Flying Blind

It's hard to recognize a daring failure when it's taking off. Consider the Concorde.

by Nicholas G. Carr

Early one summer morning in 1909, a man on crutches hobbled across a field near the seaside town of Sangatte in northwestern France and approached a small airplane built of wood and cloth. Although his foot had been badly burned in a recent flying accident, he was determined to do what no pilot had done before: cross the English Channel. Ignoring a last plea from his wife to abandon the venture, he hoisted himself into the tiny seat that served as the plane's cockpit. At exactly 4:35, he took off, just managing to clear a nearby telegraph line. Almost immediately, he found himself blinded by the heavy mists hanging over the water. "I am alone," he would later write of the experience. "I can see nothing at all. For 10 minutes I am lost."

But then, catching sight of a castle on the far coast, he regained his bearings. Operating a steering lever with his injured foot, he forced his plane back on course and, after fighting a last gust of wind and dodging a brick farmhouse, touched down on English soil. Although the flight took little more than half an hour and covered a mere 23 miles, it was momentous. It inaugurated the age of international air travel, and it propelled the pilot, a French engineer named Louis Blériot, to a triumphant business career. His Blériot XI monoplane became the coveted high-tech product of its day, and, during World War I, Allied pilots flew 5,600 of his SPAD fighters over Europe. As demand for international flights expanded, so too did Blériot's enterprise. He became one of the leading aircraft manufacturers in France and licensed his designs around the world.

Inspired, intrepid, and pigheaded, Louis Blériot fits the archetype of a business innovator. And his flight itself serves as a worthy metaphor for the innovator's journey: a leap into the unknown followed by a spirit-testing passage toward an uncertain destination. For Blériot, the journey ended well. His personal passion anticipated popular desire, and he prospered. But many equally daring flights of innovation don't come to such happy conclusions. They either fail to produce a product, or they produce one that goes nowhere in the marketplace. It doesn't appeal to customers, or it

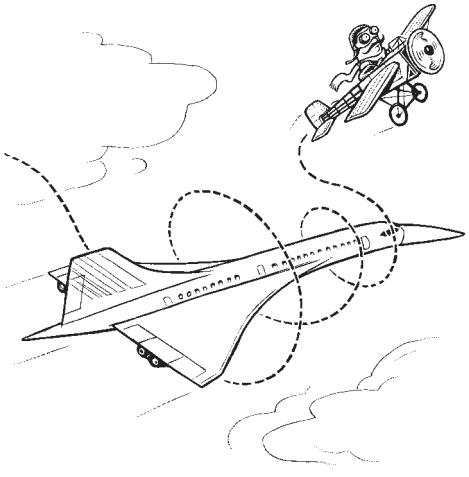

Illustration by Lars Leetaru

can't be produced economically, or competitors are able to create knockoffs easily.

Think of another milestone in commercial aviation: the Concorde supersonic passenger jet. Many consider its creation second only to the Apollo moon landing as the greatest feat of 20th-century engineering. Yet as a product, the Concorde never turned a profit and in the end, just two years ago, it was pulled off the market. Its troubles reveal some hard truths about the challenges facing even the most remarkable of business innovations — and offer lessons on why great inventions can fail to produce profits.

Launching the Concorde

Back in 1956, when the British government organized the Supersonic Transport Aircraft Committee to begin work on a passenger jet that could fly at twice the speed of sound, the commercial logic seemed ironclad. Ever since Blériot's flight, the aviation market had been driven by the public's seemingly insatiable appetite for faster flights over longer distances. The prospect of cutting flight times in half — turning a six-hour transatlantic slog into a three-hour jaunt — stirred the enthusiasm of both travelers and the airlines that served them.

The technical challenges, however, were forbidding, ranging from heat management to engine reliability to fuel storage. Most daunting of all was the so-called compressibility drag problem. When a plane moves through the air, it creates sound waves. In a normal subsonic flight, some of those waves travel forward, preceding the plane. They have the effect of smoothing the air, dramatically reducing wind resistance, or drag. When a plane flies at supersonic speeds, however, it outraces its own sound waves. The air compresses in front of it, creating a shock wave that makes for a turbulent and inefficient flight. Many aviation experts believed that the drag problem alone would doom any attempt to build a supersonic passenger jet.

But through a series of innovations in fuselage, wing, and engine design, British engineers met the challenges. Their wind tunnel tests and theoretical analyses showed that a commercial jet could be built to fly safely and comfortably at Mach 2, double the speed of sound, or even faster. The breakthroughs quickened the pace of the initiative, as work began on an actual blueprint for the jet. The project accelerated even further in late 1962, when the British Aircraft Corporation joined forces with France's Sud Aviation (later renamed Aérospatiale) to manufacture medium- and long-range versions of an "SST," a supersonic jet that would carry approximately 100 passengers. The engines would be supplied by the British, while the French would take on the

Inspired, intrepid, and pig-headed, Louis Blériot prospered from his leap into the unknown.

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majority of the work of constructing the body. The costs of the program would be shared by the governments of the two countries.

As the engineering sped forward, the market sent signals that seemed to confirm the commercial wisdom of the endeavor. By the end of 1963, Pan Am, American Airlines, Continental, and TWA had joined British Airways and Air France in taking options to purchase the planes. At the same time, the U.S. aviation industry announced plans to build its own SST to compete with the Anglo-French model. The public, too, seemed enamored of the program. When the first test flights were made in 1969 and 1970, the highways around airports were often jammed for hours as spectators tried to get a glimpse of the sleek new jet. Market research indicated strong demand for faster air travel — and a willingness to pay a premium for the privilege.

But hidden in all the excitement were some ominous signs. The cost of producing the jet had already gone far beyond the original budget. A small but growing band of environmentalists had emerged to protest the noise and pollution that would allegedly be produced by the plane. A nervous U.S. Congress cut off funding in 1971, and the Americans abandoned their SST. In 1973, an oil crisis sent gas costs skyrocketing, dramatically increasing the fuel-hungry plane's operating costs. More troubling still, the demand for business travel had flattened, and the airlines had trouble filling the seats of their ever-expanding fleets of big subsonic jets. They began to slash their fares. When the Concorde made its maiden commercial flight on January 21, 1976, it entered a market that had changed drastically from the one that existed 20 years earlier when it was conceived.

The supersonic revolution never happened. Only 16 Concordes were ever sold, all to British Airways and Air France. The other airlines canceled their orders. Noise and other concerns limited the jet to just a few routes. Passengers found the interiors cramped. And high fuel and other costs doomed the plane to marginal profits or, more typically, outright losses. On July 25, 2000, an Air France Concorde crashed during takeoff, killing everyone on board and resulting in a temporary grounding of all SSTs. On September 11, 2001, the attacks on the World Trade Center and Pentagon devastated demand for air travel.

The Concorde's troubles reveal hard truths about the challenges facing even the most remarkable innovations.

On April 10, 2003, the end came abruptly, as British Airways and Air France simultaneously announced that they would retire their Concorde fleets. On October 24, 2003, the jet flew for the last time, and a month later many of its parts were auctioned off at Christie's in Paris. The Concorde had become just another flashy product that had failed to find a market.

Unforeseen Hazards

The brief history of the Concorde encapsulates the hopes and disappointments that so frequently characterize attempts at launching radically new products and services. The story also reveals many of the reasons that seemingly winning innovations can go awry.

Some of those reasons relate to the pace and direction of technological change itself. Complex innovations may have one or two core technologies, but they typically also incorporate many other supporting or complementary technologies. Advances in the core technologies may make a new product feasible — and excite inventors, investors, and managers — but shortcomings in the supporting technologies may undermine the product's commercial viability. Breakthroughs in engine power and aerodynamics, for example, enabled engineers to build the Concorde, but deficiencies in materials science rendered it unprofitable to fly. Because of the unavailability of lightweight materials, the plane was able to carry only a relatively small number of passengers, and it had to burn a huge amount of fuel. Air France and British Airways simply couldn't charge enough to cover their costs. With most flights, they just burned money.

Technological advances also tend to produce backlashes, which can be hard for those caught up in the excitement of invention to understand or foresee. That's why the members of the Concorde team were blindsided by the environmental concerns that played a key role in limiting the plane's routes. If they had anticipated the protests, they might have been able to blunt their

impact through aggressive education and public-relations programs. The noise fears, for example, turned out to be exaggerated, but the perception that the Concorde would disturb local communities lingered.

The failure of innovations can also often be traced to the misreading of market dynamics. When an attractive new technology is introduced, customers tend to be hungry for rapid advances in its performance — and they're willing to pay extra for every new generation. But at some point, and it is often sooner than most experts expect, the demand for better performance at any price begins to flag. The product's capabilities become satisfactory to a majority of buyers, and they lose their interest in spending more for better features. They'd rather get the same level of performance for less money. When the Concorde was on the drawing board, it seemed obvious that customers would gladly pay more for faster flights — after all, that had always been the case in the past — but by the time the plane was actually airborne, the market was paying more attention to price than performance. As the Concorde's makers discovered, market research can be blind to such a sea change in customer behavior.

Finally, and perhaps most deadly of all, innovations can fail because of cognitive biases — flaws in the way people think as they create and try to sell breakthrough technologies and products. In a series of famous psychological experiments, Nobel laureate Daniel Kahneman and his late colleague Amos Tversky showed that people are naturally prone to both overconfidence and overoptimism. We overestimate our ability to do hard things, and we underestimate the hazards and difficulties involved. It's this aspect of human nature that produces the risk-loving dreamers like Louis Blériot who push the world forward. But it's also what seals the fate of many well-intentioned innovation initiatives. Wanting to believe the best, of themselves and their organizations, businesspeople routinely underestimate the costs of complex initiatives, failing to take into account the inevitable delays, failures, and conflicts that waste time and money.

When Britain and France agreed to jointly build the Concorde in 1962, they projected the total cost would run around £160 million. Ten years later, they'd spent well over £1 billion. The team didn't even factor inflation into their original cost estimates, an oversight that, given the hyperinflation of the 1970s, proved particularly damaging. Innovators and their financiers need to remember that, when it comes to commercial products, clear thinking about costs is as important as clear thinking about sales. Revenues are worth little if they're overwhelmed by expenses. (As the cover story of this issue suggests, many companies are already facing this problem. See "Money Isn't Everything," by Barry Jaruzelski, Kevin Dehoff, and Rakesh Bordia, *s+b*, Winter 2005.)

When people are deeply engaged in a project, they also find it difficult to appraise its progress realistically. They become true believers, and lose their objectivity. Business scholars such as Isabelle Royer of the University of Paris-Dauphine have done extensive research showing how difficult it is for managers to discontinue large-scale initiatives, even when the signs of failure become clear. They filter out the bad news, play up the good news, and continue to invest in the vain belief that a shift in the market is just around the corner. For years, British Airways and Air France would regularly avow that the Concorde would soon turn into a thriving operation.

Flights of Imagination

But although the traps that litter the path of business innovation may be intimidating, that's no reason to abandon hope. Even the Concorde story offers an encouraging epilogue. At the Paris Air Show in June 2005, France and Japan announced ambitious plans to develop a new supersonic jet by 2015. Combining France's experience with the SST and Japan's skill at building powerful engines, the joint effort seems likely to overcome many of the problems that doomed the Concorde to the auction block. Recent advances in lightweight materials and engine efficiency, for example, should allow the plane to carry 300 passengers, nearly three times as many as the Concorde, with far greater fuel efficiency. That alone would make the jet's economics much more attractive than its predecessor's. And with business travelers flying more frequently between Europe or North America and the Far East, the demand for faster flights may surge again.

The technology and the market, in other words, may finally be ripe for the profitable launch of a supersonic passenger jet. Which brings us to the final lesson: When it comes to commercial innovation, timing is everything. Just ask Louis Blériot. ✚

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