### What Would You Do? Case Assignment

#### 3M

Minneapolis, Minnesota

With 40,000 global patents and patent applications, 3M, maker of Post-it notes, reflective materials (Scotch lite), and 55,000 products in numerous industries (displays and graphics, electronics and communications, health care, safety and security, transportation, manufacturing, office products, and home and leisure), has long been one of the most innovative companies in the world. 3M codified its focus on innovation into a specific goal, “30/5,” which meant that 30 percent of its sales each year must come from products no more than five years old. The logic was simple but powerful. Each year, five-year-old products become six years old and would not be counted toward the 30 percent of sales. Thus, the 30/5 goal encouraged everyone at 3M to be on the lookout for and open to new ideas and products. Furthermore, 3M allowed its engineers and scientists to spend 5 percent of their time, roughly a half-day per week, doing whatever they wanted as long as it was related to innovation and new product development.

 And it worked, for a while. A decade ago, the Boston Consulting Group, one of the premier consulting companies in the world, ranked 3M as *the* most innovative company in the world. In subsequent years, it dropped to second, third, and then seventh. Today, 3M doesn’t even crack the top 50. Dev Patnaik, of Jump Associates, an innovation consulting firm, says, “People have kind of forgotten about those guys [3M]. When was the last time you saw something innovative or experimental coming out of there?” So, what happened?

When your predecessor became CEO ten years ago, he found a struggling, inefficient, oversized company in need of change. He cut costs by laying off 8,000 people. Marketing, and research and development funds, which had been allocated to divisions independent of performance (all divisions got the same increase each year), were now distributed based on past performance and growth potential. Perform poorly, and your funds would shrink the next year. Likewise, with U.S. sales stagnating and Asia sales rising, management decreased headcount, hiring, and capital expenditures in the United States, while significantly increasing all three in fast-growing Asian markets. Six Sigma processes, popularized at Motorola and GE, were introduced to analyze how things got done, to remove unnecessary steps, and to change procedures which caused defects. Thousands of 3M managers and employees became trained as Six Sigma “black belts” and returned to their divisions and departments to root out inefficiencies, reduce production times, and decrease waste and product errors. And it worked incredibly well, in part. Costs and capital spending dropped, while profits surged 35 percent to record levels. But, product innovation, as compared to the 30/5 goal sank dramatically, as only 21 percent of profits were generated by products that were no more than five years old.

So, what should 3M do? From inception, 3M has been an innovator, bringing a stream of new products and services to market, creating value for customers, sustainable advantage over competitors, and sizable returns for investors. Thanks to your predecessor, 3M has lower costs, is highly efficient, and much more profitable. But it no longer ranks among the most innovative firms in the world. In fact, the use of Six Sigma procedures appears to be inversely related to product innovation. If that’s the case, should 3M continue to focus on using Six Sigma procedures to reduce costs and increase efficiencies, or should it strive again to encourage its scientists and managers to focus on innovation? Which will make 3M more competitive in the long run?

When people think of innovation, they tend to think of game-changing advances that render current products obsolete, for example, comparing the iPhone to text-based “smartphones.” Innovation, however, also occurs with lots of incremental changes over time. What are the advantages and disadvantages for 3M of each approach, and when and where would each be more likely to work? Finally, some companies innovate from within by successfully implementing creative ideas in their products or services. Sometimes, though, innovation is acquired by purchasing other companies that have made innovative advances. For example, although Google is generally rated as one of the most innovative companies in the world, most people have forgotten that Google bought YouTube to combine its search expertise with YouTube’s online video capabilities. Over time, how much should companies like 3M rely on acquisitions for innovation? Should 3M acquire half, one-third, 10 percent, or 5 percent of its new products through acquisitions? What makes the most sense and why?

**If you were in charge at 3M, what would you do?**

### What Really Happened? Solution

In the opening case, you learned that 3M, once the most innovative company in the world, was no longer considered innovative. While layoffs, allocating research & development funds based on performance and potential, and Six Sigma processes – the latter of which rooted out inefficiencies, reduced production times, and decreased waste and production errors – led to significantly reduced costs and record profits, product innovation, as measured by the percentage of percentage of profits generated by products that were no more than five years old, dropped to a record low of 21%, dramatically below the company’s long-term goal of 30%. Let’s find out what happened at 3M and see what steps CEO George Buckley took to improve 3M’s ability to introduce innovative products and services.

*So, what should 3M do? From inception, 3M has been an innovator, bringing a stream of new products and services to market, creating value for customers, sustainable advantage over competitors, and sizable returns for investors. Thanks to your predecessor, 3M has lower costs, is highly efficient, and much more profitable. But, it no longer ranks among the most innovative firms in the world. In fact, the use of Six Sigma procedures appears to be inversely related to product innovation. If that’s the case, should 3M continue to focus on using Six Sigma procedures to reduce costs and increase efficiencies, or should it strive again to encourage its scientists and managers to focus on innovation? Which will make 3M more competitive in the long run?*

In Chapter 6, we learned that organizations can create competitive advantage for themselves if they have a distinctive competence that allows them to make, do, or perform something better than their competitors. A competitive advantage becomes sustainable if other companies cannot duplicate the benefits obtained from that distinctive competence. Technological innovation, however, can enable competitors to duplicate the benefits obtained from a company’s distinctive advantage. In other words, innovation can allow companies that fall behind to catch up. And, sometimes, innovation can be so disruptive that market leaders become market followers as their competitive advantage turns into a competitive disadvantage.

Consequently, companies that want to sustain a competitive advantage must understand and protect themselves from the strategic threats of innovation. Over the long run, the best way for a company to do that is to create a stream of its own innovative ideas and products year after year. When a company does that, it’s called an *innovation* stream, that is, a pattern of innovation over time that creates sustainable competitive advantage. Innovation streams prevent competitors from catching up because new innovations keep market leaders, one, two, or three-steps ahead of their competition.

While Six Sigma procedures helped make 3M more efficient, reduce costs, and highly profitable, it also made the company less innovative. In terms of long run competitiveness and profitability, should 3M continue to focus on costs and efficiencies, or should it encourage its managers and scientists to be more innovative?

In the long run, innovation is likely to be a more profitable strategy than low costs and efficiency. Why? Because the latter are easier to duplicate, which is another way of saying it’s more difficult to sustain a competitive advantage based on costs and efficiency. And while innovation is a more profitable strategy because firms can charge more for innovative, value-added products and services that aren’t available from competitors, it is difficult, as 3M’s experience has shown, to maintain an innovation stream, that is, a pattern of innovation over time that creates sustainable competitive advantage.

One sure thing, however, is that while Six Sigma processes increased 3M’s short-run profitability, it also hurt the company’s ability to innovate. CEO George Buckley observed, “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.” Former 3M employee Michael Mucci said, “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 [meaning Six Sigma].” Art Fry, the 3M scientist who invented the Post-it Note, one of 3M’s most successful products, said innovation is, “a numbers game. You have to go through 5,000 to 6,000 raw ideas to find one successful business.” Because the point of Six Sigma is to eliminate waste, that is, all of the ideas it takes to find that one great product or service, Fry believes that Six Sigma was destroying 3M’s innovation culture. Said Fry, “What's remarkable is how fast a culture can be torn apart."

*When people think of innovation, they tend to think of game-changing advances that render current products obsolete, for example, such as comparing the iPhone to text-based “smart phones.” Innovation, however, also occurs with lots of incremental changes over time. What are the advantages and disadvantages for 3M of each approach, and when and where would each be more likely to work?*

“Game-changing advances” in technology are also known as discontinuous change, where old standards are made obsolete by new technological standards. In other words, new technology displaces old technology. Discontinuous change is accompanied by uncertainty because no one is sure in periods of discontinuous change which technological approaches will become the new standard, that is, the new dominant design. In highly uncertainly environments during periods of discontinuous change, it’s best to use the experiential approach, which assumes that intuition, flexible options, and hands-on experience can reduce uncertainty and accelerate learning and understanding. This approach involves frequent design iterations, frequent testing, regular milestones, creation of multifunctional teams, and use of powerful leaders to guide the innovation process.

Whereas the experiential approach is used to manage innovation in highly uncertain environments during periods of discontinuous change, the compression approach is used to manage innovation in more certain environments during periods of incremental change Whereas the goals of the experiential approach are significant improvements in performance and the establishment of a new dominant design, the goals of the compression approach are lower costs and incremental improvements in the performance and function of the existing dominant design.

With the experiential approach, the general strategy is to build something new, different, and substantially better. Because there’s so much uncertainty—no one knows which technology will become the market leader—companies adopt a winner-take-all approach by trying to create the market-leading, dominant design. With the compression approach, the general strategy is to compress the time and steps needed to bring about small, consistent improvements in performance and functionality. Because a dominant technology design already exists, the general strategy is to continue improving the existing technology as rapidly as possible. In short, a compression approach to innovation assumes that innovation is a predictable process, that incremental innovation can be planned using a series of steps, and that compressing the time it takes to complete those steps can speed up innovation.

What are the advantages and disadvantages for 3M of each approach, and when and where would each be more likely to work? Beyond the issues mentioned above, the primary issue is cost and time frame. It’s generally more expensive and takes longer to use the experiential approach to compete with other companies to try to establish a new dominant design. After all, only one, or at best, two companies will “win.” And, if your company’s design isn’t the “winner,” you’ll lose all of your development costs with few ways to recoup them in the marketplace.

Cost considerations may be why 3M CEO George Buckley has encouraged 3M’s managers and scientists to focus on innovating around its core products and services in 3M’s largest markets. Furthermore, Buckley is encouraging his scientists to use the compression approach to innovation where they focus on “inventing hundreds of next small things,” that is, making current products a little bit better year after year. Buckley calls this finding innovations “at the bottom of the pyramid.” And not only is he encouraging incremental improvements in innovation, he’s also pushing 3M’s people to innovate in ways that reduce product costs. One example is 3M’s low-cost respirator mask. Buckley said, “I didn't drive the invention of this, but I said the invention of this is necessary. You have to drive out costs to defend yourself against competition. I wanted the manufacturing process that made these respirators [to have] a quadrupling in speed and efficiency.” Says Buckley, “We often think innovation is making a breakthrough at the top of the pyramid. That's often not where the hardest challenges are. The hardest challenges are often: How do I make a breakthrough for next to nothing?”

Another example of the incremental approach to innovation using the compression method is when 3M scientists can leverage ideas from other products or scientists in the company. 3M was able to do this with its Cubitron sanding disks. 3M knew that its sanding disks would work better if each tiny piece of ceramic “sand” on its sanding disks was identical. That would allow the disks to act more like a razor blade when sanding off layers of materials. But, the reality was that each piece of ceramic “sand” was a different shape with a slightly different size. That meant that the sanding disks made uneven contact with sanding surfaces, which produced “bouncing” that made it more difficult to do a quality sanding job. Scott Culler, a 3M Scientist said, “The big voila happened." And that “big voila” was realizing that 3M’s micro-replicating technology, used to create identical reflective materials in reflective roads signs, could also be used to create identical, tiny pieces of ceramic sand. It took 15 months to perfect the process, but Culler and his fellow scientists were able to do it and produce substantially better Cubitron sanding disks, sales of which are now up 30%.

*Finally, sometimes companies innovate from within by successfully implementing creative ideas in their products or services. Sometimes, though, innovation is acquired by purchasing other companies that have made innovative advances. For example, while Google is generally rated as one of the most innovative companies in the world, most people have forgotten that Google bought YouTube to combine its search expertise with YouTube’s online video capabilities. Over time, how much should companies like 3M rely on acquisitions for innovation? Should 3M acquire half, one-third, 10 percent, or 5 percent of its new products through acquisitions? What makes the most sense and why?*

One way to grow a company is through internal or organic growth. And when your strategy is innovation, like at 3M, that means innovating with new products and services developed from your existing businesses. Another way to grow is through external growth, or buying other companies. And when your strategy is innovation, that means acquiring or buying other companies which have developed innovative products and services. The question is how much should 3M focus on internal growth and innovation versus external growth and innovation through acquisitions?

It’s a difficult question to answer. When innovation is your core competency *and* your company’s source of competitive advantage, relying too much on acquisitions for innovation is an admission that you’re failing to generate enough innovative products and services from your existing businesses. And, while it’s expensive to develop new products and services internally, it’s more expensive to acquire them by buying other companies. On the other hand, acquiring other companies is a relatively quick way to fill holes in product and service offerings, or to bring in a critical, already developed technology that can be leveraged throughout existing businesses. However, there’s also the risk that acquired companies won’t succeed. A meta-analysis based on 103 studies and a sample of 25,205 companies indicates that, on average, acquiring other companies actually hurts the value of the acquiring firm. In other words, there is only a 45 percent chance that growing a company through external acquisitions will work!

If there’s a less than 50% chance that acquired companies will prosper, is there some way to increase the odds of success when acquiring companies and their technological innovations? The best approach is probably related diversification, in which the different business units share similar products, manufacturing, marketing, technology, or cultures. The key to related diversification is to acquire or create new companies with core capabilities that complement the core capabilities of businesses already in the corporate portfolio. While seemingly different, most of 3M’s product divisions are based in some fashion on its distinctive competencies in adhesives and tape (e.g., wet or dry sandpaper, Post-it notes, Scotchgard fabric protector, transdermal skin patches, and reflective material used in traffic signs). Furthermore, all of 3M’s divisions share its strong corporate culture that promotes and encourages risk taking and innovation. In sum, in contrast to a single, undiversified business or unrelated diversification, related diversification reduces risk because the different businesses can work as a team, relying on each other for needed experience, expertise, and support. The improvement of 3M’s Cubitron sanding disks above is an example of the advantages of related diversification.

To what extent will 3M rely on acquisitions as it executives its innovation strategy? According to CEO George Buckley, 3M will spend about $1 billion a year to buy 15 to 20 companies. Said Buckley, “We are using these kind of acquisitions to show the art of the possible when it can be done fast.” For example, 3M paid $810 million to buy Arizant, a medical company whose products keep anesthetized patients, who lose the ability to regulate their temperatures, warm. Arizant complements other product offerings in 3M’s health care division, particularly in its infection prevention division.

How successful has CEO George Buckley been at making 3M an innovative company again? After restoring the 5% rule, which allows 3M engineers and scientists to spend 5% of their time each week on anything they want, as long at its related to innovation and new product development, and after significantly increasing 3M’s research and development spending, and after limiting Six Sigma practices to factories and removing it from the rest of the company, particularly research labs, 3M has rebounded strongly. 3M’s organic growth rate from products it develops from existing businesses is a healthy 7-8% a year. As a result, it is introducing 1,000 new products a year. Finally, after dropping to a low of 23%, new products that are 5 years old or less, now account for 31% of 3M’s sales, surpassing the company goal of 30% for the first time in years.