

Hal Berghel

# The Cost of Having Analog Executives in a Digital World

*The likelihood of accurate technology forecasting can never be known.*

*“There is no business in the world which can hope to move forward if it does not keep abreast of the time, look into the future and study the probable demands of the future.”*

This quote is attributed to Thomas J. Watson, Sr., on the occasion of the opening of a new IBM laboratory in 1932. Few would disagree with the need for sound and accurate technology forecasting in any organization that seeks to remain competitive. However, there is little evidence that the full ramifications of this observation are consistently understood or widely implemented. Watson’s advice may be falling on deaf ears—and this will become even more of a problem as we begin a new millennium in which network and distributed processing environments will be even more unforgiving of technological blunders.

Many years ago, a senior IBMer told me that Watson, Sr., founded the Yorktown Heights research center primarily as a means to avoid technological surprises, and only secondarily as a leading

research center. In a sense, this same theme was behind the Manhattan Project, the original goal of which was to prove it was impossible to make an atomic bomb—in this case the *reductio ad absurdum* approach literally backfired. How-

ever, in retrospect, the strategy of using research to prevent being blindsided—either by competition or foe seems wise. In many situations, it is more important to know what we don’t know than to know what we know. I assume that Watson, Sr., and Leo Szilard were thinking along the same lines.

History has shown that many

giants of our industry, including those as formidable as Xerox, Digital, NCR, Control Data, and Unisys, seem to have failed to take this to heart. IBM itself is no foreigner to technology apoplexy—Future

Systems,  
micro-channel  
architecture,  
RISC, OS/2.

Need I say more?

In this column I emphasize the importance of accurate technology forecasting and attempt to give some explanation of why we have so few industry and academic leaders who are really good at it. The quotes running throughout this column illustrate this point. (Note: This list came to me as unsolicited email some time ago so I can’t personally guarantee the accuracy of the quotes or the names attributed to them.)

## The Genesis of Bad Technology Forecasting

Is the inability to spot technological black holes truly damaging? How many organizations are trying to extricate themselves from costly thin-Ethernet connectivity in favor of 10baseT networks that use inexpensive copper and are far easier to trace and debug? How many failed ISDN sites will have to undergo retrofits to DSL systems that capture the unused frequencies of the existing telephone copper infrastructure to achieve several times the bandwidth of ISDN? How many organizations jumped on the CP/M, Next, and OS/2 bandwagons? The point is that these sorts of decisions call for informed leadership and not management by consensus. Trend analysis, poll taking, flash lists, and outside consultants will not provide accurate information quickly enough to be reliable in this information age. Organizations having much involvement with high technology (which is almost everyone nowadays) need the internal capability and adaptability that comes from such leadership. So it behooves us to determine the strategies that will provide an organization with the greatest likelihood of success in understanding and controlling its technological future.

In *The Mythical Man-Month: Essays on Software Engineering* (Addison-Wesley, 1995) Fredrick Brooks deplores wasteful practices of corporate software managers that throw bodies at software pro-

jects to speed completion. To quote Brooks: "I think it's important to have a system architect who's different from the boss. It's also just as important in the implementation of an architecture to have a chief designer who maintains personal intellectual mastery of the overall design."

Why not throw bodies at software projects? Why not put people in charge of technology projects who do not possess intellectual mastery of the overall design? Because it won't work. Technology can't be managed like inventories. The skills required are precise and, to a large degree, nonportable.

Over the years, I have argued this point before both industry executives and academic leaders. I have suggested that the information needs of modern organizations are so variegated and complex that executive positions should be created just for science and technology oversight. In information-intensive industries and academia, the appropriate model might be to create an executive position for strategic planning of IT.

But I've been disappointed. While I have noticed the title of "info czar" has certainly caught on, the substance of my idea hasn't. Modern organizations that have created these positions routinely violate the spirit of my argument—that this position calls for a technologist. My concept is that the placement of skilled and successful technologists in the organi-

zational power loop is essential to successful strategic planning. Never has my advice been to create additional managerial overhead by throwing bodies at a problem. The central theme throughout this column is that the skills of technology executives are first and foremost technology-related.

My idea is similar to Brooks—the success of an organization depends on a blend between job description and skill set. Consider the following question: What kind of skills would be required of an IT vice president? Knowledge of the capabilities of digital networks? Familiarity with data mining? Working knowledge of an information agency? An understanding of distributed database systems? These are all likely to be critical skills for the info czar of a progressive organization. However, based on my experience, these are not the skills most widely sought. I'll illustrate the point by paraphrasing two recent job ads for executive positions in U.S. universities.

**Position #1:** Vice Chancellor for Information Infrastructure

**Job Description:** Executive responsibility for policy-making, planning, development, implementation, and overall administration for computing and related technologies in support of the university's ... mission. The vice chancellor will (1) create and maintain a productive, dynamic environment for the use of computing and related technologies; (2) create and maintain

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## The way we organize our institutions for administrative purposes is only loosely coupled with the way the organization gets its work done.

an organizational climate and a working environment ... that encourages creativity, adaptability, and cost-effectiveness; (3) have administrative responsibility for academic technology, computing, administrative systems, network, and telephone services; (4) participate ... in policy-making, strategic planning, goal-setting, and troubleshooting on institutional issues [regarding information technology].

**Requirements:** (1) A minimum of five years of management in computer-related areas, (2) experience in directing and managing an open, distributed-computing environment in a university, (3) a proven record of success in planning and problem-solving and in managing complex information technology resources, (4) strong interpersonal working relationships with members of diverse constituencies, (5) a Ph.D. or equivalent.

**Position #2:** Associate Provost for Information Technologies

**Job Description:** Executive position reporting to the Provost. Responsibility for envisioning and planning the effective use of information technologies. This person will be

the institution's advocate for information technology. Position includes management of full-time staff of 109 with an annual budget of \$8 million.

**Requirements:** Successful applicant must have (1) excellent interpersonal and oral/written communication skills, (2) experience with, and commitment to, participatory management, (3) at least five years in planning and problem-solving and managing a diverse information technologies staff, (4) knowledge and experience in information and telecommunications technology with at least a Master's degree in an appropriate discipline. Desired qualifications include (1) an earned doctorate in computer science/engineering, MIS or related field, (2) professional experience in a higher-education setting, (3) experience with state and federal funding agencies, (4) a proven record of obtaining external gifts and grants, (5) a proven record of promoting the creative and innovative use of technology to support the teaching and learning process, (6) experience with the delivery of instance learning through technology, (7) experience in high-performance computing, (8) experience with

distributed client/server administrative systems, (9) knowledge and experience with multimedia technology, (10) a record of academic achievement including publications and participation in professional conferences and organizations, (11) prior experience in management of a computing facility, (12) prior experience in management of a telecommunications facility.

**B**oth of these institutions seem to be forward-looking, and they may well have succeeded in what they were trying to accomplish. But if they did so, it was despite their job ads rather than because of them, for the ads betray a fundamental misconception about the nature of the solution and of the position which is to bring about the solution.

Let's analyze these ads. In the ad for position #1, there is a clear mismatch between what I believe are the essential skills sought after in the ad. The problem, which is so typical of our time, is that the ad hopelessly confuses the way the university chooses to administer itself with the way it intends to address its future IT needs. By separating the two, one has much better defined objectives and a greater likelihood of achieving them. Failure to separate the two is most likely to produce confused and conflicting organizational objectives.

Let me illustrate. The four elements in the job description define two mutually exclusive skill

- "THERE IS NO REASON ANYONE WOULD WANT A COMPUTER IN THEIR HOME."—KEN OLSON, PRESIDENT, CHAIRMAN AND FOUNDER OF DIGITAL EQUIPMENT CORP., 1977
- "THE COMMERCIAL MARKET FOR COMPUTERS WILL NEVER EXCEED A HALF-DOZEN IN THE U.S."—HOWARD AIKEN, 1945.
- "WHO THE HELL WANTS TO HEAR ACTORS TALK?"—H.M. WARNER, WARNER BROTHERS, 1927.

sets. Skills (1) and (3) would fall within managerial skills. Perhaps one might argue that these skills are portable across job domains. Element (2) tends to be a stretch for mainstream managers, calling for the encouragement of creativity and the adaptability of the group to presumably new technologies and applications. Encouraging creativity is a far different skill than recognizing it after the fact. Requirement (4) calls for yet another set of skills—in this case those that are primarily technological and only secondarily managerial. The intersection of these two contradictory skill sets creates a target candidate who is almost impossible to find.

This problem arises when trying to secure the science and technological future of an organization in the same way that we secure its governance and administration. While this was probably never a great idea, it has heretofore avoided disaster because of herd mentality; most organizations try to achieve what other organizations of their type achieve. This produces a sort of tidal wave approach to technology evolution—together everyone advances the technology front. Incidentally, a corollary is that herd mentality also inhibits rapid technological change because true innovation must overcome the momentum of the tidal wave. Large corporations and organizations tend to be unresponsive to sudden changes in environment, as was shown by the

analog watch, typewriter, and published sheet music industries. High-tech industries are also vulnerable to such sudden downturns, as demonstrated by IBM when it experienced the largest U.S. corporate profit and largest U.S. corporate loss, in that order, within the same decade.

**T**he searchers for position #2 are equally misguided, but for slightly different reasons. As with position #1, the incidental and irrelevant requirements are listed as essential requirements. But what makes this ad so ironic is that the skills which I argue as essential for a successful deployment of an information infrastructure are demoted to the desired category. In other words, there seems to be some sensitivity to the importance of these skills, but with a concomitant lack of understanding about their relevance to the project at hand. This is also evident in the long list of desired skills that are practically impossible to satisfy jointly. It is difficult for me to imagine how a claim to have “proven records” in so many robust areas of research and experimentation could reflect more than diletantism. Entire careers have been spent on small fractions within each of these areas. These desired qualities cry superficiality.

### Looking Forward

The information age, and, most importantly, the Internet, have changed the rules of the forecast-

ing game forever. IT product life cycles may be measured in months. In the area of browser technology, for example, the first five Web browsers, Erwise, Midas, Viola, Cello and Mosaic, are of historical significance only, and all were developed in this decade. Further, the standard protocol for indexing network resources in 1994—Gopher—has lapsed into insignificance as the Web soared past it in terms of both Internet packet and byte count in 1995. The hottest technology in 1997—push technology—fell into widespread disuse in 1998 as MIS managers tried to hang on to some vestige of their bandwidth. The information age is very unforgiving when it comes to mistakes and misjudgments.

This is the milieu in which new info czars are placed. Strong people skills won't get the job done. Neither will the ability to govern disparate groups and constituencies nor the ability to manage open computing environments. If this is our captain, our ship will sink. The solution is to redefine the role of info czar into one of a strategic technology planner. The greatest rewards will accrue in those high-tech corporations that experiment with and continuously refine this notion of a technology strategist shaping policy around emerging technologies and adapting to rapidly changing protocols, into the organization. They will be asked to define what is to be proprietary vs.

- “THIS ‘TELEPHONE’ HAS TOO MANY SHORTCOMINGS TO BE SERIOUSLY CONSIDERED AS A MEANS OF COMMUNICATION. THE DEVICE IS INHERENTLY OF NO VALUE TO US.”—WESTERN UNION INTERNAL MEMO, 1876.
- “THE WIRELESS MUSIC BOX HAS NO IMAGINABLE COMMERCIAL VALUE. WHO WOULD PAY FOR A MESSAGE SENT TO NOBODY IN PARTICULAR?”—DAVID SARNOFF’S ASSOCIATES IN RESPONSE TO HIS URGINGS FOR INVESTMENT IN THE RADIO IN THE 1920S.

## Digital Village

public domain in their organization. They will be expected to anticipate future technological horizons lest their organization fall behind the curve. They will be expected to avoid technological surprises that might blindsides their institution. These are expectations that are not managerial in nature. They call for technological leadership.

The solution lies in the recognition of a very basic fact: the way we organize our institutions for administrative purposes is only loosely coupled with the way the organization gets its work done. The skills required of our leaders are also very different. Executives in charge of science and technology, if they are to be effective in today's rapidly changing environment, will have different skills than those in charge of marketing

and finance, for the former must of necessity be primarily scientific and technical positions.

The information needs of modern organizations are so rigorous and complex that a new position for a strategic technology leader will have to be created at the highest levels of modern organizations. I envision a position in which the person reports directly to the corporate planner(s) without any intervening filtering or revision. This position is presently viewed as an "internal consultant," charged with an objective assessment of business unit plans and objectives, the rapid summary and reporting of technology trends, the accurate forecasting of relevant technology advances, and will have the ear and attention of the CEO.

**T**he solution is to redefine the role of info czar into one of a strategic technology planner—not a manager or decision maker, but someone capable of the highest level of technological understanding while at the same time being grounded in the needs and objectives of the organization. This position will require both enormous depth and breadth within a technology area.

It is unclear whether our current organizations are prepared for this challenge. 

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