The Market Value of Technology
Revenge of the Consumers

BY STEVE CRANDALL & STEVE GREENSPAN

Technology investors attempt to minimize their risk by engaging analysts who predict which technology companies will succeed and which will fail. Traditionally, the investment community looks at the supplier side and maps how costs react to manufacturing and distribution improvements. Now, however, a new breed of investment analyst is taking an innovative approach by looking at the consumer side, asking: *"Why in the world do new technologies get adopted?"*

Pip Coburn, formerly global technology strategist for UBS and now head of Coburn Ventures (http://www.coburnventures.com/), is at the vanguard of this new approach. Unlike most investment analysts, Pip spends a lot of time talking with anthropologists, sociologists, and user experience gurus in addition to technologists. His passion is in understanding why things change, or more exactly, why people adopt new technologies. His analyst reports, and the recent successes of Apple's intuitive iPod and iTunes combo, Google's minimalist web design, and Research in Motion's easy-to-use BlackBerry, are changing how investors think about value; and this, in turn, may change how companies think about user experience.

This article summarizes some of Pip's recent analyses and several of our conversations with him. The full reports are available from UBS Investment Research (http://www.ibb.ubs.com/Institutions/investment_research.shtml) and carry names like "The Nutcracker Suite and Sour" and "The Hitchhiker's Guide to the Changing Galaxy." Unless otherwise noted, all quotations are from these two analyst reports.

In the dot.com era, the overarching axioms were *cool technology will just get cheaper* and *build it and they will come*. As founders of Intel, Gordon Moore and Andy Grove had a profound effect on the digital revolution, and are well known for the "laws" that were named after them. Although Moore's law is an observation about the decrease of the cost of transistors on a chip, the observation quickly morphed into technological determinism: the cost of all technology is just going to get cheaper. Grove coined a corollary, "Technology happens," and more recently, "Technology will always win." In combination, the idea was to find a technological advancement that made a ten-fold improvement or that might be disruptive (in other words, a technology that overturns the dominant technology in the market, despite being both radically different and, at first, performing worse than established technologies), and then to let Moore's law work its magic. As Pip observes, in the traditional, technology-oriented supplier-centric model:

Change = f (Moore's law x Grove's Law)

To state it another way, a cool technology at the right price is a killer application. Adoption by users is assumed.

However, as recent history tells us, this model hasn't been very accurate. Although the Moore and Grove formula could explain why some hi-tech products succeeded, it could not explain why so many more failed. According to many technology gurus just a few years ago, by 2005 we would be inundated with cheap picture phones, wireless telephony service in remote locations, interactive TVs, tablet PCs, and "smart" mobile phones; we would be ordering groceries over the net and using voice over the Internet. It hasn't happened yet; but every week there is at least one article that explains how "the technology" is about to explode—it's just a matter of getting the price low enough. But Pip says, "This [Grove-Moore law] thinking is not wrong, it's just limited. It merely tells us what may be possible. Its inputs are necessary but not sufficient conditions for success."

Technologists and technology companies often assume that change (or adoption of a new technology) is easy if the overall value is obvious. But Pip believes that change is extremely difficult. Buying into a new technology—becoming a user of a new service or product—is not just about cost in terms of dollars; it's also about time to learn, time to install, difficulty of working alongside other goods and services, and the fear of looking stupid because it's too hard to use or because you missed a better product that does the same thing more easily. Although this may be axiomatic to most user experience professionals, what is crucial is that investment analysts, led by Pip, are also starting to understand its central role in technology adoption.

"We need to understand the crisis at the adopter level, or specifically how the new offering solves a problem such that the pain of moving to a new technology is far lower than the pain of staying in the status quo" – Pip Coburn, *Will Emerging Technologies Save Tech*, 2003.

In other words, and as an alternative to a supplier-centric view, a user-oriented model of change states:

Change= f (crisis vs. total perceived pain of adoption)

"Crisis" and "total perceived pain of adoption" (TPPA) are continuums from insignificant to critical, and highly personal. Losing a cell phone is a calamity for one person, while another person doesn't even have one; reading a user guide for a new cell phone is entertainment for some and a nightmare for others. But in each case, before a purchase is made, many consumers will evaluate the utility of changing their behavior. For some, "because everyone else has one," or "my boss said to learn this," is sufficient reason to adopt a new technology, but others will be

put off by the complex remote control or the need to buy and install new network equipment. Across the population, the various perceived user and customer experiences will determine the market.

This doesn't mean that price isn't important; it just means that a low(er) price doesn't ensure success. Indeed, price is a factor in the TPPA, but "issues about price are minor in the scheme of the sales process... If the conversation turns to price too early, you are sunk."

The user-oriented model can help us understand why some products have failed and why some have succeeded. Let's take a look a several killer applications that have failed and two that have been highly successful.

Failure #1: Picture Phone
Crisis: None
TPPA: High

The picture-phone concept has been around since the early 1930s and every decade or so attempts are made to build and market one. But in the early 1990s, when AT&T and others created a commercially-viable picture phone, customers were

not interested. Customers had no interest in watching others and even less interest in exposing themselves to prying eyes. The suppliers failed to uncover a crisis. They "assumed that people liked watching Dick Tracy and George Jetson use their picture phones." But, as Pip observes, "that doesn't indicate a crisis." The suppliers were trying to *create a need*, instead of *addressing an existing perceived need*.

In 1990, and even today, there is little "societal reference point" for the service. The business-to-business (B2B) Avistar system is technically very good, but has a low probability of actually connecting users with someone: most people are moving around and are camera-shy. In short, people look for services that are not complete deviations from their lives.

Failure #2: Interactive TV
## Crisis: Very Low
TPPA: High

Interactive TV was supposed to bring Internet-like services to the television and e-commerce revenues to the cable providers. Unfortunately, consumers didn't think that televisions needed more interactivity (apart from program guides). There were many obstacles to interactive TV—serious financial difficulties due to lack of standards, the very high cost of ITV content creation, and a greatly overestimated willingness to pay. But the overriding factor was that there was no crisis: HSN, for example, was very successful using the telephone to take home-shopping orders. Complicated remote controls were no substitute for a phone and speech.

It might have lowered HSN's costs, but for the consumer, the TPPA was very high. Users simply didn't want 100-button remotes. Moreover, the suppliers confused the lean-into user experience of PCs with the lean-back entertainment value of televisions. The crisis was on the supplier side, not on the consumer side: cable providers were looking for ways to stop churn and losses to satellite providers.

As Pip notes, "if the vast bulk of the conversation is from and about the purveyors of the new technology, we watch out."

Failure #3: Tablet PC
Crisis: None
TPPA: High

According to Microsoft, the tablet PC was going to revolutionize how people used computers. Instead of typing, the touch-sensitive screen would let people write documents in longhand. But, "few people think writing is a 10 [times] improvement to hunt and peck...
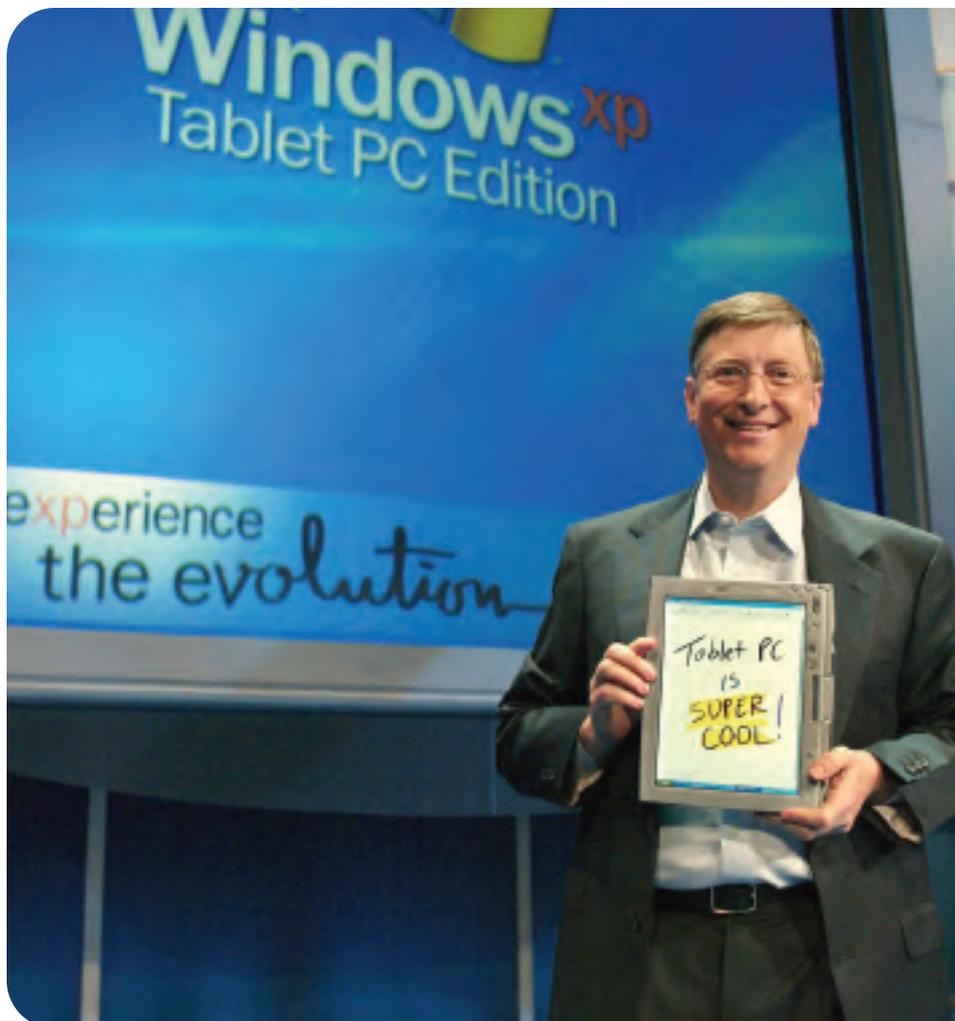
the problem with the tablet PC is very few people are seeking a new way to interface with a laptop… For now, the TPC is a shocking reminder of what we hated about the Newton and the Palm—the tablet demands learning for most people."

Failure #4: Smart Phones
Crisis: Low
TPPA: High

Almost every IT developer and UI designers know about feature creep. That's when the product requirements keep growing—one feature after the other in a seeming babel of input from users, product managers, technologists, and the development team itself. Pip refers to it as the Swiss-Army knife approach to product design, and notes that the approach works well only for Swiss-Army knives. And it certainly doesn't work for smart phones.

"The mobile phone industry—as a follow-up to its incredible success that was nearly a half century in the making—created extremely expensive feature-laden computer-esque so-called Smart Phones. These phones have a variety of attributes…but certainly any phone allowing a user to run an Excel spreadsheet and featuring a Windows or Symbian operating system would qualify.

"Smart phones as a category have continually undersold expectations, much to the dismay of scientists and technologists, while "bare bones" phones that accommodate non-serious and non-smart activities such as $1 music ringtone downloads exploded to the north of 600 [million phones] in 2004.

"But smart phones have garnered tremendous media attention because they are supposedly smart and represent the future or at least the future that some folks would like. The media likes to talk about such stuff. Normally these feature stories are an annual review of why NOW folks will buy smart phones."

Success #1: Apple's iPod/iTunes
Crisis: High
TPPA: Low to Moderate

The pieces for desirable portable MP3 players began to come together in the late 1990s with dropping storage costs and high-quality audio-compression codecs. Early players had cumbersome interfaces, and the

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Pip's Ten Questions When Evaluating a Company

1. What are the core aspects of successful products? How do you use or conduct customer research on new products? What guides you?

2. What are the criteria you'll use to decide to pull a product if it isn't working? What do you mean when you say, "We just need to execute?"

3. Forgetting about profitability for a moment, describe your sense of price elasticity for the product. Is your product disruptive and why? (Hint: Grove x Moore's law isn't the answer.)

4. After technological considerations are eliminated fully and you're happy with the price points, what else needs to be done for this product to sell well? (Hint: Grove x Moore's law isn't the answer.)

5. What are the user crises you intend to solve?

6. Describe the total perceived pain of adoption for the user. What are the top five reasons a user with this "crisis" will not buy this product? What can be done to create the lowest total perceived pain of adoption? When do you introduce the

client into the design process and why? What internal processes do you use to see your products through the eyes of your potential audience? Have you introduced value for your client during the past two years that seemed remarkable in the sense of many thinking it was against your best interests at least at first?

7. Describe the market. What does the crisis vs. TPPA for the first five percent look like? Who are these buyers? For next ten percent?

8. What doesn't work in your R&D design

hardware player industry was engaged in a massively unproductive effort to make copyright holders comfortable.

But for users, a crisis (of a sort) was mounting. Legally or illegally, users were creating huge archives of music and wanted to access this music when they weren't in front of their computers. At the same time, cell phones sales were skyrocketing—mobility was king. CD players were clunky and burning CDs was time-consuming. Users wanted portable players for their MP3 collections.

Apple understood the need and attacked most of the problems—an easy-to-use interface, tight integration with a best-of-class software jukebox, and a digital-rights management scheme that did not preclude existing music and appeared fairly transparent to most users. Conventional wisdom said the players were far too expensive, and Apple, with its minor CPU share, would be unable to sustain growth in the segment.

Apple's domination of the segment is partly a failure of the rest of the market to understand how people manage and listen to music. The TPPA is high for much of the competition—complicated players and jukeboxes that tried to make their mark with features that few users wanted. Instead, Apple (with Steve Jobs's direct involvement) worked very hard to make the iPod-iTunes combination easy and desirable for most people.

Success #2: Enterprise E-mail
Crisis: High
TPPA: Low to Moderate

Research in Motion's BlackBerry service has approximately 2.5 million corporate email

users (out of 150 million corporate email users worldwide). So what's the crisis? According to Pip, two of the major themes that will continue to be played out over the next decade are our obsessive avoidance of boredom and our

addiction to communication—not computation, as can be found in Excel-enabled smart phones —but the pure joy of connecting with someone in real time or in non-real time. In his words, "people don't like isolation very much." Combine that with the growing perception

among corporations that they need to be 24x7, global, and always in touch with their highly mobile sales force and executives, and you get an increasing crisis for an easy-to-use, enterprise-friendly, secure, wireless email solution.

Moreover, email is a key established link among people in varied organizations. The TPPA is low. "Users tend not to replace dominant designs very often—the cultural pain is too high." Wireless enterprise e-mail has an especially low TPPA because the enterprise's IT staff manages it. This gives the IT staff a core value to deliver and makes life very comfortable for the users. So, wireless email might not be a big winner with residential users, but it has that "addictive" quality for its many corporate users.

Pip's essays are a refreshing change from most investor reports. Although concerned with revenue and margins, they are also concerned with the social impact of the products and services. They focus on what we believe is the right issue: How difficult will it be to incorporate the product or service into the user's already complex life and the enterprise's complex culture? For user experience professionals, many of these points may appear obvious—it's what we've been saying all along. But their appearance in investor analyst reports may signal a dramatic change in how user experience analyses are used in the corporate culture. At the very least, these writings help validate the struggle to keep companies focused on the lives, desires, and needs of their current and potential users **UX**

process? How do you avoid tech's siren call of tech for tech's sake and sales-force kitchen-sinking?

9. What great idea on customer experience have you copied from another company? Discuss a product mistake in the past twelve months and how quickly you recognized it, overcame it, and the resulting change in staffing.

10. Is it more important to focus on increasing a user's perceived crisis or lowering their TPPA? What does your organization do to disrupt itself?

ABOUT THE AUTHORS

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