

'Hundreds of Incremental Changes' - A Case Study on Dyson

Google 'cheap vacuum cleaners' and your search results are many. The internet age has allowed consumers to find cheap alternatives to just about any name brand item. Entrepreneurs now confront a landscape in which they can assume someone else can almost always do what they're doing, but cheaper. In order to capture a share of the market, entrepreneurs must offer something different; they must innovate. This is the position held by James Dyson, whose latest upright vacuum cleaner retails at a steep £460, three or four times the price of a standard vacuum. Dyson products are knowingly expensive, but there is a no-nonsense sensibility about the price. Dyson makes design-driven, extensively tested products. Its marketing strategy is to make this technology clear, (with the vacuum cleaner's famous transparent body, you can literally see it working). The webpage for the most recent vacuum includes graphs, images and video to explain the latest developments - <http://www.dyson.co.uk/vacuum-cleaners/upright/dyson-cinetic-big-ball.aspx>. By side-stepping completely the trend for low cost home goods, and concentrating significantly on design and innovation, Dyson has captured a dramatic section of the market. This case study will look briefly at the early days of James Dyson's first development, the dual cyclone cleaner, and the notorious closed innovation standpoints of his now competitors to whom he offered the licence. I will then discuss Dyson's development into the twenty-first century, exploring both its most prominent product inventions, and the means by which it manages innovation and progress.

Dyson's beginnings have become somewhat of an entrepreneurial myth. Borne out of frustration at the repeated loss of suction in his own vacuum whilst renovating his house, James Dyson looked around to see if he could do it better. The vacuum cleaner bag collects dust by allowing air to pass through tiny pores, these pores become clogged with said dust quickly, considerably reducing suction. To put it simplistically; merely by dint of its working, the bag breaks. Dyson's early innovation, the ballbarrow (a wheelbarrow with a large ball rather than a wheel) was already in production. Dyson had previously faced a similar frustration with the air filter in the ballbarrow paint room. Finding it was constantly clogging with powder, Dyson designed an industrial cyclone tower which removed the particles through centrifugal force. With this innovation of necessity in mind, Dyson created his first vacuum cleaner prototype. The dust would be sucked into a cone in the middle, then centrifugal force would be used to spin it out to the edges of the canister, from which it could then be removed.

This was the first of 5,127 prototypes. To this day Dyson maintains the importance of the prototype phase. Nick Schneider, an acoustic engineer working on the Dyson Cool Fan (a product for which 640 prototypes were made) describes the process as 'hundreds of incremental changes'. It is worth noting that the manageability of this lengthy R&D phase is vastly different for an established and successful company than for a single entrepreneur. James Dyson spent the majority of the time he was working on the beginnings of the dual cyclone vacuum cleaner supported by his wife, an art teacher. It is representative of Dyson's commitment to producing a well considered and quality product, despite the short term difficulties of such resources allocation.

Dyson spent eight years trying to licence his dual cyclone concept to established vacuum cleaner manufacturers. They all turned him down. Dyson's technology negated the need for vacuum cleaner bags, itself a profitable industry for the manufacturers. The industry's response to Dyson's

development represented a classic example of 'the way we do it round here' closed innovation. Relying on only their own innovators to progress their technology, large industry standards such as Hoover created a competitor where they would have gained an asset.

Eventually a small Japanese company contacted Dyson after seeing a picture of his vacuum cleaner in a magazine. This resulted in the G-Force vacuum cleaner, a luxury home goods item for the Japanese market. With the money from this development, (and further articulating the intense significance placed by Dyson on R&D), a research centre and manufacturing base was opened in Malmesbury, Wiltshire.

Dyson has continued to innovate the vacuum cleaner. In an interview with The Guardian Newspaper in 2014 he described his attraction to the previously overlooked home item, 'What attracted me [to vacuum cleaners] was that they were an unloved object. Manufacturers made them. They didn't really care what they were making. They were just copying each other. It had become a commodity. I got really excited about that.' You can watch a video of Dyson getting excited by vacuuming here - <http://www.fastcodesign.com/1673030/watch-sir-james-dyson-clean-up-coffee-grounds>. Having trained at Art College, Dyson's innovation's begin from a design perspective, often proposing one radical innovation on a product (a cyclone rather than a bag, a ball rather than a wheel). From this starting point hundreds of small, incremental innovations are made to create a high-functioning and well tested item. To do this successfully, all members of the team must feel comfortable innovating.

A video of Dyson engineers discussing the design process can be viewed here - <https://www.youtube.com/watch?v=I-WRgQlzES8>. Dyson staff are included in the market research outputs. Everybody who works at Dyson makes their own vacuum cleaner to use at home. Aside from the obvious merits of user feedback in the design process, systems like this encourage a sense of ownership amongst the Dyson workforce; promoting innovation at all levels.

Ownership has been significant for Dyson in other capacities too. Dyson has taken out numerous legal battles against competitors regarding intellectual property and patent infringement. Notably, in 1999 US company Hoover (to whom Dyson had initially pitched his cyclone technology) was found guilty of patent infringement.

In the early noughties, Dyson launched their first washing machine, the CR01 contrarotator. An advert for which can be viewed here - <https://www.youtube.com/watch?v=mbWhbUyPNhQ>. As with the cyclone vacuum cleaner, the contrarotator was a major product innovation, using two drums rather than one. In 2004 however, Dyson stopped making washing machines entirely; the contrarotator having apparently been unprofitable for the company. In an interview for The Times Newspaper in January 2015 Dyson commented, 'Our problem with that was that we didn't charge enough, so we lost money on every one'. It is remarkable that a company as experienced in the habit of pricing premium products would make such a mistake; an example perhaps of the complexities of managing resources for projects as distinctive in their design processes as Dyson's.

In 2006 the Dyson Airblade was launched, an advert for which can be viewed here - <https://www.youtube.com/watch?v=p-8sNl1Iqkw>. Rather than using a broad area of warm air to dry hands, the Dyson Airblade uses a thin stream of unheated air travelling at high speed. Dyson has made claims to its superior environmental friendliness (as an alternative to paper towels, and using less energy as it negates the need to heat the air), and to its superior hygiene.

The Dyson Air Multiplier fan was launched in 2009, an advert for which can be viewed here - <https://www.youtube.com/watch?v=KHbXhD2hcFQ>. The fan works by drawing air in through the base, then forcing it through the circular structure. A video explaining the technology can be viewed here - <https://www.youtube.com/watch?v=bUJ-X1rsKV4>. Dyson has highlighted the potential safety benefits of the product, with regard to its bladeless technology. Like the vacuum cleaner, the former advert also demonstrates the fan's underappreciated status prior to Dyson's rethink. That the fan had not changed for so long allowed Dyson to create something that appeared totally novel. As with the vacuum cleaners, Dyson has continued to develop the Air Multiplier technology, acoustically re-engineering it to be significantly quieter. A video explaining these developments can be viewed here - <https://www.youtube.com/watch?v=X2IuzIEJmfM>. The product's webpage highlights this by advertising it next to a sleeping baby; an example of Dyson's publicised commitment to 'changing things for people at home everyday'.

Most recently, James Dyson has been discussing his company's development into vision and robotics. The Dyson 360 eye uses a fisheye camera lens, allowing the robot device to analyse 30 frames per second of data, and triangulate its position in the room. The device is explained further here - <https://www.youtube.com/watch?v=OadhulCDAjk>. Dyson has said that the project was the result of £28 million worth of research.

James Dyson's story is an exercise in entrepreneurial myth-making. According to the aforementioned article in The Times, the mantra 'Never Say Die' decorates a wall inside the Malmesbury Research centre. Certainly, it is a sentiment that has been the recipe for success for manifold entrepreneurs; but it is also a perfect recipe for failure (you only hear about the walls of the successful tycoons). Dyson's early success can be attributed in no doubt to perseverance, but also to a commitment to continued innovation and development. James Dyson often describes himself as an artist, and it seems that this is integral to his ideas process. By looking sideways, by re-structuring conventional notions about how products work, Dyson has been able to present them differently to the world. According to the man himself, if a couple buy a Dyson vacuum cleaner, statistically more than half of men will take over the vacuuming. Developments in embedded behaviours as a result of a vacuum cleaner; innovation doesn't get much more radical than that.

A video case study of Dyson can be viewed here - <https://www.youtube.com/watch?v=l-WRgQlzES8&t=188>.