



Xaar plc
Annual Report and
Financial Statements
2019

About Xaar plc

Innovation, efficiency & creativity

Through consistently delivering on our commitments we will be the partner of choice for all inkjet applications. With 30 years of experience, world class products and talented people our mission is to push technical boundaries to become the inkjet technology leader.



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 sectors such as for printing Ceramic Tile Decoration, Graphics, Décor, Labels and Packaging as well as 3D Printing and Additive Manufacturing.

[Read more about Printhead on page 8.](#)



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 about Product Print Systems on page 14.](#)



3D Printing

Our 3D Printing business unit, in which Xaar 3D sits, develops 3D printing solutions based on High Speed Sintering technologies 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 about 3D Printing on page 16.](#)

Revenue – Continuing operations

49.4£m

2019	49.4
2018	60.5

Net cash¹

25.3£m

2019	25.3
2018	27.9

Adjusted (loss)/profit before tax – Continuing operations²

(9.8£m)

2019	(9.8)
2018	4.5

Total (Loss)/profit before tax – Continuing operations

(11.9£m)

2019	(11.9)
2018	0.3

1 Net cash includes cash, cash equivalents and treasury deposits.

2 Adjusted measures exclude items from the IFRS operating (loss)/profit margin and (loss)/profit before tax, such as share-based payment charges, exchange differences on intra-group transactions, gain / loss on derivative instruments, restructuring costs and research and development expenditure credit, per the reconciliation of adjusted financial measures – note 4 on page 114.

Strategic and operational highlights

- New Strategy in place and a clear path for all our business units
- New management team with appointment of John Mills as CEO in October 2019, and Ian Tichias as CFO in January 2020
- Printhead business restructured in November 2019 to align with new strategy to focus on the Bulk technology platform
- Significant progress in Xaar 3D Printing saw Stratasys increase its investment from 15% to 45% with an option to acquire the business outright
- Cessation of Thin Film programme in September 2019 following unsuccessful search for investment
- Appropriate measures taken to mitigate the impact of COVID-19 ensuring the health of our employees while ensuring we continue to deliver for customers.

Financial highlights

- Revenue from Continuing Operations of £49.4 million (2018: £60.5 million) down £11.1 million year-on-year, underlying revenue excluding one-off Licensee Royalties in 2018 fell £1.2 million
- Decline in gross margin to 24.2% (2018: 48.8%) caused by declining licensee royalties and reduced factory throughput as cash conversion is prioritised
- Adjusted loss before tax for the continuing operations of £9.8 million (2018: £4.5 million profit)
- Loss for the year under IFRS of £71.5 million (2018: £12.5 million) driven by the cessation of the Thin Film programme
- Strong balance sheet with Net cash at 31 December 2019 of £25.3 million (2018: £27.9 million), significant cash outflows associated from Thin Film £18.0 million offset by increased Stratasys investment in Xaar 3D, £12.0 million, and cash generated by the continuing operations of £3.4 million
- Continued uncertainty associated with COVID-19 and any potential impact on financial performance therefore we believe it is prudent to suspend financial guidance.

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Chairman's statement

A clear way forward



Andrew Herbert
Chairman

2019 was a challenging year for Xaar and tough decisions have been necessary to position the business for a return to profitable growth. We start 2020 with a strong balance sheet and significant cash, providing confidence in our ability to navigate the present uncertainty surrounding COVID-19.

Chairman's statement

These are exceptional times. The rise of the COVID-19 early in 2020 and the resulting actions globally are having a profound effect on economies, business and society at large. At Xaar our priority in managing this crisis has been to ensure the wellbeing of our people while taking necessary actions to navigate through what appears likely to be an extended period of uncertainty.

This situation comes on top of a tough year for the business in 2019. Following a review of strategy, difficult decisions were taken. Specifically the decision to stop work on the Group's Thin Film technology, with consequent cost actions and resulting job losses, was necessary for the good of the business but painful for all involved.

We entered 2020 with a printhead strategy re-focused on exploiting the Group's excellent bulk piezo technological capabilities. This, coupled with our investment in direct to shape product printing and strong progress and fresh investment including that from our partner Stratasys in Xaar 3D, provided a sense of optimism as the year started. Early signs have been promising with a change to the business model in the printhead business already leading to stronger engagement with key customers. Our order book in the first quarter has been encouraging, our operations teams are maintaining supply to customers and we have renewed vigour and focus in both our sales and marketing and R&D programmes.

The impact of COVID-19 was first felt in our China based operations. Our customers saw production levels fall but the relatively short period of 'lockdown' in China meant the impact on our business levels to date in the region has been minimal. Across Europe and, at time of writing, to a lesser extent America, the effects of Government action were being felt as the first quarter of 2020 came to a close.

The situation continues to evolve rapidly and that has led us to take actions to preserve cash and maintain liquidity. The Group entered 2020 debt free and with £25.3 million of net cash. This positive cash position means that even in our most pessimistic scenario for trading during the remainder of the year, along with actions to reduce costs and cash outflow and use government support where appropriate, we are confident that the business is well placed to manage through an extended period of uncertainty.

One of the consequences of the Covid-19 outbreak has been the delay in publishing these 2019 results. Further to the announcement made in September 2019 that Robin Williams had already served more than nine years on the Board and would be standing down at the end of March 2020, I was appointed Chairman on 1 April 2020. In expectation of publishing results before this event, Robin as retiring Chairman had prepared a report which, given the timing of the change, I am including below.

Andrew Herbert
Chairman

A new strategic vision

With a new strategy and business model already being implemented, and the major issues that have hindered performance in the last few years being addressed, I am confident in the new management team's ability to turn the business around and deliver on the undoubted potential of the Company in the long term.

- Read more about our Board of Directors **on page 44.**
- Read more about our people **on page 36.**

Retiring Chairman's report

Dear Shareholder,

2019 has been a very challenging year for Xaar. In reaching the conclusion of the Strategic Review the Board has had to make a number of tough decisions to address the funding requirements for the Thin Film operation and issues affecting the underlying performance of the Printhead business.

As announced in March 2019, further investment was required in order to realise the full potential of Xaar's Thin Film technology. Having undergone a thorough advisor-led process that explored a number of different options the Board took the decision, in the absence of additional investment and with annual cash outflows in excess of £15 million, to cease Thin Film activities. This is clearly disappointing given the strength of the technology and the capability of the Xaar 5601 printhead. However, with volume sales still a number of years away and significant funding required for both the on-going development of the Thin Film platform and associated working capital the Board was left with no choice other than to cease investment.

We have also decided to stop all other related Thin Film programmes. Consequently, we have initiated the End Of Life of the Thin Film Xaar 1201. Unfortunately, with several integration and quality issues this product has not achieved the success that was originally anticipated and the consequential impairment charge was significant.

Our conclusion of the Thin Film programme and the decline in the rest of the Printhead business necessitated a significant restructuring of the business and a new strategy for the Printhead business, which is outlined in detail in the CEO report.

Following restructuring we have retained a small team of engineers in the hope of being able to monetise our Thin Film assets and IP.

Ceasing Thin Film activities has resulted in a significant impairment and write-off of assets; this combined with the underlying performance of our Thin Film programmes has resulted in a loss from discontinued operations of £56.1 million for the year. In December the further investment agreement between Stratasys and Xaar in relation to Xaar 3D was approved. This agreement saw Stratasys pay \$15.5 million, £12.0 million, to increase its shareholding to 45% and acquire a written call option, exercisable within 3 years, to purchase all remaining shares in Xaar 3D. This investment agreement secures the funding required to commercialise whilst further strengthening the relationship between the two parties.

The underlying performance of our continuing operations was disappointing with revenues of £49.4 million (2018: £60.5 million) and losses before tax for the Group of £9.8 million on an adjusted basis (2018: £4.5 million profit) with both our Printhead and Product Print Systems business units underperforming. However, our strong cash focus saw the continuing operations generate £3.4 million of cash in the year and the change

in business model has shown some early signs of success with OEMs starting to reengage with the business.

In summary, the Company has undergone a significant change of direction arising from a Strategic Review and a major restructuring of the Printhead business. However, a substantial level of R&D expertise is retained in the Printhead business to make the advances in the Bulk product platform, which are required to underpin the new business plan.

We are confident that we now have the correct strategy in place to return Xaar to growth in the medium term.

Board changes

Having served almost five years as CEO, Doug Edwards resigned from the Board at the conclusion of the Thin Film Strategic Review and John Mills took over as CEO on 11 October 2019. John has extensive technical experience of the Print industry and of inkjet in particular and has successfully overseen the growth of several companies, most recently at Inca Digital where customer satisfaction and technical innovation drove performance.

Shomit Kenkare, CFO, stood down from his position at the 31 December 2019 in order to return to the USA and we are delighted to have Ian Tichias join us as CFO on 1 March 2020. Previously Group Finance Director and Deputy CFO at Ibstock plc, Ian brings over 15 years' experience in senior financial roles alongside a fresh new perspective, which will add significant value to the Company.

Margaret Rice-Jones indicated that she will not seek re-election at the 2020 AGM and so will leave the Board at that time, in order to be able to focus on her other Non-Executive responsibilities. A search has been initiated to find her successor as Chairman of the Remuneration Committee.

We announced in September 2019 that I had been on the Board of Xaar for more than the nine years recommended by the Governance Code. Having now overseen the Strategic Review and managed the CEO succession, I stepped down from the Board on 31 March. We are fortunate to have Andrew Herbert as a Non-executive Director, who has taken over as Chairman from 1 April 2020.

Employees

As a business we have faced a number of challenges this year, not least in the Printhead business where we have had to make a number of redundancies. It is through the hard work, dedication and professionalism of our employees that we have been able to overcome these challenges and start on a path to a brighter future. Our people are vital to our future success. The entire Board and I would like to take this opportunity to thank them for everything they have done this year

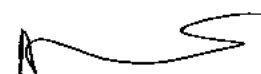
Robin Williams
Chairman (retired 31 March 2020)

Outlook

Despite the difficulties in the last few years and the disappointing end of the Thin Film programme, the Company entered 2020 well positioned. Our strong balance sheet including a significant cash position with no debt, coupled with the steps taken to right size our cost base and improve our working capital position, provided confidence in our ability to re-establish a platform for profitable growth.

Our new management team has a clear insight into the environment in which our printheads and printers operate and a competitive product range with which to address both existing and new markets. In addition, we have a 3D Printing business with the potential to deliver a significant return on investment in the next few years and a Product Print business capable of improved performance and expansion.

While the uncertainty created by the measures taken to stem the spread of Covid-19 worldwide means it is impossible to determine the impact on Xaar's 2020 results, the Board believes the actions taken to address the issues that have hindered performance in recent years will enable a return to profitability and growth in the medium term.



Andrew Herbert
Chairman

Who we are

Leading the digital inkjet revolution

<p>Overview</p> <p>Xaar is a world leader in the development of digital inkjet technology.</p> <p>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 which have been in use for years.</p> <p>We design and manufacture printheads as well as systems for product decoration and industrial 3D Printing which use our inkjet technology. Our unique technologies and products are a leading enabler for innovation and for driving production efficiencies for many industries.</p>	<p>Markets we serve</p>	<p>We are structured around three business units</p>
	<p>Ceramics, Glass</p>	<p>Printhead</p> <p>Read more on page 8</p>
	<p>Wide-Format Graphics</p>	<p>Product Print Systems</p> <p>Read more on page 14</p>
	<p>Packaging, Textiles</p>	<p>3D Printing</p> <p>Read more on page 16</p>
	<p>Coding & Marking, Direct-to-Shape</p>	
	<p>3D Printing, Advanced Manufacturing</p>	

	<p>Offices #</p> <p>9</p>	<p>Average employees #</p> <p>437</p>
	<p>Americas Revenue £m</p> <p>23.9£m</p>	
	<p>EMEA Revenue £m</p> <p>18.5£m</p>	
	<p>Asia Revenue £m</p> <p>7.0£m</p>	

● Xaar regional locations

Why we are different

<p>30 years</p> <p>We are the only truly independent inkjet technology company with 30 years of know how.</p>	<p>Inkjet expertise</p> <p>We offer unrivalled inkjet expertise, innovative technologies and printhead design and development. We also manufacture highly customised product decoration systems and industrial 3D printing machines.</p>	<p>Unique technologies</p> <p>Our unique technologies and products are the leading enabler for innovation and creativity, and for driving production efficiencies for many industries.</p>	<p>Collaborative</p> <p>Our independence enables a flexible, collaborative approach to ensure we focus on our customers' goals.</p>
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Read more about our markets and opportunities **on page 10**.
 Read more about our business units **from pages 8 to 17**.

Over the last 30 years digital imaging technologies, including digital inkjet, have emerged for applying images, patterns or finishes in more efficient, flexible and cost effective ways.

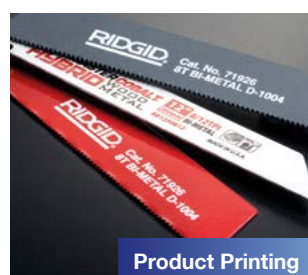
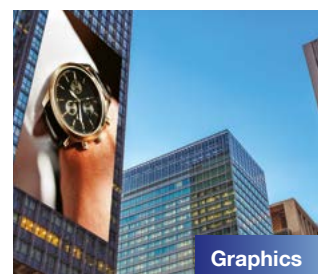
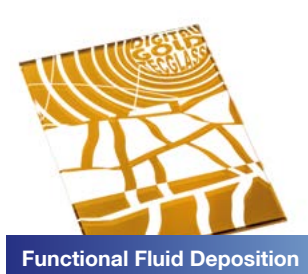
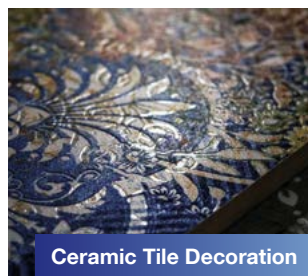
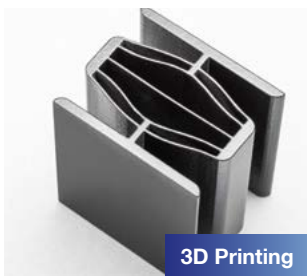
Because inkjet is suitable for a wide variety of fluids (including inks) and many different substrates, and it copes in harsh environments, it has the potential to replace current printing techniques in many market sectors. In the main, Xaar focuses on inkjet technology. Our Printhead business unit develops and sells inkjet Printheads to Original Equipment Manufacturers ('OEMs') who buy and use them as the print engine in the printers and print systems they manufacture. Their customers ('end users') buy their printers and print systems which they use to pattern, decorate, print or finish the goods they are producing. (Finishing refers to value-added operations that are performed after printing, such as adding embellishments).

We also design and manufacture systems for product decoration (our Product Print Systems business unit) and 3D printing (our 3D Printing business unit) which use our inkjet technology.

What are the benefits of digital inkjet?

- Cost effective production with no limit on the run length and no minimum order
- Mass customisation and variable data printing is easy
- Short print runs for limited editions or localised promotions
- Printing onto irregular shapes is possible
- Print turnaround once the design is agreed
- Simple workflow with quick and easy job setup and changeover
- Avoids the complexities, cost and waste associated with analogue printing
- Very controlled fluid deposition.

A world of opportunity



Our business model

Creating value for all stakeholders

We sell our technology in component form (the printhead) to OEMs who produce and sell the complete digital printing solution. We also actively partner and co-develop with fluid suppliers, hardware and software integrators as well as substrate suppliers. Therefore we deliver a robust and attractive total solution to our customers. In some markets we design and develop complete industrial printing machines which we sell to end users.

	<h2>Xaar designs</h2>	<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 (2019: 11.5%).</p>	<p>We continually add to our Intellectual Property ('IP') portfolio, and currently we have 300 patents and patent applications. Our R&D staff represent totals 77 which is 18% of the total workforce.</p>
	<h2>Xaar manufactures</h2>	<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. EPS, a Xaar company, manufactures customised and bespoke printing solutions in Vermont, USA.</p>	
	<h2>Xaar markets</h2>	<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. Primary markets include:</p> <ul style="list-style-type: none"> • 3D Printing • Ceramic Tile Decoration • Coding & Marking • Decorative Laminates 	<ul style="list-style-type: none"> • Direct-to-Shape • Functional Fluid Deposition • Glass Printing • Graphics • Primary Labels • Packaging • Product Printing.
	<h2>Xaar sells</h2>	<p>Xaar sells direct to OEMs around the world through its global sales team. Xaar's highly skilled application engineers offer the highest level of technical support to assist OEMs 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 also sells product printing equipment, services and consumables via EPS; Xaar's 3D Printing business unit is responsible for selling Industrial 3D printers.</p>

Outputs

We create value for all our stakeholders.

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

Shareholders

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

Our employees

Our success depends on the 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.

Following some years of decline and resulting redundancies, we want to concentrate on rebuilding the trust and engagement of our employees. We will gather feedback from employees via a survey and use the data to drive the actions and improvements.

We will continue with forums where employees have the opportunity to meet and chat with all of 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

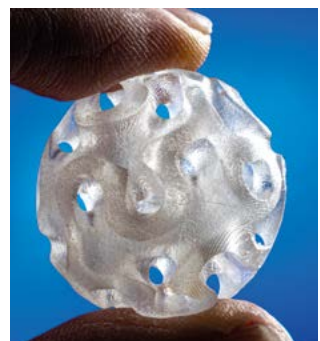
Digital print methods are inherently more environmentally friendly than the analogue techniques we seek to replace. Research shows that, compared to analogue alternatives, digital has a huge impact in reducing energy consumption (by as much as 55%), water consumption (by up to 60%) and CO₂ emissions (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 will be moving to packaging which is 100% recyclable.

Digital printing compared to analogue reduces consumption of up to:

CO₂ emissions
95%

Energy consumption
55%

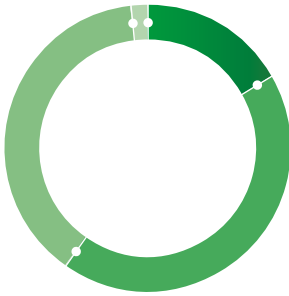
Water consumption
60%



Our business units – Printhead

Introduction to Printhead

Key figures



● Graphic Arts	16%
● Industrial	44%
● Packaging	38%
● Royalties	2%

Printhead revenue

33.7 £m

2019	33.7
2018	46.7

2019 summary

2019 was a particularly challenging year for the Printhead business unit.

In September's interim results statement, we announced that we would cease further developmental investment in the Thin Film platform and carry out a business unit restructuring.

In June 2019 we celebrated the Xaar 128 printhead reaching 20 years since its launch in 1999. This printhead was the driving force behind the first industrial inkjet revolution in wide-format graphics. Its flexibility and robustness have been the key to its success and it's still in demand today, now proving ideal for certain uses in the latest Advanced Manufacturing and 3D market sectors, as well as coding & marking applications.

At InPrint in November we announced our Ultra High Viscosity capability across the Bulk printhead range. 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. This opens up a wide range of new inkjet capabilities and applications. For example, Xaar customer Delo uses Xaar's Ultra High Viscosity capability to jet optical materials with digitally controlled precision.

Priorities for 2020

1. A customer-centric business model that places the OEM at the heart of everything we do
2. Focus on markets where Xaar Bulk 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
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.



Where we excel

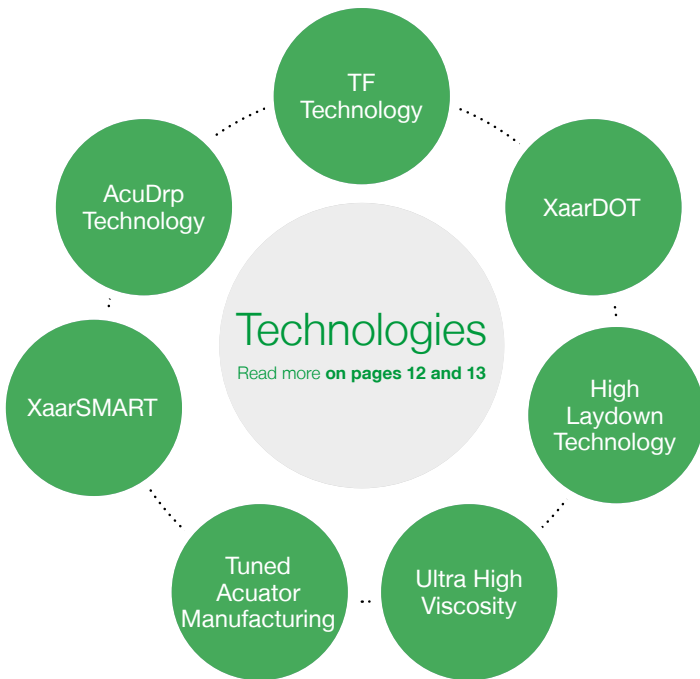
Extensive inkjet expertise to develop solutions for customers.

- 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
- Well-established partnerships with ink manufacturers which means our OEMs benefit from accelerated ink optimisation.

 Read more about Technologies on pages 12 and 13.

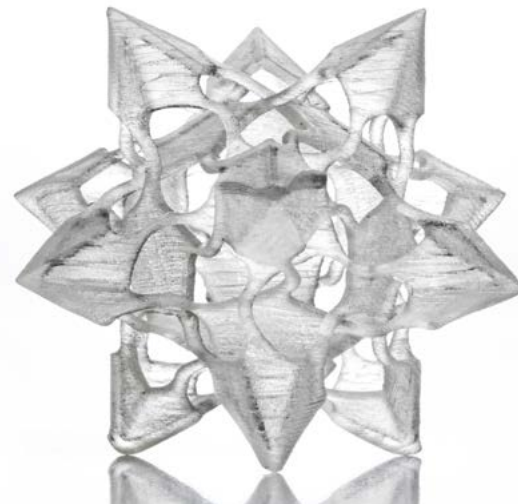
Xaar's technologies

Xaar is a world-leader in the development of industrial inkjet technology. Our innovative printheads feature technologies unique to Xaar and which can be utilised by OEMs to offer truly robust, reliable and differentiated printing solutions.



Xaar Printhead range

Product	Key benefits	
Xaar 1003	Ultimate versatility in Ceramic Tile Decoration	
Xaar 2001/ Xaar 2001+	High print quality with high productivity	
Xaar 128	Adaptable printhead with trouble-free integration	
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 Graphics	
Xaar 5501	High print quality, cost-effective and easy to integrate	
Xaar 1003 AM	Highly accurate fluid deposition for manufacturing	
Xaar Ink Supply Systems	Industrial fluid control solutions	
Xaar Drive Electronics	Reduce Time-to-Market and rapid production ready solutions	



Our business units – Printhead *continued*

Our markets and opportunities

Industrial

The main sectors for Xaar within the Industrial market are:

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 will be required each year for the foreseeable future. The Xaar 2001+ 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 is now being demonstrated with Xaar printheads matches 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

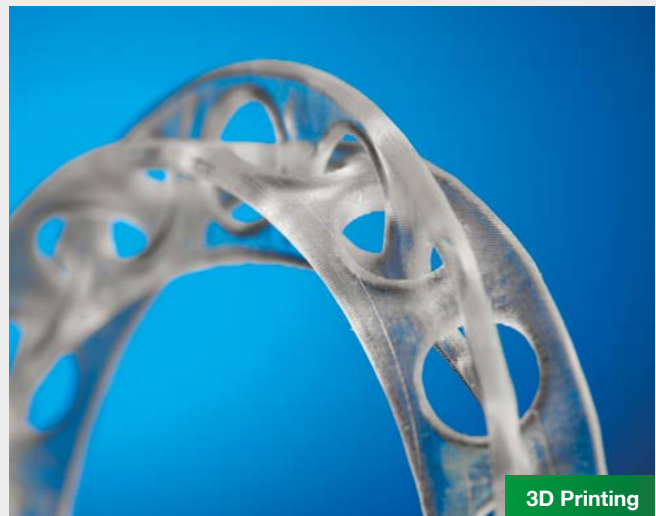
Architectural glass is increasingly used to complement ceramic tiles in modern commercial design, and is starting to be used in residential projects also. Functional glass, such as car windscreens or glass tops used in induction hob cookers, is predominantly printed using analogue screen techniques, 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 which means that Xaar printheads with TF Technology have a competitive advantage.

Textiles

Textile printing for clothing and home furnishing using digital inkjet technology is growing fast due to rapid shifts in consumer demand and preferences as well as requirements to reduce waste and pollution. This drives the need for new, digital printing systems which are capable of delivering short print runs quickly, economically and in a more environmentally friendly way. Another reason for the growth in inkjet printed textiles is the increase in the use of digitally printed soft signage which offers environmental and logistical benefits.



Ceramic Tile Decoration



3D Printing



Glass Printing



Direct-to-Shape

Packaging

The main sectors for Xaar within the Packaging market are:

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.

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.

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.

Product Printing

Product Printing is the practice of printing onto all kinds of industrial objects, including consumer and promotional items, packaging, medical, automotive, apparel, appliances, sports equipment and toys.



Product Printing

Graphic Arts

The Graphic Arts sector includes:

Grand- and Wide-Format Graphics

Grand- and Wide-Format Graphics (‘GWFG’) 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.



Grand- and Wide-Format Graphics

Our business units – Printhead continued

Technology

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

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.



The Xaar 2001+ which incorporates a number of Xaar's unique technologies

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.

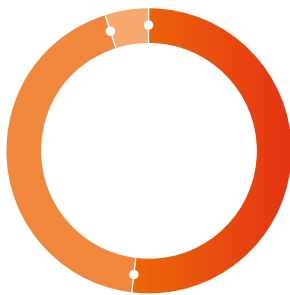


The Xaar 1003 which incorporates a number of Xaar's unique technologies

Our business units – Product Print Systems

Introduction to Product Print Systems

Key figures



- Pad Printing 52%
- Digital Inkjet 43%
- Other 5%

Product Print Systems revenue

15.7 £m

2019	15.7
2018	13.7
2017	14.0

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.



Where we excel

Our core strengths are designing, building and integrating machines.

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.



What we achieved in 2019

2019 was also the first year that EPS revenue achieved \$20 million.

During the year we continued to enhance our initial bespoke designs. The first was the XD360 V2.0 which was built in 2019 for an industrial irrigation application. The Version 2.0 system now forms a more robust product platform that can cut across multiple industries. We are targeting this platform to be a golf ball product marking system in 2020; the second advancement in 2019 was in the Personal Protection industry where we improved the frame assembly and the pre-treat capability in the Safety Helmet product line; lastly, with the sale of a Mouse Trap printer, EPS began introducing its modular design and build protocol. We have established core modules that have the basic elements for designing and building XD070 single-pass systems. This will reduce the R&D design time required for each machine we build.

We also introduced the EPS and Machines Dubuit partnership. EPS is the exclusive distributor for Machines Dubuit products in the US and Canada. EPS promoted its Machines Dubuit demo machine at two key autumn tradeshows – Pack Expo and Print United.

Priorities for 2020

Looking ahead, we will continue to focus on successful machine solutions.

Looking ahead, we will continue to focus on successful machine solutions with a specific emphasis on providing our customers with a competitive advantage. We will also focus on the use of Xaar technology where possible (printheads, electronics and specialty inks).



John Mills
Chief Executive Officer

Opportunities for growth
“There are opportunities to accelerate growth as well as to improve profitability and cash generation.”

Xaar product portfolio

The EPS product portfolio focuses on three major technologies:

XD-360° Cylindrical Inkjet Printer

The XD-360° is a multi-color, 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. growth opportunity.



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 which 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.



Within the three product portfolios, analogue printing will continue to remain competitive, especially in the irregular parts product space.

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.

Our business units – 3D Printing

Introduction to 3D Printing

3D Gross R&D investment

2.6£m

2019	2.6m
2018	2.2m

Introduction to the 3D business

Xaar 3D is developing powder bed fusion – using High Speed Sintering.

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, Xaar 3D process is more consistent, controllable and cost effective.

Xaar 3D is an independent legal entity which constitutes 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 focussed 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 (High Speed Sintering). 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. By combining the complementary assets of Xaar 3D and Stratasys we are gearing up to take a major place in the fast growing field of industrial 3D Printing (aka Additive Manufacturing).

John Mills
Chief Executive Officer

Xaar 3D has made significant progress

“With the increased investment by Stratasys in December 2019 Xaar 3D now has sufficient financial resources to accelerate development and fully fund the commercialisation of its first High Speed Sintering 3D printer.”

* Pira 2017.

Chief Executive Officer's report



John Mills
Chief Executive Officer

I was delighted to join Xaar in August 2019 taking over as Chief Executive Officer on 11 October 2019. Whilst I joined Xaar at a challenging time I am excited by the commitment, passion and innovation of the people at Xaar and would like to take this opportunity to thank them for their welcome, and their continued hard work and dedication.

Strategic review

My immediate priority was to review the strategy for the Group and stabilise the Group's performance. We now have a clear strategy for the each of the individual business units as follows.

Printhead strategy

The decision taken in September 2019 to stop the Thin Film program, whilst difficult, was clearly necessary. That decision and the subsequent restructuring have left the Printhead business in a stronger more stable position from which to rebuild and eventually return to growth.

My management team and I have worked to evaluate and define a new strategy for the Printhead business which focusses on its Bulk technology. We have undertaken a detailed evaluation of our product portfolio and R&D roadmap, the market opportunities, our competitive position, core capabilities, and the cost structure, effectiveness and efficiency of the organisation.

Based on this evaluation, we have set out four strategies for our Printhead business:

1. A customer-centric business model that places the OEM at the heart of everything we do
2. Focus on markets where Xaar Bulk 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
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

A change in go-to-market strategy is critical to the future success of Xaar products. Our customers must be at the heart of our strategy. Whilst it is clear that Xaar has lost market share partly due to a failure to keep its Bulk product portfolio up to date, we have already seen a willingness from our customers to re-engage now we no longer use distributor channels. We will focus on helping OEMs to use Xaar printheads in their next generation products by emphasising our product's strong competitive features now they can be more certain about the impact on their own commercial models.

Key to the change in our business model will be moving from dual distribution to only selling through our OEMs. By selling printheads through distribution, Xaar removed the OEM's potential aftermarket which is fundamental to their sustained success. Removing distribution will eliminate the channel conflict which has made OEMs cautious of developing new machines with Xaar's printheads.

In addition, several behavioural and cultural changes regarding the way Xaar acts towards, and perceives, its OEM partners is required. These changes are already being embraced by the business. Fundamental to this change is a clear pricing strategy and more importantly a sales process that is focussed on selling the printhead based on its technical merits and the value of the relationship with Xaar.

John Mills
Chief
Executive
Officer

Vision

Through relentless innovation, Xaar technology will be at the heart of every inkjet application so that the world can be a more colourful, creative and productive place for all.

3D Investment

In December we announced the additional investment from Strasys in Xaar 3D Limited.

Strasys investment

15.5 \$m

3D R&D

Development in 2020 will focus upon go-to-market capabilities.

2019 gross R&D investment

2.6 £m

Americas

Printhead business growth driven by Xaar 501 sales into Coding & Marking.

Xaar 501

14+ %

Competitive advantage of our Bulk technology

Xaar's Bulk technology offers several benefits over the competition.

Xaar's Through Flow ('TF') Technology ink recirculation provides a significant benefit where nozzle open time is an issue as it improves print reliability and machine uptime as well as reducing ink waste. Furthermore, Xaar's TF Technology improves ink stability. This means that ink companies and OEMs can broaden the specification for pigment suspensions in ink which in turn could reduce costs and improve reliability.

Xaar's High Laydown Technology allows the printhead to produce a drop which is more than 5 times the size of the native drop without any reduction in the number of drops per second. This feature is unique, and many OEMs have requested a demonstration to help them understand this significant achievement. High Laydown Technology offers the OEMs the ability to differentiate their products to provide print features that are not possible with any other printhead. This technology is particularly relevant to Ceramics, Labels, Product Print, 3D and Advanced Manufacturing.

Xaar's printhead architecture also enables jetting of ultra-high viscosity fluids. This high viscosity capability means that ink manufacturers and OEMs can formulate and use inks with more degrees of freedom in order to achieve desired end user properties. We have seen this capability gain traction in applications such as Glass, 3D and Advanced Manufacturing, where Xaar technology has proved to be superior to the competition.

Xaar's Bulk printhead technology and architecture enables operation in multiple orientations whilst maintaining print uniformity across the length and breadth of the printhead. This provides increased opportunities and unique solutions to printing on a range of objects. This has led to Xaar's printheads being used in vertical 'skyscraper' mode in Coding & Marking, Direct-to-Shape and Product Print applications.

Product roadmap

Despite the lack of investment in the Bulk technology Despite the lack of investment in the Bulk technology in recent years, I have been surprised and excited to discover a range of technology projects that are at varying stages of the R&D life cycle. These are all projects that have either been put on hold because resources were redirected to Thin Film or are specific research projects undertaken by R&D team members who were not focussed purely on Thin Film. These technology projects provide a real opportunity to build on the current product portfolio by addressing some of the gaps whilst further enhancing the competitive advantages we have in other areas.

These technology developments have been prioritised in our roadmap and are focussed on delivering performance enhancements within our core product range that will both strengthen our position in markets where we already hold a competitive advantage whilst adding capability that makes Xaar technology more applicable to a range of applications where we are presently under represented, such as Wider Format Graphics, Labels, Packaging and Textiles.

The product roadmap will also provide our OEMs with a more differentiated product offering than we have today and enable Xaar to better serve several key markets.

With a number of technology developments in the pipeline we are planning a more regular cadence of product launches over the next few years. We expect to launch the first product from our roadmap later in 2020 and we will start providing alpha and beta samples of products based on the new technology programmes to partner OEMs before the end of this year with the view to commercial launches in 2021. We are already engaging with our OEM partners and have received positive feedback on the new roadmap, with a number of OEMs looking to actively participate in the alpha and beta testing.

Chief Executive Officer's report *continued*

Marketing and communications

Rebuilding the Xaar brand and regaining the trust of OEMs is vital to the Company's future success. Much of Xaar's resources, including those of the go-to-market functions, in recent years have been focussed on the Thin Film platform. Consequently, the benefits of the Bulk technology are poorly understood, and market perception is that Xaar's Bulk platform is aged. However, the advantages of the Bulk platform are clearly valid in a number of applications and based on the current competitive position will be well into the future. We need to do a better job of ensuring that Xaar's technology advantages are properly understood by our core markets.

Furthermore, our competitors have been very successful in promoting the benefits of their own technology particularly in areas where Xaar has an advantage, such as ink recirculation; consequently, market belief is that these technologies are fundamentally all the same.

Work is required to change perception and educate our target markets by demonstrating that the Xaar Bulk technology platform provides several significant and demonstrable advantages over competitor technology. Marketing resources are now focussed on meeting this challenge.

Through rebuilding the Xaar brand and promoting Xaar's technology advantages in focussed markets we expect to be able to recover some of the market share we have lost in recent years and gain traction in the newer markets we are targeting.

Product Print System strategy

Our Product Print Systems company EPS has a strong reputation in the US product printing market and has grown its top line in recent years by delivering high quality, reliable, highly customised print systems. Opportunities remain to accelerate growth and to improve profitability and cash generation. The new priorities for EPS are as follows:

1. Focussed 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
3. Improved controls over pricing and costs.

This strategy is now becoming embedded in our operations and will help drive our performance during 2020 and beyond.

3D strategy

The Xaar 3D business has made significant progress and following the increased investment in the business by Stratasys in December 2019 Xaar 3D now has sufficient financial resources to accelerate development and fully fund the commercialisation of its first High Speed Sintering based 3D printer. The business is moving towards beta testing of the first products during 2020 leading to product introduction by end of 2020. Technical progress is good and feedback from customer trials to date has been positive.

The investment agreement allows Xaar 3D to benefit to a greater degree from Stratasys' leading knowledge of the 3D market and go-to-market expertise providing confidence in the commercialisation programme.

As part of this investment agreement Xaar granted Stratasys a written call option to acquire all its remaining shares in Xaar 3D within the next three years for the greater of \$33 million or two times the revenue in the preceding year. In addition, Xaar will be entitled to an annual payment of 2% of the revenue associated with this business for a period of 15 years starting from the date the call option is exercised, up to a maximum aggregate amount of \$10 million. This potentially represents a significant return for shareholders based on a relatively modest initial investment. Additionally, Xaar expects to retain a strong long-term commercial relationship with the business for printhead supply.

COVID-19 (Coronavirus)

Following the coronavirus outbreak earlier this year our thoughts are first and foremost with our employees and their families in affected areas and to ensuring their wellbeing. Across all three business units we are taking measures to mitigate the impact of COVID-19 whilst doing all we can to ensure the health and wellbeing of our employees. We have stopped all international travel, remote access and business continuity testing has been performed, employees in at risk areas are working from home, we have communicated sick and self-quarantine policies to our staff, and we are closely following local government guidance.

The Xaar Printhead business has a significant customer base in both China and EMEA, including a strong customer presence in both Italy and Spain. These regions are supported by operations based out of Hong Kong, Italy and the UK. We are closely monitoring the situation and have stopped all travel in the affected areas and employees based in those regions are working from home. Our local teams have done a superb job in maintaining communications and support for our customers in difficult circumstances.

We have yet to see a significant impact on customer demand despite the impact of COVID-19 in China and Italy. However, it is too early to predict what impact the virus will have on customer demand during 2020; it is possible that the impact of the economic slowdown has not yet filtered through the entire supply chain so that we may see a drop off in demand from Q3 2020.

Read more about our business units **on pages 8 to 17.**

Read more about our risk management **on pages 28 to 35.**

In addition, 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. We are also putting in place contingencies should the virus continue to spread and impact on production at our manufacturing facility in Huntingdon, UK. We currently feel we are well placed to ensure the continuity of supply to customers of our Printhead business.

Our EPS business, which is based in the US, has so far been unaffected by the COVID-19 outbreak. With sales predominantly in North America, the slowdown in output in China, the rest of Asia, and parts of Europe has not affected demand. However, EPS is the US master distributor for Comec Italia which is based in Italy, just north of Milan, so its supply of pad machines and parts are at risk. At present, EPS holds sufficient inventory to cover demand for the next three months for inks and approximately six months for parts and machine kits and we are working with Comec Italia to ensure continuity of supply. Depending on the severity of the speed of the virus, this could pose a significant risk to performance in 2020 with over half of EPS revenues coming from its Pad Printing product lines.

The supply chain of parts for EPS's digital inkjet machines has been unaffected at present. We are working closely with our suppliers to monitor the situation and are taking measures to mitigate any disruption in the supply chain.

Our 3D business is based primarily out of Nottingham, UK, and Copenhagen, Denmark. Measures implemented by the Danish government are impacting on the Copenhagen team who are restricting the number of individuals working from the office. This is slowing down the testing of the 3D machines due to the limit on individuals and the additional steps being taken to sanitise workspaces.

The supply chain for our 3D machines is reliant on components sourced from China and from our UK based Printhead business. Whilst our contract manufacturer is based in Israel. We are working with our suppliers to pull forward orders in order to mitigate supply risk.

Issues in the supply chain and further workplace restrictions may threaten to slow down, or delay, testing and the commercialisation of the 3D printers. However, currently Xaar 3D remains on track to commercialise its first product in the second half of this year.

With the continued uncertainty associated with the virus it is too early to assess the impact on the Groups financial performance. We remain committed to supporting our customers and suppliers whilst ensuring the health and wellbeing of our employees. Our thoughts remain with all those affected by the situation.

Brexit

The Group operates globally and the potential impact following the transition phase of Brexit is being monitored. One of the greatest challenges is potentially concerning EU workers and migration. Any actual or perceived barriers to free trade are an obvious area of concern for us as this could make trading with our EU customers more complex. As a result of Brexit, the Group is exposed to potential currency fluctuations, although not significant. 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. Although there is still uncertainty surrounding the outcome of Brexit post the transition phase, we do not expect the direct consequences of Brexit to have a material impact on the Group.

Section 172 Statement

In accordance with section 172 of the Companies Act 2006, the Board recognises the importance of our wider stakeholders to the sustainability of our business. The Sustainable & Responsible Business Report (pages 36 to 37) and the Corporate Governance section (pages 54 to 58) set out in more detail how the Board has approached its duty under Section 172.



Chief Executive Officer's report *continued*

Product Printing OEM EPS

15.7 £m

EPS Digital inkjet sales

+11%

2019 business performance

2019 has been a tough year for the Group with the disappointing performance of the Printhead business unit, and to a lesser extent Product Print Systems, outweighing the positive steps taken in 3D business unit.

Printhead business unit

The decision to stop the Thin Film program whilst difficult was clearly necessary. This decision along with the subsequent restructuring have left the Printhead Business in a stronger more stable position from which to rebuild and eventually return to growth. Beyond Thin Film the Printhead business, whilst still in decline, has stabilised.

Revenues excluding the discontinued Thin Film part of the business continued to decline falling from £46.7 million in 2018 to £33.7 million in 2019. However, the majority of this can be attributed to the presence of one-off Licensee Royalties of £9.9 million in 2018. Excluding the one-off Licensee Royalties, the 2019 revenue was down £3.1 million year on year, an 8% decline.

Historically Xaar has assessed its performance by looking at different market segments and sectors. From now on, whilst we will continue to group market sectors together, we will do this based on the required printhead functionality, primarily driven by the ink type; speed; resolution; price point; and robustness. From here on in we will assess our performance in following market sectors:

- Ceramics and Glass (includes Décor)
- Wide-Format Graphics ('WFG') and Labels
- Packaging and Textiles
- Coding & Marking and Direct-to-Shape (includes Product Print)
- 3D and Advanced Manufacturing
- Licensee Royalties.

The performance of the Ceramics and Glass sector remains heavily influenced by the Ceramics market. We continued to see erosion of the Ceramics installed base with older Xaar-based machines being replaced by new machines with competitor printheads.

Therefore, sales of the Xaar 1003, which addresses the existing install base, continued to decline. Xaar's market share of new installations remains low, estimated to be in single digits, with the Xaar 2001+ struggling to gain traction. The poor performance within the Ceramics sector can be attributed to several things. At the heart of this is the channel conflict caused by the dual distribution strategy that was in place. Secondly, the value proposition of the Xaar 2001+ is still not well understood and therefore the product is undervalued. Dealing with these issues will be key to reversing the declines in Ceramics with sales in 2019 declining 17% year-on-year.

We have started to make good progress in the Glass sector where we believe we have a clear competitive advantage due to the printhead architecture which has allowed us to develop a number of key accounts in this area and leaves us well positioned for growth in 2020.

Revenue from the WFG and Labels sector continues to fall due to the declining install base of printers using Xaar technology. Until we deliver on our product roadmap, we will struggle to gain traction with new installs in these sectors as there is a fundamental requirement for higher resolution and robust nozzle plates which Xaar cannot currently meet.

The Packaging and Textiles sector largely requires printheads which are aqueous compatible. Without this in the current portfolio of products, Xaar's Bulk technology is unable to compete.

In the Coding & Marking and Direct-to-Shape sectors we have seen mixed fortunes. We have had great success with our Xaar 501 and Xaar 502 products in Coding & Marking, with this sector growing 25% year-on-year. Direct-to-Shape, which includes the Product Print sector, has declined 20% year-on-year. With Direct-to-Shape still, relatively speaking, in its infancy the speed of conversion is modest and sales into this sector are inconsistent.

Performance in market sectors

	Reported revenue			Underlying revenue		
	2019	2018	Var%	2019	2018	Var%
Ceramics and Glass	12,161	14,301	(15%)	12,161	14,301	(15%)
WFG and Labels	5,550	7,076	(22%)	5,550	7,076	(22%)
Packaging and Textiles	885	1,131	(22%)	885	1,131	(22%)
C&M and DTS	11,862	10,410	14%	11,862	10,410	14%
3D and Adv. Manufacturing	2,581	2,694	(4%)	2,581	2,694	(4%)
Royalties	642	11,098	(94%)	642	1,187	(46%)
Total	33,681	46,709	(28%)	33,681	36,799	(8%)

 Read more about our markets on page 10.

The 3D and Advanced Manufacturing sectors have remained flat year-on-year and are difficult to forecast. These sectors have large potential for Xaar; however, OEM development times are long, and demand is often driven by specific programmes which makes delivering consistent growth from these sectors in the short term difficult.

The restructuring programme announced in September 2019 has now been completed with a leaner, more efficient and focussed Printhead business designed to deliver the strategy. The targeted cost savings of £8 million, which were split across the Thin Film and Bulk parts of the business, have been delivered.

Xaar has retained a small team of Thin Film engineers in the hope of being able to realise some monetary value from the Thin Film technology we developed. It is our intention to retain this team until a suitable conclusion has been found either through the disposal of the technology through an asset sale or another option. We have also retained a small team to support the 'Last Time Buy' requirements of our Xaar 5601 customers and we expect to be able to absorb these individuals back into the Bulk business once the build out is complete.

Product Print Systems

Revenues from our Product Printing OEM EPS grew 15% year-on-year from £13.7 million in 2018 to £15.7 million in 2019 with improvements across all major product lines. Sales from our digital inkjet product lines grew 11% year-on-year driven by the sales of consumables and spares to the aftermarket, with machines sales up 5%. The analogue pad print product line grew 18% year-on-year driven by a 26% increase in revenues from machine sales.

In Q4 we installed the first machine designed and manufactured using our modular strategy and already have a second order in place. We have also identified several other opportunities we could win by using designs based around the core modules in this machine.

With profitability failing to match revenue in terms of growth we have started a programme of cost saving initiatives to improve our financial performance.

3D

We have made significant progress with our 3D business and have delivered against a number of key strategic milestones.

The manufacturing strategy has been finalised and we are working with one of the largest contract manufacturers in the world. We received the first machine manufactured by them in December, with 7 machines received in total to date. These are now all undergoing extensive testing prior to commercialisation.

With the receipt of the first sub-contract manufactured machine at the beginning of December we officially locked down the design of the printer. Therefore, we have stopped the capitalisation of development costs (a total of £5.1 million was capitalised) and started to amortise the intangible asset over an amortisation period of ten years.

We have begun strengthening the go-to-market capabilities of the Xaar 3D team and are working closely with Stratasy on our joint go-to-market plans

Outlook and summary

2019 has undoubtedly been a difficult year for the Group, and for the Printhead business. However, we enter 2020 with a new strategy and a clear path for all our business units.

In the Printhead business we have a strategy which will enable us to re-engage with our OEMs, increase market share in sectors we have a competitive advantage and an exciting product roadmap which will deliver significant growth opportunities in the long run.

We now have a strong management team in place and coupled with our financial resources we have a clear commercial plan and market opportunity backed with great technology to drive increased performance.

In our Product Print Systems business our strategy addresses the key constraints to growth for EPS, expanding into new markets and the ability to scale whilst driving profitability and cash generation.

In 3D our partnership with Stratasy and the increased investment made in December leave the business in a strong position to deliver its potential and realise real value for shareholders.

2020 will be a year of transition setting the foundations for future growth and return to profitability. For the Printhead business this means stabilising, rebuilding relationships with key OEMs and executing on the early stages of the product roadmap. For EPS it will be to continue to grow revenue and move to a more scalable business model. Finally, in 3D the testing and validation of the design of the 3D Printer will continue and the planned commercialisation of the Printer by the end of 2020.

The business is entering a new phase, with a new sense of focus and renewed energy. This is embodied in our new vision and mission which we have recently launched.

Our vision is:

Through relentless innovation, Xaar technology will be at the heart of every inkjet application so that the world can be a more colourful, creative and productive place for all.

The mission is:

Through consistently delivering on our commitments we will be the partner of choice for all inkjet applications. With 30 years of experience, world class products and talented people our mission is to push technical boundaries to become the inkjet technology leader.



John Mills
Chief Executive Officer

Financial performance

2019 has been a difficult year for the Group with the loss for the year of £71.5 million reported on an IFRS basis (2018: £12.5 million). This was made up of a £56.1 million loss from the discontinued Thin Film operation and a £15.4 million loss from continuing operations.

During the year the Board took the decision to cease activities in relation to the Thin Film technology platform within its Printhead business. The financial results for this part of the business have been treated as discontinued operations in both the current and prior year financial statements. The remaining activities within the Group are referred to as continuing operations. Xaar also uses an underlying or adjusted measure which excludes the impact of share-based payment charges, exchange differences related to intra-group transactions, research and development expenditure credit, restructuring and investment expenses.

Continuing operations

Revenue

Total revenue for the Group was £49.4 million down £11.1 million year-on-year (2018: £60.5 million). On an underlying basis, excluding the one-off £9.9 million Licence Royalty in 2018, revenue declined 2% year-on-year.

Revenues in the Americas grew £3.0 million with the Printhead business driven by Xaar 501 sales into Coding & Marking up 14% and the EPS business which was 15% year-on-year. In Asia, revenue declined £0.5 million on an underlying basis as year-on-year royalties fell by £0.5 million and product revenues in the Printhead business remained flat. In EMEA the decline of £3.7 million was driven primarily by the Wide-Format Graphics and Labels sectors, down £2.7 million, and Direct-to-Shape which was down £0.5 million.

The gross profit for the Group declined by £17.5 million to £12.0 million (2018: £29.5 million). With the gross profit for the EPS business remaining flat, the decline in the gross profit for the Group can be attributed to the performance of the Printhead business. This was driven by a £10.5 million reduction in Licensee Royalties, £9.9 million of which related to a one-off Royalty in 2018. The contribution margin, excluding the one-off Royalty in 2018, has remained flat which, with the decline in revenue, has led to £2.6 million reduction in gross profit. Despite delivering cash savings of £2.7 million year-on-year, the overhead charge to the income statement increased £3.0 million. The overhead savings were offset by an underutilisation of the factory and a significant net movement of overheads out of inventory. Having seen the amount of Bulk inventory increase significantly in 2018 by £4.2 million and the turns on several product lines reaching excessive levels, action was taken during 2019 to reduce inventory and release cash tied up in working capital. The net result of this is a reduction in inventory of £6.5 million and a significant reduction in factory output leading to an unfavourable year-on-year difference in overheads. Other cost of goods sold increased £2.4 million year-on-year; these were mainly one-off charges related to slow moving and legacy products.

As mentioned, the gross profit for the EPS business remained flat year-on-year. Given the 15% increase in revenues this is a somewhat disappointing result. It can be attributed to a small number of new accounts and lower than anticipated margins on the first bespoke machines for these customers.

Gross R&D for the continuing operations was £5.7 million in 2019 (2018: £8.3 million). Despite investment in the 3D business increasing £0.5 million R&D spend for the Group fell £2.6 million as R&D resources in the Printhead business were focussed on the now discontinued Thin Film operation. Net R&D spend was £3.5 million (2018: £6.4 million) after capitalising £2.3 million in relation to the development of a new High-Speed Sintering 3D printer platform. Capitalisation of the 3D printer platform ceased at the end of November, having capitalised a total of £5.1 million.

Revenue – Continuing operations

	2019				2018			
	PH	PPS	3D	Total	PH	PPS	3D	Total
Americas	8,239	15,698	—	23,937	7,256	13,658	15	20,929
Asia	6,969	—	—	6,969	7,458	—	—	7,458
EMEA	18,473	—	18	18,491	22,084	—	86	22,170
Underlying revenue	33,681	15,698	18	49,397	36,798	13,658	101	50,557
2018 one off Royalty*	—	—	—	—	9,911	—	—	9,911
Total revenue	33,681	15,698	18	49,397	46,709	13,658	101	60,468

* royalty relates to Asia.

General and administrative expenses, on an adjusted basis, decreased by £0.3 million. However, under IFRS general and administrative expenses increased from £6.6 million in 2018 to £8.7 million in 2019. This increase was caused by a £1.2 million variance year-on-year in exchange differences relating to intra-group transactions and a £0.7 million increase in share-based payment charges.

Impairment losses on financial assets of £2.7 million in 2019 (2018: £3.2 million) predominantly relate to a distribution channel utilised by the Printhead business. Xaar has incurred significant charges over the last couple of years in relation to doubtful debts. With a change in business model which will see the Printhead business only selling to OEMs and a greater focus on managing working capital, impairment losses on financial assets are expected to be minimised in the following years.

Restructuring costs of £0.9 million (2018: £5.4 million) relate to the rightsizing of the Bulk technology part of the Printhead business and costs associated with closing our Swedish entity.

The adjusted loss before tax was £9.8 million with a tax charge of £3.5 million bringing the adjusted loss to £13.3 million. The loss before tax reported under IFRS was £12.2 million with a tax credit for the year of £0.3 million bringing the loss before tax to £11.9 million.

Discontinued operations

The decision to cease Thin Film operations was based on the level of continued investment required. Combined losses before tax on an adjusted basis over the last two years have been over £31 million (2019: £15.6 million, 2018: £16.2 million), whilst significant cash has also been utilised to fund working capital requirements. The net decrease in cash from discontinued operations for the year was £18.0 million (2018: £16.1 million) being £17.6 million from operating activities and £0.3 million (2018: £0.4 million) from investing activities.

Retaining the Thin Film operation would place a significant burden on the Groups cash position.

In total the loss before tax from discontinued operations was £60.0 million (2018: £15.3 million). This included several significant impairments and one-off expenses:

- £28.5 million for the impairment of capitalised R&D
- £8.7 million of inventory write-offs related to the Xaar 5601 and Xaar 1201
- £5.4 million for the impairment of PPE
- £3.1 million for the settlement and provision of contractual liabilities
- £0.8 million for redundancy costs
- £0.2 million for doubtful debts that have occurred due to the cessation of Thin Film
- £0.1 million on advisory services.

- Income of £2.3 million in relation to research and development expenditure credits in 2018/19 and the accelerated relief due to the impairment of the intangible asset.

Financial position

The net assets for the Group in 2019 fell £60.9 million to £70.7 million (2018: £131.6 million). The decrease in the net asset position attributable to discontinued operations was £56.1 million, with the net assets of the continuing operations decreasing by £4.8 million.

Non-current assets for the Group decreased £30.9 million driven by Thin Film asset impairments of £33.9 million. With a strong cash focus in both the Printhead and EPS businesses the net book value of property, plant and equipment and other intangibles in these businesses declined. In the 3D business £2.3 million was added to the High-Speed Sintering 3D printer platform intangible assets. £3.6 million has been added for Right of Use assets as part of the transition to IFRS 16 and the Group has recognised £0.1 million deferred tax assets.

Current assets decreased by £34.2 million with current assets for the discontinued operation falling £10.8 million excluding cash. Inventories for the continuing operations fell £7.5 million as the Group focussed on lowering its working capital and driving cash whilst trade debtors fell £8.9 million driven primarily by £2.1 million of doubtful debts related to distribution channels and a focus on working capital management.

The £2.6 million decline in net cash was made up of £18.0 million of outflows related to discontinued operations, £12.0 million cash inflow from Stratasys in relation to 3D investments, and £3.4 million generated by the continuing operations through normal trading.

Current liabilities decreased £5.7 million, £6.0 million related to a decrease in Thin Film trade creditors and other payables. This was offset by a £2.4 million provision for Thin Film supplier commitments. Derivative financial instruments recognised at the end of the period related to the option granted to Stratasys to acquire Xaar 3D. £1.5 million has been added for lease liabilities as part of the transition to IFRS 16.

Non-current liabilities at the end of 2019 of £2.5 million relates to lease liabilities added as part of the transition to IFRS 16.

Revenue (Continuing operations)

49.4 £m

Adjusted loss before tax

(9.8) £m

Total gross R&D investment (Continuing operations)

5.7 £m

R&D tax credits

2.3 £m

Key Performance Indicators

Monitoring our progress

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

Revenue – Continuing operations

49.4£m

Total revenue for the Group was £49.4 million down £11.1 million year-on-year (2018: £60.5 million). On an underlying basis, excluding the one-off £9.9 million Licence Royalty in 2018, revenue declined 2% year-on-year.

Revenue by sector £m

	30.4	12.8	5.6	0.6
2019	30.4	12.8	5.6	0.6
2018	30.6	11.5	7.1	11.1

Declining Ceramics revenue in the Industrial sector and associated Royalties. Packaging growth primarily in Coding and Marking and Direct-to-Shape.

- Industrial (incl. 3D/EPS)
- Packaging
- Graphic Arts
- Royalties

Revenue by region £m

	18.5	7.0	23.9
2019	18.5	7.0	23.9
2018	22.2	17.4	20.9

The significant reduction in revenue in Asia is due to the sales decline in the Ceramics sector, lower than expected sales in the wide-format graphics and textiles sectors, and the reduction in licensing income. Revenues in the Americas grew £3.0 million with the Printhead business driven by Xaar 501 sales into Coding & Marking up 14%.

- EMEA
- Asia
- Americas

Profit

Gross margin %

24.2%

2019	24.2
2018	48.8

The decline in the gross profit for the Group can be attributed to the performance of the Printhead business. This was driven by a £10.4 million reduction in Licensee Royalties, £9.9 million of which related to a one-off Royalty in 2018. (2018: 48.8%).

(Loss)/profit before tax –
Continuing operations £m

(11.9£m)

2019	(11.9)
2018	0.3

Loss before tax from continuing operations, represents operating loss after investment income and finance costs (2018: £0.3 million profit).

Adjusted (Loss)/profit before tax –
Continuing operations £m

(9.8£m)

2019	(9.8)
2018	4.5

Operating (Loss) / profit before tax from continuing operations adjusted for recurring and non-recurring items. Reconciliation of adjusted Financial measures is provided in note 4 (page 114). (2018: Profit £4.5 million).

Cash

Cash and cash equivalents comprise cash at bank (£24.8 million) and other short-term highly liquid investments with a maturity of three months or less (£0.5 million).

Net cash £m

25.3£m

2019	25.3
2018	27.9

2018: £27.9 million comprising Cash £24.7 million and liquid investment £3.2 million.

Net cash used in operating activities £m

(9.8£m)

2019	(9.8)
2018	(9.9)

Operating Cashflow in 2019 (£27.9 million) reduced due to improvements in working capital and tax credit received. (2018: (£9.9 million)).

Gross R&D investment (Continuing operations) £m

5.7£m

2019	5.7
2018	8.3

Gross R&D investment (Continuing Operations) includes development costs associated with Xaar 3D Ltd in 2019 (£2.6 million). 2018 investment excludes amortisation of development costs and impairment of Thin Film (2018 restated: £8.3 million).

Adjusted Diluted Earnings Per Share (Continuing - EPS)

(16.9p)

2019	(16.9)
2018	10.0

Adjusted EPS - Continuing Operations is considered to provide a fairer representation of the Group's trading performance year on year. (2018: 10.0 pence). EPS performance is one of the criteria for the new LTIP.

See note 13 for more information on page 122.

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') is proposed for 2020. Metrics will be set to reflect the key challenges seen across the business and specific units for that year. We will continue to measure EPS but due to commercial sensitivity these EPS targets will not be disclosed at this time as they are deemed to be commercially sensitive.

See the Directors' Remuneration report on page 63.

Xaar uses adjusted figures as key performance measures in addition to those reported under IFRS, as management believe 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 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 note 4 of the Group's Consolidated Financial Statements, for reconciliation between adjusted and statutory items on page 114.

2018 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 31 to 35, but the key risk areas can be identified as being associated with the following:

Market – Risk owner – CEO – John Mills

- 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.
- 2 Identification of market requirements**
Successfully developing products with the characteristics that meet market requirements within the necessary timescale.
- 3 Commercialising and maintaining products with cutting edge technology**
Creating value by generating innovative products.
- 4 Merger and acquisition opportunities**
Seek opportunities to expand, create synergies and generate greater shareholder value.

Operational – Risk owner – CEO – John Mills

- 5 Organisational capability**
Having the right people in the right roles.
- 6 Coronavirus ('COVID-19')**
Tracking the potential impact and response to pandemic and Government guidance.
- 7 Brexit**
Tracking the potential impact of the UK Government's negotiations.
- 8 Manufacturing facility**
Diversifying products, locations and manufacturing partners to alleviate operational issues.
- 9 Partnerships**
Working with the right companies, at the right time on the right terms to deliver long-term value.
- 10 IT systems and information failures (incl. Cyber security)**
The Group uses IT systems to operate and control its business; any disruption to this would have an adverse impact on the business. The Group also needs to ensure the protection and integrity of its data.

Financial – Risk owner – CFO – Ian Tichias

- 11 Ability to access sufficient capital**
Ability to access sufficient capital to fund growth opportunities.
- 12 Customer credit exposure**
Offering credit terms ensuring recoverability is reasonably assured.
- 13 Inventory obsolescence**
Holding inventory levels that are not in excess of normal demand.
- 14 Exchange rates**
Monitoring global economic events and mitigating any resulting significant exchange rate impacts.



- Read more about our market risks **on page 31.**
- Read more about our operational risks **on page 32.**
- Read more about our financial risks **on page 35.**

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 2019, the senior management and Board re-evaluated the existing Principal Risks, to consider emerging/alternative risks.

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 2020, 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.

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. Such a 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 the 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 and risk management 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.

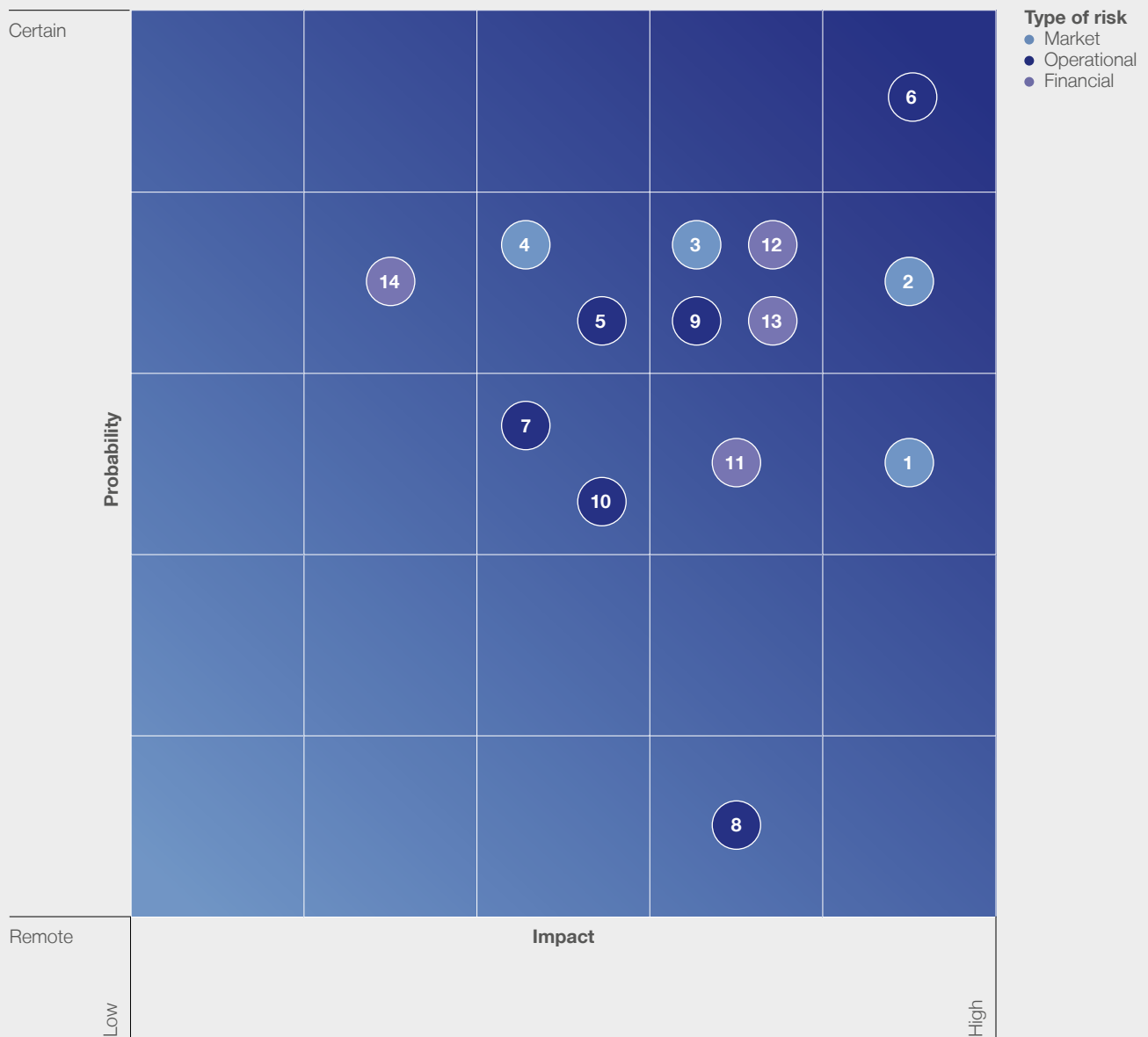
The Board has also performed a specific assessment for the purpose of this Annual Report. This assessment considers all significant aspects of internal control arising during the period covered by the report. The Audit Committee assists the Board in discharging its review responsibilities.



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 *continued*



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 to 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.

Our business units

- Printhead
- Product Print Systems
- 3D Printing

Key of change

- ▲ Increase
- No change
- ▼ Decrease

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Market			
<p>1. Competition</p> <p>● ● ●</p>	<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, alongside 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>
<p>2. Failure to identify market requirements</p> <p>● ● ●</p>	<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 focus 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.</p> <p>We have a rigorous product lifecycle management process which ensures we deliver against our customers requirements.</p>	<p>Possible Very High</p> <p>●</p>

Risk management *continued*

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Market continued			
<p>3. Commercialising and maintaining products with cutting edge technology</p> <p>● ● ●</p>	<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>Possible High</p> <p>▲</p>
<p>4. Merger and acquisition opportunities</p> <p>● ● ●</p>	<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>
Operational			
<p>5. Organisational capability</p> <p>● ● ●</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>A suite of Learning and Development courses ('XCEL') has been rolled out across the Company to ensure key skills are maintained and enhanced.</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>

Our business units






- Printhead
- Product Print Systems
- 3D Printing

Key of change

- ▲ Increase
- No change
- ▼ Decrease

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
6. Coronavirus ('COVID-19') ● ● ●	<p>Impact across all business operations and locations:</p> <p>Reduction in staff availability and development of commercial opportunities.</p> <p>This could negatively impact the growth objectives in the near term.</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>With the continued uncertainty associated with the virus it is too early to assess the impact on the Groups financial performance.</p> <p>IT infrastructure – see 10. 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 our staff, manufacturing operations continue, whilst we are closely following local government guidance.</p> <p>We are in regular contact with our customers and have yet to see a significant impact on demand . We are working closely with our clients to mitigate the risks caused by the virus and maximise business continuity in our and their operations.</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>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>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>Further assessment will be made against available Government support schemes, should the need arise.</p>	Certain Very High NEW
7. Brexit ● ●	<p>The United Kingdom's decision to leave the European Union presents both risk and opportunities to the Company.</p> <p>There is a period of uncertainty during the transition phase concerning EU workers, immigration and trade leading up to the formal conclusion of trade negotiations at the end of 2020.</p> <p>Some of our current workforce have migrated from other countries in the EU and the continued recruitment of world class talent is critical to our success in a technical and specialised industry.</p> <p>Another 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>We remain exposed to currency fluctuations that could result from the United Kingdom concluding the transition period with the EU without a comprehensive free trade agreement. i.e. a “skeleton” agreement or falling back on WTO rules following “no deal”.</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>Identify and support EU, EEA or Swiss employees requiring advice in completion of application to 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>A review of import and export tariffs identify minimum effect on the raw materials and finished goods. Non-tariff barriers (i.e. import/export documents) are being reviewed to ensure pro-active compliance with possible scenarios from 1 January 2021.</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>A weakened Pound as a result of a “no-deal” scenario would likely have a positive impact on the Group due to the high proportion of export sales in US Dollars.</p> <p>The Group has sufficient cash resources to protect against any short-term volatility.</p>	Probable Medium ●

Risk management *continued*

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Operational continued			
8. 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 site 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>	Remote High 
9. 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 Director of IP and Legal 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>	Possible High 
10. IT systems and information failures (incl. Cyber security) 	<p>COVID-19: IT network resilience and access to information via hardware and software capabilities.</p> <p>IT security breaches or disruption (Loss of network) unauthorised access or mistaken disclosure of information.</p> <p>The risk to the Group is that of unauthorised access to or external disclosure of Group information, including those caused by 'cyber attacks'.</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>Management has implemented technical and procedural controls to minimise the occurrence of information and financial security and data protection breaches.</p> <p>The Group employs security and testing measures for the software it deploys and on internal systems. Employees are trained on the risks of phishing and best practice for data 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 also requires the appropriate authorisation.</p> <p>Where sensitive data is made available to third parties it is done so under confidentiality agreements.</p>	Probable Medium NEW

Our business units

- Printhead
- Product Print Systems
- 3D Printing

Key of change

- ▲ Increase
- No change
- ▼ Decrease

Risk and link to business unit	Impact	Mitigation	Likelihood Magnitude Change
Financial			
11. 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>	Probable High ▶
12. Customer credit exposure ●	<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 life cycle. 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 market place 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>	Possible High ▲
13. Inventory obsolescence ● ● ●	<p>As the Group launches new products across its businesses, it could end up stocking volumes in excess of near term demand. As a result, these products could be exposed to obsolescence and pricing risks.</p>	<p>Taking into consideration the stage of market development for new products and minimum supply constraints. Where possible, the Group aligns supplier purchase commitments with customer sale commitments, and enter into back to back agreements to minimise exposure.</p>	Possible High ▶
14. Volatility in exchange rates ● ● ●	<p>Global economic events and uncertainty may cause currencies to fluctuate and currency volatility contributes to variations in our sales of products and services in impacted jurisdictions.</p> <p>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>See 'Brexit' risk above for further disclosure.</p>	Possible Low ▶

Sustainable and responsible business

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.

Social responsibility

- Xaar employees raised 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.
- Xaar has sponsored 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 £5,100 (2018: £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, held several events throughout the year including comedy nights, theatre trips, festivals, meals, nights at the races, family fun days and sports activities such as ice skating, charity races and cycling events.

- 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 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 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 security. 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 anti-bribery and corruption policies of the Group are set out in the Corporate Governance Section in page 56.

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.

Human Resources policies are reviewed regularly to ensure that they are non-discriminatory and promote equality of opportunity. In particular, recruitment, selection, promotion, training and development policies and practices are monitored to ensure that all employees have the opportunity to train and develop according to their abilities.

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:

	Reported Headcount	
	2019 Male/Female	2018 Male/Female
All employees	297/69	373/90
Directors	6/1	5/1
Senior managers	42/8	65/10
Employees excluding Directors and senior managers	249/60	303/79

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. 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 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 & 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 & 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 & 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.

Sustainable and responsible business *continued*

Project: Xaar energy efficiency Hurricane Close

The management of Xaar is committed to achieving and maintaining full compliance with appropriate environmental, health and safety legislation.

Although certain responsibilities under this policy can be attributed to specific roles within the organisation, and in particular with different levels of management, each and every Xaar employee shares the basic core duty to understand their responsibilities to observe instructions put in place and, where necessary, to draw these to the attention of others.

To achieve our Environmental and Health & Safety commitments, Xaar will ensure that the organisation is led by example; systems are in place to engage, train, develop and maintain competent, informed personnel; resources are allocated to enable environmental health and safety standards to be maintained; employee involvement and open communications are actively encouraged; plant, equipment and facilities are safe and without risk to the health and welfare of all persons who could be affected by their use or maintenance; substances required and used in the workplace are handled and disposed of safely and in accordance to regulations; a comprehensive risk assessment programme is maintained covering all activities and processes, with control measures implemented to minimise risk where applicable; adequate welfare facilities are provided; where accidents or 'near misses' occur, they are reported, investigated and treated as the source of learning for ongoing working practices; and that best practice is shared across the Group.

The Group is committed to minimising its impact on the environment through the reduction and recycling of waste and by operating its facilities as efficiently as is practicable.

Project: Xaar energy efficiency Hurricane Close

Executive summary

At the end of 2018 Xaar kicked off a project to review energy use at our Hurricane Close site with a target of achieving a 7.5% reduction in electricity consumed during the 2019 calendar year. The site has a system of smart meters which in conjunction with plant surveys were used to identify potential areas for improvement. Several 'quick wins' were identified making a combined saving of 134 000 kWh for the year 2019, these included a hard Christmas shutdown where equipment in the clean rooms was turned off during the Christmas break and installation of a variable speed house vacuum system to replace fixed speed vacuum pumps.

Detailed analysis of smart meter information and analysis of data from the site Building Management System followed which led to various investigations and subsequent work on the clean room's Hevac systems. During the course of 2019 to date we have saved a further 539000 kWh. This has been achieved in part by reviewing historic environmental performance data for the clean rooms and allowing our Hevac plant to flex performance whilst meeting historically achieved conditions.

As we stand today we will achieve a total saving of 904 000kWh for 2019 from the project work completed to date. When applied to 2020 across a whole year the total energy saving will be in excess of 1,250,000kWh of energy.

Evidence of improvements in energy usage can be backed up using data from our electricity supplier invoices. The following graph plots actual electricity consumed during 2018 by month. Using 2018 as a base line, we have calculated predicted energy savings from the work completed and plotted a 2019 forecast line. The actual 2019 usage line differs from the predicted 2019 line due to fluctuations in the production line output between the two years and also due to external environmental conditions. Allowing for output and environmental differences, we believe the plot effectively demonstrates the efficiency gains made and the resultant reduction in electricity consumption at our site.

[See table A](#)

Project details – What did we target, what did we do?

The following list details project work packages to date, the lists break into two actions, quick wins and project work packages that required significant investigation and analysis to determine areas for improvement.

Quick Wins

- Christmas Equipment Shutdown – Actual Saving in Jan invoice 62,677kWh
- Variable Speed Vacuum Pump – Target saving 72,000kWh pa.

Project Work Packages

- Clean Room 1 Laser Service Corridor humidity control – Anticipated saving 124,000kWh pa
- AHU7 BMS control software, humidifier control – Anticipated saving 18,200kWh pa
- AHU7 BMS chilling and dehumidification efficiency – Anticipated saving 177,000kWh pa
- Apply lessons from AHU7 work to AHU 2,3,4,6 – Anticipated savings 524,000kWh pa
- Plating area joint control, make one recirc unit redundant – Anticipated savings 97,000kWh
- AHU7 Control, split cooling and dehumidification controls – Anticipated savings 63,000kWh.

[See table B](#)

Table A: Electrical energy consumption at Xaar Hurricane Close, 2018 verses 2019

HC Electricity kWh Day & Night

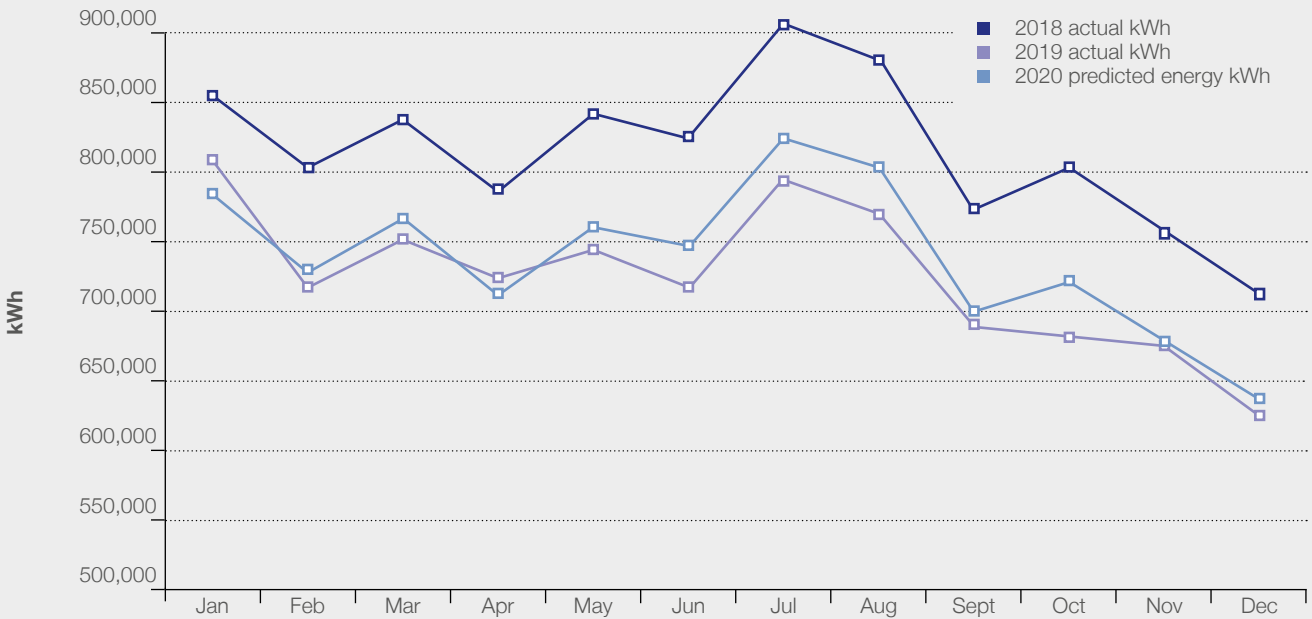
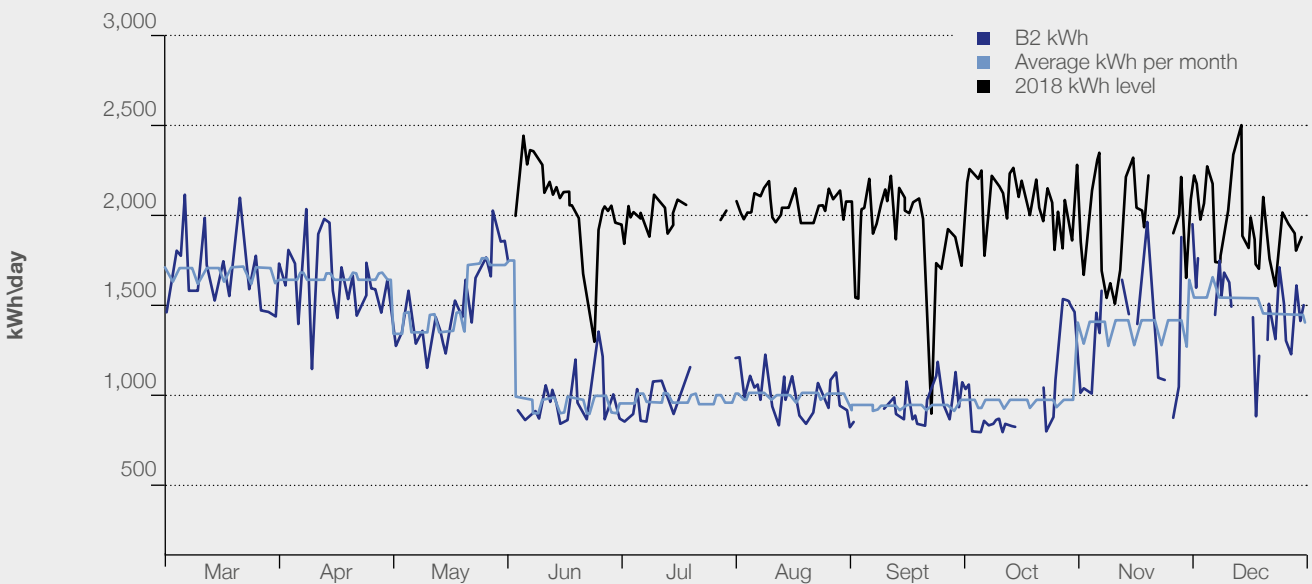


Table B: Distribution board B2 (AHu2, AHU3)



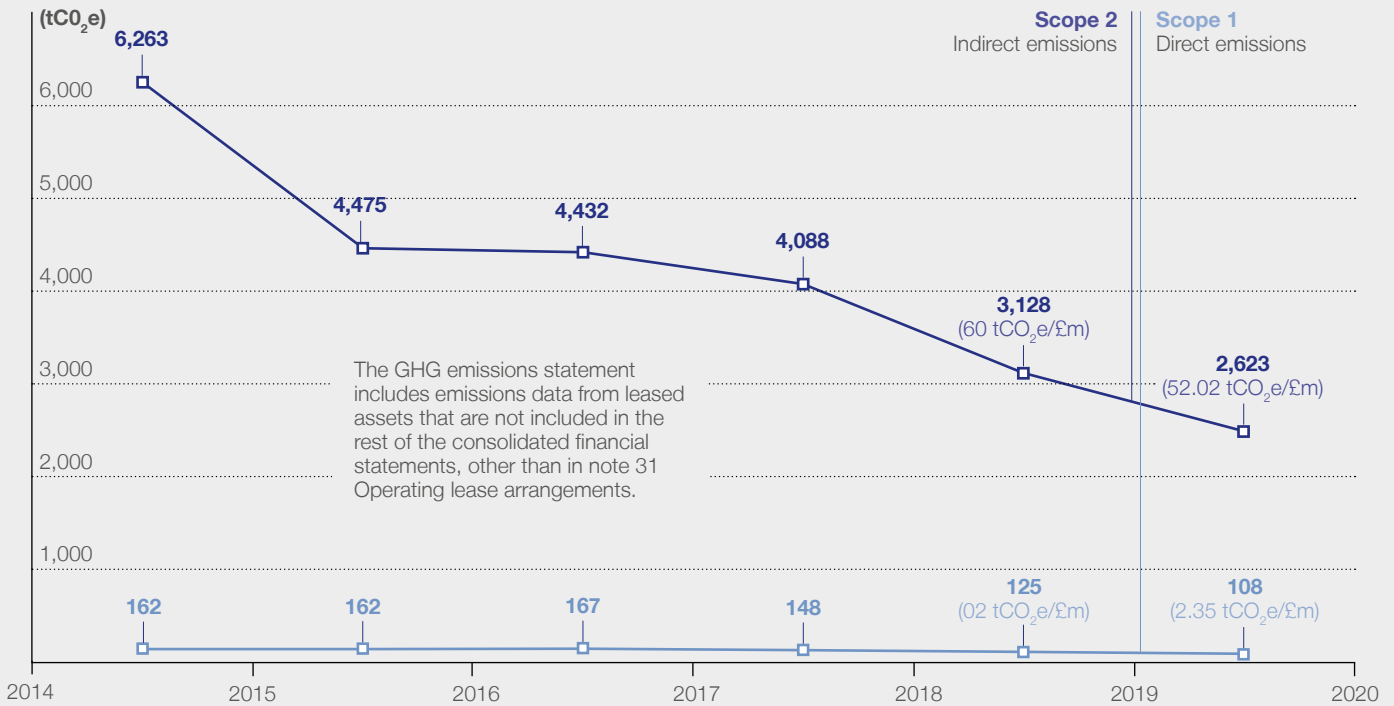
Energy saving (kWh)

904,000

Sustainable and responsible business *continued*

Greenhouse gas emission statement

Statutory total 2019
2,731



Greenhouse gas emission 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.

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 excluding royalties

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

Board approval of the Strategic and Annual Reports

Board approval

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.

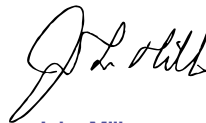
The Strategic Report was approved by the Board on 22 April 2020 and is signed on its behalf by:



Andrew Herbert
Chairman



Margaret Rice-Jones
Senior Independent Director



John Mills
Chief Executive Officer



Chris Morgan
Non-Executive Director



Ian Tichias
Chief Finance Officer

Introduction to Governance

Committed to high standards



Andrew Herbert
Chairman

We recognise the importance of, and are committed to, high standards of Corporate Governance, aligned with the needs of the Company and the interests of all our stakeholders.

Introduction

This corporate governance section of the Annual Report sets out what governance means to Xaar and to the Board, both in itself and in terms of its impact on decision making in the business, and looks to assure shareholders and others we have embedded the values that they would expect to see in place.

Corporate governance is not just a set of guidelines but a framework which underpins the core values of the business. It sets standards against which we can judge whether we are acting in the right way and for the right reasons when we make decisions, while ensuring we have all the appropriate and necessary safeguards, checks and balances in place.

Culture and values

A healthy corporate culture is a valuable asset, a source of competitive advantage and vital to the creation and protection of long-term value. It is the Board's role to determine the purpose of the Company and ensure that the Company's values, strategy and business model are aligned to it.

In order to make this a reality, we need to live by a certain set of values every single day.

These values are our guiding principles.

- **Trust**

We trust each other to deliver on our commitments and do the best for Xaar.

Leadership ethos

We all lead with integrity, passion & courage to inspire everyone to live our values. We overcome our challenges through innovation & deliver on promises to our customers, winning together.

Andrew Herbert
Chairman

- **Collaboration**

We all work together, and with our partners, to achieve success.

- **Drive**

We are excited about our potential and put energy into everything we do.

A new Code of Conduct has been introduced, pulling together existing Company policies into a single document to provide guidance to employees on how to handle common ethical dilemmas when decision making. Its development will help to engender a sense of trust amongst employees and stakeholders, and communication and promotion by senior management can help inform critical business decisions.

Board of Directors

The Board continues to provide leadership within a framework of prudent and effective controls for risk assessment and management.

The Non-Executive Directors play a vital role in advising the Executive Directors, through informal engagement as well as through attendance at formal Board and Committee meetings. They continue to provide effective and independent oversight of the Company's strategy and its broad business operation.

Key decision areas reserved for the Board include:

- The Group's strategy
- The Group's corporate structure and capitalisation
- Approval of financial reports
- Risk management
- Approval of material transactions and contracts
- Board composition
- The remuneration policy for Executive Directors
- Approval of equity awards
- Oversight of governance, including approval of the Group's applicable corporate policies.

Section 172 Statement

In accordance with Section 172 of the Companies Act 2006, the Board recognises the importance of our wider stakeholders to the sustainability of our business. The Sustainable & Responsible Business Report (pages 36 to 37) and the Governance section (pages 54 to 58) set out in more detail how the Board has approached its duty under Section 172.

2018 UK Corporate Governance Code

The 2018 UK Corporate Governance Code (the 'Code') sets out a new approach to governance. This table shows where shareholders can evaluate how the Company has applied the principles of the Code and where key content can be found in this report.

Non-financial information statements

	Page
Environmental matters	36 to 38
Employee matters	36, 42, 54 to 56, 66
Social matters	36-37, 54 to 55
Human Rights	36, 56
Anti-corruption and anti-bribery	36, 56
Principal risks and uncertainties	28 to 35
Business model	4 to 7

Principles	Statement	Page
Board leadership & Company purpose	The Board's role is to promote the long-term sustainable success of the Company, generating value for the shareholders and contributing to wider society stakeholders – employees, customers, suppliers, the community and the environment.	56
Division of Responsibilities	There exists a clear division of responsibilities between the Chair and the Chief Executive Officer. The Chair's primary role includes ensuring the Board functions properly, that it meets its obligations and responsibilities, and that its organisation and mechanisms are in place and are working effectively.	56
Composition, Succession and Evaluation	The Nomination Committee is responsible for regularly reviewing the composition of the Board. The Executive Directors, in consultation with the Chair, appraise the performance of the Non-Executive Directors.	61
Audit, Risk & Internal control	The Audit Committee plays a key role in monitoring and evaluating our compliance and risk management processes, providing independent oversight of our external audit and internal control programmes, accounting policies and business transformation projects, ensuring the Board reports are fair, balanced and understandable.	59
Remuneration	The Remuneration Committee sets levels of remuneration which are designed to promote the long-term success of the Group and structures remuneration so as to link it to both corporate and individual performance, thereby aligning management's interests with those of shareholders.	62

Board of Directors - 2020



(R) (N)

Andrew Herbert

Chairman

Appointed: 2016

Qualifications

- Chartered Management Accountant
- BA (Hons) in Business Studies.

Skills and experience beneficial to the Company:

- Extensive experience in the global digital printing industry following a 30-year career with Domino Printing Sciences plc, working both in the UK and the US
- Group Finance Director/Chief Financial Officer of Domino Printing Sciences plc from 1998 to 2015 during which time he played an instrumental role in expanding the business geographically through acquisition and creation of sales channels, and in broadening the product range via acquisition of technology based businesses
- Previously held a number of line director roles in Finance, Operations, Planning and Business Development.

External appointments

- Non-Executive Chairman of Midwich Group plc.



(N)

John Mills

Chief Executive Officer

Appointed: 2019

Qualifications

- Ph.D Physics.

Skills and experience beneficial to the Company:

- Five years as CEO at Inca Digital
- Previously CEO at DataLase and COO at Plastic Logic
- Wealth of experience in inkjet, having started career at Domino Printing Sciences as Development Scientist rising to Director of Development after four years in various technical roles.



Ian Tichias

Chief Finance Officer

Appointed: 2020

Qualifications

- ACA Institute of Chartered Accountants in England & Wales
- BSc (Hons) Economics & Maths, University of Leeds.

Skills and experience beneficial to the Company:

- Over 15 years' experience in senior financial roles
- Previously, Ibstock plc Group Finance Director and Deputy CFO, with direct responsibility for the Group's Clay division business
- Other past roles include Senior Director, Finance & Global Pricing Lead – Europe, Africa and Middle East for Zoetis and before that, Head of Finance for Pfizer Diversified Businesses ('PDB') UK
- Proven track record of delivering business focussed finance operations that drive efficiency and commercial performance beyond finance.



(R) (A) (N)

Margeret Rice-Jones

Senior Independent Director

Appointed: 2015

Qualifications

- BSc in Engineering, Durham University.

Skills and experience beneficial to the Company:

- Over 25 years' experience within innovative technology businesses
- Engineering background and has operated at Board level in various executive and non-executive roles for the last 15 years
- Margaret was CEO of Aircom International, a global software and services company, and Corporate Vice President of Motorola Inc.
- P&L responsibility for over \$1 billion revenue and has worked with both business turnaround situations and high growth companies including Skyscanner where she was Chairman.

External appointments

- Chairman of Origami Energy Ltd
- Non-Executive Director of Holiday Extras Ltd.



Chris Morgan
Non-Executive Director
Appointed: 2016

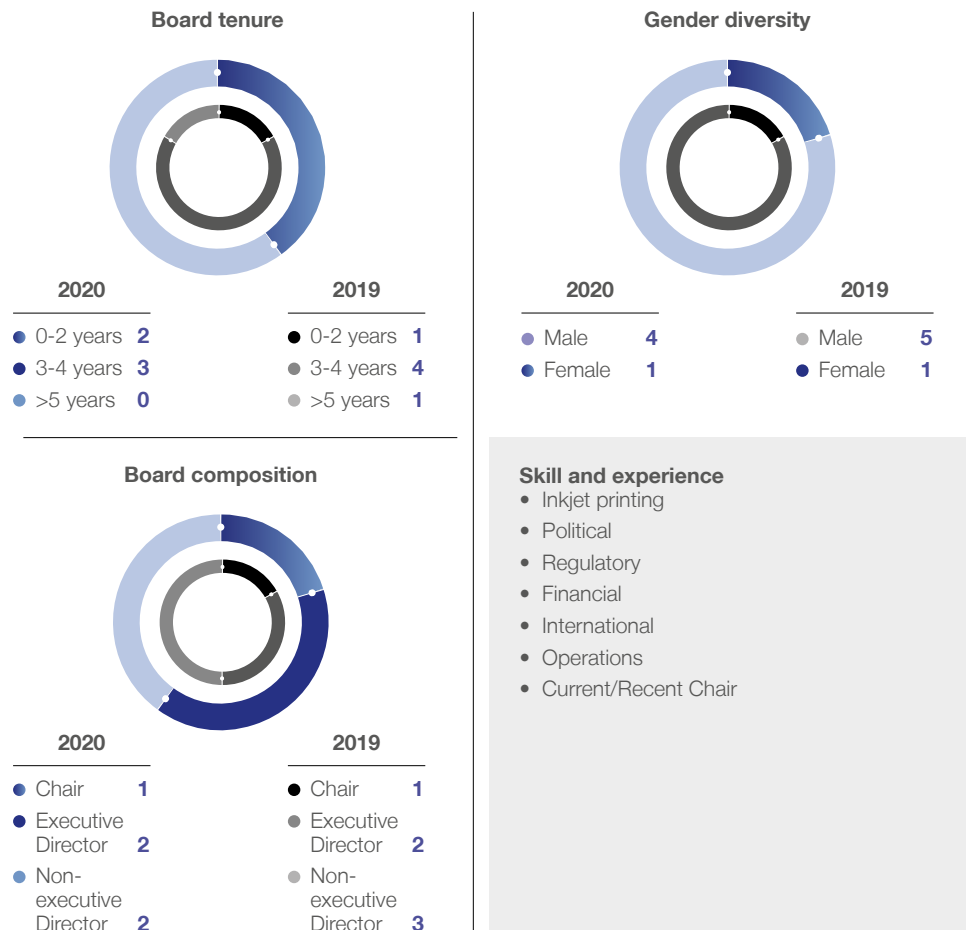
Skills and experience beneficial to the Company:

- Wealth of expertise in managing complex international technology businesses, having spent 25 years at HP Inc.
- Strong background in global marketing, sales and general management senior executive roles including global accountability for HP's multibillion dollar graphics/ industrial portfolio of digital 2D and 3D printing businesses from 2009-2012
- Extensive experience in Asia and Japan having spent more than a decade in senior APJ leadership roles
- Led strategic investments in key growth markets and has been involved in a number of mergers and acquisitions at both the strategic and operational levels
- Chief Marketing Officer for Stratasy in 2014-2015 and recently served as Senior Vice President of Americas and Asia for 3D Systems, Inc. until January 2018.

Board dashboard

The Board has a balanced and diverse range of skills and experience.

All Board appointments are made on merit, in the context of the diversity of skills, experience, background and gender required to be effective. Given the change in Board membership 2020 & 2019 Board membership are disclosed.






Key to Committee

- A** Audit
- R** Remuneration
- N** Nomination

- Chair
- Member

Board structure - 2019

Board of Directors		
Management Committee	Principle Committees	
<p>Audit Committee</p> <p>The Audit Committee is responsible for monitoring and reviewing the integrity of the financial reporting process, including the appropriateness and effectiveness of the Internal Controls and Risk Management procedures of the Group.</p>	<p>Nomination Committee</p> <p>The Nomination Committee is responsible for reviewing the size, structure and composition of the Board and providing advice to the Board on Board and senior management appointments and succession planning; monitoring of the composition of the Board and its Committees.</p>	<p>Remuneration Committee</p> <p>The Remuneration Committee is responsible for the development and implementation of the Group's remuneration framework and policies for Directors including all incentives and bonuses.</p>
<p>Andrew Herbert Chair (Andrew Herbert resigned 31 March 2020, Chris Morgan appointed 1 April 2020)</p> <p>See pages 59 and 60.</p>	<p>Robin Williams Chair (Robin Williams retired 31 March 2020, Andrew Herbert appointed 1 April 2020)</p> <p>See page 61.</p>	<p>Margaret Rice-Jones Chair</p> <p>See page 62.</p>
		

Directors' report

Report on the affairs of the Group

The Directors present their Annual Report together with the financial statements and auditor's report for the year ended 31 December 2019.

The Company has chosen, in accordance with section 414C(11) of the Companies Act 2006, to include matters of strategic importance in the strategic report which otherwise would be required to be disclosed in the Directors' report. An indication of likely future developments in the business of the Company and details of research and development activities and important events since the financial year-end are included in the Strategic Report. The following cross-referenced material is incorporated into this Directors' report

Subject matter	Section / Page
Employee Engagement	Directors' Remuneration report on page 66 Corporate Governance on page 54
Disabled employees	Sustainable & responsible business on page 36
Supplier engagement	Corporate Governance on page 54
Engagement with customers & other business relationships	Strategic Report on page 18 Corporate Governance on page 54
Greenhouse Gas Emissions	Sustainable & responsible business on page 40
Political donations	Sustainable & responsible business on page 36

Branches

In addition to the subsidiaries disclosed in note 10 of the Company's separate financial statements on page 150, there is a branch in Stockholm, Sweden through which Research & Development activities are conducted. Xaarjet Overseas Limited also has Sales Branches in Hayana, India and Hong Kong.

Dividends

No interim or final dividend was proposed or paid for the year ended 31 December 2019.

Details on dividends are set out on page 122.

Capital structure

Details of the issued share capital, together with details of the movements in the Company's issued share capital during the year, are shown in note 26. The Company has one class of ordinary shares which carries no right to fixed income. Each share carries the right to one vote at general meetings of the Company, except for shares held in the Xaar Share Incentive Plan trust, which hold no voting rights.

There are no specific restrictions on the size of a holding nor on the transfer of shares, which are both governed by the general provisions of the Articles of Association and prevailing legislation. The Directors are not aware of any agreements between holders of the Company's shares that may result in restrictions on the transfer of securities or on voting rights.

There are a number of employee share schemes, namely, Employee Share Option Schemes ('ESOP'), Long-Term Incentive Plans ('LTIPS'), Share Incentive Plans ('SIP'), and Share Save Schemes ('SAYE').

- Details of the Shareholding held in trust by Xaar Trustee Ltd, and held by the Xaar plc ESOP trust are provided in note 28. These have voting rights exercised by the Trustees.
- Details of other share based payment schemes are set out in note 33. Shares held in Xaar plc SIP do not hold voting rights.

No person has any special rights of control over the Company's share capital and all issued shares are fully paid.

The business of the Company is managed by the Board, which may exercise all the powers of the Company subject to the Articles and the Companies Act.

The powers of Directors are described in the Main Board terms of reference, copies of which are available on request, and the Corporate Governance statement, division of responsibilities on page 56.

Treasury

The Group's policy enables it to use financial instruments to hedge foreign currency exposures. The main trading currency of the Group is the Sterling. The Group's use of financial instruments and the related risks are discussed further in notes 20, 21 and 24.

At the 2019 AGM held on 21 May 2019, the Company's shareholders granted the Company authority to make one or more market purchases (within the meaning of section 693(4) of the Companies Act 2006) of ordinary shares of 10 pence each in the capital of the Company.

The Company did not purchase any shares for cancellation or to be held as treasury in 2018 or 2019.

Directors and their interests

The Directors who served during the year, and subsequent to the year-end, unless otherwise stated, were as follows:

Robin Williams

Chairman (retired 31 March 2020)

Andrew Herbert

Non-Executive Director (appointed Chairman 1 April 2020)

John Mills

Chief Executive Officer (appointed on 11 October 2019)

Doug Edwards

Chief Executive Officer (resigned on 11 October 2019)

Ian Tichias

Chief Finance Officer and Company Secretary (appointed on 1 March 2020)

Shomit Kenkare

Chief Financial Officer (resigned on 31 December 2018)

Margaret Rice-Jones

Senior Independent Director

Chris Morgan

Non-Executive Director

Details of the Directors are set out on pages 44 and 45.

Full details of their interests in shares of the Company and its subsidiary undertakings are included in the Directors' Remuneration report on page 69.

Directors' report *continued*

Shareholdings in the Company

The interests of the Directors in the shares of the Company and its subsidiaries (all of which are beneficial) as at 31 December 2019 are as follows:

	Number of ordinary shares of 10p each 31 December 2019	Number of ordinary shares of 10p each 31 December 2018
Doug Edwards	33,885	33,885
John Mills	—	—
Shomit Kenkare	—	—
Robin Williams	10,000	10,000
Margaret Rice-Jones	5,700	5,700
Chris Morgan	—	—
Andrew Herbert	—	—

There have been no changes in the Directors' interests in shares of the Company between 31 December 2019 and 21 April 2020. Directors' interests in options over shares in the Company are shown in the Directors' Remuneration report.

Directors' liabilities

Xaar plc, the ultimate parent company and its subsidiaries have granted an indemnity to all of the Directors of Xaar plc and of its subsidiaries against liability in respect of any potential proceedings that may be brought by third parties, subject to the conditions set out in the Companies Act 2006. Such qualifying third party indemnity provision remains in force as at the date of approving the Directors' report.

Share capital

As at 31 December 2019 the Company had been notified in accordance with Chapter 5 of the Financial Conduct Authority's ('FCA's') Disclosure and Transparency Rules of the following material interests in its share capital:

	Number of ordinary shares held	Percentage of issued share capital
AXA Investment Managers	9,065,798	11.57%
Aberforth Partners	8,620,333	11.00%
M&G Investments	7,676,539	9.80%
Schroder Investment Management	7,438,706	9.50%
T Rowe Price International	6,144,616	7.84%
Lombard Odier Asset Management	5,001,377	6.38%
FIL Investment International	4,341,812	5.54%
Legal & General Investment Management	4,052,506	5.17%
Oppenheimer Funds	4,000,000	5.11%
Canaccord Genuity Wealth Management	2,454,910	3.13%
River & Mercantile Asset Management	2,380,059	3.04%

During the period 31 December 2019 to 21 April 2020, the Company had been notified in accordance with Chapter 5 of the Financial Conduct Authority's ('FCA's') Disclosure and Transparency Rules of the following material interests in its share capital:

	Number of ordinary shares held	Percentage of issued share capital
Schroder Investment Management (increase in shareholdings to 20.38% from 9.5%)	15,940,006	20.38%
AXA Investment Managers (decrease in shareholdings to 4.16% from 11.57%)	3,251,066	4.16%

COVID -19 statement

In the lead up to the Annual General Meeting, we are closely monitoring the impact of the Covid-19 virus in the United Kingdom. In light of current public health advice and "Stay at Home" legislation recently introduced, external shareholders (i.e. shareholders who do not also hold office as a director of the Company) are prohibited from attending the Annual General Meeting in person. Shareholders attempting to attend the meeting will be refused admission. Instead of attending this year's AGM, shareholders are asked to exercise their votes by submitting their proxy as set out in the Notice of Meeting. All shareholders are strongly recommended to vote electronically at www.signalshares.com as your vote will automatically be counted. Given the currently escalating situation sending a paper proxy is no guarantee of having your vote counted. In addition, should a shareholder have a question that they would have raised at the meeting, we ask that they send it by e mail to investor.relations@xaar.com before 5.00 pm on 25 May 2020. Answers to the questions will be published on our Corporate website (www.xaar.com) after the AGM.

Annual General Meeting

☒ The notice convening the Annual General Meeting is set out on pages 153 to 156.

Resolutions 1 to 8 set out in the notice of the meeting deal with the ordinary business to be transacted at the meeting. The special business to be transacted at the meeting is set out in Resolutions 9 to 14.

Re-election of Directors

Resolutions 4 to 7

The Company's Articles of Association require the Directors to retire by rotation at least once every three years, with the number to retire by rotation at each Annual General Meeting being the number nearest to but not exceeding one third of the Board. However, the UK Corporate Governance Code provides that all Directors should be subject to re-election by their shareholders every year. In accordance with this provision of the UK Corporate Governance Code and in keeping with the Board's aim of following best corporate governance practice, the Board has, in recent years, decided that all Directors should retire at each Annual General Meeting and offer themselves for re-election.

The Company announced in September 2019, that Margaret Rice-Jones would not seek re-election at this year's Annual General Meeting as she was intending to leave the Board at the time of the Meeting. It remains the case that Margaret will not seek re-election at the Annual General Meeting on the basis that she will soon leave the Board. However, given the uncertainty of the current environment, Margaret has agreed to remain in office until the end of June so as to ensure an orderly transition once her successor is identified.

Directors' Remuneration report

Resolution 8

This Resolution seeks shareholder approval for the Directors' Remuneration report, which includes the new remuneration policy.

☒ The Directors' Remuneration report can be found on pages 63 to 85 (inclusive) of the Annual Report and Financial Statements.

In accordance with regulations which came into force on 1 October 2013, Resolution 8 offers shareholders an advisory vote on the implementation of the Company's new remuneration policy.

Power to issue securities

Resolutions 9, 10 & 11

Under section 551 of the Companies Act 2006 (the 'Act'), the Directors may only allot shares or grant rights to subscribe for or convert any securities into shares if authorised by the shareholders to do so.

Resolution 9, which complies with guidance issued by the Investment Association, will, if passed, authorise the Directors to allot ordinary shares or grant rights to subscribe for or convert any securities into ordinary shares, up to an aggregate nominal value of £2,611,143 (corresponding to approximately one third of the issued share capital at 21 April 2020 and up to an additional aggregate nominal value of £5,222,286 (corresponding to approximately two-thirds of the issued share capital at 21 April 2020) in the case of allotments only in connection with a fully pre-emptive rights issue. The Directors have no present intention to exercise the authority sought under this Resolution. However, the Directors may consider doing so if they believe it would be appropriate in respect of business opportunities that may arise consistent with the Company's strategic objectives.

This authority will expire no later than 15 months after the passing of the Resolution. It is the Board's current intention to seek renewal of such authority at each future Annual General Meeting of the Company.

Disapplication of pre-emption rights (Resolutions 10 and 11)

Under section 561(1) of the Act, if the Directors wish to allot equity securities (as defined in section 560 of the Act) they must in the first instance offer them to existing shareholders in proportion to their holdings. In addition, there may be occasions, when the Directors will need the flexibility to finance business opportunities by the issue of shares without a pre-emptive offer to existing shareholders. This cannot be done under the Act unless the shareholders have first waived their pre-emption rights.

In accordance with institutional guidelines, under Resolution 10, to be proposed as a special resolution, authority is sought to allot shares:

- (i) in relation to a pre-emptive rights issue only, up to an aggregate nominal amount of £5,222,286 (being the nominal value of approximately two thirds of the issued share capital of the Company); and
- (ii) in any other case, up to an aggregate nominal amount of £391,672 (representing 5% of the issued share capital of the Company).

The Directors do not currently have an intention to exercise the authority.

In addition, Resolution 11, which is also to be proposed as a special resolution, asks the shareholders to waive their pre-emption rights in relation to the allotment of equity securities or sale of treasury shares up to a further aggregate nominal amount of £391,672 (representing 5% of the issued share capital of the Company), with such authority to be used only for the purpose of financing (or refinancing, if the authority is to be used in the six months after the original transaction) a transaction which the Directors of the Company determine to be an acquisition or other capital investment of a kind contemplated by the Pre-emption Group's Statement of Principles on Disapplying Pre-emption Rights.

The Directors will also have regard to the guidance in the Statement of Principles concerning cumulative usage of authorities within a three year period. Accordingly, the Board confirms that it does not intend to issue shares for cash representing more than 7.5% of the Company's issued ordinary share capital in any rolling three-year period other than to existing shareholders, save as permitted in connection with an acquisition or specified capital investment as described above, without prior consultation with shareholders.

Directors' report *continued*

Power to issue securities continued

Disapplication of pre-emption rights (Resolutions 10 and 11) continued

If Resolutions 10 and 11 are passed, the authorities will expire at the conclusion of the next Annual General Meeting of the Company, or, if earlier, the date which is 15 months after the date of passing of the Resolutions. It is the Board's current intention to seek renewal of such authorities at each future Annual General Meeting of the Company.

Authority to purchase own shares

Resolution 12

It is proposed by Resolution 12, by Special Resolution, to authorise the Company generally and unconditionally to purchase its own shares at a price of not less than the par value of the shares and not more than the higher of:

- (i) 5% above the average of the middle market quotations of the shares as derived from the London Stock Exchange Daily Official List for the five dealing days immediately preceding the day on which the purchase is made; and
- (ii) the amount stipulated by article 5(1) of the Buy-back and Stabilisation Regulation 2003 (in each case exclusive of any expenses payable by the Company).

The authority will be for a maximum of 14.9% of the Company's issued share capital and will expire at the earlier of the next Annual General Meeting of the Company or within 15 months from the date of the passing of this Resolution. The Directors currently have no intention to exercise the authority and will only purchase shares if it is in the best interests of shareholders as a whole.

The total number of ordinary shares under option, which remain unexercised and outstanding as at 21 April 2020 (including options awarded under LTIP which may be satisfied by subscription for new shares) was 2,738,875. This represents 3.4% of the issued ordinary share capital at that date. If the Company was to buy back the maximum number of ordinary shares permitted pursuant to the passing of this Resolution, then the total number of ordinary shares under option which remain unexercised and outstanding as at 31 December 2019 would represent 3.5% of the reduced issued ordinary share capital.

Directors' Remuneration Policy

Resolution 13

That, the Directors' Remuneration Policy, the full text of which is contained in the Directors' Remuneration report for the year ended 31 December 2019 and which is set out in pages 63 to 85 of the Annual Report. Which will take effect at the conclusion of this meeting, be approved.

Amendments Long-Term Incentive Plan

Resolution 14

That the amendments to the Xaar 2017 Long-Term Incentive Plan, as shown in the marked-up version of the plan rules produced to the meeting, be and they are hereby approved and the Directors be and are generally authorised to adopt the amendments and to do all acts and things that they consider necessary or expedient to give effect to the amendments.

Additional information for shareholders

The following provides the additional information required for shareholders as a result of the implementation of the Takeovers Directive into UK law.

The structure of the Company's issued share capital is shown in note 26.

Details of ordinary shares held in trust owned by the Company can be found in note 28.

The Company is not aware of any agreements between shareholders that may result in restrictions on the transfer of securities and/or voting rights.

The Directors are authorised to issue and allot shares and to undertake purchases of the Company's shares. Appropriate resolutions to renew these authorities are proposed to be passed at the Annual General Meeting as detailed above and notice of which is on pages 153 to 156.

 The notice of the Annual General Meeting is on pages 153 to 156.

Ordinary shares

On a show of hands at a general meeting of the Company every holder of ordinary shares present in person and entitled to vote shall have one vote for every ordinary share held and, on a poll, every member present in person or by proxy and entitled to vote shall have one vote for every ordinary share held. The notice of the Annual General Meeting on pages 153 to 156 specifies deadlines for exercising voting rights either by proxy notice or present in person or by proxy in relation to resolutions to be passed at the Annual General Meeting.

All proxy votes are counted and the numbers for, against or withheld in relation to each resolution are made available at the Annual General Meeting and are published on the Company's website after the meeting. No person holds securities carrying special rights with regard to control of the Company.

Restrictions

There are no restrictions on the transfer of ordinary shares in the Company other than:

- certain restrictions may from time to time be imposed by laws and regulations (for example, insider trading laws and market requirements relating to close periods); and
- pursuant to the Listing Rules of the FCA whereby all employees of the Company require the approval of the Company to deal in the Company's securities.

Articles of Association

The Company's Articles of Association may only be amended by a Special Resolution at a general meeting of the shareholders. Directors are reappointed by Ordinary Resolution at a general meeting of the shareholders.

Action to be taken

As detailed in the notes to the notice convening the Annual General Meeting, you will not receive a Form of Proxy for the Annual General Meeting in the post. Instead, you can vote online at www.signalshares.com. To register, you will need your Investor Code, which can be found on your share certificate, once logged on, click on the "Vote Online Now" button to vote. Proxy votes should be submitted as early as possible and in any event, no later than 48 hours before the start of the meeting (excluding weekends and public holidays). Shareholders attempting to attend the meeting will be refused admission.

You may request a hard copy proxy form directly from the registrars, Link Asset Services on 0871 664 0300. (Calls cost 12 pence per minute plus your phone company's access charge. If you are outside the United Kingdom, please call +44 371 664 0300. Calls outside the United Kingdom will be charged at the applicable international rate). Lines are open between 9.00a.m. to 5.30p.m., Monday to Friday, excluding public holidays in England and Wales.

Appointment and replacement of Directors

With regard to the appointment and replacement of Directors, the Company is governed by its Articles of Association, the UK Corporate Governance Code, the Companies Act and prevailing legislation.

The Board can appoint a Director but anyone so appointed must be elected by an Ordinary Resolution at the next general meeting. All Directors are required to submit themselves for reappointment every year at the AGM (see: Re-election of Directors, above) in line with UK Corporate Governance Code.

A Director may be removed by the Company in certain circumstances set out in the Articles of Association or by an ordinary resolution of the Company.

Significant interests

Directors' interests in the share capital of the Company are shown in the table **on page 48**.

Major interests (i.e. those greater than 3%) of which the Company has been notified are shown **on page 48**.

Company share schemes

The Xaar plc ESOP Trust holds 1.2% of the issued share capital of the Company in trust for the benefit of employees of the Group and their dependants. The voting rights in relation to these shares are exercised by the Trustees.

Change of control

The Company is not party to any agreements which take effect, alter or terminate upon a change of control of the Company following a takeover bid. There are no agreements between the Company and its Directors or employees providing for compensation for loss of office or employment (whether through resignation, purported redundancy or otherwise) that occurs because of a takeover bid. Depending on the achievement of performance conditions, share-based payment arrangements may vest on change of control but this is subject to the approval and exercise of the discretion of the Remuneration Committee.

Directors' report *continued*

Going concern

☐ The Group's business activities, together with the factors likely to affect its future development, performance and position are set out in the Strategic Report **on pages 6 to 25**.

The Group's business activities, together with the factors likely to affect its future development, performance and position are set out in the Strategic Report on pages 6 to 25. Notes 20, 21 and 24 include a description of the Group's objectives, policies and processes for managing its capital; its financial risk management objectives; details of its financial instruments and hedging activities; and its exposure to credit risk and liquidity risk.

The Board have considered the impact of the ongoing COVID-19 impact. Whilst the impact to date on trading and debtor recoverability has been minimal, the impact of COVID-19 has created a high level of uncertainty as to the outlook for the remainder of the financial year and it is still too early to ascertain the impact this may have on our full year 2020 revenue and profitability.

The Board have therefore performed a number of stress tests to assess the Group's ability to continue as a going concern.

The Directors have prepared cash flow forecasts for the Group for a review period of 12 months from the date of approval of the 2019 financial statements. These forecasts reflect an assessment of current and future market conditions and their impact on the Group's future cash flow performance. The forecasts have been sensitised for a reduction in revenue from the second half of 2020 to the end of the review period. The forecasts have also been reverse stress tested by significantly reducing revenue from the second half of 2020 to the end of the review period, with some cost mitigations.

In the sensitised scenario the forecasts indicate the Group would still have sufficient cash to continue. In the reverse stress tested scenario, the Group would run out of cash. However, with some mitigation such as reducing discretionary spend, delaying capital expenditure and research and development costs, the Group would have sufficient cash. Notwithstanding this, the Group has further options to mitigate a cash shortfall which have not been factored into the above forecasts, such as staffing reductions, further delaying/stopping capital and research and development expenditure and applying for certain government support measures. Should it become apparent that sales orders, revenue and/or cash collections are being affected by a global slowdown, the Directors will undertake a further review on discretionary expenditure, staffing levels and capital investment to protect the Group's cash position.

Having considered all the above, including the Group's current strong cash position, the Directors remain confident in the long-term future prospects for the Group and its ability to continue as a going concern for the foreseeable future and therefore continue to adopt the going concern basis in preparing the financial statements.

Viability Statement

The long-term viability of the Group is assessed by the Directors as part of the risk management process and regular strategic reviews.

The Company has undertaken a thorough strategic review of all three business units which has resulted in a three year plan which takes into consideration the principal risks, product portfolios and R&D roadmaps, the market opportunities, our competitive position, core capabilities, and the cost structure, effectiveness and efficiency of the organisation.

☐ Details of which are outlined in the CEO report and in the strategic review **on pages 18 to 23**.

The plan forms the basis for strategic actions to be taken across the Company and the key objectives for each business. These objectives, and the key performance metrics associated with these, are regularly reviewed by the Directors.

The Company is aware that it operates in an uncertain environment and faces risks both internally and externally that could potentially impact on the Company's ability to achieve its strategy.

☐ The principal risks and uncertainties faced by the Company are included **on pages 29 to 35**.

As part of the process of reviewing these risks, and other potential risks, the Board assigns responsibility for these to members of the Executive Committee. It is the responsibility of the Executive Committee members to manage the risk and the mitigating actions.

This process is supplemented with strong internal controls and processes. This combination ensures that the Company manages the risks it faces appropriately and that these are considered in all of the financial models.

The Board have assessed the viability of the Group over a three year timeframe based on the development cycles of our competitors and that of our customers and the probability this could lead to technological advancements that disrupt the markets that Xaar operates in. In practice the combined development time to produce a new printhead and subsequently a new printer is longer than this. The major risks to the Group in the three year timeframe considered predominantly relate to existing competition displacing Xaar with their current product portfolios and macro-economic events, such as the COVID-19 pandemic, that cause a significant downturn in the global economy.

In assessing the viability of the Group, the Board have reviewed the forecasts and stress tested these by reducing forecasted revenues by the same double digit percentage each year. Whilst the future forecasts show growth (including expected sales from the commercialisation of Xaar 3D), these stress tests indicate that even if revenue decreases to an amount lower than that recognised in 2019, the Group, with some mitigation such as reducing discretionary spend, delaying capital expenditure and research and development costs, would have sufficient cash to survive. Moreover, the Group has further options to mitigate a cash shortfall which have not been factored into the above stress tests, such as staffing reductions, further delaying/stopping capital and research and development expenditure and applying for certain government support measures.

Taking account of the Company's current financial position, operating performance, and the principal risks and uncertainties, the Directors have assessed the prospects of the Company, and confirm that they have a reasonable expectation that the Company will be able to continue in operation and meet its liabilities as they fall due for the next three years, to December 2022.

Auditor

Ernst & Young LLP were appointed in 2019 and have expressed their willingness to continue in office as auditor and a resolution to reappoint them will be proposed at the forthcoming AGM.

Directors' statement as to disclosure of information to auditor

☐ The Directors who were members of the Board at the time of approving the Directors' report are listed **on page 41**.

Having made enquiries of fellow Directors, each of these Directors confirm that:

- To the best of each Director's knowledge and belief, there is no information relevant to the preparation of their report of which the Group's auditor is unaware
- Each Director has taken all the steps a Director might reasonably be expected to have taken to be aware of relevant audit information and to establish that the Group's auditor is aware of that information
- If any independent director does not agree to support this statement this must be disclosed.

This confirmation is given and should be interpreted in accordance with the provisions of section 418 of the Companies Act 2006.

Approval

The Directors' report was approved by the Board on 22 April 2020 and is signed on its behalf by:



John Mills
Chief Executive Officer

Corporate Governance statement

Including Section 172 Statement

From 1 January 2019 the Company has committed to the principles of corporate governance contained in the 2018 UK Corporate Governance Code ('the 2018 Code') which was issued in July 2018 by the Financial Reporting Council, effective 1 January 2019 for which the Board is accountable to shareholders.

The 2018 Code is an updated set of Principles and Provisions that emphasise the value of good corporate governance to long-term sustainable success and achievement of wider objectives.

S.172 Statement - Duty to promote the success of the Company

A director of a company must act in the way he considers, in good faith, would be most likely to promote the success of the company for the benefit of its members as a whole, and in doing so have regard (amongst other matters) to factors (a) to (f):

- a) The likely consequences of any decision in the long term,
- b) The interests of the company's employees,
- c) The need to foster the company's business relationships with suppliers, customers and others,
- d) The impact of the company's operations on the community and the environment,
- e) The desirability of the company maintaining a reputation for high standards of business conduct, and
- f) The need to act fairly as between members of the company.

The governance report gives:

- A clear and honest view of progress throughout the year
- The outcome of our Board evaluation
- Disclosure of Board discussions and the resulting actions
- Our approach to ensuring long-term viability of the business
- Our approach to risk and mitigation.

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 Environment, 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
- Remuneration Policy consultation with significant shareholders ahead of the approval of the new Policy
- Regular interaction between the Executive Directors with shareholders and non-holders with investor relations roadshows
- Further details of shareholder engagement are reported in the Directors Remuneration Report (page 63).

- Renewal of policies and procedures – Annual review
- Issue new Code of Conduct
- Annual employee appraisal and review by all managers
- Recruitment, Retention and Development plans
- Regular business updates / forums with Non-Executive Directors and senior management to all employees
- Further details of employee engagement are reported in the Directors Remuneration Report (page 66), Business Model outputs (page 7) and Sustainable and Responsible business (page 36).

- Developing high-quality products in conjunction with customers to equip them to maximise productivity and operational efficiency to utilise less energy and raw materials
- Developing the reporting of emissions across the Group with the intention to further improve environmental performance
- Supporting educational initiatives, awards and programmes for young scientists in schools to promote science, technology, engineering and mathematics subjects
- Further details of activities in the community are reported in Sustainable and Responsible Business (page 36).

- 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
- Key account management structure across the businesses to encourage meaningful, consistent and ongoing engagement with customers.

- Effective and regular communication with suppliers with standardised procedures
- Ensuring high standards throughout our 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 suppliers to optimise operational efficiency
- Ongoing dialogue with strategic business partners
- Ensuring that Xaar values are shared with our partners and suppliers.

Corporate Governance statement *continued*

Compliance with the Code

Application of the main principles of the Code

The Board has considered and implemented the provisions of the 2018 Code effective 1 January 2019. The Terms of Reference for the Audit, Nomination and Remuneration Committees have been updated to reflect the changes in the 2018 Code, with the Committees addressing additional requirements of them. An explanation of how the Main Principles have been applied during 2019 is set out below.

1. Board leadership and Company purpose

The Board's role is to promote the long-term sustainable success of the Company, generating value for the shareholders and contributing to wider society:

The Group has three main locations. The head office functions, R&D, EMEA sales, marketing, human resources, finance, IT and facilities are based in Cambridge & Nottingham, UK. The Group has two manufacturing facilities: one in Huntingdon, UK, and the other in Vermont, USA. The Group also has representatives in other global locations including USA, Italy, India, Hong Kong, Sweden and Denmark.

☒ Refer to page 6 for the Xaar business model.

During 2019, the Board commenced a strategic review of the business, this concluded with the decision to cease all further Thin Film activities and as a consequence impaired all associated assets and embarked upon a further restructuring of the printhead business unit.

Subsequently, there has been a significant change of direction arising from the strategic review, and transformation of the membership of the executive board with new CEO, CFO and Chair being appointed. The immediate focus will be on developing a customer-centric business model and a change in the go to market strategy to increase the product offering to original equipment manufacturers and progress development of new technological solutions to address customer's requirements with a clear product roadmap.

The Board and Directors seek to build on a mutual understanding of objectives between the Group and its institutional shareholders by meeting at least twice per year, following interim and annual results, to provide an update on trading and obtain feedback. As a component of the Remuneration Committees review of the proposed new policy, contact was made with significant institutional investors to understand and better develop an agreed policy.

☒ See Shareholder Communications as part of Directors' Remuneration report on page 66.

The Group's financial public relations advisors and lead brokers give all investors and potential investors who have met with the Group's investor relations team, the opportunity to provide feedback on the meetings. Additionally, the Chief Executive Officer and the Chief Financial Officer provide feedback to the Board at the meeting following shareholder meetings to ensure that the Board, and in particular the Non-Executive Directors, possess an understanding of the views of the Company's major shareholders. Both the Chairman and the Senior Independent Director are available to meet with shareholders as required.

The Board uses the AGM to communicate with investors and to encourage their participation.

Shareholders can access up-to-date Company information from the Investors section of the Xaar website at www.xaar.com.

A resolution at the 2019 AGM had more than 20% votes cast against (Resolution 9. Re-elect Robin Williams as a Director) arising from the length of tenure as a Non-executive Director and Chairman. An opportunity to engage with the significant shareholders who voted against the resolution was offered in advance of the AGM but not taken up.

However the Company did make further efforts to make contact with these shareholders to discuss their position, from which shareholders provided feedback as to their position in relation to the resolution. Having been on the Board of Xaar for more than the nine years recommended by the Governance Code. Robin Williams stepped down from the Board on 31 March 2020 having overseen the Strategic Review and managed the CEO succession.

The Board have worked closely with Executive Management to redefine the Group's mission, vision and values which will underpin the Group's evolving culture under the new leadership team. Further information in Directors Remuneration Report (page 65) and Sustainable & Responsible Business (page 36).

The Board has formally introduced workforce engagement sessions to be held at least three times a year, the first sessions taking place in December 2018. With a designated non-executive director in attendance.

The Company conducts its business with the highest standards of integrity and honesty at all times and expects its employees to maintain the same standards in everything they do. Employees are therefore required to report any wrongdoing by Xaar or its members of staff that falls short of these principles. The whistle-blowing, and anti-bribery and corruption policies are available and communicated to all employees via the Company intranet, and all employees confirm in writing that they have read and comply with the whistle-blowing and anti-bribery and corruption policies. All reported incidences of actual or suspected bribery or corruption will be promptly and thoroughly investigated and dealt with appropriately by the Board. The purpose of the anti-bribery and corruption policy is to protect Xaar and its employees from breaches of anti-bribery and corruption laws. Xaar does not tolerate any employee or third party being involved in any level of bribery or corruption. Xaar is committed to complying with applicable anti-bribery and corruption laws in all countries in which it conducts business.

Following the changes made to the Company's Articles of Association to incorporate the provisions of section 175 of the Companies Act 2006 which gave boards the statutory power to authorise conflicts of interest, any potential conflict of interest is approved by the Board in advance of any action or appointment that could result in a conflict of interest arising. Each member of the Board is familiar with the procedure to follow in relation to conflicts of interest and the process is operated efficiently.

2. Division of responsibilities

The Board discharges its responsibilities by providing strategic and entrepreneurial leadership of the Company, within a framework of strong governance, effective controls and a strong culture emphasising openness and transparency, which enables opportunities and risks to be assessed and managed appropriately. In addition, the Board sets the Company's strategic direction; ensures that the necessary financial and human resources are in place for the Company to meet its objectives; and reviews management performance.

There exists a clear division of responsibilities between the Chair and the Chief Executive Officer. The Chair's primary role includes ensuring the Board functions properly, that it meets its obligations and responsibilities, and that its organisation and mechanisms are in place and are working effectively.

The Board delegates management of the business to the Executive Committee, comprising of Executive Directors and senior operational managers, headed by the Chief Executive Officer. The Executive Committee meets weekly and is responsible for implementing Group strategy, monitoring business performance, preparing the operating and capital expenditure budgets for recommendation to the Board, and ensuring efficient management of the Group.

The Non-executive Directors attend the Board meetings, and form the Audit, Remuneration and Nomination Committees. They are responsible for scrutinising the performance of management and determining appropriate levels of remuneration of Executive Directors. They also have a key role in appointing and, where required, removing Executive Directors.

The Company Secretary is the secretary to the Board and its Committees and is also the secretary to the Executive Committee. All Directors have access to the services of the Company Secretary and Directors may take independent legal and other professional advice at the expense of the Company.

3. Composition, succession and evaluation

The Nomination Committee is responsible for regularly reviewing the composition of the Board. In recommending appointments to the Board, the Nomination Committee considers the range of skills, knowledge and experience required, with due regard for the benefits of diversity on the Board, including gender.

The Board continues to consider that diversity quotas at Board level are inappropriate, and is committed to recruiting the best talent available, assessed against objective criteria of skills, knowledge, independence and experience. All candidates are therefore considered on merit but without reference to a specific diversity policy and without any established measurable objectives in respect of diversity quotas (e.g. age, gender, ethnicity, disability, religion or educational and professional background). More information on the Group's gender profile is reported in Sustainable & Responsible business on page 37.

The Board of Directors comprises the Chairman, two Executive Directors and two Non-executive Directors.

The Board considers Margaret Rice-Jones, Chris Morgan and Andrew Herbert to be independent within the meaning of the Code. To be considered independent each Non-Executive Director is sufficiently separate to management and free from any business or other relationships which could affect their judgement, impartiality or objectivity.

All the Non-executive Directors are deemed to be independent members of the Board having no financial relationship or significant links with related parties. Chris Morgan maintains his independence, having departed Stratasys in 2015. All Directors complete a disclosure document prior to appointment.

The appointment of new Directors is led by the Nomination Committee. The year was an active one for the Nomination Committee, as the culmination of the Strategic Review and newly introduced Governance time limits on Board membership brought about four departures from the Board between October 2019 and May 2020.

The Board conducted an internal review of the effectiveness of itself, with each Non-executive Director, the Chairman and the Board Committees in November 2019. From the review and conclusion process areas of improvement were identified, in summary:

1. Preparation of material, content and frequency of meetings
2. Delegation of authority and matters requiring Board approval to be extended to commercial contracts with long-term consequences
3. Insight into and interaction with the operating management
4. Access to off-board management and focus on succession planning.

Further details of the activities of the Nomination Committee can be found on page 61.

As part of the selection process for any potential directors, any significant external time commitments are considered before an appointment is agreed. All Directors are required to consult with the Chair of the Board and obtain the approval of the Board, before taking on additional appointments.

Executive Directors are not permitted to take on more than one significant appointment as a director of a FTSE 100 company or any other substantial appointment.

The responsibilities of the Chair, Chief Executive, Senior Independent Director, Board and Committees are clear, set out in writing, agreed by the Board and made publicly available, with terms of reference for the committees available on request.

The Board's policy for individual Director performance review is for a formal and rigorous appraisal process based on performance by the individual Director against specific targets. Individual Director performance is reviewed at least annually. The Senior Independent Director, in consultation with the other Non-executive Directors and taking into account the views of the other Directors, appraises the performance of the Chairman. The Executive Directors, in consultation with the Chairman, appraise the performance of the Non-executive Directors.

It is the Board's intention to review its own performance, and that of its Committees, at least once a year. All Directors were subject to shareholder election or re-election at the 2019 AGM, as will be the case at the 2020 AGM.

The biographies of the Directors, set out on pages 44 to 45 contain the evaluation of skills and experience beneficial to the Company that the Board recommends the re-election or election of each Director.

4. Audit, risk and internal control

The role and responsibilities of the Audit Committee are set out in the Audit Committee section on pages 59 to 60.

The Audit Committee, led by Andrew Herbert, plays a key role in monitoring and evaluating our compliance and risk management processes, providing independent oversight of our external audit and internal control programmes, accounting policies and business transformation projects, and in assisting the Board in reporting in a fair, balanced and understandable manner to our shareholders.

The significant issues that the Audit Committee has considered relating to the financial statements are set out in the Audit Committee section on pages 59 to 60.

On 1 April 2020, Andrew Herbert will be succeeded by Non-executive Director Chris Morgan as Chair of the Audit Committee, all of the Audit Committee members are independent Non-executive Directors and have financial and/or related business experience due to the senior positions they hold or have held in other listed or publicly traded companies and/or similar large organisations.

The Board has established arrangements to ensure that reports and other information published by the Group are fair, balanced and understandable. The Strategic Report, set out on pages 1 to 37, provides information about the performance of the Group, the business model, the Group's strategy and the risks and uncertainties relating to the Group's future prospects.

The Group's policies relating to risk management and internal control can be found in the 'Risk management' section of the Strategic Report on pages 28 to 35.

The Committee has formally identified the Chief Executive Officer as responsible for health and safety and the Chief Financial Officer as Director responsible for risk assessment.

5. Remuneration

The Remuneration Committee sets levels of remuneration which are designed to promote the long-term success of the Group and structures remuneration so as to link it to both corporate and individual performance, thereby aligning management's interests with those of shareholders.

Details of the activities of the Remuneration Committee can be found in the Remuneration Committee section on page 62 and in the Directors' Remuneration report on pages 63 to 85.

Corporate Governance statement *continued*

Summary of Board meeting attendance in 2019

Eleven Board meetings were held in 2019.

Name	Meetings attended
Doug Edwards ¹	8 (8)
John Mills ²	3 (3)
Shomit Kenkare ³	11 (11)
Robin Williams ⁴	11 (11)
Margaret Rice-Jones	11 (11)
Andrew Herbert	11 (11)
Chris Morgan	11 (11)

1 Doug Edwards stepped down from the Board on 10 October 2019.

2 John Mills was formerly appointed as Chief Executive Officer on 11 October 2019.

3 Shomit Kenkare stepped down from the Board on 31 December 2019.

4 Robin Williams retired from the Board on 31 March 2020.

Board Committees

Summary of Committee membership:

Name	Audit Committee	Remuneration Committee	Nomination Committee
Robin Williams	No	Yes	Chair
Margaret Rice-Jones	Yes	Chair	Yes
Chris Morgan	Yes	Yes	Yes
Andrew Herbert	Chair	Yes	Yes
Doug Edwards ¹	No	No	Yes
John Mills ¹	No	No	Yes

1 The Committee invites the CEO to attend meetings when the subject matter deems their presence appropriate.

Summary of Committee meeting attendance in 2019:

Name	Audit Committee	Remuneration Committee	Nomination Committee
Robin Williams	N/A	8 (8)	4 (4)
Margaret Rice-Jones	3 (3)	8 (8)	4 (4)
Chris Morgan	3 (3)	8 (8)	4 (4)
Andrew Herbert	3 (3)	8 (8)	4 (4)
Doug Edwards	N/A	N/A	N/A
John Mills	N/A	N/A	1 (1)

Figures in brackets denote the maximum number of meetings that could have been attended.

Statement of compliance with the Code

Throughout the year ended 31 December 2019 the Company has followed the provisions set out in the Code, and have either complied with the provisions of the 2018 Code or explained why the provision has not been followed.

The Board confirms the 2019 Annual Report and Financial Statements, taken as a whole, is fair, balanced and understandable, and provides the information necessary for shareholders to assess the position, performance, strategy, and business model of the Company.

Approval

The Corporate Governance statement was approved by the Board on 22 April 2020 and is signed on its behalf by:



John Mills
Chief Executive Officer

Audit Committee

The Audit Committee (the 'Committee') is appointed by the Board and comprises independent Non-Executive Directors of the Company.

The Chairman of the Committee in 2019, Andrew Herbert, is deemed by the Board to have recent and relevant financial experience as he was, until 2015, CFO of FTSE listed Domino Printing Sciences plc and is a Fellow of the Institute of Chartered Management Accountants.

The Committee's terms of reference are subject to regular review to ensure they are appropriate and up to date with appropriate regulations. They were last revised and updated in January 2019 and include all matters indicated by Disclosure and Transparency Rule 7.1 and the 2018 UK Corporate Governance Code. The written terms of reference of the Committee are available on request from the Company Secretary.

Please see the tables on page 58 for details of the Committee members in the year and the number of Committee meetings attended. The Committee meetings are also attended, by invitation, by the Chief Executive Officer, the Chief Financial Officer and other senior financial or executive management as appropriate. The external auditor attends specific parts of the meeting including separate sessions with Committee members only.

Report from the Committee Chairman

I am pleased to present the Audit Committee's report describing our work during the past year.

Deloitte LLP ('Deloitte'), originally appointed in 2009, were reappointed as the Company's auditor at the Annual General Meeting ('AGM'). In line with FRC guidance and following the AGM and completion of the 2018 audit, the Company undertook a tender for future audit services subsequently appointing Ernst & Young LLP ('EY') as the Group auditor. Deloitte formally resigned as auditor in July 2019 and EY commenced their tenure with the review of results for the six month period to 30 June 2019. Anup Sodhi is the engagement partner.

The Audit Committee's primary responsibilities are:

- To approve and monitor key financial and accounting policies and practices
- To monitor the integrity of the financial statements, announcements and review significant financial reporting judgements contained therein
- To keep under review the adequacy and effectiveness of internal controls
- To review procedures, systems and controls for whistle blowing, fraud detection and bribery prevention
- To review, approve and monitor internal audit activities
- To monitor and review the Group's external auditor's independence, objectivity and effectiveness
- To monitor and approve any non-audit services provided by the external auditor
- To conduct any tender process and make recommendation to the Board on the appointment, remuneration and terms of engagement of the external auditor.

The Committee is not responsible for the identification of key risks or the review of the adequacy of arrangements to mitigate those risks, which remains the responsibility of the Board.

The Committee is required to report its findings to the Board at least annually, identifying any matters on which it considers that action or improvement is needed, to make recommendations on the steps to be taken, and to ensure that the required actions are implemented.

Significant issues considered by the Committee

The Committee has a work plan that is designed to ensure its responsibilities are fully discharged over the annual reporting cycle. Specific items are added to the agenda for individual meetings as required.

There were a number of significant accounting matters considered during the year including:

- Capitalisation of development costs under IAS 38
- Consolidation of Xaar 3D Ltd – assessment of control
- Discontinued operations and impairment of P4 intangible assets
- Valuation of Xaar 3D call option with Stratasys
- Adequacy of provisions – doubtful debts and inventory valuation

Other areas considered include internal audit reports e.g. improvements to the procedures for Revenue Recognition associated with EPS contracts and control and compliance matters e.g. adoption of IFRS 16 and treatment of leases.

Key areas of management judgement

The results of the Group in 2019 reflect a number of non-cash adjustments both for non-recoverability of working capital balances and impairment of intangible assets. These adjustments have led to a significant pre-tax loss. The Committee has taken a pro-active role in reviewing and challenging management judgement in respect of recovery of overdue receivables and slow moving inventories, in particular in light of non-satisfaction of commercial commitments made by third parties. Further to the Board's review of strategic options and prospects for the Thin Film business, the Committee, in consultation with the auditors, advised the Board on the impairment of intangible and tangible assets associated with the P4 Thin Film platform.

☒ Additional disclosure in relation to key sources of estimation uncertainty and critical accounting judgements is provided in the Group's Financial statements – note 2 on page 101.

Key activities

In discharging its responsibilities the Committee has completed the following activities:

Financial statements and reports

- Reviewed the Annual Report, financial statements and the half-yearly financial report including disclosures made therein, and confirm that taken as a whole, is fair, balanced and understandable, and provides the information necessary for shareholders to assess the position, performance, strategy, and business model of the Company
- Reviewed Going Concern and Viability Statements
- Reviewed and confirmed the adoption and impact on the financial statements of IFRS 16 'Leases'
- Reviewed reports from the external auditor on their work and findings
- Reviewed the effectiveness of the Group's internal control environment e.g. Revenue Recognition procedures in EPS.
- The Audit Committee have reviewed and challenged the forecasts

Audit Committee *continued*

and scenarios relating to COVID-19 impact on the Going Concern and Viability Statements and reviewed the associated disclosures around COVID-19 and are satisfied that the Group can continue as a going concern and the appropriate disclosures have been made.

Internal controls and compliance

To assist the Board with its responsibilities to effectively determine the nature and extent of the Group's significant risks, the Committee carries out a robust annual assessment of the principal risks and uncertainties facing the Group. The Board remains ultimately responsible for determining the nature and extent of the effectiveness of the risk management and internal controls system which mitigate potential impacts on shareholder investments and the Company's assets.

The Committee undertakes this evaluation having:

- Agreed a schedule of internal audit activities, and reviewed the results of internal audit activities performed
- Reviewed the internal financial controls and risk management systems
- Reviewed fraud detection and the systems and controls for the prevention of bribery
- Reviewed and approved new Company policies, including the capitalisation policy and the corporate criminal offence policy
- At each meeting the Committee considered and challenged reports from the internal auditors on the effectiveness of internal controls and noted no significant weaknesses.

The Committee having performed the annual review of the Group's internal control processes considers the system to be effective and in accordance with the Guidance on Risk Management, Internal Control and Related Financial and Business Reporting as issued by the FRC.

The Committee remains of the view that the statement made regarding the Company's viability period continues to be an accurate assessment of the Company's viability as at the date of the report. The Viability Statement can be found in full on page 52.

As a Committee, a particular focus in 2020 will continue to be on risk management and, in particular, the Group's ongoing enhancements to systems of governance and internal control.

External audit

- Successfully completed a tender for external audit services
- Reviewed and agreed the scope of the audit work to be undertaken by the auditor
- Agreed the fees to be paid to the external auditor relating to their services rendered for the annual audit and interim review
- Reviewed audit work performed on significant risk areas, including those areas identified and discussed by the external auditor in their report, and ensured the independence and objectivity of the external auditor.

The Chairman of the Audit Committee will be available at the AGM to answer any questions about the work of the Committee.

External auditor

During the year Deloitte completed their tenth year as the Company's auditor. In compliance with FRC and CMA Guidance for audit, a full tender for audit services was undertaken in the period following the AGM.

Deloitte was invited to participate. The Committee received three high quality tender proposals and, after considering the merits of each, made a recommendation to the Board that EY should be appointed. The timing of the tender allowed the new auditor to engage immediately with the review of interim results (for the six months ended 30 June) and to advise the Committee on a number of accounting matters.

In addition to the tender process, the Committee has met with the Company's new auditor on at least three occasions since appointment. In future years it is expected that the Committee will meet with the auditor a minimum of two times. The Chief Executive Officer and Chief Financial Officer, and other relevant managers as required, attend by invitation, except for a period of each meeting where the Committee members may meet with the auditor without any member of executive management present.

The Committee is required to assess the qualifications, expertise, resources, and independence of the external auditor, and the objectivity and effectiveness of the audit process. The Committee reviews the type of work, effectiveness of, and level of fees charged by the auditor on an annual basis and recommends to the Board the appointment, reappointment, term, remuneration, and terms of engagement of the external auditor.

The Committee safeguards Auditor objectivity and independence through maintaining a dialogue with the auditor and by monitoring all fees paid. It is the policy of the Group not to engage the statutory auditor in any non-audit related services. This includes tax services. Specifically, the Policy states that the preparation of tax forms, payroll tax, calculation of indirect tax and the provision of tax advice cannot be provided by the statutory auditor.

Note 7 to the Consolidated financial statements includes disclosure of the auditor's remuneration for the year.

The Committee, taking into consideration relevant UK professional and regulatory requirements, regularly considers the independence and objectivity of the auditor. The Committee receives an annual statement from the auditor detailing their independence policies and safeguards, and confirming their independence, taking into account relevant ethical guidance regarding the provision of non-audit services by the external auditor.

The Committee considers the effectiveness of the external audit and the Group's relationship with the external auditor on an on-going basis. In completing the review of the effectiveness of the annual audit in 2019, the Committee was able to conclude the audit undertaken by Deloitte was effective. This review consisted of considering a number of key points together with the senior financial management of the Group. A similar exercise will be undertaken following completion of audit procedures by EY on the 2019 results and reported on in next year's Annual Report.



Andrew Herbert
Former Chair of the Audit Committee

Nomination Committee

The Nomination Committee is appointed by the Board from the Non-Executive Directors of the Company and the Chief Executive Officer. The former Chair of the Committee was Robin Williams.

The terms of reference of the Committee require at least two meetings per year. When specific issues or changes need to be addressed, such as the appointment of a new Board member, the Committee may meet on additional occasions. Please see the tables on page 58 for details of the Committee members in the year and the number of Committee meetings attended.

Responsibilities

The Nomination Committee's main responsibilities, as outlined in its terms of reference, are:

- Reviewing the size, structure, composition and independence of the Board and its Committees
- Identifying and nominating candidates to fill Board vacancies as the need arises
- Ensuring adequate succession planning is in place for both Executive Directors, Non-Executive Directors and members of the senior management team
- Making recommendations to the Board on the appointment of new Executive and Non-Executive Directors and their reappointment following retirement by rotation
- Reviewing the results of the annual Board performance evaluation process.

The Committee Chair will not chair the Committee when it deals with the appointment of a successor to that role. The Committee shall annually review its terms of reference and may recommend to the Board any amendments. The terms of reference of the Committee are available on written request from the Company Secretary.

The Nomination Committees role in Composition, succession and evaluation of the Board are disclosed in the Corporate Governance Statement.

Boardroom diversity

The Committee is committed to ensuring that recruitment and promotion of individuals throughout the Group, including those at Board and senior management level, always consider relevant skills, experience, knowledge, ability, gender and ethnicity. All appointments are considered, on merit and suitability against objective selection criteria with consideration of, amongst other things, the benefits of diversity on the Board, including gender.

The Board has not established a specific diversity policy and has not set any measurable objectives in respect of a diversity quota.

The gender ratio of the Board in 2019 is 17% female versus 83% male. Further disclosure of information in respect of diversity for the Group is in the Sustainable and Responsible report on pages 36 and 37.

Key issues and activities

The year was an active one for the Nomination Committee, as the culmination of the Strategic Review and newly introduced Governance time limits on Board membership brought about four departures from the Board between October 2019 and May 2020.

The process adopted by the Committee to identify a candidate for a specific vacancy is, in the first instance, to determine whether any external individuals known to the Committee or internal candidates would be suitable for the role. If no compelling candidates can be identified through this process then an external search consultancy will be approached. Even if a suitable internal candidate exist, an external mapping process may be used.

Members of the Committee and other Executive and Non-Executive Directors interview shortlisted candidates, as the Committee deems appropriate. Upon identifying a suitable candidate, the Chair of the Nomination Committee will recommend to the Board that the Company make a formal offer of employment to the candidate.

Appointments

We engaged the services of external consultants Korn Ferry to conduct a benchmarking exercise and validation process to validate an external candidate known to the Board as a potential CEO successor. It was determined on the conclusion of the validation exercise not to conduct a full external search and we were delighted to conclude discussions that enabled John Mills to join Xaar plc in August 2019, and formally appointed as CEO on 11 October 2019, and appointed a statutory Director on 1 December 2019.

With our CFO announcing his intention to leave at the 2019 year-end, we engaged the services of an external search firm, Independent Search Partnership, to identify appropriate candidates to fill this role. The recruitment process concluded in January 2020 with the announcement of Ian Tichias appointment as CFO to commence on 1 March 2020.

Both Korn Ferry and Independent Search Partnership have no other connection with the Group and are independent advisors.

After nearly ten years on the Board, including over three as Chair, the Corporate Governance Rules necessitate my retirement from the Board. An internal candidate with the relevant skills and experience was identified and the Board unanimously approved the nomination of Andrew Herbert as Chair to take up this role from 1 April 2020.

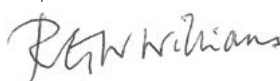
Finally, Margaret Rice-Jones indicated that she would step down from the Board at the May 2020 AGM. We further engaged the services of, Independent Search Partnership, who began the search for a Non-executive Director with the skill set that would allow the individual to serve as Chair of the Remuneration Committee. As incoming Chairman of the Board, Andrew Herbert will lead the Nomination Committee in this process. It remains the case that Margaret will not seek re-election at the Annual General Meeting on the basis that she will soon leave the Board. However, given the uncertainty of the current environment, Margaret has agreed to remain in office until the end of June so as to ensure an orderly transition once her successor is identified.

As part of the recruitment process the Committee ensure appropriate disclosure of other demands on Full-time Directors time, any such external appointment would require approval of the Board.

The Board of Directors profiles discloses any external appointments on pages 44 and 45. No Executive Directors have a non-executive role in a FTSE100 company, or other significant appointment. All Directors are required to submit themselves for reappointment every year at the AGM.

Review of the Nomination Committee's effectiveness

The Committee has reviewed and considered the effectiveness of its performance during the year. The review included the views of members of the Committee and of regular attendees at the various meetings (including the Executive Directors). I am satisfied that the degree of rigour and challenge applied in performing the Committee's responsibilities is appropriate and effective.



Robin Williams

Former Chair of the Nomination Committee

Remuneration Committee

The Remuneration Committee is appointed by the Board from the Non-Executive Directors of the Company.

The Chairman of the Committee is Margaret Rice-Jones. The Chief Executive Officer and other senior personnel attend meetings by invitation, except when their own remuneration package is being discussed. The written terms of reference of the Committee are available on request from the Company Secretary.

☞ Please see the tables on page 58 for details of the Committee members in the year and the number of Committee meetings attended.

Responsibilities

The Remuneration Committee's primary responsibilities are:

- To make recommendations to the Board on the Group's policy for executive remuneration, and review the ongoing appropriateness and relevance of the policy
- To review the design of all share incentive plans and oversee any major changes in employee benefit structures
- To monitor the level and structure of remuneration for senior managers
- To determine the individual remuneration packages on behalf of the Board for the Executive Directors of the Group
- To ensure appropriate stakeholder input into the work of the Committee with specific focus on employees through regular employee engagement.

Key issues and activities

The Committee has access to professional advice, both inside and outside the Company, in the furtherance of its duties.

A new policy will be proposed to the AGM in June 2020. This has been the main focus for the Committee as it considered the application of the output of the strategic review and the subsequent cessation of the thin film related activities to forward looking remuneration contained in this report. The Committee also worked on the new compensation levels for the incoming CEO and CFO reflecting market practice in a company of a smaller size acknowledging the reductions in market capitalisation and ensuring consideration of any differences in quantum of rewards with the wider workforce.

During 2020 the Committee will undertake a broader review of the remuneration across the Company to ensure it reflects the current core principles arising from the review of the strategy by the new CEO; Innovation, continuous improvement, delivery of commitments, customer focus and alignment based on openness & transparency. It will also consider the background of COVID-19 and its impact on remuneration.

The Directors' Remuneration report sets out in more detail the Committee's policies and practices on Executive remuneration.



Margaret Rice-Jones
Chair of the Remuneration Committee

Directors' Remuneration report

Statement from the Chairman of the Remuneration Committee

Dear Shareholder

On behalf of the Board, I am pleased to present the 2019 Remuneration report. This covers the actual amounts earned by Directors for the year ended 31 December 2019 and a forward looking guide to changes proposed for our new policy to run for 2020-2022. The Committee is mindful of external developments linked to COVID-19. The impact of COVID-19 and for how long it will be felt is currently uncertain. The Committee will consider carefully the impact of COVID-19 in taking decisions in relation to remuneration in 2020.

The Committee's goals are:

- Attracting and retaining management of the highest calibre
- Providing incentives that reward near and longer term achievement that are clearly linked to performance and Company strategy
- Offering competitive packages comparable to those offered by companies similar to Xaar in terms of size and complexity
- Being considerate to the climate for pay restraint, with awards biased towards delivery of sustainable long-term growth
- Being considerate to the current share price and trading performance of the business
- Taking into account the views of all our stakeholders including specific employee engagement activities and shareholder consultations.

Remuneration for 2019

During 2019 the challenging market trends we had experienced since 2017 continued to impact the growth and development of the Company. In the Printhead business unit whilst bulk piezo sales stabilised we were disappointed by the sales performance of the 1201 thin film product. Strong progress was made in the 3D area with the further investment from Stratasys in our partnership, approved by shareholders on 27 November 2019.

In reaction to the declining share price, the Remuneration Committee used its discretion during the year in reducing the normal grant level to the CEO and CFO. Instead of using the share price at the point of grant, a price of £3.34 was used to calculate the quantum which represented the average price over the previous 12 months. Similar scalebacks were made in other awards across the company. This year also saw significant changes in the Executive management of the Company. In October John Mills replaced Doug Edwards as CEO and at the end of December Shomit Kenkare left the Board. We welcomed Ian Tichias as CFO on 1 March 2020. A summary of Ian's remuneration is set out below:

Notice period	12 months
Salary	£210,000 (less than his predecessor)
Pension	6% of salary, in line with the wider workforce
Annual bonus	Up to 100% of salary
LTIP	Annual award over 170,000 shares, subject to an annual limit of 100% of salary as further described below.

Annual bonus payments

Following the profit warning in late 2019 no bonus payments will be made to employees or Executive Directors against the profit and cash targets. We were disappointed with the slower than expected adoption of some of our new products and the delays in 5601. Delays resulted in higher than expected forecasted costs to complete the thin film programme leading us to look for strategic investment partners for this activity and eventually to our decision to stop this work on the project announced in September. Threshold cash and profit targets for the annual bonus were not met and no bonus was paid in respect of these elements. The strategic goals relating to the thin film bonus were also not met.

A "buy-out" bonus of £45,833 was agreed with John Mills who joined the business in August 2019 as head of the Printhead business unit. This was to compensate John for the loss of income as a result of John joining us quickly after accepting our offer. John is planning to use all of this bonus (after tax) to acquire shares in the Company on the open market once the trading window allows thus aligning his interests with other stakeholders.

Existing LTIP grants

The 2017 LTIP grant will not vest. Cumulative EPS over the three year performance period ending 31 December 2019 was below the vesting threshold on that element of the grant. Threshold vesting was at 39 pence and maximum at 61 pence. Aon Hewitt has independently calculated the Relative TSR measured against the FTSE All Share Index. This also fell below the vesting threshold on that element.

In line with our existing policy all unvested grants to departing Executives Doug Edwards and Shomit Kenkare lapsed on 31 December 2019.

John Mills was given a joining grant on 4 October 2019 of 180,328 nil cost options which will vest after 3 years with holding periods as defined in our existing policy. These options carry the performance criteria of an Absolute EPS requirement and TSR relative to the FTSE SmallCap (50/50 weighting) which must be achieved on conclusion of a 3-year vesting period. Actual performance targets are considered commercially sensitive and will be disclosed retrospectively or as soon as they are no longer considered commercially sensitive.

Leading remuneration decisions for 2020

The policy is now due for renewal with a binding vote at the AGM in June 2020. The Remuneration Committee has undertaken a comprehensive and detailed review of the operation of the whole awards policy with support from our consultants. The Remuneration Committee Chairman has also consulted with Xaar's largest shareholders and key shareholder bodies.

Background to policy changes

When reviewing our binding policy it was clear that the current structure, designed for a high growth business, was no longer suitable for the Company as it did not operate as intended in terms of Company performance and quantum of outcome. In designing the new policy, we have made changes to reflect the lower revenues and revised growth strategy in order to improve strategic alignment, aid simplicity and ensure that it is aligned to our culture, aligning key elements such as pension with the wider workforce. The current strategy and underlying culture are built on the following principles; Innovation, Continuous Improvement, Delivery of Commitments and alignment built on Openness & Transparency.

Directors' Remuneration report *continued*

Leading remuneration decisions for 2020 *continued*

Background to policy changes *continued*

The annual bonus will now have a deferred element which encourages long-term sustainable growth. The metrics and targets have been set to align with the new strategic direction that our new CEO is setting for the short term. Performance targets are shared with plans for the wider staff to ensure alignment and openness within the business.

The LTIP now fits with the new strategy and the focus on:

- developing our current technology base in bulk printhead business;
- exploiting the technology in our product print business; and
- bringing the product in our 3D business to commercialisation.

The quantum of options has also been reviewed and we will be reducing the number granted while our share price recovers.

Summary of proposed new policy

The table below summarises the principal differences between the policy approved at the AGM in 2017 and the policy for which approval will be sought at the AGM in 2020. Other changes have been made to the policy as a consequences of these principal changes, to aid the administration of the policy and to reflect changes in governance best practice.

Feature	Current	Proposed	Rationale
Annual bonus performance measures	Two metrics of PBT (60%) and Revenue (40%). With flexibility to vary weightings and consider alternative measures in future. In 2019 this was PBT (60%) and cash improvement (40%) with additional strategic measures.	Three metrics of PBT (50%), Cash flow improvement (30%) and 3D revenue (20%). With flexibility to vary weightings and consider alternative measures in future. Revenue element is subject to a minimum cash gate.	To drive the return to profitability, focus on working capital improvements and push 3D towards commercialisation.
Annual bonus maximum	Maximum of 125% of salary (CEO) and 100% (CFO).	No change.	Simplifies the current plan, contains Total Direct Compensation, and places more emphasis on longer range achievement.
Annual bonus deferral	No deferral.	30% of bonus awarded paid in deferred shares and subject to a two year deferral period.	In line with shareholder expectations and encourages building sustainable growth aligning Executive and shareholders.
Annual LTIP performance conditions	EPS growth 60% and revenue growth 40% with relative TSR as a multiplier.	Absolute EPS and TSR against FTSE SmallCap index. Weighting of 60% EPS 40% TSR maintained. With flexibility to vary weightings and consider alternative measures in future.	To focus on achievement of 3 year plan, acknowledging the nature of the challenge for a new Executive team in a turnaround situation.
Annual LTIP grant quantum	Up to 150% (CEO) and 100% (CFO) base grant with multiplier to increase to 300% (CEO) and 150% (CFO) of base salary.	A fixed number of shares (based on £1.22 share price being average 12 month price at October 2019 as used in the CEO "buyout" grant) CEO: 365,000 and CFO: 170,000. Up to a maximum of 150% salary for CEO and 100% for CFO.	To manage potential dilution and remove the complexity of calculating the price to use at the time of grant and ensuring we maintain the 10% in 10 year limit.
Annual LTIP vesting	3 to 5 years with a vesting in equal tranches from year 3.	Award vesting over a 3 year performance period with a 2 year holding period.	To comply with Corporate Governance Code.
Pension	Pension rate set at 10%.	Pension rate set at 6%.	To align with wider workforce.

We already have an "in service" shareholding guideline of 2x salary. As part of the policy review we considered how to address the requirement of the Corporate Governance Code to develop a policy on post-employment shareholding requirements. Our approach is to apply the "leaver" provisions included in our incentive plans, which we consider will continue to align the interests of Executive Directors with those of shareholders following employment, in particular having regard to the introduction of bonus deferral and a two year holding period for the whole of the LTIP award.

Bonus performance targets for 2020

We believe the three metrics chosen this year reflect the strategy and key challenges in 2020 for the Company. Namely to improve the profitability of the Company and in particular the Printhead business unit, to protect the cash position of the business and improve operational cash flow whilst ensuring the 3D business delivers on its growth targets including those related to the commercial availability of its products (revenue and gross margin). The revenue measure will also be subject to a "cash gate", requiring that the 3D BU must reach a threshold level of cash generated by Operations in order for there to be any payout.

The Company considers its performance targets to be commercially sensitive information but as in past years will fully disclose the exact measurements retrospectively.

Operation of the LTIP and performance measures for 2020

As noted above, the fixed number of shares has been determined by reference to a share price of £1.22. Based on a share price of £0.50, which applied when we consulted with shareholders these awards would equate to 60% and 40% of salary for the CEO and CFO respectively. As the share price increases, the percentage of salary would increase (subject to the 150% and 100% of salary maximum) and self-rectify towards the market competitive range for a company of our size. The Committee has the discretion to review the fixed number of shares to be granted in the 2 future years of the policy (subject to the cap of 150% of salary for the CEO and 100% of salary for the CFO).

EPS (60% of the award)

Given the turnaround position of the Company the Board considers the absolute EPS performance targets for 2022 to be used in the LTIP awards this year to be commercially sensitive information at this time but as in past years will fully disclose the exact measurements retrospectively in the event of any pay out. We will revert to publishing any measurement targets in advance as we have done in the past as soon as possible.

TSR (40% of the award)

Will operate as follows against the peer group (FTSE SmallCap Index):

- Threshold – ie 25% – at median performance with respect to the peer group
- Target – straight line between threshold and maximum
- Maximum – at upper quartile performance with respect to the peer group.

Base salary

Executive Directors

An Executive Director's basic salary is set on appointment and reviewed annually or when there is a change in position or responsibility.

When determining an appropriate level of salary, the Committee considers:

- general salary rises to employees
- remuneration practices within the Company
- any change in scope, role and responsibilities
- the general performance of the Company
- the experience of the relevant Director
- the economic environment
- when the Committee determines a benchmarking exercise is appropriate (normally every three years) salaries within the ranges paid by the companies in the comparator groups used for remuneration benchmarking.

Individuals who are recruited or promoted to the Board may, on occasion, have their salaries set below the targeted policy level until they become established in their role. In such cases subsequent increases in salary may be higher than the general rises for employees until the target positioning is achieved.

The CEO's salary was set at £300,000 on appointment in October 2019 and will not be increased in 2020. The CFO's salary was set at £210,000 on appointment in March 2020 and will not be increased in 2020.

Non Executive Directors

From 1 January 2020 the Chairman fee has been reduced to £90,000 pa. This will apply to Robin Williams until the end of March when he steps down and to Andrew Herbert from 1 April 2020.

Also from 1 January 2020:

- Andrew Herbert will receive fees of £45,000 pa + £3,000 as Chair of the Audit Committee (pro-rata in this year)
- Margaret Rice-Jones will receive fees of £45,000 pa + £3,000 as Chair of the Remuneration Committee and £1,000 as SID (pro rata until her departure)
- Chris Morgan will receive fees of £45,000 pa + £1,000 as Chair of the 3D entity and from 1 April 2020 £3,000 pa as Chair of the Audit Committee (pro rata in this year).

We believe these fees are appropriate and competitive for a company of our size.

Directors' Remuneration report *continued*

UK Corporate Governance Code

The Committee has also considered the guidance of the UK Corporate Governance Code as it has produced the proposed policy. The pension is now in line with the wider UK employee body and post vesting holding periods have also been adjusted in line with the recommendations of the code. Malus and clawback provisions have been extended to include corporate failure and a post employment shareholding policy has been introduced, reflecting the "leaver" provisions in our variable remuneration. We have also added the ability to override formulaic outturns in relation to the LTIP and expanded the circumstances in which we may do so as regards the annual bonus, in each case to reflect the provisions of the new Code. The Committee has maintained the minimum target shareholding requirements at 200%, these are all considered appropriate for a company of the size of Xaar. As both Executive Directors are new to the Company it will take some time for them to work towards this level.

COVID-19

At this time in the circumstance surrounding the COVID-19 virus the Remuneration Committee is especially mindful of the need to ensure that Executive compensation in 2020 and any LTIP's granted during the year is aligned with the interests of the broader stakeholder groups. We will continue to operate a bonus scheme and award LTIP's to the Executive and the broader employee base in a manner similar to previous years. The targets for these schemes have been set to align with shareholder interests and would represent a significant improvement on the performance of 2019. The Committee also expects to exercise judgement over the extent to which any cost offset actions influence reported results and will use its discretion should a formulaic approach to these elements of variable remuneration provide windfall gains or any other gains that are not aligned with the interests of all stakeholders. The fact that we have set a fixed number of shares to be granted to the Executive rather than an award that relies on the current share price further protects and aligns the interests of shareholders whilst providing incentives for this new Executive team

Employee engagement

The forum we established in 2018 has proved invaluable to the Board in 2019. The forum comprises all the four Non-Executive Directors and a group of employees drawn from both the Cambridge and Huntingdon sites. These discussions have covered a wide range of topics and input into the future of the Company and have not been limited to remuneration matters. During 2019 a significant portion of time was spent on future strategy and comments from the forum have been especially useful in creating the new strategy for the Printhead business unit. The Committee also recognised that the various strategic options would not impact the Company in a uniform manner especially as we considered the thin film strategy with some areas such as 3D still expanding whilst others contracted. This presents challenges when considering the application of both short and longer term incentives. In such a critical year we felt that it was appropriate that all Non-executive Directors participate in this rather than a single nominated Director or the appointment of a single employee to the Committee. Employees are drawn from as wide range of functions within the business as possible to ensure all views were represented. They will continue to meet with the Non-executive Directors at least three times during the year in future to ensure that all Non-executives can better appreciate employee perspectives as they participate in Board discussions.

The forum allowed the employees to express some dissatisfaction at the extent of a scaleback that was applied to SAYE scheme in 2019. This feedback has allowed the Company to better explain the constraints that such scheme operates under including Corporate Governance and the Non-executive Directors to consider how many shares are allocated to the scheme in the future. It is very important to the leadership team that our employees, have the same alignment with our strategic goals, are driving the success of the Company and will benefit from a share of any future success.

These forums will be supplemented by data from the all employee survey that has been in place for several years which provides an opportunity for anonymous feedback from all employees around the globe. The Board also receive regular feedback on broader employee communications sessions held by management.

Shareholder communications

Results of the recent policy consultation

We remain committed to openly reporting the details of our Director pay arrangements and to consulting with shareholders on any changes as required. I would like to thank those of you who engaged in our recent consultation of the proposed policy.

We received feedback during the consultation that shareholders were concerned that the 3D revenue goal without other constraints could lead to behaviour that was not aligned with their interests we have therefore added a cash gate to the 3D element of the annual bonus scheme. This will ensure that gross margins on sales effectively form a gate for this element of the bonus.

We also received feedback on the light touch nature of the post-employment shareholding requirement which we will keep under review. As both Executive Directors have joined the business in the last seven months neither has a significant vested holding hence we believe that the light touch policy where we will review the situation on a case by case basis is appropriate for this policy cycle.

We will continue to maintain a dialogue with investors regarding our disclosures to ensure we clearly communicate our arrangements as far as possible without it impacting our commerciality. If you would like to discuss any aspect of this report, I would be happy to hear from you.

You may contact me through the Company Secretary or Millie Bullett, who provides support to Non-executive Directors. I will not seek re-election at the AGM in June as previously announced to focus on my other Non-executive appointments and have enjoyed working with you all.



Margaret Rice-Jones
Chairman of the Remuneration Committee
22 April 2020

Annual report on remuneration

This part of the report sets out the actual payments made by the Company to its Directors with respect to the year ended 31 December 2019.

The Remuneration Committee's policy is to attract and retain individuals of the highest calibre by offering remuneration competitive with comparable publicly listed companies, and to drive Company performance by providing arrangements which fairly and responsibly reward individuals for their contribution to the success of the Group. Performance related bonuses and equity-based remuneration represent a substantial proportion of Executive Directors' potential remuneration.

The information provided in this part of the Directors' Remuneration report is subject to audit.

Single figure table

The aggregate remuneration provided to Directors who have served as Directors in the year ended 31 December 2019 is set out below, along with the aggregate remuneration provided to such Directors for the financial year ended 31 December 2019.

Year ended 31 December 2019

	Salary/fees ^(a) £'000	Benefits ^(b) £'000	Bonus ^(c) £'000	Long-term Incentives ^(d) £'000	Pension ^(e) £'000	Clawback ⁴ £'000	Total remuneration £'000
Executive							
John Mills ¹	67	6	46	—	3	—	122
Doug Edwards ²	271	59	—	—	27	—	357
Non-Executive							
Robin Williams (Chairman)	102	—	—	—	—	—	102
Margaret Rice-Jones	48	—	—	—	—	—	48
Chris Morgan	44	—	—	—	—	—	44
Andrew Herbert	47	—	—	—	—	—	47

	Salary/fees ^(a) \$'000	Benefits ^(b) \$'000	Bonus ^(c) \$'000	Long-term Incentives ^(d) \$'000	Pension ^(e) \$'000	Clawback ⁴ \$'000	Total remuneration \$'000
Shomit Kenkare ³	294	32	—	—	29	—	356

Year ended 31 December 2018

Director	Salary/fees £'000	Benefits £'000	Bonus £'000	Long-term incentives £'000	Pension £'000	Clawback £'000	Total remuneration £'000
Executive							
Doug Edwards	345	71	52	0	34	—	502
Lily Liu ⁴	200	1	0	0	20	(77)	144
Ted Wiggans ⁵	139	15	—	0	14	—	168
Non-Executive							
Robin Williams (Chairman)	102	—	—	—	—	—	102
Margaret Rice-Jones	48	—	—	—	—	—	48
Chris Morgan	44	—	—	—	—	—	44
Andrew Herbert	47	—	—	—	—	—	47

	Salary/fees ^(a) \$'000	Benefits ^(b) \$'000	Bonus ^(c) \$'000	Long-term Incentives ^(d) \$'000	Pension ^(e) \$'000	Clawback ⁴ \$'000	Total remuneration \$'000
Shomit Kenkare ⁶	38	4	—	—	4	—	46

1 John Mills became CEO and joined the Board on 11 October 2019.

2 Doug Edwards stepped down from the Board on 11 October 2019.

3 Shomit Kenkare stepped down the Board on 31 December 2019 and his salary is paid in US Dollars. (2019 Average exchange rate \$1.277/£).

4 Lily Liu stepped down from the Board on 14 November 2018, the bonus and relocation allowance paid to Lily Liu was clawed back following her resignation.

5 Ted Wiggans stepped down from the Board on 31 March 2018 following his previously announced retirement.

6 Shomit Kenkare joined the Board on 15 November 2018 and his salary is paid in US Dollars. (2018 Average exchange rate \$1.335/£).

Directors' Remuneration report *continued*

The figures in the single figure table on page 67 are derived from the following:

(a) Salary/fees	The amount of base salary/fees received in the year.
(b) Benefits	This is the taxable value of benefits and the flexible benefits allowance received in the year. This includes any relocation allowance claimed in 2019.
(c) Bonus	The value of the bonus earned in respect of the year.
(d) Long-Term Incentives	<p>The value of performance related incentives vesting in respect of the financial year and the value of SAYE options and Matching Shares under the HMRC approved Share Incentive Plan ('SIP') granted based on the fair value of the options/shares at grant.</p> <p>The performance conditions for the Performance Share Awards granted under the LTIP on 16 May 2017 was a cumulative EPS amount and a revenue growth delivered over the three year performance period ending 31 December 2019 plus a relative TSR measure.</p> <p>For the year ended 31 December 2019, the Company's EPS achieved -108 pence over the three year performance period commencing 1 January 2017 and ending 31 December 2019, and revenue growth of -£50.7 million was achieved during the same period. Xaar was ranked 251 against the 255 companies in the FTSE SmallCap Index during the performance period.</p> <p>This will result in 0% of the granted LTIPs vesting in 2020.</p> <p>For the year ended 31 December 2018 comparative figures, 0% of the Performance Share Awards in respect of the year ending 31 December 2018 vested.</p>
(e) Pension	The value of the employer contribution to the defined contribution pension plan in the UK or the 401k plan in US (or the value of a salary supplement paid in lieu of a contribution to this pension plan).

Individual elements of remuneration

Base salary and fees

Base salaries for Executive Directors were reviewed by the Remuneration Committee prior to the beginning of each year and when an individual changes position or responsibility. In deciding appropriate levels, the Remuneration Committee considers the role, responsibility, and experience of the individual, corporate and individual performance, market conditions, and the range of salary increases awarded across the Group.

The fees for the Non-executive Directors are reviewed periodically.

Benefits

UK Benefits principally comprise a car allowance, private medical insurance and basic levels of other insurances (such as income protection cover). In addition, UK Executive Directors are provided with an allowance of 5% of base salary which they can apply to a range of benefits such as life insurance and critical illness insurance. US Benefits comprise of health insurances including medical, vision and dental.

Pension

The Company operates a self-administered, defined contribution, HMRC approved pension scheme. UK Executive Directors participate in this scheme. In appropriate circumstances, Executive Directors may take a salary supplement instead of contributions into a pension plan. This salary supplement does not form part of salary for the purposes of calculating any other entitlement under the policy. US Executive Directors participate in a 401k plan. Non-executive Directors do not receive pension contributions.

Annual bonus

For the year ended 31 December 2019 the annual bonus was based on performance against Group profit (70%) and cash (30%) targets, which were not achieved for 2019. As a consequence, an annual bonus in respect of these elements will not be paid for 2019.

In accordance with our recruitment policy, John Mills was offered a bonus payment to compensate him for losses he would incur when joining Xaar as CEO. His intention is to use the after tax amount of this bonus to buy shares to move towards his shareholding requirements. This transaction will take place at the next available opportunity.

Long-term incentives awarded during the financial year

The table below outlines awards made under the LTIP to Executive Directors in 2019:

Award basis	Performance condition	Number of shares	Face value of the award £'000	Vesting at EPS & Revenue threshold	Performance period	Vesting date
4 October 2019	John Mills	EPS 90,164 TSR 90,164	110 110	25% of award ¹	January 2019 to 31 December 2021	4 October 2022 4 October 2022
30 April 2019	Doug Edwards ¹	EPS 77,470 TSR 154,940 Printhead revenue 30,988 3D & PPS Revenue 46,482	75 150 30 45	25% of award ¹	January 2019 to 31 December 2021	30 April 2022 30 April 2022 30 April 2022 30 April 2022
30 April 2019	Shomit Kenkare ²	Performance Share plan Awards EPS 34,431 TSR 34,431 Printhead revenue 13,772 3D & PPS Revenue 20,659	33 33 13 20	25% of award ¹	January 2019 to 31 December 2021	30 April 2022 30 April 2022 30 April 2022 30 April 2022

¹ Doug Edward's LTIP lapsed in full on 31 December 2019.

² Shomit Kenkare's LTIP lapsed in full on 31 December 2019.

The share price used to calculate the face value of Doug Edwards' and Shomit Kenkare's LTIP awards was £0.97 being the mid-market price on the day prior to award date. The price used to calculate the quantum of shares granted was £3.34 which was the average mid market price over the period 23 to 29 March 2018. This second price figure was used to reflect the drop in share price and reflect Corporate Governance guidance that using price at grant against a percentage of salary would be inappropriate in the circumstances. The Board considers the performance targets used in the LTIP awards to be commercially sensitive information at this time but as in past years will fully disclose the exact measurements retrospectively in the event of any pay out.

 The performance conditions for the LTIP and awards are described in full on pages 139 and 140.

Shareholding guidelines and total shareholdings of Directors

On 16 May 2017, the Remuneration Committee introduced a shareholding guideline of 2x salary. Executive Directors will be expected to move towards the new guidelines as new grants vest. The extent to which each Executive Director has met the shareholding guideline is shown in the table below:

Name	Shareholding guidelines	Current shareholdings at 31 December 2019 (or date or resignation if earlier) (% of salary)	Type	Owned outright	Vested	Unvested		Total as at 31 December 2019 (or date of resignation if earlier)
						Subject to performance conditions	Not subject to performance conditions	
Executive Directors								
John Mills ¹	200% of salary	(0%)	Shares	—	—	—	—	—
			LTIP options	—	—	180,328	—	180,328
Doug Edwards ²	200% of salary	33,031 (14%)	Shares	33,031	—	—	—	33,031
			LTIP options	—	40,134	—	—	40,134
			Matching SIP	—	—	—	854	854
Shomit Kenkare ³	200% of salary		Shares	—	—	—	—	—
			LTIP Options	—	—	—	—	—
Non-Executive Directors								
Robin Williams (Chairman)	—	—	Shares	10,000	—	—	—	10,000
Margaret Rice-Jones	—	—	Shares	5,700	—	—	—	5,700

¹ John Mills' LTIPs were granted before his appointment to the Board.

² Doug Edward's unvested LTIP lapsed on 31 December 2019.

³ Shomit Kenkare's unvested LTIP lapsed on 31 December 2019.

There have been no changes in the holdings of any current Director in the share capital of the Company, as set out in the table above, between 31 December 2019 and 21 April 2020.

Directors' Remuneration report *continued*

Outstanding Directors' share awards

The awards held by Executive Directors of the Company under the LTIP are shown below:

LTIP

The outstanding awards granted to each Executive Director of the Company under the Xaar plc 2007 and 2017 LTIP are as follows. All options under the LTIP are nil-cost options such that no exercise price is payable. The performance conditions for these LTIP awards are described in full in note 33.

Name	As at 1 January 2019 (or date of appointment if later)	Granted during the year	Exercised during the year	Lapsed during the year	As at 31 December 2019 (or date of resignation if earlier)	Grant date	Share price at date of grant	Earliest date of exercise	Expiry date
John Mills ¹	—	180,328	—	—	180,328	4 October 2019	£0.452	4 October 2022	4 October 2029
	—	180,328	—	—	180,328				
Doug Edwards ²	40,134	—	—	—	40,134	2 April 2015	£4.09	2 April 2018	2 April 2025
	61,539	—	—	(61,539)	—	1 April 2016	£4.875	1 April 2019	1 April 2026
	11,494	—	—	(11,494)	—	11 May 2016	£4.93	11 May 2019	11 May 2026
	47,559	—	—	(47,559)	—	25 August 2016	£4.9675	25 August 2019	25 August 2026
	255,267	—	—	(255,267)	—	16 May 2017	£3.702	16 May 2020	16 May 2027
	309,880	—	—	(309,880)	—	3 April 2018	£3.34	3 April 2021	3 April 2028
	—	309,880	—	(309,880)	—	30 April 2019	£0.97	30 April 2022	30 April 2029
	725,873	309,880	—	(995,619)	40,134				
Shomit Kenkare ³	10,000	—	—	(10,000)	—	1 June 2018	£2.985	1 June 2021	1 June 2028
	—	103,293	—	(103,293)	—	30 April 2019	£0.97	30 April 2022	30 April 2029
	10,000	103,293	—	(113,293)	—				

1 John Mills' LTIP were granted before his appointment to the Board.

2 Doug Edwards stepped down from the Board on 11 October 2019 and his termination date from Xaar Plc was 7 January 2020. His unvested LTIP awards have lapsed.

3 Shomit Kenkare stepped down from the Board on 31 December 2019. His unvested LTIP awards have lapsed.

All employee share plans

The Executive Directors may participate in the Company's all employee share plans, the Xaar plc SAYE Scheme ('SAYE Scheme') and the Xaar SIP, on the same basis as other employees.

The SAYE Scheme provides an opportunity to save a set monthly amount (up to £500) over three years towards the exercise of a discounted share option, which is granted at the start of the three years.

The SIP provides an opportunity for employees to buy shares from their pre-tax remuneration up to the limit permitted by the relevant tax legislation (currently £1,800 per year) and are awarded additional shares for free on a matching basis; the Company currently operates the plan on the basis of a 1:1 match but may award Matching Shares up to the maximum ratio permitted by the relevant tax legislation (currently a 2:1 ratio).

Options and awards under these plans are not subject to performance conditions.

The outstanding awards granted to each Executive Director under the SAYE Scheme at 31 December are as follows:

Name	As at 1 January 2019	Granted during the year	Lapsed during the year	Exercised during the year	As at 31 December 2019	Grant date	Exercise price	Earliest date of exercise	Expiry date
Doug Edwards	4,316	—	4,316	—	—	1 November 2015	£4.17	1 November 2018	1 May 2019

The outstanding awards granted to each Executive Director under the SIP at 31 December are as follows:

Name	Total number of matching shares as at 31 December 2019
Doug Edwards	368

Payments for loss of office made during the year

On 11 October 2019 Doug Edwards stepped down from the Board. He remained available to the Company until his termination date of 7 January 2020 at which point he was paid £95,629 in lieu of pay and benefits to 31 March 2020. In line with the LTIP rules his unvested LTIP have lapsed and he has 6 months from termination date to exercise vested options.

Shomit Kenkare stepped down from the Board on 31 December 2019. No payments for loss of office were made and his outstanding share awards lapsed on his termination date. He continues to work on a fixed term basis as an advisor to the CEO.

The information provided in this part of the Directors' Remuneration report is not subject to audit.

Performance graph and table

The graph on this page shows the Company's performance measured by total shareholder return ('TSR'), compared with the performance of the FTSE TechMARK and SmallCap All Share Index, which the Remuneration Committee considers to be the most appropriate index for comparison because they illustrate the Company's TSR performance against a broad equity market index of similar UK companies.

Total Shareholder Return



Source: Datastream (Thomson Reuters).

This graph shows the value, by 31 December 2019, of £100 invested in Xaar on 31 December 2009, compared with the value of £100 invested in the FTSE TechMARK All Share and FTSE Small Cap Indices on the same date on a yearly basis.

The other points plotted are the values at intervening financial year-ends.

Directors' Remuneration report *continued*

The table below shows details of the total remuneration, annual bonus (as a percentage of maximum opportunity) and LTIP vesting percentage for the Chief Executive Officer over the last ten financial years.

	Total remuneration	Annual bonus as a % of maximum opportunity	LTIP as a % of maximum opportunity
Year ended 31 December 2019 - John Mills	122	0% ²	0%
Year ended 31 December 2019 - Doug Edwards	357	0%	0%
Year ended 31 December 2018	502	12%	0%
Year ended 31 December 2017	594	0%	50%
Year ended 31 December 2016	429	12.5%	0%
Year ended 31 December 2015	571	48%	0%
Year ended 31 December 2014	562	0%	100%
Year ended 31 December 2013	1,379	83%	100%
Year ended 31 December 2012	649	53%	100%
Year ended 31 December 2011	1,244	100%	100%
Year ended 31 December 2010	504	80%	32%

1 Doug Edwards was CEO from 1 January until 10 October, and John Mills was CEO from 11 October until 31 December.

2 John Mills did not earn a bonus under the annual bonus scheme in respect of 2019. He received a buy-out bonus of £45,833 to compensate him for the loss of income to join Xaar.

Chief Executive Officer pay increase in relation to all employees

The table below sets out in relation to salary and annual bonus the increase between the pay for the year ended 31 December 2018 and the pay for the year ended 31 December 2019 for the Chief Executive Officer compared with the average increase/bonus award between the same periods for the wider workforce. For the purposes of the table below, the wider workforce has been defined as the UK employees of the Group. This comparator group was chosen because it is the most relevant sub-set of employees and can be used consistently.

Element of remuneration	CEO	Wider workforce average
Salary – % change	(2%)	4%
Annual bonus – absolute % of salary paid	15%	0%
Benefits – absolute % of salary paid	19%	9%

1 The 2% reduction reflects the difference between the salary earned by Doug Edwards in 2018 (£345,000) and the aggregate salary earned by Doug Edwards and John Mills in 2019 for the period in which each was CEO (£338,000). John Mills' rate of salary on appointment as CEO of £300,000 is 13% less than Doug Edwards' rate of salary.

2 The bonus paid relates to the "buy-out" bonus paid to John Mills, this was not part of the annual bonus scheme.

CEO Pay gap ratio

The ratio between the CEO's pay for FY19 as per the single figure table and the median UK employee is 12:1. This is shown below together with the pay quartiles. The median and quartile figures have been determined based on Option A as this was stated in the code as the most statistically accurate method. The employees at the 25th percentile, median percentile and 75th percentile were determined by reference to remuneration at 31 December 2019.

Year	Method	25 th percentile	Median pay ratio	75 th percentile
2019	Option A	17:1	12:1	8:1

The total pay and benefits for each of the identified comparator employees for 2019 is as follows:

	25 th percentile	Median pay ratio	75 th percentile
Total pay and benefits	£28,530	£39,004	£57,588
Salary	£26,000	£33,000	£52,659

The Company believes that the median pay ratio for 2019 is consistent with the pay, reward and progression policies for the Company's employees.

Spend on pay

The table below sets out the Group's distributions to shareholders by way of dividends and total Group-wide expenditure on pay for all employees (including employer social security, pension contributions and share-based payments), as reported in the audited financial statements for the financial year ended 31 December 2019.

	2019 £'000	2018 Restated £'000	Change %
Dividends paid to shareholders	0	6,009	(100%)
Group-wide expenditure on pay for all employees (note 8)	25,416	27,594	(8%)

Implementation of Directors' Remuneration Policy for the financial year commencing 1 January 2020

Information on how the Company intends to implement the policy for the financial year commencing 1 January 2020 is set out below.

We want our remuneration policy to support our turnaround and our strategy to stabilise the business after a challenging period and to drive recovery through our three business units. A new three year policy will be approved in 2020 intended to drive and reward the achievement of short- and long-term objectives aligned with shareholders' interests, to retain a refreshed Executive Team over the longer term and to simplify the reward structures.

Basic salary and fees

Our approach to base salary is to maintain salaries that are market competitive for a business of our size and market capitalisation.

As the CEO is new in post his salary will not change in 2020 and will be subject to review in January 2021. The new CFO will be joining in March 2020 so will also be subject to review in January 2021.

The proposed base salary increases for the Executive Directors are shown below:

	Review date	2019	2020	% increase
John Mills	1 Jan 2020	£300,000	£300,000	0%
Ian Tichias	—	—	£210,000	0%

Robin Williams agreed that it would be appropriate for the fee for this position to be reduced. This reduction will also affect Andrew Herbert as he steps into this role. The other Non-Executive Directors have received a small fee increase for 2020.

	Additional duties	Additional fees	Review date	2019	2020	% increase
Robin Williams			1 Jan 2020	£102,000	£90,000	(11.7%)
Margaret Rice-Jones	Rem Com & SID	£4,000	1 Jan 2020	£44,300	£45,000	1.58%
Andrew Herbert	Audit Committee	£3,000	1 Jan 2020	£44,250	£45,000	1.69%
Chris Morgan			1 Jan 2020	£44,100	£45,000	2.04%

Annual bonus

The maximum opportunity for the Chief Executive Officer is 125% and for the Chief Financial Officer is 100% of salary. 30% of any bonus earned will be deferred in shares and subject to a two year deferral period. The core performance metrics of the bonus are profit, cashflow and 3D revenue.

The Board considers the Group profit and cashflow targets for 2020 to be matters that are commercially sensitive and should therefore remain confidential to the Company. It provides our competitors with insight into our business plans, expectations and our strategic actions. However, the Remuneration Committee will disclose on a retrospective basis how the Company's performance relates to any annual bonus payments made.

Long-term incentives

Through the next three years of turnaround, we wish to simplify the LTIP and remove the outperformance multiplier. We will maintain the maximum grant of 150% of salary for CEO and 100% for CFO but move to granting a fixed number of shares each year. Until our share price recovers, this move is designed to manage shareholder dilution and remove the complexity of having to determine an appropriate price for each year's grant. Metrics will be set to reflect the key challenges seen across the business and specific units for that year.

Performance measures will align to the wider FTSE SmallCap market and will initially include the following:

1. Relative TSR (FTSE SmallCap)
2. Third year EPS target.

They will have an appropriate minimum threshold and straight-line vesting to a stretching maximum achievement.

We will continue to measure EPS but due to commercial sensitivity these EPS targets will not be disclosed at this time as they are deemed to be commercially sensitive. They will be fully disclosed retrospectively.

Awards will be subject to a two year holding period after the three year performance period.

Directors' Remuneration report *continued*

Consideration by the Directors of matters relating to Directors' remuneration

Membership

The Company has established a Remuneration Committee which is constituted in accordance with the recommendations of the UK Corporate Governance Code. The terms of reference of the Remuneration Committee can be obtained by contacting the Company Secretary.

The Remuneration Committee is currently chaired by Margaret Rice-Jones. The other members during the year ended 31 December 2019 were Robin Williams, Andrew Herbert and Chris Morgan. All members of the Remuneration Committee are considered independent within the meaning of the UK Corporate Governance Code.

The principal function of the Remuneration Committee is to determine, on behalf of the Board, the specific remuneration and other benefits of Executive Directors, including pension contributions, bonus arrangements, long-term incentives and service contracts. The fees paid to the Non-Executive Directors are determined by the Chief Executive Officer and the Chairman. The fees paid to the Chairman are determined by the Chief Executive Officer and the Non-Executive Directors.

Additionally, the Remuneration Committee makes recommendations to the Board on the framework of Executive Director remuneration as well as principal Company-wide compensation programmes.

The members of the Remuneration Committee have no personal financial interest, other than as shareholders, in the matters to be decided, no actual or potential conflicts of interest arising from other directorships and no day to day operational responsibility within the Company. Executive Directors are not entitled to accept more than one non-executive directorships outside the Group.

Advisors to the Remuneration Committee

The Remuneration Committee is assisted in its work by Xaar's human resources department. The Chief Executive Officer is consulted on the remuneration of those who report directly to him and also of other senior executives. No Executive Director or employee is present or takes part in discussions in respect of matters relating directly to their own remuneration.

During the year, the Remuneration Committee was assisted in its work by the following external consultants:

Advisor	Details of appointment	Services provided by the advisor	Fees paid by the Company for advice to the Remuneration Committee and basis of charge	Other services provided to the Company in the year ended 31 December 2019
Willis Towers Watson	Appointed by the Remuneration Committee in 2016	Consulting advice regarding LTIP award levels for 2019 grant in response to share price decline	£2,027	n/a
Deloitte LLP	Appointed by the Remuneration Committee in 2019 following a competitive tender. Deloitte is a founder member of the Remuneration Consultants Group and provides advice on executive remuneration consulting in the UK in line with that Group's Code of Conduct. The Remuneration Committee considers Deloitte to be independent.	Consulting advice regarding the proposed Directors Remuneration policy for 2020	£8,850	Note: Deloitte Sweden provide audit services to our subsidiary in Sweden.

Shareholder voting

The Company remains committed to ongoing shareholder dialogue and takes an active interest in voting outcomes. The following table sets out actual voting in respect of the resolution to approve the Directors' Remuneration report for the year ended 31 December 2018, and in respect of the resolution to approve the current Directors' Remuneration Policy at the 2017 AGM.

Number of votes	For (including discretion)	Against	Withheld
Resolution 10 – Directors' Remuneration report for the year ended 31 December 2018	54,684,659 (87.8%)	7,605,879 (12.2%)	445,241
Resolution 13 - Directors' Remuneration Policy - 2017 AGM	54,599,814 (86.2%)	8,720,060 (13.8%)	1,527,691

Directors' Remuneration Policy

This part of the report sets out the Company's Directors' Remuneration Policy, for which approval will be sought at the 2020 AGM. The Policy is determined by the Remuneration Committee. The Directors' Remuneration Policy is not audited.

Policy table for Executive Directors

The table below describes each of the elements of the remuneration package for the Executive Directors.

Base salary	
Objective	Core element of fixed remuneration that provides the basis to recruit and retain talent necessary to deliver the business strategy.
Operation	<p>Normally reviewed annually and any increases generally apply from 1 January (but may be reviewed more frequently if required).</p> <p>When determining base salary levels, consideration is given to the following:</p> <ul style="list-style-type: none"> • Role, responsibility and experience of the individual • Corporate and individual performance • Market conditions including typical pay levels for comparable roles in companies of a similar size and complexity • The range of salary increases awarded across the Group.
Opportunity	<p>No maximum salary opportunity has been set out in this policy report to avoid setting expectations for Executive Directors and employees.</p> <p>The base salaries effective as at 1 January 2020, are shown on page 67.</p>
Performance measure	Not applicable.
Benefits	
Objective	<p>Provide a market-competitive benefits package to recruit and retain Directors of the calibre required for the business.</p> <p>Participation in the Company's Share Incentive Plan ('SIP') and Share Save Scheme ('SAYE') encourages share ownership and alignment with the wider workforce.</p>
Operation	<p>Executive Directors receive base benefits including car allowance, private medical insurance, and basic levels of other insurances (such as income protection cover).</p> <p>All UK staff, including Executive Directors, are also provided with a benefit allowance which they can apply to a range of benefits, including pension contributions. In some circumstances, and subject to Remuneration Committee approval, the allowance may be paid in cash rather than utilised to purchase benefits.</p> <p>The SIP and SAYE are HMRC approved share plans for all employees facilitating the acquisition of shares in the Company at a discount.</p> <p>Other benefits may be provided based on individual circumstances, such as, but not limited to: housing or relocation allowances, travel allowance or other expatriate benefits.</p>
Opportunity	<p>Whilst the Remuneration Committee has not set an absolute maximum on the level of benefits Executive Directors receive, the value of benefits is set at a level which the Remuneration Committee considers to be appropriately positioned taking into account relevant market levels based on the nature and location of the role and individual circumstances.</p> <p>The flexible benefits allowance is currently up to 5% of base salary.</p> <p>The Remuneration Committee has the authority to review and amend this rate as appropriate. Individuals have the choice to invest all or part of this amount in their pension scheme, in addition to the benefits outlined in the 'Retirement benefits' section of this table.</p> <p>SAYE and SIP limits as permitted in accordance with the relevant tax legislation.</p>
Performance measures	Not applicable.

Directors' Remuneration report *continued*

Retirement benefits

Objective	Provide market competitive post-employment benefits to recruit and retain Directors of the calibre required for the business.
Operation	Executive Directors are eligible to participate in the defined contribution pension scheme (or such other pension plan as may be deemed appropriate). In appropriate circumstances, Executive Directors may take a salary supplement instead of contributions into a pension plan.
Opportunity	6% of base salary subject to any increase to reflect increases in the pension opportunity for the wider workforce.
Performance measures	Not applicable.

Annual bonus

Objective	Rewards performance against annual targets which support the strategic direction of the Company. The majority of staff participate in the same scheme.
Operation	<p>Targets are set annually and any pay-out is determined by the Remuneration Committee after the period-end, based on performance against those targets. The Remuneration Committee has discretion to vary the bonus pay-out should any formulaic output not produce a fair result for either the Executive Director or the Company, taking account of the Remuneration Committee's assessment of overall business performance or be inappropriate in the context of circumstances that were unexpected or unforeseen at the start of the bonus year, or in the event of other circumstances determined by the Remuneration Committee.</p> <p>30% of any bonus will ordinarily be deferred in shares and subject to a two year deferral period with the balance is delivered in cash. However, if the amount to be deferred would be below £5,000, the Remuneration Committee has discretion to pay the whole amount of the bonus in cash.</p> <p>On the exercise of a deferred bonus award, the Remuneration Committee has the discretion to decide that Executives can receive additional shares to reflect the dividends paid or payable on the award shares over the period ending on vesting of the award. This amount may assume the reinvestment of dividends (on such basis as the Remuneration Committee determines).</p> <p>Additionally Directors may opt to invest in the Company SIP (refer to note 33 for details).</p>
Opportunity	<p>Overall maximum annual bonus is 125% of salary for Chief Executive Officer and 100% for any other Executive Directors. This will normally be subject to the following performance components:</p> <p>Profit The Company profit performance element will normally represent 50% of the bonus and has a direct relationship with adjusted profit before tax. A minimum profit threshold is set.</p> <p>Cashflow The Company cashflow performance element will normally represent 30% of the bonus. This measure is based on cash generated by Operations. A minimum cashflow threshold is set.</p> <p>3D Revenue Revenue from the 3D business unit will normally represent 20% of the bonus. This measure is based on revenue generated in the performance year. This measure also has a 'cash gate' which means that in order to pay out, the 3D BU must reach a threshold level of cash generated by Operations.</p> <p>The Committee may vary the weighting of these measures and could consider alternative measures in future years.</p>
Performance measures	Stretching performance targets are set each year reflecting the business priorities that underpin Group strategy.

Long-Term Incentive Plan	
Objective	<p>Drive and reward the achievement of longer term objectives aligned closely to shareholders' interests.</p> <p>Support the turnaround of the business towards longer term, sustainable profitability.</p> <p>Provide alignment with shareholders' interests.</p> <p>Support retention and promote share ownership.</p>
Operation	<p>Following the approval by shareholders in May 2020, the LTIP will operate as follows:</p> <p>An award of performance shares (zero priced share options) may be granted on an annual basis and will vest after three years subject to the achievement of the applied performance conditions. There will be a further two year holding period which may be operated on the basis that either (1) the Executive Director can acquire shares following the end of the performance period but that other than as regards sales to cover tax, may not sell shares until the end of the holding period; or (2) the Executive Director may not acquire shares until the end of the holding period.</p> <p>On the vesting/exercise of an LTIP award, the Remuneration Committee has the discretion to decide that Executives can receive additional shares to reflect the dividends paid or payable on vested shares between the date of grant and the date on which the vested shares can first be acquired.</p> <p>The Remuneration Committee has discretion to vary the vesting outturn should any formulaic output not produce a fair result for either the Executive Director or the Company, taking account of the Remuneration Committee's assessment of overall business performance or be inappropriate in the context of circumstances that were unexpected or unforeseen at grant, or in the event of other circumstances determined by the Remuneration Committee.</p> <p>The Remuneration Committee may at its discretion structure awards as Approved Long-Term Incentive Plan ('ALTIP') awards. ALTIP awards enable the participant and Company to benefit from HMRC approved option tax treatment in respect of part of the award, without increasing the pre-tax value delivered to participants. ALTIP awards may be structured either as an approved option for the part of the award up to the HMRC limit (currently £30,000) with an unapproved option for the balance and a 'linked award' to fund the exercise price of the approved option, or as an approved option and an LTIP award, with the vesting of the LTIP award scaled back to take account of any gain made on the exercise of the approved option. Other than to enable the grant of ALTIP awards, the Company will not grant awards to Executive Directors under the Executive Share Option Plan.</p>
Maximum opportunity	<p>The maximum award in respect of any year will be:</p> <ul style="list-style-type: none"> • as regards the Chief Executive Officer, an award over 365,000 shares; and • as regards any other Executive Director an award over 170,000 shares, <p>subject to an overriding limit in respect of any year of 150% of salary for the Chief Executive Officer and 100% of salary for any other Executive Director.</p> <p>These limits do not include the value of shares subject to any approved option granted as part of an LTIP award.</p>
Performance measures	<p>Stretching performance targets are set each year reflecting the business priorities that underpin longer term Group strategy.</p> <p>The base LTIP award will normally be measured using the following:</p> <ul style="list-style-type: none"> • Absolute EPS achievement in year 3 – 60% • Relative TSR – 40%. <p>For threshold performance, 25% of award will vest. Straight-line vesting applies between threshold and maximum vesting.</p> <p>The Remuneration Committee retains the discretion to alter the weighting of measures and to apply alternative or additional measures in future years.</p>

Shareholding guideline

To align the interests of Executive Directors with those of shareholders, the Remuneration Committee has adopted formal shareholding guidelines in accordance with which Executive Directors are required to build and maintain a shareholding with a value of at least 2x salary. Executive Directors are required to retain half of the after tax number of shares they acquire pursuant to the LTIP or deferred bonus until this level of holding is achieved.

The Remuneration Committee's policy on post-employment shareholder is to apply the "leaver" provisions under the Company's share plans (described on page 84) as regards both unvested awards and awards which are vested but subject to a holding period.

Directors' Remuneration report *continued*

The table below details how the Remuneration Committee addresses the principles set out in the UK Corporate Governance Code in respect of the Directors' remuneration policy.

Provision	Approach
<p>Clarity Remuneration arrangements should be transparent and promote effective engagement with shareholders and the workforce.</p>	<ul style="list-style-type: none"> • The Committee regularly engages and consults with key shareholders to take into account shareholder feedback and to ensure there is transparency on our policy and its implementation • Details of our remuneration practices and policy for Directors are published and available to all our employees • Employees have a forum where they can raise questions and give feedback about the remuneration policy directly to the Non-executives.
<p>Simplicity Remuneration structure should avoid complexity and their rationale and operation should be easy to understand.</p>	<ul style="list-style-type: none"> • Our remuneration policy has been designed to achieve simplicity while complying with the provisions of the UK Corporate Governance Code. The performance measures for LTIP have been simplified removing the multiplier • We choose metrics that are clear and measurable.
<p>Risk Remuneration structures should identify and mitigate against reputational and other risks from excessive rewards, as well as behavioural risks that can arise from target-based incentive plans.</p>	<ul style="list-style-type: none"> • We have introduced a deferred element to the annual bonus which is designed to promote long-term delivery of growth. The deferral to options will be subject to clawback provisions • We are also introducing a two year post vest holding period to our LTIP awards • Our LTIP rules have been updated to make further provisions to malus and clawback to include corporate failure.
<p>Predictability The range of possible values of rewards to individual Directors and any other limits or discretions should be identified and explained at the time of approving the policy.</p>	<ul style="list-style-type: none"> • The charts set out on page 81 show how the total value of remuneration and its composition vary under different performance scenarios for Executive Directors.
<p>Proportionality The link between individual awards, the delivery of strategy and the long-term performance of the Group should be clear and outcomes should not reward poor performance.</p>	<ul style="list-style-type: none"> • The annual bonus rewards the achievement of operating targets • The LTIP is designed to reward long-term financial and shareholder value creation targets • The Committee retains the discretion to reduce the annual bonus and LTIP payouts if it considers that they do not appropriately reflect the overall position and performance of the Company.
<p>Alignment with culture Incentive schemes should drive behaviours consistent with the Company's purpose, value and strategy.</p>	<ul style="list-style-type: none"> • The culture at Xaar needs change in order for us to deliver on our short- and long-term goals. We need to focus on delivery of commitments, innovation, continuous improvement and being open & transparent • Our incentive schemes are aligned with us delivering on our goals, providing our shareholders with return and giving our employees with a more stable and predictable future.

Malus, clawback and underpin provisions

The Remuneration Committee has the right to:

- Reduce any LTIP awards which have not yet vested or annual bonus opportunity (i.e. a malus provision); and
- Recover any vested LTIP awards, paid cash bonuses or deferred bonus awards (i.e. a clawback provision).
- Malus and clawback provisions may be applied in the event of: (1) a material misstatement of the Company's financial results; (2) a material loss for the Company, any Group Member or a relevant business unit; (3) reputational damage to the Company, any Group Member or a relevant business unit; (4) corporate failure in any Group Member or a relevant business unit; (5) serious misconduct on the part of the Participant; and (6) an error in assessing any performance condition.

Operation of share plans

The Remuneration Committee may amend the terms of awards and options under its share plans in accordance with the plan rules in the event of a variation of the Company's share capital or a demerger, special dividend or other similar event or otherwise in accordance with the rules of those plans. Awards may be settled, in whole or in part, in cash, although the Remuneration Committee would only settle an Executive Directors' award in cash in exceptional circumstances, such as where there is a regulatory restriction on the delivery of shares.

Awards under the Company's share plans may vest in the event of a change of control (or other relevant event) as follows.

- unvested awards under the LTIP will be released to the extent determined by the Remuneration Committee taking into account the relevant performance conditions (and the Remuneration Committee may vary the weightings of the applicable performance measures) and, unless the Remuneration Committee determines otherwise, the extent of vesting so determined shall be reduced to reflect the proportion of the vesting period that has elapsed;
- vested awards under the LTIP which remain subject to a holding period will be released to the extent they vested;
- deferred bonus awards will vest in full;
- SAYE and SIP awards will vest to the extent determined in accordance with the rules of the relevant plan, to the same extent as for all other participants.

Chairman and Non-Executive Directors

The table below sets out an overview of the remuneration of Non-Executive Directors:

Alignment with strategy/purpose	Approach of the Company
<p>Chairman and Non-Executive Directors' fees Provide an appropriate reward to attract and retain Directors of the calibre required for the business.</p>	<p>The remuneration of the Chairman of the Board is set by the Remuneration Committee. Fees are set at a level which reflects the skills, knowledge, and experience of the individual, whilst taking into account appropriate market data.</p> <p>The fee is set as a fixed annual fee and may be paid wholly or partly in cash or Company shares. Fees include a base fee plus additional fees for holding the Chairmanship of a Board Committee or the office of Senior Independent Director or Chair of Xaar 3D entity. Additional fees may be paid to reflect additional roles and/or time commitments.</p> <p>The Chairman and the Chief Executive Officer are responsible for deciding Non-Executive Directors' fees. Fees are set taking into account several factors, including the size and complexity of the business, fees paid to Non-Executive Directors of UK listed companies of a similar size and complexity, and the expected time commitment and contribution for the role.</p> <p>The fees may be paid wholly or partly in cash or Company shares. Overall fees paid to Directors will remain within the limit stated of £300,000 in our Articles of Association.</p> <p>Non-Executive Directors do not participate in any incentive scheme.</p> <p>Directors may be eligible to benefits such as the use of secretarial support, travel costs or other benefits that may be appropriate.</p>

Directors' Remuneration report *continued*

Explanation of performance metrics chosen

The annual bonus is assessed against financial targets which are determined by the Remuneration Committee, for 2020 the measures will be based on profit, cashflow and 3D revenue. This incentivises Executive Directors to focus on delivering the key financial goals of the Company. These targets therefore ensure that the interests of the Executive Directors are aligned with those of the shareholders.

For the LTIP, long-term performance measures are chosen by the Remuneration Committee to provide a robust and transparent basis on which to measure Xaar's performance over the longer term and to provide alignment with Xaar's business strategy. EPS and TSR are deemed to be the key measure of success of the execution of our long-term strategy.

The Remuneration Committee retains the discretion to adjust the performance targets and measures where it considers it appropriate to do so (for example, to reflect changes in the structure of the business and to assess performance on a fair and consistent basis from year to year).

Pay policy for other employees

The Company values its wider workforce and aims to provide a remuneration package that is market competitive, complies with any statutory requirements, and is applied fairly and equitably across the wider employee population. Where remuneration is not determined by statutory regulation, the key principles of the compensation philosophy are as follows:

- We remunerate people in a manner that allows for stability of the business and the opportunity for sustainable long-term growth
- We seek to remunerate fairly and consistently for each role with due regard to the marketplace, internal consistency and the Company's ability to pay
- The Company operates HMRC approved SIP and SAYE and invites all employees to participate, therefore encouraging wider workforce share ownership.

Illustrations of application of Remuneration Policy

The charts on page 81 set out an illustration of the remuneration policy, in line with the policy above and include base salary, pension, benefits and incentives. The charts provide an illustration of the proportion of total remuneration made up of each component of the policy and the value of each component. The scenarios now have the additional element of showing 50% appreciation in share price as requested under new reporting regulations.

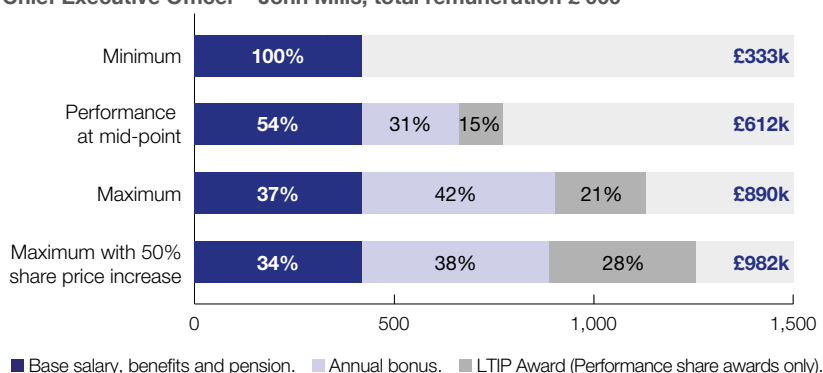
For these purposes base salary reflects the salary at 1 January 2020 or start date for CFO. Bonus is based on anticipated base salary as at 31 December 2020. Benefits are calculated as 5% for the Chief Executive Officer and 5% for the Chief Financial Officer of salary for 2020. Pension is based on the policy set out in the policy table. LTIP awards assume an award of 365,000 shares for the Chief Executive Officer and an award of 170,000 shares for the Chief Financial Officer, with the share price applicable to each being assumed to be £0.50 for consistency with page 65, other than in relation to the final scenario where share price appreciation of 50% is assumed in line with the applicable regulations.

LTIP awards are based on a base salary level at 1 January 2020, and are calculated as set out in the policy on pages 77 to 81.

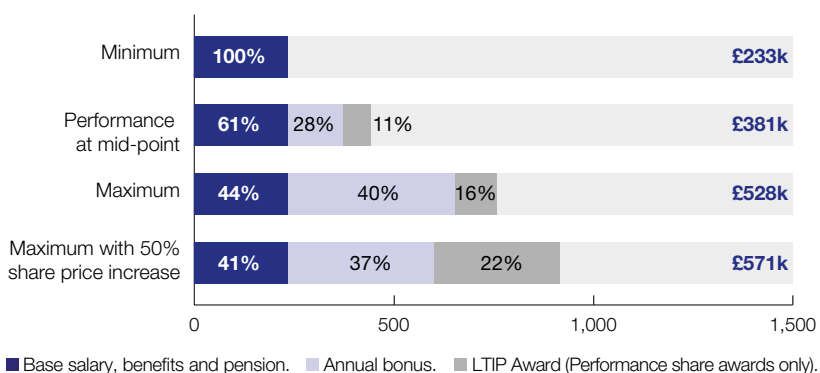
Three scenarios have been illustrated for each Executive Director.

Minimum performance	<ul style="list-style-type: none"> No bonus pay-out No vesting under the LTIP.
Performance at mid point	<ul style="list-style-type: none"> 62.5% of salary pay-out under the annual bonus for the CEO, 50% for the CFO 50% of shares vesting under the LTIP (182,500 shares for the CEO, 85,000 for the CFO).
Maximum performance	<ul style="list-style-type: none"> 125% of salary pay-out under the annual bonus for the CEO, 100% for the CFO 100% of shares vesting under the LTIP (365,000 shares for the CEO, 170,000 for the CFO).
Maximum performance plus share appreciation (50%)	<ul style="list-style-type: none"> 125% of salary pay-out under the annual bonus for the CEO, 100% for the CFO 100% of shares vesting under the LTIP (365,000 shares for the CEO, 170,000 for the CFO), and an assumed 50% increase in the share price from the £0.50 assumed for the purposes of these scenarios as noted above, to £0.75.

Chief Executive Officer – John Mills, total remuneration £'000



Chief Financial Officer – Ian Tichias, total remuneration £'000



Directors' Remuneration report *continued*

Approach to recruitment remuneration

When appointing a new Executive Director, whether with an internal or external candidate, the Remuneration Committee will typically seek to use the policy detailed in the table on page 65 to determine the Executive Director's ongoing remuneration package.

To facilitate the appointment of candidates of the appropriate calibre required to implement the Group's strategy, the Remuneration Committee also retains the discretion to include any other remuneration component or award which is outside the policy. The Remuneration Committee does not intend to use this discretion to make a non-performance related incentive payment (for example, a 'golden hello'). In determining appropriate remuneration, the Remuneration Committee will take into consideration all relevant factors (including the quantum and nature of remuneration) to ensure that the arrangements are in the best interests of the Company and its shareholders. This may, for example, include (but is not limited to) the following circumstances:

- An interim appointment being made to fill an Executive Director role on a short-term basis
- Exceptional circumstances require that the Chairman or a Non-executive Director takes on an Executive function on a short-term basis
- An Executive Director is recruited at a time in the year when it would be inappropriate to provide a bonus or long-term incentive award for that year as there would not be sufficient time to assess performance. The quantum in respect of the months employed during the year may be transferred to the subsequent year so that reward is provided on a fair and appropriate basis
- The Executive received benefits at his previous employer which the Remuneration Committee considers it appropriate to offer.

The Remuneration Committee may also alter the performance measures, performance period, vesting period and holding period of the annual bonus or long-term incentive, subject to the rules of the scheme, if the Remuneration Committee determines that the circumstances of the recruitment merit such alteration. The rationale will be clearly explained.

In determining appropriate remuneration arrangements on hiring a new Executive Director, the Remuneration Committee will take into account relevant factors such as the calibre of the individual, local market practice, the existing remuneration arrangements for other Executives and the business circumstances. It will seek to ensure that arrangements are in the best interests of both the Company and its shareholders and not seek to pay more than is appropriate.

The Remuneration Committee may make an award or payment to 'buy-out' remuneration arrangements forfeited on leaving a previous employer. In doing so the Remuneration Committee will take account of relevant factors regarding the forfeited arrangements which may include the form of any forfeited awards (e.g. cash or shares), any performance conditions attached to these awards (and the likelihood of meeting those conditions), and the time over which they would have vested. It will generally seek to structure buy-out awards and payments on a comparable basis to remuneration arrangements forfeited. These awards or payments are excluded from the maximum level of variable pay referred to below; however, the Remuneration Committee's intention is that the value awarded or paid would be no higher than the expected value of the forfeited arrangements.

Appropriate costs and support will be covered if the recruitment requires the relocation of the individual. All buy-out awards and payments will normally be liable to forfeiture or 'clawback' on early departure. For Executive Directors, early departure is typically defined as being within the first two years of employment although the Remuneration Committee has the ability to amend this definition in appropriate circumstances.

The maximum level of variable pay which may be awarded to new Executive Directors, excluding buy-out arrangements, would normally be in line with the maximum level of variable pay that may be awarded under the annual bonus plan and LTIP, but in any event the Remuneration Committee would not make an award of annual variable pay above:

- In the case of the CEO – a bonus of 125% of salary and an LTIP award of 365,000 shares (or 150% of salary if lower); and
- In the case of any other Executive Director – a bonus of 125% of salary and an LTIP award of 170,000 shares (or 100% of salary if lower).

The Remuneration Committee may determine that such awards will be forfeited if performance or continued employment conditions are not met and it is deemed appropriate to do so.

Any share awards referred to in this section will be granted as far as possible under the Company's existing share plans. If necessary, and subject to the limits referred to above, in order to facilitate the awards mentioned above, the Committee may rely on exemption 9.4.2. of the Listing Rules which allows for the grant of awards to facilitate, in exceptional circumstances, the recruitment of a Director.

Where a position is fulfilled internally, any ongoing remuneration obligations or outstanding variable pay elements shall be allowed to continue according to the original terms.

Fees payable to a newly-appointed Chairman or Non-executive Director will be in line with the fee policy in place at the time of appointment.

Service contracts

Executive Directors

It is the Group's policy that Executive Directors should have contracts with an indefinite term, providing for one year's notice.

	Date of contract	Date of appointment	Notice from the Company	Notice from Director
John Mills	31 May 2019	1 August 2019	12 months	12 months
Ian Tichias	26 November 2019	1 March 2020	12 months	12 months

Non-executive Directors

All Non-executive Directors are appointed for an initial three year term with provision for two further three year terms, subject to satisfactory performance.

	Date of letter of appointment ¹	Date of appointment	Unexpired term of contract on 31 December 2019
Robin Williams (Chairman)	27 September 2016	1 October 2019	33 months
Margaret Rice-Jones	3 June 2015	1 August 2018	17 months
Chris Morgan	2 December 2015	4 January 2020	24 months
Andrew Herbert	15 April 2016	1 June 2019	30 months

¹ The dates above refer to the dates of the latest service agreements for each of the Non-executive Directors.

Robin Williams retired from the Board on 31 March 2020. Margaret Rice-Jones will not stand for re-election in May 2020.

All Directors offer themselves for annual re-election at each AGM in accordance with the UK Corporate Governance Code. Letters of appointment are available for inspection at the registered office address of the Company.

Payments for loss of office

The principles on which the determination of payments for loss of office will be approached is set out below. Where the Remuneration Committee retains discretion, as outlined below, it will be used to provide flexibility in certain situations, taking into account the particular circumstance of the Director's departure and recent performance of the Company.

Notice period on termination by employing company	12 months. The Committee has the discretion to determine what proportion of the notice period will be utilised in active service.
Termination payment	Severance payments are limited to no more than one year's salary plus benefits in kind (including company car or car allowance and private health insurance) and pension contributions (which may include salary supplements). Benefits provided in connection with termination of employment may also include, but are not limited to, outplacement and legal fees.

Directors' Remuneration report *continued*

Leaver provisions

	Reason for cessation	Calculation of vesting/ payment	Timing of vesting
Annual bonus	Termination with cause.	No bonus paid.	Not applicable.
	Resignation or retirement.	No bonus is normally paid unless the Committee in its absolute discretion (and on a case-by-case basis) determines otherwise. Any bonus paid will typically be pro-rated to reflect time served in relation to the performance period.	Normal payment date.
	Redundancy, disability, illness, injury, death or any other reason as determined by the Remuneration Committee.	Typically bonus amounts will be determined by reference to the applicable performance targets, pro-rated for time served in relation to the performance period.	Normal payment date unless Remuneration Committee decides it should be earlier.
Deferred bonus shares	Termination with cause.	Shares forfeited.	Not applicable.
	All other reasons.	Award retained.	Normal vesting, following the end of the originally anticipated deferral period. Remuneration Committee has discretion to permit early vesting.
LTIP	Termination with cause.	Lapse.	Not applicable.
	Resignation or retirement before vesting.	Normally lapse but with Remuneration Committee discretion to determine otherwise; if the award continues, its vesting will be subject to the satisfaction of the applicable performance condition and, a pro-rata reduction to reflect the proportion of period worked during vesting period. Remuneration Committee can decide not to pro rate.	Normal vesting date. The post-vesting holding period will ordinarily continue to apply.
	Redundancy, disability, illness, injury, death or any other reason as determined by the Remuneration Committee.	Performance condition applies (with early assessment if applicable) and vesting then pro-rated to proportion of period worked during vesting period. Remuneration Committee can decide not to pro rate.	Normal vesting unless Remuneration Committee decides it should be at cessation of employment. The post-vesting holding period will continue to apply unless the Remuneration Committee determines otherwise (other than in the case of death, ill-health, injury or disability, when it will cease to apply unless the Remuneration Committee decides otherwise).

	Reason for cessation	Calculation of vesting/ payment	Timing of vesting
LTIP continued	Leaving during the holding period.	If employment is terminated for cause, the award is forfeit. If employment terminates in any other circumstances, the award is retained to the extent vested.	The post-vesting holding period will continue to apply unless the Remuneration Committee determines otherwise (other than in the case of death, ill-health, injury or disability, when it will cease to apply unless the Remuneration Committee decides otherwise).
SIP and SAYE	Governed by the HMRC approved plan rules and which cover certain leaver provisions.		

Non-executive Directors

Under the terms of their engagement, the notice period to be given by the Non-executive Directors on the Company is six months and the Company is obliged to give the same length of notice. Discretion is retained to terminate with or without due notice or paying any payment in lieu of notice dependent on what is considered to be in the best interests of the Company in the particular circumstances.

Statement of consideration of employment conditions elsewhere in the Company

Salary, benefits and performance related reward provided to employees is taken into account when setting policy for Executive Directors' remuneration (although employees are not formally consulted in relation to the setting of the policy). This includes consideration of:

- Salary increases for the general employee population
- Company-wide benefit (including pension) offerings
- Overall spend and participation levels in the annual bonus and LTIP
- Relevant ad-hoc information.

Existing contractual arrangements

The Remuneration Committee reserves the right to make any remuneration payments and payments for loss of office notwithstanding that they are not in line with the policy set out below where the terms of the payment were agreed:

- before the policy came into effect (provided that, in the case of any payments agreed on or after 14 May 2014 they are in line with any applicable shareholder approved Directors' remuneration policy in force at the time they were agreed or were otherwise approved by shareholders, or
- at a time when the relevant individual was not a Director of the Company (or other person to whom the Policy set out above applies) and, in the opinion of the Remuneration Committee, the payment was not in consideration for the individual becoming a Director of the Company (or such other person).

For these purposes 'payments' includes the Remuneration Committee satisfying awards of variable remuneration and, in relation to an award over shares, the terms of the payment are 'agreed' at the time the award is granted.

Statement of consideration of shareholder views

In the interests of ensuring ongoing and transparent dialogue with shareholders, the Remuneration Committee consulted major shareholders over its base salaries and proposed new three year policy outlined in this report.

Approval

This report was approved by the Board on 22 April 2020 and signed on its behalf by:



Margaret Rice-Jones
Remuneration Committee Chair

Directors' responsibilities statement

The Directors are responsible for preparing the Annual Report and the Financial Statements in accordance with applicable law and regulations.

Company law requires the Directors to prepare financial statements for each financial year. Under that law the Directors are required to prepare the Group financial statements in accordance with International Financial Reporting Standards ('IFRSs') as adopted by the European Union and Article 4 of the IAS Regulation and have also chosen to prepare the parent Company financial statements in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards and applicable law), including Financial Reporting Standard 101 Reduced Disclosure Framework ('FRS 101'). Under company law the Directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Group and the Company and of the profit or loss of the Group for that period.

In preparing the parent Company financial statements, the Directors are required to:

- Select suitable accounting policies and then apply them consistently
- Make judgements and accounting estimates that are reasonable and prudent
- State whether IFRSs as adopted by the European Union have been followed, subject to any material departures disclosed and explained in the financial statements;
- Prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Group will continue in business.

In preparing the Group financial statements, International Accounting Standard 1 requires that Directors:

- Properly select and apply accounting policies
- Present information, including accounting policies, in a manner that provides relevant, reliable, comparable and understandable information
- Provide additional disclosures when compliance with the specific requirements in IFRSs are insufficient to enable users to understand the impact of particular transactions, other events and conditions on the entity's financial position and financial performance
- Make an assessment of the Company's ability to continue as a going concern.

The Directors are responsible for keeping adequate accounting records that are sufficient to show and explain the Company's and Group's transactions and disclose with reasonable accuracy at any time the financial position of the Company and the Group and enable them to ensure that the financial statements comply with the Companies Act 2006 and, with respect to the Group financial statements, Article 4 of the IAS Regulation. They are also responsible for safeguarding the assets of the Company and Group and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Under applicable law and regulations the Directors are also responsible for preparing a strategic report, Directors' report, and Directors' remuneration report that comply with that law and those regulations.


Website publication

The Directors are responsible for the maintenance and integrity of the corporate and financial information included on the Company's website. Legislation in the United Kingdom governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.

Responsibility statement

We confirm that to the best of our knowledge:

- The financial statements, prepared in accordance with the relevant financial reporting framework, give a true and fair view of the assets, liabilities, financial position and profit or loss of the Company and the undertakings included in the consolidation taken as a whole;
- The Strategic Report includes a fair review of the development and performance of the business and the position of the Company and the undertakings included in the consolidation taken as a whole, together with a description of the principal risks and uncertainties that they face; and
- The 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 performance, business model and strategy.

 The Directors of Xaar plc are listed **on pages 44 and 45**.

This responsibility statement was approved by the Board of Directors and is signed on its behalf by:



John Mills
Chief Executive Officer
22 April 2020

Independent auditor's report to the members of Xaar plc

Opinion

In our opinion:

- Xaar plc's group financial statements and parent company financial statements (the 'financial statements') give a true and fair view of the state of the group's and of the parent company's affairs as at 31 December 2019 and of the group's loss for the year then ended;
- the group financial statements have been properly prepared in accordance with IFRSs as adopted by the European Union;
- the parent company financial statements have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- the financial statements have been prepared in accordance with the requirements of the Companies Act 2006, and, as regards the group financial statements, Article 4 of the IAS Regulation.

We have audited the financial statements of Xaar plc which comprise:

Group	Parent Company
Consolidated statement of financial position as at 31 December 2019	Balance sheet as at 31 December 2019
Consolidated income statement for the year then ended	Statement of changes in equity for the year then ended
Consolidated statement of comprehensive income for the year then ended	Related notes 1 to 12 to the Parent company financial statements including a summary of significant accounting policies
Consolidated statement of changes in equity for the year then ended	
Consolidated cash flow statement for the year then ended	
Related notes 1 to 38 to the financial statements, including a summary of significant accounting policies	

The financial reporting framework that has been applied in the preparation of the group financial statements is applicable law and International Financial Reporting Standards ('IFRSs') as adopted by the European Union. The financial reporting framework that has been applied in the preparation of the parent company financial statements is applicable law and United Kingdom Accounting Standards, including FRS 101 "Reduced Disclosure Framework" (United Kingdom Generally Accepted Accounting Practice).

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report below. We are independent of the group and parent company in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard as applied to listed public interest entities, and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Conclusions relating to principal risks, going concern and viability statement

We have nothing to report in respect of the following matters in relation to which the ISAs (UK) require us to report to you where:

- the disclosures in the annual report set out on pages 28-35 that describe the principal risks and explain how they are being managed or mitigated;
- the Directors' confirmation set out on page 52 in the annual report that they have carried out a robust assessment of the principal risks facing the entity, including those that would threaten its business model, future performance, solvency or liquidity;
- the Directors' statement set out on page 53 in the financial statements about whether they considered it appropriate to adopt the going concern basis of accounting in preparing them, and their identification of any material uncertainties to the entity's ability to continue to do so over a period of at least twelve months from the date of approval of the financial statements;
- whether the Directors' statement in relation to going concern required under the Listing Rules in accordance with Listing Rule 9.8.6R(3) is materially inconsistent with our knowledge obtained in the audit; or
- the Directors' explanation set out on page 52 in the annual report as to how they have assessed the prospects of the entity, over what period they have done so and why they consider that period to be appropriate, and their statement as to whether they have a reasonable expectation that the entity will be able to continue in operation and meet its liabilities as they fall due over the period of their assessment, including any related disclosures drawing attention to any necessary qualifications or assumptions.

Independent auditor's report to the members of Xaar plc *continued*

Summary of our audit approach

Key audit matters	<ul style="list-style-type: none"> • COVID-19 • Consolidation of Xaar 3D • Recoverability of receivables • Revenue recognition • Impairment of goodwill and intangible assets • Capitalised development costs • Valuation of inventory
Audit scope	<ul style="list-style-type: none"> • We performed an audit of the complete financial information of nine components and audit procedures on specific balances for a further two components. • The components where we performed full or specific audit procedures accounted for 100% of adjusted Loss before tax, 100% of Revenue and 100% of Total assets.
Materiality	<ul style="list-style-type: none"> • Overall group materiality of £0.2 million which represents 0.5% of revenue.

Key audit matters

Key audit matters are those matters that, in our professional judgement, were of most significance in our audit of the financial statements of the current period and include the most significant assessed risks of material misstatement (whether or not due to fraud) that we identified. These matters included those which had the greatest effect on: the overall audit strategy, the allocation of resources in the audit; and directing the efforts of the engagement team. These matters were addressed in the context of our audit of the financial statements as a whole, and in our opinion thereon, and we do not provide a separate opinion on these matters.

Risk	Our response to the risk	Our response and observation
<p>Impact of COVID-19 <i>Refer to the Audit Committee Report (page 59); Accounting policies (page 101); and note 38 of the Consolidated Financial Statements (page 144).</i></p> <p>We draw attention to note 3 and note 38 in the financial statements which outline the uncertainties arising from the recent COVID-19 outbreak and their impact on the group's ability to continue as a going concern and events after the balance sheet date.</p> <p>COVID-19 has created significant uncertainty for businesses due to potential illness affecting the ability of employees to work and economic factors impacting upon the level of sales demand and the ability for the supply chain to provide the necessary component parts for manufacturing. As well as impacting future supply and demand, it creates further uncertainty on the group's ability to convert working capital into cash and to settle liabilities as they fall due.</p>	<p>We read the Directors' assessment of the risks and impact of COVID-19 on the business. We compared this assessment to our own understanding of the risks, and the nature of Xaar's operations, products, customer-base and suppliers.</p> <p>We obtained the forecast for the 12 month period to 30 April 2021 and checked it for accuracy. We tested the underlying assumptions to underlying data and for reasonableness.</p> <p>We obtained the three stress tested scenarios being</p> <ol style="list-style-type: none"> 1. A severe but plausible scenario 2. A reverse stress test scenario 3. A reverse stress test, as above, with some mitigations <p>The scenarios primarily focussed on reductions in revenue from forecast. We checked the calculations for accuracy and evaluated the underlying assumptions for reasonableness.</p> <p>We assessed the sensitivities relating to the impact on future demand for Xaar's products and its ability to meet that demand and the resulting impact on the cashflows</p> <p>For mitigations modelled we assessed whether management had the ability to affect these in the time period involved.</p> <p>We assessed current trading performance by inspecting the March period end management accounts and also to identify any issues with current trading, in particular customer orders, debtor recoverability, inventory on hand of core components and supply chain lead times.</p>	<p>The disclosures in notes 3 and 38 adequately reflect the Directors' conclusions around the uncertainties and impact of COVID-19 and, that the going concern assumption remains appropriate.</p>

Risk	Our response to the risk	Our response and observation
<p>Impact of COVID-19 continued</p>	<p>We obtained customer order reports indicating the level of future and historic orders to date in 2020.</p> <p>We assessed debtors recoverability by obtaining the debtors ledger as of 18 April 2020. We checked the ledger for indications of non payment by checking for aged debtors. We checked the movement of debtor balances from 31 December 2019 to 18 April 2020, again for indications of non payment.</p> <p>For the largest five debtor balances as at 18 April 2020 we searched for evidence of financial difficulty by checking for news stories. We also checked company websites for any evidence of distress. Where applicable we obtained the line of credit for a large customer.</p> <p>We assessed the completeness and accuracy of the matters covered in the going concern and post balance sheet disclosures by comparing them to the outcome of our procedures detailed above.</p>	
<p>Consolidation of Xaar 3D <i>Refer to the Audit Committee Report (page 59); Accounting policies (page 101); and note 36 of the Consolidated Financial Statements (page 142).</i></p> <p>Management were required to make a judgement as to whether the Group still controls Xaar 3D Limited and in turn whether they should continue to consolidate Xaar 3D in accordance with IFRS 10. This judgement was required following the additional investment Stratasys Solutions Limited ('Stratasys') made in Xaar 3D Limited at the end of 2019 which took their ownership percentage to 45%, changes in the respective responsibilities of Xaar/Stratasys as well as granting Stratasys the option to purchase the remaining share capital of Xaar 3D Limited at any point over a three year period to December 2022 across the three year option term.</p> <p>As detailed in note 2, management concluded that the Group continue to control Xaar 3D and should therefore continue to consolidate.</p>	<p>We reviewed the investment agreement governing the additional stake taken by Stratasys, the respective responsibilities of Xaar/Stratasys and the terms associated with the written call option. We compared the contractual terms against the requirements of IFRS 10, namely whether Xaar continues to:</p> <ul style="list-style-type: none"> • Retain power over Xaar 3D; • Be exposed to and have the right to variable returns; and • Have the ability to use its power to affect these returns. <p>As part of these procedures, we firstly established the relevant activities and then considered the impact of the following areas:</p> <ul style="list-style-type: none"> • Whether the written call option was substantive; • the make-up of the Xaar 3D board; • the process to make key strategic and operational decisions over the relevant activities; and • who the key decision makers are. <p>We also reviewed the supply agreement between Xaar/Xaar 3D and distribution agreement between Xaar 3D/Stratasys to assess whether they were on an arms length basis, compared to other commercial agreements entered into by the group.</p>	<p>We agree with Management's judgement that Xaar continues to control the 3D business.</p>

Independent auditor's report to the members of Xaar plc *continued*

Key audit matters continued

Risk	Our response to the risk	Our response and observation
<p>Recoverability of receivables (£6.4 million net of provisions of £8.0 million, 2018: £18.6 million net of provisions of £5.2 million) Refer to the Audit Committee Report (page 59); Accounting policies (page 101); and note 20 of the Consolidated Financial Statements (page 127).</p> <p>Given the extended credit terms that were provided to customers in previous periods, judgement is required to establish how much of the open receivables balance is recoverable. There is a risk that management's judgements and estimates over recoverability are inappropriate, when considering the specific balances and the requirements of IFRS 9.</p>	<p>We understood the group's process for estimating the expected credit loss provision under IFRS 9 and other specific provisions and how they are applied, including the relevant controls, and performed a walkthrough to validate our understanding.</p> <p>We requested and obtained confirmation of receivables balances from key customers and compared their return to the amounts recorded in the ledger as at 31 December 2019, investigating any differences and agreeing reconciling items to relevant supporting documentation. For any of these customers that did not provide a return, we performed alternative procedures by obtaining proof of payment or evidence of delivery of the product/service.</p> <p>We selected a sample of receivable balances and verified them to cash received post year-end, reflecting either full settlement or payments against an agreed payment plan.</p> <p>We discussed with the credit control team the status of account balances with key customers and the steps being taken to recover overdue balances and assessed whether the accounting provision appropriately reflects the facts and circumstances.</p> <p>We analysed the historical accuracy of the receivables provisions to actual results to determine whether management's forecasting is reliable based on past experience.</p> <p>We reviewed publicly available information for key customers to identify and evaluate any matters relating to their financial viability that might result in a recoverability risk to the related receivable balance.</p>	<p>We did not identify any evidence of material misstatement related to the carrying value of receivables. Management continue to apply an appropriate expected credit loss provision, plus specific provisions for aged balances where there is additional doubt over the recoverability of the remaining balance.</p>
<p>Revenue recognition (£51.0 million, 2018: £63.5 million) Refer to the Audit Committee Report (page 59); Accounting policies (page 101); and note 5 of the Consolidated Financial Statements (page 115).</p> <p>Given the difficult trading environment and investor focus on the group's revenue we consider there to be a risk in relation to the manipulation by central management of the amount of revenue recorded. Management reward and incentive schemes based on achieving profit targets may also place pressure on management to manipulate revenue recognition.</p> <p>As part of the financial statement close process, certain manual adjustments are required to account for contracts with customers. There is risk that the manual adjustments are incorrectly recorded in the period.</p>	<p>We understood the group's revenue recognition policies and how they are applied, including the relevant controls, and performed a walkthrough to validate our understanding. In respect of the main UK trading entity, which comprised 60% of the group's revenue, we analysed the whole population of transactions from invoicing to cash collection, including adjustments to arrive at revenue recognised in the year. Where the postings did not follow our expectation, we investigated and understood the characteristics of these entries and tested a sample to assess their validity by agreeing the transactions back to source documentation.</p>	<p>Revenue was recognised in accordance with the Group's accounting policies and we identified no evidence of management override in respect of inappropriate manual journals recorded in revenue.</p>

Risk	Our response to the risk	Our response and observation
<p>Revenue recognition (£51.0 million, PY comparative £63.5 million) continued</p> <p>Further, in the product print segment, judgement is required to determine whether revenue should be recognised over time or at a point in time. Where revenue is recognised over time, estimation is required to establish how much of the performance obligation has been satisfied and how much is recorded as a contract liability.</p> <p>There is risk that the manual adjustments are incorrectly recorded in the period. Further, in the EPS segment, judgement is required to determine whether revenue should be recognised over time or at a point in time. Where revenue is recognised over time, estimation is required to establish how much of the performance obligation has been satisfied.</p>	<p>We performed tests of detail for a sample of revenue transactions to confirm the transactions had been appropriately recorded in the income statement with reference to IFRS 15 and corroborated that control of the products had been transferred to the customer by:</p> <ul style="list-style-type: none"> • analysing the contract and terms of the sale to determine that the group had fulfilled the requirements of the contract; • confirming revenue could be reliably measured by reference to underlying documentation; and • confirming collectability of the revenue was reasonably assured by agreeing to collection history. <p>We performed cut-off testing by tracing a sample of revenue items recorded either side of year-end to delivery note to determine whether revenue was recognised in the same period in which the performance obligations have been fulfilled.</p> <p>We selected a sample of post year-end credit notes to ensure that, where the credit note relates to the audit period, that these credit notes were appropriately provided for in the financial statements.</p> <p>We tested journal entries posted to revenue accounts, applying parameters designed to identify entries that were not in accordance with our expectations. This included analysing and selecting journals for testing which appeared unusual in nature either due to size, preparer or being manually posted. To assess their validity, we verified the journals to originating documentation.</p> <p>We performed full and specific scope audit procedures over this risk area in 4 locations which covered 100% of the risk amount.</p> <p>Revenue recognised over time</p> <p>For a sample of items, we reviewed the respective sales contract to determine whether the customer:</p> <ul style="list-style-type: none"> • Simultaneously receives and consumes the benefits; or • Controls the asset that is being created or enhanced; or • Has an enforceable requirement to pay for performance to date. <p>Where any of these criteria are fulfilled, revenue should be recognised over time in accordance with IFRS 15. For these items, we evaluated judgements made by management regarding the expected costs to complete and the timing and recognition of variation orders, by obtaining and reviewing the variation order and comparing the cost assumptions to similar projects. We also verified a sample of actual costs incurred to date through to purchase invoice or timesheet records. Where the criteria have not been fulfilled we confirmed management has recognised revenue at a point in time, when the performance obligation has been achieved.</p> <p>We performed full scope audit procedures over this risk area in 1 location which covered 100% of the risk amount.</p>	

Independent auditor's report to the members of Xaar plc *continued*

Key audit matters continued

Risk	Our response to the risk	Our response and observation
<p>Impairment of goodwill and intangible assets (£10.9 million, 2018: £38.3 million) Refer to the Audit Committee Report (page 59); Accounting policies (page 101); and note 14 of the Consolidated Financial Statements (page 123).</p> <p>IFRS requires impairment testing to be undertaken when there are indicators that an impairment may exist, and in the case of goodwill at least annually.</p> <p>Given the significant balances in respect of goodwill, capitalised development costs, recent trading losses and the decision to cease Thin Film related activity, there is a risk that the group's cash generating units ('CGUs') may not achieve the anticipated business performance to support their respective carrying values.</p> <p>Judgement is required in estimating the recoverable value of each CGU, including the determination of the future cash flows, long-term growth rates applied to these cash flows, together with the rate at which they are discounted.</p>	<p>We examined management's methodology together with their model for assessing the valuation of goodwill and intangible asset balance to understand the composition of management's future cash flow forecasts, and the process and related controls undertaken to prepare them. This included confirming the underlying cash flows were consistent with the Board approved budget and strategic plan, didn't include reorganisations and enhancements not committed at the balance sheet date and assessing the identified CGUs for appropriateness. We also re-performed the calculations in the model to test the mathematical integrity.</p> <p>We assessed the robustness of the budgeting process and cash flow forecasting models, including consistency with the strategic plans for the group and assessment of historical forecast accuracy.</p> <p>We tested the key inputs to management's impairment models by:</p> <ul style="list-style-type: none"> • analysing the historical accuracy of budgets to actual results to determine whether forecast cash flows are reliable based on past experience; • assessing the discount rate used by obtaining the underlying data used in the calculation and benchmarking it against an EY range derived from comparable organisations and market data, involving EY internal specialists to assist us with this assessment; and • comparing the forecast growth rates to observable market data and challenging whether the forecast growth rates have been appropriately adjusted to reflect the changes in the group's strategy. <p>We calculated the degree to which the key inputs and assumptions would need to fluctuate before an impairment was triggered and considered the likelihood of this occurring. We performed our own sensitivities on the group's forecasts and determined whether adequate headroom remained.</p> <p>We assessed whether there were any other indicators of impairment, which would give rise to the impairment of an individual asset.</p> <p>For the Thinfilm intangible assets that were fully impaired in the first half of the year, we considered whether there are any indicators that a reversal of impairment is required, including enquiry of management of any subsequent third party offers.</p> <p>We audited the related disclosures with reference to the requirements of IAS 36 and confirmed their consistency with the audited impairment models.</p>	<p>Based on the decision to cease Thin Film activity, impairment adjustments have been appropriately made over the CGU. The assumptions used for other CGU's appropriately reflect the associated risk and support the carrying value of goodwill and intangible assets.</p>

Risk	Our response to the risk	Our response and observation
<p>Capitalised development costs (£2.3 million additions, 2018: £1.9 million additions) Refer to the Audit Committee Report (page 59); Accounting policies (page 101); and note 15 of the Consolidated Financial Statements (page 124).</p> <p>IFRS requires development costs to be capitalised only under specific circumstances highlighted as follows:</p> <ul style="list-style-type: none"> • It is technically feasible to complete the intangible asset; • There is clear intention to complete; • Ability to use or sell the intangible asset exists; • There is adequate technical, financial and other resources to complete the asset; • Future economic benefits are probable; and • Expenditure can be measured reliably. <p>Because of the judgements applied in determining whether a product is technically feasible and commercially viable and the complexity of the criteria applied, there is a risk that development costs are incorrectly accounted for (i.e., capitalised as opposed to being expensed through the income statement).</p>	<p>We understood the group's policies on capitalised development costs and how they are applied, including the relevant controls, and performed a walkthrough to validate our understanding.</p> <p>We reviewed management's assessment on how the development costs of the High Speed Sintering 3D printer developed by Xaar 3D satisfy the capitalisation criteria of IFRS. In order to test the costs capitalised we:</p> <ul style="list-style-type: none"> • Reviewed the capitalised development costs opening balance to assess whether they met the requirements of IAS 38, through reviewing the work of the predecessor auditor; • Agreed capitalised development costs balance to underlying accounting records; • Tested a sample of additions to capitalised development costs against supporting documentation, ensuring that they were incurred wholly for the purpose of the project; • Confirmed the commencement date of amortisation in accordance with the completion of development activity; and • Performed an analytical review comparing the nature and magnitude of capitalised development costs in the current year, compared to our expectations of the nature of activity in the year. 	<p>We did not identify any evidence of material misstatement related to capitalised development costs.</p>
<p>Valuation of inventory (£16.2 million, 2018: £32.1 million) Refer to the Audit Committee Report (page 59); Accounting policies (page 101); and note 19 of the Consolidated Financial Statements (page 127).</p> <p>Given the level of slow moving finished goods, judgement is required to assess the future uptake of new products by customers, the price for which products can be sold, overall success of the sales and marketing strategy and the resulting carrying value recorded in the financial statements. There is a risk that the provision recorded by management does not accurately reflect the level of exposure and that inventory is incorrectly valued.</p>	<p>We understood the group's policies on inventory provisions and how they are applied, including the relevant controls, and performed a walkthrough to validate our understanding.</p> <p>We tested obtained evidence to support the standard costs used and performed procedures to assess whether only normal production variances had been capitalised in the year-end inventory balance and material abnormal inefficiencies had been appropriately expensed. This included comparing actual production rates to budget.</p> <p>We performed clerical procedures on the formulaic calculations to evaluate the accuracy of the inventory provisioning. We performed procedures to validate the appropriateness of any management adjustments to the formulaic calculation.</p> <p>For a sample of inventory lines, we reviewed post year-end selling prices in comparison to the values assumed in the book values recorded. Where the book value exceeded realisable value, we considered whether management had recorded an appropriate provision.</p> <p>We discussed with the managing director of the printhead business and the finance team the latest sales and marketing strategies and considered the implications for the level of provision recorded. This included comparing forecast product usage to customer orders, considering historical usage, historical accuracy of provisioning and understanding management's future plans to utilise the inventory.</p>	<p>The inventory provisions have been appropriately updated to reflect the impact of the latest strategic review on each product line and resulting future recoverable amount.</p>

Independent auditor's report to the members of Xaar plc *continued*

Key audit matters *continued*

The risks of material misstatement as set out in the table above include those reported by Xaar plc's previous external auditor, with the following exceptions: -

- Revenue recognition - we have expanded the Key Audit Matter to also include the judgements and estimates relating to revenue recognised over-time.
- Impairment of intangibles - we have expanded the Key Audit Matter to include goodwill, as the recoverable amount is based upon the same forecasts used to support the carrying value of intangible assets for Engineered Printing Solutions.
- New Key Audit Matters - the Key Audit Matters over Going Concern and Consolidation of Xaar 3D were added in the current year, as a result of the impact of COVID-19 and the current year transaction with Stratasys, respectively.

An overview of the scope of our audit

Tailoring the scope

Our assessment of audit risk, our evaluation of materiality and our allocation of performance materiality determine our audit scope for each entity within the Group. Taken together, this enables us to form an opinion on the consolidated financial statements. We take into account size, risk profile, the organisation of the group and effectiveness of group-wide controls, changes in the business environment and other factors when assessing the level of work to be performed at each entity.

In assessing the risk of material misstatement to the Group financial statements, and to ensure we had adequate quantitative coverage of significant accounts in the financial statements, of the 13 reporting components of the Group, we selected 11 components covering entities within the UK, US and Denmark, which represent the principal business units within the Group.

Of the 11 components selected, we performed an audit of the complete financial information of 9 components ('full scope components') which were selected based on their size or risk characteristics. For the remaining 2 components ('specific scope components'), we performed audit procedures on specific accounts within that component that we considered had the potential for the greatest impact on the significant accounts in the financial statements either because of the size of these accounts or their risk profile.

The reporting components where we performed audit procedures accounted for 100% of the Group's loss before tax, 100% of the Group's Revenue and 100% of the Group's Total assets. For the current year, the full scope components contributed 99% of the Group's loss before tax, 98% of the Group's Revenue and 100% of the Group's Total assets. The specific scope components contributed 1% of the Group's loss before tax, 2% of the Group's Revenue and 0% of the Group's Total assets. The audit scope of these specific scope components may not have included testing of all significant accounts of the component but will have contributed to the coverage of significant accounts tested for the Group.

The remaining 2 components were non-revenue generating. For these components, we performed other procedures, including analytical review, testing of consolidation journals and intercompany eliminations and foreign currency translation recalculations to respond to any potential risks of material misstatement to the Group financial statements.

Xaar plc's previous external auditor performed full and specific scope audit procedures on components accounting for 93% of the group's loss before tax, 97% of the group's revenue and 85% of the group's net assets.

Changes from the prior year

There are no significant changes in scoping in comparison to the scoping performed by the predecessor auditor.

Involvement with component teams

All audit work performed for the purposes of the audit was undertaken by the Group audit team.

Our application of materiality

We apply the concept of materiality in planning and performing the audit, in evaluating the effect of identified misstatements on the audit and in forming our audit opinion.

Materiality

The magnitude of an omission or misstatement that, individually or in the aggregate, could reasonably be expected to influence the economic decisions of the users of the financial statements. Materiality provides a basis for determining the nature and extent of our audit procedures.

We determined materiality for the Group to be £247k, which is 0.5% of revenue. We believe that revenue provides us with the most appropriate basis given it is the main KPI for the group, whilst the group reports an adjusted loss before tax.

We determined materiality for the Parent Company to be £247k, which we capped at the group materiality.

During the course of our audit, we reassessed initial materiality and updated for the final result for the year.

Performance materiality

The application of materiality at the individual account or balance level. It is set at an amount to reduce to an appropriately low level the probability that the aggregate of uncorrected and undetected misstatements exceeds materiality.

On the basis of our risk assessments, together with our assessment of the Group's overall control environment, our judgement was that performance materiality was 50% of our planning materiality, namely £124k. We have set performance materiality at this percentage due to this being the first period for which we are performing the audit.

Audit work at component locations for the purpose of obtaining audit coverage over significant financial statement accounts is undertaken based on a percentage of total performance materiality. The performance materiality set for each component is based on the relative scale and risk of the component to the Group as a whole and our assessment of the risk of misstatement at that component. In the current year, the range of performance materiality allocated to components was £25k to £93k.

Reporting threshold

An amount below which identified misstatements are considered as being clearly trivial.

We agreed with the Audit Committee that we would report to them all uncorrected audit differences in excess of £12k, which is set at 5% of planning materiality, as well as differences below that threshold that, in our view, warranted reporting on qualitative grounds.

We evaluate any uncorrected misstatements against both the quantitative measures of materiality discussed above and in light of other relevant qualitative considerations in forming our opinion.

Other information

The other information comprises the information included in the annual report other than the financial statements and our auditor's report thereon. The Directors are responsible for the other information.

Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in this report, we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of the other information, we are required to report that fact.

We have nothing to report in this regard.

In this context, we also have nothing to report in regard to our responsibility to specifically address the following items in the other information and to report as uncorrected material misstatements of the other information where we conclude that those items meet the following conditions:

- Fair, balanced and understandable set out on page 41 – the statement given by the Directors that they consider the annual report and financial statements taken as a whole is fair, balanced and understandable and provides the information necessary for shareholders to assess the group's performance, business model and strategy, is materially inconsistent with our knowledge obtained in the audit; or
- Audit Committee reporting set out on page 59 – the section describing the work of the Audit Committee does not appropriately address matters communicated by us to the audit; or
- Directors' statement of compliance with the UK Corporate Governance Code set out on page 56 – the parts of the Directors' statement required under the Listing Rules relating to the company's compliance with the UK Corporate Governance Code containing provisions specified for review by the auditor in accordance with Listing Rule 9.8.10R(2) do not properly disclose a departure from a relevant provision of the UK Corporate Governance Code.

Opinions on other matters prescribed by the Companies Act 2006

In our opinion, the part of the Directors' remuneration report to be audited has been properly prepared in accordance with the Companies Act 2006.

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the strategic report and the Directors' report for the financial year for which the financial statements are prepared is consistent with the financial statements and those reports have been prepared in accordance with applicable legal requirements;
- the information about internal control and risk management systems in relation to financial reporting processes and about share capital structures, given in compliance with rules 7.2.5 and 7.2.6 in the Disclosure Rules and Transparency Rules sourcebook made by the Financial Conduct Authority (the 'FCA Rules'), is consistent with the financial statements and has been prepared in accordance with applicable legal requirements; and
- information about the company's corporate governance code and practices and about its administrative, management and supervisory bodies and their committees complies with rules 7.2.2, 7.2.3 and 7.2.7 of the FCA Rules.

Matters on which we are required to report by exception

In the light of the knowledge and understanding of the group and the parent company and its environment obtained in the course of the audit, we have not identified material misstatements in:

- the strategic report or the Directors' report; or
- the information about internal control and risk management systems in relation to financial reporting processes and about share capital structures, given in compliance with rules 7.2.5 and 7.2.6 of the FCA Rules.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept by the parent company, or returns adequate for our audit have not been received from branches not visited by us; or
- the parent company financial statements and the part of the Directors' Remuneration Report to be audited are not in agreement with the accounting records and returns; or
- certain disclosures of Directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit; or
- a Corporate Governance Statement has not been prepared by the company.

Independent auditor's report to the members of Xaar plc *continued*

Responsibilities of Directors

As explained more fully in the Directors' responsibilities statement set out on page 86, the Directors are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the Directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Directors are responsible for assessing the group and parent company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Directors either intend to liquidate the group or the parent company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Explanation as to what extent the audit was considered capable of detecting irregularities, including fraud

The objectives of our audit, in respect to fraud, are; to identify and assess the risks of material misstatement of the financial statements due to fraud; to obtain sufficient appropriate audit evidence regarding the assessed risks of material misstatement due to fraud, through designing and implementing appropriate responses; and to respond appropriately to fraud or suspected fraud identified during the audit. However, the primary responsibility for the prevention and detection of fraud rests with both those charged with governance of the entity and management.

Our approach was as follows:

- We obtained an understanding of the legal and regulatory frameworks that are applicable to the group and determined that the most significant are those that relate to the reporting framework (IFRS, FRS 101, the Companies Act 2006 and the UK Corporate Governance Code) and the relevant tax compliance regulations in the jurisdictions in which the Group operates. In addition, we concluded that there are certain significant laws and regulations which may have an effect on the determination of the amounts and disclosures in the financial statements being the Listing Rules of the UK Listing Authority, and those regulations relating to health and safety and employee matters.
- We understood how Xaar plc is complying with those frameworks by making enquiries of management, the Company Secretary, the head of legal and those responsible for legal and compliance procedures. We corroborated our enquiries through our review of board minutes, papers provided to the Audit Committee, discussion with the Audit Committee and any correspondence received from regulatory bodies.
- We assessed the susceptibility of the Group's financial statements to material misstatement, including how fraud might occur by reviewing the Group's risk register, enquiry with management and the Audit Committee during the planning and execution phases of our audit. We also considered performance targets and their influence on efforts made by management to manage earnings or influence the perceptions of analysts. We considered the programs and controls that the Group has established to address risks identified, or that otherwise prevent, deter and detect fraud and how senior management monitors those programs and controls. Where the risk was considered to be higher, we performed audit procedures to address each identified fraud risk including revenue recognition as discussed above. These procedures included testing manual journals and were designed to provide reasonable assurance that the financial statements were free from fraud or error.
- Based on this understanding we designed our audit procedures to identify non-compliance with such laws and regulations. Our procedures involved journal entry testing, with a focus on manual consolidation journals and journals indicating large or unusual transactions based on our understanding of the business; enquiries of the Company Secretary, head of legal, management; and focussed testing, as referred to in the key audit matters section above. In addition, we completed procedures to conclude on the compliance of the disclosures in the Annual Report and Accounts with the requirements of the relevant accounting standards, UK legislation and the UK Corporate Governance Code 2018.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at <https://www.frc.org.uk/auditorsresponsibilities>. This description forms part of our auditor's report.

Other matters we are required to address

- We were appointed by the company on 30 August 2019 to audit the financial statements for the year ending 31 December 2019 and subsequent financial periods. We were appointed as auditors by the Directors and signed an engagement letter on 30 August 2019.

The period of total uninterrupted engagement including previous renewals and reappointments is 1 year, covering the 2019 year-end.

- The non-audit services prohibited by the FRC's Ethical Standard were not provided to the group or the parent company and we remain independent of the group and the parent company in conducting the audit.
- The audit opinion is consistent with the additional report to the Audit Committee.

Use of our report

This report is made solely to the company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the company and the company's members as a body, for our audit work, for this report, or for the opinions we have formed.

Anup Sodhi (Senior statutory auditor)
for and on behalf of Ernst & Young LLP, Statutory Auditor

Luton

22 April 2020

Notes:

1. The maintenance and integrity of the Xaar plc website is the responsibility of the Directors; the work carried out by the auditors does not involve consideration of these matters and, accordingly, the auditors accept no responsibility for any changes that may have occurred to the financial statements since they were initially presented on the website.
2. Legislation in the United Kingdom governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.

Consolidated income statement for the year ended 31 December 2019

	Notes	2019 £'000	2018 Restated £'000
Revenue	5	49,397	60,468
Cost of sales		(37,435)	(30,972)
Gross profit		11,962	29,496
Research and development expenses		(3,502)	(6,358)
Research and development expenditure credit		260	842
Sales and marketing expenses		(8,410)	(8,581)
General and administrative expenses		(8,689)	(6,608)
Impairment losses on financial assets		(2,715)	(3,202)
Restructuring costs		(896)	(5,447)
Gain/(loss) on derivative financial liabilities	21	106	(32)
Operating (loss)/profit		(11,884)	110
Investment income	9	103	170
Finance costs for leases	17	(110)	—
(Loss) / profit before tax		(11,891)	280
Income tax (expense)/credit	11	(3,501)	2,406
(Loss) / profit for the year from continuing operations		(15,392)	2,686
Loss from discontinued operations after tax	10	(56,082)	(15,166)
Loss for the year		(71,474)	(12,480)
Attributable to:			
Owners of the Company		(71,051)	(12,397)
Non-controlling interest	36	(423)	(83)
Loss for the year		(71,474)	(12,480)
Earnings / (Loss) per share - Total			
Basic	13	(92.1p)	(16.1p)
Diluted	13	(92.1p)	(15.9p)
Earnings / (Loss) per share - Continuing Operations			
Basic	13	(19.4p)	3.6p
Diluted	13	(19.4p)	3.6p

Dividends paid in the year amounted to £nil (2018: £6,009,000). Further disclosures are given in note 12.

Consolidated statement of comprehensive income for the year ended 31 December 2019

	Notes	2019 £'000	2018 Restated £'000
Loss for the year		(71,474)	(12,480)
Items that may be reclassified subsequently to profit or loss:			
Exchange differences on retranslation of net investment		(192)	202
Tax charge on share option	22	—	(41)
Other comprehensive (loss) / income for the year		(192)	161
Total comprehensive loss for the year		(71,666)	(12,319)
Total comprehensive loss attributable to:			
Owners of the Company		(71,208)	(12,234)
Non-controlling interests	36	(458)	(85)
		(71,666)	(12,319)

Consolidated statement of financial position

as at 31 December 2019

	Notes	2019 £'000	2018 Restated £'000
Non-current assets			
Goodwill	14	5,333	5,522
Other intangible assets	15	5,543	32,796
Property, plant and equipment	16	20,908	28,044
Right of use asset	17	3,561	—
Deferred tax asset	22	130	—
		35,475	66,362
Current assets			
Inventories	19	16,164	32,142
Trade and other receivables	20	9,109	21,398
Current tax asset	20	1,788	5,142
Treasury deposits	20	522	3,277
Cash and cash equivalents	20	24,800	24,669
		52,383	86,628
Total assets		87,858	152,990
Current liabilities			
Trade and other payables	23	(7,284)	(18,958)
Other financial liabilities	24	—	(33)
Provisions	25	(2,947)	(499)
Derivative financial instruments	21	(2,996)	(936)
Lease liabilities	17	(1,450)	—
		(14,677)	(20,426)
Net current assets		37,706	66,202
Non-current liabilities			
Deferred tax liabilities	22	—	(870)
Lease liabilities	17	(2,521)	—
Other financial liabilities	24	—	(103)
Total non-current liabilities		(2,521)	(973)
Total liabilities		(17,198)	(21,399)
Net assets		70,660	131,591
Equity			
Share capital	26	7,833	7,833
Share premium	27	29,328	29,328
Own shares	28	(2,676)	(3,113)
Translation reserve	29	660	817
Other reserves	30	20,921	15,144
Retained earnings	30	7,855	79,554
Equity attributable to owners of the Company		63,921	129,563
Non-controlling interest	36	6,739	2,028
Total equity		70,660	131,591

The financial statements of Xaar plc, registered number 3320972, were approved by the Board of Directors and authorised for issue on 22 April 2020. They were signed on its behalf by:



John Mills
Chief Executive Officer



Ian Tichias
Chief Finance Officer

Consolidated statement of changes in equity for the year ended 31 December 2019

	Notes	Share capital £'000	Share premium £'000	Own shares £'000	Other reserves £'000	Translation reserve £'000	Retained earnings £'000	Total £'000	Non-controlling interest £'000	Total equity £'000
Balance at 1 January 2018		7,833	29,317	(3,642)	14,638	613	98,425	147,184	—	147,184
Loss for the year		—	—	—	—	—	(12,276)	(12,276)	(62)	(12,338)
Exchange differences on retranslation of net investment		—	—	—	—	204	—	204	(2)	202
Tax on items taken directly to equity		—	—	—	—	—	(41)	(41)	—	(41)
Total comprehensive loss for the year		—	—	—	—	204	(12,317)	(12,113)	(64)	(12,177)
Issue of share capital	27	—	11	—	—	—	—	11	—	11
Own shares sold in the year		—	—	529	—	—	(424)	105	—	105
Dividends paid	12	—	—	—	—	—	(6,009)	(6,009)	—	(6,009)
Credit to equity for equity-settled share-based payments		—	—	—	506	—	—	506	—	506
Adjustment arising from change in non-controlling interest		—	—	—	—	—	—	—	2,264	2,264
Balance at 31 December 2018 as previously reported		7,833	29,328	(3,113)	15,144	817	79,675	129,684	2,200	131,884
Prior period adjustments	37	—	—	—	—	—	(121)	(121)	(172)	(293)
Balance at 31 December 2018 restated		7,833	29,328	(3,113)	15,144	817	79,554	129,563	2,028	131,591
Effect of initial application of IFRS 16	3	—	—	—	—	—	(211)	(211)	(2)	(213)
Balance at 1 January 2019 restated for IFRS 16		7,833	29,328	(3,113)	15,144	817	79,343	129,352	2,026	131,378
Loss for the year		—	—	—	—	—	(71,051)	(71,051)	(423)	(71,474)
Exchange differences on retranslation of net investment		—	—	—	—	(157)	—	(157)	(35)	(192)
Total comprehensive income for the year		—	—	—	—	(157)	(71,051)	(71,208)	(458)	(71,666)
Own shares sold in the year		—	—	437	—	—	(437)	—	—	—
Credit to equity for equity-settled share-based payments		—	—	—	1,111	—	—	1,111	—	1,111
Adjustment arising from change in non-controlling interest		—	—	—	4,666	—	—	4,666	5,171	9,837
Balance at 31 December 2019		7,833	29,328	(2,676)	20,921	660	7,855	63,921	6,739	70,660

The nature of retained earnings and other reserves in equity are described in note 30.

Consolidated cash flow statement for the year ended 31 December 2019

	Notes	2019 £'000	2018 Restated £'000
Net cash used in operating activities	31	(9,828)	(9,862)
Investing activities			
Investment income		103	171
Treasury amounts withdrawn / (deposited)		2,755	(2,524)
Purchases of property, plant and equipment		(1,071)	(2,790)
Proceeds on disposal of property, plant and equipment		—	584
Expenditure on software		(90)	(160)
Expenditure on licence		—	(177)
Expenditure on capitalised product development		(2,255)	(1,915)
Net cash used in investing activities		(558)	(6,811)
Financing activities			
Dividends paid		—	(6,009)
Proceeds from issue of financial instrument		—	902
Proceeds from non-controlling interest transactions		12,003	2,115
Proceeds from the sale of ordinary share capital		—	105
Proceeds from issue of ordinary share capital		—	11
Payment of lease liabilities and related interest	17	(1,274)	—
Net cash provided by / (used in) financing activities		10,729	(2,876)
Net increase / (decrease) in cash and cash equivalents		343	(19,549)
Effect of foreign exchange rate changes on cash balances		(212)	274
Cash and cash equivalents at beginning of year		24,669	43,944
Cash and cash equivalents at end of year	20	24,800	24,669

Cash and cash equivalents (which are presented as a single class of asset on the face of the consolidated statement of financial position) comprise cash at bank and other short-term highly liquid investments with a maturity of three months or less. The carrying amount of these assets is approximately equal to their fair value.

Notes to the consolidated financial statements for the year ended 31 December 2019

1. General information

Xaar plc ('the Group') is incorporated in England and Wales under the Companies Act 2006. The address of the registered office is given on the inside back cover. The nature of the Group's operations and its principal activity is set out in the Strategic Report starting on pages 18 to 25.

☞ The Strategic Report can be found on pages 18 to 25.

2. Key sources of estimation uncertainty and critical accounting judgements

The key assumptions concerning the future and other sources of estimation uncertainty at the date of the statement of financial position that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are as follows:

Accounting Judgements - The Group applies judgement in how it applies its accounting policies, which do not involve estimation, which could materially affect the numbers disclosed in these financial statements. The key judgements, without estimation, that could have the most significant effect on the amounts recognised in these financial statements are as follows:

Capitalisation of development costs (accounting judgement) - note 15

As described in note 3, the Group capitalises development expenditure as an intangible asset where the criteria under IAS 38 'Intangible Assets' is met. This requires management to make judgement on when all of the criteria for capitalisation are met and when to cease capitalisation and start amortising the asset. In 2019, total capitalised development additions amounted to £2,255,000 (2018: £1,915,000).

Consolidation of Xaar 3D (accounting judgement) - notes 21, 35 & 36

Following the additional investment in Xaar 3D Limited by Stratasy Solutions Limited at the end of 2019 the Group considered the application of IFRS 10 Consolidated Financial Statements. Following this review the Group concluded that it has retained power over the investee, it is both exposed, and has the right, to variable returns, and it has the ability to use its power to affect these returns. This conclusion was drawn on the basis of the current share ownership (55% Xaar), the make-up of the Board (Xaar has a majority position), the terms of the call option that Stratasy holds over the Xaar 3D shares, and the process used to make key strategic and operational decisions including who the key decision makers are. Based on the option valuation, the Board have concluded that the currently exercisable call option that Stratasy holds over the remaining 45% of Xaar 3D is not substantive as at the reporting date. While certain matters require the consent of Stratasy, management have assessed that these only give protective rights over the relevant activities, which are judged at this time to be the development and commercialisation of the 3D product for it to be produced by a contract manufacturer, an area in which Xaar plc has the expertise. As such, the Group has concluded it continues to retain control and should therefore continue to consolidate Xaar 3D.

Discontinued operations (accounting judgement) - note 10

Following the cessation of Thin Film activities in September 2019 the Group consider the application of IFRS 5 'Non-current Assets Held for Sale and Discontinued Operations'. Following its cessation, the Thin Film business is an abandoned operation and has met the criteria of a discontinued operation per IFRS 5. The Group unsuccessfully sought additional investment for its Thin Film operation and has therefore deemed that the operation should not be classified as held for sale due to the low probability of successfully selling it.

Significant Estimates - The preparation of financial statements in conformity with adopted IFRSs requires the use of estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting year. Although these estimates are based on management's best knowledge of the amount, events or actions, actual results ultimately may differ from those estimates. The estimates and underlying assumptions are reviewed on an ongoing basis. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision affects both current and future periods.

The Directors consider the following to be the key estimates applicable to the financial statements, which have a significant risk of resulting in a material adjustment to the carrying amounts of assets and liabilities within the next financial year or in the longer term:

Xaar 3D option – (estimation uncertainty) - note 21

In December 2019 Xaar 3D Holdings granted Stratasy Solutions Limited an option to acquire the remaining shares in Xaar 3D Limited. This financial liability is measured at fair value. In order to calculate the fair value the Group uses the Black Scholes model. The Black Scholes model uses a number of inputs that require estimation. Whilst the Group uses third party experts to provide these inputs the estimates remain uncertain.

Inventory provision (estimation uncertainty) - note 19

The Group's inventory provision at 31 December 2019 of £20,935,000 (2018: £5,082,000) includes £17,815,000 relating discontinued operations (2018: 2,679,000) and £3,120,000 from continued operations (2018: £2,403,000). All assets, including inventory, that relate to the discontinued operations have been value at fair value less cost to sell. Provisions in relation to continued operations have been made based on management's assessment of customer sell through, market conditions, current and potential competitors, and the ageing profile and quantity of the inventory on hand. Furthermore, management has assessed the likely time period to sell the inventory and the ability to decrease prices to drive sales.

Credit provision for the allowance of doubtful debts (estimation uncertainty) - note 20

The Group's provision for doubtful debts of £7,959,000 (2018: £5,178,000) relates to management's assessment of the ageing profile of receivables and the risk of collecting unpaid overdue balances. In making the estimate, management has taken steps to assess the ongoing viability of the customers, the probability and timing of repayment, external factors which may affect the customers' ability to pay and historical data relating to settlement of aged debts.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

2. Key sources of estimation uncertainty and critical accounting judgements continued

Impairment of capitalised development costs (estimation uncertainty) - note 15

The Group determines whether capitalised development costs, and all other non-current assets, are impaired at least on an annual basis. This requires an estimation of the 'value-in-use' of the cash-generating units to which the capitalised development costs are allocated. Estimating a value-in-use amount requires management to make an estimate of the expected future cash flows from the cash-generating unit and also to choose a suitable discount rate in order to calculate the present value of those cash flows. The carrying amount of capitalised development costs at 31 December 2019 was £5,166,000 (2018: £32,337,000).

During 2019, following a strategic review the Directors took the decision to close the Thin Film development projects leading to the impairment and write down of the Capitalised development costs of £28,494,000. Customers have been provided with the opportunity to implement "last time buys" of the product developed, and work has been undertaken to identify alternative ways to monetise the Intellectual Property that has been capitalised, with no significant opportunities readily available, the Directors have estimated that value attributable to previously capitalised development costs in thin film is nil, and have therefore fully impaired the asset value.

3. Significant accounting policies

Basis of accounting

The financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS), as adopted for use in the European Union. Therefore the Group financial statements have been prepared in accordance with Article 4 of the EU IAS regulation. The financial information has been prepared on the basis of all applicable IFRS, including all International Accounting Standards (IAS), Standing Interpretations Committee (SIC) interpretations and International Financial Reporting Interpretations Committee (IFRIC) interpretations issued by the International Accounting Standards Board (IASB) that are applicable to the financial period, as adopted by the European Union.

The financial statements have been prepared on the historical cost basis, except for the revaluation of financial instruments. The Group financial statements are presented in Sterling and all values are rounded to the nearest thousand pounds (£'000) except when otherwise indicated. The principal accounting policies adopted are set out below.

Basis of consolidation

The consolidated financial statements incorporate the financial statements of the Company and entities controlled by the Company ('its subsidiaries') made up to 31 December each year. Control is achieved where the Company has the power to govern the financial and operating policies of an investee entity so as to obtain benefits from its activities. An investor controls another entity, an investee, if and only if the investor has all of the following: it has power over the investee, exposure or rights to variable returns from its involvement with the investee, and the ability to use its power over the investee to affect the amount of the investor's returns. To have power, an investor must have existing substantive rights that give it the current ability to direct the relevant activities. The investor reassesses whether it controls an entity if facts and circumstances indicate changes to one or more of the elements of control.

The results of subsidiaries acquired or disposed of during the year are included in the consolidated income statement from the date of acquisition or up to the date of disposal, as appropriate. Where necessary, adjustments are made to the financial statements of subsidiaries to bring the accounting policies used in line with those used by the Group.

All intra-group transactions, balances, income and expenses are eliminated on consolidation. Foreign exchange gains and losses arising on the retranslation of trading balances with subsidiaries with different functional currencies are reported in the income statement.

Non-controlling interests in subsidiaries are identified separately from the Group's equity therein. Those interests of non-controlling shareholders that are present ownership interests entitling their holders to a proportionate share of net assets upon liquidation may initially be measured at fair value or at the non-controlling interests' proportionate share of the fair value of the acquiree's identifiable net assets. The choice of measurement is made on an acquisition-by-acquisition basis.

Profit or loss and each component of other comprehensive income are attributed to the owners of the Company and to the non-controlling interests. Total comprehensive income of subsidiaries is attributed to the owners of the Company and to the non-controlling interests even if this results in the non-controlling interests having a deficit balance.

Changes in the Group's interests in subsidiaries that do not result in a loss of control are accounted for as equity transactions. The carrying amount of the Group's interests and the non-controlling interests are adjusted to reflect the changes in their relative interests in the subsidiaries. Any difference between the amount by which the non-controlling interests are adjusted and the fair value of the consideration paid or received is recognised directly in equity and attributed to the owners of the Company.

3. Significant accounting policies continued

Going concern

The Group's business activities, together with the factors likely to affect its future development, performance and position are set out in the Strategic Report on pages 6 to 25. Notes 20, 21 and 24 include a description of the Group's objectives, policies and processes for managing its capital; its financial risk management objectives; details of its financial instruments and hedging activities; and its exposure to credit risk and liquidity risk.

The Board have considered the impact of the ongoing COVID-19 impact. Whilst the impact to date on trading and debtor recoverability has been minimal, the impact of COVID-19 has created a high level of uncertainty as to the outlook for the remainder of the financial year and it is still too early to ascertain the impact this may have on our full year 2020 revenue and profitability.

The Board have therefore performed a number of stress tests to assess the Group's ability to continue as a going concern.

The Directors have prepared cash flow forecasts for the Group for a review period of 12 months from the date of approval of the 2019 financial statements. These forecasts reflect an assessment of current and future market conditions and their impact on the Group's future cash flow performance. The forecasts have been sensitised for a reduction in revenue from the second half of 2020 to the end of the review period. The forecasts have also been reverse stress tested by significantly reducing revenue from the second half of 2020 to the end of the review period, with some cost mitigations.

In the sensitised scenario the forecasts indicate the Group would still have sufficient cash to continue. In the reverse stress tested scenario, the Group would run out of cash. However, with some mitigation such as reducing discretionary spend, delaying capital expenditure and research and development costs, the Group would have sufficient cash. Notwithstanding this, the Group has further options to mitigate a cash shortfall which have not been factored into the above forecasts, such as staffing reductions, further delaying/stopping capital and research and development expenditure and applying for certain government support measures. Should it become apparent that sales orders, revenue and/or cash collections are being affected by a global slowdown, the Directors will undertake a further review on discretionary expenditure, staffing levels and capital investment to protect the Group's cash position.

Having considered all the above, including the Group's current strong cash position, the Directors remain confident in the long-term future prospects for the Group and its ability to continue as a going concern for the foreseeable future and therefore continue to adopt the going concern basis in preparing the financial statements.

Adjusted financial measures

Adjusted financial measures comprise adjusted operating profit / (loss), adjusted profit / (loss) before tax, and adjusted diluted earnings per share. These measures are alternative performance measures ('APMs') which are not defined or specified under the requirements of IFRS. These APMs adjust for recurring and non-recurring items which management consider to have a distorting effect on the underlying results of the Group. These APMs are used in evaluating management's performance and in determining management and executive remuneration. Items adjusted for include share-based payment charges, exchange differences on intra-group transactions, gains and losses on derivative financial instruments, restructuring and investment expenses and the research and development expenditure credit.

Recurring items are adjusted each year irrespective of materiality to ensure consistent treatment, and allow for variation that can occur due to volatility in share prices in respect of share based payment charges, or the significant impact of restructuring costs. Net cash includes cash, cash equivalents and treasury deposits. Gross R&D investment includes the capitalised costs of the High Speed Sintering development programme (and P4 (Thin Film) technology platform in 2017), and excludes the amortisation cost of P4 (Thin Film) technology platform.

A new adjusted performance measure arising from gains and losses on derivative financial instruments, as these are not deemed a transaction in the normal course of business, arising from an investment in a separate legal entity for development with the option for disposal. Previously an APM was calculated to reflect the impact of IAS 38 'Intangible Assets', as this is no longer a method for evaluating management's performance this calculation has been removed as an APM and KPI upon which management and executive remuneration may be determined.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

3. Significant accounting policies continued

Business combinations

The acquisition of subsidiaries is accounted for using the acquisition method.

Goodwill arising on acquisition is recognised as an asset and initially measured at cost, being the excess of the sum of consideration transferred, the amount of any non-controlling interests in the acquiree over the net of the acquisition-date fair values of the identifiable assets, liabilities and contingent liabilities recognised. If after reassessment, the Group's interest in the net fair value of the acquiree's identifiable assets, liabilities and contingent liabilities exceeds the cost of the business combination, the excess is recognised immediately in the income statement.

Goodwill

Goodwill arising on consolidation is initially recognised as an asset at cost and is subsequently measured at cost less any accumulated impairment losses. Goodwill which is recognised as an asset is reviewed for impairment at least annually. Any impairment is recognised immediately in the income statement and is not subsequently reversed.

For the purposes of impairment testing, goodwill is allocated to each of the Group's cash-generating units expected to benefit from the synergies of the combination. Cash-generating units to which goodwill has been allocated are tested for impairment annually, or more frequently when there is an indication that the unit may be impaired. If the recoverable amount of the cash-generating unit is less than the carrying amount of the unit, the impairment loss is allocated first to reduce the carrying amount of any goodwill allocated to the unit and then to the other assets of the unit pro rata on the basis of the carrying amount of each asset in the unit.

On disposal of the cash-generating unit, the attributable amount of goodwill is included in the determination of the profit or loss on disposal.

Goodwill arising on acquisitions before the date of transition to IFRS has been retained at the previous UK GAAP amounts subject to being tested for impairment at that date. Goodwill written off to reserves under UK GAAP prior to 1998 has not been reinstated and is not included in determining any subsequent profit or loss on disposal.

Revenue recognition

Revenue is measured based on the consideration to which the Group expects to be entitled in a contract with a customer and excludes amounts collected on behalf of third parties. The Group determines whether to recognise revenue, following a five-step process:

1. Identifying the contract with a customer;
2. Identifying the performance obligations;
3. Determining the transaction price;
4. Allocating the transaction price to the performance obligations; and
5. Recognising revenue when/as performance obligation(s) are satisfied.

Revenue arises from a number of sources but mainly the manufacture and sale of printheads and engineered printing solutions. The Group also licences intellectual property to third parties as part of Royalty based Revenue. Revenue is shown net of value-added tax, returns, rebates and discounts and after eliminating sales within the Group.

Revenue from goods and services is recognised in accordance with IFRS 15 when control has been transferred to the customer. For sale of goods and services revenue is recognised at a point in time, unless specific conditions have been satisfied allowing revenue to be recognised over a period of time as identified in the five-step process (above) e.g. where the asset produced doesn't have an alternative use and the Group has an enforceable right to payment for performance completed to date. An input methodology (based on estimated costs) is used when recognising revenue over time. Use has been made of the practical expedient not to recognise a significant financing component where the period between transfer of the good or service and payment is one year or less.

Royalties are recognised on an accruals basis in accordance with the actual revenue trend in the most recent quarterly statements received from each licensee. The Royalties arise from the licensee's use of their printheads and our related intellectual property installed in equipment developed by original equipment manufacturers ('OEMs').

A receivable is recognised when the performance obligations are satisfied (e.g. upon shipment, upon delivery as services are rendered or upon completion of service) as this is the point in time that the consideration is unconditional because only the passage of time is required before the payment is due, there will be a reservation of title until payment has been received, but control has been transferred.

3. Significant accounting policies continued

Investment income

Investment income is accrued on a time basis, by reference to the principal outstanding and at the effective interest rate applicable, which is the rate that discounts estimated future cash receipts through the expected life of the financial asset to that asset's net carrying amount.

Leases

The Group has changed its accounting policy for leases where the Group is the lessee. The new policy and the impact of the change is described on page 110.

Until 31 December 2018, leases of property, plant and equipment where the Group, as lessee, had substantially all the risks and rewards of ownership were classified as finance leases. Finance leases were capitalised at the lease's inception at the fair value of the leased property or, if lower, the present value of the minimum lease payments. The corresponding rental obligations, net of finance charges, were included in other short-term and long-term payables. Each lease payment was allocated between the liability and finance cost. The finance cost was charged to profit or loss over the lease period so as to produce a constant periodic rate of interest on the remaining balance of the liability for each period. The property, plant and equipment acquired under finance leases was depreciated over the asset's useful life, or over the shorter of the asset's useful life and the lease term if there is no reasonable certainty that the Group will obtain ownership at the end of the lease term.

Leases in which a significant portion of the risks and rewards of ownership were not transferred to the Group as lessee were classified as operating leases. Payments made under operating leases (net of any incentives received from the lessor) were charged to profit or loss on a straight-line basis over the period of the lease.

Interest expense

Interest expense on lease liabilities is a component of finance costs which requires to be presented separately in the income statement.

Foreign currencies

The individual financial statements of each Group Company are presented in the currency of the primary economic environment in which it operates (its functional currency). For the purpose of the consolidated financial statements, the results and financial position of each Group Company are expressed in Sterling, which is the functional currency of the Company and the presentation currency for the consolidated financial statements.

Exchange differences arising on the settlement of monetary assets and liabilities, and on the retranslation of monetary assets and liabilities, are included in the income statement for the period.

In order to hedge its exposure to certain foreign exchange risks, the Group may enter into forward contracts (see page 108 for details of the Group's accounting policies in respect of such derivative financial instruments).

 Further information can be found on page 131.

For the purposes of presenting consolidated financial statements, the assets and liabilities of the Group's foreign operations are translated at the exchange rates prevailing on the date of the statement of financial position. Income and expense items are translated at the average exchange rates for the period.

Exchange differences arising are recognised in other comprehensive income and taken to the translation reserve. Exchange differences on the translation of net investments are taken to the translation reserve.

Goodwill and fair value adjustments arising on the acquisition of a foreign entity are treated as assets and liabilities of the foreign entity and translated at the closing rate.

Government and EU grants

Government and EU grants are not recognised until there is reasonable assurance that the Group will comply with the conditions attached to them and that the grant will be received. Government and EU grants relating to research and development are treated as income over the periods necessary to match them with the related costs.

Operating profit/(loss)

Operating profit/(loss) is stated after charging restructuring costs but before investment income and finance costs.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

3. Significant accounting policies continued

Restructuring costs

Restructuring Cost refers to the one-time expenses or infrequent expenses which are incurred by the Company in the process of reorganising its business operations with the motive of the overall improvement of the long-term profitability and working efficiency of the Company.

Retirement benefit costs

Payments to defined contribution retirement benefit schemes are charged as an expense as they fall due. Payments made to state managed retirement benefit schemes are dealt with as payments to defined contribution schemes where the Group's obligations under the schemes are equivalent to those arising in a defined contribution retirement benefit scheme.

Taxation

The tax expense represents the sum of the tax currently payable and deferred tax, including UK corporation tax and foreign tax.

The tax currently payable is based on taxable profit for the year. Taxable profit differs from net profit as reported in the income statement because it excludes items of income or expense that are taxable or deductible in other years and it further excludes items that are never taxable or deductible. The Group's liability for current tax is calculated using tax rates that have been enacted or substantively enacted by date of the statement of financial position.

Deferred tax is the tax expected to be payable or recoverable on differences between the carrying amounts of assets and liabilities in the financial statements and the corresponding tax bases used in the computation of taxable profit and is accounted for using the statement of financial position liability method. Deferred tax liabilities are generally recognised for all taxable temporary differences and deferred tax assets are recognised to the extent that it is probable that taxable profits will be available against which deductible temporary differences can be utilised. Such assets and liabilities are not recognised if the temporary difference arises from the initial recognition of goodwill or from the initial recognition (other than in a business combination) of other assets and liabilities in a transaction that affects neither the tax profit nor the accounting profit.

Deferred tax liabilities are recognised for taxable temporary differences arising on investments in subsidiaries, except where the Group is able to control the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future.

The carrying amount of deferred tax assets is reviewed at the date of each statement of financial position and reduced to the extent that it is no longer probable that sufficient taxable profits will be available to allow all or part of the asset to be recovered.

Deferred tax is calculated at the tax rates that are expected to apply in the period when the liability is settled or the asset is realised. Deferred tax is charged or credited in the income statement, except when it relates to items charged or credited directly to equity, in which case the deferred tax is also dealt with in equity.

To the extent that the Group receives a tax deduction relating to share-based payment transactions, a deferred tax asset is recognised at the appropriate tax rate on the difference in value between the market price of the underlying equity as at the date of the financial statements and the exercise price of the outstanding share options multiplied by the expired portion of the vesting period. As a result, the deferred tax impact of share options will not be derived directly from the expense reported in the consolidated income statement. Where the deductible difference exceeds the cumulative charge to the consolidated income statement the excess of the associated tax benefit is recorded directly to equity rather than in profit or loss.

Deferred tax assets and liabilities are measured on an undiscounted basis and are offset when there is a legally enforceable right to set off current tax assets against current tax liabilities and when they relate to income taxes levied by the same taxation authority and the Group intends to settle its current tax assets and liabilities on a net basis.

3. Significant accounting policies continued

Property, plant and equipment

All property, plant and equipment is shown at original historical cost less accumulated depreciation and any recognised impairment loss.

Assets in the course of construction for production or administrative purposes are carried at cost, less any recognised impairment loss. Depreciation of these assets, on the same basis as other assets in the same class, commences when the assets are ready for their intended use.

Freehold land is not depreciated.

Depreciation is charged so as to write off the cost or valuation of assets, less their residual values, other than assets in the course of construction, over their estimated useful lives, using the straight-line method, on the following bases:

Leasehold property improvements	Up to 20 years
Plant and machinery	Three to 20 years
Buildings	Up to 40 years

Assets held under finance leases are depreciated over their expected useful lives on the same basis as owned assets or, where shorter, over the term of the relevant lease.

The gain or loss arising on the disposal of an asset is determined as the difference between the sales proceeds and the carrying amount of the asset and is recognised in income.

Internally generated intangible assets – research and development expenditure

Expenditure on research activities is recognised as an expense in the period in which it is incurred.

In accordance with IAS 38, an internally generated intangible asset arising from the Group's development is recognised only if all of the following conditions are met:

- An asset is created that can be identified (such as software and new processes);
- It is probable that the asset created will generate future economic benefits;
- The development cost of the asset can be measured reliably;
- The project is technically and commercially feasible;
- The Group intends to and has sufficient resources to complete the project; and
- The Group has the ability to use or sell the services and product developed.

Internally generated intangible assets are amortised on a straight-line basis over their useful lives. Where no internally generated intangible asset can be recognised, development expenditure is recognised as an expense in the period in which it is incurred.

Other intangible assets

Costs incurred in maintaining the patent and trademark portfolio are written off to the income statement as incurred.

Payments in respect of software, and licence rights acquired are capitalised at cost and amortised on a straight-line basis over their estimated useful lives.

Impairment of tangible and intangible assets excluding goodwill

At the date of each statement of financial position, the Group reviews the carrying amounts of its tangible and intangible assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). Where the asset does not generate cash flows that are independent from other assets, the Group estimates the recoverable amount of the cash-generating unit to which the asset belongs.

Recoverable amount is the higher of fair value less costs of disposal and value-in-use. In assessing value-in-use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted.

If the recoverable amount of an asset (or cash-generating unit) is estimated to be less than its carrying amount, the carrying amount of the asset (cash-generating unit) is reduced to its recoverable amount. An impairment loss is recognised as an expense immediately.

Where an impairment loss is subsequently reversed, the carrying amount of the asset (or cash-generating unit) is increased to the revised estimate of its recoverable amount, but so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset (or cash-generating unit) in prior years. A reversal of an impairment loss is recognised as income immediately.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

3. Significant accounting policies continued

Inventories

Inventories are stated at the lower of cost and net realisable value. Cost is calculated using the first in, first out ('FIFO') cost formula, by applying the standard cost methodology, with costs including direct materials, direct labour costs and an attributable proportion of manufacturing overheads based on normal levels of activity that have been incurred in bringing the inventories to their present location and condition. Net realisable value represents the estimated selling price less all estimated costs of completion and costs to be incurred in marketing, selling and distribution. Provision is made for obsolete, slow-moving or defective items where applicable.

Financial instruments

Financial assets and financial liabilities are recognised in the Group's statement of financial position when the Group becomes a party to the contractual provisions of the instrument. To be classified and measured at amortised cost (if the business model is held to collect) or fair value through OCI (if the business model is both held to collect and selling financial assets).

Financial assets and financial liabilities are initially measured at fair value. Transaction costs that are directly attributable to the acquisition or issue of financial assets and financial liabilities are added to or deducted from the fair value of the financial assets or financial liabilities, as appropriate, on initial recognition. Transaction costs directly attributable to the acquisition of financial assets or financial liabilities at fair value through profit or loss are recognised immediately in profit or loss.

Financial assets

All regular way purchases or sales of financial assets are recognised and derecognised on a trade date basis. Regular way purchases or sales are purchases or sales of financial assets that require delivery of assets within the time frame established by regulation or convention in the marketplace.

All recognised financial assets are measured subsequently in their entirety at either amortised cost or fair value, depending on the classification of the financial assets.

In order for a financial asset to be classified and measured at amortised cost or fair value through OCI, it needs to give rise to cash flows that are 'solely payments of principal and interest ('SPPI')' on the principal amount outstanding. This assessment is referred to as the SPPI test and is performed at an instrument level. Financial assets with cash flows that are not SPPI are classified and measured at fair value through profit or loss, irrespective of the business model.

Effective interest method

The effective interest method is a method of calculating the amortised cost of a debt instrument and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts through the life of the debt instrument, or, where appropriate, a shorter period, to the net carrying amount on initial recognition.

Impairment of financial assets

The Group recognises an allowance for expected credit losses ('ECLs') for all debt instruments not held at fair value through profit or loss. ECLs are based on the difference between the contractual cash flows due in accordance with the contract and all the cash flows that the Group expects to receive, discounted at an approximation of the original effective interest rate. The expected cash flows will include cash flows from the sale of collateral held or other credit enhancements that are integral to the contractual terms.

ECLs are recognised in two stages. For credit exposures for which there has not been a significant increase in credit risk since initial recognition, ECLs are provided for credit losses that result from default events that are possible within the next 12-months (a 12-month ECL). For those credit exposures for which there has been a significant increase in credit risk since initial recognition, a loss allowance is required for credit losses expected over the remaining life of the exposure, irrespective of the timing of the default (a lifetime ECL). Trade receivables are recognised using a lifetime ECL approach.

For financial assets carried at amortised cost, the amount of the impairment is the differences between the asset's carrying amount and the present value of the estimated future cash flows, discounted at the financial asset's original effective interest rate.

Derecognition of financial assets

The Group derecognises a financial asset only when the contractual rights to the cash flows from the asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity. If the Group neither transfers nor retains substantially all the risks and rewards of ownership and continues to control the transferred asset, the Group recognises its retained interest in the asset and an associated liability for amounts it may have to pay. If the Group retains substantially all the risks and rewards of ownership of a transferred financial asset, the Group continues to recognise the financial asset and also recognises a collateralised borrowing for the proceeds received.

On derecognition of a financial asset, the difference between the asset's carrying amount and the sum of the consideration received and receivable and the cumulative gain or loss that had been recognised in other comprehensive income and accumulated in equity is recognised in profit or loss.

3. Significant accounting policies continued

Financial liabilities and equity

Debt and equity instruments are classified as either financial liabilities or as equity in accordance with the substance of the contractual arrangement.

Financial liabilities

All financial liabilities are measured subsequently at amortised cost using the effective interest method or at fair value through profit or loss (FVTPL).

However, financial liabilities that arise when a transfer of a financial asset does not qualify for derecognition or when the continuing involvement approach applies, and financial guarantee contracts issued by the Group, are measured in accordance with the specific accounting policies set out below:

Financial liabilities are classified at FVTPL when the financial liability is (i) contingent consideration of an acquirer in a business combination, (ii) held for trading or (iii) it is designated as at FVTPL.

Financial liabilities at FVTPL are measured at fair value, with any gains or losses arising on changes in fair value recognised in profit or loss to the extent that they are not part of a designated hedging relationship. The net gain or loss recognised in profit or loss incorporates any interest paid on the financial liability and is included within 'other gains and losses' in profit or loss.

The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments (including all fees and points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) through the expected life of the financial liability, or (where appropriate) a shorter period, to the amortised cost of a financial liability.

Derecognition of financial liabilities

The Group derecognises financial liabilities when, and only when, the Group's obligations are discharged, cancelled or have expired. The difference between the carrying amount of the financial liability derecognised and the consideration paid and payable is recognised in profit and loss.

Derivative financial instruments

The Group's activities expose it primarily to the financial risks of changes in foreign currency exchange rates and interest rates and liquidity risk.

The Group uses derivative financial instruments (primarily foreign currency forward contracts) to hedge its risks associated with foreign currency fluctuations relating to certain firm commitments and forecast transactions.

Derivatives are recognised initially at fair value at the date a derivative contract is entered into and are subsequently remeasured to their fair value at each reporting date. The resulting gain or loss is recognised in profit or loss immediately unless the derivative is designated and effective as a hedging instrument, in which event the timing of the recognition in profit or loss depends on the nature of the hedge relationship.

A derivative with a positive fair value is recognised as a financial asset whereas a derivative with a negative fair value is recognised as a financial liability. Derivatives are not offset in the financial statements unless the Group has both legal right and intention to offset. The impact of the Master Netting Agreements on the Group's financial position is disclosed in note 20. A derivative is presented as a non-current asset or a non-current liability if the remaining maturity of the instrument is more than 12 months and it is not expected to be realised or settled within 12 months. Other derivatives are presented as current assets or current liabilities.

Embedded derivatives

An embedded derivative is a component of a hybrid contract that also includes a non-derivative host with the effect that some of the cash flows of the combined instrument vary in a way similar to a stand-alone derivative.

Derivatives embedded in hybrid contracts with a financial asset host within the scope of IFRS 9 are not separated. The entire hybrid contract is classified and subsequently measured as either amortised cost or fair value as appropriate.

Derivatives embedded in hybrid contracts with hosts that are not financial assets within the scope of IFRS 9 (e.g. financial liabilities) are treated as separate derivatives when they meet the definition of a derivative, their risks and characteristics are not closely related to those of the host contracts and the host contracts are not measured at FVTPL.

If the hybrid contract is a quoted financial liability, instead of separating the embedded derivative, the Group generally designates the whole hybrid contract at FVTPL.

An embedded derivative is presented as a non-current asset or non-current liability if the remaining maturity of the hybrid instrument to which the embedded derivative relates is more than 12 months and is not expected to be realised or settled within 12 months.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

3. Significant accounting policies continued

Cash and cash equivalents

Cash and cash equivalents comprise cash on hand and demand deposits and other short-term highly liquid investments that are readily convertible to a known amount of cash within a period of up to three months post the date of the statement of financial position and are subject to an insignificant risk of changes in value.

Treasury deposits

Treasury deposits comprise demand deposits that are convertible to a known amount of cash with an original maturity of between three months and 12 months and are subject to an insignificant risk of changes in value.

Interest-bearing loans and borrowings

Interest-bearing loans and bank overdrafts are measured initially at fair value, net of direct issue costs. Finance charges, including premiums payable on settlement or redemption and direct issue costs, are accounted for on an accrual basis in the income statement using the effective interest rate method and are added to the carrying amount of the instrument to the extent that they are not settled in the period in which they arise.

Equity instruments

Equity instruments issued by the Company are recorded as the proceeds received, net of direct issue costs.

Provisions

Provisions are recognised when the Group has a present obligation as a result of a past event and it is probable that the Group will be required to settle that obligation. Provisions are measured at the Directors' best estimate of the expenditure required to settle the obligation at the date of the statement of financial position and are discounted where the effect of the time value of money is material.

A restructuring provision is recognised when the Group has developed a detailed formal plan for the restructuring and has raised a valid expectation in those affected that it will carry out the restructuring by starting to implement the plan or announcing its main features to those affected by it, and the plan has reached a stage where the decision is unlikely to be reversed. The measurement of a restructuring provision includes only the direct expenditures arising from the restructuring, which are those amounts that are both necessarily entailed by the restructuring and not associated with the ongoing activities of the entity.

Provisions for the expected cost of warranty obligations under contracts with customers and local sale of goods legislation are recognised in the month of sale of the relevant products, at the Directors' best estimate of the expenditure required to settle the Group's obligation.

Share-based payments

The Group has applied the requirements of IFRS 2 'Share-based Payment'. In accordance with the transitional provisions, IFRS 2 has been applied to all grants of equity instruments after 7 November 2002 that were unvested at 1 January 2005.

The Group issues equity-settled share-based payments to certain employees. These payments are measured at fair value (excluding the effect of non-market based vesting conditions) at the date of grant. The fair value determined at the grant date of the equity-settled share-based payments is expensed on a straight-line basis over the vesting period, based on the Group's estimate of the shares that will eventually vest based on the satisfaction of non-market based vesting and service conditions.

The fair value of options issued under the Group's Long-Term Incentive Plan is measured using a stochastic (Monte Carlo binomial) model for grants made with market based vesting conditions since 2007. The fair value of all other equity-settled share-based payments is measured using the Black-Scholes pricing model. The expected life used in these models has been adjusted, based on management's best estimate, for the effects of non-transferability, exercise restrictions and behavioural considerations.

SAYE share options granted to employees are treated as cancelled when employees cease to contribute to the scheme. This results in accelerated recognition of the expenses that would have arisen over the remainder of the original vesting period.

Own shares

Own shares are deducted from equity. No gain or loss is recognised in the income statement on the purchase, sale, issue or cancellation of the Group's own shares.

3. Significant accounting policies continued

Non-controlling interests

The transactions with non-controlling interests are accounted for as equity transactions. For purchases of non-controlling interests, the difference between any consideration paid and the relevant share acquired of the carrying value of the net assets of the subsidiary is deducted from equity. Gains or losses on disposals to non-controlling interests are also recorded in equity.

New and amended standards adopted by the Group

The Group has applied IFRS 16 'Leases' for the first time for their annual reporting period commencing 1 January 2019. The Group had to change its accounting policies as a result of adopting IFRS 16. The Group elected to adopt the new rules retrospectively but recognised the cumulative effect of initially applying the new standard on 1 January 2019. This is disclosed in changes in accounting policies of this note.

New standards and interpretations not yet adopted

Certain new accounting standards and interpretations have been published that are not mandatory for 31 December 2019 reporting periods and have not been early adopted by the Group. These standards do not have a material impact on the entity in the current or future reporting periods and on foreseeable future transactions.

Other standards

The following new standards, amended standards and interpretations became effective as at 1 January 2019 but did not have a significant impact on the Group's financial statements.

IFRIC Interpretation 23	Uncertainty over Income Tax Treatments
IFRS 9 (amendments)	Prepayment Features with Negative Compensation
IAS 28 (amendments)	Long-term Interests in Associates and Joint Ventures
IAS 19 (amendments)	Plan Amendment, Curtailment or Settlement
Annual IFRS Improvements Process	
- IFRS 3 'Business Combinations'	Previously held Interests in a joint operation
- IFRS 11 'Joint Arrangements'	Previously held Interests in a joint operation
- IAS 12 'Income Taxes'	Income tax consequences of payments on financial instruments classified as equity
- IAS 23 'Borrowing Costs'	Borrowing costs eligible for capitalisation

Discontinued operations

A discontinued operation is a component of the Group that has been disposed of and that represents a separate major line of business and is part of a single coordinated plan to dispose of such a line of business. The results of discontinued operations are presented separately in the income statement and are shown net of tax.

Where an operation is classified as discontinued, the post-tax results of that operation will be presented as a single line item on the face of the income statement and the cash flows from the discontinued operations will be split between continuing and discontinued operations on the face of the cash flow statement. Comparatives are restated to distinguish between continuing and discontinued operations.

Changes in accounting policies – IFRS 16

In the current year, the Group, for the first time, has applied IFRS 16 'Leases'. The date of initial application of IFRS 16 for the Group is 1 January 2019.

IFRS 16 introduces new or amended requirements with respect to lease accounting. It introduces significant changes to the lessee accounting by removing the distinction between operating and finance lease, requiring the recognition of a right-of-use asset and a lease liability at commencement for all leases, except for short-term leases and leases of low value assets. In contrast to lessee accounting, the requirements for lessor accounting have remained largely unchanged.

The Group is not party to any material leases where it acts as a lessor, but the Group does have a large number of material property and equipment leases.

Details of the Group's accounting policies under IFRS 16 are set out below, followed by a description of the impact of adopting IFRS 16. Significant judgements applied in the adoption of IFRS 16 included determining the lease term for those leases with termination or extension options and determining an incremental borrowing rate where the rate implicit in a lease could not be readily determined which is required for all leases..

The Group assesses whether a contract is or contains a lease, at inception of the contract. The Group recognises a right-of-use asset and a corresponding lease liability with respect to all lease arrangements in which it is the lessee, except for short-term leases (defined as leases with a lease term of 12 months or less) and leases of low value assets. For these leases, the Group recognises the lease payments as an operating expense on a straight-line basis over the term of the lease unless another systematic basis is more representative of the time pattern in which economic benefits from the leased assets are consumed.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

3. Significant accounting policies continued

Practical expedients adopted on transition

The Group has made use of the practical expedient available on transition to IFRS 16 not to reassess whether a contract is or contains a lease. Accordingly, the definition of a lease in accordance with IAS 17 and IFRIC 4 will continue to be applied to those leases entered into or modified before 1 January 2019.

As part of the Group's adoption of IFRS 16 and application of the modified retrospective approach to transition, the Group also elected to use the following practical expedients:

- a single discount rate has been applied to portfolios of leases with reasonably similar characteristics;
- right-of-use assets have been adjusted by the carrying amount of onerous lease provisions at 31 December 2018 instead of performing impairment reviews under IAS 36;
- exclusion of initial direct costs from the measurement of the right-of-use asset at the date of initial application;
- non-lease components have not been separated from lease components, and instead both components have been treated as a single component for the purpose of accounting under IFRS 16; and
- hindsight has been used in determining the lease term.

Impact on lessee accounting

Former operating leases

IFRS 16 changes how the Group accounts for leases previously classified as operating leases under IAS 17, which were off balance sheet.

Applying IFRS 16, for all leases (except as noted above), the Group now recognises right-of-use assets and lease liabilities in the consolidated balance sheet, initially measured at the present value of the future lease payments as described above.

Lease incentives (e.g. rent free periods) are recognised as part of the measurement of the right-of-use assets and lease liabilities whereas under IAS 17 they resulted in the recognition of a lease incentive liability, amortised as a reduction of rental expenses on a straight line basis.

Under IFRS 16, right-of-use assets will be tested for impairment in accordance with IAS 36 'Impairment of Assets'. This replaces the previous requirement to recognise a provision for onerous lease contracts.

Under IFRS 16 the Group recognises depreciation of right-of-use assets and interest on lease liabilities in the consolidated income statement, whereas under IAS 17 operating leases previously gave rise to a straight-line expense in other operating expenses.

Under IFRS 16 the Group separates the total amount of cash paid for leases that are on balance sheet into a principal portion (presented within financing activities) and interest (presented within operating activities) in the consolidated cash flow statement. Under IAS 17 operating lease payments were presented as operating cash outflows.

Former finance leases

The main differences between IFRS 16 and IAS 17 with respect to assets formerly held under a finance lease is the measurement of the residual value guarantees provided by the lessee to the lessor. IFRS 16 requires that the Group recognises as part of its lease liability only the amount expected to be payable under a residual value guarantee, rather than the maximum amount guaranteed as required by IAS 17. This change did not have a material effect on the Group's consolidated financial statements.

Financial impact

The application of IFRS 16 to leases previously classified as operating leases under IAS 17 resulted in the recognition of right-of-use assets and lease liabilities. Provisions for onerous lease contracts have been derecognised and operating lease incentives previously recognised as liabilities have been de-recognised and factored into the measurement of the right-to-use assets and lease liabilities.

3. Significant accounting policies continued

Impact on lessee accounting continued

Financial impact continued

The Group has chosen to use the table below to set out the adjustments recognised at the date of initial application of IFRS 16:

	As previously reported as at 31 December 2018 £'000	Impact of IFRS 16 £'000	As restated at 1 January 2019 £'000
Non-current assets			
Right of use assets	—	3,127	—
Current assets			
Trade and other assets	21,398	(19)	21,379
Total impact on assets		3,108	
Current liabilities			
Trade and other payables	(18,958)	278	(18,680)
Lease liabilities	—	(1,164)	(1,164)
Non-current liabilities			
Lease liabilities	—	(2,475)	(2,475)
Deferred tax liabilities	(870)	40	(830)
Total impact on liabilities		(3,318)	
Equity - restated			
Retained earnings	79,554	(211)	79,343
Non-controlling interest	2,028	(2)	2,026
		(213)	

Of the total right-of-use assets of £3.13 million recognised at 1 January 2019, £3.05 million related to leases of property and £0.08 million to leases of machinery.

The table below presents a reconciliation from operating lease commitments disclosed at 31 December 2018 to lease liabilities recognised at 1 January 2019.

	£'000
Operating lease commitments disclosed under IAS 17 at 31 December 2018	3,148
Short-term and low value lease commitments straight-line expensed under IFRS 16	(4)
Effect of discounting	(152)
Payments due in periods covered by extension options that are included in the lease term	599
Other adjustments on transition	48
Lease liabilities recognised at 1 January 2019	3,639

In terms of the income statement impact, the application of IFRS 16 resulted in a decrease in other operating expenses and an increase in depreciation and interest expense compared to IAS 17. During the period ended 31 December 2019, in relation to leases under IFRS 16 the Group recognised the following amounts in the consolidated income statement:

	£'000
Depreciation	1,061
Interest expense	110
Short-term lease expense	53

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

4. Reconciliation of adjusted financial measures

	Note	2019 £'000	2018 Restated £'000
Operating (loss) / profit before tax from continuing operations		(11,884)	110
Share-based payment charges		912	235
Exchange differences on intra-group transactions		601	(628)
(Gain) / loss on derivative financial liabilities	21	(106)	32
Restructuring costs		896	5,447
Research and development expenditure credit		(260)	(842)
Adjusted Operating (loss) / profit from continuing operations		(9,841)	4,354
Investment Income	9	103	170
Finance costs - for leases	17	(110)	—
Adjusted (loss) / profit from continuing operations before tax		(9,848)	4,524

Adjusted financial measures are alternative performance measures, which adjust for recurring and non-recurring items that management consider to have a distorting effect on the underlying results of the Group.

Share-based payment charges include the IFRS 2 charge for the period of £1,111,000 (2018: £506,000) and the credit relating to National Insurance on the outstanding potential share option gains of £199,000 (2018: £271,000). These costs were included in the general and administrative expenses in the consolidated income statement.

Exchange differences relating to the United States, Danish and Swedish operations represent exchange gains or losses recorded in the consolidated income statement as a result of operating in the United States, Denmark and Sweden. These costs were included in general and administrative expenses in the Consolidated income statement.

Gain/loss on derivative financial instruments relate to gains and losses made on call option contracts. These amounts are included on the consolidated income statement under (Gain)/loss on derivative financial liabilities.

Restructuring costs of £896,000 (2018: £5,447,000) relates mainly to 2019 redundancy programme, of which £87,000 is accrued as at year-end. The calculated impact of the restructuring at Corporation Tax rate of 19% would be £170,000. In the prior year, restructuring costs of £5,447,000 relates mainly to the impairment of fixed assets of £3,126,000 used by the Printhead business unit. The fair value less costs of disposal is less than the value in use and hence the recoverable amount of the relevant assets has been determined on the basis of their value in use. The remaining costs in prior year relate to expenses incurred and provisions made in relation to a reorganisation, the closure of the manufacturing facility in Sweden in 2016, and investment related expenditure.

The research and development expenditure credit relates to the corporation tax relief receivable relating to qualifying research and development expenditure. This item is shown on the face of the Consolidated income statement.

	Note	2019 Pence per share	2018 Restated Pence per share
Diluted earnings per share from continuing operations	13	(19.4p)	3.6p
Share-based payment charges		1.2p	0.3p
Exchange differences on intra-group transactions		0.8p	(0.8p)
(Gain) / Loss on derivative financial asset		(0.2p)	—
Restructuring costs		1.2p	7.1p
Tax effect of adjusting items		(0.4p)	(0.2p)
Adjusted diluted earnings per share from continuing operations	13	(16.9p)	10.0p

This reconciliation is provided to enable a better understanding of the Group's results.

5. Revenue

The Group derives its revenue from contracts with customers for the transfer of goods and services over time and at a point in time in the following major segments. This is consistent with the revenue information that is disclosed for each reportable segment under IFRS 8 Operating Segments in note 6.

Continuing Operations	2019 £'000	2018 £'000
Printhead	33,681	46,709
Product Print Systems	15,698	13,658
3D Printing	18	101
	49,397	60,468

Product Print Systems has contracts with customers where the performance obligations are partially unsatisfied at 31 December 2019. The transaction price allocated to partially satisfied and unsatisfied performance obligations at 31 December 2019 are as set out below. The transaction price allocated to partially satisfied performance obligations have been recognised in the year while the transaction price allocated to partially unsatisfied performance obligations has not been recognised.

Continuing Operations	2019 £'000	2018 £'000
Transaction price allocated to partially satisfied performance obligations	647	1,066
Transaction price allocated to partially unsatisfied performance obligations	754	395
Total transaction price for partially completed contracts	1,401	1,461

Management expects that 100% of the transaction price allocated to the unsatisfied contracts as at 31 December 2019 totalling £754,000 will be recognised during the 2020 financial year (2018: £395,000 recognised in 2019). No significant financing components have been provided to customers.

6. Business and geographical segments

For management reporting purposes, the Group's operations are analysed according to the three operating segments of 'Printhead', 'Product Print Systems', and '3D Printing'. These three operating segments are the basis on which the Group reports its primary segment information and on which decisions are made by the Group's Chief Executive Officer and Board of Directors, and resources allocated. Each business unit is run independently of the others and headed by a general manager. The Group's chief operating decision maker is the Chief Executive Officer.

Segment information for continuing operations is presented below:

Year ended 31 December 2019	Printhead £'000	Product Print Systems £'000	3D Printing £'000	Unallocated £'000	Consolidated £'000
Revenue					
Total segment revenue	33,681	15,698	18	—	49,397
Result					
Adjusted (loss) / profit from continuing operations before tax	(8,326)	(21)	(1,501)	—	(9,848)
Share-based payment charges	—	—	—	(912)	(912)
Exchange differences relating to intra-group transactions	(483)	—	(118)	—	(601)
Gain on financial instrument	—	—	106	—	106
Restructuring	(951)	55	—	—	(896)
Research and development expenditure credit	29	—	231	—	260
Profit / (Loss) before tax from Continuing operations	(9,731)	34	(1,282)	(912)	(11,891)

Share-based payment charges include the IFRS 2 charge for the period and the credit relating to National Insurance on the outstanding potential share options.

Notes to the consolidated financial statements *continued*
for the year ended 31 December 2019

6. Business and geographical segments continued

Year ended 31 December 2018 (Restated) - Continuing Operations	Printhead £'000	Product Print Systems £'000	3D Printing £'000	Unallocated £'000	Consolidated £'000
Revenue					
Total segment revenue	46,709	13,658	101	—	60,468
Result					
Adjusted profit / (loss) before tax	4,567	407	(450)	—	4,524
Share-based payment charges	—	—	—	(235)	(235)
Exchange differences relating to intra-group transactions	631	—	(3)	—	628
Restructuring	(4,381)	(982)	(84)	—	(5,447)
Gain / (loss) on financial instrument	—	—	(32)	—	(32)
Research and development expenditure credit	838	—	4	—	842
Profit / (Loss) before tax from continuing operations	1,655	(575)	(565)	(235)	280

Segment assets - Total Operations

	2019 £'000	2018 £'000
Printhead	58,117	124,242
Product Print Systems	14,776	15,611
3D Printing	14,964	13,137
Total assets	87,858	152,990

Assets are allocated to the segment which has responsibility for their control.

No information is provided for segment liabilities as this measure is not provided to the chief operating decision maker.

Other segment information - Total Operations

Year ended 31 December 2019	Notes	Printhead £'000	Product Print Systems £'000	3D Printing £'000	Unallocated £'000	Consolidated £'000
Depreciation and amortisation	15, 16, 17	4,908	386	566	—	5,860
Share-based payment charges		—	—	—	912	912
Capital expenditure	15, 16, 17	2,091	198	3,220	—	5,509

Year ended 31 December 2018	Notes	Printhead £'000	Product Print Systems £'000	3D Printing £'000	Unallocated £'000	Consolidated £'000
Depreciation and amortisation	15, 16	6,430	366	68	—	6,864
Share-based payment charges		—	—	—	235	235
Capital expenditure	15, 16	2,861	217	2,169	—	5,247

6. Business and geographical segments continued

Revenues from major products and services – Continuing Operations

	2019 £'000	Restated 2018 £'000
Printhead	33,681	46,709
Product Print Systems	15,698	13,658
3D Printing	18	101
Consolidated revenue (excluding investment income)	49,397	60,468

Geographical information

The Group operates in three principal geographical areas: EMEA, the Americas and Asia. The Group's revenue from external customers and information about its segments (non-current assets excluding deferred tax assets and other financial assets) by geographical location is detailed below:

	Revenue from external customers Continuing operations	
	2019 £'000	Restated 2018 £'000
EMEA	18,491	22,170
Asia		
– China	5,101	4,617
– Japan	1,338	11,963
– Other	530	789
The Americas (including USA)	23,937	20,929
	49,397	60,468

Revenues are attributed to geographical areas on the basis of the customer's operating location.

	Non-current assets - Total Operations	
	2019 £'000	Restated 2018 £'000
EMEA	27,396	58,128
Asia	6	8
The Americas (including USA)	8,073	8,226
	35,475	66,362

Non-current assets, being Goodwill, Other intangible assets, Property, plant and equipment, Right of use assets and the Deferred tax asset, are attributed to the location where they are situated.

Information about major customers

There are no customers whose revenue exceeds 10% of total revenues from continuing operations (2018: one customer whose revenue exceeds 10% of total revenues from continuing operations, with revenue of £9.9 million (16% of total revenues from continuing operations)). No other single customer contributed 10% or more to the Group's revenue in either 2019 or 2018.

Revenue from the top five customers represents 23% of revenues (2018: 33%).

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

7. (Loss)/profit for the year

(Loss) / profit for continuing operations in the year has been arrived at after charging/(crediting):

	2019 £'000	Restated 2018 £'000
Research and development expenses (net of capitalised development costs)*	3,502	6,358
Grants towards research and development including the research and development expenditure credit	(262)	(928)
Depreciation of property, plant and equipment	3,359	3,974
Depreciation of right of use asset	1,061	—
Amortisation of capitalised development costs (included in research and development expenses)	136	493
Amortisation of software (included in general and administrative expenses)	87	63
Amortisation of licence (included in general and administrative expenses)	14	7
(Profit)/loss on disposal of property, plant and equipment	(18)	—
Cost of inventories recognised as expense	34,411	27,799
Impairment of other financial assets	2,715	3,202
Total fees payable to the Company's auditor and its associates	225	288

* Total spend on research and development in 2019, before capitalised and amortised development costs included in note 15, was £5,714,000 (2018: £8,273,000).

Grant income includes £260,000 (2018: £842,000) in respect of the research and development expenditure credit and £2,000 (2018: £86,000) of grant income in support of the 3D Printing Projects.

Auditor's remuneration

	2019 £'000	2018 £'000
Fees payable to the Company's auditor for the audit of the Company's annual accounts	20	22
Fees payable to the Company's auditor and its associates for other services to the Group – The audit of the Company's subsidiaries	175	240
Total audit fees	195	262
– Interim review	30	26
Total non-audit fees	30	26
Total fees payable to the Company's auditor and its associates	225	288

The Audit Committee has considered the independence of the auditor in relation to non-audit services throughout the year. A description of the work of the Audit Committee is set out in the Corporate Governance statement on pages 59 and 60 and includes an explanation of how auditor's objectivity and independence is safeguarded when non-audit services are provided by the auditor.

 The Audit Committee report can be found **on page 59**.

8. Staff costs

The average monthly number of persons employed by the Group including Executive Directors was as follows:

	2019 Number	2018 Number
Research and development	77	74
Sales and marketing	53	86
Manufacturing and engineering	247	291
Administration	60	65
	437	516

Their aggregate remuneration comprised:

	Notes	2019 £'000	Restated 2018 £'000	Previously reported 2018 £'000
Wages and salaries		21,518	23,965	21,895
Social security costs		2,035	2,341	2,341
Pension costs	33	951	1,053	1,053
Share-based payments		912	235	235
		25,416	27,594	25,524

Share-based payment charges include the IFRS 2 charge for the period (£1,111,000) and a credit relating to National Insurance on the outstanding potential share option gains (£199,000). Wages and Salaries have been restated in 2018 to reflect a correction in the disclosure of direct and indirect salary costs included in cost of goods sold this has increased reported wages and salaries by £2,070,000.

9. Investment income

	2019 £'000	2018 £'000
Interest receivable on cash and bank balances, and treasury deposits	103	170

10. Discontinued operations

On 26 September 2019 Xaar announced the cessation of all Thin Film activities. This resulted in an impairment charge of £39,000,000 in the interim 2019 financial statements which is made up of £28,500,000 of intangible assets, £5,400,000 of property, plant and equipment and £5,100,000 working capital.

Thin Film activities are included within the Printhead business unit. The results of Thin Film related activities for the year are shown below:

	2019 £'000	2018 £'000
Revenue from contracts with customers	1,586	3,066
Expenses	(61,587)	(18,415)
Loss before tax from discontinued operations	(60,001)	(15,349)
Income tax credit	3,918	183
Loss after tax from discontinued operations	(56,082)	(15,166)

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

10. Discontinued operations continued

Included in the Expenses of £61,587,000 for 2019 is £1,712,000 for the buy back of inventory from a distributor, which was subsequently impaired given the discontinuance of the Thin Film business. This is a reclassification from the 2019 interims where this was relating to the original entry treated as a reversal of revenue. The reclassification has resulted in Revenue increasing by £4,332,000, cost of goods sold (based on the original sale) increasing by £2,620,000, and Expenses (for writedowns) increasing by £1,712,000.

The net cash flows incurred by Thin Film business unit are, as follows:

	Notes	2019 £'000	2018 £'000
Net cash outflow from operating activities		(17,647)	(15,684)
Net cash outflow from investing activities		(321)	(391)
Net cash inflow / (outflow) from financing activities		—	—
Net cash (outflow) / inflow from discontinued operations		(17,968)	(16,075)

Earnings per share		2019	2018
Basic: profit / (loss) for the year from discontinued operations	13	(72.7p)	(19.7p)
Diluted: profit / (loss) for the year from discontinued operations	13	(72.7p)	(19.5p)

Potential ordinary shares are treated as dilutive if their conversion to ordinary shares would decrease earnings per share or increase loss per share. Therefore in 2019, the diluted earnings per share is not impacted by the effect of dilutive potential ordinary shares.

11. Tax

	Notes	2019 £'000	2018 £'000
Current tax – UK		153	241
Current tax – overseas		113	10
		266	251
Amounts under provided in previous years		281	238
Total current income tax charge		547	489
Deferred tax – origination and reversal		(1,054)	(3,355)
Adjustment in respect of prior years		90	277
Total deferred tax credit	22	(964)	(3,078)
Total tax credit for the year		(417)	(2,589)

The rate of tax for the year, based on the UK standard rate of corporation tax, is 19% (2018: 19%). Taxation for other jurisdictions is calculated at the rates prevailing in the respective jurisdictions.

The Finance (No.2) Act 2017, which was substantively enacted on 6 September 2017, provided for a reduction in the main rate of UK corporation tax from 19% to 17% on April 1, 2020. As deferred tax assets and liabilities are measured at the rates that are expected to apply in the periods of the reversal, deferred tax balances at December 31, 2019 have been calculated at the rate at which the relevant balance is expected to be recovered or settled.

Following the UK Budget on 11 March 2020, the government have announced that legislation will be introduced in Finance Bill 2020 to amend the main rate of UK corporation tax to 19%. However, as this legislation has not been substantively enacted at the balance sheet date, this effect has not been included in these financial statements. There is expected to be no overall effect from the reversal of the rate from 17% to 19% to the deferred tax balance at the balance sheet date (this is due to the fact that the net deferred tax position for U.K entities is nil).

The note to the cash flow statement (note 31) shows repayments of tax for £3,392,000 during the year (2018: payments of £471,000).

The closing deferred tax liability at 31 December 2019 has been calculated at 17% reflecting the tax rate at which the deferred tax liability is expected to be reversed in future periods. Details on deferred tax assets are disclosed in note 22.

11. Tax continued

In addition to the amount charged to the income statement and other comprehensive income, the following amounts relating to tax have been recognised directly in equity:

	Notes	2019 £'000	2018 £'000
Current tax			
Excess tax deductions in relation to share-based payments on exercised options	21	—	(1)
Foreign exchange movement		13	—
		13	(1)
Deferred tax			
Arising on transactions with equity participants:			
Change in estimated excess tax deductions in relation to share-based payments	21	—	42
Foreign exchange movement		4	—
		4	42
Total income tax recognised directly in equity		17	41

The charge for the year can be reconciled to the profit per the income statement as follows:

	2019 £'000	Restated 2018 £'000
(Loss) / profit before tax from continuing activities	(11,891)	279
Loss before tax from discontinuing activities	(60,001)	(15,349)
Accounting loss before income tax	(71,892)	(15,070)
Tax on ordinary activities at standard UK rate of 19.00% (2018: 19.00%)	(13,659)	(2,863)
Effect of:		
Expenses not deductible for tax purposes	557	392
(Non-taxable) / non-deductible foreign exchange differences	—	(25)
Effect of different tax rates of subsidiaries operating overseas	43	(110)
Enhanced tax deduction for patent box	—	(904)
Effect of change in UK corporation tax rate on deferred tax	65	379
Current year losses not recognised	8,364	—
Derecognition of previously recognised deferred tax balances	3,842	—
Prior year adjustments	371	542
Total tax credit for the year	(417)	(2,589)
Income tax expense / (credit) reported in the statement of profit and loss	3,501	(2,406)
Income tax expense credit attributable to discontinued operations	(3,918)	(183)
	(417)	(2,589)

The expenses not deductible for tax purposes mainly relate to depreciation on non-qualifying assets and share-based payments.

The effective tax rate for the year is 1% (2018: 17%). The low percentage this year is due to losses no longer being recognised for deferred tax. For 2019 if the prior year adjustments and derecognition of previously recognised deferred tax balances alongside current year losses not recognised were excluded the effective tax rate would have been 17% (2018: 20%).

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

12. Dividends

	2019 £'000	2018 £'000
Amounts recognised as distributions to equity holders in the year:		
Final dividend for the year ended 31 December 2018 of nil (2017: 6.8p) per share	—	5,238
Interim dividend for the year ended 31 December 2019 of nil (2018: 1.0p) per share	—	771
Total distributions to equity holders in the year	—	6,009
Proposed final dividend for the year ended 31 December 2019 of nil (2018: nil) per share	—	—

No interim or final dividend was proposed or paid for the year ended 31 December 2019.

13. Earnings per share – basic and diluted

The calculation of basic and diluted earnings per share is based on the following data:

	2019 £'000	2018 Restated £'000
Earnings		
Earnings for the purposes of basic earnings per share being net (Loss) attributable to equity holders of the parent	(71,051)	(12,397)
from continuing operations	(14,969)	2,769
from discontinued operations	(56,082)	(15,166)
Number of shares		
Weighted average number of ordinary shares for the purposes of basic earnings per share	77,116,331	76,957,142
Effect of dilutive potential ordinary shares:		
Share options	—	941,350
Weighted average number of ordinary shares for the purposes of diluted earnings per share	77,116,331	77,898,492

	2019 Pence per share	2018 Pence per share
Basic	(92.1p)	(16.1p)
Diluted	(92.1p)	(15.9p)
Continuing operations:		
Basic	(19.4p)	3.6p
Diluted	(19.4p)	3.6p
Discontinued operations:		
Basic	(72.7p)	(19.7p)
Diluted	(72.7p)	(19.5p)

Potential ordinary shares are treated as dilutive if their conversion to ordinary shares would decrease continuing earnings per share or increase continuing loss per share. Accordingly there is now a dilutive impact in the prior year following classification of Thin Film as discontinued. However, in 2019, the diluted continuing earnings per share is not impacted by the effect of dilutive potential ordinary shares.

The weighted average number of ordinary shares for the purposes of basic earnings per share is calculated after the exclusion of ordinary shares in Xaar plc held by Xaar Trustee Ltd, the Xaar plc ESOP Trust and the matching shares held in trust for the Share Incentive Plan.

For 2019, there were share options granted over 978,915 shares that would not have been included in the diluted earnings per share calculation because they were anti-dilutive at the year-end (2018: 541,008 shares had not been included).

The performance conditions for LTIP awards over 1,733,172 shares (2018: 1,581,632 shares) have not been met in the current financial year or are not expected to be met in future financial periods, and therefore the dilutive effect of those shares have not been included in the diluted earnings per share calculation.

Adjusted earnings per share

This adjusted earnings per share information is considered to provide a fairer representation of the Group's trading performance year on year, as it removes items which, in the Board's opinion, do not reflect the underlying performance of the Group.

13. Earnings per share – basic and diluted continued

The calculation of adjusted EPS excluding share-based payment charges, exchange differences relating to intra-group transactions, restructuring and acquisition expenses, is based on continued operation earnings of:

	2019 £'000	2018 Restated £'000
Earnings / (loss) on continuing operations for the purposes of basic earnings per share being Net profit / (loss) attributable to equity holders of the parent	(14,969)	2,769
Share-based payment charges	912	235
Exchange differences relating to intra-group transactions	601	(629)
(Gain) / loss on derivative financial assets	(106)	32
Restructuring costs	896	5,447
Tax effect of adjusting items	(337)	(95)
Adjusted (loss) / profit after tax - continuing operations	(13,003)	7,759

Tax effect of adjusting items is calculated at current Corporation tax rate (19%) less any disallowed tax items.

The denominators used are the same as those detailed above for both basic and diluted earnings per share.

Adjusted earnings per share on continuing operations is earnings per share excluding the items adjusted for as detailed above:

	2019 Pence per share	2018 Restated Pence per share
Adjusted basic	(16.9p)	10.1p
Adjusted diluted	(16.9p)	10.0p

Adjusted EPS on continuing operations is considered to provide a fairer representation of the Group's trading performance year on year.

14. Goodwill

The carrying amount of goodwill at 31 December 2019 was £5,333,000 (2018: £5,522,000).

Goodwill acquired in a business combination is allocated, at acquisition, to the cash-generating units (CGUs) that are expected to benefit from that business combination. Goodwill occurred from the acquisition of Engineered Print Solutions (EPS) in July 2016.

	2019 £'000	2018 £'000
Product Print Systems (a single CGU)		
Balance at the beginning of the year	5,522	5,212
Foreign currency translation	(189)	310
Balance at the end of the year	5,333	5,522

Goodwill relates to the acquisition of Engineered Print Solutions in July 2016 (a Company incorporated in USA). As part of the changes to the reportable segments in the prior year, the goodwill stated above is now wholly attributed to Product Print Systems (a single CGU).

The Group tests goodwill annually for impairment or more frequently if there are indications that goodwill might be impaired. Having performed impairment testing, no impairment has been identified and therefore no impairment loss has been recognised in 2019 (2018: £nil).

The recoverable amount of the CGU is determined from a value-in-use calculation. The key assumptions to which the value-in-use calculation is most sensitive are those regarding the discount rates and expected changes to selling prices and direct costs during the period.

A budget was prepared for a period of 5 years and a terminal value determined using a prudent 2% growth rate in Engineered Print Solutions, based on OECD growth rates.

The Group prepared cash flow forecasts derived from the most recent financial forecasts reviewed by management for the next three years and these have been used in the value-in-use calculation. The discount rate applied to the cash flow projections is 12.1% (2018: 8.4%) and reflects external third party advice on the discount rate associated with Engineered Print Solutions. The discount rate reflects the risk free rate, equity beta and local market premium as calculated at the year-end.

Sensitivity analysis has been completed on each key assumption in isolation and this indicates that reasonable changes in key assumptions on which we have based our determination of the recoverable amount would not cause the carrying amount of goodwill to exceed its recoverable amount.

Notes to the consolidated financial statements *continued*
for the year ended 31 December 2019

15. Other intangible assets

	Capitalised development costs £'000	Licences acquired £'000	Software £'000	Total £'000
Cost				
At 1 January 2018	39,550	533	3,223	43,306
Additions	1,915	177	160	2,252
Exchange Movements	—	6	—	6
At 1 January 2019	41,465	716	3,383	45,564
Additions	2,255	—	90	2,345
Transfer	17	(3)	(2)	12
Exchange movements	—	(4)	—	(4)
Disposals	—	—	(18)	(18)
At 31 December 2019	43,737	709	3,453	47,899
Amortisation				
At 1 January 2018	7,059	533	3,036	10,628
Charge for the year	2,069	7	63	2,139
At 1 January 2019	9,128	540	3,099	12,767
Charge for the year	923	14	87	1,024
Transfers	26	—	62	88
Disposals	—	—	(17)	(17)
Impairment	28,494	—	—	28,494
At 31 December 2019	38,571	554	3,231	42,356
Carrying amount:				
At 31 December 2019	5,166	155	222	5,543
At 31 December 2018	32,337	175	284	32,796

Internally generated product development costs relate to the Platform 2, Platform 3 and Platform 4 ranges of printheads and technology. It also includes the capitalisation of the product development costs that relate to the High Speed Sintering 3D printer developed by Xaar 3D. Platform 2 and Platform 3 are fully amortised.

Amortisation of Platform 4 commenced in August 2017 and was being amortised over a period of 20 years prior to the decision to cease all Thin Film activities. Following the decision to discontinue the Thin Film operation the Platform 4 range has been fully impaired (an impairment of £28,494,000) based on its fair value less costs to sell.

The development of the High Speed Sintering 3D printer was completed in December 2019 and amortisation commenced over a ten year period.

Licences acquired are amortised over their estimated useful lives which is, on average, ten years.

The amortisation period for software is three to five years and for other product development costs incurred on the Group's product development is ten years.

As at 31 December 2019 the Group had not entered into any contractual commitments for the acquisition of intangible assets.

16. Property, plant and equipment

	Land and buildings £'000	Leasehold property £'000	Plant and machinery £'000	Furniture, fittings and equipment £'000	Assets in the course of construction £'000	Total £'000
Cost						
At 1 January 2018	1,125	14,937	78,212	4,189	3,974	102,437
Additions	—	1,145	1,503	96	251	2,995
Transfers	—	788	1,300	15	(2,103)	—
Exchange movements	67	(9)	(187)	16	2	(111)
Disposals	—	(3,440)	(10,094)	(551)	(2)	(14,087)
At 1 January 2019	1,192	13,421	70,734	3,765	2,122	91,234
Additions	—	50	1,421	83	96	1,650
Transfers	532	628	1,111	(182)	(2,102)	(12)
Exchange movements	(41)	(29)	(46)	(16)	(5)	(138)
Disposals	1	(25)	(5,059)	(16)	(3)	(5,102)
At 31 December 2019	1,684	14,045	68,161	3,634	108	87,632
Depreciation						
At 1 January 2018	57	10,798	54,793	3,318	—	68,966
Charge for the year	7	654	3,969	95	—	4,725
Exchange movements	—	(55)	(194)	(10)	—	(259)
Disposals	—	(3,235)	(9,747)	(518)	—	(13,500)
Impairment	—	60	3,195	3	—	3,258
At 1 January 2019	64	8,222	52,016	2,888	—	63,190
Charge for the year	17	576	3,089	94	—	3,776
Transfer	242	(480)	(293)	444	—	(87)
Exchange movements	(3)	(1)	(47)	(2)	—	(53)
Disposals	—	(18)	(5,122)	(16)	—	(5,156)
Impairment	—	5	5,049	—	—	5,054
At 31 December 2019	320	8,303	54,692	3,408	—	66,724
Carrying amount						
At 31 December 2019	1,364	5,742	13,468	225	108	20,908
At 31 December 2018	1,128	5,199	18,717	878	2,122	28,044

Impairments in 2018 of £3,258,000 primarily relate to the write down of assets at the manufacturing site for Xaar's printheads. These were for old and obsolete machines. Impairments in 2019 of £5,054,000 are almost all in relation to the Thin Film discontinued operation, these assets have been valued at fair value, less costs of disposal of nil.

As at 31 December 2019 the Group had entered into contractual commitments for the acquisition of property, plant and equipment amounting to £71,000 (2018: £90,000).

17. Leases

The Group and its subsidiaries have adopted IFRS 16 retrospectively from 1 January 2019, but have not restated comparatives for the 2018 reporting period, as permitted under specific transition provisions in the standard. The reclassifications and adjustments arising from the new leasing rules are therefore recognised in the opening balance sheet on 1 January 2019. The new accounting policies, measurement and the impact of the change in accounting policy are disclosed in note 3.

The Group has lease contracts for various items of buildings, equipment and vehicles used in its operations. The Group's obligations under its leases are secured by the lessor's title to the leased assets. Generally, the Group is restricted from assigning and subleasing the leased assets and some contracts require the Group to maintain certain financial ratios.

The Group also has certain leases of machinery with lease terms of 12 months or less and leases of office equipment with low value.

The Group applies the 'short-term lease' and 'lease of low-value assets' recognition exemptions for these leases.

Notes to the consolidated financial statements *continued*
for the year ended 31 December 2019

17. Leases continued

Set out below are the carrying amounts of right-of-use assets recognised and the movements during the period:

	Buildings £'000	Equipment £'000	Vehicles £'000	Total £'000
Cost				
At 1 January 2019 (restated)	12,204	99	16	12,319
Additions	1,494	20	—	1,514
Disposals	(6)	—	—	(6)
Exchange movements	(28)	—	—	(28)
At 31 December 2019	13,664	119	16	13,799
Depreciation				
At 1 January 2019 (restated)	9,159	25	8	9,192
Charge for the year	1,025	31	5	1,061
Exchange movements	(15)	—	—	(15)
At 31 December 2019	10,169	56	13	10,238
Carrying amount				
At 31 December 2019	3,495	63	3	3,561
At 1 January 2019 (restated)	3,045	74	8	3,127

Set out below are the carrying amounts of lease liabilities (included under current and non-current liabilities on the statement of financial position) and the movements during the period:

	£'000
At 1 January 2019 (restated)	3,639
Additions	1,507
Accretion of interest	110
Payments	(1,274)
Exchange movement	(11)
At 31 December 2019	3,971
Current	1,450
Non-current	2,521

The table below summarises the maturity profile of the Group's financial liabilities based upon the contractual undiscounted payments as at 31 December 2019.

	£'000
On demand	—
Less than three months	292
Four to twelve months	1,250
One to five years	2,530
More than 5 years	97
	4,169

17. Leases continued

The following are the amounts recognised in profit or loss:

	£'000
Depreciation expense of right-of-use assets	1,061
Interest expense on lease liabilities	110
Expense relating to short-term leases (included in administrative expenses)	53
Total amount recognised in profit or loss	1,224

Under IAS 17 the total cost of lease payments (excluding short-term leases) included in operating expenses would be £1,274,000, under IFRS 16 the depreciation and interest cost are £1,171,000. The IFRS 16 transition has decreased operating expenses in 2019 by £103,000.

18. Subsidiaries

A list of the investments in subsidiaries, including the name, country of incorporation and proportion of ownership interest, is given in note 10 to the Company's separate financial statements.

19. Inventories

	2019 £'000	2018 £'000
Raw materials and consumables	8,938	11,124
Work in progress	3,258	2,315
Finished goods	3,968	18,703
	16,164	32,142

The cost of inventories recognised as an expense includes £19,891,000 (2018: £3,299,000) in respect of inventory write-downs, and has been offset by £1,090,000 (2018: £1,745,000) in respect of the reversal of such write-downs. The reversal of such write-downs arose from specific projects related to finished goods and raw materials i.e. Printbar release, 1003 Built under concession, 1002 write-off in the year, and PZT wafer write down.

Gross stock was £37,099,000 (2018: £37,224,000) with inventory provisions of £20,935,000 (2018: £5,082,000). The provision of £20,935,000 included £17,815,000 in relation to discontinued operations and £3,120,000 for continuing operations. Inventory for discontinued operations has been recognised at fair value.

20. Other financial assets

The fair value of all financial assets and financial liabilities approximates their carrying value.

Trade and other receivables

	2019 £'000	2018 £'000
Amount receivable for the sale of goods	14,407	23,825
Allowance for doubtful debts	(7,959)	(5,178)
	6,448	18,647
Other debtors	1,634	894
Prepayments	1,027	1,857
	9,109	21,398
Current tax asset	1,788	5,142

No amounts are expected to be settled in more than 12 months.

Trade receivables

The average credit period taken on sales of goods is 48 days (2018: 113 days). No interest is charged on the receivables for the period agreed in the Requirements Contract or, if not specified or applicable, the first 30 days from the date of the invoice. Thereafter, the Group reserves the right to charge interest at a daily rate of the greater of either 3% per annum above the base rate of the Bank of England from time to time, or the maximum rate of interest allowable under the Late Payment of Commercial Debts (Interest) Act 1998, on all sums outstanding until payment in full is received. Trade receivables over 120 days are provided for based on estimated irrecoverable amounts from the sale of goods, determined by reference to past default experience.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

20. Other financial assets continued

Trade receivables continued

The maximum exposure to credit risk is the carrying amount of the financial assets as disclosed on page 127. Before accepting any new customer, the Group uses an external credit scoring system to assess the potential customer's credit quality and defines credit limits by customer. Credit limits are reviewed at least once per year. Of the trade receivables balance at the end of the year, four customers each represented greater than 5% of the total receivables balance, totalling £7.5 million (2018: £13.6 million). The total due from these customers represents 15% (2018: 22%) of the Group's revenue.

Included in the Group's trade receivables balance are debtors with a carrying amount of £2.1 million (2018: £7.6 million) at the reporting date for which the Group has not provided:

	2019 £'000	2018 £'000
1–30 days overdue	801	1,575
30–60 days overdue	434	451
60–90 days overdue	228	252
90–120 days overdue	61	353
Over 120 days overdue	570	4,995
Total receivables	2,094	7,626

Movement in the allowance for doubtful debts:

	2019 £'000	2018 £'000
Balance at the beginning of the year	5,178	510
Impairment losses increased	2,781	4,668
Balance at the end of the year	7,959	5,178

The Group always measures the loss allowance for trade receivables at an amount equal to lifetime ECL. The expected credit losses on trade receivables are estimated using a provision matrix by reference to past default experience of the debtor and an analysis of the debtor's current financial position, adjusted for factors that are specific to the debtors, general economic conditions of the industry in which the debtors operate and an assessment of both the current as well as the forecast direction of conditions at the reporting date. The Group has recognised a loss allowance of 2.9% against all receivables, excluding those with a specific provision against them. Most of the debt over 120 days has been provided in full and relates to a small number of customers where none of the debt is expected to be recovered through normal trading. A provision is made against trade receivables until such time as the Group believes the amount to be irrecoverable (such as the bankruptcy of a customer or emerging market risks, which would render the receivable irrecoverable), after which the trade receivable balance is written off.

Ageing of impaired trade receivables:

	2019 £'000	2018 £'000
Current	132	—
1–30 days overdue	45	—
30–60 days overdue	25	—
60–90 days overdue	15	—
90–120 days overdue	361	—
Over 120 days overdue	7,381	5,178
Total	7,959	5,178

The Directors have considered the sensitivity of doubtful debts and a 1% increase on the ECL percentage would equate to an additional £144,000 allowance. The Directors consider that the carrying amount of trade and other receivables approximates their fair value.

20. Other financial assets continued

Treasury deposits

Treasury deposits comprise bank deposits with an original maturity of between three months and 12 months. The carrying amount of these assets approximates their fair value.

	2019 £'000	2018 £'000
Treasury deposits	522	3,277

Cash and cash equivalents

Cash and cash equivalents comprise cash held by the Group and short-term bank deposits with an original maturity of three months or less. The carrying amount of these assets approximates their fair value.

The analysis of cash and short-term bank deposits is as follows:

	2019 £'000	2018 £'000
Cash	24,800	24,669

The credit risk on liquid funds and derivative financial instruments is limited because the counterparties are banks with high credit ratings assigned by international credit-rating agencies.

21. Financial instruments

Fair value measurements

The following table combines information about:

- Classes of financial instruments based on their nature and characteristics;
- The carrying amounts of financial instruments;
- Fair values of financial instruments (except financial instruments when carrying amount approximates their fair value); and
- Fair value hierarchy levels of financial assets and financial liabilities for which fair value was disclosed.

Fair value hierarchy Levels 1 to 3 are based on the degree to which the fair value is observable:

- Level 1 fair value measurements are those derived from quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2 fair value measurements are those derived from inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices); and
- Level 3 fair value measurements are those derived from valuation techniques that include inputs for the asset or liability that are not based on observable market data (unobservable inputs).

	Financial assets			Financial liabilities		Total £'000
	FVTPL – designated £'000	FVTPL – mandatorily measured £'000	Amortised cost £'000	FVTPL – mandatorily measured £'000	Amortised cost £'000	
2019						
Trade and other receivables	–	–	8,082	–	–	8,082
Treasury deposits	–	–	522	–	–	522
Cash and bank balances	–	–	24,800	–	–	24,800
Trade and other payables	–	–	–	–	(7,284)	(7,284)
Derivative financial instrument	–	–	–	(2,996)	–	(2,996)

Additional disclosure for Lease Liabilities is reported in note 17.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

21. Financial instruments continued

	Financial assets			Financial liabilities		Total £'000
	FVTPL – designated £'000	FVTPL – mandatorily measured £'000	Amortised cost £'000	FVTPL – mandatorily measured £'000	Amortised cost £'000	
2018						
Trade and other receivables	—	—	19,541	—	—	19,541
Treasury deposits	—	—	3,277	—	—	3,277
Cash and bank balances	—	—	24,669	—	—	24,669
Trade and other payables	—	—	—	—	(18,958)	(18,958)
Other financial liabilities due within one year	—	—	—	—	(33)	(33)
Other financial liabilities due after more than one year	—	—	—	—	(103)	(103)
Derivative financial instrument	—	—	—	(936)	—	(936)

Fair value of the Group's financial assets and financial liabilities that are measured at fair value on a recurring basis

Some of the Group's financial assets and financial liabilities are measured at fair value at the end of each reporting period. The following table gives information about how the fair value of these financial assets and financial liabilities are determined (in particular, the valuation technique(s) and inputs used).

Financial asset/ financial liabilities	Valuation technique(s) and key input(s)	Significant unobservable input(s)	Relationship and sensitivity of unobservable inputs to fair value
Derivative financial instrument (Level 3)	Black-Scholes model. The following variables were taken into consideration: current underlying price of the underlying share, options strikeprice, time until expiration (expressed as a percent of a year), implied volatility of the underlying share and LIBOR.	Underlying price of the share. Volatility of the underlying share.	8% increase / (decrease) would result in a £427,000 increase in the fair value and a £347,000 decrease. 10% increase / (decrease) would result in £280,000 increase in the fair value and £265,000 decrease.

There were no transfers between Level 1 and 2 during the current or prior year.

The only financial liabilities measured subsequently at fair value on Level 3 fair value measurement represent written call options relating to a business combination. In July 2018 Xaar signed an investment agreement with Stratasys Solutions Limited ("Stratasys") which granted Stratasys a 15% share of Xaar 3D Limited ('Xaar 3D') and two written call options to acquire a further 10% and 5%. These options gave Stratasys the right, but not the obligation, to acquire GBP denominated shares in Xaar 3D for a fixed price which was denominated, and to be settled, in USD. At the 1 January 2019 the fair value of these options was £936,000. On the 4 December 2019 Stratasys exercised the first of the two options granting them a further 10% share in Xaar 3D. At the same time Xaar 3D and Stratasys agreed to extinguish the second option, thereby settling both options in the year. On the 4 December 2019 Xaar 3D Holdings sold to Stratasys a 20% share in Xaar 3D. As a consequence Stratasys now owns 45% of Xaar 3D with the remaining 55% owned by Xaar 3D Holdings. As part of the agreement between Xaar 3D Holdings and Stratasys, Xaar 3D Holdings granted Stratasys a written call option to acquire its remaining 55% shareholding in Xaar 3D. As with the original option agreement between the Xaar 3D and Stratasys the new options are USD denominated giving rise to a new derivative financial liability. This liability was valued at a fair value of £2,996,000 at the 31 December 2019. Additional disclosure information is provided in note 36 Non-Controlling interest and note 35 Related Party Transactions.

	2019 £'000	2018 restated £'000
Balance at 1 January 2019	(936)	—
Issues	(2,908)	(904)
Settlements	742	—
Total gains or losses - in profit or loss	106	(32)
Balance at 31 December 2019	(2,996)	(936)

21. Financial instruments continued

Fair value of the Group's financial assets and financial liabilities that are measured at fair value on a recurring basis continued

The use of financial derivatives is governed by the Group's policies approved by the Board of Directors, which provides written principles on the use of financial derivatives consistent with the Group's risk management strategy. The Group does not use derivative financial instruments for speculative purposes.

Financial risk management objectives

The Group's policy is to manage the Group's financial risk, secure cost effective funding for the Group's operations and to minimise the adverse effects of fluctuations in the financial markets on the value of the Group's financial assets and liabilities, on reported profitability and on the cash flows of the Group.

The Group finances its activities with a combination of cash and treasury deposits. Other financial assets and liabilities, such as trade debtors and trade creditors, arise directly from the Group's operating activities.

Financial instruments give rise to foreign currency, interest rate, credit and liquidity risk. The Group's management of its exposure to credit risk is discussed in note 20 and to liquidity risk is discussed in note 24.

The Group's exposure has been calculated with reference to these balances as at the year-end.

Interest rate risk

As the Group currently has no borrowings, its exposure to interest rate risk relates to the interest rate on its cash, cash equivalent and treasury deposit balances. The Group's interest rate risk arises mainly from its funds invested in short-term bank deposits. To mitigate these risks, limits have been set by the Board in relation to maturity period and maximum deposits with any one institution.

If interest rates had been 2% higher/reduced to 0% and all other variables were held constant, the Group's profit for the year ended 31 December 2019 would increase by £0.2 million or decrease by £0.1 million (2018: increase by £0.6 million or decrease by £0.2 million). There would be no effect on equity reserves.

Foreign currency risk

The Group receives approximately 35% of its revenues in US Dollars and 10% of its revenue in Euros, which are partially naturally hedged by supplies in these currencies, but the remainder requires conversion into Sterling in order to fund the remaining costs of the UK operations. The Group has R&D operations in Sweden, and therefore incurs costs and holds cash balances in Swedish Krona. In 2017, the Group had a manufacturing facility in Sweden which was closed in 2016 and legacy working capital balances denominated in Swedish Krona remain in the Group's Swedish companies prior to the dissolution of these entities.

The Group is mainly exposed to foreign currency risk resulting from transactions in US Dollars, Euros and Swedish Krona. The following table demonstrates the Group's sensitivity to a 10% increase and decrease in the Sterling exchange rate against the relevant foreign currencies on the Group's profit before tax and equity (due to changes in the fair value of monetary assets, liabilities and forward currency contracts). 10% represents management's assessment of the reasonably possible movement in exchange rates. The sensitivity analysis includes only outstanding foreign currency denominated monetary items and adjusts their translation at the period end for a 10% change in foreign currency rates. The sensitivity analysis includes inter-company balances within the Group where the denomination of the balance is in a currency other than the functional currency of the debtor or the creditor. A positive number below indicates an increase in profit or equity.

	Euro currency impact		US Dollar currency impact		Swedish Krona currency impact	
	2019 £'000	2018 £'000	2019 £'000	2018 £'000	2019 £'000	2018 £'000
Effect of a 10% increase in relevant exchange rate on:						
Profit or loss	(90)	(229)	(342)	(1,024)	(12)	(22)
Other equity	—	—	(227)	(202)	57	40
Effect of a 10% decrease in relevant exchange rate on:						
Profit or loss	110	280	418	1,251	15	27
Other equity	—	—	276	247	(48)	(52)

Capital risk management

The primary objective of the Group's capital management is to ensure that it maintains a strong credit rating and healthy capital ratios in order to support its business, maximise shareholder value and provide flexibility for value enhancing investments. The Group manages its capital structure and makes adjustments to it in light of changes in economic conditions or as a result of corporate strategy. To maintain or adjust the capital structure, the Group may adjust the dividend payment to shareholders, return capital to shareholders or issue new shares. In addition, any potential value enhancing investments may be funded through additional debt instruments. No changes were made in the objectives, policies or processes during the current or prior year. No Dividend is proposed for 2019.

Further information can be found on page 122 (note 12).

The Group monitors capital using a gearing ratio, which is determined as the proportion of debt to equity. Debt is defined as long- and short-term borrowings. Equity includes all capital and reserves of the Group attributable to the equity holders of the parent. The Group's policy for its existing business is to use debt where appropriate, whilst maintaining the gearing ratio at a level under 10%.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

21. Financial instruments continued

Capital risk management continued

The gearing ratio (excluding IFRS 16 leases) at the year-end is as follows:

	2019 £'000	2018 £'000
Net debt	—	—
Total Equity	70,660	131,591
Gearing ratio	0%	0%

The Group is not subject to externally imposed capital requirements.

Credit risk management

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial loss to the Group. The Group has adopted a policy of only dealing with creditworthy counterparties, as a means of mitigating the risk of financial loss from defaults.

Trade receivables consist of a large number of customers, spread across different industries and geographical areas. Ongoing credit evaluation is performed on the financial condition of accounts receivable.

The credit risk on liquid funds is limited because the counterparties are banks with high credit ratings assigned by international credit rating agencies.

22. Deferred tax

The following are the major deferred tax liabilities and assets recognised by the Group and movements thereon during the current and prior reporting periods:

	Accelerated tax depreciation £'000	Share-based payment £'000	Untaxed reserves £'000	Tax losses £'000	Other temporary difference £'000	Total £'000
At 1 January 2018	5,219	(549)	—	(105)	(660)	3,905
Charge/(credit) to income	(162)	356	148	(3,306)	(114)	(3,078)
Charge to equity	—	43	—	—	—	43
At 1 January 2019 as reported	5,057	(150)	148	(3,411)	(774)	870
Impact of IFRS 16 on transition	(40)	—	—	—	—	(40)
At 1 January 2019 restated	5,017	(150)	148	(3,411)	(774)	830
(Credit)/charge to income	(56)	110	(148)	2,829	220	2,955
(Credit)/charge for discontinued operations	(4,256)	—	—	—	337	(3,919)
Foreign exchange movement	—	—	—	—	4	4
At 31 December 2019	705	(40)	—	(582)	(213)	(130)

Certain deferred tax assets and liabilities have been offset. The following is the analysis of the deferred tax balances (after offset) for financial reporting purposes:

	2019 £'000	2018 Restated £'000
Deferred tax liabilities	—	(830)
Deferred tax assets	130	—
Being: Deferred tax assets / (liabilities) from continuing operations	130	3,089
Being: Deferred tax assets / (liabilities) from discontinued operations	—	(3,919)

The deferred tax has changed from a liability in 2018 to a deferred tax asset in 2019.

There has been two major changes in deferred tax during the year:

1. It was deemed that a deferred tax asset should no longer be recognised in relation to XaarJets losses; this has resulted in the release of the £3.2 million deferred tax asset.
2. In contrast to this most of the accelerated tax depreciation has been released. It is mainly due to the discontinued Thin Film operation. The deferred tax liability for expenditure capitalised under IAS 38 (where revenue deductions had been previously claimed for Thin Film) was fully released in the current year which resulted in a deferred tax credit of £4.3 million.

As at 31 December 2019, the Group had unused tax losses of £65.8 million (2018: £24.6 million) available to offset against future profits. As at 31 December 2019 the Group has an unrecognised deferred tax assets in respect of these losses totalling £62.7 million (2018: no unrecognised deferred tax asset for losses). These losses may be carried forward indefinitely. As at 31 December 2019, the Group has unused capital losses of £1.1 million (2018: £1.1 million) available for offset against future gains.

No deferred tax asset has been recognised in respect of these capital losses as it is not considered probable that there will be future chargeable gains available. These losses may be carried forward indefinitely.

23. Trade and other payables

	2019 £'000	2018 £'000
Trade payables and accruals	7,284	18,958

Trade payable and accruals principally comprise amounts outstanding for trade purchases and ongoing costs. The average credit taken for trade purchases is 27 days (2018: 45 days).

The Directors consider that the carrying amount of trade payables approximates to their fair value.

24. Other financial liabilities

Other financial liabilities consist of lease incentives, which as part of the IFRS 16 transition have been released in 2019.

	2019 £'000	2018 £'000
Within one year	—	33
In the second year	—	31
In the third to fifth years inclusive	—	67
Over five years	—	5
	—	136
Less: amount due for settlement within 12 months (shown under current liabilities)	—	(33)
Amount due for settlement after 12 months	—	103

The amounts included above are not considered to be materially different from the present value of their carrying amounts.

Liquidity risk

The Group aims to mitigate liquidity risk by managing cash generation by its operations and applying cash collection targets throughout the Group. Investment is carefully controlled, with authorisation limits operating up to Group Board level and cash payback periods applied as part of the investment appraisal process. In this way the Group aims to maintain a good credit rating to facilitate fund raising.

In order to mitigate the Group's liquidity risks, the Group can choose to fund significant fixed asset purchases by finance leases repayable over a period of three to five years dependent on the individual asset being financed and interest-bearing loans.

In its funding strategy, the Group's objective is to maintain a balance between continuity of funding and flexibility through the use of overdrafts, bank loans, finance leases and hire purchase contracts. The Group manages liquidity risk by maintaining adequate reserves and banking facilities by continuously monitoring cash flows and matching the maturity profiles of financial assets and liabilities. Given the current level of cash availability there are currently no overdraft or bank loan facilities arranged with Banks either drawn or undrawn.

Non-derivative financial liabilities of £7,284,000 (2018: £19,094,000) comprise trade creditors of £7,284,000 (2018: £18,958,000) and lease incentives of nil (2018: £136,000). The trade creditors are within current liabilities. Of the lease incentives in 2018, £33,000 were within current liabilities and £103,000 within non-current liabilities with a range of maturity dates which are set out as above. The inherent liquidity risk of these financial liabilities is managed within the overall liquidity risk of the Group as described above.

The Group's policy is to invest any excess cash used in managing liquidity is only invested in financial instruments exposed to insignificant risk of changes in market value, being placed on interest-bearing deposit with maturities no more than 12 months.

25. Provisions

	Warranty and commercial agreements £'000	Restructuring £'000	Total £'000
At 1 January 2018	171	1,740	1,911
Additional provision in the year	592	891	1,483
Utilisation of provision	(105)	(2,339)	(2,444)
Release of provision	(451)	—	(451)
At 1 January 2019	207	292	499
Additional provision in the year	206	2,641	2,847
Utilisation of provision	(166)	(233)	(399)
Release of provision	—	—	—
At 31 December 2019	247	2,700	2,947

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

25. Provisions continued

The warranty and commercial agreements provision represents management's best estimate of the Group's liability related to claims against product warranties or commercial sales agreements. The timing of the utilisation of this provision is uncertain.

Additional restructuring provisions of £2,642,000 have been added primarily in relation to the strategic review of the business and redundancy programme, utilisation of £233,000 relates to the consolidation of the office and research facilities in the Cambridge area, and the conclusion of the 2018 redundancy programme.

26. Share capital

	2019 £'000	2018 £'000
Issued and fully paid: 78,334,296 (2018: 78,334,296) ordinary shares of 10.0p each	7,833	7,833

The Companies Act 2006 abolished the legal requirement for a Company to have an authorised share capital. The Articles of Association were amended to remove the authorised share capital article following approval via special resolution at the AGM on 19 May 2010.

The movement during the year on the Company's issued and fully paid shares was as follows:

	2019 Number	2018 Number	2019 £'000	2018 £'000
At beginning of year	78,334,296	78,329,296	7,833	7,833
Exercise of share options	—	5,000	—	1
At end of year	78,334,296	78,334,296	7,833	7,833

The Company has one class of ordinary shares which carry no right to fixed income.

Scheme	Date of grant	Number of shares under option as at 31 December 2019	Number of shares under option as at 31 December 2018	Subscription price per share
Xaar plc 2004 Share Option Plan	22 November 10	10,000	10,000	211.0p
	1 June 11	40,000	65,000	250.0p
	1 May 12	90,000	100,000	226.5p
		140,000	175,000	
Xaar plc Share Save Scheme	1 November 15	—	79,176	417.0p
	1 November 16	22,676	45,129	407.0p
		22,676	124,305	
Xaar plc 2017 Share Save Scheme	1 November 17	19,351	96,933	344.0p
	1 November 18	182,295	918,341	142.0p
	1 December 19	1,196,152	—	34.0p
		1,397,798	1,015,274	
Xaar plc 2013 Share Incentive Plan	17 April 13	8,105	8,422	0.0p
	16 April 14	11,079	12,956	0.0p
	14 April 16	16,206	19,870	0.0p
	13 April 17	8,000	11,280	0.0p
		43,390	52,528	
Total share options outstanding at 31 December		1,603,864	1,367,107	

26. Share capital continued

Options granted under the Xaar plc 2004 Share Option Plan are ordinarily exercisable within three to ten years after the date of the grant. The maximum value of approved options, under the Xaar plc 2004 Share Option Plan, which may be granted to individual employees is £30,000.

Options under the Xaar plc Share Save Scheme are ordinarily exercisable between 36 and 42 months after the date of the grant.

Awards under the Xaar plc Share Incentive Plan are ordinarily exercisable between three and five years after the date of the grant.

Long-Term Incentive Plan

Performance Share Awards outstanding under the Xaar plc 2007 Long-Term Incentive Plan are as follows:

Date of grant	Number of shares under option as at 31 December 2019	Number of shares under option as at 31 December 2018
3 May 11	4,533	7,081
2 April 12	60,417	60,417
1 May 12	66,872	79,564
2 April 15	111,077	184,628
28 September 15	3,695	9,033
7 December 15	9,354	12,088
1 April 16	58,579	370,759
11 May 16	14,019	57,018
27 June 16	8,400	18,000
25 August 16	—	57,710
6 September 16	700	8,250
1 December 16	15,093	22,640
	352,739	887,188

All awards under this scheme are exercisable within three to ten years after the date of grant.

Performance share awards have been made under the Xaar plc 2017 Long-Term Incentive Plan as follows:

Date of grant	2019 Number of shares	2018 Number of shares
16 May 17	194,079	537,777
3 April 18	199,396	615,044
1 June 18	—	40,000
2 April 2019	127,821	—
30 April 2019	80,648	—
4 October 2019	180,328	—
	782,272	1,192,821

All awards under this scheme are exercisable within three to ten years after the date of grant.

27. Share premium account

	2019 £'000	2018 £'000
Balance at 1 January	29,328	29,317
Premium arising on issue of equity shares	—	11
Balance at 31 December	29,328	29,328

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

28. Own shares

	2019 £'000	2018 £'000
Balance as at 1 January	(3,113)	(3,642)
Sold in the year	437	529
Balance at 31 December	(2,676)	(3,113)

Of this balance, £20,000 (2018: £20,000) represents 91,250 ordinary shares in Xaar plc held in trust by Xaar Trustee Ltd. Xaar Trustee Ltd was formed in 1995 to act as trustee to the Employee Benefit Trust established in 1995 to hold shares for the benefit of the employees of the Company and the Group. There has been no movement in the number of shares held in trust by Xaar Trustee Ltd during the year.

The remaining balance of £2,656,000 (2018: £3,093,000) represents the cost of 966,410 (2018: 1,125,304) shares in Xaar plc purchased in the market at market value and held by the Xaar plc ESOP trust to satisfy options granted under the Company's share option schemes.

The market value of own shares at 31 December 2019 was £585,000 (2018: £1,765,000).

29. Translation reserves

	2019 £'000	2018 £'000
Balance at 1 January	817	613
Exchange differences on retranslation of net investment	(157)	204
Balance at 31 December	660	817

Exchange differences relating to the translation of the net assets of the Group's foreign operations, which relate to subsidiaries only, from their functional currency into the parent's functional currency, being Sterling, are recognised directly in the translation reserve.

30. Retained earnings and other reserves

Notes	Merger reserve £'000	Share-based payments £'000	Other reserves £'000	Total other reserves £'000	Retained earnings £'000	Total £'000
Balance at 1 January 2018	1,105	13,048	485	14,638	98,425	113,063
Net loss for the year	—	—	—	—	(12,276)	(12,276)
Dividends paid	11	—	—	—	(6,009)	(6,009)
Tax taken directly to equity	—	—	—	—	(41)	(41)
Own shares sold in the period	—	—	—	—	(424)	(424)
Movement in valuation of share options	—	506	—	506	—	506
Balance at 31 December 2018 as reported	1,105	13,554	485	15,144	79,675	94,819
Prior period Adjustments	—	—	—	—	(121)	(121)
Balance at 31 December 2018 restated	1,105	13,554	485	15,144	79,554	94,698
Effect of initial application of IFRS 16	—	—	—	—	(211)	(211)
Balance at 1 January 2019 restated IFRS 16	1,105	13,554	485	15,144	79,343	94,487
Net loss for the year	—	—	—	—	(71,051)	(71,051)
Own shares sold in the period	—	—	—	—	(437)	(437)
Charge to equity for equity-settled share-based payments	—	1,111	—	1,111	—	1,111
Adjustment arising from change in non-controlling interest	—	—	4,666	4,666	—	4,666
Balance at 31 December 2019	1,105	14,665	5,151	20,921	7,855	28,776

The merger reserve and other reserves are not distributable. The merger reserve represents the share premium account in Xaar Technology Limited.

The share-based payment reserve represents the cumulative charge made under IFRS 2 in relation to share options and LTIP awards. Other reserves represent the non-distributable portion of the dividend received in Xaar plc from Xaar Digital Limited.

31. Notes to the cash flow statement

	2019 £'000	2018 £'000
(Loss) / Profit before tax from continuing operations	(11,891)	280
Loss before tax from discontinued operations	(60,001)	(15,349)
Total loss before tax	(71,892)	(15,069)
Adjustments for:		
Share-based payments	912	235
Depreciation of property, plant and equipment	3,776	4,725
Depreciation of right of use assets	1,061	—
Amortisation of intangible assets	1,024	2,139
Impairment of assets	39,013	3,258
Research and development expenditure credit	(2,610)	(1,737)
Investment income	(103)	(170)
Interest expense - finance cost for leases	110	—
Foreign exchange losses / (gains)	447	(689)
Gain on re-measurement of derivative liability	(106)	—
Profit on disposal of property, plant and equipment	(18)	(3)
(Increase) / Decrease on disposal of minority interest in subsidiary	—	32
Decrease / (Increase) in provisions	1,267	(1,383)
Operating cash flows before movements in working capital	(27,119)	(8,662)
Decrease / (Increase) in inventories	12,172	(12,817)
Decrease in receivables	11,059	9,364
(Decrease) / Increase in payables	(9,332)	2,724
Cash used in operations	(13,220)	(9,391)
Income taxes received / (paid)	3,392	(471)
Net cash used in operating activities	(9,828)	(9,862)

During the year non cash investing activity pertains to purchase of property, plant and equipment by the Company on credit amounting to £114,000 (2018: £354,000).

From the consolidated cashflow statement net cash (including treasury deposits) generated from continuing operations (excluding proceeds from transactions with non-controlling interest) amounted to £3,400,000.

Further information of cashflows from discontinued operations can be found on note 10.

32. Operating lease arrangements

From 1 January 2019, the Group has recognised right-of-use assets for these leases, except for short-term and low-value leases.

See note 3 in Changes in Accounting Policies and note 17 Leases.

	2019 £'000	2018 £'000
Minimum lease payments under operating leases recognised as an expense in the year:		
Fixtures, fittings and equipment	53	82
Land and buildings	—	1,692
	53	1,774

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

32. Operating lease arrangements continued

At the balance sheet date, the Group had outstanding commitments for future minimum lease payments under non-cancellable operating leases, which fall due as follows:

	Fixtures, fittings and equipment		Land and buildings	
	2019 £'000	2018 £'000	2019 £'000	2018 £'000
Within one year	—	12	—	741
In the second to fifth years inclusive	—	17	—	2,262
After five years	—	—	—	116
	—	29	—	3,119

The operating leases in respect of fixtures, fittings and equipment extend over a period of up to five years.

33. Share-based payments

Equity-settled share option scheme

The Company's share option schemes are open to all employees of the Group. Options are exercisable at a price equal to the average quoted market price of the Company's shares on the date of grant. The standard vesting period is three years.

An option granted under the Xaar plc 2004 Share Option Plan from 2011 onwards will be exercisable over shares with a market value at the date of grant not exceeding a person's annual salary, if at the third anniversary of grant, Xaar plc has achieved positive adjusted profit before tax as shown in the consolidated income statement in the Company's Annual Report and Accounts for any of the three years ending during the vesting period. One third of the shares subject to the option granted rounded to the nearest whole share, will vest based on the performance condition being met per year for each of the three years ending in the vesting period. If the adjusted profit before tax as shown in the consolidated income statement in Xaar plc's Annual Report and Accounts for any relevant year is restated before the option becomes exercisable, the restated figure shall, unless the Remuneration Committee determines otherwise, be applied in determining whether the above targets are met. In addition, options shall only become exercisable in respect of any shares if the Committee in its absolute discretion determines that the overall financial performance of Xaar plc over the performance period is satisfactory.

The Xaar 2007 and 2017 Share Save Schemes provides an opportunity to all UK employees to save a set monthly amount (up to £500) over three years towards the exercise of a discounted share option, which is granted at the start of the three years.

The Xaar Share Incentive Plan provides an opportunity for all UK employees to buy shares from their pre-tax remuneration up to the limit permitted by the relevant tax legislation (£1,500 per year for the awards made in 2013 and 2014, £1,800 per year for awards made from 2015) and are awarded additional shares for free on a matching basis; the Company currently operates the plan on the basis of a 1:1 match but may award matching shares up to the maximum ratio permitted by the relevant tax legislation (currently a 2:1 ratio).

Options and awards under the Xaar 2007 and 2017 Share Save Schemes and Xaar Share Incentive Plan are not subject to performance conditions.

If the options remain unexercised after a period of ten years from the date of grant, or 42 months in the case of the Share Save Scheme, or five years in the case of the Share Incentive Plan (being the contractual lives), the options expire. Save as permitted in the share option scheme rules, options ordinarily lapse on an employee leaving the Group.

Details of the share options outstanding during the year are as follows:

	2019		2018	
	Number of share options	Weighted average exercise price (£)	Number of share options	Weighted average exercise price (£)
Outstanding at beginning of year	1,367,107	1.87	1,018,299	3.22
Granted during the year	1,196,152	0.34	931,141	1.42
Lapsed during the year	(951,559)	1.91	(535,097)	3.59
Exercised during the year	(7,836)	—	(47,236)	2.48
Outstanding at the end of the year	1,603,864	0.72	1,367,107	1.87
Exercisable at the end of the year	159,184	2.04	275,554	2.69

The weighted average share price at the date of exercise for share options exercised during the period was £0.86 (2018: £3.34). The options outstanding at 31 December 2019 had a weighted average remaining contractual life of three years (2018: Three years). In 2019, options were granted on 1 December. The aggregate of the estimated fair values of the options granted on those dates is £0.25 million. In 2018, options were granted 1 November. The aggregate of the estimated fair values of the options granted on those dates is £0.82 million.

33. Share-based payments continued

Equity-settled share option scheme continued

The inputs into the Black-Scholes model are as follows:

	2019	2018
Weighted average share price	£0.43	£1.78
Weighted average exercise price	£0.34	£1.42
Weighted average expected volatility	61%	62%
Expected life	3 years	3 years
Risk-free rate	0.60%	1.00%
Weighted average expected dividends	0.00%	0.15%

Expected volatility was determined by calculating the historical volatility of the Group's share price over periods ranging from the previous one to three years. The expected life used in the model has been adjusted, based on management's best estimate, for the effects of non-transferability, exercise restrictions and behavioural considerations.

Long-Term Incentive Plan

The Company's Long-Term Incentive Plan is open to all employees of the Group.

All LTIP share awards granted before 2015 are subject to the achievement of EPS performance conditions, the number of shares that vest will depend on the EPS growth of the Company for the three financial years of the Company commencing on 1 January of the year of grant, as follows:

- (1) None of the Awards will vest if the Company's EPS growth does not exceed growth in the Retail Prices Index ('RPI') by at least 4% compound p.a.
- (2) 35% of the Awards will vest if the Company's EPS growth exceeds growth in the RPI by at least 4% compound p.a.
- (3) All of the Awards will vest if the Company's EPS growth exceeds growth in the RPI by at least 10% compound p.a.
- (4) Awards will vest on a straight-line basis for EPS growth in excess of growth in the RPI of between 4% and 10% compound p.a.

LTIP share awards granted in 2015 onwards are subject to the achievement of different performance conditions depending on the level of the employee. The number of shares that vest will depend on for the three financial years of the Company commencing on 1 January of the year of grant, and are subject to one, two, three, four or five of the conditions as set out below:

- (1) Absolute cumulative EPS performance over the period, whereby 25% of the Awards will vest if the threshold target is achieved, below threshold 0% will vest and up to a maximum of 100% if the maximum EPS target or higher is achieved.
- (2) For 2015 and 2016 grants, TSR relative to FTSE TechMARK All Share Index, whereby 25% of the Awards will vest if the median rank in the comparator Group is achieved, below median 0% will vest and up to a maximum of 100% if the upper quartile or higher is achieved. For 2017 and 2018 grants, TSR outperformance multiplier determined by comparison to the FTSE Small Cap Index, whereby a performance multiplier of between 116.7% (for upper quartile performance) and 150% or 200% (for upper decile performance) is applied to the base award relating to awards granted with EPS and revenue performance conditions.
- (3) For 2015 and 2016 grants, Achievement of positive adjusted profit before tax as shown in the consolidated income statement in the Company's Annual Report and Accounts for any of the three years ending during the vesting period. One third of the shares subject to the option granted rounded to the nearest whole share, will vest based on the performance condition being met per year for each of the three years ending in the vesting period. If the adjusted profit before tax as shown in the consolidated income statement in Xaar plc's Annual Report and Accounts for any relevant year is restated before the option becomes exercisable, the restated figure shall, unless the Remuneration Committee determines otherwise, be applied in determining whether the above targets are met. In addition, options shall only become exercisable in respect of any shares if the Committee in its absolute discretion determines that the overall financial performance of Xaar plc over the performance period is satisfactory.
- (4) From 2017, revenue growth over the period, whereby 25% of the Awards will vest if the threshold target is achieved, below threshold 0% will vest and up to a maximum of 100% if the maximum revenue growth target or higher is achieved.
- (5) From 2018, revenue from new products in the third year in the vesting period, whereby 25% of the Awards will vest if the threshold target is achieved, below threshold 0% will vest and up to a maximum of 100% if the maximum revenue target or higher is achieved.
- (6) From 2019, Adjusted Basic EPS over the performance period, whereby 25% of the Awards will vest if the threshold target is achieved, below threshold 0% will vest and up to a maximum of 100% if the maximum EPS target or higher is achieved. TSR element over the performance period, whereby 25% of the Awards will vest if the median target v comparator group is achieved, below threshold 0% will vest and up to a maximum of 100% if the TSR ranking of the company is ranked in the upper quartile of the comparator group.

There are also a number of LTIP share awards granted that are subject to the achievement of different performance conditions for specific individuals, dependent on revenue or profit performance over a set performance period.

In addition, options shall only become exercisable in respect of any shares if the Committee in its absolute discretion determines that the overall financial performance of Xaar plc over the performance period is satisfactory. All awards that will vest will be calculated on a straight-line basis. All awards made under this scheme are exercisable within three to ten years after the date of grant. Save as permitted in the Long-Term Incentive Plan rules, awards lapse on an employee leaving the Group.

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

33. Share-based payments *continued*

Long-Term Incentive Plan *continued*

Key individuals have previously been invited to participate in a bonus matching scheme where matching LTIP share awards are granted when the employee invests their bonus in Xaar shares and retains ownership of these shares for the duration of the LTIP share award vesting period. The matching share award is a 1 for 1 match on the pre-tax value of the bonus used to acquire bonus investment shares. Matching LTIP share awards are subject to the same performance criteria as all other LTIP awards.

Details of performance share awards outstanding during the year are as follows:

	2019	2018
Awards outstanding at start of year	2,080,009	1,992,945
Granted during the year	829,149	909,737
Lapsed during the year	(1,615,254)	(662,185)
Exercised during the year	(158,893)	(160,488)
Awards outstanding at end of year	1,135,011	2,080,009
Exercisable at the end of the year	255,948	352,811

The weighted average share price at the date of exercise for awards exercised during the period was £0.72 (2018: £2.76). The options outstanding at 31 December 2019 had a weighted average remaining contractual life of seven years (2018: eight years). In 2019, Performance Share Awards were made in April and October. The aggregate of the estimated fair values of grants made on those dates is £0.5 million. In 2018, Performance Share Awards were made in April and June. The aggregate of the estimated fair values of grants made on those dates is £2.2 million.

The estimated fair values for grants with non-market based performance conditions were calculated using the Black-Scholes model. The inputs into the Black-Scholes model were as follows:

	2019	2018
Weighted average share price	£0.96	£3.34
Weighted average exercise price	£nil	£nil
Weighted average expected volatility	44%	36%
Weighted average expected life	3 years	3 years
Weighted average risk free rate	0.76%	0.87%
Weighted average expected dividends	0.00%	3.05%

The estimated fair values for grants with market based performance conditions were calculated using the Monte Carlo model. The inputs into the Monte Carlo model were as follows:

	2019	2018
Weighted average share price	£0.79	£3.34
Weighted average exercise price	£nil	£nil
Weighted average expected volatility	56%	36%
Weighted average expected life	4 years	4 years
Weighted average risk free rate	0.83%	0.98%
Weighted average expected dividends	0.00%	3.05%

The Group recognised total expenses of £1,111,000 and £506,000 related to all equity-settled share-based payment transactions in 2019 and 2018, respectively.

34. Retirement benefit schemes

Defined contribution schemes

The UK based employees of the Group's UK companies have the option to be members of a defined contribution pension scheme managed by a third party pension provider. For each employee who is a member of the scheme the Company will contribute a fixed percentage of each employee's salary to the scheme. The only obligation of the Group with respect to this scheme is to make the specified contributions.

The total cost charged to the income statement in respect of these schemes during 2019 was £951,000 (2018: £1,053,000). As at 31 December 2019 contributions of £94,000 (2018: £215,000) due in respect of the current reporting period had not been paid over to the schemes.

35. Related party transactions

Transactions between the Company and its subsidiaries, which are related parties, have been eliminated on consolidation and are not disclosed in this note.

Following the transaction in December 2019 which increased the shareholding owned by Stratasys Solutions Limited ('SSYS') in Xaar 3D Limited from 15% to 45%, the shareholding determines that they are a related party to Xaar plc. The related party transactions were:

- SSYS part exercised its existing option, which was granted to SSYS under the terms of the Initial Transaction in 2018, to acquire additional Xaar 3D Shares in return for a \$4 million investment in Xaar 3D, increasing its shareholding in Xaar 3D to 25%.
- Xaar sold to SSYS, 20% of the enlarged share capital of Xaar 3D for \$10 million.
- Subsequently, Xaar and SSYS together invested \$3.25 million in Xaar 3D on a fully-preemptive basis as follows:
 - Xaar re-invested \$1.79 million into Xaar 3D by way of an additional share subscription; and
 - SSYS invested \$1.46 million into Xaar 3D by way of an additional share subscription.

Following such share subscriptions, Xaar hold 55% of the enlarged issued share capital of Xaar 3D, and SSYS hold 45% of the enlarged issued share capital of Xaar 3D.

In addition, Xaar granted SSYS a call option to acquire its remaining 55% shareholding in Xaar 3D for at least \$33 million (being the greater of \$33 million and 2 x revenue for previous 12 months), the option is exercisable during the three year period following completion of the Additional Investment Agreement ('Call Option'). Exercising such Call Option will entitle Xaar to receive royalties on products and services sales for up to 15 years, subject to a \$10 million cap.

Additional disclosure on the transaction is included in note 21 - Financial Instruments and note 36 Non Controlling Interest

There were no other transactions during the year with related parties who are not members of the Group.

Remuneration of key management personnel

The actual remuneration of the Directors, who are the key management personnel of the Group, is disclosed in the Directors Remuneration Report. The contractual employee benefits are set out below in aggregate for each of the categories specified in IAS 24 'Related Party Disclosures'.

Further information about the remuneration of individual Directors is provided in the audited part of the Directors' Remuneration report on page 67.

	2019 £'000	2018 £'000
Short-term employee benefits	947	1,022
Post-employment benefits	53	71
Share-based payments	90	(140)
	1,090	953

Notes to the consolidated financial statements *continued* for the year ended 31 December 2019

36. Non-controlling interest

Summarised financial information in respect of each of the Group's subsidiaries that has a material non-controlling interest is set out below. The summarised financial information below represents amounts before intro-group eliminations. During the year the Group entered an agreement with Stratasys Solutions Limited, increasing their shareholding in Xaar 3D Limited from 15% to 45%, with an option to acquire 100% shareholding within three years. 2018 has been restated to reflect changes to assumptions in relation to the valuation of the original 3D option with Stratasys, resulting in an increase of £293,000 in the derivative liability to £936,000.

The terms of the 2019 call option allow for Stratasys to purchase the remaining 55% of Xaar 3D Ltd for at least \$33 million, which is exercisable at any time within three years of closing. The fair value of the option is a £2.9 million derivative liability and is disclosed further in note 21.

The management judgement is that the shareholding and option call held by Stratasys are assessed as having significant influence but does not exercise control over Xaar 3D Ltd and which is therefore subject to consolidation as a subsidiary of Xaar plc. This judgement will be reassessed at each reporting period end.

Stratasys have not consolidated Xaar 3D Limited into their financial statements, presenting their investment under other non-current assets in their consolidated Balance Sheet.

Xaar 3D Limited

Statement of financial position	2019 £'000	2018 Restated £'000
Current assets	10,057	9,347
Non-current assets	6,909	3,549
Current liabilities	(1,432)	(2,893)
Non-current liabilities	(558)	(143)
Equity attributable to owners of the Company	14,976	9,860
Non-controlling interests (2019: 45% / 2018: 15%)	6,739	1,479

Income statement and other comprehensive income	2019 £000	2018 Restated £000
Revenue	18	60
Expenses	(1,219)	(616)
Loss for the year	(1,201)	(556)
Loss attributable to owners of the Company	(778)	(473)
Loss attributable to the non-controlling interests	(423)	(83)
Loss for the year	(1,201)	(556)
Total comprehensive loss attributable to owners of the Company	(778)	(473)
Total comprehensive loss attributable to the non-controlling interest	(458)	(85)
Total comprehensive loss for the year	(1,236)	(558)

Cash flow statement	2019 £'000	2018 Restated £'000
Net cash inflow / (outflow) from operating activities	(2,434)	(809)
Net cash inflow / (outflow) from investing activities	(2,299)	6,034
Net cash inflow / (outflow) from financing activities	5,511	3,017
Net cash inflow / (outflow)	778	8,242

36. Non-controlling interest continued

Non-controlling interest equity	2019 £'000	2018 Restated £'000
Balance at 1 January	2,028	—
Effect of initial application of IFRS 16	(2)	—
Adjustment arising from change in non-controlling interest	5,171	2,113
Share of other comprehensive expense for year	(458)	(85)
Balance at 31 December	6,739	2,028

37. Prior period restatement

The financial statements include a prior period restatement in relation to the recognition of the derivative financial instrument which represents contingent consideration relating to a business combination. The adjustment relates to a correction to the fair value of the option granted to the non-controlling interest in Xaar 3D Limited at both the inception date and prior year-end. This has then reclassified from restructuring costs to loss on derivative liabilities.

Furthermore there is also a prior period restatement in respect of the allocation of profit / loss from continuing and discontinued operations (further information can be found on note 10).

The following tables summarise the impact of the prior period restatement on the financial statements of the Group for the twelve month period ended 31 December 2018:

Consolidated income statement	2018 £'000	3D Option adjustment £'000	Discontinued Operation £'000	2018 restated £'000
Revenue	63,534	—	(3,066)	60,468
Cost of sales	(39,085)	—	8,113	(30,972)
Gross profit	24,449	—	5,047	29,496
Research and development expenses	(14,682)	—	8,324	(6,358)
Research and development expenditure credit	1,737	—	(895)	842
Sales and marketing expenses	(9,071)	—	490	(8,581)
General and administrative expenses	(7,512)	—	904	(6,608)
Impairment losses on financial assets	(4,681)	—	1,479	(3,202)
Restructuring costs	(5,337)	(110)	—	(5,447)
Loss on derivative liabilities	—	(32)	—	(32)
Operating (loss) / profit	(15,097)	(142)	15,349	110
Investment income	170	—	—	170
(Loss)/profit before tax	(14,927)	(142)	15,349	280
Income tax credit / (expense)	2,589	—	(183)	2,406
(Loss) / profit for the year from continuing operations	(12,338)	(142)	15,166	2,686
Loss for the year from discontinued operations	—	—	(15,166)	(15,166)
Loss for the year	(12,338)	(142)	—	(12,480)
Attributable to:				
Owners of the Company	(12,276)	(121)	—	(12,397)
Non-controlling interests	(62)	(21)	—	(83)
	(12,338)	(142)	—	(12,480)
Earnings per share from continuing operations (Restated)				
Basic	(15.9p)	(0.2p)	19.7p	3.6p
Diluted	(15.7p)	(0.2p)	19.5p	3.6p

Notes to the consolidated financial statements *continued*
for the year ended 31 December 2019

37. Prior period restatement continued

Consolidated statement of comprehensive income	Note	2018 £'000	2018 adjustment £'000	2018 restated £'000
Loss for the year		(12,338)	(142)	(12,480)
Exchange differences on retranslation of net investment	29	202	—	202
Tax charge on share options		(41)	—	(41)
Other comprehensive income for the year		161	—	161
Total comprehensive loss for the year		(12,177)	(142)	(12,319)
Attributable to:				
Owners of the Company		(12,113)	(121)	(12,234)
Non-controlling interests		(64)	(21)	(85)
		(12,177)	(142)	(12,319)
<hr/>				
Consolidated statement of financial position		31-Dec-18 as previously reported £'000	31-Dec-18 adjustment £'000	31-Dec-18 restated £'000
Current liabilities				
Derivative financial instruments		(643)	(293)	(936)
Equity				
Retained earnings		79,675	(121)	79,554
Equity attributable to owners of the Company		129,684	(121)	129,563
Non-controlling interests		2,200	(172)	2,028
Total equity		131,884	(293)	131,591
<hr/>				
Condensed consolidated cash flow statement		31-Dec-18 as previously reported £'000	31-Dec-18 adjustment £'000	31-Dec-18 restated £'000
Proceeds from issue of financial instrument		753	149	902
Income from non-controlling interest		2,264	(149)	2,115

38. Non-adjusting post balance sheet event – COVID-19

The impact of COVID-19 has created a high level of uncertainty as to the outlook for the remainder of the financial year and it is still too early to ascertain the impact this may have on our full year 2020 revenue and profitability. Should it become apparent that sales orders, revenue and/or cash collections are being affected by a global slowdown, the Directors will undertake a further review on discretionary expenditure and capital investment to protect the Group's cash position.

Given the above, it is not possible to estimate the financial effect of COVID-19 disruption.

The Group will, as part of its usual period end reporting process, conduct impairment reviews across all cash generating units. The process will be informed by any impact arising from challenging trading environments and macro-economic weakness, exacerbated by the uncertainty created by COVID-19.

There is the potential should global macro-economic weakness persist, for write down of goodwill and investment valuation alongside increases in inventory provisions and bad debt provisions and write offs should customers enter financial difficulty. We aim to mitigate this customer risk categorising customers as either paying in advance or by securing suitable credit insurance coverage on certain customers according to input from external credit agencies.

The Group continues to enjoy a strong cash position and is well positioned, given further opportunities for cost mitigation and use of government support if required, to cope with the current situation.

Company balance sheet

as at 31 December 2019

	Notes	2019 £'000	2018 £'000
Fixed assets			
Investments	3	32,893	32,062
		32,893	32,062
Current assets			
Debtors	4	50,159	58,792
Cash at bank and in hand		4,201	245
		54,360	59,037
Total assets		87,253	91,099
Creditors: amounts falling due within one year			
Trade and other payables	5	(8,646)	(12,116)
Provisions		(119)	(78)
		(8,765)	(12,194)
Net current assets		45,595	46,843
Total assets less current liabilities		78,488	78,905
Net assets		78,488	78,905
Capital and reserves			
Called up share capital	8	7,833	7,833
Share premium account	8	29,328	29,328
Other reserves		36,561	35,729
Own shares		(2,656)	(3,093)
Share-based payment reserve		3,440	3,160
Profit and loss account		3,982	5,948
Equity shareholders' funds		78,488	78,905

Xaar plc reported a loss for the financial year ended 31 December 2019 of £1,512,000 (2018: loss of £506,000).

The financial statements of Xaar plc, registered number 3320972, were approved by the Board of Directors and authorised for issue on 22 April 2020. They were signed on its behalf by:



John Mills
Chief Executive Officer



Ian Tichias
Chief Finance Officer

Company statement of changes in equity for the year ended 31 December 2019

	Notes	Called up share capital £'000	Share premium account £'000	Other reserves £'000	Own shares £'000	Share-based payments £'000	Profit and loss account £'000	Total £'000
At 1 January 2018		7,833	29,317	35,169	(3,622)	3,214	12,894	84,805
Loss for the financial year		—	—	—	—	—	(506)	(506)
Total comprehensive income for the period		—	—	—	—	—	(506)	(506)
New shares issued		—	11	—	—	—	—	11
Own shares sold in the period		—	—	—	529	—	—	529
Dividends paid	7	—	—	—	—	—	(6,009)	(6,009)
Share option exercises		—	—	—	—	—	(424)	(424)
Deferred tax on share-based payment transactions		—	—	—	—	—	(7)	(7)
Capital contribution for share-based payments	3	—	—	560	—	—	—	560
Share-based payments		—	—	—	—	(54)	—	(54)
At 31 December 2018 as reported		7,833	29,328	35,729	(3,093)	3,160	5,948	78,905
Effect of initial application of IFRS 16		—	—	—	—	—	18	18
Balance at 1 January 2019 restated		7,833	29,328	35,729	(3,093)	3,160	5,966	78,923
Loss for the financial year		—	—	—	—	—	(1,512)	(1,512)
Total comprehensive expense for the period		—	—	—	—	—	(1,512)	(1,512)
Own shares sold in the period		—	—	—	437	—	—	437
Share option exercises		—	—	—	—	—	(472)	(472)
Capital contribution for share-based payments	3	—	—	832	—	—	—	832
Share-based payments		—	—	—	—	280	—	280
At 31 December 2019		7,833	29,328	36,561	(2,656)	3,440	3,982	78,488

The share premium account and other reserves are non-distributable.

Other reserves represent the profit from the sale of a subsidiary, the non-distributable portion of the dividend received in Xaar plc from Xaar Digital Limited and the capital contribution to investments relating to share-based payments.

The share-based payment reserve represents the cumulative charge made under IFRS 2 in relation to share options and LTIP awards.

Full details of share capital, share premium and own shares are given in notes 26, 27 and 28 to the consolidated financial statements.

Notes to the Company financial statements for the year ended 31 December 2019

1. Significant accounting policies

Basis of accounting

The separate financial statements of the Company are presented as required by the Companies Act 2006 and in accordance with FRS 101 ('Financial Reporting Standard 101') 'Reduced Disclosure Framework' as issued by the Financial Reporting Council. The results of Xaar plc are included in the consolidated financial statements of Xaar plc.

As permitted by FRS 101, the Company has taken advantage of the disclosure exemptions available under that standard in relation to share-based payments, financial instruments, capital management, presentation of comparative information in respect of certain assets, presentation of a cash flow statement and certain related party transactions.

Where required, equivalent disclosures are given in the consolidated financial statements of Xaar plc.

The financial statements have been prepared under the historical cost convention.

The principal accounting policies adopted are the same as those set out in note 3 of the consolidated financial statements except as noted below. They have all been applied consistently throughout the year and the preceding year.

Share-based payments

The share-based payment reserve represents the cumulative charge made under IFRS 2 in relation to share options and LTIP awards. The costs related to employees contracted with other Group entities are recharged from Xaar plc to the related entity.

Going concern

The Company's business activities, together with the factors likely to affect its future development, performance and position are set out in the Strategic Report on pages 6 to 19. Notes 20, 21 and 24 include a description of the Company's objectives, policies and processes for managing its capital; its financial risk management objectives; details of its financial instruments and hedging activities; and its exposure to credit risk and liquidity risk.

After making enquiries, and having regard to the principal risks the Directors have a reasonable expectation that the Company has adequate resources to continue in operational existence for the foreseeable future, based on the Company's forecasts and projections for the next 12 months, taking account of reasonably possible changes in trading performance. For this reason, we continue to adopt the going concern basis in preparing the financial statements.

Investments

Fixed asset investments in subsidiaries are shown at cost less provision for impairment and includes capital contributions arising from share-based payments. Each year, the Company carries out impairment tests of its investments which require estimates to be made of the value in use of its CGUs and groups of CGUs. The value in use calculations are dependent on estimates of future cash flows, long-term growth rates and appropriate discount rates to be applied to future cash flows. Having modelled a number of sensitivities, it was concluded that no reasonably foreseeable change in the key assumptions used in the impairment model would result in a significant impairment charge being recorded in the financial statements.

For investments in subsidiaries acquired for consideration, including the issue of shares qualifying for merger relief, cost is measured by reference to the nominal value only of the shares issued. Any premium is ignored. Utilising transition rules, as the merger valuation arose from transactions before the introduction of FRS101, the transaction has utilised grandfathering relief rather than recalculating and presenting under appropriate FRS101 treatment.

Dividends

Dividend income is recognised when an irrevocable right to receive payment has been established provided that it is probable that the economic benefits will flow to the Company and the amount of income can be measured reliably.

2. Loss for the year

As permitted by section 408 of the Companies Act 2006, the Company has elected not to present its own profit and loss account for the year.

The average number of employees throughout 2019 was 31 (2018: 34). Staff costs amounted to £1.9 million (2018: £2.5 million). Information about the remuneration of Directors is provided in the audited part of the Directors' Remuneration report on page 67. For the remuneration of key management personnel of the Company see note 35 of the consolidated financial statements.

 The Directors' Remuneration report can be found **on page 67**.

The audit fee for the audit of the Company's financial statements in 2019 was £20,000 (2018: £22,000).

The figures for the auditor's remuneration for the Company required by regulation 5(1)(b) of the Companies (Disclosure of Auditor Remuneration and Liability Limitation Agreements) Regulations 2008 are not presented as the consolidated financial statements comply with this regulation on a consolidated basis.

Notes to the Company financial statements *continued*
for the year ended 31 December 2019

3. Fixed asset investments

	2019 £'000	2018 £'000
Subsidiary undertakings held at cost		
At beginning of the year	32,062	25,473
Additions in the year	—	6,035
Disposals in the year	—	(6)
Capital contributions arising from share-based payments	831	560
At end of the year	32,893	32,062

The Directors believe that the carrying value of the investments is supported by their underlying net assets.

4. Debtors

	2019 £'000	2018 £'000
Amounts receivable within one year		
Amounts owed by Group undertakings	50,159	58,748
Amounts receivable after more than one year		
Deferred tax asset (see below)	—	44
	50,159	58,792

	2019 £'000	2018 £'000
Deferred tax asset at 1 January	44	135
Effect of initial application of IFRS 16	(4)	—
Restated Deferred tax asset at 1 January	40	135
Deferred tax movement on IFRS 16	4	—
Deferred tax movement on share option	(44)	(91)
Deferred tax asset at 31 December	—	44
Deferred tax asset due after more than one year	—	44

Amounts owed by Group undertakings are trading balances and interest is not charged.

For additional disclosures relating to current and deferred taxation, see notes 11 & 22 to the consolidated financial statements.

5. Creditors

	2019 £'000	2018 £'000
Amounts falling due within one year		
Amounts owed to Group undertakings	8,593	11,862
Accruals	53	254
	8,646	12,116

Amounts owed to Group undertakings are trading balances under normal commercial terms and interest is not charged.

For additional disclosures relating to financial liabilities, see note 24 to the consolidated financial statements.

6. Provisions

	2019 £'000	2018 £'000
At 1 January	78	—
Additional provision in the year	119	78
Release of provision	(78)	—
At 31 December	119	78

7. Dividends

	2019 £'000	2018 £'000
Amounts recognised as distributions to equity holders in the period:		
Final dividend for the year ended 31 December 2018 of nil pence (2017: 6.8 pence) per share	—	5,238
Interim dividend for the year ended 31 December 2019 of nil pence (2018: 1.0 pence) per share	—	771
Total distributions to equity holders in the period	—	6,009
Proposed final dividend for the year ended 31 December 2019 of nil pence (2018: nil) per share	—	—

8. Share capital and share premium account

Full details of movements in share capital and the share option schemes, and share premium are given in notes 26 and 27 to the consolidated financial statements.

9. Share-based payments

Equity-settled share option scheme

The Company's share option schemes are open to all employees of the Company. Options are exercisable at a price equal to the average quoted market price of the Company's shares on the date of grant. The vesting period is three years. The vesting criteria of these options are disclosed in note 33 to the consolidated financial statements. If the options remain unexercised after a period of ten years from the date of grant, 42 months in the case of the Share Save Scheme, or five years in the case of the Share Incentive Plan, the options expire. Save as permitted in the share option scheme rules, options lapse on an employee leaving the Company.

The weighted average share price at the date of exercise for share options exercised during the period was £1.32 (2018: £3.01). The options outstanding at 31 December 2019 had a weighted average remaining contractual life of three years (2018: nine years), and a range of exercise prices between 0 pence and 403 pence (2018: 0 pence and 417 pence).

The performance conditions relating to the above share options and the exercise prices of options outstanding at the year-end are given in note 33 to the consolidated financial statements.

Notes to the Company financial statements *continued* for the year ended 31 December 2019

9. Share-based payments continued

Long-Term Incentive Plan

The Company's Long-Term Incentive Plan is open to all employees of the Company. Vesting of Performance Share Awards made under this scheme is conditional upon the achievement of performance conditions. Full details of the performance conditions are shown in note 33 of the consolidated financial statements. All awards made under this scheme are exercisable within three to ten years after the date of grant. Save as permitted in the Long-Term Incentive Plan rules, awards lapse on an employee leaving the Company.

The weighted average share price at the date of exercise for awards exercised during the period was £0.73 (2018: £3.40). The awards outstanding at 31 December 2019 had a weighted average remaining contractual life of nine years (2018: eight years). All awards have a £nil exercise price.

10. Subsidiary undertakings

The following entities are the subsidiary undertakings of the Company:

Name	Country of incorporation	Address of registered office	Principal activity	Issued and fully paid up share capital	Proportion of ordinary share capital held by the Company
Xaar Technology Limited	England & Wales	Science Park, Cambridge, CB4 0XR	Research and development	4,445,322 ordinary £1 shares	100%
XaarJet Limited	England & Wales	Science Park, Cambridge, CB4 0XR	Manufacturing, research and development and sales and marketing	2 ordinary £1 shares	100%
XaarJet (Overseas) Limited	England & Wales	Science Park, Cambridge, CB4 0XR	Sales and marketing	1 ordinary £1 share	100%
Xaar Trustee Limited ¹	England & Wales	Science Park, Cambridge, CB4 0XR	Trustee	2 ordinary £1 shares	100%
Xaar Digital Limited	England & Wales	Science Park, Cambridge, CB4 0XR	Treasury	100 ordinary £1 shares	100%
Xaar 3D Holdings Limited	England & Wales	Science Park, Cambridge, CB4 0XR	Holding Company	1,100 ordinary shares of £0.01 each	100%
Xaar 3D Limited ²	England & Wales	Science Park, Cambridge, CB4 0XR	Manufacturing, research and development	2,400 ordinary shares of £0.01 each	55%
Xaar 3D ApS ³	Denmark	c/o Bygning OBV 028, Otto Busses Vej 5 A, 1. sal., 2450 Kobenhavn SV, Denmark	Research and development	500 ordinary shares of DKK 100 each	55%
Xaar Group AB	Sweden	Science Park, Cambridge, CB4 0XR	Holding Company	1,137,000 ordinary shares of SEK 0.09 each	100%
XaarJet AB ⁴	Sweden	Science Park, Cambridge, CB4 0XR	Manufacturing	1,000 ordinary shares of SEK 100 each	100%
Xaar US Holdings Inc.	USA	1209 Orange Street, Wilmington, New Castle County, Delaware, USA	Holding Company	6,000 shares of common stock \$1 each	100%
Engineered Printing Solutions ⁵	USA	201 Tennis Way, East Dorset, VT 05253, USA	Manufacturing, sales and marketing	100 shares of common stock \$1 each	100%
Xaar Americas Inc. ⁵	USA	1000 Post and Paddock, Suite 405, Grand Prairie, TX 75050, USA	Sales and marketing	10,000 shares of common stock US\$1 each	100%

¹ Xaar Trustee Limited shares are held by Xaar Technology Limited.

² Xaar 3D Limited shares are held by Xaar 3D Holdings Limited.

³ Xaar 3D ApS shares are held by Xaar 3D Limited.

⁴ XaarJet AB shares are held by Xaar Group AB.

⁵ Xaar Americas Inc and Engineering Printing Solutions are held by Xaar US Holdings Inc.

11. IFRS 16 transition

As indicated in note 3 of the consolidated financial statements, the Group and its subsidiaries have adopted IFRS 16 retrospectively from 1 January 2019, but have not restated comparatives for the 2018 reporting period, as permitted under specific transition provisions in the standard. The reclassifications and adjustments arising from the new leasing rules are therefore recognised in the opening balance sheet on 1 January 2019. The new accounting policies are disclosed in the equivalent disclosure in note 3 of the consolidated financial statements.

On adoption of IFRS 16, the Company recognised lease liabilities in relation to leases which had previously been classified as operating leases under the principals of IAS 17 'Leases'. These liabilities were measured at the present value of the remaining lease payments, discounted using the lessee's incremental borrowing rate as of 1 January 2019. The weighted average lessee's incremental borrowing rate applied to the lease liabilities on 1 January 2019 was 3%.

The impact of the change in accounting policy affected the following items in the balance sheet on 1 January 2019.

	At 31 December 2018 (as previously reported) £'000	Impact of IFRS 16 £'000	At 1 January 2019 (as restated) £'000
Non current assets			
Right of use asset	—	53	53
Total impact on assets	—	53	53
Current liabilities			
Lease liabilities	—	31	31
Non-current liabilities			
Deferred tax liabilities	—	4	4
Total impact on liabilities	—	35	35
Equity			
Retained earnings	5,948	(18)	5,930
	5,948	(18)	5,930
			£'000
Operating lease commitments disclosed under IAS 17 at 31 December 2018			31
Lease liabilities recognised at 1 January 2019			31

In terms of the income statement impact, the application of IFRS 16 resulted in a decrease in other operating expenses and an increase in depreciation and interest expense compared to IAS 17. During the year ended 31 December 2019, in relation to leases under IFRS 16 the Group recognised the following amounts in the consolidated income statement:

	£'000
Depreciation	53

12. Non-adjusting post balance sheet event – COVID-19

As indicated in note 38 of the consolidated financial statements which addresses the impact of COVID-19 on the Group.

Given the uncertainty it is not possible to determine the financial effect of COVID-19 disruption on the Company which could include, for example, the impairment of investments in subsidiaries or receivables.

Five year record

	2019 Continuing Operations £'000	2018 Restated Continuing Operations £'000	2018 £'000	2017 £'000	2016 £'000	2015 £'000
Summarised consolidated results						
Results						
Revenue	49,397	60,468	63,534	100,142	96,178	93,472
Gross profit	11,962	29,496	24,449	47,045	44,667	44,690
Adjusted (loss)/profit before tax (note 4)	(9,848)	4,524	(11,721)	18,012	19,482	20,819
Adjusted (loss)/profit after tax	(13,349)	6,930	(7,483)	16,413	16,587	19,024
Adjusted diluted earnings per share (note 4)	(17.4p)	10.0p	(9.7p)	20.7p	21.2p	24.5p
Dividends pence per share	—	1.0p	1.0p	10.2p	10.0p	9.45p
Assets employed						
Net cash*	25,322	27,946	27,946	44,697	49,321	69,747

* Net cash is made up of cash and cash equivalents, treasury deposits less borrowings.

Notice of the Annual General Meeting

COVID-19 statement

In the lead up to the Annual General Meeting, we are closely monitoring the impact of the COVID-19 virus in the United Kingdom. In light of current public health advice and "Stay at Home" legislation recently introduced, external shareholders (i.e. shareholders who do not also hold office as a director of the Company) are prohibited from attending the Annual General Meeting in person. Shareholders attempting to attend the meeting will be refused admission. Instead of attending this year's AGM, shareholders are asked to exercise their votes by submitting their proxy as set out in the Notice of Meeting. All shareholders are strongly recommended to vote electronically at www.signalshares.com as your vote will automatically be counted. Given the currently escalating situation sending a paper proxy is no guarantee of having your vote counted. In addition, should a shareholder have a question that they would have raised at the meeting, we ask that they send it by e mail to investor.relations@xaar.com before 5.00 pm on 25 May 2020. Answers to the questions will be published on our Corporate website (www.xaar.com) after the AGM.

Notice is hereby given that the twenty-third Annual General Meeting ('AGM') of Xaar plc (the 'Company') will be held at Xaar plc, 316 Science Park, Milton Road, Cambridge, CB4 0XR on Tuesday 2 June 2020 at 9:30am for the following purposes:

Ordinary business

To consider and, if thought fit, pass the following Resolutions which will be proposed as Ordinary Resolutions:

1. THAT the Company's annual financial statements for the financial year ended 31 December 2019, together with the Directors' report and auditor's report on those financial statements, be received and adopted.
2. THAT Ernst & Young LLP be re-appointed as the Company's auditors to hold office from the conclusion of this meeting until the conclusion of the next general meeting of the Company at which financial statements are laid.
3. THAT the Directors be authorised to determine the remuneration of the auditors.
4. THAT Dr Robert Mills be re-elected as a Director of the Company.
5. THAT Andrew Herbert be re-elected as a Director of the Company.
6. THAT Christopher Morgan be re-elected as a Director of the Company.
7. THAT Ian Tichias be re-elected as a director of the Company.
8. THAT the Directors' remuneration report (excluding the Directors' remuneration policy which is set out on pages 63 to 85 of the Annual Report) for the year ended 31 December 2019 be approved

Special business

To consider and, if thought fit, pass the following Resolutions which will be proposed in the case of Resolution 9 as an Ordinary Resolution and in the case of Resolutions 10 to 12 as Special Resolutions:

9. THAT, in substitution for all existing authorities including the authority conferred on the Directors of the Company by Article 4(b) of the Company's Articles of Association, pursuant to and in accordance with section 551 of the Companies Act 2006 ('Act') the Directors of the Company be hereby generally and unconditionally authorised to exercise all powers of the Company to allot equity securities (within the meaning of section 560 of the Act), or grant rights to subscribe for, or convert any security into, shares in the Company ('Rights'):
 - (i) up to an aggregate nominal value of £2,611,143 (being the nominal value of approximately one third of the issued share capital of the Company); and
 - (ii) up to an aggregate nominal value of £5,222,286 (being the nominal value of approximately two thirds of the issued share capital of the Company) (such amount to be reduced by the nominal amount of any equity securities allotted or Rights granted under paragraph (i)) in connection with an offer by way of a rights issue (as defined in the Listing Rules issued by the Financial Conduct Authority pursuant to Part VI of the Financial Services and Markets Act 2000) or other pre-emptive offer to:
 - (a) the holders of ordinary shares of 10 pence each in the capital of the Company ('ordinary shares') in proportion (as nearly as may be practicable) to the respective numbers of ordinary shares held by them; and
 - (b) holders of other equity securities, as required by the rights of those securities or, subject to such rights, as the Directors otherwise consider necessary, and so that, in each case, the Directors of the Company may impose any limits or restrictions and make any arrangements which they consider necessary or appropriate to deal with treasury shares, fractional entitlements, record dates, legal, regulatory or practical problems in, or under the laws of, any territory or the requirements of any regulatory body or stock exchange or any other matter, such authority to expire on the earlier of the next Annual General Meeting of the Company held after the date on which this resolution becomes unconditional and the date 15 months after the passing of this Resolution, save that the Company may at any time before such expiry make any offer(s) or enter into any agreement(s) which would or might require shares to be allotted or Rights to be granted after such expiry and the Directors may allot shares or grant Rights in pursuance of any such offer(s) or agreement(s) as if the authority conferred hereby had not expired. This Resolution revokes and replaces all unexercised authorities previously granted to the Directors to allot shares or grant Rights but without prejudice to any allotment of shares or grant of Rights already made, offered or agreed to be made pursuant to such authorities.
10. THAT, subject to the passing of Resolution 9, the Directors of the Company be authorised to allot equity securities (as defined in section 560 of the Act) for cash under the authority conferred by that Resolution and/or to sell ordinary shares held by the Company as treasury shares as if section 561 of the Act did not apply to any such allotment or sale, provided that such authority shall be limited to:

Notice of the Annual General Meeting *continued*

Special business *continued*

- (a) the allotment of equity securities in connection with an offer of equity securities (but, in the case of the authority granted under paragraph (ii) of Resolution 9, by way of a rights issue only):
- (i) to the holders of ordinary shares in proportion (as nearly as may be practicable) to their respective holdings; and
 - (ii) to holders of other equity securities as required by the rights of those securities or as the Directors otherwise consider necessary, but subject to such exclusions or other arrangements as the Directors of the Company may deem necessary or expedient in relation to treasury shares, fractional entitlements, record dates, legal or practical problems in or under the laws of any territory or the requirements of any regulatory body or stock exchange; and
- (b) the allotment of equity securities or sale of treasury shares (otherwise than pursuant to paragraph (i) of this Resolution) to any person up to an aggregate nominal amount of £391,672.

The authority granted by this Resolution will expire at the conclusion of the Company's next Annual General Meeting after the passing of this Resolution or, if earlier, at the close of business on the date 15 months after the passing of this Resolution, save that the Company may, before such expiry make offers or agreements which would or might require equity securities to be allotted (or treasury shares to be sold) after the authority expires and the Directors of the Company may allot equity securities (or sell treasury shares) in pursuance of any such offer or agreement as if the authority had not expired.

11. THAT, subject to the passing of Resolution 9, the directors of the Company be authorised in addition to any authority granted under Resolution 10 to allot equity securities (as defined in section 560 of the Act) for cash under the authority conferred by Resolution 9 and/or to sell ordinary shares held by the Company as treasury shares as if section 561 of the CA 2006 did not apply to any such allotment or sale, provided that such authority shall be:
- (a) limited to the allotment of equity securities or sale of treasury shares up to an aggregate nominal amount of £391,672; and
 - (b) used only for the purpose of financing (or refinancing, if the authority is to be used within six months after the original transaction) a transaction which the Directors of the Company determine to be an acquisition or other capital investment of a kind contemplated by the Statement of Principles on Disapplying Pre-Emption Rights most recently published by the Pre-Emption Group prior to the date of this notice.
- The authority granted by this Resolution will expire at the conclusion of the Company's next Annual General Meeting after this Resolution is passed or, if earlier, at the close of business on the date 15 months after the passing of this Resolution, save that the Company may, before such expiry make offers or agreements which would or might require equity securities to be allotted (or treasury shares to be sold) after the authority expires and the Directors of the Company may allot equity securities (or sell treasury shares) in pursuance of any such offer or agreement as if the authority had not expired.
12. That the Company be generally and unconditionally authorised for the purposes of section 701 of the Act to make one or more market purchases (within the meaning of section 693(4) of the Act) of ordinary shares provided that:
- (a) the maximum aggregate number of ordinary share authorised to be purchased is 11,671,810 (representing 14.9% of the issued ordinary share capital);
 - (b) the minimum price (excluding expenses) which may be paid for an ordinary share is the par value of the shares;
 - (c) the maximum price (excluding expenses) which may be paid for an ordinary share is an amount equal to the higher of (i) 105% of the average of the middle market quotations for an ordinary share as derived from the London Stock Exchange Daily Official List for the five business days immediately preceding the day on which that ordinary share is purchased, and (ii) the amount stipulated by article 5(1) of the Buy-back and Stabilisation Regulation 2003;
- this authority shall expire at the conclusion of the next Annual General Meeting of the Company, or, if earlier, at the close of business on the date which is 15 months after the passing of this Resolution unless renewed, revoked or varied before that time; and
- the Company may make a contract to purchase ordinary shares under this authority before the expiry of the authority which will or may be executed wholly or partly after the expiry of the authority, and may make a purchase of ordinary shares in pursuance of any such contract.
13. That, the Directors' Remuneration Policy, the full text of which is contained in the Directors' Remuneration report for the year ended 31 December 2019 and which is set out in pages 63 to 85 of the Annual Report. Which will take effect at the conclusion of this meeting, be approved.
14. That the amendments to the Xaar 2017 Long-Term Incentive Plan, as shown in the marked-up version of the plan rules produced to the meeting, be and they are hereby approved and the Directors be and are generally authorised to adopt the amendments and to do all acts and things that they consider necessary or expedient to give effect to the amendments. (Further details included in note 17 of the Notice of AGM).



By order of the Board
Ian Tichias
Company Secretary

22 April 2020

Notes

1. A member entitled to attend and vote at the meeting may appoint one or more proxies to exercise all or any of the member's rights to attend, speak and vote at the meeting. A proxy need not be a member of the Company but must attend the meeting for the member's vote to be counted. If a member appoints more than one proxy to attend the meeting, each proxy must be appointed to exercise the rights attached to a different share or shares held by the member. If a member wishes to appoint one or more proxies they may do so at www.signalshares.com, if not already registered you will need your Investor code to do so, this can be found on your share certificate. If paper proxy forms are required, the member should contact the registrars' helpline on 0871 664 0300 (calls cost 12 pence per minute plus network extras). If you are outside the United Kingdom, please call +44 371 664 0300 (calls will be charged at the applicable international rate). We are open between 9.00 a.m. – 5.30 p.m., Monday to Friday excluding public holidays in England and Wales. Submission of a proxy vote shall not preclude a member from attending and voting in person at the meeting in respect of which the proxy is appointed or at any adjournment thereof.
2. To be effective, the proxy vote must be submitted at www.signalshares.com so as to have been received by the Company's registrars not less than 48 hours (excluding weekends and public holidays) before the time appointed for the meeting or any adjournment of it. Any power of attorney or other authority under which the proxy is submitted must be returned to the Company's registrars, Link Asset Services, PXS1, 34 Beckenham Road, Beckenham, Kent, BR3 4ZF. If a paper form of proxy is requested from the registrar, it should be completed and returned to Link Asset Services, PXS1, 34 Beckenham Road, Beckenham, Kent, BR3 4ZF to be received not less than 48 hours before the time of the meeting.
3. Any person to whom this notice is sent who is a person nominated under section 146 of the Companies Act 2006 to enjoy information rights (a 'Nominated Person') may, under an agreement between him/her and the shareholder by whom he/she was nominated, have a right to be appointed (or to have someone else appointed) as a proxy for the Annual General Meeting. If a Nominated Person has no such proxy appointment right or does not wish to exercise it, he/she may, under any such agreement, have a right to give instructions to the shareholder as to the exercise of voting rights.
4. The statement of the rights of shareholders in relation to the appointment of proxies in paragraphs 1 and 2 above does not apply to Nominated Persons. The rights described in these paragraphs can only be exercised by shareholders of the Company.
5. In accordance with Regulation 41 of the Uncertified Securities Regulations 2001, the Company specifies that only those members entered on the register of members of the Company as at close of business on 31 May 2020 (or in the event the meeting is adjourned, on the register of members 48 hours before the time of any adjourned meeting) shall be entitled to attend or vote at the meeting in respect of the number of shares registered in their name at that time. Changes to entries on the register of members after close of business on 31 May 2020 (or in the event the meeting is adjourned, on the register of members less than 48 hours before the time of any adjourned meeting) shall be disregarded in determining the rights of any person to attend or vote at the meeting.
6. Copies of Directors' service agreements, the terms of appointment of Non-Executive Directors, the register of Directors' interests kept by the Company under section 808 of the Companies Act 2006, the Xaar plc 2004 Share Option Plan, the Xaar plc 2007 Share Save Plan, the Xaar plc 2017 Share Save Plan, Xaar plc 2007 Long-Term Incentive Plan, the Xaar Share Incentive Plan and the Xaar 2017 Long-Term Incentive Plan will be available 15 minutes prior to the commencement of the meeting and will remain open and accessible during the continuance of the meeting to any person attending the meeting.
7. Biographical details of all Directors offering themselves for re-appointment are set out on pages 44 and 45 of the Annual Report and Accounts. The Company announced in September 2019, that Margaret Rice-Jones would not seek re-election at this year's Annual General Meeting as she was intending to leave the Board at the time of the Meeting. It remains the case that Margaret will not seek re-election at the Annual General Meeting on the basis that she will soon leave the Board. However, given the uncertainty of the current environment, Margaret has agreed to remain in office until the end of June so as to ensure an orderly transition once her successor is identified.
8. Shareholders should note that it is possible that, pursuant to requests made by shareholders of the Company under section 527 of the Companies Act 2006, the Company may be required to publish on a website a statement setting out any matter relating to: (i) the audit of the Company's accounts (including the auditor's report and the conduct of the audit) that are to be laid before the Annual General Meeting; or (ii) any circumstance connected with an auditor of the Company ceasing to hold office since the previous meeting at which annual accounts and reports were laid in accordance with section 437 of the Companies Act 2006. The Company may not require the shareholders requesting any such website publication to pay its expenses in complying with sections 527 or 528 of the Companies Act 2006. Where the Company is required to place a statement on a website under section 527 of the Companies Act 2006, it must forward the statement to the Company's auditor not later than the time when it makes the statement available on the website. The business which may be dealt with at the Annual General Meeting includes any statement that the Company has been required under section 527 of the Companies Act 2006 to publish on a website.
9. In order to facilitate voting by corporate representatives at the meeting, arrangements will be put in place at the meeting so that: (i) if a corporate shareholder has appointed the Chairman of the meeting as its corporate representative to vote on a poll in accordance with the directions of all of the other corporate representatives for that shareholder at the meeting, then on a poll those corporate representatives will give voting directions to the Chairman and the Chairman will vote (or withhold a vote) as corporate representative in accordance with those directions; and (ii) if more than one corporate representative for the same corporate shareholder attends the meeting but the corporate shareholder has not appointed the Chairman of the meeting as its corporate representative, a designated corporate representative will be nominated, from those corporate representatives who attend, who will vote on a poll and the other corporate representatives will give voting directions to that designated corporate representative. Corporate shareholders are referred to in the guidance issued by the Institute of Chartered Secretaries and Administrators on proxies and corporate representatives (www.icsa.org.uk) for further details of this procedure. The guidance includes a sample form of appointment letter if the Chairman is being appointed as described in (i) above.
10. CREST members who wish to appoint a proxy or proxies through the CREST electronic proxy appointment service may do so by using the procedures described in the CREST Manual. CREST Personal Members or other CREST sponsored members, and those CREST members who have appointed a service provider(s), should refer to their CREST sponsor or voting service provider(s), who will be able to take the appropriate action on their behalf.

Notice of the Annual General Meeting *continued*

Notes continued

11. In order for a proxy appointment or instruction made using the CREST service to be valid, the appropriate CREST message (a 'CREST Proxy Instruction') must be properly authenticated in accordance with CRESTCo's specifications, and must contain the information required for such instruction, as described in the CREST Manual. The message, regardless of whether it constitutes the appointment of a proxy or is an amendment to the instruction given to a previously appointed proxy must, in order to be valid, be transmitted so as to be received by the issuer's agent (ID RA10) by 9:30 am on 31 May 2020. For this purpose, the time of receipt will be taken to be the time (as determined by the timestamp applied to the message by the CREST Application Host) from which the issuer's agent is able to retrieve the message by enquiry to CREST in the manner prescribed by CREST. After this time any change of instructions to proxies appointed through CREST should be communicated to the appointee through other means.
 12. CREST members and, where applicable, their CREST sponsors, or voting service providers should note that CRESTCo does not make available special procedures in CREST for any particular message. Normal system timings and limitations will, therefore, apply in relation to the input of CREST Proxy Instructions. It is the responsibility of the CREST member concerned to take (or, if the CREST member is a CREST personal member, or sponsored member, or has appointed a voting service provider, to procure that his CREST sponsor or voting service provider(s) take(s) such action as shall be necessary to ensure that a message is transmitted by means of the CREST system by any particular time. In this connection, CREST members and, where applicable, their CREST sponsors or voting system providers are referred, in particular, to those sections of the CREST Manual concerning practical limitations of the CREST system and timings.
 13. The Company may treat as invalid a CREST Proxy Instruction in the circumstances set out in Regulation 35(5)(a) of the Uncertificated Securities Regulations 2001 (as amended).
 14. As at 7.00am on 21 April 2020, the Company's issued share capital comprised 78,334,296 ordinary shares of 10 pence each. Each ordinary share carries the right to one vote at a general meeting of the Company, except for the shares held in trust for the Xaar Share Incentive Plan totalling 100,124 ordinary shares and, therefore, the total number of voting rights in the Company as at 7.00am on 21 April 2020 is 78,234,172.
 15. Any member attending the meeting has the right to ask questions. The Company must answer any such question relating to the business being dealt with at the meeting but no such answer need be given if: (a) to do so would interfere unduly with the preparation for the meeting or involve the disclosure of confidential information; (b) the answer has already been given on a website in the form of an answer to a question; or (c) it is undesirable in the interests of the Company or the good order of the meeting that the question be answered.
 16. You may vote your shares electronically at www.signalshares.com. On the home page, search "Xaar plc" and then log in or register, using your Investor Code. To vote, click on the "Vote Online Now" button.
 17. Resolution 14 relates to proposed amendments to the Xaar 217 Long-Term Incentive Plan (the 'LTIP'). The LTIP was approved by shareholders at the AGM on 16 May 2017 and certain amendments are proposed, to provide more administrative flexibility and to reflect the proposed new Directors' Remuneration Policy. The rules of the LTIP marked-up to show the proposed changes will be available for inspection on the Company's website at www.xaar.com from the date of this Notice until the close of the Annual General Meeting. The changes for which shareholder approval is required are as follows.
 - (a) The LTIP includes a limit on the value of shares over which awards may be granted during any financial year of the Company. This limit is not being increased, and awards granted to the Company's Executive Directors will be consistent with the Company's Directors' Remuneration Policy. However, recognising that in certain circumstances awards in respect of a financial year may not be made during that financial year, the limit is proposed to be varied so that it applies to awards in respect of a financial year rather than awards during a financial year. This will mean that if awards are not made during a particular financial year, the LTIP opportunity for that year can be granted in the following year (without affecting the opportunity for that subsequent year).
 - (b) The LTIP provides that in assessing the limit on awards, the market value of a share must be the middle market quotation of a share on the dealing day before grant, or the average of such quotations for up to five days. The rules are proposed to be varied so that the Remuneration Committee may determine the market value of a share for these purposes. This is to give flexibility in appropriate circumstances, and there is no intention to change the Company's current practice. Awards granted to the Company's Executive Directors will be consistent with the Company's Directors' Remuneration Policy.
 - (c) The LTIP provides that awards cannot vest before the third anniversary of grant. The rules are proposed to be varied so that awards may vest before this date. There is no intention to change the length of the performance period, but this amendment will mean that where awards are granted later than usual (for example due to regulatory restrictions) they can vest following assessment of the performance conditions, without the vesting being deferred as a result of the deferral of the grant.
- Other changes will be made to the rules of the LTIP, for which shareholder approval is not required. These changes are to reflect the proposed new Directors' Remuneration Policy and are as follows.
- (a) To enable the operation of the post-vesting holding period on a "gross" basis, so that the participant is unable to acquire shares before the end of that holding period. The rules are also amended to permit the award of dividend equivalents over the holding period (reflecting that the participant will not own the shares and so will not be entitled to the dividends) and to reflect the impact of cessation of employment during the holding period.
 - (b) To enable the Remuneration Committee to make the delivery of shares subject to the participant agreeing to take any action required by the Remuneration Committee in connection with any post-employment shareholding requirement.
 - (c) To update the malus and clawback provisions so that they reflect the proposed new Directors' Remuneration Policy.
18. A copy of this Notice, and other information required by section 311A of the Companies Act 2006, can be found at www.xaar.com.

Advisors

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Registered number
3320972

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Ian Tichias

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Bankers
HSBC Bank plc
Vitrum Building
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Cambridge CB4 0DS

Registrars

Link Asset Services
The Registry
34 Beckenham Road
Beckenham
Kent BR3 4TU

Unsolicited mail:

The Company is obliged by law to make its share register publicly available should a request be received. As a consequence, shareholders may receive unsolicited mail from organisations that use it as a mailing list. Shareholders wishing to limit the amount of such mail should either write to Mailing Preference Service, DMA House, 70 Margaret Street, London W1W 8SS, register online at www.mpsonline.org.uk or call the Mailing Preference Service ('MPS') on +44 (0)845 703 4599. MPS is an independent organisation which offers a free service to the public.

Warning to shareholders – boiler room scams

Each year in the UK, £1.2bn is lost to investment fraud, with the average victim losing around £20,000. What is more, it is estimated that only 10% of the people that become victims of investment fraud actually report it.

Investment scams are becoming ever more sophisticated – designed to look like genuine investments, they are increasingly difficult to spot. They are targeted at those most at risk, typically people in retirement who are actively seeking an investment opportunity.

Protect yourself

1. Reject cold calls

If you have been cold called with an offer to buy or sell shares, it is likely to be a high-risk investment or scam. You should treat the call with extreme caution. The safest thing to do is hang up.

If you are offered unsolicited investment advice, discounted shares, a premium price for shares you own, or free company or research reports, you should get the name of the person and organisation contacting you and take these steps before handing over any money.

2. Check the firm on the Financial Services Register at www.fca.org.uk/register

The Financial Services Register is a public record of all the firms and individuals in the financial services industry that are regulated by the FCA.

Use the details on the Financial Services Register to contact the firm.

3. Get impartial advice

Think about getting impartial financial advice before you hand over any money. Seek advice from someone unconnected to the firm that has approached you.

REMEMBER, if it sounds too good to be true, it probably is!

If you use an unauthorised firm to buy or sell shares or other investments, you will not have access to the Financial Ombudsman Service or Financial Services Compensation Scheme if things go wrong.

Report a scam

If you suspect you have been approached by fraudsters please tell the FCA using the share fraud reporting form at www.fca.org.uk/scams, where you can find out more about investment scams.

You can also call the FCA Consumer Helpline on +44 (0)800 111 6768.

If you have lost money to investment fraud, you should report it to Action Fraud on +44 (0)300 123 2040 or online at www.actionfraud.police.uk.

Find out more at www.fca.org.uk/scamsmart



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