Procter & Gamble

Challenge
Continue to push the boundaries of science and technology in cleaning agents and personal care products.

Analytics for everyday innovation
Quantitative scientists use statistics to advance P&G's most iconic consumer brands

Since its founding nearly 200 years ago, Procter & Gamble (P&G) has grown from a two-man candle- and soap-making partnership to become the largest and most profitable consumer goods company in the world. P&G's portfolio now includes more than 60 iconic brands, including Gillette, Tampax, Bounty and Pampers. In an industry as fast-moving and competitive as consumer packaged goods, such success is no small achievement. And it's no small undertaking either.

"I don't think that the average consumer is really aware of the fact that [R&D in personal care and cleaning products] is a high-tech program," says Beatrice Blum, a statistician with P&G's Quantitative Sciences Division. They just know a good product when they see one. "Our goal is to use a quantitative approach to develop superior products – winning products – that are not only meeting consumers' needs but also improving consumers' lives around the globe."

At P&G today, 'statistics is part of everything'
What makes P&G so successful when it comes to its portfolio of "winning products"? Blum says data-driven decision making is part and parcel with quality. By relying on data insight to drive the business, P&G runs more efficiently, saving both time and money, and improving product design in accordance with consumer expectations. Resources go further. And products conform to high quality standards.

Blum herself supports P&G's research and development functions in Germany, helping to address needs in a variety of different business areas. "From manufacturing plants to design work to process [improvement], I support engineers on one side and commercial work on the other," she says. "Because we have to not only improve the product, we also have to improve the way of looking at data, collecting data and looking at the methods that we're already using."

Years ago, she says, "a lot of data that was being collected wasn't being used. If data is collected improperly, it's incredibly difficult to analyze or draw conclusions from." Now Blum and her colleagues in Quantitative Sciences have changed all that. "We're able to stand back and look at what we already have in a different way. At P&G today, statistics is part of everything. Everywhere data is collected, you see a statistician assigned to that program, looking into the data."

A holistic approach to product and process data, from raw material to the end consumer
Statisticians at P&G draw on a variety of different data sets, from consumer and sensorial panel testing to stability and reliability to accelerated experiments that look at how well products maintain their shelf-life. And that's all on top of standard laboratory testing. Take diapers, for example. "We have all different kinds of data," Blum says. "We might test absorbency and how liquid is distributed amongst the layers. We also test the diaper production line, setting parameters accordingly. And we test raw materials [before the production process even begins]. We have to check not only what is supplied to us but also our own production process and pre-types before all these components can come together."

What sets P&G apart is that all this experimentation is now carefully designed so that Blum and her colleagues collect data that provides

meaningful, practical business insights without the superfluous numbers. Doing more with less (but more strategically collected) data has huge impact, Blum says: "So much information is hidden behind the mask of a massive data set." Optimal design of experiments (DOE) helps the team focus on what's important – and helps departments optimize the resources they spend running studies.

"DOE has begun to play a bigger and bigger role within the company," Blum says. "If you can afford to do big consumer studies, then you'll usually get the answers. But nowadays most departments [prefer to use resources more efficiently]. In fact, [with optimal DOE] you may even find that there are different solutions which vary greatly in cost to the company. And if you have two or three optimal solutions, you can pick the cheaper one. Only DOE will give us these kinds of options. So in every single step, we try to use DOE wherever possible."

Sophisticated experimentation yields more insight in less time with JMP®

Even before P&G adopted JMP as its software of choice, Blum says she was "already aware of the fact that the DOE platform in JMP was outstanding." Early adopters in the division were using JMP to develop custom scripts that would serve the whole lab: "The data came from the machine and you'd just click a button [in JMP] and get the result."

It wasn't long before Blum herself was using the software to run increasingly complex analyses. "JMP has a really strong practical interface that allows you to plot data intuitively with Graph Builder – anyone can do it. As long as your data is structured, Graph Builder will help you to understand what is really there before you even start analyzing – that's what I absolutely love about it."

Blum says for a company like P&G where diversity of background and experience is considered the core component of a successful team, JMP helps bridge the gaps. "We decided to really embrace [P&G's culture of diversity] and look at things from different perspectives – a computer science person, a machine-learning person. If they all look at the same problem, the result will be a much better understanding of what is really there and how we can improve what we read from those data." Bridging gaps between statisticians and engineers. Between people on the factory floor and those in the board rooms.

"Visualization is the key to everything because this is usually what people understand – particularly in management. They don't want to deal with numbers. Give them a picture that tells the story instead. It doesn't have to be the most precise picture; it just has to tell the story that holds the conclusion. This is also where I must say I see there is strength in JMP to deliver those graphics and thoughts. And the interactivity."

A culture change embodies P&G brand values

Statistics-driven strategies are now making their way into other business applications. There's no question quantitative, innovation-oriented thinking plays a critical role at P&G. "It's been fun to see this culture change here," Blum says. "P&G is continuously improving, moving forward. There is no routine. No repetitive tasks. It's a learning culture. The more people who have become aware of the fact that [we can now get such valuable insight] with all the data we collect, the more we've been able to accomplish what we couldn't previously."

Solution
Adopt a culture of analytics throughout the organization. Take a data-centric approach to experimentation with design of experiments capabilities in JMP to improve quality while also cutting costs.

Results
P&G has embraced a culture of continuous improvement.

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