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p24-30

Technology Life Cycles and the Consumer

Technological products have a fascinating life cycle as they progress from birth through maturity. The same product that was attractive and desired in its youth can be irrelevant and ignored at maturity. Once through the unstable days of adolescence, everything changes. Customers view products in a new light, seeking very different things. The dimensions upon which the product is judged change. As a result, the way the product is conceived, developed, and marketed must also change.

The very talents of a company that made it successful in the early stages of a technology are exactly wrong for the latter phases.[1]

In the early days of a technology, some people will buy because of the functions it offers. These are called *early adopters,* people who buy because they are in love with technology and will buy almost any new item, or whose needs for the newly developed functions are so great that they are willing to put up with any other problems. Gertrude is a classic example.

New technology, functionality—that's what these early adopters purchase. Products are advertised and sold on the basis of their feature lists and technological claims. Marketing becomes the act of beating the competition's claims. Marketing teams go out and ask customers what new features they require, and then return to the company to implore the technologists to provide them in the next release of the product. Each company works hard to demonstrate that its products are technologically superior, that they have some new advantage that causes them to be faster, smaller, more powerful, or unique in whatever way seems appropriate to the audience. After a while, these claims take on a life of their own.

The result is technology-driven, feature-laden products. Each new release touts a new set of features. Advertisements proudly list them all, extolling their virtues. Seldom are the customer's real needs addressed, needs such as productivity, ease of use, getting the job done. Instead, the feature lists proclaim the technological feats, as if the mere purchase of enhanced technology thereby makes everything else OK. The notion that a product with fewer features might be more usable, more functional, and superior for the needs of the customer is considered blasphemous.

The situation is not helped by the product reviews in the press. Every field of technology spawns its own set of industry conferences and technical and popular journals. Financial analysts, whose job is to write about the minute differences among the companies, and the popular press, who write the reviews of new product releases, need some way of differentiating among the products they write about, so they take to

inventing measurements. There seems to be some belief that their personal opinions are suspect. If they were simply to say "I liked this feature" or "I hated that feature," it would be regarded as personal opinion and carry little weight. As a result, they have created the myth that quantitative measurements are superior, for, after all, they are not subject to personal bias. All the reader has to do, goes the claim, is notice that the numbers measured for one product are better than those for another. Now the reviewer can say "When I held the scroll bar down in product X, it took 11 seconds to go from the start to the end of a document, but only 6 seconds with product Y." No matter that no user ever goes from the start of a document to the end in this way; here is a measurable, if irrelevant, difference between products.

Quantitative measurements are indeed valuable. They are at the heart of the scientific method, for they are precise and repeatable. But the choice of what is to be measured and what not is just as personal and just as biased as any other opinion. What is measured is deemed important, making what is not measured appear to be of little value. Reviewers measure what is easy to measure, regardless of whether these reflect any real utility for the users. Companies labor to improve on these highly quantifiable, highly marketable measures of performance, no matter that they are inapplicable to real life. Fortunes are won and lost, companies climb and collapse on the basis of such irrelevant measures and marketing claims.

I've just described the computer industry, although the general trends are common to the first few generations of products from many technology areas, from automobiles around the turn of the century to early televisions. This is where the computer industry is today; it still believes in technological frenzy. Megabyte, gigabyte, terabyte. Kilobaud, megahertz, gigahertz. New software releases gobble up speed and capacity, demanding more and more and more. But does the consumer understand what all these mean? Is the consumer well served? Strange you should ask.

When a technology matures, the story changes. You could even claim that a mature company is no longer a "technology" company—it's a

products or a service company. After all, in everyday speech, we use the word *technology* to refer to things that are new, where the technology dominates over usability and usefulness. We call the digital computer "technology." We call the internet "technology." But what about a pencil or paper? How about a gas stove or a safety pin? In actuality, all are technologies, all follow advanced scientific and engineering practice in their design and manufacture. But pencils, paper, stoves, and pins are so commonplace that we take them for granted. We assume the technological features are reliable and robust, and so, on the whole, we ignore them.

Once technologies mature, we take their basic performance for granted. We assume it works just fine for our purposes. As a result, we look for other properties: price, value, prestige, appearance, and convenience. We purchase by brand name as much as by actual product. Even large, costly items such as automobiles and television sets are purchased more by price, appearance, prestige value, and brand reputation than by technical distinctions.

Marketing tries hard to make one product different from another by touting minor technical differences, often by giving them fancy names: "Only PixelTech has black-matrix, diagonal pixel-plating," they will proudly proclaim, even if we, the everyday users, are unable to understand, let alone evaluate, the claim.

The computer industry is still in its rebellious adolescent stage. It is mature enough that its technology, functions, and reliability should be taken for granted, but it still has a good deal of immaturity. It keeps trying to grow bigger, faster, more powerful. The rest of us wish it would just quiet down and behave. Enough already. Grow up. Settle down and provide good, quiet, competent service without all the fuss and bother. Ah, but to make this change from youth to maturity is to cross the chasm between the technological excitement of youth and the staid utility of maturity. It is a difficult chasm to bridge.

A vast chasm separates the requirements of the people on the early side of a product life from those on the late side. The first, the early adopters, want technological superiority, and they will suffer any cost,

whether initial purchase price or cost of maintenance and usage, for the benefits. The other, the conservative late adopters, want reliability and simplicity: Their creed is "turn it on, use it, and forget it."

Products have to be developed, marketed, and sold very differently for these two groups of people. Alas, the aging teenagers who rule the computer companies of the world are still stuck on the youthful side of the chasm and they seem unable to make it across. It is time for computers to grow up, to enter the mature world of consumer appliances. The appliance argument is all about the consumer's comfort zone—the mature side of the chasm. It is all about ease of use, dependability, attractive appearance, prestige, and brand. The consumer world is a very different world than the high-tech world of technology-addicted developers and reviewers.

There are many ways to judge a product, many dimensions. Different dimensions are important at different phases of a product's life cycle. Similarly, different customer segments become relevant. In the early days of a product, what matters is that it provides unique capabilities. This is where the early adopters come in, the people who will buy regardless of the complexity or other difficulties just to be on the cutting edge. Early adopters are important—they help establish a market. But they are not the typical buyer—they have more technical abilities, they will put up with more grief, and they are willing to spend more money.

As the market develops, competition arises, the technology matures, and quality improves. This is the adolescent stage of a product. At some point, the technology can be taken for granted; that is, everyone has roughly comparable technology, so other dimensions of the product take on added relevance: reliability, maintenance, cost. This is where the pragmatic wave of adopters comes in, people who wait until they see whether the new technology stabilizes, whether it can actually deliver on its promises.

Eventually, the product reaches adulthood. It is mature, stable, reliable. Now, new dimensions are important; cost, appearance, and convenience play more important roles, with the technology and its functionality and reliability taken for granted. Now we get the late adopters, conservative purchasers who wait until the product has

reached consumerhood, the final state of maturity. Now, the product provides real value. The technology moves to the background. Convenience and reliability are more important than technological superiority. Appearance, prestige, and pride of ownership start to matter.