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## Company case

### Dyson: reinventing continuously Yansong Hu, Warwick Business School

When we Google the word 'vacuum', we find that the name Dyson nearly always appears in the search results. Since their introduction into market in the early 1990s, Dyson's vacuum cleaners have become one of the world's best-known products for cleaning our carpets.

Best known for its vacuum cleaners, Dyson also sells a range of other products including award-winning hand dryers, bladeless fans, heaters and hair dryers. In 2017, Dyson was named as one of the world's most innovative companies, together with big brands such as Amazon, Google, Apple and Netflix.

Ever since its beginnings in the early 1990s when British inventor James Dyson founded the company, Dyson has established a quality name, best exemplified by the Dyson vacuum cleaners, which use centrifugal force to separate dust from heavier dirt to eliminate the need for a filtered vacuum bag. Today, the company's founder, Sir James Dyson, has an estimated net worth of £3.5 billion.

#### The long journey in developing the first Dyson vacuum

Dyson's journey to the top of vacuum mountain has been eventful.

Dyson's expedition into the vacuum world began in 1978, when he was determined to find a way to build a better device than the popular vacuums of the day. He started Dyson with an idea for a bagless vacuum that didn't lose suction. The idea seemed so simple – bagged vacuums begin to lose suction as soon as they fill with dust, so Dyson invented a vacuum that didn't rely on bags, and cyclone technology meant the vacuum wouldn't lose suction.

The idea of cyclone technology first came to him after seeing a local sawmill one day, which used a 30-foot-high conical centrifuge that would spin dust out of the air. He later adopted the same technology to build into a vacuum cleaner.

Easier said than done, though. Dyson spent the next 15 years developing and perfecting his design, a process that resulted in 5,127 different prototypes. Those years were tough for the fledgling inventor and his family. 'By 2,627, my wife and I were really counting our pennies', Dyson wrote in 2011. 'By 3,727, my wife was giving art lessons for some extra cash.'

Still, Dyson knew he had something potentially great on his hands and carried on. 'It didn't happen overnight, but after years of testing, tweaking, fist-banging, and after more than 5,000 prototypes, it was there', he said. 'Or nearly there. I still needed to manufacture it and go sell it.'

#### Challenges in getting market acceptance of the newly developed vacuum

With his patented cyclone technology and design, Dyson had thought that licensing the technology to a company would be simple. The logic is simple enough: after all, who wouldn't want to buy such an innovative product that is considerably more effective than anything else on the market?

Yet, the reality was something quite different. After three years travelling around the world trying to sell his bagless vacuum, Dyson could not find a single buyer. 'These vacuum makers had built a razor-and-blade business model reliant on the profits from bags and filters. No one would license my idea', he explained. 'Not because it was a bad one, but because it was bad for business.'

Despite his inability to sell the technology to large manufacturers, in the mid-1980s, Dyson was able to produce and sell his vacuum with the help of a small licensing company called Apex Limited. The 'G-Force', sold for \$2,000, was only available in Japan. This expensive device became something of a status symbol in Japan. Sales in Japan helped Dyson head off on his own to start the Dyson company in 1993.

Dyson soon set up his own workshop in England, and developed his business, which quickly became a household name in the UK and later the world.

#### Dyson's product portfolios

**Washing machine.** In the early 1990s, Dyson launched its first washing machine: the CR01 contrarotator. Similar to the cyclone vacuum cleaner, the contrarotator was another example of radical product innovation, using two drums instead of one to mimic the motion of hand washing. However, Dyson stopped manufacturing the washing machines in 2005 as they were losing money. 'The problem was that we didn't charge enough for it. . . . As a washing machine, it was a great success. As a business, it wasn't.' He added, 'But you learn a lot from all that failure. Making this washing machine was the most wonderful educative failure.'

**Dyson Airblade.** In 2006, the Dyson Airblade was launched. This hand dryer uses 430 mph sheets of air to dry hands quickly and hygienically in about 10–12 seconds, preventing bacteria and viruses from being blown onto your hands, a common problem with other hand dryers. The running costs of these Dyson hand dryers are up to 80 per cent less than other hand dryers and up to 98 per cent less than paper towels.

**Bladeless Dyson Air Multiplier fan.** The bladeless fan was launched in 2009. It works by drawing air in through the base before forcing it through a circular structure. Like the vacuum

cleaner, the fan without blades seemed entirely novel and Dyson has continued to develop the technology, re-engineering it to be significantly quieter.

*Supersonic hair dryer and beauty products.* In 2016, Dyson unveiled its first beauty product, the Supersonic hair dryer. The hair dryer is the result of over £50 million in research, including the construction of a dedicated beauty lab, where over 1,100 miles of human hair were used to test 600 prototype hair dryers. In this new dryer, Dyson combined ultra-power, directed airflow with intelligent heat control to prevent extreme heat damage when drying hair. This dryer has also leveraged stabilising machines, originally used to assemble nuclear weapons, to create a more efficient fan. The result is a slim, lightweight device that is 300 per cent more powerful than the most powerful hair dryers on the market.

Then in 2018, Dyson unveiled its latest beauty product: a \$550 curling iron that draws on the principles of aerospace physics to heat your hair, without burning it. This product took six years and \$31 million for Dyson to develop.

*Robots that suck and see.* To develop the core computer vision algorithms for the next generation robotic cleaner, Dyson approached Professor Andrew Davison, a pioneer in visual SLAM research who has been leading the Robot Vision Group at Imperial College since 2005. After over a decade of working together and £28 million worth of research, the Dyson 360 Eye vacuum cleaner was announced, with computer vision at its heart. The robot uses a fish-eye camera lens, allowing it to analyse 30 frames per second of data, and triangulate its position in the room.

### Innovating the Dyson way: frustration and failure fuel Dyson's success

According to Dyson, product is king: whatever your product is, please make sure everyone in your company understands the product. In fact, Dyson has famously been known to ask every employee on their first day to make a vacuum cleaner, even if they're working in customer service.

Dyson does not like memos. The logic behind this is that people just rely on memos and emails and don't speak to one another. 'The real value occurs when we meet each other at work, spark off each other, argue with each other. That's when creative things happen'. Dyson added. 'Having a philosophy of disliking emails is healthy'.

Perhaps the most prominent factor contributing to the success of Dyson could be best explained by his story of having 5,126 failures in his vacuum development. He famously took 15 years and failed 5,126 prototypes before he created a vacuum cleaner that worked perfectly. Today, Dyson says he still embraces risk and the potential for failure as part of the process, particularly when it comes to his employees. 'Nothing beats the thrill of invention. Letting people go out and try their ideas, getting them totally involved, and unleashing new thinking', he says. 'They're not bound to any methodology – in fact, the stranger and riskier, the better.'

At Dyson, failure is seen as positive: it allows the engineers to use maths, science and creative thinking to find solutions, build great products more quickly and identify other areas for innovation.

Lengthy R&D and prototyping phases continue to be a core part of the production cycle and innovation at Dyson. Dyson's engineers start the product design process with card and foam models, which they use to map out what needs to go into the product and roughly where the components should go. Then they build prototypes, which are often failures.

Dyson's success to date can be attributed to his perseverance and commitment to continuous innovation and development. These attributes are now a core part of the Dyson business model and culture in the form of structured and incremental innovation, which has allowed Dyson to continue innovating, disrupting markets and outpacing the competition.

### Looking into the future

Sir James Dyson is relying on the company's culture of innovation to take its reputation beyond domestic products and into the wider world of cutting-edge technology. In fact, Dyson is now expanding into many areas such as battery storage, robotics, artificial intelligence and even cars. 'We are a technology company and we're passionate about developing technologies that are going to be very important in the future.'

Even so, there are questions over whether the company, sometimes described as 'the UK's Apple', risks overreaching itself as it moves from the home into frontier technologies. Privately held, it remains under the control of its founder. Max Conze, chief executive, may run the business but Sir James decides which research projects get the green light for commercialisation.

'In some companies you get design by committee', says one former Dyson researcher during a BBC interview. 'Dyson is very much the opposite – you just have to convince one person ... He makes all the calls.'

Others have now questioned the effectiveness of the company's structure, in which the industrial design and engineering teams have worked separately.

Underpinning Dyson's achievements are an obsessive perfectionism and the patience for long-term bets to deliver. Yet, Steve Carden, technology and innovation expert at PA Consulting, believes that Dyson can achieve its goals but that its culture might need to change. In particular, Steve has concerns about the company's painstaking development process where some products have taken more than a decade to come to market. 'This could be out of step with the fast pace of many high-tech industries. Though the market for a vacuum cleaner is on quite a slow life cycle. In effect, you get breathing space to optimise and improve the product', he commented.

Employees say that mistakes can be freely admitted, so researchers are not afraid to push the boundaries. 'They certainly aim at being the best or nothing in each product range they move into', a former researcher at Dyson commented. But

### Part 3 Designing a customer value-driven strategy and mix

developing core technologies requires more than just sheer determination. 'Failing many times doesn't mean you're going to learn much, which is why I have some reservations in trusting they can transition from that culture of product industrial design to broader technological company', he added.

While speaking of the company's culture, another former engineer similarly criticises the 'siloed' nature of the research. 'It doesn't allow cross-fertilisation', he said.

The former employee explained: 'They don't always collaborate successfully – they create more of a battle than a multidisciplinary collaboration, which is what it could be.'

And yet, Dyson's success is indisputable. Since launching its bagless vacuum cleaner, the group has been on a virtually uninterrupted upward trajectory. Sales exceeded £2 billion in 2016, having roughly doubled in the previous six years, according to the company. During the same period, Dyson's market share in eight of the top ten countries for vacuum cleaners increased, according to Euromonitor. Globally, it is the third biggest-selling brand in the \$16.7 billion market, behind Bissell and Dirt Devil.

That success has been based on heavy investment in research and development. In 2017, R&D expenditure was equivalent to roughly 18 per cent of sales, and significantly higher than most industrial companies. The company is now looking at how to exploit 'vision robotics', the technology of interpreting pictures and visual moving images. 'We're going where our technology development takes us', Sir James says. 'We are reinventing ourselves all the time in each of the product areas'. The scale of Dyson's ambition emerged recently when a government website revealed it was developing an

electric car with help from a state grant. The innovation story of Dyson continues.

### Questions for discussion

- 1 Based on concepts discussed in this chapter, describe the factors that have contributed to Dyson's new product success.
- 2 It took years for Dyson to successfully launch his first invention. What caused this delay? Explain.
- 3 Failures in new product development are often seen. What can we learn, and how can we learn from failure?
- 4 With respect to product life cycle, what challenges does Dyson face in managing its product portfolio?
- 5 Can Dyson continue to maintain its innovative culture?

Sources: Andrew Dickson, 'How we made the Dyson vacuum cleaner', *Guardian*, 24 May 2016, <https://www.theguardian.com/culture/2016/may/24/interview-james-dyson-vacuum-cleaner>; Stephen Dowling, 'Frustration and failure fuel Dyson's success', BBC, 14 March 2013, <http://www.bbc.com/future/story/20130312-failure-is-the-best-medicine>; Dinah Eng, 'How James Dyson created a \$3 billion vacuum empire', *Fortune*, 9 September 2017, pp. 1–6; Madison Malone-Kircher, 'James Dyson on 5,126 vacuums that didn't work – and the one that finally did', *New York*, 22 November 2016 <http://nymag.com/vindicated/2016/11/james-dyson-on-5-126-vacuums-that-didnt-work>; Michael Pooler and Peggy Hollinger, 'Dyson's perfectionists invent a future beyond vacuum cleaners', *Financial Times*, 8 February 2017, <https://www.ft.com/content/2041b5b2-ec75-11e6-ba01-119a44939bb6>, accessed May 2019; Matthew Shaer, 'Watch out for Dyson', *Fast Company*, October 2015, pp. 128–135; Chloe Sorvino, 'The reinvention factory', *Forbes*, 13 September 2016, pp. 101–122.