# Online and Search Costs:
## *Koan to Unknowns*

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*As* online access sweeps into everyday life, its push buries common sense in a pile of bits and bytes. In this article I use online and search—though technically quite different—as synonyms because both share a "cost challenge."

In 2000, the U.S. federal government began work on a program to allow citizens to search for information on thousands of Web servers operated by government agencies. Estimated first-year costs for the program were about $500,000. For 2005, the U.S. government's search-and-retrieval system followed the path of many other Federal projects. Costs were—according to one person familiar with the program—on track to break through the $20 million threshold.

To put this in context, in 2000, a car payment of $229 per month would rise to a breathtaking $9,560 and a house payment of $668 would be brushing against a staggering $27,000 per month to track with this government program's expenditures. During this same 5-year period, gasoline for the family car actually rose from $1.25 to around $3.00 per gallon and Pepperidge Farm cookies from about $1.80 to $3.50, quite a different scale of cost increase.

Common sense says, "Online costs should behave like these other costs." Basic everyday common sense does not apply to online costs. From Wall Street to venture firms in San Francisco, very bright people insist that online search and retrieval systems follow the same cost patterns as gasoline and snacks for the kids' lunches. The reality is that search-and-retrieval systems have their own financial logic—or illogic, depending on one's point of view.

### Common Sense Cost Sutra

Costs matter greatly to online because the industry is undergoing tremendous change. New features and functions mean more programming costs. Hardware advancements force system upgrades. Something breaks and an organization has no choice but

spend whatever it takes to get back online. Careless programming adds to the time and cost of debugging. A new competitor enters the market, and an organization must respond with rich media, triggering more spending on storage, bandwidth, and servers.

To date, very few people want to look closely at the costs of designing, building, maintaining, and scaling an online system. The variables give most analysts a headache. Ask a programmer how long it will take to make a change in a system at your organization and what do you learn? The answers are fuzzy because the programmer doesn't know for sure until the problem is solved. Then and only then can you calculate the amount of time consumed, add in the direct costs for a software utility or a hardware gizmo, multiply by the programmer's hourly wage plus overhead, and make a stab at the "opportunity cost" of having a system offline. Daunting work, indeed.

The purpose of this essay is to focus attention on costs. The exercise provides a different perspective on what may differentiate winners and losers in the race for a sustainable competitive advantage.

## Economic Payoff

The economic payoff from search and retrieval, or findability, to use the latest five-syllable buzzword, is huge. Google alone has feathered the nests of financial professionals and Googlers lucky enough to have Google Stock Units or GSUs. Google's vendor and user ecosystem is thriving and pumps billions into the global economy. Amazon, eBay, Microsoft, and Yahoo! are in this search market space as well. There are more than 100 vendors of enterprise search systems, dozens of search utility vendors including Attensity, Inxight, and Teragram. Thousands of consultants, integrators, and researchers hype the online bandwagon. Newcomers such as Devilfinder and Exalead enter the market. Oracle signs up to resell Google's appliance and rolls

out a new and improved search system, Secure Enterprise Search 10g, simultaneously in order to get its snout into the online search money trough.

Search and retrieval has a long history. Commercial search and retrieval stretches back 50 years to IBM's mainframe STAIRS system, which is still available. STAIRS was shorthand for Storage and Information Retrieval System, which started the tradition of naming search systems in a clever way. However, financial returns have been uneven. Can search and retrieval ever give birth to another money machine like Google? Will established companies be able to design, build, and operate search systems that deliver a business model that grinds out money as Google does?

## An Amazon Koan

The online search sector seems to be ripe for startups as well as new systems and services. Yet there is constant grousing. Google returns laundry lists. Exalead's interface is too complex. Fast Search & Transfer is complicated to deploy. Autonomy's "automatic indexing" needs human assistance. Attensity's natural language processing algorithms require specialists to care and feed the system. Yahoo! offers too many bells and whistles, thus confusing users. Nevertheless, search is the "killer app" or must-have application that drives computer usage.

Let's look at Amazon for an anchor point on the costs of an online business. Figure 1 below left shows Amazon's reported expenses from its 10K reports for the period from FY2000 to FY2005.

The blue line represents Amazon's investments in its fulfillment operation. Amazon has warehouses, staff, systems, and other costs rolled into this one line. Amazon's customers value rapid delivery. To get an Amazon customer a product quickly, Amazon must have a "brick-and-mortar" inventory and the mechanics to get the book to the customer. Critics of Amazon were quick to point out the cost of a fungible infrastructure. For a "zero gravity" play, Amazon created some heavy operations to make its business model work. Jeff Bezos, Amazon's founder, built warehouses and, in general, has kept the fulfillment costs from sinking the company. In fact, Amazon's marketing, administrative, and catch-all "other" category trend smoothly.

But look at the red line. In 2003, costs for technology started to increase. Between FY2003 and FY2005, the cost of technology tilted upwards. Through the first 6 months of 2006, the slope upward continues. Projecting these costs with assumptions of year-on-year percentage increases in line with what happened from FY 2000 to the present, technology costs trend upwards. Analysts point out that, as a percent of revenue, Amazon's costs are understandable. Amazon's accountants are pushing piles of technology money around to gild the lily.

Amazon's management has to control their technology investments. If the trend graphed in this analysis is accurate, technology costs could weaken Amazon, perhaps fatally, unless Amazon's top-line revenue continues to grow robustly. In FY2004, Amazon reported revenue of $6.9 billion, jumping to $8.5 billion in FY2005. FY2006 is on track to outperform FY2005.

Amazon's management and the Wall Street analysts know there's a problem somewhere in the complexities of the company. As I write this, Amazon's stock is trading at about $26 per share, down from the 52-week high of $50.

## The Yahoo Koan

Yahoo! is a portal with a mind-numbing range of services. In the last year, Yahoo! has rolled out a number of new search initiatives. The company's been growing under the firm hand of Terry Semel, former motion picture mogul. In FY2004, Yahoo! reported revenues of $3.6 billion, which jumped to $5.3 billion in FY2005. The company seems on track to hit $6.2 billion when FY2006 ends.

A plot of Yahoo!'s cost of revenues and other costs reported by the company (see Figure 2 below right) warrants comment on two points.

First, Yahoo!'s cost of revenue is rising. It's getting more expensive for Yahoo! to stay in the game. The other interesting costs are those associated with sales and marketing and with product development. Despite the flurry of new product activity at Yahoo!, it seems to be spending less than its flow of new products suggests. One wonders if Yahoo! is taking the costs of its infrastructure, software development, and acquisitions and chopping them up. Stuffing costs in
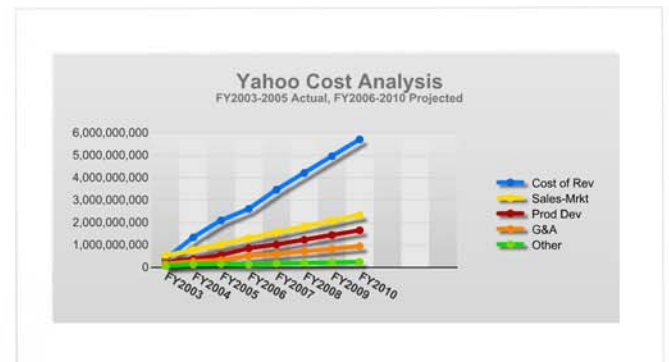


**Figure 1.** Amazon



**Figure 2.** Yahoo!

different nooks and crannies sometimes makes sense, but has Yahoo! already begun to cut back on technology spending in order to keep the company healthy? Whatever is causing Yahoo!'s "cost of revenue skyrocket" to take off means the movie mogul's minions have some cost containment work to do.

## The Microsoft Koan

Microsoft cut its costs in 2004 and 2005. In this context, it's useful to mention Microsoft's announcement that it would allocate an additional $2.0 billion to "invest" in the company. Analysts said Microsoft did not provide enough detail at the end of April 2006 when Steve Ballmer offered a forecast for FY2007 that included about $2 billion in unexpected spending and reduced per-share earnings. According to one version of a Microsoft memorandum, its management said, "We are heavily investing in Internet search, advertising, and data storage that will show how serious we are about Live services." Live.com is Microsoft's response to the online presence of Google and Yahoo!.
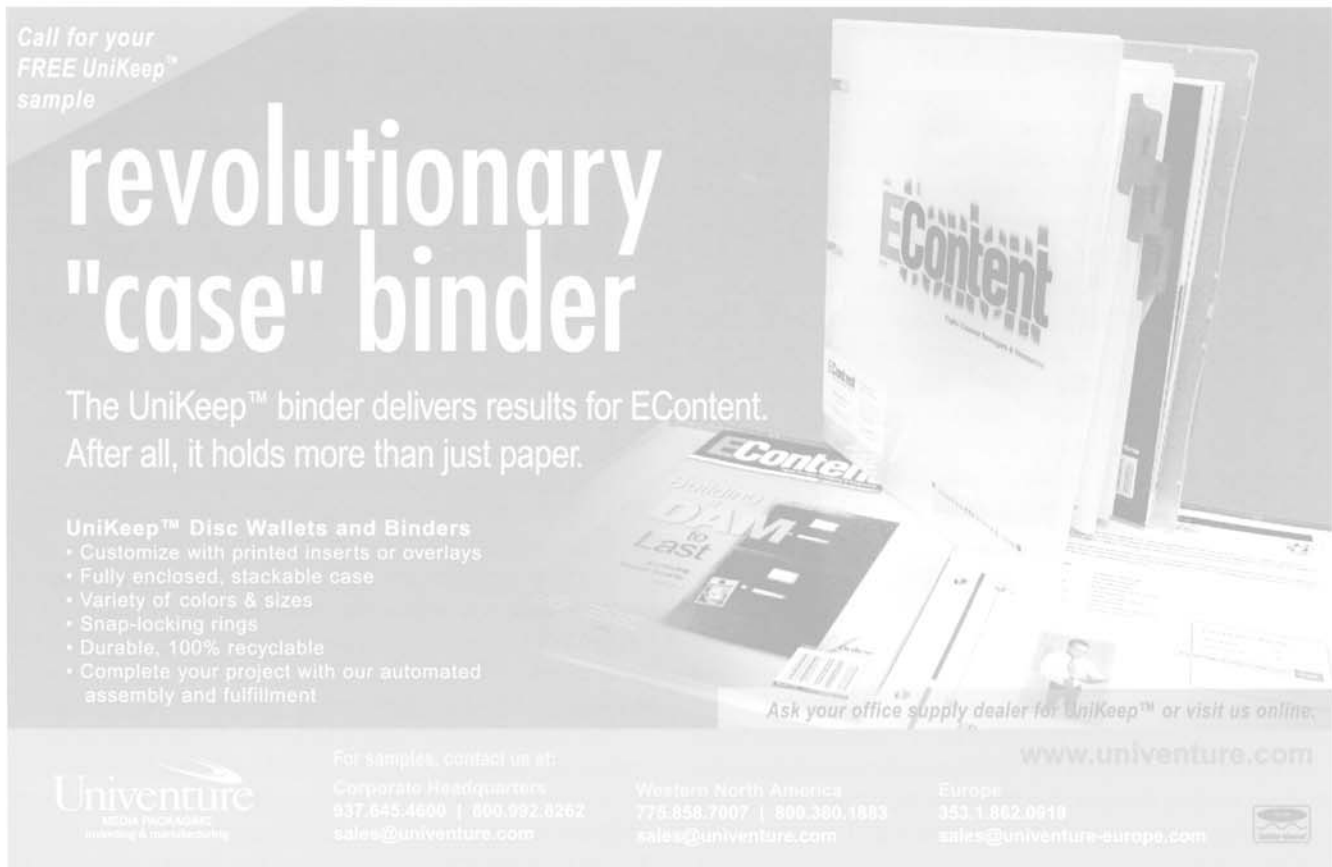
So costs are spiking at Microsoft. When online chews into well-crafted expense plans, no company is exempt. Microsoft's method of reporting its results by business units adds to the excitement of figuring out where the company is spending.

For the purpose at hand, here's what Microsoft's Steve Ballmer said about the "surprise" spending in a talk to New York analysts in July 2006, "We are not a company that starts things and gives them up. We keep working, and working, and working, and working. We are not afraid of initial resistance to our efforts." Well, $2.0 billion additional investment will help Microsoft keep working, and working, and working.

## Google's Apparent Fix

Google seems to nave beaten the odds. The company generates 99 percent of its revenue from online advertising. The company has managed to keep costs under control. News services largely ignored its announcement in mid-2006 that it would spend an additional $1.5 billion for infrastructure. Its fix involves these areas:

1. Developing its own operating system, supporting code libraries, and hardware designed to chop 20 to 30 percent or more out of routine operations.

2. Automating certain programming functions so a typical programmer at Google can accomplish in 4 hours what takes a programmer at other companies 6–8 hours to

accomplish. The "1 day for personal projects" that Google provides to engineers makes sense when you understand the efficiencies of the Google programming system.

3. Tackling specific problems in operating a large, distributed, massively parallel computing infrastructure that chew up money. More efficient data center designs coupled with commodity hardware keep capital expenditures from taking off in an uncontrolled way.

Will Google's "fix" last forever? No, nothing in hardware or software lasts more than a year, usually less. Google's cost advantage, however, is sufficient to keep it ahead of the pack for the next 18 to 36 months and, more importantly, to force Amazon, Microsoft, Yahoo!, and other competitors to spend aggressively. The impact on Google's competitors is massive. As they spend more money, their costs—already a problem—veer more dangerously upward.

## Challenges of Cost Control

Costs associated with online and search rise over time and, therefore, must be controlled in a meaningful way. Pushing money around doesn't reduce costs—it's powdering the company's financial health so customers and stakeholders can't see its true pallor.

Cosmetics don't address the reasons online and search costs are difficult, almost impossible, to control. If costs are not controlled, the company can find itself losing money or worse. Second, the slopes of the Amazon and Yahoo! trend lines seem similar to the takeoff of a fighter jet. Without prompt corrective action, trend lines like these are ominous even when revenues increase.

A more basic lesson comes from these cost examples. Most professionals know the business school truisms about "learning curves" and "economies of scale." However, none of these companies have transferred that knowledge to cost control. It's reasonable to expect that Amazon and Yahoo! would have figured out how to flatten or reduce online and search costs. Microsoft—after more than 20 years' experience in digital products and services—should have been able to keep the FY2004 cost control lid clamped on tight. Each of these companies' stock is suffering. Microsoft dropped 11 percent in a single day after the news about the $2.0 boost in spending broke. Three problems are evident.

## The "Long Train" Problem

*Search and online cost more the longer the company's successful.*

Is there a learning curve that delivers lower costs over time in online? Are there economies of scale to be gained in online just as there were in the salad days of mass production? The history of online, in my opinion, is littered with online engines rusting away or sputtering along: Thomson's Dialog (sputtering), Reed's LexisNexis (sputtering), Lycos (rusting), Excite (rusting).

Online, search-and-retrieval, and related digital businesses such as commercial database production have their own peculiar cost physics. They have what I call the Long Train Problem (not to be confused with Chris Anderson's "long tail" concept). The engine produces revenue and operates on the hardware and software delivering the digital power. As the "train" processes more data, it takes more infrastructure, programming, and money. Railroad companies discovered that adding engines was not a solution. Squeezing more dollars out of Yahoo! or LexisNexis customers is difficult. In short, it costs more money to support the revenue engines than the revenue engines can generate. Online companies, like steam railroads, scale back services and cut corners. Eventually, the train stops and customers go elsewhere.

## The Fusion Problem

*Search is trendy. Sell what generates money; don't spend money chasing a fashion winner.*

Search and online also face a "fashion" problem. Consider STAIRS. STAIRS can do most of what Google does; that is, a user can search for words and phrases and get results. But IBM also sells OmniFind, WebFountain, DB2—search systems all. Why, then, isn't IBM the principal competitor in search and online?

IBM is a services company and not terribly trendy. Its search technology is in fashion for a select clientele. To show its customers and prospects that IBM is *au courant* in search, IBM bought iPhrase, inked a deal with X1, cooked up UIMA (a universal software "glue" to hook search into information), and became a Google OneBox partner in a span of about 18 months.

Search and online, if IBM's behavior is an indication, addle the thought processes of otherwise excellent managers and engineers. Few regard IBM as a threat in the search market. Few doubt that the company will rake in sybaritic fees for advising its customers on which search system to license, use, and customize. IBM can make more money advising about search and online than it can by deploying search and online. IBM has learned that search and online pose a Darwinian problem—some search technologies thrive at the expense of other search technologies. IBM is hedging its bets, in sharp contrast to the fashionable behavior at Amazon, Microsoft, and Yahoo!

IBM doesn't want to lose in the high-stakes game Google and others are playing. IBM knows the fate of Excite (Architext), Web Harvest, SDC Orbit, BRS, and STAIRS itself. Marginalized or vaporized is not IBM's game today. Fashion can doom search and online systems.

## The "Inventor's Dilemma" Problem

*It costs more to stay ahead than it cost to get ahead.*

Search and online face the Innovator's Dilemma problem, brilliantly articulated by Clayton M. Christensen in 1997. What was good enough to create today's leader makes it very difficult for today's leader to be tomorrow's leader. Ford Motor Company has not adopted the Toyota approach to
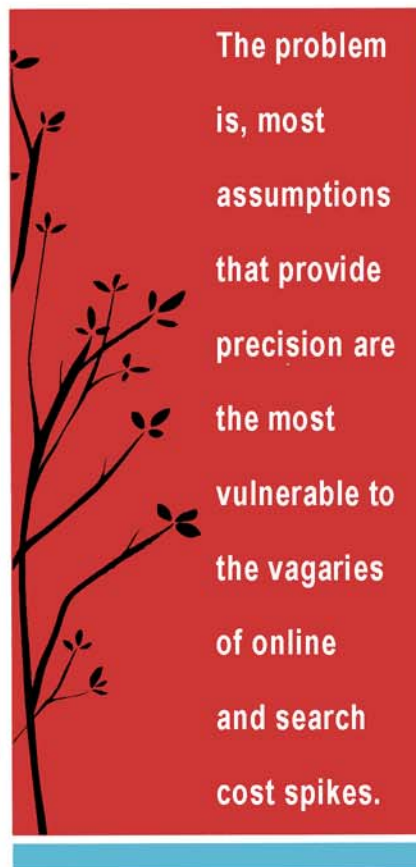
manufacturing that chops months from the design process and thousands of dollars from each car's manufacturing costs. Ford executives knew what to do, but Ford couldn't get from its existing manufacturing system to a Toyota system because of time and cost.

Google, if it stops innovating, will face fierce competition and be unable to respond. The once-dominant Dialog Information Services has been marginalized into a product of Thomson Scientific. The company lacked the capital and gumption to change. LexisNexis, on the other hand, tries every new technology trick in the book. When these fail to deliver the needed revenue kick, Reed Elsevier raises prices.

### Rumsfeld's "Known" Koan

Search and online, then, pose some unusual challenges with regard to costs. My table of search costs on page 22 identifies 13 costs, labeled in one of three ways:

1. A known known: That is, data are available to estimate the cost with a high degree of confidence. These costs can be documented by previous expenditure data, controlled by a contract with a fixed price, or estimated within a few percentage points because the products and services come from a published price list. Inflation can be factored into these costs and any softness in the data can be limited in management's direct intervention in not approving an expense.

2. A known unknown: That is, costs that experienced analysts know will be incurred. However, the timing and magnitude of the expense are not known, and available data provide only generalized guidance. As a result, those involved in the budgeting process will make what are believed to be reasonable assumptions about such costs and add a factor to cover any uncertainty related to items in this category.

3. An unknown unknown: That is, costs about which the analysts and those involved in the budgeting process know nothing. The costs cannot be quantified any more than one can estimate the cost of an unexpected electrical failure at a restaurant on a busy Saturday night. Experienced analysts may set aside a pool of money or an expense reserve in some cases. However, in today's economic climate set-asides are more easily handled by taking money from one line item and plowing it into an expense generated by an unknown unknown.

The problem is, most assumptions that provide precision are the most vulnerable to the vagaries of online and search cost spikes.

### Known Costs - Well, Sometimes

The search and online world has a basket of costs that venture capitalists and chief financial officers are accustomed to reviewing and, ultimately, accepting. These typically include the following:

• Licensing
• One-time costs
• Operations (backup fail over restore)
• People (full-time equivalents and an allocation for contract professionals)

These costs usually whiz through the review process. The assumptions can be tuned, and future cost projections generated, with a high degree of confidence.

However, an ominous threat lurks. Like a swimmer who is blissfully unaware of the hungry shark tracking its lunch, cost dangers lurk below the surface. The more "precision" brought to the known knowns, the greater the likelihood that the organization will experience a budget crisis. The problem is, most assumptions that provide precision are the most vulnerable to the vagaries of online and search.

Microsoft uses its own Windows Advanced Server, 64-bit branded servers from mainstream vendors, and its programming tools to build its online search system. One would assume that Microsoft's financial planners would have these costs nailed. Wrong. Microsoft surprised the financial community with an announcement of extraordinary costs, proving that, even when an organization is in a position to have both information about costs and control over most aspects of an online and search operation, costs can be slippery.

### Known Unknonws: Cost Uncertainty Is Permanent

A quick scan of the table reveals several aspects of online and search that bedevil financial wizards. First, there are six cost categories tagged "known unknowns." When estimating costs, the analyst or team working on budgets can identify expense items that are going to crop up:

• Bandwidth
• Fraud detection
• Infrastructure hot spots
• Optimization
• Scaling
• Troubleshooting

## Online Cost Inventory

| Type | Expense | Definition | Characteristics |
|---|---|---|---|
| Known | Licensing | Recurring costs associated with third-party software, including maintenance and upgrades | Easy to budget. Services component may add additional costs. |
| Known | One-time costs | Capital expenditures or other disbursements to handle a specific problem or opportunity; e.g., buy any unbudgeted item or service | Easy to budget. These are the initial assumptions and the costs associated with starting a new service. |
| Known | Operations (backup fail over restore) | Recurring costs needed to keep the system or systems operating to the stated requirements; e.g., 99 percent availability | Costs can be budgeted easily. Variances arise when backup system is unable to restore data. Inefficient data center operations increase the ongoing cost burden. |
| Known | People | Fully loaded costs of full-time staff plus costs of contract labor or consulting services | Easy to budget. Staffing assumptions and a pool of funds for consultants can be based on assumptions or existing data. |
| Known unknown | Bandwidth | Shorthand for infrastructure, connectivity, and facilities | Costs governed by service level agreements with specific clauses and price lists to address surges in demand, outages, etc. |
| Known unknown | Fraud detection | People, system, infrastructure, and recurring costs to protect financial assets | Magnitude of the task becomes evident after an unplanned event. |
| Known unknown | Infrastructure hot spots | Unforeseen problems related to infrastructure or subsystem performance | All systems develop issues or problems. Predicting the event and its magnitude are difficult without statistical data about the system |
| Known unknown | Optimization | Any cost related to improving the throughput or efficiency of one or more components, either hardware or software, in the system | All systems must be optimized to deliver close to their estimated maximum. Code optimization can be difficult in complex systems due to factor interrelationship. |
| Known unknown | Scaling | Costs for hardware, software, and services related to expanding the system in order to meet increased load. Scaling can be an outcome of troubleshooting and fixing infrastructure hot spots. | As usage increases, system capacity must be expanded. The complexity and engineering options for scaling vary with innovations and particular circumstances. |
| Known unknown | Troubleshooting | Staff and consulting costs to identify one or more causes related to some issue in the system | Easy to budget with a pool of money. However, some problems may be intractable; therefore, invention costs or infrastructure changes may be needed. |
| Unknown unknown | Environmental factors | Changes in the market or broader economic or social ecosystem that are beyond the control of any one organization | Unpredictable. May become an issue after a period of gestation. |
| Unknown unknown | Extraordinary | An acquisition of a company, a technology, another business unit, etc. | Once an operation is up and running, problems or opportunities may trigger this activity. |
| Unknown unknown | Invention | Full-time or contract professionals who must come up with a solution to a new problem or opportunity | A problem or issue does not have an off-the-shelf fix. Therefore, a solution must be discovered, invented, or arrived at by trial and error. |

*Table 1*

Most of these categories are murky. Changes in technology, new online exploits, and the vagaries of technical people and systems force the creation of "best guesses" about how much these functions will cost. Some brave souls assume that once the system is in place, most of these expenses won't occur, a decidedly risky approach to cost control.

No matter how expert the system architects and engineers, online systems providing search require attention in one or more of these areas with almost 100 percent certainty. Unfortunately, there is no bulletproof way to determine how many people, how much money, and what type of resources will be needed to resolve these issues in a satisfactory manner. Google paid almost $100 million to settle a dispute about click fraud. Google does not itemize click fraud related costs in its financial reports. No one except some at Google know the cost of click fraud. Another lawsuit could require Google to pay up again.

## Unknowns: The Dark Side of Search Costs

Finally, search and online have three "unknown unknowns," or what some investors euphemistically label as "big surprises." The unknowns in online and search are scary, but the unknown unknowns flip companies staffed with the best and brightest off the rails. Here are those identified in the table:

- Environmental factors—costs triggered by an unforeseen event

- Extraordinary—costs that go far beyond whatever allocations the organization made

- Invention—costs associated with solving a problem, creating a new solution, or developing a new product

In the datasphere, a word I coined years ago to indicate the organic and unpredictable nature of online, a change sweeps across the market like a storm across the Kansas prairie. Google was a violent weather system. Social search—that is, the use of user clicks and recommendations—to inform search relevance rankings is a modestly sized tornado. Vertical search—the narrowing of an index or collection to a single topic such as skin care or automobile part manufacturers—is a fast-moving warm front. Social bookmarking sites such as digg.com and del.icio.us.com that provide an adjunct to traditional search are another weather front. The challenge in this environment is that no one knows what's coming next, how strong its effect will be, how long it will linger, nor what it will cost to compete and innovate.

The second interesting unknown unknown occurs when an organization pulls an end run on market leaders. If development is slow or the senior management team loses confidence in an executive, the fix is simple: Buy a company. Hire a new leader. Reorganize. Any of these actions can impose extraordinary costs on the search or online service. The traditional performance of Microsoft's Live.com will be fixed by spending, reorganization, and new staff.

The cost of invention is, by definition, impossible to predict. Most analysts assume that "our guys are really bright and can solve any problem thrown at them." Far be it from me to doubt that some problems are trivial to "our engineers." May I raise the question: "Are online and search problems different from other types of computing problems?" Forget the fuzzy-wuzzy nature of language. Focus on the problem of crunching lots of data and delivering on point search results in the blink of an eye. Now, ask those engineers to find a fix for the hitch that slows 1,500 to 250,000 servers to a crawl with no apparent cause discernible to those reviewing the server logs. The fix may require inventing a solution or sitting down and figuring out how to duplicate Google's infrastructure without its weaknesses. With this solution in hand, the fix is easy. Build a new system and deploy it. What's silly is ordering an engineer to invent a solution by noon.

## Holding Search Costs Down

How will Amazon, Yahoo!, and Microsoft bring the cost lines down? None of the bosses of these three flagships offer much detail about costs. We do know that Amazon dumped Google as a search supplier after the head of A9.com jumped to Google. Can Amazon get the Microsoft search results to deliver relevance and stable expenses? Will Amazon be able to roll out its ambitious online plans for music and other rich media without bankrupting the company? Will Amazon be able to control the maintenance costs of its present code base while adding new features and functions to an aging system? Will Amazon make a successful shift to Linux and commodity hardware?

Will Yahoo! "rationalize" its numerous search systems and reduce costs? Will Yahoo!'s approach to innovation overtax an aging infrastructure and go offline? Yahoo! Mail, according to TrimMail's newsletter *Email Battles*, has a spotty record for mail server availability. Will Yahoo!'s fire hose of redesign, new products, and new services offset the delay of its upgrade to the creaky Overture advertising infrastructure?

Will Microsoft's $2.0 billion in new spending resuscitate its wheezing online services? Will Microsoft be able to get its next-generation online, desktop, and server products out the door and book billions of dollars quickly? Will Microsoft's new products work as SAAS (software as a service) and be stable enough to keep customers from jumping to lower-cost options? Will Microsoft succeed with its new iPod/iTune clone?

## Actions to Take

Remedies to a complicated problem are risky. Nevertheless, let me offer a few ideas to consider in the quest for cost control:

1. Engineer a search and online system that delivers maximum performance for the least amount of money possible, which is Google's core idea. Try to eliminate routine data center operations that can add 30 percent to the cost of a system.

2. Create a series of assumptions based on hard data from your own organization and from other organizations willing to provide these data. A consultant may be able to intermediate and facilitate. Then normalize the data and create a medium case scenario that you tweak to provide an alternate scenario. Use the model to determine what makes sense for your organization. Don't make up numbers. Fudging is a one-way ticket to unemployment.

3. Stall, if possible, when the money allocated is insufficient to do the required job. Work to refine the estimates. Erring high is better than having too few sources allocated.

## Koan the Librarian

In closing, I've raised some tough questions about Amazon, Yahoo!, and Microsoft.

What about the online and search systems that serve professionals? Focusing too closely on Pearson, Reed Elsevier, Thomson, and others in this club roils the placid waters of commercial databases. I'll close this discussion of cost koans with some hypothetical questions and tentative answers.

*What's the future of the commercial database companies specializing in professional publishing?*

These companies won't go away, but some will consolidate, slash expenses further, try to diversify into software or consulting, and boost license fees. Commercial database companies are likely to remain niche players until one of the search companies with a different business model offers similar or "good enough" data for free. Then, as with Ford Motor Co., watch more agile competitors surge past them in the market.

*What's the outlook for online operations with search, content, shopping, and hosting services?*

These companies are looking at roads that diverge in a dark wood. One road leads to ever-narrower margins, a takeover, or becoming captive to a big customer. InQuira (formed from the merger of several money-losing search vendors) is surviving as a key supplier to Yahoo! and a handful of other companies. The other path leads to going to a competitor with a lower-cost, higher-performance infrastructure and paying that competitor to host the service. If Amazon were to run on Google's infrastructure, the financial picture at Amazon would undergo a dramatic change for the better almost overnight. When cooler management thinking prevails, some interesting tie-ups will occur. Stubborn refusal to explore an alternative that serves customers and stakeholders could reduce the company to a shadow of its present self.

*What about online advertising? Will it continue ever upwards?*

The online ad business is a strange and wonderful world. Click fraud, lawyers, point-and-advertise programs, increasing competition, loss of affordable options for marketing, and herd mentality will continue to thrive for the next 12 to 24 months. If an upstart emerges and gains momentum, that new system could destabilize today's market giants. Everyone in this sector faces increasing risk for cost overruns caused by lawyers, ill-doers, and competitors.

*Will search become the new application interface?*

Yes. Each of today's major players has a distinct and different advantage. Unfortunately, Google controls (as of July 2006) 42 to 70 percent of the traffic for searching. The variation in share is a result of the different methodologies Web-traffic navel gazers use. The services do agree that Google is currently the leader in search. Microsoft, however, still enjoys a monopoly on the browser and its default search to Live.com. Yahoo! still has the cachet of a media company but upstarts like Youtube.com are threatening. Amazon still has a solid grip on book search and sales. When search becomes the way to begin most types of computer-related work, many of today's leaders will be forced to transform themselves. A merger of Microsoft and Yahoo! would be interesting. Google could partner with Amazon to form Googlezon. eBay could find a happy home with Barry Diller's IAC.

*What about enterprise search? Who will win in that market?*

Consolidation, price cuts, and dozens of options characterize this space. Unlikely alliances such as Oracle and IBM teaming with Google increase. Surprising acquisitions such as Autonomy's snatch of Verity become more frequent. At the same time, newcomers such as Exalead with "better mousetraps" ferret out the dissatisfied customers of other search vendors to eke out a living. This is a sector destined for rapid change and considerable marketing fireworks. Meanwhile text mining is becoming the "new" enterprise search. This sector is up for grabs. Google's OneBox looks promising, but Autonomy plc and Fast Search & Transfer won't give up without a fight. Microsoft and IBM can give away search, and universities spawn new search systems like overly romantic gerbils. If it becomes a battle of dollars, one would have to bet on IBM, Google, and Microsoft unless deep pockets become available to the others in this free-for-all.

*What's the outlook for controlling costs of online and search?*

Not good. Listen for the moans of the known koans howling through the industry. Oh, those are lengthy koans and moans, too.

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