

IRIDIUM'S 66 PIES IN THE SKY

[This is an expanded version of “Why Cell Phones Succeeded Where Iridium Failed” by Jagdish N. Sheth and Rajendra Sisodia, published in the *Wall Street Journal* 08/23/1999.]

“If you believe in God, Iridium is god manifesting himself through us.”

Raymond Leopold, former Chief Technical Officer, Iridium Inc.

The recent bankruptcy filing of Iridium Inc. should not come as a surprise to anyone familiar with the dynamics of marketplace response to new technologies. A basic analysis of Iridium's value proposition to the customer illustrates clearly why this long-heralded venture crashed and burned a short nine months after its launch.

There is no question that the Iridium project, with its 66 satellites orbiting the earth at 17,000 miles per hour (34 times faster than commercial jetliners) represents an extraordinary technological, logistical and regulatory triumph. The satellites were launched and deployed in one year, and the resulting wireless communications network spans the globe, providing voice and paging connectivity from the deepest forest to the highest mountains to the remotest oceans (although a sizable number of countries are still not covered). Prior to launch, agreements had to be reached with 140 countries, and dozens of partners (including companies as well as governments) are involved in managing and marketing the service. Motorola and other Iridium owners will no doubt enjoy the residual benefits of these pioneering efforts for years, if not decades, to come.

Viewed as a business proposition, however, it becomes clear that Iridium has been a huge marketing failure. Many marketing successes occur by accident, and many others happen *despite* rather than *because* of management actions. Marketing failures, on the other hand, are almost always attributable to mistaken management decisions.

To be successful, a marketing program must deliver high levels of each of four attributes, all measured from the viewpoint of customers in the chosen target market:

Awareness refers to the extent to which customers are informed regarding product or service characteristics, persuaded to try it, and if needed, reminded to repurchase it.

Acceptability refers to the extent to which the firm's product or service offering meets and exceeds customer expectations (which are defined based on competing alternatives).

Affordability refers to the extent to which customers in the target market are willing (i.e. does the value created exceed the price) and able (i.e. can they economically afford it) to pay the price being asked for the product or service.

Availability refers to the extent to which customers are able to readily acquire and use the product or service, with an amount of effort that is reasonable for the context.

A simple formula can then be used to evaluate the overall marketing program:

$$\text{Market Value Coverage} = \text{Acceptability} \times \text{Affordability} \times \text{Availability} \times \text{Awareness}$$

Highly successful marketing programs achieve close to 100% on each dimension. Mediocre marketing programs tend to achieve high levels (i.e., close to 100%) on two or three of the dimensions, but suffer a bottleneck in one or two. For example, if a marketing program achieves 100% on Acceptability and Availability, 50% on Awareness but only 5% on Affordability, it can realize a maximum of 2.5% of the target market. In misguided attempts to “fix” failures, companies often end up throwing good money after bad. For example, instead of addressing its Affordability problem, a company may focus on improving its product quality.

Sorting “Killer Applications” From “Dead on Arrival”

Direct broadcast satellites, airplane phones, and cellular telephony all have obvious parallels with Iridium; the first two are satellite-based services (one a big success, the other a total failure), and the third is a wireless service that was initially a failure but later became a huge success.

DirectTV

Few consumer electronic product introductions have been as successful as Hughes’ DirecTV, a service that beams over 175 “cable” channels directly into subscribers’ homes using a pizza-sized dish. The service attracted over one million customers in less than a year. DirecTV had high Acceptability because Hughes’ outstanding technology enabled it to provide sharp digital pictures and CD quality sound. Second, Hughes picked Thomson (owner of the RCA brand) to manufacture the receiving units, thereby achieving widespread Awareness through brand recognition as well as widespread Availability, since RCA has an established 11,000-dealer network. Availability was complete in the targeted market, since the footprint of the two satellites covered the entire country. Finally, Hughes made the product Affordable, finding a price point that stimulated enough demand to match the supply of receiving units; a higher price would have deterred most potential buyers, while a much lower price would have stimulated more demand than Thompson could have met – a common problem with successful new products. Hughes later allowed additional manufacturers to produce the units, drove prices down further and made the service affordable to the next tier of customers.

Air Phones

In 1984, many airlines began installing air-to-ground telephony systems. Despite impressive technological achievements and great expectations all around, the service has largely been a disappointment. In ten years of existence, one of the services generated only 50 million total calls—a fraction of the calls carried *daily* by cellular companies. Capacity utilization was less

than 0.5%. The reasons are not hard to discern. Awareness and Availability (the product is literally in your face in airlines so equipped) were never an issue. However, Acceptability was low because calls were noisy and there was little privacy. Affordability was very low because of the high price of the service—\$5 the first minute and \$2.50 a minute thereafter—making it impractical for routine calls, even for those who could afford it. As a result, service providers failed to create much of an impact with their technological *tour de force*, and many airlines have started to remove the expensive phone infrastructure from their cabins.

Cellular Telephony

A market research study commissioned by cellular technology inventor Bell Labs predicted a subscriber base of only 800,000 by the year 2000, and concluded, “no market at any price.” Given this dire forecast, AT&T decided not to commercialize it. Eventually, the FCC gave away free cellular licenses to all local phone companies, as well as by lottery to one other company in each market.

In the early years, it appeared that the forecast was right. Phone companies targeted only an elite market of business executives. The service was expensive, handsets cost thousands of dollars, and choice was limited (Affordability). Service was unreliable and only available for cars; installation was cumbersome and expensive (Acceptability). Phones and service could only be obtained from a few authorized resellers (Availability). Little advertising or other promotional activity was done (Awareness). The resulting low volumes of calling did little to offset the huge infrastructure costs, and cellular companies lost large amounts of money.

All of that changed when the industry adopted some marketing innovations. First, the target market was broadened to include many more segments, including sales people, professional service people, and women concerned with safety. Second, the industry started to subsidize and bundle handsets with service contracts, thus removing upfront barriers to adoption and improving customer retention. Airtime prices were lowered and multiple pricing packages were created to appeal to different segments, vastly raising Affordability. Distribution was expanded to include electronics retailers, mass merchandisers and even kiosks, and the geographic reach of networks was expanded, making Availability nearly universal. Finally, promotional efforts were stepped up, greatly increasing Awareness and changing consumers’ misperceptions about the service. Acceptability improved as handsets were detached from cars, became smaller and more full-featured, and voice quality and network coverage both improved. With the transition to digital technology, an even richer feature set became available.

With all cylinders firing in this manner, the industry took off and experienced explosive growth rates of 40-50% per year. As a result, there will be an estimated 80 million subscribers by the year 2000 in the US alone, 100 times more than originally predicted.

The Concorde

The Iridium case has some interesting parallels with the French-British supersonic plane Concorde, now in its 31st year of operation. When the Concorde was introduced, it was expected to seriously hurt the transoceanic travel business, as well as the slower jumbo jets. Thirty years later, the Concorde is on its way out; the service will continue for another ten years or so, when the planes will be taken out of service. Meanwhile, ocean travel continues to thrive, and jumbo jets have not been impacted at all.

A technological marvel when it was launched and even today, the Concorde never lived up to its promise to transform air travel. Its backers had predicted that they would sell hundreds of planes to other carriers, but in actuality sold none at all; the plane is simply too expensive to build and operate. A 4A analysis clearly reveals the plane's other shortcomings. While Awareness has never been a problem, Availability has been limited to a few trans-oceanic routes; the plane is not allowed to fly at supersonic speed over land because of the extremely loud sonic booms it makes when it crosses Mach I speed from either direction. The Acceptability of the plane is low because its narrow fuselage makes for extremely claustrophobic quarters. Business travelers accustomed to the luxury of first class find nowhere near that level of comfort in the plane. Also, since the plane uses engines designed for use in bomber jets, it is extremely noisy. Finally, in terms of Affordability, given its high upfront and operating costs, travel on the Concorde is extremely expensive, with round trips between the US and Europe running \$10,000-15,000. That comes to thousands of dollars per hour of travel time saved – a value proposition that appeals to very few. The result is that flying on the Concorde has primarily novelty value; most people try it just once for the experience.

Iridium and the 4As

The target market for Iridium was initially defined as business executives who frequently travel internationally. The expectation was that these executives could afford a premium service that would allow them to communicate from anywhere in the world.

In the nine years that Iridium Inc. has been in existence, however, the communications world changed dramatically. Cellular communications exploded worldwide, making a speedy transition to higher quality digital systems within the last three years. The GSM system already allows seamless roaming in 62 countries – soon to be many more. Prices have crashed as usage has soared; with AT&T's Digital One Rate and its imitators, customers can make virtually unlimited calls for 10-15 cents per minute.

Here is how Iridium stack up on the 4A's:

- **Acceptability:** Iridium compares poorly with its competitors on all facets of Acceptability. The one-pound handset is huge by current standards and service reliability and call clarity were poor (especially early on). The phone cannot be used inside buildings or cars. Iridium's coverage is advertised as global, but in fact excludes many countries in Europe,

Asia and Africa. Overall, Acceptability could be judged less than 5% for business travelers, though it may prove to be substantially higher for miners, oil and gas explorers and other specialized markets, which are now being targeted.

- **Affordability:** Sticker shock all around. In an era of \$100 miniature cell phone wonders, the Iridium handset cost a jaw-dropping \$3000, and airtime prices were also in nosebleed territory, ranging from \$4-9 per *minute* (before recently announced price cuts). Even most of those economically able to pay such prices are not willing to pay them. Thus, Affordability can be rated at 10% at best.
- **Availability:** As mentioned, the service is not available in many countries, and can only serve as few as 25,000 simultaneous users. With an inadequate sales force and poor customer service, Availability could be rated 50% at most.
- **Awareness:** This is where Iridium truly excelled (at least in marketing terms). In addition to receiving huge amounts of free publicity, the company orchestrated an intense \$180 million media blitz, running ads in the *Wall Street Journal*, *Fortune* magazine and 37 airline magazines. In addition, it launched a major direct mail campaign in 20 markets in 20 languages. It is safe to say that most executives in Iridium's target market were quickly made aware of the service. Awareness can thus be rated at 90%.

Iridium's conversion rate from prospects to customers is telling. In just the first quarter during which its successful advertising and direct mail campaigns ran, Iridium received 1.5 *million* inquiries from potential customers, of whom only a few thousand signed up. The above analysis indicates that Iridium's market value coverage comes to 0.225% (90% x 50% x 10% x 5%). In other words, Iridium could expect to get less than 1/4% of the market it had targeted. Given that the company has only signed up about 20,000 customers, this seems about right (assuming that the size of the target market is about 7-8 million worldwide).

Iridium is now operating under Chapter 11, with a revamped marketing strategy. If it succeeds in writing off its development costs, the venture might yet become a marketing success. However, it would still remain a business failure (as has been the case with GM's Saturn). The horrendous economics of the project (\$5 billion in development costs, at least \$1 billion a year in operating costs, plus the costs of deploying twelve new satellites every year) mean that even if the company gets a million customers, it would have to net \$1000 from each of them just to pay operating costs.

What Can Be Learned?

The Iridium project was a classic case of technology push; the opportunity Iridium sought to address nearly ten years ago, when the company was created, seemed at the time a large and worthy one. In the intervening years, however, competing technologies moved fast and benefited dramatically from the experience curve effects of huge volumes of demand. Iridium's value proposition all but disappeared, and the project became an adventure rather than a viable venture.

Long-running projects such as Iridium must watch closely for signs of technological or marketplace obsolescence, and be prepared to pragmatically change direction or even abandon the project if circumstances so dictate. Iridium's backers, it seems, fell into a classic "sunk cost" thinking trap; having already spent billions of dollars and years of effort on the project, they were loath to abandon it. Instead, they redoubled their efforts, and spent more billions – a syndrome that has been described as an escalating commitment to a losing cause (the Vietnam War being a non-business example).

Few technology-based companies have done more market research prior to launch. Iridium spent \$15 million on market research, hiring Gallup, Booz-Allen and Hamilton, and AT Kearney; 200,000 people in 54 cities were interviewed, in addition to 22,000 individuals at 3000 corporations. It is hard to imagine that the company did not pick up signals from all this research about fundamental problems with its Acceptability and Affordability. Nonetheless, it plowed ahead, changing little from the plans it had stated years earlier. The Iridium project will go down in history along with the Ford Edsel and New Coke as examples of extensive market research that failed to prevent colossal marketing failures.

Finally, the company put much stock in being the pioneer – the first company to offer global satellite-based telephony. However, for most customers, it was a case of too little too late. Even if Iridium had been a truly pioneering service, the competitive value of being a pioneer is in fact highly suspect. Unless a company has strong patent rights (as in pharmaceuticals), major experience curve effects (i.e., its costs come down rapidly with volume) and is able to serve the entire resulting market (i.e. is not capacity-constrained), the advantages of pioneering are fleeting and the risks are many, especially with fast-moving technology. Innovative fast followers benefit from the pioneer's experience (fine tune their own 4A's) and utilize more powerful and cost-effective second-generation technology, more precise targeting, better pricing and so on. Indeed, empirical research finds that pioneers are market share leaders in only four out of 50 product categories.

Several other companies are waiting in the wings with their own satellite projects. Based on Iridium's experience, we cannot anticipate clear skies and smooth sailing for them.