Concern (SVHC) from the manufacturing process.

Resource efficiency and circularity

Our products and processes are designed in such a way that energy and raw materials are used efficiently, and waste and residual products are minimised over the product lifecycles.

We have implemented a successful circular and resource efficient approach to the recovery of key electronic and piece parts from printheads that do not meet our high standards. This innovative approach, along with considerable sourcing efforts, has enabled us to continue production despite global shortages and has enhanced our business resilience.

Environmental performance

The Company routinely audits, follows up and reports on its environmental performance, with particular emphasis on evaluating the potential risks of present and future products and operations.

Product quality

We issued a number of Technical Bulletins throughout the course of 2022, advising customers on product updates, system improvements and product end of life announcements. No product recalls were initiated in 2022.



Innovation summary

Focus, commitments and action

Progress in 2022

Sustainable supply chain:

Undertake supplier review, sustainability policy and partnership to enhance sustainable opportunities

In order to baseline our Supplier Scope 3 GHG emissions we have partnered with external consultancy CO2A. Their experts will model our carbon footprint due to upstream activities. The model is based on financial transactions but includes typical transport carbon impacts from the countries each supplier works within.

In addition, we have started discussions with our key suppliers to validate the model and to enable actions for what we foresee as our likely highest carbon impacting supply chain partners.

As part of all new part supply contracts we are now looking for the carbon footprint to allow a selection on the basis of quality, cost and sustainability for all future decisions.

We have already taken the decision for some Far East suppliers to order months in advance and ship by boat to dramatically reduce the carbon impact of transport, where previously we used air.

Sustainable materials:

Investigate & explore new opportunities

While we transition to recycled PLA for all of our jigs and fixtures the use of the current Fishy Filaments materials is proving difficult. Development by this innovative company continues and we remain hopeful that a new material may provide an easier option for printing jigs and fixtures, and potentially structural printheads parts.

Critical supplier climate risks

Undertake full review of top ten suppliers

With our partner CO2A we are undertaking a climate risk analysis of each of the Group's top ten critical supply partners. Our intent is to work with each to mitigate the perceived risk as climate temperatures increase and the environment becomes more susceptible to extreme weather events.

Focus areas for 2023

- ✔ Develop a generic Printhead Sustainability metric that can be used across the industry to inform customers and allow comparisons between competitors.
- ✔ Establish Continuous Improvement team to look at cost down and Sustainable Improvements on New and Established products.
- ✔ Develop a future roadmap towards a sustainable printhead.
- ✔ Investigate rationale and business case for projects that explore participation in circular economy of printhead reclaim and solvent recycle.

Community

Xaar is proud to play an active role in the communities in which it operates.

As part of our commitment to social value and community we have an active programme of sponsorship for projects and initiatives that are aligned to our business values.

For example our Printhead business sponsors an Imagineering Club within a local primary school (Stukeley Meadows School). Imagineering Clubs are designed to introduce children to engineering through fun activities. Our employees provide their time to support these within work hours.

In June 2022 we welcomed ten pupils from Stukeley Meadows School in Cambridgeshire on site for a day of activities and learning. This was not simply a great way to add value and connect with our local community, it was a valuable and energising way to inspire the next generation of youngsters through STEM-based activities ('Science, Technology, Engineering and Mathematics').

Charities

At a strategy and policy level, we have updated and published a Group Charity Policy. Moving forward, it will help us to define how we select and work with our charity partners. We think this is an important part of our ESG/Sustainability agenda and will be a useful framework.

Xaar contributes annually to charitable causes through three funds:

A chosen charities fund: with our three-year affiliation to Break the chosen charities fund in the UK has promised to match-fund up to £20,000 raised by staff each year from April to April.

In the US, EPS continues to support Manchester Machine Makers, a club that is dedicated to promotion of STEM subjects.

A Sponsorship fund: for staff and their families engaging in charity events or team activities, Xaar will provide up to £100 towards an event (e.g. charity golf days, sporting events, donations to community foodbanks) or team sponsorship. Wherever possible the Xaar logo should be incorporated (e.g. in a team sports kit). There is a fixed annual budget to cover all sites.

A Central fund: Xaar will donate monies as appropriate to disasters and emergencies or other local causes not covered by the other funds. This will be at the discretion of the executive team. In total, the Group made charitable contributions to local and national charities during the year totalling £2,966. (2021: £5,060).



Charitable sponsorship

Chosen with input from our colleagues, our charity work inspired us to enter into a three-year partnership with the East Anglian children's charity 'Break' to help change the lives of vulnerable young people on the edge of care, in care and leaving care (www.break-charity.org/charity/). We have set ourselves a fundraising target of £20,000 – we aim to reach this figure with the help of our internal Charity Champions and Break.

While our fundraising activities are clear we hope that mentoring and potentially employment opportunities may also be offered as a result of this longer-term union.

Volunteering

Our senior leadership team recognises the benefits to Xaar, our employees and to the wider community of a framework within which volunteering can take place. Managed well, volunteering can raise our profile within the community and support our social responsibility plans.

Xaar supports employees' voluntary work/ activities by providing 'holiday matching' of up to two and a half days a year. We believe this will help them get involved in their community, support employee mental health and wellbeing through positive activities and additionally assist them in developing new skills and hone existing ones.

Xaar has donated and grant matched time off to an employee in 2022 to travel overseas and support construction of a school/facilities building in Africa. That employee was so enthused by the effect of his contribution that Xaar intends to support grant matched time off for a follow up project in 2023.

Political donations

The Company has a longstanding global policy against making contributions to political parties, political committees or candidates using Company resources (including monetary and in-kind services), even where permitted by law.

No political donations were made in the current or previous year.

Taxation

We aim to manage our tax affairs in accordance with national legislative provisions and within the guidelines set down by the Organisation for Economic Cooperation and Development (OECD). Our objective is to structure our operations tax efficiently and take advantage of available incentives and exemptions provided by governments for eligible capital investments, R&D and similar expenditure.

We do not enter into any artificial tax arrangements.

We have not received any fines or penalties from any government tax agencies.



Community summary





Focus, commitments and action	Progress in 2022
<p>Charity partnerships: Alignment of values & fundraising activities</p>	<p>This year, we released a new Group-wide Charity Policy. This is designed to help us align our chosen charity partnerships with our Company values. This policy clarifies our commitment to work with organisations that support young people and vulnerable groups in society.</p> <p>Our Charity Champions network is now established across the Xaar Group with several fundraising activities completed and more planned.</p> <p>In the UK, we have established a three-year partnership with East Anglia based charity Break. In the USA, we continue to support Manchester Machine Makers.</p> <p>Xaar has committed to match-fund up to £20,000 of our fundraising activities in the UK.</p>
<p>Volunteering: Increase volunteering opportunities</p>	<p>Our Volunteering Policy has been fully rolled out across the Group. This allows a matched period for time taken by an employee to volunteer with a recognised charity up to 2.5 days a year.</p> <p>In 2022, one of our team volunteered to help build a school in Africa, and will return in 2023 to continue this valuable work.</p>
<p>Supporting STEM subjects: Working with local communities & schools</p>	<p>In the UK, we are working with Stukeley Meadows STEM Club. Ten of their students visited Xaar Huntingdon for the day in 2022 to take part in tours and activities to inspire their interest in technology-focused careers. We plan to run taster sessions in a second primary school and support a STEM activity day in a third primary school in January 2023. We also intend to support industry focused lessons to support the curriculum in a local secondary school in 2023.</p>
<p>Electronic equipment reuse: Exploring options for redeployment for schools & local social projects.</p>	<p>Xaar Group has taken delivery of our first 15 remanufactured laptops from our partner Circular Computing. This order has avoided over 4tCO₂e when compared with ordering new laptops. It is hoped that in three years' time this will form a closed circular route with these laptops being remanufactured and reused again.</p> <p>Any waste electrical equipment that is beyond use for schools and local social projects is being sent for precious metal recovery. We continue to review all end of life electronics for opportunities to support schools or local projects.</p>
<p>Focus areas for 2023</p>	<ul style="list-style-type: none"> ✔ Continue to increase awareness of the work of UK Charity Partner Break and provide support for fundraising in 2023. ✔ Drive quarterly site-based activities through Charity Champions network, and support Break by promoting additional activities such as firewalks and skydiving. ✔ Initiate mentoring support for Break's young people with help and engagement from our UK staff. ✔ Create a Volunteering Diary to encourage staff engagement and publish this across UK Xaar Group.

Task Force on Climate-related Financial Disclosures (TCFD)



In meeting the requirements of Listing Rule 9.8.6 R, the Board has concluded that:

We comply with the recommended disclosures across each of the provisions. See below for details.

Disclosures	Recommended disclosures	Response
A. Governance		
Disclose the organisation's governance around climate-related risks and opportunities.	1. Describe the board's oversight of climate-related risks and opportunities.	<p>The Xaar plc Board reviews key climate-related risks and opportunities and oversees mitigation strategies as part of the bi-annual review of principal and emerging risks.</p> <p>Alison Littley, Senior Independent Director, has specific responsibility for ESG matters, including climate change and sustainability.</p>
	2. Describe management's role in assessing and managing climate-related risks and opportunities.	<p>Executive management receives reports from an ESG Committee whose members consist of senior managers across the Group.</p> <p>The ESG Committee meets on a quarterly basis to assess the opportunities and proposals developed by the Sustainability Working Group.</p> <p>The Sustainability Working Group meets regularly and is driving our roadmap whilst also receiving information from both the Carbon Net Zero team and Energy Efficiency team.</p> <p> See governance structure on page 60</p>
B. Strategy		
Disclose the actual and potential impacts of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning where such information is material.	3. Describe the climate-related risks and opportunities the organisation has identified over the short, medium, and long term.	<p>We completed climate scenario planning out to 2100 across two climate scenarios (e.g. RCP 2.6, RCP 8.5).</p> <p>The review examined all Xaar sites globally and our top ten critical supplier sites using 12 separate climate models, in each case the RCP 8.5 model was used to assess risks at the most extreme expected temperature rises (4.5oC).</p> <p>The report concluded physical risks are low to very low in almost all cases.</p> <p>There are two Xaar sites at risk of flooding:</p> <ul style="list-style-type: none"> • Bayes Street Kettering – surface water high risk • Fuzhou Avenue, Bao'an District Shenzhen – one metre above sea level <p>There are three supplier sites of ten analysed with risks:</p> <ul style="list-style-type: none"> • Site 1 IPRO PID five metres above sea level near coast • Site 4 Fabrinet five metres above sea level protected by Bangkok (7km inland) • Site 5 CTS Tianjin China 0 metres above sea level near coast <p>Mitigations</p> <p>China is expected to create one metre coastal defences to protect its major population centres and both the Xaar and CTS sites are part of major population centres and should be part of these coastal actions.</p> <p>IPRO PID at five metres will not be affected for a long time, so there is plenty of time to monitor actual sea level rise before making any risk judgement.</p> <p>Fabrinet at five metres, and 70km inland will not be affected for a long time, so there is plenty of time to monitor actual sea level rise before making any risk judgement. We expect coastal defences to be put in place to protect Bangkok which will also protect Fabrinet.</p> <p> See Risk management on pages 53 to 54</p>

Disclosures	Recommended disclosures	Response
B. Strategy continued		
	4. Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning.	<p>In managing these financial climate-related risks our business model would not require material change, except for increasing inventory levels of components to account for transport delays arising from exceptional weather events, and to consider mitigation for potential business disruption, e.g. flood defences.</p> <p>Opportunities exist in the transition to a low carbon manufacturer, by reducing both energy usage and utilising renewable energy sources to deliver lower costs to the business. Product development will incorporate sustainability as a central objective, to transition manufacturing from a linear to a circular process and to being a process to reduce, reuse and recycle materials, all to be undertaken as part of Xaar's overall Sustainability Roadmap.</p> <p> See Risk management on pages 53 to 54</p>
	5. Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	<p>We have undertaken a high-level review of the likely impact of 2°C and 4.5°C global warming scenarios (see section 3 above), an independent external climate related scenario review in 2022 to identify physical and transition risks and opportunities in delivering carbon neutral manufacturing leading to 'Net Zero by 2030'. The review identified very low to low risks in most cases with five sites identified with slightly higher risk scenarios.</p> <p> See Risk management on pages 53 to 54</p>
C. Risk management		
Disclose how the organisation identifies, assesses, and manages climate-related risks.	6. Describe the organisation's processes for identifying and assessing climate-related risks.	<p>The Group has processes in place for identifying, evaluating and managing the principal risks, which could have an impact upon the Group's financial performance. Climate change has been disclosed as an emerging risk in recent years, and has been escalated to a principal risk category in 2021.</p> <p>With new inputs from an independent report the Board has considered the potential impact of climate change that could occur in the short, medium and longer term.</p> <p> See Risk Management on pages 53 to 54</p>
	7. Describe the organisation's processes for managing climate-related risks.	See above – A. Governance – Xaar has introduced a new structure to identify climate-related risks to be reported to the Board bi-annually including making decisions to mitigate, transfer, accept, or control those risks.
	8. Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management.	As part of the Group's risk management, within the detailed risk register, climate-related risks are determined alongside other principal risk areas, e.g. manufacturing facility, inventory and supply chain risks. The assessment is quantified via a Likelihood/Magnitude matrix to determine the overall net risk after mitigation.
D. Metrics & Targets		
Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	9. Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process.	<p>Metric updates for 2022:</p> <ul style="list-style-type: none"> Investigate metrics and targets to be defined as part of Science Based Targets initiative Continuing improvement/reduction in Scope 1 & 2 emissions along with intensity measurement Scope 1 & 2 emissions are being offset to become 'carbon neutral' Analysis completed to recognise and begin to action travel, commute and upstream Scope 3 emissions Set, measure and disclose waste to landfill target, any waste not recycled being sent to a waste to energy recovery process. We are aware that the new acquisition, Megnajet, is not a zero to landfill site and it will be a priority to correct this situation in 2023. <p> See page 29 for Sustainability Roadmap</p>

Task Force on Climate-related Financial Disclosures (TCFD) continued

Disclosures	Recommended disclosures	Response
D. Metrics & Targets continued		
	10. Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	<p>GHG emissions are disclosed as per the SECR requirements for Scope 1 and Scope 2.</p> <p>An initial assessment has been completed for Printhead business unit Scope 3 emissions, and a boundary developed.</p> <p>We have recognised Scope 3 emissions arising from employee travel and commuting; a model has been generated to allow an estimate of the upstream value chain and direct interaction with suppliers to validate the quality of this modelled data has been initiated. Downstream value chain activities have not yet been examined, and with the initial upstream results being approximately 100 times our own internal Scope 1 & 2 footprint we intent to focus on upstream value chain activities for a number of years before moving to downstream review.</p> <p> See GHG/SECR disclosure on page 45</p>
	11. Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.	<p>Xaar has committed short-term targets:</p> <ul style="list-style-type: none"> • To achieve a net zero target by 2030 • 100% renewable (green) electricity at UK facilities by Sep 23 • Zero waste to landfill • Offset of all Scope 1 & 2 Group emissions as we continue to drive reductions in energy use. <p> See page 33 for progress summary</p>

Greenhouse Gas Emissions statement

Xaar plc has calculated its global greenhouse gas (GHG) emissions statement using an operational control consolidation approach

Scope 1 emissions

Scope 1 emissions occur from sources that are owned or where Xaar plc has operational control. This includes direct emissions from gas combustion in our buildings, fuel used in leased Company vehicles and for the first time we have chosen to include impacts from refrigerant leaks (not currently required).

Actual and estimated gas consumption data has been collected from each of the leased properties under the control of the Xaar Group, from data sources including direct meter readings, meter readings from suppliers included on invoices and estimations where required based on available information from property management suppliers and other sources. Actual mileage data has been collected from the leased Company vehicle fleet.

Scope 2 emissions

Scope 2 refers to indirect emissions from the consumption of purchased electricity (also including any purchased heat, steam or cooling) from facilities owned or under the operational control of Xaar plc. Actual and estimated data has been collected from each of the leased properties under the control of the Xaar Group, from data sources including direct meter readings, meter readings from suppliers included on invoices and estimations where required based on available information from property management suppliers and other sources.

Scope 3 emissions

Scope 3 emissions are all indirect emissions – not included in Scope 2 – that occur in the value chain of the reporting company, including both upstream and downstream emissions.

Scope 3 CO₂ emissions currently represent calculated and estimated CO₂ emissions from travel and employee commuting as well as modelled totals from our upstream emissions. Our financial records were reviewed to extract purchased product data which was then used to calculate the carbon footprint of the matched products using MRIO data from CenSA (now University of Leeds as used by DEFRA). As the Group's Sustainability Roadmap progresses, we aim to collaborate with the supply chain to validate our upstream model data and reduce CO₂ emissions. We will continue to disclose ongoing progress in our Annual Report. Activities on downstream Scope 3 have not yet been initiated, but plans are in place to understand these in the future.

 Please refer to page 32 for actions that Xaar is undertaking to offset its carbon emissions

Assessment parameters	
Baseline year	1 January 2013 to 31 December 2013
Consolidated approach	Operational control
Boundary summary	All entities and all facilities under operational control included subject to the materiality threshold applied
Consistency with the financial statements	The only variation is that leased properties deemed to be under operational control have been included in Scope 1 and 2 emissions
Materiality threshold	Materiality has been set at Group level at 5%*
Assessment methodology	Greenhouse Gas Protocol and ISO 14064-1 (2006)
Intensity ratio	Emissions per £'000 turnover exc. royalties

* The total of any excluded emission sources is estimated to be less than 5% of Xaar plc's total reported emissions.

Greenhouse gas emissions		Renewable	Non-renewable	2022 Total	Renewable	Non-renewable	2021 Total (restated)
Global energy use	KWh	10,525,987	1,022,484	11,548,472	10,610,069	1,741,835	12,351,905
	%	91.1%	8.9%		85.9%	14.1%	
UK	KWh	10,292,374	509,164	10,801,538	10,205,766	962,135	11,167,901
Non-UK	KWh	233,613	513,321	746,934	404,303	779,701	1,184,004
Absolute values							
Scope 1	tCO ₂ e	–	220	220	–	98	98
Scope 2	tCO ₂ e	–	21	21	–	116	116
Scope 3	tCO ₂ e	–	479	479	–	150	150
Total	tCO ₂ e	–	720	720	–	364	364
– Scope 1 & 2 emissions of which UK	tCO ₂ e	–	156	156	–	198	198
Normalised values							
Scope 1	tCO ₂ e/£'000	–	302	302	–	165	165
Scope 2	tCO ₂ e/£'000	–	29	29	–	198	198
Scope 3	tCO ₂ e/£'000	–	658	658	–	254	254
Total	tCO ₂ e/£'000	–	989	989	–	617	617

* UK energy certified by EON, by Guarantees of Origin from renewable wind sources. US energy (Green Mountain) 100% carbon free, 68% renewable (balance being nuclear). Significant site based emissions improvements since 2021. The Nottingham site (carbon impact of 35 tCO₂e) was sold in 2021. A 45 tCO₂e reduction as FFEI moved to a green electricity source. Our 2022 figures show an emissions increase because we have chosen to disclose refrigerant leaks across the Group. The leaks generated a total Scope 1 impact of 124 tCO₂e (2021 0). 2021 energy figures have been updated to include gas kWh.

Historic greenhouse gas emissions	2020	2019	2018	2017	2016	2015
Scope 1 – tCO ₂ e	75.0	108.3	124.8	147.7	167.0	162.2
Scope 2 – tCO ₂ e	1,741.0	2,622.8	3,128.1	4,088.0	4,432.0	4,475.2
Total – tCO₂e	1,816.0	2,731.1	3,252.9	4,235.7	4,599.0	4,637.4


Key performance indicators

Measuring our success

We monitor progress against the delivery of our strategic goals using financial key performance indicators (KPIs).

The Company uses a number of alternative performance measures (APMs) in addition to those reported in accordance with IFRS. The Directors believe that these APMs, shown, are important when assessing the underlying financial and operating performance of the Group and its divisions, providing management with key insights and metrics in support of the ongoing management of the Group's performance and cash flow. A number of these align with KPIs and other key metrics used in the business and therefore are considered useful to also disclose to the users of the financial statements.

The following APMs do not have standardised meaning prescribed by IFRS and therefore may not be directly comparable with similar measures presented by other companies.

 See note 4 of the Group's Consolidated Financial Statements, for reconciliation between adjusted and statutory items

2022 figures and 2021 comparative figures are based on continuing operations (where relevant), and are subject to rounding.

Revenue

Statutory

£72.8m

Continuing operations

Total revenue for the Group was £72.8 million, an increase of £13.5 million year-on-year (2021: £59.3 million). Revenue increased 23% year-on-year.

Revenue by sector £m

Industrial

2022	£54.9m
2021	£40.8m

Packaging

2022	£12.9m
2021	£11.9m

Industrial sector growth incorporates the acquisition of Megnajet (£2.5 million), the effect of a full year of FFEI revenue (£6.4 million) and improvements to EPS performance (£5.7 million).

Graphic Arts

2022	£4.7m
2021	£6.2m

Royalties

2022	£0.3m
2021	£0.4m

Declines in the wide format graphics and labels markets are behind the reduction in the graphic arts sector. Royalties from the single remaining licensee declined in the year and are expected to cease in 2023.

Revenue by region £m

EMEA

2022	£28.4m
2021	£23.7m

Asia

2022	£8.2m
2021	£12.0m

Americas

2022	£36.2m
2021	£23.6m

The increased revenue in Americas is primarily due to the continued sales turnaround in the EPS business and a key US printhead customer increasing stock holding in the year.

The Asia market was significantly impacted by the COVID-19 lockdown measures in China, which prevented OEMs from assembling machinery in the region.

EMEA growth was predominantly driven by inorganic growth related to the FFEI and Megnajet acquisitions.

Profit

Statutory

39%

Gross margin – Continuing operations

2022	39%
2021	34%

The increase in gross profit for the Group can be attributed to the performance of the Printhead business, driven by operational leverage and cost-saving initiatives, and the continuing turnaround of the EPS business. (2021: 34%).

£0.8m

Profit before tax £m – Continuing operations

2022	£0.8m
2021	£1.0m

Profit before tax represents operating profit after investment income and finance costs (2021: £1.0 million). Impact of COVID reduced Printhead profitability but offset by turnaround in EPS.

2.1p

Basic earnings per share (Total)

2022	2.1p
2021	20.9p

The calculation of basic EPS is based on the weighted average number of ordinary shares outstanding during the period (2021: 20.9p). See Financial Statements – note 14 for further information.

Alternative Performance Measures (APMs)

£6.2m

Adjusted EBITDA £m – Continuing operations

2022	£6.2m
2021	£3.2m

Adjusted EBITDA is defined as operating profit before separately reported items. It is one of the Group's KPIs and is used to assess the trading performance of Group businesses. It is also used as one of the targets against which the annual bonuses of certain employees are measured. Refer note 4.

£2.8m

Adjusted profit before tax £m – Continuing operations

2022	£2.8m
2021	(£0.6m)

Adjusted profit before tax from continuing operations represents the loss before tax adjusted for recurring and non-recurring items. Reconciliation of adjusted financial measures is provided in note 4.

4.8p

Adjusted basic earnings / (loss) per share – Continuing operations

2022	4.8p
2021	(1.0p)

Earnings per share adjusted for the impacts of adjusting items and share-based payment expense. This measures the growth and profitability of the Group operations.

Cash

Statutory

£8.5m

Cash & treasury deposits £m

2022	£8.5m
2021	£25.1m

Cash and cash equivalents comprise cash at bank of £8.5 million (2021: £25.1 million).

(£16.5m)

Net (decrease)/increase in cash and cash equivalents £m

2022	(£16.5m)
2021	£5.0m

During 2022 we acquired businesses resulting in an initial net cash outlay of £3.5 million as well as a further deferred payment for FFEI of £1.7 million. Additionally, we invested £5.4 million on key infrastructure and product development and a further £9.5 million in inventory. 2021: £5.0 million inflow – benefitting from an inflow of £9.3 million on the sale of Xaar 3D.

Alternative Performance Measures (APMs)

£6.7m

R&D investment £m

2022	£6.7m
2021	£5.7m

Group R&D investment (continuing operations) excluding capitalised costs. Reflects the ongoing investment in Xaar's ImagineX platform as well as increased investment in FFEI (2021: £5.7 million).

(£16.3m)

Cash outflow from continuing operations £m

2022	(£16.3m)
2021	(£2.3m)

Net cash outflow (including £0.3 million benefit from invoice discounting facility) was £16.3 million as a result of acquisition related payments of £5.3 million and the investments in inventory and key product development as explained on the left. Excluded from this figure is a cash outflow of £0.2 million relating to settlements for the discontinued Thin Film business. 2021 figure is excluding the discontinued operations outflows of £2.0 million and proceeds from 3D disposal of £9.3 million.

Risk management

Managing our risks

Key risk areas

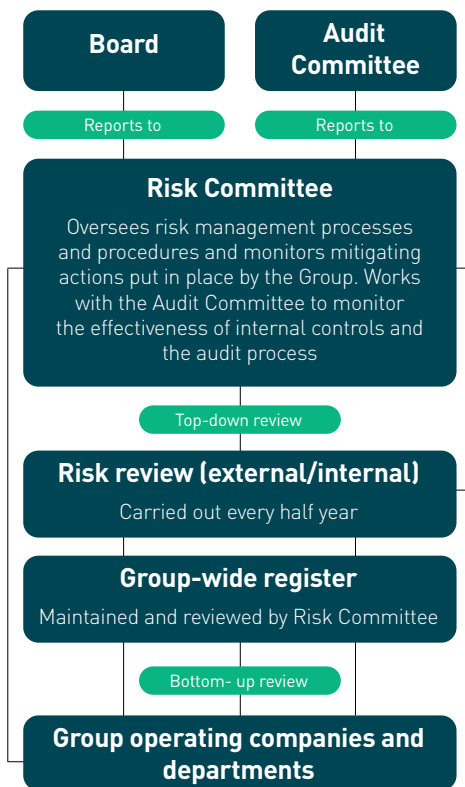
The risks around our business are set out in more detail on pages 52 to 57, but the key risk areas can be identified as being associated with the following:

Market		Risk owner: CEO John Mills	
<p>1. Competition Monitoring and adjusting to competitive dynamics such as pricing/promotion, innovation, resource investments and market share changes.</p>	<p>2. Identification of market requirements Successfully developing products with the characteristics that meet market requirements within the necessary timescale.</p>	<p>3. Commercialising and maintaining products with cutting edge technology Creating value by generating innovative products that deliver significant customer benefit.</p> <p>4. Merger and acquisition opportunities Seek opportunities to expand, create synergies and generate greater shareholder value.</p>	<p>5. Coronavirus (COVID-19 and variants) – External Tracking and adjusting to the potential global impact and external risks arising from pandemic response and impact on customers/supply chain.</p>
Operational		Risk owner: COO Graham Tweedale	
<p>6. Climate change Identifying risks and scenario planning of physical and transition impact upon operations and developing mitigating actions.</p> <p>7. Organisational capability Having the right people in the right roles.</p>	<p>8. Partnerships and alliances Working with the right companies, at the right time on the right terms to deliver long-term value.</p>	<p>9. Supply chain Optimising sourcing and supply chain relationships to drive performance and minimise operational issues.</p> <p>10. War in Ukraine and the world economy Staying resilient in the face of challenging world economy and a recession in the UK.</p>	<p>11. Laws and regulations Compliance with key laws and regulations in all countries Group operates in.</p>
IT		Risk owner: CFO Ian Tichias & Group IT Director Graeme Smith	
<p>12. IT systems and control environment Strengthen IT infrastructure and key IT systems. Enhance and build resilience by investing in and implementing new IT infrastructure or IT systems.</p>	<p>13. Cyber security risk Loss of systems or confidential data due to a malicious cyber-attack, leading to disruption to business operations and loss of data.</p>		
Financial		Risk owner: CFO Ian Tichias	
<p>14. Ability to access sufficient capital Ability to access sufficient capital to fund growth opportunities.</p>	<p>15. Customer credit exposure Offering credit terms ensuring recoverability is reasonably assured.</p>	<p>16. Inventory obsolescence Holding excess inventory levels when compared to demand, that leads to increased risk of obsolescence and write-off before consumption.</p>	<p>17. Exchange rates Monitoring global economic events and mitigating any resulting significant exchange rate impacts.</p>

Risk management

Effective risk management is key to our success against the dynamics of the industry that we operate in and the characteristics of our chosen business model.

Risk management responsibilities



Risk management strategy and framework

To safeguard the assets of the Group and to ensure the Group's resources are appropriately managed, we should have effective processes to identify key risks and mitigate them. This is achieved through having appropriate policies and internal control frameworks.

Starting from 2022, the structure and the processes around risk management have been formalised. A formal Risk Committee has been created, which comprises the CEO, CFO, COO and Director of Risk, Controls and Audit. The Risk Committee meets twice a year and reviews the principal risks and key changes within the past six months.

Before each Risk Committee meeting, all departmental risk meetings take place, where all relevant risks are discussed, ratings re-evaluated, and current and future mitigating actions are considered. The risk register updated after all these meetings is reviewed and considered by the Risk Committee as part of its principal risks evaluation.

This year, a risk benchmarking exercise has also been performed to identify any key risks not already covered in the principal risks of the Group. FTSE 100 and FTSE 250 companies in similar industries have been analysed and their risks were compared against the existing risks reported by the Group. As a result of this exercise, the risk around laws and regulations has been introduced as a principal risk.

Please note that this risk had already been captured in the risk register, but was not disclosed as a principal risk before.

Another risk which was added to principal risks as a result of the benchmarking exercise is the risk around the loss of key entity personnel. Although there is an existing wider risk referred as Organisational Capabilities, the Risk Committee considered it necessary to explicitly state the 'loss of key entity personnel' within the wider risk to acknowledge a significant dependence of the Group on its key leaders.

After all risks and proposals are approved by the Risk Committee, the principal risks are then presented to the Board and the Audit Committee for their final review and approval.

Key updates since Half-year

Coronavirus (COVID-19) – Internal/ Operations – removed

As already indicated in the Half-year report, this risk has significantly reduced due to a mature vaccination programme in the countries Xaar operates in, as well as well-established and well-functioning hybrid working arrangements which have been operating for many months by now. We do not consider this risk to be key for our operations any longer.

IT transformation – removed

As already indicated in the Half-year report, the risk around IT transformation has become very low considering we're far advanced in this journey. The second half of the year demonstrated continued success and meeting of timetables, which led us to downgrade this risk to removal.

Laws and regulations – new risk

There is a risk that the Group may not be compliant with existing laws and regulations in the UK and other countries the Group operates in. This could be manifested through liabilities around employee accidents or consequences of environmental damage, breaches of export controls and customs, lack of awareness of economic sanctions and product liability claims.

We must continually review and update our operations and procedures, and ensure our colleagues are fully informed and educated in all applicable legal requirements.

Breaching any of these laws or regulations could have serious consequences for the Group.

Climate change – update

The risk was introduced in 2021 and in 2022 we have conducted a formal assessment of climate-related scenarios to identify risks and opportunities and the potential impact of both physical and transition risks on the Group's operations, strategy and financial planning. After the analysis was performed, our assessment of the risk for the Group is medium to low. Physical risks are low based on the locations where we operate and transition risks will also remain low assuming we meet our target of Net Zero by 2030, which will be much sooner than most of the industry.

Cyber security – update

Cyber risks continue to be a significant area of focus for the Group following the cyber security incident in October 2020 (systems were recovered without disruption to Operations and Customer Shipments, and costs and damages were disclosed in the Annual Report in 2021). There have been no known incidents since 2020.

All mitigating actions to this risk are disclosed in the relevant section of this report. The key updates in 2022 were establishing an independent external audit of Xaar IT Security & IT Security Technical Controls on an annual basis and achieving compliance with the Xaar Security Standard (Minimum Baseline), or acceptable alternatives, across all business units.

Additional plans for 2023 are establishing a more comprehensive IT Security and Data Protection training and education programme for all employees and reviewing cyber security insurance policy proposals with the Board of Directors.

Emerging risks

The Board periodically reviews emerging risks, to consider and evaluate the potential impact of newly identified risks against current principal risks, and monitor developing issues. The most recent report from Gartner (Q4 2022) highlighted the Top 5 emerging risks relevant for the UK, and these were mapped against existing principal risks (please see below).

Compliance

The Board has applied principle O of the 2018 UK Corporate Governance Code by establishing a continuous process for identifying, evaluating, and managing the significant risks the Group faces which has operated throughout the year and up to the date of this report. The internal control and risk management system is designed to manage rather than eliminate the risk of failure to achieve business objectives and can only provide reasonable and not absolute assurance with respect to the preparation of financial information and the safeguarding of assets against material misstatement or loss.

This also complies with FRC guidance on risk management, internal control and related financial and business reporting (September 2014).

Risk name	Link to our risk/relevance
1. Escalation of Conflict in Europe	10. War in Ukraine and world economy
2. Critical Infrastructure Failure	9. Supply chain and 13. Cyber security risk
3. ESG Implementation Challenges	6. Climate change
4. Cloud Concentration Risk	Not applicable, mostly relevant for financial institutions
5. China Trade Tensions	5. Coronavirus (COVID-19) - External

For all those risks, we were able to identify identical risks in the principal risks we disclose in this report.

Approach to risks

The first approach to managing these risks is to have high quality leaders and teams within the business functions that proactively monitor and adjust to risks that could impact effectiveness.

Probability rating

The probability rating is the likelihood of an event occurring based on previous experiences, historical information and professional judgement with respect to the incident in the territory or industry. Probability can be subjective and is not an exact science. The probability of an incident occurring can be estimated to give a probability rating. This gives an overall view of the risk exposure faced by the business.

Impact rating





The impact of an incident can be measured in terms of human suffering, damage to assets, interruption to operations or business, effect on customers, impact on reputation/brand and financial loss. The calculation of the impact rating should be taken as the worst case in respect of these categories.

The financial element of the impact rating is the amount of money that is 'at risk'.




This 'at risk' means that it is either revenue at risk, or the cost of rebuilding a system, or replacement cost of hardware. This must be taken in the context that there are limited recovery capabilities and that revenue at risk is not a daily amount, but the amount of revenue that would be lost until the process, system or business function can be reinstated.





Risk management continued



Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Market			
1. Competition	<p>Failure to continually improve may mean that we lose market share or have to reduce prices. Since there are fixed factory costs, reductions in sales volumes may substantially reduce profit margins.</p> <p>We are the only true independent printhead company in the world and we are competing with vertically integrated large scale multinational companies.</p>	<p>Competitive pricing policies are employed and product portfolios and pricing are constantly monitored. The re-alignment of our go-to-market capabilities allows us to focus more on our customers and to deliver requested products into the OEM marketplace.</p> <p>Production efficiency improvement programmes are established to ensure that cost bases remain competitive within the marketplace.</p> <p>Regular communication and sharing of information with customers and partners to enhance 'peer-to-peer' relationships. Market reports and other reliable sources are reviewed to improve demand forecasting.</p> <p>Continued investment in innovative technical solutions for development of new applications from existing technologies and launch new technologies.</p>	<p>Unlikely Very high </p> <p>Given recent acquisitions and strategic progress, there is a well-defined value proposition and product development roadmap focused on competitive/market leading product features. This greatly reduces the likelihood of emerging technology outpacing our own development.</p>
2. Failure to identify market requirements	<p>Products need to meet the changing demands of the market, including regulatory changes.</p> <p>Failure to meet future market requirements/specifications could impact on long-term revenue and profit.</p>	<p>Regular, specific and detailed reviews are held to assess current and anticipated market requirements, including expected regulatory changes.</p> <p>These reviews include regular customer visits between senior executives, technical experts and R&D team members to develop a culture of innovation that focuses on delivering technical solutions to original equipment manufacturers' (OEMs) requirements.</p> <p>Product developments are selected on appropriate criteria. Product development activity is properly managed with regular reviews of progress against project plans, and gated milestone reviews. We have a rigorous product lifecycle management process which ensures we deliver against our customers' requirements.</p>	<p>Unlikely Very high </p> <p>Xaar's product development process and roadmap setting is now heavily anchored to end use case customer requirements, and together with the recent successful launch of Aquinox this reduces the risk further.</p>
3. Commercialising new products	<p>Failure to test new products under all relevant application conditions could lead to unexpected cost and loss of reputation due to quality failures.</p>	<p>New products are thoroughly tested before launch.</p> <p>Xaar's manufacturing facilities are ISO 9001 accredited. We proactively engage with customers for all new products to ensure all incompatibilities are reviewed quickly using a consistent and thorough investigation process.</p>	<p>Possible High </p> <p>Although we endeavour to work with beta partners at the development stage, it is not possible to test all application conditions pre-launch.</p> <p>This risk is foreseen to stay at this level.</p>
4. Merger and acquisition opportunities	<p>Our strategy is predicated primarily on organic growth.</p> <p>Failure to realise the expected benefits of an acquisition or post acquisition performance of the acquired business not meeting the expected financial performance at the time acquisition terms were agreed could adversely affect the strategic development, future financial results and prospects of the Group.</p>	<p>The Board reviews the Group strategy annually. Each acquisition is thoroughly reviewed by the Board at each stage.</p> <p>Whenever a potential for M&A is identified, robust modelling of the opportunity is undertaken through involving third party subject matter experts. The competence and independence of the third party involved gets assessed separately by the Board. Professional due diligence is a required step in any acquisition.</p> <p>Senior management and the Board monitor customer and supplier activity through regular meetings and other sources such as industry gatherings.</p> <p>Senior management reviews any relevant M&A activity in the market and decides on specific actions to defend Xaar's position. The overall landscape is constantly reviewed with assistance from external advisors.</p>	<p>Probable Medium </p> <p>Multiple acquisitions over the past five to six years have been a significant learning experience, which together with a strengthened senior team leads to a reduced possible impact.</p>

Key of change




-  Increase
-  No change
-  Decrease
- NEW


Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Market continued			
<p>5. Coronavirus (COVID-19) – External</p>	<p>In the uncertain environment of a global pandemic, the impact of COVID-19 can be felt within the entire customer base and supply chain.</p> <p>We operate in a global environment with significant exposure as part of the new business model to OEM customers in China, Europe and USA.</p> <p>Any slowdown in the global economy could lead to delays in capital investment for new equipment that utilises Xaar printheads.</p> <p>Temporary disruption to the supply chain and further workplace restrictions may threaten to slow down production.</p>	<p>Whilst it is difficult for a company individually to mitigate against a global economic slowdown, taking a portfolio approach on risk factors enables Xaar to spread the risk throughout its customer base, rather than previously relying upon distribution as a business model.</p> <p>We are carefully monitoring our own supply chain and are in regular contact with our suppliers. We hold a sufficient buffer stock of critical components and at present we do not foresee any supply issues.</p> <p>Xaar has improved its customer relationships and remains close to its customers to be able to respond quickly to any slowdown; the opening of the China subsidiary will enable an agile response specifically in this market.</p> <p>Order books and manufacturing processes are closely aligned with goods manufactured to customer order.</p> <p>Newly developed printheads will enable Xaar to diversify into a broader customer base and new vertical markets.</p> <p>Scenario planning alongside stress testing and reverse stress testing to identify and develop alternative solutions, as guidance and requirements change during an evolving event.</p>	<p>Virtually Certain High </p> <p>Remains very high and is one of the key risks the Group is going to face over the next 12-18 months, until China, a key market for Xaar, recovers from Coronavirus. We have plans in place to cope with this period, which include a longer-term plan of expansion into alternative regions (i.e. Americas) and shorter-term measures of advance purchasing of materials and components to protect the supply chain.</p>
Operational			
<p>6. Climate change</p>	<p>Climate change is not only a future challenge. The IPCC report in 2021 was declared a “code red for humanity”.</p> <p>The IPCC, IEA & COP26 have re-enforced the changes that are required to re-wire the economy to a low carbon manufacturing one – and the climate impacts that are expected in a range of scenarios.</p> <p>The impact of climate change can be specified as:</p> <p>a) the physical risks that may impact the assets of the business, and cause business disruption (e.g. flooding), and extreme weather events that may negatively impact the supply chain, to the increases in temperature that will impact human activity and the global supply chain, at an extreme level this could negatively impact the global economy and cause mass emigration from emerging economies</p> <p>b) the transition risks in managing the shift to a low carbon economy, and investment/expenditure to manage the transition and remain viable – the potential for reputation damage should the transition be poorly executed or risk of ‘greenwashing’ if announcements are not supported by actions that are measurable.</p>	<p>Investigating and reporting on climate-related risks and opportunities in adherence to internationally accepted recommendations, such as those published by the Financial Stability Board’s Task Force on Climate-related Financial Disclosures (TCFD).</p> <p>The assessment of the risks associated with climate change can also identify opportunities that arise to help potential customers reduce their emissions and increase efficiencies by using digital printhead solutions.</p> <p>Physical risks:</p> <ul style="list-style-type: none"> • Major incident plans are in place with specific provisions for areas most exposed to potential risks (flood, fires, hurricanes etc) • Geographic spread of the business limits the impact to our customers. Our sourcing strategy takes into account risks associated with our key suppliers • We completed climate scenario planning across two climate scenarios (e.g. RCP 2.6, RCP 8.5), using RCP 8.5 to identify risks and recommendations for key mitigation measures and resilience consideration: • The review examined ALL Xaar sites globally and our top ten critical supplier sites using 12 separate climate models, in each case the RCP 8.5 model was used to assess risks at the most extreme expected temperature rises (4.5°C). <p>The report concluded physical risks are low to very low in almost all cases. The remaining risk is not material, however the actions are being developed to address those further.</p>	<p>Possible Medium </p> <p>The risk is reduced due to the now known low impact upon completion of scenario planning.</p>



Risk management continued

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Operational continued			
6. Climate change continued		Transition risks <ul style="list-style-type: none"> Develop Sustainability Roadmap to deliver 'Net Zero by 2030' Outline metrics and targets in support of reducing greenhouse gas emissions and developing Science Based Targets to 1.5°C across Scope 1, 2 & 3 emissions. Carbon pricing presents a £1.3 million risk if no actions were taken to reduce the supplier Scope 3 impact before 2030 (model suggests it is around 21,000 tCO₂e in 2022) Continue reducing carbon use to minimise impact, and to become a low carbon manufacturer Analyse Supply Chain Infrastructure Risk Exposure Identify 'spend to save' projects that are cash generative Continue GHG mitigation actions to maintain a carbon neutral position Develop transparency and credibility in 'net zero' commitments with verifiable plans and progress in both near-term and medium-term action plans. 	
7. Organisational capability	<p>Our people remain key to our business. Ensuring the right people are in the right roles is critical to our future success and growth.</p> <p>Operations in remote locations or highly competitive markets make attracting and retaining skilled employees challenging.</p> <p>We need to attract and retain the right talent to enable achievement of our strategic aims. Failure to do this risks delivery and growth.</p> <p>Key management personnel are critical to success of our business. Losing them without adequate succession planning could have a significant impact on the Group's performance.</p>	<p>Our focus is to minimise the voluntary turnover of employees, through better hiring for fit, improved induction procedures and employee engagement initiatives.</p> <p>The Group reviews remuneration to ensure that the appropriate reward packages accompany a fulfilling work environment.</p> <p>Annual performance management reviews for the majority of employees to identify talent and develop key employees.</p> <p>Investment to build a learning organisation with focus on culture, reward and recognition.</p> <p>Succession plans are being developed to highlight key personnel risks with mitigation plans being developed.</p> <p>Campaigns to increase performance and development of communication between managers and employees to ensure alignment to Company objectives.</p>	<p>Possible Medium </p> <p>We have significantly increased the strength of the senior team to deliver the strategy, our voluntary turnover is below the industry average and the analysis of our actions proves they have been effective. So the probability of this risk should be reduced.</p>
8. Partnerships and alliances	<p>If key partners we have alliances with are acquired, this can change the relationships they have with us.</p>	<p>The IP and Legal team focuses on the extensive review of legal agreements and in particular IP with such partners.</p> <p>Partnerships are constantly reviewed both internally and with those partners at the most senior level to develop long-term partnerships and supply agreements to the benefit of both parties.</p> <p>Where significant investment and research is undertaken there will be contractual arrangements to ensure appropriate governance and Board structure to support the business and product development.</p>	<p>Possible Medium </p>




Key of change





-  Increase
 -  No change
 -  Decrease
- NEW

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Operational continued			
9. Supply chain	<p>The Group is dependent on retaining its key suppliers and ensuring that deliveries are on time and the materials supplied are of appropriate quality.</p> <p>There has been a shift from a finished goods risk to a component materials risk particularly where components have a single source of supply.</p> <p>There are challenges with the supply of some key components that are used in production and global logistics routes have experienced some disruption.</p>	<p>Focused on monitoring and securing continuity of supply of components necessary to maintain production and the supply of printheads for the following 18 months.</p> <p>We conduct regular audits of our key suppliers and in addition keep large amounts of safety inventory of key components, which we also regularly review.</p> <p>Dual sourcing for critical components is in place for some suppliers, and there is ongoing work to extend this to the full list of critical suppliers.</p> <p>We will continue to diversify and localise our supply chains, and investigate developing a circular manufacturing approach by recovery of materials from finished goods to be re-utilised in production.</p>	<p>Unlikely High </p> <p>The risk in the last year was very high due to global shortages in the electronics manufacturing sector. During the past year we have been working with all of our supply chain partners and since the beginning of 2022 we have significantly removed risks from areas of the supply chain through multiple methods such as long-term supply contracts, consignment stock and increased inventory investment as well as re-design on some high risk materials.</p>
10. War in Ukraine and world economy	<p>The war in Ukraine has materially altered the near-term outlook for the UK and global economies and increased uncertainty over the path ahead. Energy prices are by far the greatest concern for the UK economy which also result in further upward pressure on inflation and a potential hit to GDP growth over the next two years.</p>	<p>We have fixed our unit electricity costs and will continue to do so in future.</p> <p>We have been proactive in buying materials and components to enable continued production.</p> <p>We have no direct operations in Ukraine or Russia.</p> <p>We have planned a factory restructuring in 2023, which will make the production process more efficient, driving reductions in cost of sales.</p> <p>We have secured some key long-term contracts (both sales and procurement) and supply chains outside of unstable countries and regions.</p>	<p>Probable High NEW</p>
11. Laws and regulations	<p>There is a risk that the Group may not be compliant with existing laws and regulations in the UK and other countries the Group operates in. This could be manifested through liabilities around employee accidents or consequences of environmental damage, breaches of export controls and customs, lack of awareness of economic sanctions and product liability claims.</p>	<p>We have relevant certifications in respect of quality management and environmental management with the appropriate bodies including ISO.</p> <p>The quality of supplies is constantly monitored. Quality performance is regularly reviewed by senior management who apply appropriate resources to systematically address recurrent problems. New products are thoroughly tested before launch.</p> <p>All contracts go through legal review before signing. For all complex transactions relevant third party experts are engaged to evaluate all legal risks and adequately respond to them.</p> <p>In January 2023 a new Company Secretary joined the Group who is going to be responsible for managing wider and higher-level legal risks.</p>	<p>Possible Medium NEW</p>

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
IT			
<p>12. IT systems and control environment</p>	<p>IT networks, infrastructure, and business systems resilience is not sufficient causing access issues for end users.</p> <p>Inability to operate effectively or loss of operating capability.</p> <p>Loss of information, incurring financial or regulatory penalties.</p> <p>Fraud committed through manipulation of IT business systems or data.</p>	<p>Investment has been made to move to a hybrid cloud model, strengthen the resilience and security of our IT infrastructure, rationalise and modernise our business systems, and re-align systems with improved operational business processes.</p> <p>Developed the IT Service Delivery maturity and increased capacity in the Group IT function.</p> <p>Access to systems and data is only provided on a 'need-to-know' and 'least privilege' basis consistent with the user's role and requires the appropriate authorisation.</p> <p>Key business systems are being developed to strengthen IT system controls and further reduce the burden from manual controls.</p>	<p>Possible High </p> <hr/> <p>The recent IT controls gap analysis has identified areas for further improvement, which we are going to continue to work on.</p>
<p>13. Cyber threat and information security</p>	<p>Malicious cyber-attack breaches IT security potentially leading to:</p> <p>A loss of IT infrastructure, business systems, or data.</p> <p>Disruption to business operations, ranging from inability to operate effectively to a complete loss of operating capability.</p> <p>Unauthorised access to confidential or personal data and disclosure externally.</p> <p>Breach of information security and data protection regulations incurring financial penalties from regulators.</p> <p>Reputational impact and potential deterioration in customer and supplier relationships.</p> <p>Loss of Intellectual Property or exposure of commercially sensitive information.</p> <p>Extensive resources expended in responding and recovering.</p>	<p>Implemented a Multi-Factor Authentication solution for VPN. MFA rolled out to protect key business systems including CRM and HR.</p> <p>Enterprise Backup Solution provides an immutable copy of all key business systems and data enabling complete systems and data recovery within an acceptable timeframe.</p> <p>Implemented a risk-based security testing approach across IT infrastructure and systems to identify ongoing vulnerabilities and prioritise remediation.</p> <p>Included a security workstream in the IT Transformation Programme.</p> <p>Group IT Director provides an Information Security update to the Executive on a monthly basis and to the Board of Directors every six months.</p> <p>Established Xaar Security Standards (Minimum and Enhanced Baselines) to measure current levels of defence and recovery and track progress.</p> <p>Established a process of undertaking an independent external audit of Xaar IT Security and IT Security Technical Controls on an annual basis. This started in 2022.</p>	<p>Possible Medium </p> <hr/>

Key of change

-  Increase
 No change
 Decrease
 NEW

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Financial			
14. Ability to access sufficient capital	<p>Our ability to access sufficient capital/liquidity may restrict growth opportunities for our organisation, as well as the strategic plan and vision.</p> <p>Significant investment is required to bring new products to market and ramp up to meaningful volumes.</p>	<p>The Group has sufficient cash available for execution and delivery of the strategy within agreed timescales.</p> <p>The Group has implemented cost reduction actions to focus resources on key initiatives.</p> <p>We work with third parties to realise the full potential of research and development activities.</p> <p>We have established partnerships with our banks who understand our strategic plans. We have a strong, well capitalised balance sheet.</p> <p>We returned to profitability which transformed our ability to raise less expensive financing.</p> <p>We have secured an invoice facility which helps support short-term cash management.</p>	<p>Unlikely High </p> <p>We secured external financing recently which further reduces this risk.</p>
15. Customer credit exposure	<p>The Group may offer credit terms to its customers which at times could be extended beyond what are considered normal terms for products in early stages of their lifecycle. The Group is at risk to the extent that a customer may be unable to pay the debt on time, thus impacting working capital.</p>	<p>This risk is mitigated by strong ongoing customer relationships.</p> <p>Where possible, a full credit check of all new customers is carried out prior to trading. Payment terms are agreed depending upon credit assessment and review of credit history. For all customers with higher risk, payments in advance are requested.</p> <p>Overdue receivables are closely monitored and credit limits are managed rigorously.</p> <p>Credit insurance is in place to protect against payment default for most of the customers.</p>	<p>Possible Low </p> <p>Strong customer credit controls together with continued history of low bad debts demonstrate that the probability of this risk is going down.</p>
16. Inventory obsolescence	<p>Holding excess inventory levels when compared to demand leads to increased risk of obsolescence and write-off before consumption, and working capital restrictions.</p>	<p>There are appropriate stock holding policies, ensuring these are reviewed frequently and change dynamically in line with market/business conditions.</p> <p>Obsolete or slow moving stock items are identified and written off monthly.</p> <p>Enforcing lead times for customer orders to ensure we have the most accurate forecast in place as far out as possible.</p> <p>Continually develop forecasting techniques so that stock requirements can be predicted with great accuracy.</p> <p>Ongoing supplier negotiation to reduce minimum order quantities to prevent obsolescence and inflated inventory.</p>	<p>Probable High </p> <p>The risk has gone up due to the increased levels of inventory as at the end of 2022. The inventory levels have been increased to minimise the effect of the factory shutdown in 2023.</p>
17. Exchange rates	<p>Global economic events and uncertainty may cause currencies to fluctuate and currency volatility contributes to variations in our sales of products and services in impacted jurisdictions.</p>	<p>There is a partial natural hedge for foreign currency movements, with sales companies and manufacturing spread across the globe.</p> <p>Cash flows are constantly reviewed and action is taken when appropriate. FX exposure is tracked monthly starting from September 2022.</p>	<p>Probable Medium </p> <p>Due to the state of the current world economy, the impact of this risk is higher.</p>

Non-financial information statement

This Annual Report contains the information required to comply with the Companies, Partnerships and Groups (and Non-Financial Reporting) Regulations 2016, as contained in sections 414CA and 414CB of the Companies Act 2006. The table below provides key references to information that, taken together, comprises the Non-Financial Information Statement for 2022*.

Reporting requirement	Group policies that guide our approach	Information and risk management, with page references
Environmental matters	<ul style="list-style-type: none"> Environmental Policy statement Environmental Sustainability statement Health & Safety Policy statement Quality Policy statement. 	<ul style="list-style-type: none"> Risk management & principal risks, pages 48 to 57 Sustainable and responsible business, pages 30 to 41 Section 172 statement, pages 71 to 72 Company purpose, pages 73 to 74 Our business model, pages 8 to 9
Employees	<ul style="list-style-type: none"> Absence Policy Alcohol & Substance Abuse Policy Annual Leave Policy Bullying & Harassment Policy Capability Policy Code of Conduct COVID-19 Policy statement Disciplinary Policy Equal Opportunities Policy Family Leave Policy Flexible Working Policy Gender pay gap report Gifts & Entertainment Policy Grievance Policy Health & Safety Policy Performance Planning Policy Referral & Reward Policy Retirement Policy Whistleblowing Policy Working time regulations. 	<ul style="list-style-type: none"> Risk management & principal risks, pages 48 to 57 Sustainable and responsible business, pages 30 to 41 Section 172 statement, pages 71 to 72 Company purpose, pages 73 to 74 Our business model, pages 8 to 9
IT, cyber security & data protection	<ul style="list-style-type: none"> Confidential Information Policy Data Protection Policy Email and Internet Policy Mobile Phone Policy. 	<ul style="list-style-type: none"> Risk management & principal risks, pages 48 to 57
Social matters	<ul style="list-style-type: none"> Human Rights Policy Charitable Donations Policy Employee Volunteering Policy. 	<ul style="list-style-type: none"> Sustainable and responsible business, pages 30 to 41
Respect for human rights	<ul style="list-style-type: none"> Human Rights Policy Sanctions Policy Modern Slavery Policy Modern Slavery Act Compliance Statement. 	<ul style="list-style-type: none"> Risk management & principal risks, pages 48 to 57 Sustainable and responsible business, pages 30 to 41 Section 172 statement, pages 71 to 72 Company purpose, pages 73 to 74
Anti-corruption and anti-bribery matters	<ul style="list-style-type: none"> Anti-Bribery & Corruption Policy Anti-money Laundering Policy Conflict Materials Policy Corporate Criminal Offence Policy Employee Share Dealing Code Gifts & Entertainment Policy Whistleblowing Policy. 	<ul style="list-style-type: none"> Risk management & principal risks, pages 48 to 57 Sustainable and responsible business, pages 30 to 41 Our business model, pages 8 to 9 Section 172 statement, pages 71 to 72 Company purpose, pages 73 to 74
Description of the business model		<ul style="list-style-type: none"> Our business model, pages 8 to 9
Description of the principal risks in relation to the above matters, including business relationships, products and services likely to affect those areas of risk, and how the company manages the risks		<ul style="list-style-type: none"> Risk management & principal risks, pages 48 to 57 Sustainable and responsible business, pages 30 to 41 Climate change, pages 53 to 54
Non-financial key performance indicators		<ul style="list-style-type: none"> Sustainable and responsible business, pages 30 to 41 Greenhouse gas report, page 45 Key performance indicators, pages 46 to 47

* The policies listed above are available to employees via our intranet, alongside corporate policies being available on our website (<https://www.xaar.com/en/about/corporate-policies/>). Compliance with our policies is monitored through the implementation of annual compliance statements, through our internal audit function, and locally by our General Managers.

Board approval of the Strategic and Annual Reports

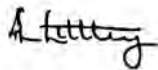
The section 172 statement forms part of this Strategic Report – please see pages 71 to 72.

The Strategic Report, Annual Report and Financial Statements, taken as a whole, are fair, balanced and understandable and provide the information necessary for shareholders to assess the Company's position, performance, business model and strategy.

The Strategic Report was approved by the Board on 27 March 2023 and is signed on its behalf by:




Andrew Herbert
Chairman



Alison Littley
Senior Independent Director



John Mills
Chief Executive Officer



Chris Morgan
Non-Executive Director



Ian Tichias
Chief Financial Officer