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Interview

# Made to last

At 78, David McMurtry has no intention of slowing down. The Dublin-born inventor and billionaire co-founder of British precision-engineering and technology company Renishaw may have recently handed over the role of chief executive, but he is still to be found heading up the company’s R&D department



John Reynolds

Many entrepreneurs might be winding down to some degree at the age of 78. But Dublin-born billionaire inventor and engineer David McMurtry works four days a week, and is busy thinking up the next generation of the precision measurement and manufacturing technology, medical robots and 3D metal printers his company Renishaw makes. He has also, he tells me, invested in an electric car start-up.

We meet in the Clontarf native’s modest first floor office. It overlooks a lake and nature reserve on the sprawling site of the Renishaw HQ, in a green Gloucestershire valley about 40 minutes’ drive from Bristol city centre.

There’s a boardroom table at one end, couches and a table in the middle of the room, where we chat, and his desk at the other end. Head of communications Chris Pockett sits in as well.

This is McMurtry’s first interview since handing over the reins to new chief executive Will Lee, an Oxford University graduate, whose MBA the company sponsored, and who has worked there for 20 years. After 45 years at the helm, McMurtry has gone back to the work he enjoys the most: research and development. His official title is executive chairman with responsibility for group innovation and product strategy.

Spending 60 years living in England has given a ‘burr’ to his accent, though at times there is a hint of an Irish lilt. In person, McMurtry is a curious mix of modesty with underlying distinct self-assuredness and certainty of vision, all with a dry and irreverent sense of humour. His scientific curiosity brings to mind the late Pearse Lyons, the founder of Alltech.

A keen tennis and squash player, McMurtry spends his spare time reading, tinkering with cars or enjoying time with his family.

The Irishman owns a 36 per cent stake in Renishaw worth €1.56 billion, from which he has banked fees and dividends of over €95 million since 2009. Control of the 17 per cent stake belonging to his co-founder John Deer gives him effective control of the company.

Its global workforce is now over 4,580 – in 70 offices in 25 countries – and could reach the 5,000 mark early next year. Sales for this financial year are forecast to hit as much as €690 million, while pre-tax profits could reach €180 million, according to the most recent update.

Employing more than 400 software engineers alone, Renishaw’s staff is split with roughly a third working on R&D, another third in manufacturing and the remainder on sales, marketing and other corporate functions.

Its software and design engineers are highly prized. A search of LinkedIn reveals several previous employees are in senior roles at Apple. Others now work for household names including Google, IBM, Rolls-Royce, Tesla and Dyson.

Renishaw makes a vast array of products. Aside from 3D printers, there are Raman spectroscopy machines, products used in dental care and brain surgery. There are laser, metal and magnetic encoders, machine tool probes, styl for them, coordinate measuring machine probes, machine calibration and optimisation products, plus a whole range of accessories, fixtures and software to go with them all.

There’s a good chance its products were used in the manufacture or inspection of your smartphone, smartwatch, your big-screen TV, your computer or tablet, many of the components in your car and many of the microchips in those products. Spacecraft, aerospace and motorsport manufacturers use their products as well.

A different cutting-edge use of a Renishaw product was recently demonstrated by a Danish research institute testing wastewater for micro-plastic particles. They were able to do this using a Raman spectroscopy system consisting of a Renishaw inVia confocal Raman microscope and an inVia Qontor system, where traditional laboratory techniques, such as gas chromatography or mass spectrometry and infrared microscopy weren’t up to the task.

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From its establishment in 1973, it took 30 years of steady growth for Renishaw to achieve annual sales of €200 million, yet in one recent year, its sales rocketed up by that amount, while its profits are now nearing that level.

Since I first interviewed McMurtry in 2012, the value of his Renishaw stake has almost quadrupled, propelling him into the billionaire league – but only on paper, of course. Its sales and profits have almost doubled in that time.

He founded Renishaw with Englishman and fellow engineer John Deer after they met at Rolls-Royce in 1972 – which the Irishman had joined as an apprentice after leaving school in 1958.

The business grew out of his invention of a touch-trigger probe to measure small diameter fuel and oil pipes in the early stages of the design of the Rolls-Royce Olympus engine they were working on at the time. A prototype of the engine is proudly displayed in the lobby of the HQ, surrounded by leather seats and shelves full of books and journals.

“My role at Rolls-Royce was mainly on the technical side that on the military jet, initially as a project manager. Then after I’d been promoted to deputy chief designer, I had a role across all the engines, including the Olympus one in his R&D staff, the business he and Deer have since built has become a F-listed €4.3 billion manufacturing and export-led business.”

He explains his move back to R&D. “As chief executive, and because the company has got so big, I was often distracted from what I love doing, with my attention being needed in marketing, sales and other functions. I’ve now been able to give very clearly refocus, and hand over the responsibility for a lot of that to Will. I can again focus on what I like doing best. My wife jokes I’m working even harder now than I did previously.”

“You can’t be good at everything, and there are people far better than me at running such a large global business efficiently. We’ve got an excellent team, and they’re best left to get on with the job. “Will has worked across many of our business divisions. He knows the business and all of our technology backwards. He can spin many more stories than I can and keep them spinning. He’s one of the many stars we’ve got and we were lucky that we had many candidates for the chief executive role to choose from, and we chose him.”

“We work very well together and see each other every morning. While he’s largely focused on the current generation of our technology, I’m solely



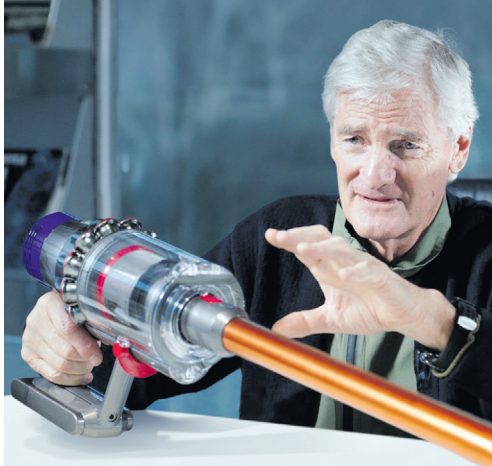
David McMurtry says that with his move back into R&D, ‘I can again focus on what I like doing best’



McMurtry with Renishaw co-founder John Deer



The Collision brothers: ‘Good luck to them. They’re an amazing success’



James Dyson is a household name, but in fact he holds fewer invention patents than McMurtry

catch up. McMurtry hopes to ensure Renishaw maintains its lead.

“We want a lead in making the process completely automated, improving manufacturing speeds and reducing the cost per part. It’s about making the process reliable and taking out the man-hours for our customers. We’re learning so much from improved control of the additive manufacturing process. That’s how we hope to stay ahead.” In short, the next generation of the printer needs to have more lasers and be able to work faster, but in a controlled way.

“It’s a fast-moving sector and we have to put in a lot of effort to make sure we’re not left behind. Targeting areas our competitors aren’t in helps as well. We are also looking at the role AI will play in this.”

“Our core strength in metrology means we’re seeing opportunities growing rather than shrinking. Asia is a big focus for us. In any manufacturing process where you’re making things in very large quantities, and you don’t want anything to go wrong with the process – and where you need total traceability of manufactured parts, from jet engine blades, to car components, electronics, microchips, electronics and electronic devices with screens – that’s where you’ll find our equipment.”

Additive manufacturing helps manufacturers become vastly more efficient, reducing manufacturing times by at least half in the case of a turbine blade for a jet engine. In healthcare it has reduced the time for a process used in facial reconstruction from an hour down to a minute and a half.

It can also be used to make range extenders for electric cars, which could prove a growth market, though McMurtry believes hybrids are likely to take a bigger share of the market first. “We’re working with some companies that make range extenders. You need additive manufacturing to make their heat exchangers.”

He describes in considerable detail how they contain a small ultra high-speed gas turbine. “I think more new cars [as with electric BMWs currently] might come with one of these in their boot: you’ll fire it up and it’ll recharge the battery rapidly.”

Many of Renishaw’s customers need to inspect and manufacture things faster and minimise costs because their margins are tightening. They also want equipment that’s easy to use and doesn’t require as many people to operate, because they’re finding it more difficult to recruit skilled staff.

Asia, where the company currently earns about half its revenues, is a key growth market. A rise in demand for computer chips due to their increased use in industrial robots – some of which also use Renishaw motion sensors – in particular and other consumer products is also a factor. The company expects China to increasingly take on Korea in manufacturing big-screen TVs, while the rise in cars featuring electronic displays also increases the requirements for high-precision manufacturing.

One London City analyst believes – although Renishaw never comments on its customers – that electronics and smartphone maker HUAWEI now uses its products in its manufacturing. Analysts previously figured out that the Chinese

and Korean giants that make Samsung and Apple smartphones and devices were customers as well.

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McMurtry describes R&D as his hobby. It’s one that’s made him a billionaire, creating a global business that is at the top of its game. Where does his inventive curiosity come from?

A keen aptitude for maths and science – “I was hopeless at everything else” – informed him from an early age. Model plane-making – “a major distraction to my education” – helped to nurture his innate talent. Growing up in the 1940s and 1950s, he also played in his father’s tinny foods factory beside the river Tolka in Fairview. The factory’s clunking, whirring machines, which later produced boiled sweets, may also have fuelled his inventive curiosity.

More recently he sought inspiration at the world’s biggest annual trade show for makers of manufacturing equipment in Beijing. “All the time I’d be looking for opportunities, asking myself ‘what have they missed?’”

“Observation is everything. That’s where most of my ideas come from. Ask yourself: What the hell are others doing? Could you save a bit of cash by doing it differently? Can you see a way of doing it better than they are?”

One solution McMurtry came up with – how to make a 3D-printed device that could deliver drugs directly to the brain for the treatment of cancer, Parkinson’s and other brain diseases – gives an idea of his genius. He was inspired by the bone-anchored hearing aid of someone he met in a pub. He and his design team then copied the way it was hidden behind the ear and incorporated a screw into the bone that went right through the skin.

His way of looking at the world brings to mind another successful Irish manufacturing entrepreneur, Eddie McElhinney, who founded metal ceiling tile manufacturer SAS International, and has been the go-to designer for some of the world’s leading architects when they want the ceilings inside their buildings to look amazing. He looks at the design of everyday objects, their shape, colour and curves, with a critical eye.

Reading books of university research abstracts – “one-page summaries of what young researchers and innovators are doing” – also help to fuel McMurtry’s inventive mind.

Geoff has just brought back a new pile for me from a conference,” he says. “They’re fascinating. I ask myself, ‘why didn’t I think of doing that?’ The failure rate in them is enormous. Perhaps 0.1 per cent make it to market. But some of the thinking is interesting.”

“I also enjoy visiting manufacturers in the sectors our customers operate in. Makers of medical devices and implants, or others making car components, engines, planes or jet engines, electronics and what have you. It’s always interesting to see what they’re doing, hear their thinking and what their needs are.”

He shares some advice for budding inventors and product designers. “If there’s an alternative way of doing what your invention does, you need to page 9

to consider it and patent it as well. But you also need to think how you would improve on an original invention or replace it and patent that as well.”

To have a competitive edge, inventors also need to consider how their invention can be efficiently manufactured. “There’s as much innovation in how we make things as in an inventor’s original patents.”

Is it becoming more difficult to come up with new inventions in this age of exponential technologies including AI and robots? “No, I don’t think so. The present environment is quite stimulating and opens more doors for new products to be invented. We’re lucky to have a number of up- and coming inventors within Renishaw. But Dyson did his own thing. Elon Musk is the same. There will be more like them. They can come from anywhere really.”

Is he concerned that the business might lose its inventive and R&D impetus to some degree whenever he is set to step down? There’s a sense that he might be irreplaceable. Of course, that might be true of Dyson too, as with other businesses whose chief executives or founders are synonymous with them, the likes of Richard Branson at Virgin or Michael O’Leary at Ryanair.

“When I step down I’ll let you know,” he replies. “When I wake up in the morning having had a good sleep, I have about two hours when everything tends to be fresh in my mind. Then I come here and do a few sketches. Everything starts with a sketch as far as I’m concerned.”

He enjoys problem solving and collaborating with his R&D teams. “We have a good ongoing relationship and dialogue. I’ve got solutions from my experiences working in many different areas over the years that I’ve gained from another division where they haven’t yet worked, or I’ll suggest someone else who might help them.”

“When I’ve drawn my sketches, I get feedback from the R&D staff, then I talk to engineering director Geoff McFarland and others to get their thoughts. We get a rapport going and then we go on to the next phase of the process.”

What happens to his inventions that don’t take off? He laughs. “Ah, we don’t talk to journalists about our failures. Only the successes. We’ve had a number of projects that have gone a long way, but haven’t got to market. It’s inevitable that you’ll have some false starts. The last one was stopped because we didn’t have the marketing capability and infrastructure to support it.”

“One was a high precision rotary table [a positioning product used in high-tech manufacturing processes, including in clean rooms.] There will be a demand for it in the future, and it was shelved because of our marketing capability. But if I open one of the drawers at my desk, there’s a load more stuff in there that didn’t quite make it either.”

As far as Irish entrepreneurs go, he named-checked Stripe founders and fellow billionaires Patrick and John Collison in a previous interview. “Good luck to them. They’re an amazing success. I’ll have a good eye and good with software or technology, I might’ve had a go at something similar.”

While he doesn’t offer any particular secrets in terms of scaling a business – aside from having

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Concorde aircraft in Bristol Aerospace Museum. At Rolls-Royce, McMurtry had a role in developing the Olympus engine for the legendary aircraft, and is a patron of the museum



Renishaw is a global powerhouse employing just shy of 5,000 people in 70 offices worldwide

the right co-founder in John Deer and then their ability to recruit and retain like-minded and talented people – he’s conscious of the dominance of the tech giants in the tech sector in business today. “Increasingly for tech start-ups, it’s about speed to market and access to huge amounts of money. Even with the right idea and tech, you can get overtaken if you raise your head above the parapet at the wrong time.”

As might be expected, he’s a champion of manufacturing and indigenous businesses, and admits the German Mittelstand model. “Countries are at their best when they’re manufacturing. Ireland needs more Kingspins, as well as food and farming,” he has said previously.

He also previously questioned the approach of Enterprise Ireland to backing start-ups, and said that Irish taxpayers’ money might be better used to help companies that had already achieved a degree of success to scale up.

McMurtry also previously questioned Britain and Ireland’s reliance on FDI. “It’s great for achieving short-term political goals, but it’s not a sustainable long-term view.” Serving as a reminder, German manufacturer Bosch, which moved its operations back to the continent, previously occupied a factory Renishaw now owns in South Wales.

He has also said in previous interviews that he regrets Renishaw going public in 1984. He would have preferred the autonomy of staying private, but he largely maintained control anyway, thanks to his and Deer’s combined 53 per cent stake. Losing control would have brought “the hassle of Renishaw’s money and permission to do things. You need to be able to take quick decisions.”

He dislikes the short-term attitude that larger investors and institutions can have to stock market investments. It’s difficult to judge whether keeping Renishaw private would have limited his or Deer’s ambition in any way. There’s a sense they were still free where they are today.

As with so many other European businesses, the firm largely has a wait-and-see approach to Brexit. “We’re hoping common sense will prevail, and that we can carry on as we are. Our Irish operation could be an advantage if we have a hard Brexit, or no deal. If you want to sell in Europe, it might be advisable to manufacture more there.”

It all depends on the outcome. It’s the friction that’s the issue for us rather than the tariffs. As we sell around the world, we’re used to a bit of friction, as long as it’s tolerable. If things go horribly wrong, we have the ability to adapt. When we see what the deal is, we will look at our resources and hopefully make sensible choices.

On the regulatory side, things like rules of origin are a monster. It’s unpicking 40 years of well-laid plans. The company has options,” Pockett says.

Our interview took place before Airbus and BMW said that the lack of progress with Brexit would jeopardise the future of their operations in Britain.

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Reluctant to talk about his private philanthropy, McMurtry is perhaps understandably also reluctant to discuss any specifics about the future of his stake in Renishaw, though he gives a clear indication of his fears.

“It’s a dangerous area to discuss. The British government is taking a greater interest in companies here being sold so hastily. I think the political situation in that regard might change, but it might be slow.”

“I don’t think they can let the likes of ARM Holdings [which was sold to Japan’s Softbank in 2016, and whose former boss said last year that he regretted selling it]... and look at what happened with Cadbury’s – much of the chocolate making went to Poland – leaving Britain.”

“I hope the government is realising that industry is so important because it’s wealth-creating. If you look at how an area like financial services here might not be the same after Brexit, they have to take a different view on retaining British ownership of companies. I think it might change dramatically.”

“Here you find that death duties might make sure that a business doesn’t stay family-owned, but that doesn’t apply in Germany, which has the successful Mittelstand model. I believe that’s under discussion here. Germany is the wealthiest country in Europe, and it’s a country that man-

ufactures and doesn’t sell off its crown jewels.”

Could a philanthropic foundation be set up in his name at some point in the future, perhaps? “It doesn’t apply at this point in time,” he laughs. “The windows were very small as well – a necessity of the design – but they got very hot, because of the friction of the plane at supersonic speeds, of course. If you sat in the window seat, you could really feel the radiation on your face. It wasn’t uncomfortable, but you certainly knew about it.”

“I think it might be a while before we get any kind of a replacement for it, that’s for sure. Perhaps Elon Musk has the answer, with a rocket we can all go on,” he laughs. “But I think it might take more than a decade for us to see whatever is going to succeed Concorde and fly us at that sort of [supersonic] speed.”

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McMurtry not only Ireland’s most prolific living inventor, but Britain’s as well, insofar as it may claim him?

Many readers will know James Dyson, the billionaire inventor of Dyson vacuum cleaners and other products. If you don’t own one of the cans or the canisters, you’ve probably at least used one of his hand dryers. Given that he is a household name, his might be the first name that comes to mind as an answer to the above question.

However, the European Patent Office’s register reveals that while Dyson has 117 patents to his name, McMurtry has at least 195.

The official line from Renishaw is that McMurtry (EPO) was fourth. David has been inventing for a longer period than, say, James Dyson, and of course he’s still inventing today.”

McMurtry’s amount to more than the European patents than entire Irish companies have, such as Kingspan, with 139, and Glen Dimplex, which has 87, according to the EPO online register.

Enquiries to Britain’s Institute of Mechanical Engineers, who works at IBM and who has 370, Institute of Patentees and Inventors and the British Inventors’ Society about whether there might be a British inventor with more patents had not elicited a response at the time of writing.

While Thomas Edison filed 1,063 patents during his lifetime, America’s most prolific living inventor seems to be 35-year-old Lisa Secrest DeLuca, an engineer who works at IBM and who has 370.

Last year, meanwhile, Britain’s Chartered Institute of Patent Attorneys named a research chemist working on immunotherapy to cure cancer, Alex Powesland, as Britain’s most prolific inventor for 2016. He was named on 33 patents last year.

McMurtry has a list of awards, honours, fellowships and doctorates one and a half pages long, more notably a CBE and knighthood. But while other countries including the US, Japan, Wales and Scotland have recognised his talent and achievements, sadly Ireland has yet to do so.

He often visits family here, and sometimes visits manufacturers here too, most recently in the medical devices sector. Renishaw’s Swords, Co. Dublin operation employs more than 200 people and is likely to expand in the near future, for which the company owns two more buildings on a site adjacent to its existing one. It could yet play a vital part in its Brexit strategy.

There are also now two fellow Irishmen on the board of Renishaw. Mark Moloney manages its operations here and in India and France, while the company’s chief financial officer, who has 370, McFarland is Irish too, and plays a key role in R&D alongside McMurtry.

Moloney, an ex-DUO graduate, has quietly established strong links with academia here to cultivate graduate talent. Such links continue to strengthen.

It is also discreetly involved in philanthropy here as well as in Britain. “I’d prefer not to say anything more than that. Actions are better than words perhaps, in that regard,” he says. “More and more will go that way. You can’t take it with you,” he said in a previous interview.

“I have never given it any thought, to be honest,” McMurtry says modestly when asked if he feels overlooked in any way by his homeland.

when it comes to attracting talented people, and nurturing the next generation of inventors and design engineers.

“We’ve always done well growing our own talent. Our applications for graduate entry, work experience and apprenticeships are very high at the moment. We also have a good conversion rate of apprentices who go on to take degrees. If students can do that, earn while you learn and we pay your fees, they’re saving a lot of money. We’re looking for people with practical interests as well as academic ones. We sometimes find that people with only academic interests aren’t as well-rounded.”

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At the nearby Bristol Aerospace Museum, of which Renishaw is also a patron, one of the last remaining Concorde aircraft is on display. It’s quite remarkable to see it up close. It looks futuristic, and yet it’s now part of history – and there’s something sad about that. Its design almost has more in common with a spaceship than the Boeings and Airbuses we’re all used to, and to whose design we give comparatively little thought.

“It really does, doesn’t it? It still looks futuristic. I flew on it twice when I was involved in the two battles over our patents that we had in our early days of Renishaw. One was with a US distributor and the other was with a manufacturer, Zeiss. I was almost needed in two places at once, so I was trying to get back to England after attending the cases in the US as fast as I could,” McMurtry recalls.

“The one thing I do remember was how much you were pushed back in your seat on it. The acceleration was a different order to what we’re used to on planes today. It was great to fly on. On my flights, it took a little over three hours from New York to London.

“The seats were quite small as well, with not a lot of legroom. They’re more like the Ryanair seats of today,” he laughs. “The windows were very small as well – a necessity of the design – but they got very hot, because of the friction of the plane at supersonic speeds, of course. If you sat in the window seat, you could really feel the radiation on your face. It wasn’t uncomfortable, but you certainly knew about it.”

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