

## **3M in 2024: Tiding Over Colossal Challenges**

### **Abstract**

In January 2024, 3M, which had a presence in over 200 countries through its portfolio of over 60,000 products, was going through arguably the worst period in its more than hundred years of existence (3M News Center, 2024). It was one of the worst performing stocks in the Dow Jones as well as the Standard & Poor (S&P) 500 Index, with the share price declining by more than half from January 2021 levels. It had also agreed to pay a cumulative amount of USD 6 Billion in compensation to over 250,000 users of its Combat Arms earplugs, over complaints that they were defective and had caused hearing damage (Chase, 2024). There was also another settlement of over USD 10 Billion put in place with public water suppliers in the US, based upon claims that the perfluoroalkyl and polyfluoroalkyl substances (PFAS) that were used in its products had caused water contamination (Feeley, 2023). The PFAS settlement was only partial in nature as it did not include personal claims or claims by various states. A source estimated that the PFAS liability beyond the settlement stood at an approximate figure of USD 30 Billion (Askew, 2022). Given the host of problems it was confronted with, what would 3M have to do to effect a turnaround and get back to its glory days?

### **Learning Outcomes**

By end of this case study, students should be able to:

- a. Comprehend the role played by core ideology (core values and core purpose) in the growth of a company.
- b. Develop an understanding of how resources and capabilities play a key role in building a company's competitive advantage.
- c. Comprehend the influence of the macroenvironment on a firm's competitive advantage.
- d. Understand how competitive advantage declines as a company loses the focus on core ideology as well as on key resources and capabilities.

### 3M: The Beginning

3M (formerly Minnesota Mining and Manufacturing Company) started its journey in 1902 as a mining company (3M, 2023). Cofounded by five individuals – Hermon Cable, Danley Budd, William McGonagle, John Dwan, and Henry Bryan – in Minnesota, USA, the firm initially focused on extracting Corundum, a mineral needed for manufacturing sandpaper (Andy Szal, 2023). However, they soon discovered another mineral, Anorthosite, which they used to make sandpaper, and which became 3M's first product (3M, 2023). Quality issues persisted with Anorthosite due to its limitations as a material for sandpaper, however (Andy Szal, 2023). As a result, 3M turned to Garnet, a superior material imported from Spain, to produce high-quality sandpaper (3M, 2002).

Despite the use of a material such as Garnet, 3M's sandpaper was not considered of a high standard and customer complaints were rampant. Usually, the customer feedback was that the garnet fell off from the sandpaper after a few uses, making it bare, rumpled, and unfit for use (3M, 2002).

As the search for a solution continued, one worker noticed that when garnet got contaminated with oil, its adhesion to the sandpaper was weak. Retracing the steps through the supply chain, it was discovered that the Garnet shipment from Spain had travelled alongside an olive oil shipment, and due to a mishap, the oil had mixed with the Garnet, resulting in the lower quality of Garnet received by 3M. Cooking the garnet roasted the oil away and made the material durable enough to be used, dramatically improving the quality of 3M's sandpapers (3M, 2002).

3M's journey throughout the next few decades was marked by an intuitive understanding of using the right materials for diverse, everyday purposes. A *Wetordry* sandpaper version was developed in 1921 by Francis Okie, which became the world's first water-resistant coated abrasive (The New York Times, 1975). While he was assigned to refine this *Wetordry* sandpaper by running various tests, Richard Drew, who had joined 3M after dropping out of engineering school, observed that the masking tape used by the painters during the vehicle painting process left behind a permanent mark after removal. To overcome the problem, he developed the Scotch masking tape, a seamless solution that could be removed without damaging the paintwork on the vehicle (American Chemical Society, 2007). At a time when roofs were limited to grey and brown colours due to fading problems, George Swenson, a research chemist, identified a market potential for coloured roofs if only they could resist fading. Experimentation with ceramic glazes and desired colour paint mixtures led to the

creation of the 3M range of coloured roofing solutions that were durable as well (Ishalli, 2022). William McKnight, who had joined as an Assistant Bookkeeper and later shaped the company's innovative culture as Chairman, observed the prevalence of injuries to athletes due to inferior track-and-field materials in use. This led to the development of Tartan Turf synthetic surfaces, which found widespread application in schools, colleges, stadiums, and even the track and field events at the 1968 Olympics (Vault, 2024). Scotchlite reflective products, which could be stuck to road surfaces to improve the night time visibility, were a result of the work by Harry Heltzer, a factory worker who later became the Chairman of the company, as he utilized novel methods to develop glass beads that were small enough to be used for the purpose at hand (Martin, 2005).

Underpinning this exceptional product development process was 3M's collaborative culture. In 1968, a senior scientist, Spencer Silver, discovered a unique adhesive with unusual properties that did not leave a mark on the surface when removed. However, he initially struggled to find a suitable application for it within 3M's existing product portfolio. Years later, Art Fry, another employee, faced the frustration of his bookmark slipping out of his book of hymns. On the lookout for an adhesive that would seamlessly stick to the back of a paper, he met Silver at a Technical Council meeting. Together, they applied latter's adhesive to a paper, leading to the invention of the famous Post-it note, nearly 12 years after Silver's initial discovery (Massachusetts Institute of Technology, 2024).

3M's story was also built on the core value of persistence. A recurring theme was the "accidental" discovery of ideas, either through serendipity or customer suggestions, followed by periods of frustration and failed attempts at developing the solution. Despite management pressure to move on to more promising projects, individuals persevered, ultimately achieving breakthrough innovations (Govindarajan & Srinivas, 2013). For instance, Drew initially faced resistance as his attempts at developing the scotch masking tape led nowhere, and he was ordered by McKnight to abandon the project. Yet, he persisted and eventually developed the revolutionary product (American Chemical Society, 2007). Similarly, an engineer defied orders to abandon his project on tape slitting, risking his job, and ultimately found a solution through collaborative funding from different product divisions. This discovery helped 3M significantly reduce the manufacturing costs and time (3M, 2002).

Recognizing the importance of employee initiatives, 3M instituted the "15% rule" which encouraged employees to dedicate 15% of their work time to independent projects

(Govindarajan & Srinivas, 2013). This initiative faced initial scepticism from other companies who questioned its effectiveness (Hindo, 2007). However, Bill Coyne, who retired as the Senior Vice President for Research and Development, emphasized its importance in the company's long-term success, stating, "The 15-percent rule is unique to 3M. Most of the inventions that 3M depends upon today came out of that kind of individual initiative... You don't make a difference by just following orders" (3M Company, 2002).

Furthermore, in 1977, 3M introduced the "Challenge '81," which aimed to generate 25% of sales from products launched within the previous five years (Daniels, 2014). This target was later raised to 30% by the 1990s (3M Company, 2002).

## **The Onset of the 21st Century and Gradual Decline of Innovation**

3M onboarded James McNerney as the chief executive officer (CEO) in the year 2000 and he continued in the position till 2005 (Young, 2024). McNerney had been a key apprentice of Jack Welch, who had successfully implemented the Six Sigma methodology and a lean organizational philosophy to transform General Electric's (GE) fortunes. Attempting to implement the Six Sigma methodology and Welch's methods at 3M, McNerney laid off 10% of the workforce and the operating margins rose from 17% in 2001 to 23% in 2005 (Peppers, 2016).

However, the attempts to impose Six Sigma methodology on the R&D process led to complications. The R&D process at 3M traditionally ran on the basis of serendipity and was unstructured in nature, as opposed to the need for documentation and the time-bound nature of Six Sigma. All the steps taken by a researcher working on a problem had to be recorded such that the data could be utilized for further improvements and refinements. This converted the R&D process into a repeatable routine that focused more on incremental gains rather than the radical innovations that 3M had come to be known for. "We all came to the conclusion that there was no way in the world that anything like a Post-it note would ever emerge from this new system," were the views of a participant in one of the first Six Sigma briefings at the organization (Peppers, 2016).

Geoff Nicholson, former vice president for international technical operations, argued that Six Sigma placed excessive control over the creative process and ultimately hampered innovation. "The Six Sigma process killed innovation at 3M. Initially, what would happen in 3M with Six Sigma people, they would say they need a five-year business plan for [a new idea]. Come on,

we don't know yet because we don't know how it works, we don't know how many customers [will take it up], we haven't taken it out to the customer yet," he stated (Huang, 2013).

George Buckley succeeded McNerney in 2005 in the CEO position and remained at the helm till 2012, where he slowly attempted to reverse the initiatives of his predecessor. "Invention is by its very nature a disorderly process. You can't put a Six Sigma process into that area and say, well, I'm getting behind on invention, so I'm going to schedule myself for three good ideas on Wednesday and two on Friday. That's not how creativity works," he remarked (Hindo, 2007).

The culture, however, had slowly become characterized by a focus on incremental improvements and immediate returns rather than aiming for radical innovations that required embracing risk and uncertainty (Keilman, 2023). The practice of informal talks in the lunchroom, where cross-breeding of ideas would happen, also slowly faded over time (Singh, 2023). 3M also abandoned the goal of 30% of revenues being generated from products introduced in the preceding five years (Keilman, 2023).

The focus was on fewer product releases in "high-growth areas", rather than the traditional way of releasing a host of products across diverse set of areas. John Banovetz, the Chief Technology Officer (CTO), stated that the shift was a conscious one, emphasizing the firm's focus on "quality over quantity" (Keilman, 2023).

3M had been granted 2,600 patents in 2022, which was significantly lesser than the average of 3,931 patents it had received on an average every year. The number of patents filed by the firm had also steadily decreased in recent times - it had filed 2523 patents in 2021, the lowest since 2013.

Robert Asmus, a former 3M scientist and member of its Carlton Society, the prestigious body of eminent employees with distinctive contributions to science and engineering, felt the traditional 3M way worked better. "Senior management has deluded themselves into thinking they can pick winners and losers, when in reality we need to generate more products so we can get into test markets to see what works," he remarked (Keilman, 2023).

## **Flurry of Lawsuits**

3M had acquired Aearo Technologies Inc. in 2008, which was a supplier of Combat Arms Earplugs Version 2 (CAEv2) to the United States Military for utilization by its troops in Afghanistan and Iraq from 2003 to 2015 (Pierson, 2023). These earplugs were designed to block the high sound levels the troops would encounter in the battlefield, which would result in hearing issues. While the production for the CAEv2 earplugs was stopped in 2015, in 2016, Moldex-Metric, Inc., a competitor to Aearo, filed a lawsuit alleging that the earplugs were defective in nature and had likely been responsible for the hearing loss and other hearing issues experienced by the soldiers (Gaines, 2023). While the case was resolved in 2018 without any admittance of liability on 3M's part, individual soldiers – serving as well as retired – started filing lawsuits against 3M, with the number of claims soon crossing 250,000. In August 2022, Aearo filed for bankruptcy protection. While 3M used the move to shield itself from the associated liabilities, the court decided that the claims against 3M would be allowed to continue. The claims were finally settled in August 2023 for a fee of USD 6 Billion, which would be paid out till 2029, with USD 1 Billion in the form of 3M stock (Gaines, 2023).

There were, additionally, around 4,000 lawsuits filed against 3M by public water entities for PFAS contamination (Friedman & Giang, 2023). The PFAS were dubbed as the “forever chemicals” as they did not naturally break down and were linked to a wide variety of deadly diseases such as cancer. These PFAS were used in various 3M products, such as fire and safety products, respirators, as well as earplugs and headsets, and had generated a revenue of over USD 1.3 Billion in 2022 for 3M.

The parties ultimately reached a settlement for USD 10.3 Billion in 2023, which would be paid out over the course of the next 13 years. There were reports that the overall liability from PFAS claims could rise to USD 30 Billion for 3M, if other aggrieved parties were factored in. 3M's CEO, Mike Roman, announced in December 2022 that the firm would be stopping the manufacturing and the use of all PFAS-based products by the end of 2025 (Friedman & Giang, 2023).

## **The Path Ahead**

Come January 2024, 3M's share price continued the freefall it had been in since hitting the highs in January 2018, plunging to levels below USD 100. A total of 8,500 people were laid off in 2023, amounting to 10% of the firm's global workforce as a step towards reversing the decline. Analysts were not convinced that the solution would work in the long run and there were major concerns that 3M had lost its way (Rao, 2023). In the face of the challenges it was encountering, what would the top management need to do in order to turnaround the fortunes of 3M and regain the lost glory?

## Discussion Questions

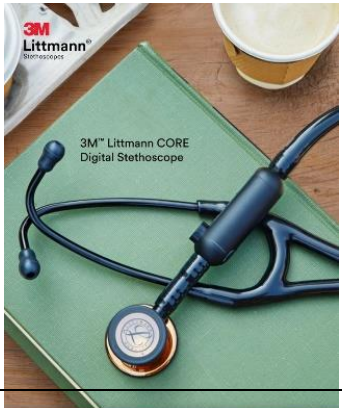
1. What led to the phenomenal, diversified success of 3M from its beginnings as a humble mining company?
2. Why is 3M going through a decline currently?
3. Discuss the strategic change that has taken place at 3M by applying the McKinsey 7-S framework.
4. Using PESTEL analysis, evaluate the influence of macroeconomic factors on 3M's operations.
5. What strategies should 3M adopt to reverse the decline and effect a turnaround?

## Further Reading

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## Exhibit 1: Famous Products of 3M

<p><b>1921 - Wetordry™ Waterproof Sandpaper</b></p> 	<p><b>1930 – Scotch® Cellophane Tape</b></p> 	<p><b>1954 – Scotch® Magnetic Tape</b></p>  <p><b>"SCOTCH" BRAND JUGGLES ATOMS to produce the finest long play magnetic tape!</b></p>
<p><b>1956 – Scotchgard™ Fabric</b></p> 	<p><b>1958 – Scotch-Brite™</b></p> 	<p><b>1979 – Thinsulate™ Thermal Insulation</b></p> <p><b>RUGGED &amp; WARM</b></p> <p>DURABLE 100% RIPSTOP POLYESTER SHELL WON'T RESTRICT RANGE OF MOTION</p>  <p>200G 3M THINSULATE TRAPS HEAT</p>
<p><b>1985 – Post-it® Note</b></p> 	<p><b>2009 – Littmann® Electronic Stethoscope</b></p> 	<p><b>2017 – Scotchlite™ Reflective Material</b></p> 

Source: Timeline of 3M History, accessed 3 March 2024,

[https://www.3m.com/3M/en\\_US/company-us/about-3m/history/timeline/](https://www.3m.com/3M/en_US/company-us/about-3m/history/timeline/)

**Exhibit 2: Share price of 3M from 2015 to 2024 (February)**



Source: CNBC, accessed 09 March 2024, <https://www.cnbc.com/quotes/MMM>

**Exhibit 3: Financial summary of 3M across years (in million USD)**

Year	Net Sales	R&D Expenditure	COGS	SG&A	Net Income	ROA (%)	Return on Sales (%)	ROE (%)	ROCE (%)
1980	6080	283	3400		668	13.20	10.99	20.19	29.71
1985	7846	507	4746		664	10.47	8.46	16.98	16.53
1990	13021	865	7656		1308	12.54	10.05	22.77	21.27
1995	13460	883	7720		976	07.16	07.25	14.33	15.95
2000	16724	1101	8787		1782	12.54	10.66	27.80	25.36
2005	21167	1274	10408	4332	3111	15.08	14.70	29.95	40.69
2010	26662	1434	13831	5479	4085	14.23	15.32	28.74	32.76
2015	30274	1763	15383	6182	4833	15.08	15.96	39.39	36.36
2020	32184	1878	16605	6929	5449	11.85	16.93	47.53	37.61
2021	35355	1994	18795	7197	5921	12.54	16.75	42.42	37.26
2022	34229	1862	19232	9049	5777	12.35	16.88	38.81	39.02
2023	32681	1842	18477	21526	-6995	-14.42	-21.40	-71.64	39.02

Source: Bloomberg, accessed on March 03, 2024

**Exhibit 4: 3M revenue by segments (in million USD)**

	2020-21		2021-22		2022-23	
Business Segments	Net Sales	% of Total	Net Sales	% of Total	Net Sales	% of Total
Safety and Industrial	11981	33.9	11604	33.9	10956	33.5
Transportation and Electronics	9262	26.2	8902	26	8501	26
Health Care	8597	24.3	8421	24.6	8195	25.1
Consumer	5513	15.6	5298	15.5	5026	15.4
<b>Total Company</b>	<b>35353</b>	<b>100</b>	<b>34225</b>	<b>100</b>	<b>32678</b>	<b>100</b>

Source: Annual reports, accessed 18 February 2024

**Exhibit 5: Financial data of 3M's competitors (in million USD)**

Company	Year	Sales	R&D Expenditure	COGS	SG&A Expenses	Net Income	ROA (%)	Return on Sales (%)	ROE (%)	ROCE (%)
<b>DuPont</b>	2015	73836	3462	52853	7610	8926		12.09		
	2020	14338	625	9508	1701	-2951	-4.21	-20.58	-7.42	6.55
	2021	12566	557	7971	1602	6467	11.09	51.46	19.92	39.39
	2022	13017	536	8402	1467	5868	13.48	45.08	22.14	50.36
	2023	12068	508	7835	1408	423	1.06	3.51	1.66	50.36
<b>Honeywell</b>	2015	38581	1856	26747	5006	4768	10.06	12.36	26.53	50.07
	2020	32637	1334	22169	4772	4779	7.75	14.64	26.52	37.46
	2021	34392	1333	23394	4798	5542	8.59	16.11	30.69	42.43
	2022	35466	1478	23825	5214	4966	7.84	14.00	28.16	44.51
	2023	36662	1456	22995	5127	5658	9.14	15.43	34.76	54.54
<b>Dow</b>	2015	48778	1598	37836	2971	9930		20.36	34.40	
	2020	38542	768	33346	1471	1225	2.01	3.18	9.43	6.11
	2021	54968	857	44191	1645	6311	10.14	11.48	41.25	23.40
	2022	56902	851	48338	1675	4582	7.41	8.05	23.57	17.03
	2023	44622	829	39742	1627	589	0.99	1.32	2.94	17.03
<b>General Electric</b>	2015	115158	5416	84994	17831	-6126	-1.07	-5.32	-5.43	-5.55
	2020	75833	2565	57871	12592	5704	2.19	7.52	16.38	-5.55
	2021	74196	2497	53896	11716	-6520	-2.87	-8.79	-17.82	-5.55
	2022	58100	1786	44272	9173	339	0.17	0.58	0.14	-5.55
	2023	67954	1907	50392	9195	9481	5.39	13.95	30.08	49.03

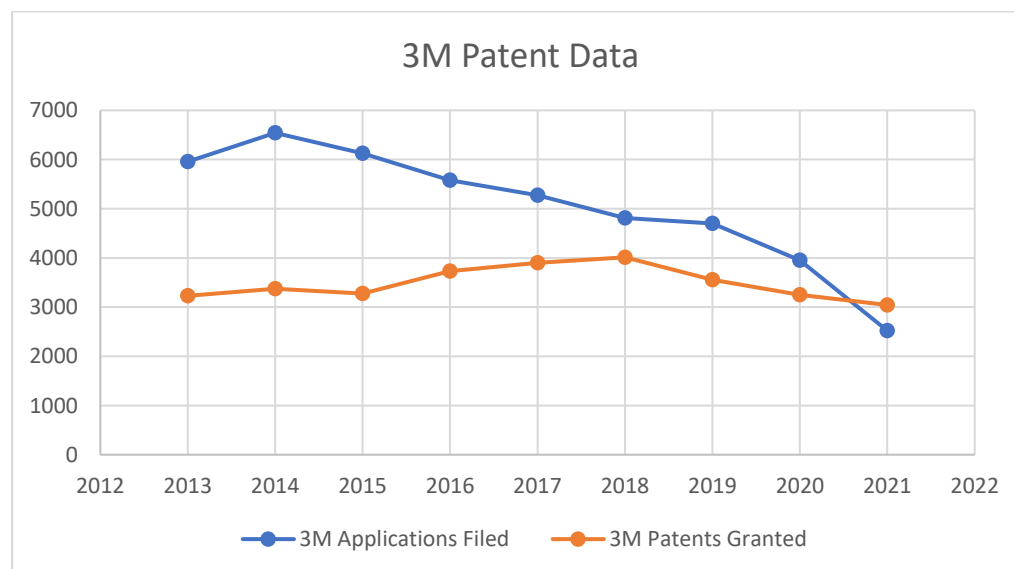
Source: Bloomberg, accessed 03 March 2024

## Exhibit 6: Environmental, Social and Governance (ESG) Scores

Company	Particulars	2015	2016	2017	2018	2019	2020	2021	2022	2023
3M	ESG Score	4.82	4.81	5.05	5.27	5.40	6.51	6.28	6.19	6.19
	Environmental Score	2.59	2.89	3.15	3.57	3.68	6.70	6.81	6.66	6.66
	Social Score	4.89	4.43	4.67	4.71	4.90	4.89	4.30	4.19	4.19
	Governance Score	7.52	7.59	7.78	7.90	8.00	8.11	7.99	8.00	8.00
DuPont	ESG Score			3.34	2.06	5.34	5.24	5.49	5.49	5.49
	Environmental Score			2.48	0.68	4.76	4.59	4.82	4.82	4.82
	Social Score			1.90	1.09	4.64	4.58	5.11	5.11	5.11
	Governance Score			6.99	6.88	7.18	7.17	7.11	7.11	7.11
Honeywell	ESG Score	4.67	4.59	5.08	5.33	5.44	5.88	5.76	5.76	5.76
	Environmental Score	4.36	3.92	5.43	5.63	5.75	5.70	5.67	5.49	5.49
	Social Score	3.00	3.00	3.00	3.00	3.00	4.12	4.12	4.13	4.13
	Governance Score	7.00	7.27	7.19	7.84	8.09	8.10	7.73	7.93	7.93
Dow	ESG Score					4.26	4.53	5.22	5.73	5.73
	Environmental Score					3.24	3.57	4.28	5.02	5.02
	Social Score					3.45	3.38	4.55	4.99	4.99
	Governance Score					7.21	7.80	7.76	7.86	7.86
General Electric	ESG Score	4.43	4.65	4.94	5.11	5.46	5.31	5.56	5.94	5.94
	Environmental Score	3.03	3.20	3.51	3.86	5.00	5.32	5.17	6.11	6.11
	Social Score	3.65	4.07	4.19	4.17	4.12	4.11	4.35	4.40	4.40
	Governance Score	6.97	7.01	7.47	7.64	7.49	6.62	7.34	7.49	7.49

Source: Bloomberg, accessed 03 March 2024

## Exhibit 7: Data on patents filed since 2013



Source: Insights, accessed 3 March 2024, <https://insights.greyb.com/3m-patents/>

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