



Xaar plc
Annual Report and
Financial Statements 2020

XAAR

XAAAR



OUR VISION

A world where you
can print anything
you can imagine

About Xaar plc

Innovation and collaboration

Innovation is at the heart of Xaar

We are a world leader in the development of inkjet technology. Our core business is to 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. We also develop print systems for product decoration and 3D printing which use our inkjet technology.

We put collaboration at the core of our global partnerships, helping our customers to unleash the true power of inkjet technology and open up a world of opportunities for their business.



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, Labels and Packaging as well as 3D Printing and Additive Manufacturing.

 [Read more on pages 18 to 23](#)

Product Print Systems

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 own inkjet printheads.

 [Read more on pages 24 and 25](#)

3D Printing

Our 3D Printing business unit, in which Xaar 3D sits, develops 3D printing solutions based on Xaar3D SAF™ technology which will have unique capabilities to address new markets especially in manufacturing. With investment from Xaar plc and Stratasys, Xaar 3D can leverage the natural synergies between global leaders in inkjet technology and 3D printing technology.

 [Read more on pages 26 and 27](#)

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Our guiding principles

A woman with her hair in a bun, wearing safety glasses and a dark blue work jacket, is focused on working on a small electronic device. She is wearing white gloves and holding a component. The background shows a factory or workshop environment with shelves and equipment. The text 'WE DO EVEN WITH' is overlaid in large white letters on the right side of the image, with an orange triangle pointing upwards from the bottom right corner.

WE DO EVEN WITH

In September 2020, when we announced our new brand identity and launched the ImagineX printhead platform, we also launched a new set of values to reflect the true essence of Xaar. We use these values to guide the way we behave towards our customers, our partners and each other.

- + We do everything with passion
- + We are creative
- + We are innovative
- + We have integrity
- + We are collaborative

EVERYTHING WITH PASSION

”

When I joined Xaar, I was particularly struck by the passion for Xaar's technology that I came across when I met everyone for the first time. It was quite inspirational to see the abundance of enthusiasm for and pride in the fantastic technology created by a relatively small team of people. There is a real buzz, everyone is incredibly busy and working hard, with a positivity and joint sense of purpose.

John Mills
Xaar CEO

One creative idea inspires the next



In my experience innovative solutions rarely come as a brilliant idea of an individual, but are typically the result of teamwork whereby one creative idea inspires the next.

Renzo Trip

Principal Engineer, Advanced Application Group
Xaar

INN

CREATIVI

Creativity

"When I started at Xaar I was unfamiliar with inkjet and the printing industry in general. I did not think in terms of print resolution, line speed and greyscale, but rather in terms of pressure, velocity and volume.

The customers that the Advanced Applications group typically supports also look at a printhead from a different perspective. For example, they can see it as a device to create very thin layers on wafers, to produce flawless microscopic lenses or to deposit an accurate amount of drugs. To find ways to achieve these targets with a technology probably never used in a similar application before requires experience, expertise, and ... creativity."

Renzo Trip

Principal Engineer,
Advanced Application Group
Xaar

Nick Jackson

Principal Engineer,
Advanced Application group,
Inventor of Xaar's High Laydown Technology
Xaar

INNOVATION ACTIVITY

Innovation

"Three years ago, NKT collaborated with Xaar and took the lead in promoting Xaar 2001 printhead in the Chinese ceramic industry. In the past three years, NKT has sold more than 200 digital inkjet machines with Xaar 2001 printheads in China, Vietnam, India, Pakistan, Bangladesh, Iran, Africa and other countries.

The technical advantages of the 720 dpi and the innovative High Laydown Technology have greatly improved the exquisiteness and colour adaptability of ceramic digital printing, which has brought huge benefits to our customers.

We believe the introduction of the new Xaar 2002 printhead will further boost the performance of our machines. In future, NKT will collaborate more closely with Xaar and especially in the ImagineX platform to innovate and bring more value to our customers in the ceramics industry."

Mr Jack Peng

General Manager
New King Time Machinery

Long-term thinking and flexibility



**IN
COLLABO**

Integrity

"I encourage my team to be open and honest with our OEM customers. This builds up trust and a strong bond.

China and Asia have a huge market potential and there is a lot of work to be done. Integrity is highly important as it shows the right values and our Chinese OEMs will treat us not as a printhead supplier but as a strong business partner for today and in the future."

Samuel Tam

Xaar General Manager, Asia

INTEGRITY COLLABORATIVE

Collaborative

"Meta Additive's binder innovation would not be possible without the right printhead. We have been collaborating with Xaar for about a year, and we chose them because first and foremost they have a reliable printhead technology.

This is crucial for mass manufacturing. Collaboration and making headway in technology needs clear and open communication, and that's what we get from Xaar. They also give us long-term thinking and flexibility, meeting us in the middle, and their aim is to support and grow with us over the long-term. We have a strong partner in Xaar."

Kate Black

Founder and CTO
Meta Additive

Chairman's introduction



In what has been a challenging year across global economies, I am pleased to report excellent progress at Xaar. Our challenge has not only been the impact of the COVID-19 pandemic and new ways of working, but also, under new leadership, refocusing the business on our core competencies and developing a strategy for growth exploiting the fundamental strength of our bulk piezo inkjet technology.

Strategic and operational highlights

- Implementation of the new strategy continues to deliver positive customer engagement
- Strong performance for the Printhead business with consistent wins of new customers and projects following successful shift in go-to market strategy and focus on markets where products have a competitive advantage
- ImagineX platform successfully launched in September 2020 utilising investment in Thin Film IP, providing clear product roadmap and compelling market opportunity
- Investment in customer service centre in Shenzhen, China, to better service Xaar's largest addressable market
- Relocation of Cambridge offices during 2021 will result in £0.7 million full year cost saving
- Xaar Nitrox, the second product offering from our ImagineX platform, is officially launched today
- Engineered Printing Solutions (EPS) impacted by COVID-19, but good progress made and strong order book and pipeline including several new target markets
- Advanced discussions to divest Xaar 3D investment.

A number of changes have been made in the business: a realignment of our go-to-market approach with a clear focus on the value chain and customers, a revitalisation of our brand and corporate identity and, importantly, a focus on the technical and competitive advantages of the Xaar bulk piezo product range with a pipeline of new product developments that we plan to exploit as a part of our new ImagineX platform.

It has been most pleasing to see the energy and enthusiasm of the Xaar team, matched only by the response we have had from customers, with both existing and new OEMs and end-users seeking to deploy Xaar technology in their next generation products.

Our Printhead business has performed very strongly this year. Sales were higher than levels achieved in 2019 and, against the challenging economic backdrop created by the pandemic, our order book has remained consistently strong. We have been particularly pleased with efficiency gains made in our printhead operations, which resulted in both improved gross margins and strong cash generation from more efficient use of working capital. Development of this core platform is a priority for the Board in 2021 and beyond.

Our product print business, EPS, based in North America, was impacted by a fall in demand through the worst of the pandemic but, with a small grant from the US Government, made only a small loss and remains a valuable contributor to the Group.

Xaar 3D was similarly impacted by COVID-19 restrictions and progress has been slower than expected. Xaar's position in the 3D business is one of technology enabler and our end goal remains one of supplying Xaar printheads for use in 3D applications as opposed to becoming an OEM in the sector. As a result of programme delays in 2020, and following a re-evaluation of the further cash investment required and extended timescales to full commercialisation of the product, we have determined that it is in Xaar's best interests to bring forward the planned sale of Xaar's shares in Xaar 3D. The terms of the proposed revised option arrangement will be published in due course and subject to Xaar shareholder approval.

The past 12 months have seen much change at Xaar. We entered the year with optimism and a renewed sense of purpose but of course had no idea of the extent of challenge we would all face. It is to the great credit of the whole team at Xaar, in all businesses and in the many countries around the world where colleagues live and work, that they have adapted, committed to and succeeded in delivering both solid financial results and a platform for continued growth.

The Board is encouraged by our progress this year and, with the prospect of some return to better market conditions later in 2021, looks forward with confidence.

Andrew Herbert
Chairman

27 April 2021

Strategy update



In April 2020 we announced a new strategy across the business and are pleased to say that we continue to make good progress delivering this and we are already seeing real benefits from this new approach. We believe we are on track to return the business to profitability and growth in the medium term.

Printhead

Our strategy for the Printhead business is:

1. A customer-centric business model that places the customer, Original Equipment Manufacturers (OEMs) and User Developer Integrators (UDIs), at the heart of everything we do;
2. A focus on markets where Xaar Bulk Printhead Technology has a competitive advantage;
3. A product roadmap that will develop the Bulk Printhead range to offer advantages over the competition in existing and new markets; and
4. A marketing and communications plan that drives home the advantages of our current products, sells the value and capabilities of the new products on our roadmap, and builds trust in the new business model.

A customer-centric business model

The change in go-to-market strategy which includes removing distribution channels, a clear pricing strategy, and a sales process that is focused on selling the printhead based on its technical merits and the value of the relationship with Xaar, has already started to reap rewards.

As part of the customer-centric focus we have implemented end-to-end customer journey management to provide an enhanced level of service and support over the entire product lifecycle in order to reduce their development times, and therefore time to market, and to also provide improved aftersales support.

We now have OEMs and UDIs across multiple applications developing machines using a range of our products. We have seen OEM customers return and have also won new accounts including several exciting UDI opportunities. We have a growing pipeline with a significant number of opportunities which we have a good chance of winning thanks to our technology advantages. This will give us additional opportunities for further vertical integration.

With sales in Asia, and particularly China, growing significantly, up 56% year-on-year, customers re-engaging and our sales pipeline increasing, the Board has decided to invest in a Chinese customer service centre in Shenzhen which is ideally situated to address a large number of existing and potential customers whilst providing excellent links to other printing hubs in the rest of China. The Chinese market is the largest addressable market in the world for Xaar printheads and represents an important growth opportunity.

Financial highlights

Revenue – Continuing operations

£48.0m

in line with management expectations (2019: £49.4 million)

Gross margin – Continuing operations

27%

increased from 25% in 2019, benefitting from operational leverage in the business

Gross R&D spend

£4.5m

by continuing operations of £4.5 million, up £1.4 million on 2019 with investment focused on the ImagineX platform and product roadmap

- Positive aEBITDA contribution from Printhead & EPS businesses

Net cash inflows

£7.1m

Net cash inflow from continuing operations (2019: £8.4 million)

Annual cost savings

£0.7m

annual cost saving from relocation of office following comprehensive review

Net cash

£18.1m

Strong closing balance sheet with net cash, and Treasury deposits, excluding Xaar 3D (2019: £16.2 million)

Strategy update (cont.)

This new facility will enable us to provide both our existing and potential customers across the region with a higher level of service including enhanced technical support through a demonstration centre, waveform development and RMA facilities. These facilities will enable local support to be provided for all aspects of the customer product lifecycle from printhead selection, through machine development and commercialisation to warranty and RMA support. We expect to be able to start welcoming customers to our new customer service centre in the coming months.

Competitive advantage of our Bulk Printhead Technology

Xaar's Bulk Printhead Technology offers several advantages over the competition including our Through-Flow (TF) Technology ink recirculation, High Laydown Technology and high viscosity capability, which means our printheads can jet the widest range of fluids available making them suitable for a number of applications that other printheads aren't. We have focused on ensuring that the benefits are better marketed and understood. Together with our customer-centric business model, this has enabled us to win a significant number of new accounts over the last 12 months whilst building up a strong pipeline of opportunities.

Through a targeted approach, an effective business model and printheads for the right market, we have started to win back market share in the Ceramics sector and have established a strong position in the Glass sector which will enable revenue growth over the coming years. Our position in the Coding & Marking (C&M) and Direct-to-Shape (DTS) sectors remains strong especially in DTS where we have a clear competitive advantage over our competitors due to our TF Technology ink recirculation. In 3D and Advanced Manufacturing, we are well positioned due to our ability to print a wide variety of materials and have an exciting pipeline of opportunities.

Our mix of customers, both OEM and UDI, is growing and now spans a variety of industries from our more traditional sectors such as Ceramics and Labels to opportunities in Aerospace, Automotive, Advanced Manufacturing processes used in Electronics, and Robotics.

Product roadmap and ImagineX platform

In September 2020 we announced the launch of our new printhead platform under the brand name ImagineX. This platform builds upon several technology and development programmes from our legacy Bulk and Thin Film investment. The ImagineX platform will drive the next phase of Xaar's success enabling the business to increase its addressable market whilst establishing market leading products across all sectors.

The ImagineX platform will deliver a number of features over the next few years which will provide significant enhancements to the current portfolio; these include substantially improved speed and throughput (frequencies up to 150kHz, equivalent to a threefold increase in speed), aqueous compatibility, 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, Labels, 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.

Several features from the ImagineX platform are already available and today we announce the launch of our second product, the Xaar Nitrox. The Xaar Nitrox delivers improved print uniformity and is capable of running at higher frequencies which enable the printhead to increase its speed and productivity by 40%. These enhancements make it ideal for Ceramics, Labels, and Advanced Manufacturing applications.

The first product from the ImagineX platform, the Xaar 2002, was launched in August 2020 following extensive customer feedback and incorporates several technology developments, including high viscosity, high laydown, and AcuChp, as well as an increased ease of integration for the OEM. This product has been well received by the market and is being adopted by both current and new customers alike.

We are engaged with OEM partners on several programmes related to our ImagineX platform, with our partners committed to alpha and beta trials. The change to the customer-centric business model is enabling improved Voice of Customer and we are engaged with a wide group of OEMs who are continuing to provide feedback on the roadmap.

Over the longer term Xaar will increasingly vertically integrate in order to provide a more complete printer solution in certain markets, whilst continuing its primary business model of selling printheads to OEMs and UDIs. The additional capabilities required to achieve this will be added through either partnership, development of existing capabilities or acquisition.

Marketing and communications

Twelve months ago, we talked about needing to rebuild the Xaar brand, regain the trust of OEMs, and to make sure the advantages of Xaar technology are well understood. We have made significant progress in addressing these issues, whilst acknowledging there is still more to do.

The combination of communicating the change in strategy and the new product roadmap, followed by a revised mission and vision, and more recently the new brand and launch of the ImagineX platform, have helped to shift perceptions of Xaar. Stakeholders are noticeably more engaged and excited by the direction Xaar is taking. This is demonstrated through the positive customer feedback, in addition to the growing number of customers engaging with the business, strong interaction with the press and positive media coverage including at conferences such as Future Print where we officially launched the ImagineX platform to the marketplace.

The level of engagement from previous and established customers indicates we have started to regain their trust. This has been achieved through our efforts to build relationships with them, our desire to listen to their needs and to work with them to find a solution, and through the consistent communications they receive. This has all been reinforced with corporate messaging on our social media platforms. The initial customer response has been encouraging, with the acceptance that we need to consistently listen and deliver on our customer needs to fully rebuild partnerships with them. We are now able to facilitate the end-to-end customer journey management, utilising marketing cloud for better campaigns and lead generation. We have also been successful in our conversion of these leads.

The launch of the Xaar 2002 printhead gave us the opportunity to demonstrate the advantages of Xaar's technology and discuss with customers our product roadmap. The launch of the ImagineX platform in September has helped reinforce the perception that Xaar's bulk technology adds real value today and has an exciting future. With ImagineX, customers can now see us as a potential partner not only for their current generation of products but also for future development programmes. The closer relationships we now have with our customers has the added benefit of enabling better Voice of Customer (VOC) which in turn allows us to fine tune our product roadmap and helps place us front and centre for the customers' next generation of products.

With the launch of the Xaar Nitrox we are also introducing a new naming convention to link into our new ImagineX platform and reflect our new brand identity. A significant amount of work is going into this product launch which will be the first of several in the coming 24 months.

To see the new Xaar brand identity and the ImagineX platform visit www.xaar.com.

Operational gearing

Substantial progress has been made in reducing the cost base of the Printhead business in recent years to reduce not only variable costs but also removing, or reducing, fixed costs where possible. These efforts had been obscured by the rate at which revenue declined, and subsequently we hadn't previously seen the expected positive impact on gross margins and ultimately the profitability of the business. With revenues increasing in 2020 we now see the benefit of these measures as sales and factory throughput have both increased and we can leverage the high operational gearing in the factory and wider business. This is reflected in the gross margin from continuing operations improvement, up 5% year-on-year to 27%. A combination of operational gearing and the reduction in the SG&A costs have seen adjusted EBITDA improve £5.4 million year-on-year to £0.0 million.

As the business continues to grow, we will be able to further leverage our high operational gearing with modest investment to support additional sales from the existing product portfolio or new products released from the ImagineX platform.

Beyond the factory we continue to review our cost base. Xaar's offices on the Cambridge Science Park are over 25 years old and require investment to bring them up to a more modern, appropriate standard. Furthermore, with the reduction in workforce over the last few years there is significant excess capacity. The move to homeworking caused by COVID-19 has been successful and has proven that flexible working can be effective for large parts of the workforce. Following a comprehensive review, a decision has been taken to relocate from the Cambridge Science Park to the nearby Cambridge Research Park. This move will allow the business to relocate to smaller premises offering a more modern and vibrant workplace for employees and guests. Significantly the move will also generate savings of £0.7 million per annum from the start of the second half of 2021.

EPS

Our strategy for the EPS business is centred on three principles:

1. Focused business development aimed at utilising existing technologies to expand into adjacent markets;
2. Increased scalability through the standardisation of modular components whilst retaining the ability to meet each customers' unique requirements through customised fixtures and tooling; and
3. Improved controls over pricing and costs.

We have continued to build upon the good progress made in the first half of the year. Despite the impact of COVID-19 continuing to impact our team's ability to travel we have been able to deliver improvements on our focused business development. This is reflected in the strong order book and pipeline at the start of 2021 which contains opportunities from several new target markets.

Our engineering teams have worked hard on delivering standardised modular systems and we continue to see orders won using this philosophy. This is significant in that it will not only reduce design costs, and improve product margins, but will also reduce the lead-time for the customer. Combined with improvements in the quotation process, and cost control, we expect to see the real benefit of this in 2021 through increases in gross margins and a faster turnover of machines on the shopfloor.

These developments aren't truly reflected in the full year performance where the rise in gross margin from the change in strategy, and related processes, are offset by the write off and provisioning of slow-moving legacy inventory and the reduction in revenue in the second half of 2020.

Additional work has been identified to take place in 2021 to remediate internal management and reporting controls to enable delivery of improved operational processes and remediate identified deficiencies, to deliver improvements in revenue recognition, gross margin and inventory management.

3D

Xaar's position in the 3D business is one of technology enabler and our end goal has been, and remains to, supply printheads for use in 3D applications and not become an OEM in the sector. That was the rationale behind our joint venture agreement with Stratasy, a recognised leader in 3D with a proven track record and strong routes to market, and the subsequent option agreement signed with Stratasy.

Alongside its investment in 3D, the Xaar Board has redefined its core business strategy during 2020 with a strong focus on the development of its bulk piezo printhead business. We have a programme of investment in technology and new products and, with a revised commercial model, we have been successful in both reengaging with OEM partners and developing new customer opportunities. Our key focus today is on building upon this core competency, increasing our capabilities in deploying bulk piezo printheads among chosen OEMs and UDIs, and prioritising investment to ensure we develop and sustain competitive advantage as we see increasing demand for our unique technology solutions. We enter 2021 with a range of further investment opportunities in both technology through internal R&D capability and capacity through the potential for acquisition of complementary technology, skills and expertise.

Whilst Xaar 3D has continued to make progress this year it has been impacted by the COVID-19 pandemic. This has affected the programme most significantly in two areas. Firstly, due to restrictions put in place in Denmark, the number of people able to access the Copenhagen facility has been limited. These limitations have restricted both the test capacity and the speed at which testing can take place. Secondly, travel restrictions have prevented the team from travelling and has meant face to face time with the sub-contract manufacturer has also been limited and has affected the original timeline of the alpha and beta programme. As a direct consequence of these delays we anticipate Xaar 3D would require further investment in 2021 (cash decreased in 2020 by £7.0 million to £2.1 million), significantly more than original plans anticipated.

As a result of the delays in the programme and the further investment anticipated, the Xaar Board has considered all options for the future financing and ownership structure of Xaar 3D, and accordingly has held detailed discussions to sell the remaining stake in Xaar 3D. Terms are still to be finalised and may potentially differ to those of the Call Option originally agreed in 2019. The Directors have assessed that the disposal is highly probable and therefore Xaar 3D is classified as a discontinued operation.

The terms of any final agreement will be subject to Xaar shareholder approval.

Such an arrangement would provide Xaar 3D with the best opportunity to complete the commercialisation of the HSS product range in the shortest time, would lead to an immediate injection of cash and will enable Xaar to focus on its core business.

Strategy update (cont.)

COVID-19

Following the outbreak earlier in the year we took measures across the Group to ensure the health and wellbeing of all our employees. The business has adapted incredibly well to these challenges with much of the organisation operating effectively from remote locations. In addition, changes at our manufacturing facilities have meant that we have been able to continue production without compromising the health and safety of our employees or our production capabilities.

The Xaar Printhead business has a significant customer base in both China and EMEA, including a strong customer presence in both Italy and Spain. Despite COVID-19 lockdowns in these geographies, which resulted in a number of short-term production stops at our customers' facilities and limited our ability to visit, we have continued to support and engage with them and have seen sales into both Asia and EMEA increase since the second half of 2019. Our teams have worked hard to maintain our supply chain and production capabilities in meeting the requirements of this increased demand. Our ability to ensure the continuity of supply has been well received by our customers and has helped us secure several orders versus the competition.

Our US-based EPS business has continued to operate throughout the period with little interruption to its manufacturing operations. As an OEM and supplier to end users the EPS business has felt the impact of a slowdown in the economy more directly than the Printhead business. Full year sales from Pad Printing machines and consumables were affected throughout the second half of the year as end user markets continued to be impacted by the pandemic. The EPS business has taken advantage of the Paycheck Protection Program (PPP) established by the 2020 US Federal government Coronavirus Aid, Relief, and Economic Security Act (CARES Act). As part of the PPP EPS has taken out a loan of \$1.0 million which under certain conditions can be waived. The company meets the criteria for the loan to be waived and has recognised it as income and reported it as a government grant (see note 7 on page 130). EPS is well positioned to take advantage of any upturn and has continued to secure orders for use of its products in various sectors despite the limitations arising from the pandemic. Furthermore, it has been able to establish both a strong pipeline and strong order book as customers start to plan for their capital investments again.

The 3D business unit has operations in Nottingham, UK, and Copenhagen, Denmark and has seen delays in the testing and commercialisation of the 3D printers. These were caused by minor delays in the supply chain and more significantly by restrictions in Denmark which limited the number of individuals who were allowed in the Copenhagen facility, restricting testing capacity, and the ability to travel and resolve issues face to face with the sub-contract manufacturer.

Both our Printhead business and EPS were well positioned prior to the pandemic with strong order books. We believe we are well positioned to continue to support our customers and suppliers, and our strong cash and balance sheet position provides confidence that we are well placed. We believe we are well positioned to take advantage of any economic upturn as pandemic restrictions recede.

Operating sustainably

Xaar strongly believes that corporate responsibility is integral to business success. 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.

We have offset all of the UK regulatory Scope 1 and 2 carbon impact that we made and reported in 2020. Based on our carbon footprint reported in 2020 this makes Xaar a carbon neutral inkjet manufacturer.

We still need to understand the full impact from our operations and are committed to continue reducing the impact on the environment and maintaining our drive to achieve complete carbon neutrality in line with the UK's 2030 goal.

In August 2020 we introduced new packaging across our printhead portfolio and now all Xaar's printheads are shipped in fully recyclable and biodegradable cardboard packs with the aim of reducing our plastic consumption by 1.2 tonnes per year.

In addition, we have moved electricity supply for our Printhead business to a green energy supply, supplementing measures we are already taking to improve energy efficiency.

We have also started a project to review our carbon footprint and the measures we take to limit this. The results of this review including definition of appropriate KPIs will be announced later in the year.

In support of our local community, we have started a programme of work to establish apprenticeship and graduate schemes which we expect to roll out over the next 12 months. This is aligned with our sponsorship of local clubs around Huntingdon and Cambridge in the UK to drive interest in STEM subjects among school students.

Our priority during the COVID-19 period has been to ensure the health and wellbeing of our employees. Beyond this we have supported our local community by donating PPE to the Addenbrookes NHS trust and manufacturing 3D printed headbands for protective masks.

We have put in place on-site COVID-19 testing facilities to test all staff on-site on a twice weekly basis.

Brexit

The Group operates globally and the impact following the transition phase of Brexit continues to be monitored. We have taken action where necessary in moving to freight carriers to ensure smooth customs clearance and to date have experienced little impact. We will continue to evaluate all transport methods and ensure we meet any increased burden of audit trail compliance. As for many businesses, a greater challenge is potentially that of EU workers and migration. As a result of Brexit, the Group is exposed to potential currency fluctuations.

Brexit and trade barriers continue to be an integral part of the Group’s ongoing risk management and review process, for which solutions to address the risks identified are explored and implemented. We continue to believe that the direct consequences of Brexit will have no material impact on the Group.


Outlook and summary

We are very pleased with the performance of the business in 2020. Given the difficult trading environment and the wider economic impact of the COVID-19 pandemic, the results are positive. There is significant work still required to increase customer trust and capitalise on the many market opportunities, and the ongoing pandemic makes it difficult to provide reliable guidance on the outlook for 2021 and beyond. That said, the short-term outlook remains good with a strong order book across the business, and the continued strength of the Group’s balance sheet and cash position leave it well placed to withstand further volatility in the market. Implementing the new strategy is already proving successful and we believe this will continue. The foundations that are being laid at present will provide a springboard for future growth and a return to profitability in the medium term.

By order of the Board


John Mills
 Chief Executive
 Officer

27 April 2021


Ian Tichias
 Chief Financial
 Officer

27 April 2021



Our business model




Together with our partners and customers, we have been transforming the world of inkjet technology for over 30 years

The largest part of Xaar is the Printhead business. Here we sell our inkjet technology in component form (the printhead) 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 actively partner and co-develop with fluid suppliers, hardware and software integrators as well as substrate suppliers to deliver a robust and attractive total solution to our customers.

Our product printing business – EPS – designs and develops complete industrial printing machines which we sell to end users.

Our 3D Printing business – Xaar 3D – is a leading developer of 3D printing solutions based on Xaar3D SAF™ technology. With investment from Xaar plc and Stratasys, Xaar 3D can leverage the natural synergies between global leaders in inkjet technology and 3D printing technology.

<p>Xaar designs</p> 	<p>We have R&D facilities in Cambridge, Nottingham, Copenhagen, Stockholm, and Vermont. We also work with strategic partners to jointly develop some products. We invest a substantial proportion of our revenue in R&D to remain a world leader in inkjet technology (2020: over 10%).</p>	<p>We continually add to our Intellectual Property ('IP') portfolio, and currently we have over 300 patents and patent applications. Our R&D staff totals 78 which is 21% of the total workforce.</p>
<p>Xaar manufactures</p> 	<p>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 Huntingdon since the plant opened in 2007. We export over 95% of our printheads to customers around the world.</p>	<p>EPS, our product printing business, manufactures customised and bespoke printing solutions in Vermont, USA.</p>
<p>Xaar markets</p> 	<p>Xaar offers a wide range of industrial inkjet printheads and print systems which are designed and produced to meet the customer-driven requirements of a range of manufacturing applications.</p> <p>Primary markets include:</p> <ul style="list-style-type: none"> • 3D Printing • Ceramic Tile Decoration • Coding & Marking 	<ul style="list-style-type: none"> • Decorative Laminates • Direct-to-Shape • Functional Fluid Deposition • Glass Printing • Graphics • Primary Labels • Packaging • Product Printing.
<p>Xaar sells</p> 	<p>Xaar sells direct to OEMs and UDIs around the world through its global sales team. Xaar's highly skilled application engineers offer the highest level of technical support to assist OEMs and UDIs in the successful design, build, commissioning, and ongoing maintenance of printing systems. Europe, Asia and North America are the primary locations of our current OEM partners.</p>	<p>Xaar company EPS also sells product printing equipment, services and consumables.</p>

We create value for all our stakeholders

Customers

OEMs and User Developer Integrators, and also 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 capability and engagement of our people. We want bright and driven people who share our values and passion for developing and manufacturing world leading technology. We want to build a culture of innovation, continuous improvement, delivery of commitments, transparency and customer focus. We aim to build long-term relationships with all our employees by helping them grow and develop, and by making Xaar an interesting place to work as well as a great company to be involved with.

In a difficult year for many, we have focused on rebuilding trust and engagement with our people. We have carried out an employee opinion survey with very positive results, reflecting our enhanced communication with employees, both in frequency and type, and a belief in the new Company strategy. The data from the survey has resulted in targeted actions and improvements specific to different parts of the business.

We have also continued with the 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.

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 as much as 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".

We are committed to adopting advanced manufacturing techniques in our own cleanrooms wherever possible. Some of these techniques reduce manufacturing waste and eliminate the need for tooling and parts. In 2020 we moved to packaging which is 100% recyclable. In addition, we have commenced a review of our energy usage under a programme to target "Carbon Zero by 2030". Progress to date includes the transfer of electricity supply to an environmentally sustainable green source, the co-ordination of energy efficient actions via an Energy Reduction Team and the investigation of energy generation solutions via supply and installation of Solar array at our Huntingdon factory.

Digital printing compared to analogue reduces consumption of up to:

CO₂ emissions

95%

Energy consumption

55%

Water consumption

60%

Marketplace

From the brightest, most textured ceramic tiles to the smallest, most complex printed electronics, 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. The Xaar 2002 with three variants, 720 dpi resolution and unique High Laydown Technology for textured tile effects, is the most versatile printhead family for ceramic tile decoration on the market.

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 promotes 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.

There is an ever increasing interest in Xaar's inkjet technology as part of a manufacturing process, and through the work that we do we aim to develop these medium-term applications into commercial opportunities.

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.

Many glass printing applications involve jetting highly viscous inks. Xaar's TF Technology provides a competitive advantage, and the Xaar 2002 is the leading printhead for glass printing.

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.

Primary Labels

Labels are used for many different applications, including product identification, name tags, warning and hazard identification, promotions and as decals for product decoration. So far only a minority of this market has converted to digital printing to date. The change driver is the delivery of lower cost per copy on run lengths up to 100,000 impressions.

There is a large range of substrates and inks in this application which adds complication 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 a relatively new 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.

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, which included the Xaar 128 and Xaar 500, was instrumental in the growth of the digital graphics industry around the world.



3D Printing



Product Printing



Glass

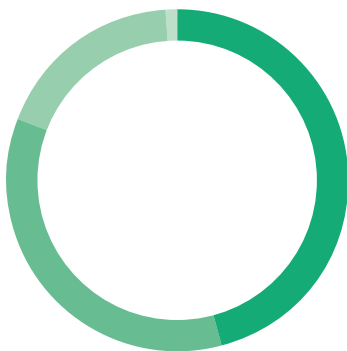


Our business units

Printhead

From the brightest, most textured ceramic tiles to the smallest, most complex printed electronics, Xaar's digital inkjet technologies are transforming print processes.

Key figures



● Industrial	46%
● Packaging	35%
● Graphic Arts	18%
● Royalty	1%

Printhead revenue

£35.3m

2020	35.3
2019	33.7

2020 summary

We made good progress with the new strategies for the Printhead business unit which we announced in April 2020.

[Read more on page 28](#)

We began to see the positive impact of the new business model introduced (only selling to OEMs and UDIs) with consistent new business wins. This has led to a growing mix of customers, both OEM and UDI, across a variety of industries beyond our more traditional sectors (Ceramics and Labels) to Aerospace, Automotive and Advanced Manufacturing.

The Xaar 2002 was launched in August. Developed using extensive customer feedback. The Xaar 2002 is being adopted by new and existing customers. The printhead incorporates drop in printhead alignment and tight mechanical tolerances to allow the printheads to be dropped into the printbar easier, making set up times faster, and machine builds quicker. In addition, thanks to its new advanced Tuned Actuator Manufacturing – TAM² – and Xaar AcuChp Technology, the Xaar 2002 also delivers visibly improved colour uniformity across the width of the printhead, further reducing printhead installation and set-up times, therefore maximising printer uptime.

The full launch of our ImagineX printhead platform took place in September, which provides a clear product roadmap for our customers and which will deliver some compelling advantages.

Priorities for 2021

A focus for 2021 is the Xaar Nitrox, launched in April 2021, and the second product offering from our ImagineX platform. As a very versatile, all round performer, this printhead, which offers a number of applications a 40% increase in productivity and more uniform print quality, is attractive to our Ceramics, Labels and Additive Manufacturing customer base in particular.

In China we are opening a Chinese office in Shenzhen to be able to deliver a higher level of service and enhanced technical support. The facility includes a demonstration centre, waveform development and RMA facilities.

We will continue focus on building our relationships with our OEM and UDI customers. This deeper working relationship is now facilitating Voice of Customer work to further develop our ImagineX platform product roadmap. In addition we are engaging with OEM and UDI partners on a number of product development programmes, with our partners committed to alpha and beta trials.

Where we excel

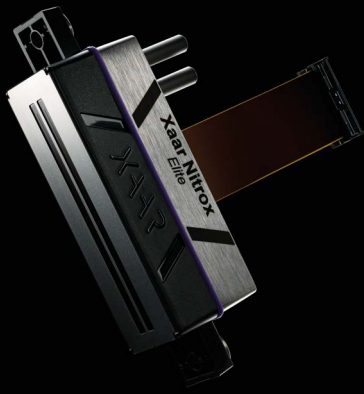
- We are the only truly independent inkjet technology company with 30 years of experience. Our independence enables a flexible, collaborative approach to ensure we remain customer-centric and focus on their goals
- State-of-the-art UK manufacturing facilities and an enviable R&D department staffed by scientists and engineers with a wealth of inkjet industry knowledge and expertise
- A comprehensive portfolio of printheads to cover a wide range of applications
- Engineers with extensive knowledge of inkjet and its application across many sectors as well as considerable field experience. This means they are able to assist our OEMs in the successful design, build, commissioning and post-installation support of all Xaar-based inkjet systems
- Ready-to-use development kits and an extensive portfolio of systems components ensures that OEMs can get up and running quickly.

Technologies

- TF Technology
- XaarDOT
- AcuDrp Technology
- High Laydown Technology
- Ultra High Viscosity
- Tuned Acuator Manufacturing
- XaarSMART.

[Read more on page 20](#)

| Our product range



Xaar Nitrox

With unparalleled productivity and performance, the Xaar Nitrox lets you create without limits



Xaar 2002

High productivity and out of the box exceptional print quality



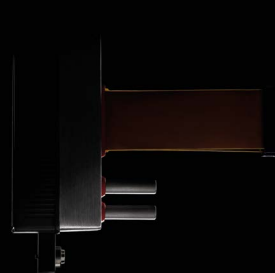
Xaar 1003 C

Ultimate versatility in ceramic tile decoration



Xaar 1003 U

All round reliable high quality printing for industrial applications



Xaar 1003 AMx

Highly accurate fluid deposition for additive manufacturing



Xaar 1003 AMp

Small drop deposition on an industrial scale



Xaar 501

High production up-time and industrial reliability



Xaar 502 O

Industrial reliability and mineral-oil free inks



Xaar 502 S

Exceptional print quality for Wide-Format Graphic



Xaar 128

Adaptable printhead with trouble-free integration

Our business units (cont.)

Printhead – Technologies

Xaar's unique inkjet technologies

We have a number of unique technologies which are incorporated into our printheads, and which provide distinct advantages to our OEM partners and their end user customers. Our leading technologies include:



TF Technology

Xaar's TF Technology is the original and still the best ink recirculation technology available. A printhead's architecture determines how well ink recirculation is implemented and therefore influences the degree to which the method delivers benefits across today's wide range of printing and jetting applications. Xaar's TF Technology, together with the unique Hybrid Side Shooter printhead architecture, enables ink or other fluids to flow directly past the back of the nozzle during drop ejection at very high flow rates.

This ensures the nozzles are continuously primed, keeping the printhead operational and the nozzles firing

and – with the ink in constant motion – prevents sedimentation and nozzle blocking, particularly in heavily pigmented inks. Any air bubbles and unwanted particles in the ink are also carried away, improving reliability, even in the harshest industrial environment.

This makes jetting significantly more reliable compared to alternative printhead designs where convoluted ink flow paths means that recirculation is close to, but not at the back of the nozzle.

The main benefits of TF Technology are unrivalled jetting reliability, outstanding print quality and an increased production uptime.

XaarDOT

XaarDot

Xaar's printheads cover three different drop configurations or three different modes of drop formation. Xaar's customers, therefore, have the flexibility to choose the right printhead for the application. XaarDOT ('Xaar Drop Optimisation Technology') encompasses

a range of drop formation options, each with specific features.

In a variable drop printhead, XaarDOT is incredibly flexible in giving customers the choice of what drop size or sizes to use for a job, both in terms of image quality and substrate flexibility.



AcuDrp

AcuDrp Technology delivers a number of advantages unique to Xaar including dynamic sub drop tuning for every nozzle in the printhead which helps minimise drop volume and drop speed variation

across the printhead, and from printhead to printhead. Therefore banding and colour density variations are minimised and changes in nozzle performance over time are managed effectively.



High Laydown Technology

Xaar's High Laydown Technology enables a range of new applications, thanks to its ability to deposit large quantities of fluid in each pass. It makes possible printing very high levels of UV inks or high build varnish in a single pass for tactile embellishments on labels, packaging and commercial print. Braille and label warning triangles are also possible. High Laydown Technology delivers unprecedented ink discharge rates for gloss and adhesive effects on ceramic tiles, so that effects can be printed at high line speeds.

For additive manufacturing applications, High Laydown Technology offers increased printing productivity which significantly accelerates build rate for parts and the ability to print a broader range of fluids including higher viscosity materials; this ultimately results in tougher 3D printed parts than those printed with standard inkjet technology.

Ultra High Viscosity

Xaar's Ultra High Viscosity capability opens up a wide range of new inkjet capabilities and applications for OEMs and manufacturers using Xaar technology. Most printheads can only jet materials with viscosities of up to 10-25 centipoise ('cP'). Thanks to Xaar's unique TF Technology and innovative High Laydown Technology, fluids with significantly higher viscosities – up to 100 cP – can now be jetted.

The ability to lay down fluids with higher particle loading and particle sizes offers advantages such as an increased colour gamut, opacity and special effects. In addition, jetting higher molecular weight photopolymers for Advanced Manufacturing and 3D printing applications is made possible.

Tuned Actuator Manufacturing

Actuator performance in each printhead is optimised with Xaar's Tuned Actuator Manufacturing. This process ensures full scalability with a simple and quick set up, streamlining printhead replacement, and achieves consistent print quality across long print bars with multiple printheads, at different greyscale levels.

XaarSMART

The Xaar 2001+ family of printheads incorporates XaarSMART technology which reports ink temperature and printhead status in real time so that printer performance can be easily adjusted to deliver consistent print quality throughout a production run.



Our business units (cont.)
Printhead – Focus on manufacturing



CUTTITI MANUFACT

Xaar's production processes are world-class and lead the way in inkjet manufacturing.

Our printheads are produced in a highly automated, cutting-edge factory in Huntingdon, Cambridgeshire which is ISO 9001 and ISO 14001 certified. Over 95% of Xaar's printheads are exported globally, with Asia, Europe and North America as the major markets.

Manufacturing on a micron and sub micron scale takes place in carefully controlled cleanrooms which have a total footprint of around 5,000m².

Initially, Xaar's printheads were manufactured in Sweden and in 2007 Xaar opened its UK factory. Since then we have invested over £70 million which gives us sufficient capacity to scale up the printhead business. Many of the machines used in the manufacturing process are bespoke as Xaar's processes have been built up from 30 years of highly specialised inkjet know-how.

In addition to manufacturing the printheads, we have specialist test areas for new developments as well as existing products, all of which go through a comprehensive print performance test before packing and shipment. In 2021 we will be opening a new customer demonstration centre to showcase the capabilities of our technologies.

ING-EDGE CTURING

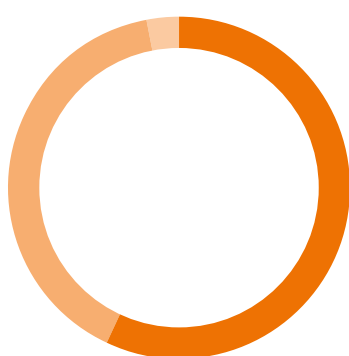
Our business units (cont.)

Product Print Systems

Introduction to the Product Print Systems business unit

Engineered Printing Solutions ('EPS') is a recognised leader in the industrial product marking machine industry, providing highly automated machines and accessories. As well as providing an industry-leading service and support, EPS occupies a niche position as one of only a few bespoke product marking machine companies in North America.

Key figures



- Digital 57%
- Analog 40%
- Other 3%

EPS revenue £m

£12.7m

Year	Revenue (£m)
2020	12.7
2019	15.7

Where we excel

Our core strengths are designing, building and integrating machines which allow our customers to product mark their parts in a highly automated manner, enabling significant cost savings and virtually unlimited print flexibility and personalisation. We offer unparalleled service and support which in turn ensures we build long-term relationships with our customers.

What we achieved in 2020

2020 was a challenging year for Engineered Printing Solutions due to the impact of COVID-19. Specifically, two of the company's key sectors – Ad Specialty and Promotional Goods – were hit very hard by the restrictions put in place to reduce the spread of the virus.

Whilst EPS saw a reduction in revenue year-over-year, we generated several long-term positive outcomes in improved margins, driven by cost cutting measures, improved lead times and the further exploitation of modular standardisation (by pre-building three core non-custom systems). This modular approach is starting to win orders.

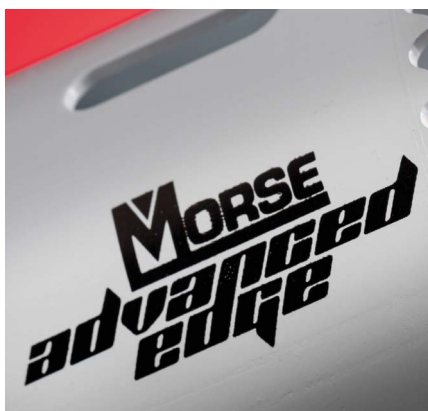
Outlook for 2021

We will continue to focus our strategy for the EPS business:

1. Business development aimed at utilising existing technologies to expand into adjacent markets;
2. Increased scalability through the standardisation of modular components whilst retaining the ability to meet each customers' unique requirements through customised fixtures and tooling; and
3. Deliver operational improvement to remediate management and financial controls, stock management, cost control and increased product margins.

Progress already made in business development is reflected in the strong order book and pipeline at the start of 2021 which contain opportunities from a number of new target markets.

Operationally, a key focus is the lead-time reduction initiative that will take the standard build times down from 26 weeks to 18 weeks to 12 weeks in two years.



EPS product portfolio

The EPS product portfolio major technologies:

In all three product portfolios, one of the key points that separates EPS from its competition is its ability to integrate and automate the product marking process. This includes robotic auto load and unload, part fixturing, part conveyance, pre-treating and post-print curing. EPS has designed and built standalone systems as well as drop-in integration solutions.



XD-360° Cylindrical Inkjet Printer

The XD-360° is a multi-colour, UV-LED, high-resolution industrial inkjet printer built specifically for decorating cylindrical objects. The XD-360° prints on flat walled or tapered cups and bottles with a synchronised printing and curing operation. Full WW+CMYK, optional primer and varnish heads are available.



F-Jet24 and Bottle Jet Digital Multi-Pass Scanning Systems

This technology is a lower cost, entry level approach to digital inkjet printing that is capable of producing high quality, high resolution images at a slower speed, but allows for image variability across multiple parts.



KP-KE Analogue Systems – Pneumatic Driven and Servo-Driven machines

Pad Printing employs machine heads, inks, silicone pads and clichés to produce a printed product. This technology is well-suited for long production runs that do not involve the changeover of artwork.



Our business units (cont.)

3D Printing

Introduction to the 3D business

Xaar 3D is developing 3D printing machines which leverage the benefits of industrial Xaar printheads.

These machines deposit a fine layer of plastic powder, onto which Xaar piezoelectric printheads print a high resolution cross-sectional pattern of the parts to be manufactured. Next, the complete powder layer is exposed to infra-red energy, causing the imaged powder to absorb this energy and fuse. This process is then repeated layer by layer until the whole build is complete. Unlike traditional laser systems, the Xaar 3D process is more consistent, controllable and cost effective.

Xaar 3D is an independent legal entity which comprises of Xaar 3D Ltd and Xaar 3D ApS. It is funded by investments from Xaar and Stratasys Solutions Ltd. The company's core strength lies in its capabilities and experience in machine design and development including powder management and thermal control, as well as years of experience in application and materials development for powder bed fusion. In order to maximise the revenue opportunity and expedite time-to-market for Xaar 3D's products, the Company has entered a partnership with global leading 3D Printing company Stratasys. In addition, Xaar 3D is working closely with materials suppliers and end-customers to assure the completeness of its product offering.

Where we excel

Our technical expertise in powder bed fusion is world-leading.

In addition our process and application team, including the technology's original inventor, bring unparalleled experience into the design of the product. The amalgamation of this knowledge has generated technology ideas under patent application and know-how that are capable of pushing the boundaries on industrial production via 3D Printing.

Our technologies

Our core technologies are predominantly based on unique implementation of a powder bed fusion process.

Inkjet printheads and infrared heaters are used to manufacture products layer by layer from polymer powder materials at much higher speeds than other additive manufacturing processes. Xaar 3D's Director of 3D Technology, Professor Hopkinson, is the original inventor of the core technology.



Our markets and opportunities

Xaar 3D is focused on enabling industrial production of products via 3D Printing.

CAGR of 3D Printing is approximately 23%* and the aspect to which we are focused, end part production – rather than prototype part production – is growing at a rate higher than the overall 3D Printing industry.

Stratasys partnership

In 2018 Xaar announced it would invest with Stratasys, the world's largest 3D Printing company, in a newly formed company, Xaar 3D Limited, to develop 3D printing solutions based on powder bed fusion. Xaar held 85% of Xaar 3D Ltd shares with Stratasys holding 15%. Subsequently in December 2019, Stratasys increased its investment in Xaar 3D to 45% with an option for Stratasys to acquire the whole of Xaar 3D within three years.

Progress update

During 2020 we manufactured commercially designed machines using our contract manufacturer partner.

With these first machines we completed our alpha programme in which we tested the commercial design and demonstrated that the machines are meeting our performance expectations and are capable of producing consistent end-use parts. We also completed the design and implementation of the workflow required for production of parts.

The successful completion of the alpha programme enabled us to ship the complete solution for further testing which also included a series of beta partners who specialised in the production of plastic parts in multiple target applications. Initial feedback from beta customers has been positive; therefore we are accelerating the beta programme during Q1 of 2021.

We are currently in advanced discussions for the disposal of our remaining stake in Xaar 3D as summarised in the strategy section (see page 11).

* Pira 2017.



Business performance

Due to the discussions to divest the remaining shares in Xaar 3D, the business will be classified as an asset held for sale as at 31 December 2020 and the business will no longer be classified as a continuing operation. Xaar's continuing operations, therefore, consist of the Printhead and EPS businesses.

Continuing operations

Revenue for the Group of £48.0 million was in line with management's expectations and whilst this represents a year-on-year decline of £1.4 million (2019: £49.4 million) it is a very pleasing result given the decline in Printhead sales in the second half of 2019 and the impact COVID-19 has had on the EPS business. Group revenues increased from £23.7 million in the first half of the year to £24.3 million in the second half driven by a £1.7 million increase in revenues from the Printhead business.

Revenue from the Americas fell year-on-year across the Group, down £3.6 million (2020: £20.3 million, 2019: £23.9 million), and also fell £1.3 million half-on-half. Printhead revenue declined by £0.6 million to £7.6 million whilst also decreasing £0.2 million half-on-half. Modest growth year-on-year in the 3D Printing and AVM sector was offset by declines in both the Coding & Marking (C&M) and Direct-to-Shape (DTS) sector and the Wide Format Graphics (WFG) and Labels sector. Revenue from the EPS business fell £3.0 million in 2020 to £12.7 million and declined by £1.1 million in the second half of the year.

Performance in Asia, and China in particular, has been very successful in 2020. Revenue grew £1.0 million in the first half of the year to £4.5 million (H2 2019: £3.5 million) and continued to grow in the second half to £5.1 million. This growth has largely been driven by the re-engagement of Chinese Ceramic customers who began to adopt the Xaar 2001 and have now transitioned to the newly launched Xaar 2002 for their new printer builds. Year-on-year revenues have increased from £7.0 million to £9.6 million, a 37% increase. This is a real proof point for the change in strategy, the removal of distribution channels, the implementation of a clear pricing strategy, and more

significantly a change in how we interact and support our customers have all helped with the speed of adoption of the Xaar 2002 in China.

Whilst revenue in EMEA was down year-on-year, £18.1 million compared to £18.5 million, we have seen a promising upward trend in revenue since H2 2019. Revenue in the first half of the year increased £1.0 million compared to the previous half to £8.4 million (H2 2019: £7.4 million) and then increased £1.3 million in the second half to £9.7 million. Increases in H1 were driven by the Ceramic sector which stayed flat in H2 whilst increases in H2 were driven by the C&M and Labels sectors.

Printhead revenue increased £1.6 million to £35.3 million (2019: £33.7 million) as we saw revenue increase half-on-half throughout the year. H1 revenue of £16.8 million was up £2.0 million relative to H2 2019 (£14.8 million) with revenues in H2 rising another £1.7 million to £18.5 million. Having hit a low of £4.4 million in H2 2019 the Ceramics & Glass sector has increased half-on-half throughout 2020 to £6.1 million in H1 and £7.7 million in H2. Full year revenues are up 13% at £13.8 million (2019: £12.2 million). Winning back market share with the launch of the Xaar 2002 in the Chinese Ceramics market, and to a lesser extent EMEA, has been a significant driver. We also established a marketing leading position in Glass with the Xaar 2002 and won several accounts in the Glass sector in 2020, with revenue in H2 2020 increasing 144% compared to H2 2019.

The C&M and DTS sector declined 3% year-on-year (2020: £11.5 million, 2019: £11.9 million). Whilst C&M has remained largely flat year-on-year, DTS declined 16% with the majority of the decline taking place in the Americas. With DTS still in its relative infancy, revenue from this sector remains volatile and largely driven by new machines from customers switching their production lines over to a digital solution. We remain confident in our ability to drive the adoption of digital solutions in this sector in the long run. Our current product portfolio, and the ImagineX product roadmap, make the C&M and DTS sector an area for potential growth in the long-term.

WFG and Labels revenue was up 13% at £6.3 million (2019: £5.6 million). As with the Ceramics & Glass sector we have seen improvements half-on-half throughout 2020 with growth in H1 (H1 2020: £2.9 million, H2 2019: £2.8 million) driven by WFG and growth in the second half (H2 2020: £3.4 million) driven by Labels.

3D Printing and Advanced Manufacturing (AVM) have stayed relatively flat year-on-year (2020: £2.5 million, 2019: £2.6 million) with gains in 3D Printing offset by a

Table A – Revenue by region – Continuing operations

£m
Americas
Asia
EMEA
Total

reduction in revenues from AVM. Similar to DTS, the AVM market for printheads is still relatively small but growing, and revenues can vary year-on-year depending on the number of production lines, or production processes, that are switched over to digital printing. Both 3D Printing and AVM are markets where we are well positioned to take advantage of growth opportunities, but development cycles can be long, therefore, it can take a number of years for a customer to reach full production and ultimately significant demand for printheads.

Revenues from Packing & Textiles remain modest. Our ability to target this sector effectively is somewhat limited by our current product range. 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 £0.9 million was flat year-on-year.

Royalties from the single remaining licensee declined 42% (2020: £0.4 million, 2019: £0.6 million) which is in line with the declining royalty rate. This royalty rate will decline again in both 2021 and 2022 before ceasing altogether thereafter.

Revenue from the EPS business declined by £3.0 million to £12.7 million (2019: £15.7 million) as COVID-19 impacted on a number of markets addressed by their Pad Printing machines and consumables; Ad Speciality and Promotional Products were hit particularly hard. Whilst the first half was helped by a strong order book, particularly on the digital inkjet side, we saw a decline in sales in the second half from both Pad Printing and digital inkjet as companies held off making large capital commitments, and demand for consumables, which declined significantly in Q2, only partially recovered. Despite this we have been able to strengthen the pipeline and order book and are well placed to return to growth in H1 2021 as companies start to invest in capital equipment again and those markets affected by the pandemic, such as Ad Speciality and Promotional Products, start to rebound.

	2020 H1			2020 H2			FY 2020			FY 2019		
	PH	EPS	Total	PH	EPS	Total	PH	EPS	Total	PH	EPS	Total
	3.9	6.9	10.8	3.7	5.8	9.5	7.6	12.7	20.3	8.2	15.7	23.9
	4.5	-	4.5	5.1	-	5.1	9.6	-	9.6	7.0	-	7.0
	8.4	-	8.4	9.7	-	9.7	18.1	-	18.1	18.5	-	18.5
	16.8	6.9	23.7	18.5	5.8	24.3	35.3	12.7	48.0	33.7	15.7	49.4

Gross profit for the year increased by £0.7 million to £13.0 million (2019: £12.3 million) driven by an increase in the gross margin to 27% (2019: 25%). This was the result of an improvement in the Printhead business unit's gross profit which, whilst helped by increased revenue, was primarily caused by an increase in the gross margin from 22% in 2019 to 27% in 2020. 2019 was characterised by an underutilisation of the factory as throughput was lowered or cut in order to reduce inventory which had reached excessive levels on several product lines. In 2020, whilst we continued to improve our working capital position, and reduced inventory by another £4.5 million (2019: £6.1 million reduction in inventory), the higher level of demand, and the fact finished goods inventory is now at sustainable levels, meant the factory output went up year-on-year. With inventories of finished goods now at sustainable levels the Printhead business is well placed to take advantage of increased demand and utilise its high level of operational gearing to deliver further improvements in the gross margin.

Gross profit for the EPS business declined £1.2 million in the year to £3.4 million (2019: £4.6 million). Whilst gross margins were down year-on-year (2020: 27%, 2019: 30%) the fall in gross profit is largely attributable to the decline in revenue which was down £3.0 million year-on-year. The gross margins for EPS were negatively impacted in the second half by a 22% decline in machine sales as companies focused on maintaining their cash position and put planned capital investment on hold. The gross margins were further impacted by inventory provisions of £0.6 million related to legacy products. Excluding these one-off provisions, gross margins were 31%, up 1% on 2019 despite the lower revenue.

R&D spend of £4.5 million was up £1.4 million on 2019 (2019: £3.1 million). This reflects the investment in the ImagineX platform which will be central to our long-term growth.

Table B – printhead revenue

£m	2020 H1	2020 H2	FY 2020	FY 2019	Var	Var %
Ceramic & Glass	6.1	7.7	13.8	12.2	1.6	13%
C&M and DTS	6.0	5.5	11.5	11.9	(0.4)	(3%)
WFG & Labels	2.9	3.4	6.3	5.6	0.6	13%
3D Printing & AVM	1.3	1.1	2.5	2.6	(0.2)	(5%)
Packaging & Textiles	0.4	0.5	0.9	0.9	-	1%
Royalties	0.2	0.2	0.4	0.6	(0.3)	(42%)
Total	16.8	18.5	35.3	33.7	1.6	5%

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

Table C – EPS revenue

£m	2020 H1	2020 H2	FY 2020	FY 2019	Var	Var %
Digital inkjet	4.0	3.2	7.2	6.8	0.4	7%
Pad printing	2.7	2.4	5.1	8.1	(3.0)	(37%)
Other	0.2	0.2	0.4	0.8	(0.4)	(49%)
Total	6.9	5.8	12.7	15.7	(3.0)	(19%)

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

Sales and marketing spend for the year was £6.0 million (2019: £8.1 million). The decline in spend of £2.1 million year-on-year largely relates to cost savings in the Printhead business unit following the restructuring of the business in the second half of 2019. Further savings were seen in both the Printhead and EPS businesses due to COVID-19 which limited our ability to visit customers and led to the cancellation of the majority of tradeshow which one, or both, businesses would have attended.

General and administrative expenses increased £0.3 million from £7.7 million in 2019 to £8.0 million in 2020.

Impairment reversals on financial assets were £0.9 million (2019: £2.7 million loss). This reversal predominantly relates to a distribution channel used by the Printhead business and the collection of a customer debt previously provided for.

Other operating income in the period of £0.8 million relates to the US Government's COVID-19 support and the Paycheck Protection Program (PPP) loan taken out by the EPS business which is expected to be forgiven in the first half of 2021, having met all qualifying criteria during 2020.

Business performance (cont.)

Restructuring costs of £0.8 million predominantly relate to the final costs in liquidating the legacy Swedish entities and provisions for the dilapidation and exit of the office on the Cambridge Science Park.

The adjusted EBITDA for continuing operations in the year was a £0.1 million profit (2019: £4.9 million loss).

The adjusted loss before tax from continuing operations was £3.9 million, compared to £8.0 million loss in 2019. The performance of the Printhead business improved £4.6 million from a £8.0 million loss in 2019 to a £3.4 million loss in 2020 driven by increased sales, a much improved gross margin, and a reduction in operating expenditure despite increased R&D investment. The EPS business went from a £0.1 million profit in 2019 to a £0.5 million loss in 2020 due to the impact of COVID-19 on revenue, and the write off and provisioning of legacy inventory.

The loss before tax under IFRS was £4.3 million (2019: £10.9 million), £0.4 million higher than adjusted loss before tax. Restructuring costs of £0.8 million, foreign exchange losses on intra-group loans of £0.3 million, and share-based payments of £0.3 million were partially offset by other operating income £0.8 million and an R&D expenditure credit of £0.1 million. Loss per share from continuing operations was 5.7p (2019: loss 18.7p).

Discontinued operations

A £10.3 million loss was recorded in relation to discontinued operations (2019: £57.3 million) with cash outflows for the period of £12.1 million (2019: £17.2 million). The Thin Film business, which was classified as discontinued in 2019, recorded a loss of £3.7 million which primarily relates to inventory commitments and supplier liabilities. All liabilities in regard to the Thin Film business have now been settled. As a result of the intended sale of Xaar 3D, which is assessed as highly probable, that business has been classified as a discontinued operation held for sale. The 3D business recorded a loss of £6.4 million in 2020 (2019: £1.2 million loss). The increased level of losses in the business primarily relate to R&D expenses recognised in the period which increased by £4.5 million with gross R&D expenditure increasing by £1.8 million. In 2019 much of the gross R&D spend was treated as capitalised development, this only ceased at the end of November 2019 and with the amortisation of capitalised R&D commencing in December 2019. The year-on-year change in the net capitalisation/amortisation of R&D was £2.7 million.

Table D – Movement in net cash* (including 3D)

£'000	2020	2019
Cash & Treasury Deposits – Continuing operations	18,117	16,177
Cash & Treasury Deposits – 3D operations	2,120	9,145
Cash & Treasury Deposits at the end of the year	20,237	25,322
Cash & Treasury Deposits at the beginning of the year	25,322	27,946
Total Net Cash Outflow	(5,085)	(2,624)
Effect of foreign exchange rate changes on cash balances	57	211
Decrease in net cash for the Group	(5,028)	(2,413)
Consisting of:-		
Total cash inflow from continuing operations	7,073	8,405
Cash outflow from Xaar 3D business	(7,018)	(4,852)
Xaar 3D - Proceeds from share capital and share sale	-	12,002
Net cash outflow from Thin Film operation	(5,083)	(17,968)
Decrease in net cash for the Group	(5,028)	(2,413)

* Net cash is defined as cash and cash equivalents, plus treasury deposits.

Loss for the year

The loss for the Group was £14.7 million (2019: £71.7 million) with the loss per share of 15.2p (2019: loss 92.5p).

Strong cash focus and improved working capital position

The net cash position remains strong with continuing operations generating £7.1 million of cash.

The Group's continuing operations continue to generate cash with a net increase attributable to continuing operations of £7.1 million for the year (2019: £8.4 million on a like for like basis and £14.8 million total). Due to cash outflow on discontinued operations, total net cash declined in the year £5.1 million (2019: £2.6 million).

Operating cash flows before movements in working capital for continuing operations improved from an outflow of £4.9 million to an inflow of £1.4 million. This was largely due to the improvements in the adjusted EBITDA (2020: £0.1 million, 2019: loss £4.9 million) and reduced expenditure on restructuring following the extensive restructuring of the business in the final part of 2019 (2020: £0.8 million, 2019: £1.5 million). Operating cash flows were further helped by £0.8 million of US Government grants.

As part of the Group's strong cash focus working capital remains a key area. Driven primarily by a £5.1 million reduction in inventory, £6.7 million of cash was released from working capital to give cash generated by operations of £8.1 million (2019: £7.6 million). Factoring in tax receipts of £0.3 million (RDEC related), and expenditure on property, plant and equipment (PPE), intangible assets and lease liabilities, continuing operations generated £7.1 million of cash (2019: £8.4 million). Whilst down year-on-year, 2019 performance was assisted by £2.6 million of income taxes received (£1.6 million of RDEC and a net inflow of £1.0 million corporation tax) and movement in working capital of £12.6 million as the business tried to address the significant excess inventory position at the end of 2018 and the large receivables position with a number of distributors.

Discontinued operations consumed cash of £12.1 million (2019: £17.2 million). The cash outflow from Thin Film operations was £5.1 million (2019: £18.0 million). This was driven primarily by supplier liabilities and the build out of inventory for a small number of customers. With all liabilities now settled and inventory in place, cash flows in future years will be minimal.

Table E – Cash flow table – Continuing operations (excluding 3D)

	2020	2019
aEBITDA	62	(4,857)
Restructuring	(754)	(1,518)
Depreciation of right of use assets	1,107	962
Government grant (PPP loan)	819	–
Other	144	473
Operating cash flows before movements in working capital	1,378	(4,940)
Movement in working capital	6,735	12,574
Cash generated by operations	8,113	7,634
Income taxes (paid)/received	351	2,618
Net cash used in investing and other financing activities	(1,391)	(1,847)
Net increase in cash and cash equivalents from continuing operations	7,073	8,405
Proceeds from the sale of share in Xaar 3D	–	6,372
Total cash inflow to continuing operations	7,073	14,777

Cash outflows from the 3D business excluding share issues increased from £4.9 million in 2019 to £7.0 million in 2020. The increase represents the accelerated investment in R&D and go-to-market functions prior to the commercialisation of the 3D printers. In 2019 the investment was offset by £5.6 million from the issue of ordinary share capital which was not repeated in 2020.

Excluding cash from the 3D business, which is now held for sale, net cash increased from £16.2 million in 2019 to £18.1 million in 2020 despite the need to settle the final Thin Film liabilities.

Strong balance sheet

Non-current assets declined £10.8 million in the year from £35.5 million to £24.7 million. This was driven by a reclassification of 3D assets to current assets held for sale (2020: £6.1 million, 2019: £6.7 million), £1.0 million depreciation of right of use assets, and a £2.8 million reduction in PPE and intangible assets as new purchases were controlled in with line with the Group's cash focus and therefore depreciation exceeded capital expenditure.

Current assets, excluding the disposal group assets held for sale, declined £13.9 million from £52.7 million in 2019 to £38.8 million. A significant proportion of this decline is attributable to the reclassification of the 3D business to an asset group held for sale with £4.0 million of current assets at the end of 2020 being reclassified. The remaining £4.4 million decline is primarily as a result of the £5.7 million reduction in inventory across the Printhead and EPS businesses (2020: £10.4 million, 2019: £16.1 million), a £1.4 million reduction

in current tax assets to £0.4 million (2019: £1.8 million), a £0.8 million increase in trade debtors and other receivables, and £1.9 million of cash generated by the rest of the business.

The 3D business has been classified as held for sale with £10.2 million of assets reclassified as at the end of 2020.

Current liabilities, excluding liabilities associated with Xaar 3D (held for sale), increased by £0.5 million. Excluding £0.9 million of 3D liabilities at the end of 2019 current liabilities increased £0.4 million. Provisions, which at the end of 2019 primarily related to the Thin Film operation, declined by £2.5 million to £0.4 million (2019: £2.9 million). Lease liabilities decreased from £1.3 million to £1.1 million primarily as a result of the decision to relocate from the Cambridge Science Park to the nearby Cambridge Research Park. These declines were offset by an increase in trade and other payables in relation to the Printhead and EPS businesses of £2.6 million (2020: £9.9 million, 2019: £7.3 million); these increases were primarily driven by increased supplier liabilities and bonus accruals within the Printhead business.

Non-current liabilities, which all mainly relate to lease liabilities recorded under IFRS 16, decreased by £1.0 million in the year.

Dividend

No dividend has been declared for 2020. The Board recognises the importance of regular income to many investors but believes that it would be inappropriate to reinstate payment of dividends before sustainable profits are restored.

Stakeholder engagement

Identifying our key stakeholder groups makes our business better

The Directors have ongoing engagement with all our key stakeholders: Our Investors. Our People. Our Communities, and Our Partners.

The Directors continually review the impact that any decisions will have on these key stakeholders.

The Board regularly reviews the Company's principal stakeholders and how it engages with them. This is achieved through information provided by management and by direct engagement with stakeholders themselves.

We aim to work responsibly with our stakeholders, including suppliers. The Board has reviewed its anti-corruption and anti-bribery, equal opportunities and whistle-blowing policies.

The key Board decisions made in the year are set out below:

- Response to COVID-19
- Determine Xaar 3D as asset held for sale
- Relocation of HQ office space to Cambridge Research Park
- Investment in ImagineX platform and development of new products
- Branding activities for re-launch of Xaar to OEM customers
- Investment in new legal entity in China to support growth.

Stakeholders

Shareholders

All Board decisions are made to promote the long-term success of the Group for the benefit of our shareholders.

People

Our people are a highly-skilled and technical workforce. They are an essential component of the Group's ability to stay ahead in a fast-moving world.

Community

As a Group, we have a wide-reaching indirect impact on the communities and environments we interact with and we are committed to making sure that this impact is as positive as possible.

Customers

Understanding our customers is critical for the success of our businesses. By developing long-term relationships with them we are well placed to support their evolving business requirements.

Suppliers and partners

Our relationships with our suppliers and partners are integral to the delivery of quality products to our customers and the operational success of our business.

Material issues

- Financial performance
- Our strategy
- Long-term viability
- How the Group meets its environmental, social and governance objectives.

- Culture
- Values
- Operating in an ethical environment
- Progression and personal development opportunities
- Remuneration
- Diversity and inclusion
- Workforce engagement.

- Economic and operational impact of Group businesses on local communities
- Environmental impact of operations, both directly and indirectly
- Being able to demonstrate clear environmental, social and governance policies and how these are measured.

- Operational strength and the ability to meet customer requirements
- Ability to provide high-quality solutions and technical expertise and advice
- Ensuring we remain competitive with a strong, differentiated value proposition
- Innovation with R&D to develop new solutions to customer requirements.

- Ensuring an ethical supply chain
- Potential disruption of supply chain
- Competitiveness
- Financial performance
- Research and development investment.

Engagement methods

- Annual General Meeting
- Annual Report and Accounts, results statements, trading updates and press releases for new branding and ImagineX product launches
- Regular interactions between Directors and shareholders via investor relations roadshow and one-on-one meetings or video calls
- Further details of shareholder engagement are reported in the Directors' Remuneration Report (pages 78 to 96).

- Response to COVID-19 to secure a safe working environment and initiate a working from home policy where appropriate.
- Annual review and renewal of corporate policies and procedures
- Annual employee appraisal by managers and development plan
- Establish apprenticeship and graduate training schemes
- Recruitment, Retention and Development plans
- Regular business forums with Non-Executive Directors and senior management update calls to all employees
- Further details of employee engagement are reported in the Directors Remuneration Report (pages 78 to 96), and Sustainable and responsible business (pages 34 and 35).

- Provide PPE and 3D printed visors to local NHS hospital
- Developing the reporting of emissions across the Group with the intention to further improve environmental performance
- Communication and involvement of employees in office relocation
- Charitable donations determined by employees for local charities
- Further details of activities in the community are reported in Sustainable and responsible business (pages 34 and 35).

- Developing high-quality products in conjunction with customers to equip them to maximise productivity and operational efficiency to utilise less energy and fewer raw materials
- Maintaining effective customer relationship management tools to support the identification of customer needs
- Focus on continued innovation and prioritisation of R&D resource and spend in new ImagineX platform
- Key account management structure across the businesses to encourage meaningful, consistent and ongoing engagement with OEM and UDI customers
- Investment in China subsidiary to be closer to strategic customers.

- Review of supply chain to minimise impact of Brexit / TCA
- Effective and regular communication with suppliers with standardised procedures
- Ensuring high standards throughout our Tier 1 supply chain, measuring our key suppliers against specific criteria, including anti-slavery
- Clear payment practice processes across the Group to ensure fair and prompt treatment of creditors
- Continually monitoring the quality of our strategic suppliers to optimise operational efficiency
- Ensuring that Xaar values are shared with our business partners and suppliers.

Sustainable and responsible business

Working in responsible ways

A strong belief in responsibility

The Group strongly believes that corporate responsibility is integral to business success. The Group is compliant with all relevant regulation and legislation whilst enhancing the working environment for our employees and minimising the environmental impact of our manufacturing processes. There is internal reporting of key metrics throughout the business, and each member of staff is expected to take individual responsibility for their performance and to work together to achieve shared goals.

Our community

Xaar sponsors two Imagineering Clubs at local primary schools. These Clubs are designed to introduce children to engineering through fun activities. The sponsorships are part of Xaar's role in helping to create the 'engineers of the future' and drive interest in STEM subjects ('Science, Technology, Engineering and Mathematics') amongst school students. During 2020 the impact of COVID meant the clubs were not held as frequently as would normally be the case.

During the initial COVID lockdown in 2020, the Group donated both additional cleanroom PPE gowns and masks, and 3D printed visors were manufactured for distribution to the local NHS hospital.

 **Non-financial information statements are indexed in the Directors' Report on page 59**

Social responsibility

- Xaar employees usually raise money during the year for a number of charities, including taking part in various activities for Comic Relief on Red Nose Day, coffee mornings for Macmillan Cancer Support and Christmas Jumper Day for Save the Children. Unfortunately due to the Coronavirus pandemic in 2020 we were unable to participate in charity fundraisers this year, instead charity nominations took place in November 2020 with Hinchingsbrooke Special Care Baby Unit (donation made January 2021) and Wood Green Animal Shelter selected to receive £2,000 each
- Xaar usually sponsors a number of employees and their families engaging in events throughout the year, including charity golf days, equipment for a charity football team, various sporting events and donations to community food banks. In total, the Group made charitable contributions to local and national

charities during the year totalling £3,150 (2019: £5,100)

- No political donations were made in the current or previous year
- The social club, which is aimed at encouraging staff to have fun and get to know each other socially, was paused during 2020 as a consequence of COVID restrictions
- Xaar continues to sponsor an Imagineering Foundation club which operates at primary schools in both Huntingdon and Cambridge. Supported by eight volunteer tutors from Xaar's Operations and R&D teams, the weekly, hour-long after-school clubs are attended by up to 12 Year Six students. The students learn about basic science and engineering concepts and make working mechanical and electronics-based models, such as a balloon-powered 'rocket' car, a steady hand game and even an AM radio. The Foundation's aim is to introduce young people of 8-16 years to the exciting world of engineering, science and technology through fun, hands-on activities
- The Group has commenced a review of its energy usage under a programme to target "Carbon Zero by 2030"; actions to date incorporate:
 - Transfer of electricity supply to an environmentally sustainable green source
 - Co-ordination of energy efficient actions via an Energy Reduction Team
 - Investigation of energy generation solutions via supply and installation of Solar array at Huntingdon.

The Group respects all human rights and in conducting its business the Group regards those rights relating to non-discrimination, fair treatment and respect for privacy to be

Our guiding principles



Our new brand identity and launch of the ImagineX printhead platform.

 **Read more on pages 2 and 3**




A new set of values to reflect the true essence of Xaar.

 **Read more on pages 4 and 5**



Guide the way we behave towards our customers, our partners and each other.

 **Read more on pages 6 and 7**

the most relevant and to have the greatest potential impact on its key stakeholder groups of customers, employees and suppliers.

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 and, 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.

The Group's policies are incorporated into the Xaar Code of Conduct, including:

- Xaar Anti-bribery and Corruption policy
- Xaar Anti-money Laundering policy
- Xaar Corporate Criminal Offence policy
- Xaar Employee Share Dealing Code.

The anti-bribery and corruption policies of the Group are set out in the Corporate Governance section on page 67

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.

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 and Share Incentive Plan.

Based on the closing headcount at 31 December the split of staff by gender was as follows:

	2020 Male/ Female	2019 Male/ Female
All employees	311/77	297/69
Directors	4/1	6/1
Senior managers	40/9	42/8
Employees	267/67	249/60

The Group undertakes R&D 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 Nottingham.

Health, safety and environment

Xaar has a manufacturing site in Huntingdon, along with R&D and head office functions in Cambridge, Nottingham, Europe and the USA, 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 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.

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.

During the COVID pandemic the safety and wellbeing of our employees has been and continues to be our overriding priority. Our executive and senior management team have monitored events closely to ensure that we have been able to react quickly to an ever-changing situation. At the start of the pandemic we enabled working from home at short notice for those who were able to do so, and in the workplace we took actions to introduce enhanced hygiene and social distancing measures, screens, temperature checks, use of face coverings and more recently workplace lateral flow testing.

Sustainable and responsible business (cont.)

Task Force on Climate-related Financial Disclosures (TCFD)

Despite the pandemic, the focus on climate change has not diminished. Policy-makers, regulators, industry and wider society all increasingly recognise the urgent need to adapt.

Background

The TCFD’s recommendations continue to be adopted internationally. According to the TCFD Status Report 2020, more than 1,500 organisations have now voiced their public support. Over 110 regulators and government organisations are TCFD supporters, including the UK Government, Bank of England and the FCA. The private finance agenda of the UN Climate Change Summit 2021 (COP26) also features TCFD implementation as an objective.

The FRC has carried out a thematic review of how climate-related issues are being addressed across its various areas of responsibility, including governance, corporate reporting, audit and professional oversight.

In November 2020, the UK Chancellor of the Exchequer announced the UK’s intention to move towards mandatory TCFD-aligned disclosures across the UK economy by 2025, with most measures to be in place by 2023. Within the roadmap presented by HM Treasury, premium listed companies (like Xaar plc) will be expected to comply with the reporting requirements by the end of 2021, from January 2022 to be included in the Annual Reporting framework.

Xaar’s response:

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 as much as 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, with Senior Independent Director Alison Littlely having specific responsibility for ESG matters.

As part of the management of emerging risks within the risk register, the Board has received initial information on the potential risks and opportunities that are presented by requirements for managing climate change risk, and meeting the Task Force on Climate-related Financial Disclosures requirements in the next year.

Recent years have seen further progress internally to identify improvements in both electrical and energy usage and to reduce the greenhouse gas emissions of the Company recorded in Scope 1 and 2 (see GHG page 50).

As part of the development to ensure affordable and clean energy, Xaar is in the process of entering into a supply contract in 2021 for the supply of green electricity from a renewable source.

Xaar has also initiated a project to remove packaging complexity and improve sustainability, and introduced new packaging for its products in 2020, removing plastic as a packaging material, reducing its plastic consumption by 1.2 tonnes per year. All Xaar’s printheads will be shipped in fully recyclable and biodegradable cardboard packs by the end of the year.

<https://www.xaar.com/en/news/2020/sustainable-packaging-delivers-for-all/>

The management have set up a “Carbon Zero by 2030” team to identify metrics and targets that could be used by the organisation and develop other opportunities to reflect sustainable development goals to target continuation in the reduction in emissions to zero.

We still need to understand the full impact from our operations and are committed to continue reducing the impact on the environment and maintaining our drive to achieve complete carbon neutrality in line with the UK’s 2030 goal.

Potential UN Sustainable Development Goal targets



Ensure access to affordable, reliable, sustainable and modern energy for all.

What can business do?

Check your energy efficiency. Source your energy from renewable sources. Check what impact your energy need has on the local community.



Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

What can business do?

Put a value on the economic impact generated by the jobs your company creates to evidence your licence to operate. Check you have a policy on human rights and that it is being adhered to throughout your supply chain. Check what programmes you have in place to reduce workplace injury and recruit and retain people with disability – are both improving?



Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.

What can business do?

Review your transport and building infrastructure to identify efficiencies. Consider investing in local transport improvements that would deliver a direct business benefit to you. Check how disruptive technologies or innovative business models could impact your market. Explore your digital potential (both what you do and how you do it).



Ensure responsible consumption and production patterns.

What can business do?

Check what you are doing to manage scarce resources. Set and meet targets to reduce energy and resource intensity in production and use. Assess the waste disposal of your company. Reduce the need for new resources and waste disposal by extending product life, repairing, reusing, re-manufacturing and recycling products. Adopt circular economy principles.

The core recommendations



Governance

The organisation’s governance around climate-related risks and opportunities.

Strategy

The actual and potential impacts of climate-related risks and opportunities on the organisation’s business, strategy, and financial planning.

Risk management

The processes used by the organisation to identify, assess, and manage climate-related risks.

Metrics and targets

The metrics and targets used to assess and manage relevant climate-related risks and opportunities.

Initial actions in 2021 are focused upon:

- We have offset all of the UK regulatory Scope 1 and 2 carbon impact that we made and reported in 2020. Based on our carbon footprint reported in 2020 this makes Xaar a carbon neutral inkjet manufacturer
- Identify targets and metrics applicable to Xaar, to measure across the organisation
- Preparation and identification of Scope 3 emissions within the supply chain
- Identify actions to remove natural gas as an energy and heat source, or replace with a renewable gas supplier e.g. biogas
- Identify tier 1 suppliers and their disclosures around climate change and GHG emissions
- Green energy projects to identify additional energy and GHG savings:
 - Investigate Solar panel installation at Huntingdon location to generate a proportion of electricity ourselves.
 - Electric vehicle chargers installation for employee and delivery vehicles.
 - LED light installations to further reduce the utilisation of electricity
- Review product return policy, to identify possibilities for improvements in responsible consumption in production and remanufacturing of products, reduction in plastic use, reclaiming raw materials, recovery of any heavy metals, copper, lead etc.
- Set, measure and disclose a zero waste to landfill target, any waste not recycled being sent to a waste to energy recovery process.

	Disclosures	Recommended disclosures
Governance	Disclose the organisation’s governance around climate-related risks and opportunities.	a. Describe the board’s oversight of climate-related risks and opportunities. b. Describe management’s role in assessing and managing climate-related risks and opportunities.
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.	a. Describe the climate-related risks and opportunities the organisation has identified over the short, medium, and long-term. b. Describe the impact of climate-related risks and opportunities on the organisation’s businesses, strategy, and financial planning. c. Describe the resilience of the organisation’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.
Risk management	Disclose how the organisation identifies, assesses, and manages climate-related risks.	a. Describe the organisation’s processes for identifying and assessing climate-related risks. b. Describe the organisation’s processes for managing climate-related risks. c. Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation’s overall risk management.
Metrics and targets	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	a. Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process. b. Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks. c. Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.

Key performance indicators

Our progress in numbers

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

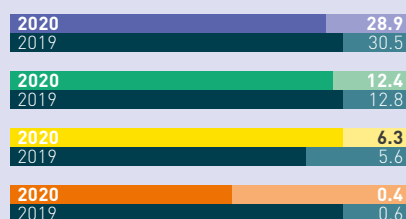
Revenue

Continuing operations

£48.0m

Total revenue for the Group was £48.0 million, down £1.4 million year-on-year (2019: £49.4 million). Revenue declined 3% year-on-year.

Revenue by sector £m



Declining EPS revenue due to COVID (3.0 million) in the industrial sector. WFG and Labels sectors increased throughout the year with full year revenue up 13%. Royalties from the single remaining licensee declined and will continue to decline in both 2021/22 before ceasing.

- Industrial
- Packaging
- Graphic Arts
- Royalties

Revenue by region £m



The significant reduction of revenue in Americas is primarily due to the sales decline in the EPS business. Performance in Asia, and China in particular, was successful with growth of £2.6 million in Printheads driven by re-engagement of Chinese Ceramic customers who began to adopt the Xaar 2001 and have now transitioned to the newly launched Xaar 2002 for their new printer builds. EMEA was slightly lower, but we have seen a promising upward trend in H2 2020 driven by C&M and Labels sectors.

- EMEA
- Asia
- Americas

Profit

Gross margin – Continuing operations %

27%



The increase in the gross profit for the Group can be attributed to the performance of the Printhead business. This was driven by the operational leverage in the business with increased product throughput absorbing greater costs in 2020 (2019: 25%).

Loss before tax £m – Continuing operations

(£4.3m)



Loss before tax from continuing operations represents operating loss after investment income and finance costs (2019: £10.9 million loss).

Adjusted loss before tax £m – Continuing operations

(£3.9m)



Adjusted loss 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 (page 126) (2019: loss £8.0 million).

Net cash

Cash and cash equivalents comprise cash at bank (£18.0 million) and short-term highly liquid investments with an original maturity of three months or less. Net cash incl. Treasury deposits of £0.1 million.

Cash & Treasury deposits £m

£18.1m

2020	18.1
2019	25.3

2019: £25.3 million comprising cash £24.8 million and Treasury deposits of £0.5 million (including £9.1 million 3D cash).

Net cash inflow from continuing operations £m

£7.1m

2020	7.1
2019	8.4

Net cash inflow (incl Treasury deposits) from continuing operations was £7.1 million as consequence of improved aEBITDA performance and further improvements in working capital (2019: £8.4 million).

Gross R&D investment £m

£4.5m

2020	4.5
2019	3.1

Gross R&D investment (continuing operations) reflects the investment in the ImagineX platform (£4.5 million). 2019 investment excludes amortisation of Xaar 3D development costs and impairment of Thin Film (2019 restated: £3.1 million).

Adjusted diluted earnings / (loss) per share – continuing operations

(5.2p)

2020	(5.2p)
2019	(15.1p)

Adjusted EPS – Continuing operations is considered to provide a fairer representation of the Group's trading performance year on year. (2019: (15.1p). EPS performance is one of the criteria for the new LTIP.

See more on page 126 and page 135

Following the appointment of a new leadership team and implementation of a new strategy for profitable growth, an assessment of our KPIs will be undertaken to ensure we utilise the best metrics to monitor our performance.

Alongside this, a new remuneration policy will be designed to ensure alignment between the interests of the Executive Directors and the senior management team with the core aims of the new strategy, as well as to align management with the interests of shareholders in the reward for improved performance against the market.

As a result, a new Long-Term Incentive Plan ('LTIP') was introduced in 2020. Metrics will be set to reflect the key challenges seen across the business and specific units for that year.

See the Directors' Remuneration Report on page 78

Xaar uses adjusted figures as key performance measures in addition to those reported under IFRS, as the Board believes these measures enable management and stakeholders to better assess the underlying trading performance of the businesses as they exclude certain items that are considered to be significant in nature and/or quantum – they exclude other operating income, share-based payments, intra-group foreign exchange movements, gain / loss on financial instruments, restructuring and R&D tax credits, that management consider to have a distorting effect on the underlying results of the Group.

The alternative performance measures ('APMs') are consistent with how the businesses' performance is planned and reported within the internal management reporting to the Board and executive management. Some of these measures are used for the purpose of setting remuneration targets.

See more on page 83 and page 126

2019 comparatives are based on continuing operations (where relevant) and are therefore restated to incorporate adjustments arising from financial instruments and discontinued operations.



Risk management

Managing our risks

Key risk areas

The risks around our business are set out in more detail on pages 43 to 49, but the key risk areas can be identified as being associated with the following:

Market		Risk owner: CEO John Mills	
<p>1. Competition Maximising returns over the long-term in the target application through early adoption to achieve a market leading position and then retention of that position.</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.</p> <p>4. Merger and acquisition opportunities Seek opportunities to expand, create synergies and generate greater shareholder value.</p>	<p>5. Coronavirus ('COVID-19') – External Tracking the potential global impact and external risks arising from pandemic response and impact on customers / supply chain.</p>
Operational		Risk owner: CEO John Mills	
<p>6. Organisational capability Having the right people in the right roles.</p>	<p>7. Coronavirus ('COVID-19') – Internal / Company Tracking the potential local impact and response to pandemic and operational internal risks on employees or organisation.</p>	<p>8. Brexit Tracking the impact of the Trade & Co-operation agreement between UK & EU.</p> <p>9. Manufacturing facility Diversifying products, locations and manufacturing partners to alleviate operational issues.</p>	<p>10. Partnerships Working with the right companies, at the right time on the right terms to deliver long-term value.</p>
IT		Risk owner: CFO Ian Tichias & Group IT Director – Graeme Smith	
<p>11. IT systems and information failures Failure of our IT infrastructure or key IT systems. Further, failure to build resilience at the time of investing in and implementing new IT infrastructure or IT systems.</p>	<p>12. IT transformation Failure to achieve our IT transformation objectives due to poor prioritisation, ineffective change management and a failure to understand and deliver the IT infrastructure, IT systems, and business process changes required.</p>	<p>13. Cyber security risk – see incident response 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.

The printing industry in which we operate is declining in overall terms of total output, tends to be capital intensive, is slow to react to change and is resistant to the adoption of new technology. Analogue printing processes are declining rapidly particularly in areas such as Commercial print (transactional documents and publications) where electronic media and digital printing processes are becoming more widespread.

However in areas such as Packaging and Textiles, analogue processes are still dominant and the conversion to digital still modest.

The first approach to managing these risks is to have high quality individuals within the necessary functions that these risks tend to fall into. Other examples of the effective day to day management of these risks include operating multi-functional teams to share knowledge across the business, having regular stage gates in the management of development programmes, and the regular assessment of manufacturing capacity against future potential needs.

In addition to day to day processes the Group's risk register is formally reviewed at senior management and Board level, including the assessment of the performance of risk management during the preceding period.

During 2020, the senior management and Board re-evaluated the existing principal risks, to consider emerging/alternative risks, with significant developments within the IT risk being expanded to cover increase in principal risks arising from cyber-security.

The Board will continue to develop the management framework across these specific risks so that it operates effectively alongside the changing organisational structure, and will inform an assessment of the Group's principal risks throughout 2021, allowing the Board to periodically review existing risks and consider key emerging risks, whether they be operation-specific or broader in scope, such as climate change and environmental matters, with particular reference to TCFD reporting requirements in 2022 (see page 36).

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.

In compliance with provision 28 of the 2018 UK Corporate Governance Code, the Board regularly reviews the effectiveness of the Group's system of internal control.

The Board's monitoring covers all controls, including financial, operational and compliance controls, risk management systems and internal control systems. It is based principally on reviewing reports from management to consider whether significant risks are identified, evaluated, managed and controlled and whether any significant weaknesses are promptly remedied and indicate a need for more extensive monitoring. Significant deficiencies in internal control were identified in EPS during the external audit process in respect to financial statement close process and management controls (see Audit Committee report on page 74), and an action plan has been developed to be implemented in 2021.

The Board has also performed a specific assessment for the purpose of this Annual Report. This assessment considers all significant aspects of internal control arising during the period covered by the report. The Audit Committee assists the Board in discharging its review responsibilities.

Approach to risks

The first approach to managing these risks is to have high quality individuals within the necessary functions that these risks tend to fall into.



Risk management (cont.)

Cyber security – Xaar Group IT security incident

As communicated in Company announcements in 2020, Xaar experienced a critical security incident on 4 October 2020 when the Group’s IT infrastructure was hit by a Ransomware attack.

Our quick response to the issue by shutting down IT systems across multiple sites contained the attack and limited the impact from it, however data was encrypted by the Ransomware on several systems. We did not experience any significant impacts to business operations and we successfully fulfilled all customer orders in the period following the attack.

As one of the affected systems was our HR system, we immediately notified the Information Commissioner’s Office (ICO) of the Personal Data Breach. We co-operated with the Information Commissioner throughout the investigation and were informed on 27 October that no further regulatory action would be taken.

We engaged external cyber security experts to investigate the attack and other key IT partners to assist with the safe recovery of the affected systems. Recovery activities continued for several weeks following the attack and were completed by the end of November. The forensic investigation into the attack confirmed that no data was extracted.

While working to recover our IT systems, we have focused on using the insights gained in the process to further strengthen our IT security and data protection platforms. We will continue this important work going forward as documented in our Risk management activities.

The external fees incurred responding to and recovering from this security incident were £35k.

Approach to risks

The first approach to managing these risks is to have high quality individuals within the necessary functions that these risks tend to fall into.

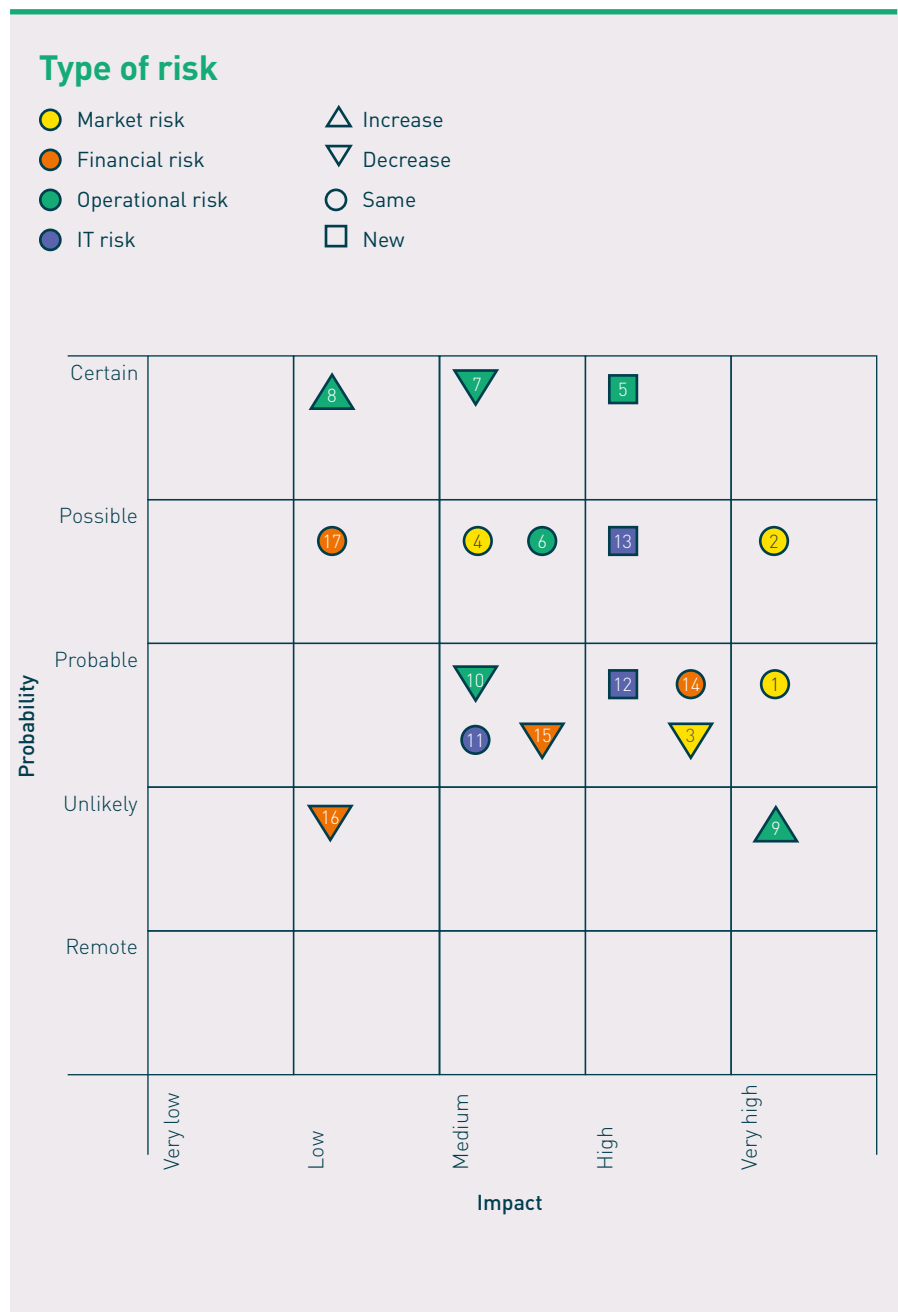
Probability rating

The probability rating is 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 generic 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.



Key of change

⬆ Increase

↔ No change

⬇ Decrease

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Market			
1. Competition	<p>We compete on the basis of our technology, innovation, price, quality, reliability, brand, reputation and customer relationships.</p> <p>Failure to continually improve in these areas may mean that we lose market share or have to reduce prices. Since there are fixed factory costs, reductions in sales volumes may substantially lower 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>Probable Very High</p> <p>↔</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>Possible Very High</p> <p>↔</p>
3. Commercialising and maintaining products with cutting edge technology	<p>We aim to produce quality end products. Failure to meet the required quality standards could have an impact on products that have been sold or that are held in inventory.</p> <p>This could lead to:</p> <ul style="list-style-type: none"> • Unexpected costs associated with resolving the issues • Possible warranty costs, customer compensation or write-down in inventory values • Potentially longer-term revenue loss if customers move to competitors and damage of reputation. <p>We operate in an increasingly dynamic and changing environment. To counter the risks associated with this and, most importantly, to exploit the opportunities it presents, we must embrace innovation, protect our Intellectual Property and capitalise on technology advancements to ensure we grow our market position.</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>Xaar's manufacturing facilities are ISO 9001 accredited. Customer returns are reviewed quickly using a consistent and thorough investigation process.</p> <p>Warranty costs, RMA and customer return costs are reviewed and compared against forecast to highlight unexpected costs, and identify root cause for corrective action. We will continue to focus on product innovation.</p> <p>This is evidenced by our continued focus on R&D spend and the number of new products brought to market.</p>	<p>Probable High</p> <p>⬇</p>

Risk management (cont.)

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Market (cont.)			
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>Divestments also carry risk. We may sell an asset at the wrong time, or may not realise appropriate value for the asset. Separation may be complex and, if poorly executed, may impact the wider business.</p>	<p>Full financial and other due diligence is conducted to the extent as is reasonably achievable in the context of each M&A opportunity.</p> <p>Integration risk and planning would be reviewed and undertaken as part of every acquisition.</p> <p>A detailed business case including forecasts is reviewed by the Board for each opportunity.</p> <p>Use of external advisors.</p>	<p>Possible Medium</p> <p>›</p>
5. Coronavirus (COVID-19) – External	<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 printhead.</p> <p>Temporary disruption to the supply chain and further workplace restrictions may threaten to slow down production or delay testing and the commercialisation of the 3D printers.</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 printhead 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>Assessment has taken place by the Board of the impact upon the 3D operation, and work has commenced to identify an appropriate solution to de-risk and transfer ownership of the 3D business.</p>	<p>Certain High</p> <p>NEW</p>

Key of change

⬆ Increase

↔ No change

⬇ Decrease

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Operational			
<p>6. Organisational capability</p>	<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. We need to attract and retain the right talent to enable achievement of our strategic aims. Failure to do this risks delivery and growth as follows:</p> <ul style="list-style-type: none"> • Lack of staff to meet a specific business need or contract requirement • Loss of project specialisms • Single point of failure • Loss of key skills. 	<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>Investment to build a learning organisation with focus on culture, reward and recognition.</p> <p>The Group reviews remuneration to ensure that the appropriate reward packages accompany a fulfilling work environment.</p> <p>An updated suite of Learning and Development tools is being developed to ensure key skills are developed and enhanced. Internal courses are developed in conjunction with the Institute of Learning and Management (ILM) to support key manager development. A new graduate and apprenticeship programme is to be launched in 2021.</p> <p>Annual performance management reviews for the majority of employees to identify talent and develop key employees.</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>↔</p>
<p>7. Coronavirus ('COVID-19') – Internal / Operations</p>	<p>Impact across all business operations and locations:</p> <p>Reduction in staff availability and development of commercial opportunities.</p> <p>With the continued uncertainty associated with the virus it is too early to assess the impact on the Group's financial performance.</p> <p>IT infrastructure – see 11. IT risk</p>	<p>We have stopped all international travel and remote access and business continuity testing has been performed.</p> <p>Employees where possible are working from home, we have communicated sick and self-quarantine policies to all our staff.</p> <p>There has been minimal impact upon the manufacturing operations in Huntingdon, with work being performed to new shift patterns to reduce the number of staff on site at any one time. COVID secure working practices have been introduced across all sites with handwashing, face coverings and safe working spaces being mandatory for all employees.</p> <p>The Group is debt free with sufficient cash reserves and liquidity to be able to continue operations "as-is" in the short term. The business has a proven track record for disciplined cost control, which will continue to be vital in the current trading environment.</p> <p>In 2020 no claims for furlough or job support were requested from the UK Government. A claim was submitted in the USD for a government loan that was subject to conditions to obtain relief and has been recorded as a Government grant.</p> <p>Further assessment will be made against available Government support schemes, should the need arise.</p>	<p>Certain Medium</p> <p>⬇</p>

Risk management (cont.)

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Operational (cont.)			
8. Brexit	<p>The United Kingdom's decision to leave the European Union presents both risk and opportunities to the Company.</p> <p>The formal trade negotiations concluded at the end of 2020 and are now governed by the Trade and Co-operation agreement reached between the UK and the European Union.</p> <p>A challenge continues to be free trade into the EU. Around one third of our revenues are generated from EU countries and so any actual or perceived barriers to free trade are an obvious area of concern.</p> <p>The free movement of employees and recruitment of potential employees are key focus areas under the new arrangements.</p> <p>We remain exposed to currency fluctuations that could result from the United Kingdom decision to leave the EU.</p>	<p>Key managers across the business are continuously monitoring the latest political developments and putting mitigating actions in place where there may be a potential impact on Xaar or its stakeholders.</p> <p>A review of import and export tariffs identified minimum effect on the raw materials and finished goods.</p> <p>Non-tariff barriers (i.e. import/export documents) are being reviewed with our freight forwarders and couriers to ensure pro-active compliance with documentation requirements from 1 January 2021.</p> <p>Identify and support EU, EEA or Swiss employees requiring advice in completion of application to the EU Settlement Scheme by June 2021.</p> <p>Xaar will become a licensed sponsor for recruitment of EU nationals. This does not apply to Irish citizens or those whose eligible status is covered by the EU settlement scheme.</p> <p>Identify talent that will meet visa requirements under existing Tier 2 conditions and/or minimum threshold criteria for skilled worker general visa.</p> <p>The Group transacts in four main currencies – Sterling, US Dollars and Euro for sales and purchases, with some additional exposure to purchases in Japanese Yen – and adopts natural hedging where possible to mitigate against exchange rate movements.</p> <p>The Group has sufficient cash resources to protect against any short-term volatility.</p>	<p>Certain Low</p> <p>^</p>
9. Loss of manufacturing facility	<p>We have manufacturing facilities in the UK and the US, and we rely on our strategic partners for key products and components.</p> <p>COVID-19: Sites left vacant / limited access, risk of theft / vandalism increased.</p> <p>If our manufacturing sites or our partners' manufacturing sites were to experience an incident this could have operational and supply chain issues for the business.</p>	<p>Formal disaster recovery plans are maintained and reviewed. Appropriate precautions are taken in all factories and warehouses to safeguard against theft and fire.</p> <p>Business continuity plan implemented, site access restricted, security enhanced, daily building and IT checks for security and performance.</p> <p>Given the specialised nature of the manufacturing equipment and processes there would be short-term disruption.</p> <p>We are also able to use manufacturing partners to alleviate some operational issues.</p>	<p>Unlikely Very High</p> <p>^</p>
10. Partnerships	<p>Companies with whom we have alliances in certain areas (i.e. manufacturing/research) may already be or may become our competitors in other areas. In addition, companies with whom we have partnerships may also acquire or form alliances with our competitors, which could reduce their business with us. If we are unable to effectively manage these complicated relationships with alliance partners, our business and results of operations could be adversely affected.</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 (e.g. 3D/Stratasys) there will be contractual arrangements to ensure appropriate governance and Board structure to support the business and product development.</p>	<p>Probable Medium</p> <p>^</p>

Key of change

⬆ Increase

↔ No change


⬇ Decrease


Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
IT			
11. IT systems and information failures	<p>COVID-19: IT network resilience and access to information via hardware and software capabilities.</p> <p>Inability to operate effectively or loss of operating capability.</p> <p>Loss of information, incurring financial or regulatory penalties.</p> <p>Reputational impact, business disruption and potential deterioration in customer relationships.</p>	<p>Appropriate testing of the network environment, new software access (MS Teams) and allocation of laptops, monitors etc., to enable work from home and instant communication.</p> <p>Developed and communicated a new IT Vision statement and IT Strategy which is clearly aligned to our overall business objectives.</p> <p>Developed a three-year IT Transformation Programme to deliver the necessary enhancements to our IT infrastructure and IT systems. This includes investment in moving to a hybrid cloud model, strengthening the resilience and security of our IT infrastructure, rationalising and modernising our business systems, and re-aligning systems with improved operational business processes.</p> <p>Consolidating more of our critical manufacturing and finance processes into our Epicor ERP system and delivering improved engagement with our existing and potential new customers through our Salesforce based CRM platform.</p> <p>Placing increased focus on ensuring that continuity plans for critical IT systems are tested and current as the IT infrastructure and systems are changed.</p> <p>Developing the IT Service Delivery maturity and increasing capacity in the Group IT function.</p>	<p>Probable Medium</p> <p>↔</p>
12. IT Transformation	<p>Partial or complete failure to deliver the key elements of the IT strategy and achieve the Vision for IT.</p> <p>Inability to progress sufficiently quickly to avoid disproportionate increases in the operational cost base as the business grows.</p> <p>Lack of alignment between business processes and IT systems.</p> <p>New risk: As a result of planning and initiating a major IT Transformation Programme in Q4 2020.</p>	<p>Designed the IT Transformation Programme to deliver the three-year plan for IT which has been generated from the IT Vision and Strategy and has been aligned with three-year plans from all the key operational functions within the business.</p> <p>Established executive-level governance and oversight for the IT Transformation activities to ensure that the Programme is adequately resourced, milestones achieved and to approve key rollout decisions.</p> <p>Active engagement with business stakeholders across the organisation and direct involvement in the Programme.</p> <p>Undertaking real-time project delivery management and assurance activities throughout the Transformation Programme.</p>	<p>Probable High</p> <p>NEW</p>


Risk management (cont.)




Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
IT (cont.)			
13. Cyber threat and information security	<p>Inability to operate effectively or significant loss of operating capability and business disruption.</p> <p>Unauthorised access to data, breach of information security and data protection regulations incurring financial penalties from regulators.</p> <p>Reputational impact, business disruption and potential deterioration in customer relationships.</p> <p>Potential loss of Intellectual Property or exposure of commercially sensitive information.</p> <p>Extensive resources expended in responding to security incidents and recovering from them. IT security breaches or disruption (loss of network), unauthorised access or mistaken disclosure of information.</p> <p>New risk: As a result of the cyber attack suffered by Xaar in October 2020, a general increase in the threat level, and increases in the financial and reputation impact from such attacks, we have separated this from inclusion in other IT risks to enable a much clearer focus on this area of IT risk.</p>	<p>Implemented a Multi-Factor Authentication solution for VPN to reduce the likelihood of remote attacks. MFA to be rolled out across all key systems in 2021.</p> <p>Strengthened our Enterprise Backup Solution by incorporating a third immutable copy of all system data in a secure public cloud environment.</p> <p>Prioritisation of infrastructure and systems rationalisation to reduce the available attack surface for malicious cyber attackers.</p> <p>Implemented a risk-based security testing approach across IT infrastructure and systems to identify ongoing vulnerabilities and prioritise remediation.</p> <p>Inclusion of a Security Work stream in the IT Transformation Programme, with an in-depth externally conducted IT Security Assessment to be completed in Q1 2021.</p> <p>IT Service maturity and increased capacity in the Group IT function will enable us to enhance our Security Operations capability.</p> <p>Employees are trained on the risks of phishing and best practices for information security.</p> <p>Access to information 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>Possible High</p> <p>NEW</p>
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 implemented cost reduction actions to focus resources on key initiatives and to achieve breakeven under current volume requirements.</p> <p>The Group has sufficient cash available for execution and delivery of the turnaround strategy within agreed timescales.</p> <p>In order to continue to fund our research and development activities and to realise the full potential value of our product portfolio we are seeking strategic investment partners (e.g. 3D/Stratasys).</p>	<p>Probable High</p> <p>></p>

Key of change

 Increase

 No change

 Decrease

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
<p>15. Customer credit exposure</p>	<p>The Group may offer credit terms to its customers which at times could be extended beyond what is considered normal terms for products in early stages of its 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, close monitoring of product launches by the customer in the marketplace and by credit insurance in certain jurisdictions.</p> <p>Monitor overdue receivables and manage credit limits prudently. Close management of overdue debtors and use of credit holds to encourage payment.</p> <p>The business model is being reviewed with a move away from a distribution model, to being a direct supplier to OEM manufacturers, which will reduce the future risk being contained in a limited number of large transactions to a wider breadth of supply across a consistent sales order pipeline.</p> <p>Significant level of existing debts written off — recoverability of remaining outstanding debts as distributors run down balances.</p> <p>Previous OEM customers being on boarded with favourable payment terms depending upon credit history — exposure to Chinese manufacturers – payments in advance.</p>	<p>Probable Medium</p> <p></p>
<p>16. Inventory obsolescence</p>	<p>Holding too much inventory increases the risk of obsolescence, theft and other costs of holding stock. Furthermore, working capital restrictions created by excess inventories could affect Xaar's liquidity or prevent investment in new products or identified future acquisitions.</p> <p>Conversely, too little inventory risks stock outs, missed sales opportunities and ultimately damage to Xaar's reputation. Insufficient buffers in raw materials increases Xaar's exposure to supply chain issues – particularly during times of economic uncertainty (see Brexit) or health emergencies (see COVID).</p>	<p>Put in place appropriate stock holding policies, ensuring these are reviewed frequently and change dynamically in line with market/business conditions.</p> <p>Identify and write off obsolete or slow moving stock items, review work in progress to determine profitability of contracts and revenue recognition for EPS.</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>The risk has reduced compared to prior year, following cessation of Thin Film activities and operational improvements.</p>	<p>Unlikely Medium</p> <p></p>
<p>17. Volatility in exchange rates</p>	<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>The Group is exposed to currency transactional risk relating to day-to-day sales and purchases across GBP, USD, EUR and SEK.</p> <p>Reported results of overseas subsidiaries are subject to translational risk which may cause volatility in earnings and the balance sheet.</p> <p>The risk is that there could be significant adverse movements in currencies which cause a foreign exchange loss, reducing profit.</p>	<p>Our treasury policy allows us to hedge.</p> <p>There is a partial natural hedge for foreign currency movements.</p> <p>Cash flows are constantly reviewed and action is taken when appropriate.</p>	<p>Possible Low</p> <p></p>

 See 'Brexit' risk above for further disclosure.

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 and fuel used in leased Company vehicles. 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.

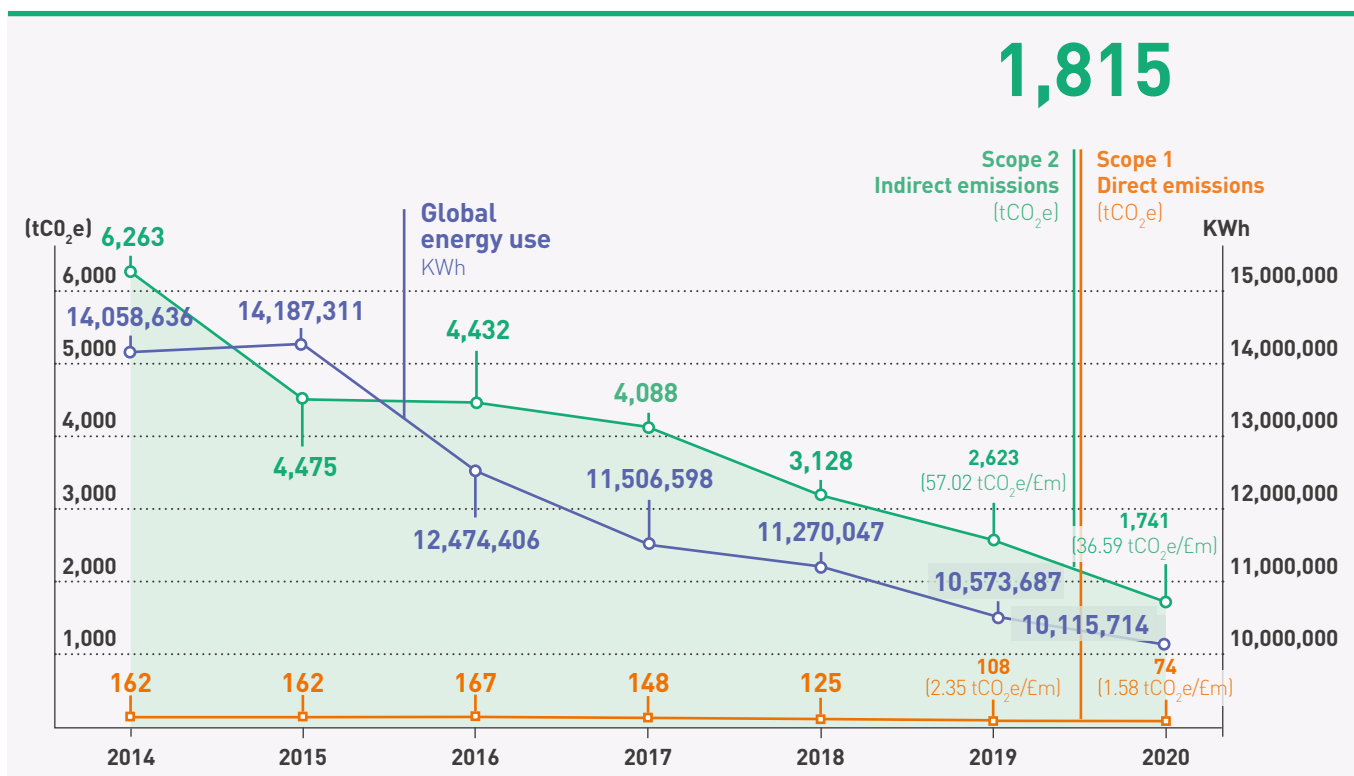
Scope 2 emissions

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. Please refer to page 15 for what Xaar is doing to offset its carbon usage.

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 £m turnover exc. royalties (2020: £47.6m)

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

UK energy usage 9.67MWh / 1,706 tCO₂e; included in this is 2.35 MWh of renewable energy attributes, in the form of Guarantees of Origin from renewable wind sources.




Board approval of the Strategic and Annual Reports

Board approval

The section 172 statement forms part of this Strategic Report – please see page 53.

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 April 2021 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 Finance Officer