

## PARAGON Perspective

### From the President

PARAGON Perspective is sponsored by PARAGON Development, an international consulting organization specializing in new value creation for corporations. This is accomplished through new business development and optimized planning in addition to corporate venturing. The purpose of this newsletter is to update, educate, stimulate, and enlighten our friends and business colleagues on many topics involving new business development as well as the world at large as it may affect our businesses and/or our professional interests. We are not intending, and will not use this communication to promote our business.

We hope to inspire debate and pass along information that may enable all of us to better understand and succeed in our new business objectives in the future. We further hope you pass these along to colleagues who may have mutual interests.

We want to use this forum to do the following:

- Share information we have learned that we consider important concerning best practices, trends, successes and failures, conferences, and other elements that will enable all of you to grow your organizations with maximum top and bottom line results.
- Share information about select client initiatives that may be of interest based on technologies, markets, or business needs that you believe could fit within the scope of those client's interests.
- Share opinions.
- Share personal observations and even humorous items given to us by others.

We welcome your comments on any topic and we encourage you to contribute to future newsletters. We have several new contributors this month and they receive our thanks. Sharrann Simmons at Colloids Naturels Inc. has forwarded a list of factoids that we will include in this and upcoming editions. In addition, we like to give a special thanks to Victor Vurpillat, an accomplished entrepreneur, businessman, and futurist. He has allowed us to include a piece concerning future trends and projections that we found very interesting.

This month's newsletter will highlight our opinion on the business development topic: "**Opportunistic Planning**". In addition, Russ Koch has added a piece about new product development. Russ is a Vice President of PARAGON and a key member of our management team.

Jack Peregrim  
Pres., PARAGON Development

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### Paragon Update

New projects are being started every month. We see this, and the general activity level, as being positive harbingers for the future.

The Corporate Venture Partnering is also creating a great deal of interest and we see venturing as a major growth vehicle and key part of many corporations' strategies.

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## Technology Transfer

This section is open for clients, friends, and other newsletter recipients to spotlight technologies that they have available for licensing, acquisition, or development. Please send a description of your technology to be posted in this section for future newsletters. Inquiries can either be sent directly to those who have posted information, or, we could forward any/all inquiries to you.

This newsletter has a distribution of several thousand individuals who are primarily in new business development, so the audience is one that has the potential to generate legitimate interest. We only reserve the right to withhold posting any technology closely related to ones in which we have a client conflict.

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## Quotes of the Month

“We are drowning in information and starved for knowledge”. *Tom Brokaw*

“75% of all work is non-value adding to the customer”. *American Management Association*

“The first responsibility of a leader is to define reality. The last is to say thank you. In between, the leader is a servant.” *Max De Pree* **“Leadership is an art”**

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## New Product Development—The Criteria **Russ Koch**

Setting criteria to evaluate the value of new product development as it relates to strategic, financial, market and other corporate objectives can be a daunting task. The object is to have meaningful criteria that will encourage new product development and ensure that those programs that proceed will indeed meet the current strategic goals.

The January issues of *Visions* and *The Journal of Product Innovation Magazine* contained articles that show the diversity in approaches for new product development. *The Journal of Product Innovation Magazine* article by Hart and coauthors, titled “Industrial Companies Evaluation Criteria in New Product Development Gates” discusses the use of several gates used to evaluate the new product development process. An interesting point was their belief that the importance of the gates or the sub-gates varied depending upon the country. The United Kingdom tended to rate items, such as idea screening, concept screening, business analysis, product testing, and test market results, higher than companies in the Netherlands. In fact, the companies in the Netherlands showed a greater differentiation even within the subclasses.

Does this mean that one group is better or more discriminating? Not at all. It shows that different groups look at the same data and interpret it differently.

Another article discussed the effect of cooperation among suppliers and the Spanish automotive industry. These companies working together reduced the cost and the development time of new product development.

*Visions Magazine’s* article “The BMW Group cultivates worldwide ‘Passion of Innovation’ in product development”, describes the steps BMW takes to encourage new products and innovations.

After reading these articles, a new practitioner could be dumbfounded and confused. There appears to be no one right process for successful new product development. The main issue is that any Stage Gate process must meet the strategic, financial and market needs of each company. Thus, the criteria can be very limiting, or very flexible to allow many new projects. It is necessary to implement a program and

more importantly modify it as much as necessary so that it represents the changing requirements of the company and markets served.

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## Opportunistic Planning

Case Example:

Pitney Bowes is a well-documented example of how an organization can take advantage of major opportunities by moving quickly to consider new products to meet rapidly changing environments. This example, however, is still lacking as a true benchmark, but it may be the best known so we will use it. In our opinion, it was not part of a process but a matter of responding to customers without being pro-active in the beginning.

When the anthrax-laden letters were shocking the nation in 2001, there were no viable solutions to prevention, detection, and isolation. Pitney Bowes and the US Postal Service were the primary entities to provide a possible solution only because they were the first to mind in postage security. But neither had any ideas about adequate processes or products to eliminate this threat.

Because it was in the spotlight, Pitney Bowes assigned a special team of engineers who gathered 82 promising concepts from fields as diverse as food handling and military security. They reduced that number to about a dozen solutions and used outside inventors to work with them to customize approaches used elsewhere that may be applied to the problems of bio-terrorism in mail. They successfully introduced new products and services that included specialized scanners and imaging systems for detection and alerting security personnel.

The real lesson is twofold:

- They moved quickly to take advantage of an opportunity that was unplanned.
- They innovated outside their firm as a key critical success factor.

There are many reasons why most corporations do not do this very well (if at all!). Some of these are:

- Over rigid planning and a narrow view of strategic intent.
- Decentralization of development resources to many separate business units.
- Impression that major new opportunities will have a short life (flash in the pan).
- Inability to provide innovation internally and not having an alternative.
- No pressure to do it as others aren't doing it either so competitive position isn't lost.
- Lack of resources and commitment!

Right now we are hearing that there are opportunities for companies in areas such as homeland security. However, it is already over 18 months since 9-11 and many of the solutions that were required have already been implemented. Most organizations consider themselves bold if they just get authority to study" this area and they set aside a small budget to allow them to do this. But the problem, again, is time. Remember the anthrax problem? In order to solve this problem Pitney Bowes was unable to follow the traditional route – conducting internal meetings, making a commitment after extensive analysis, and assigning spending and personnel over time.

Our recommendations are simple, but will take a strong internal commitment to implement. A process needs to be established (and FUNDED!), that can look at unexpected macro phenomena and determine the opportunity potential for the organization. Scenario Planning is the closest that process that companies come to doing this now, but that still isn't set up for quick reaction in a positive way that can capture new value. Voice-of-Market™ is a way to look at both the issue and to involve outside innovators but there still needs to be internal commitment and support.

It still comes down to having a sense of urgency when events occur, an open mind about potential for opportunity, and a pre-commitment internally. The next time an economy collapses (Argentina); a war

breaks out (Iraq); a new disease threatens (SARS), you have to ask if you are ready to quickly evaluate the potential for your firm to respond with a solution. It may be a small part of the solution such as a logistics component, an additive for packaging, or a software needing only minor redesign to fit quickly with the need. Our internal inertia says that none of the above “will offer opportunities for us” and in most cases they will be right. But the few that succeed will be worth it and that is what new platform development is all about.

We believe that real opportunities are too few and precious to ignore and this is a dynamic area for process development and support.

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### **Business Factoids**

But, are we smarter?

From the smallest microprocessor to the biggest mainframe, the average American depends on over 264 computers per **day!**

Where's my yacht?

The estimated worth of the world's 225 richest people is equal to the wealth of the 2.5 billion poorest people in the world.

Also: The three wealthiest people (and their families) in the world have more assets than the combined wealth of the 48 poorest countries.

18 million (we have been busy)

Chemical Abstracts Service added the 18 millionth chemical material to its database—the world's largest collection of chemical information. The substance, (1S-cis)-2-Phenyl-3-cyclohexene-1-carboxylic acid, is an intermediate compound in the preparation of tachykinin receptor antagonists which may be useful in the treatment of inflammatory diseases, pain, or migraine and other ailments.

*We know you were wondering!*

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### **Views of the Future** **Submitted by Victor V. Vurpillat Ph.D.**

**The Future of Life**  
**by Ray Kurzweil**

Origin: Living Forever - The Future of Life

[Jeff's find. Interesting dialogue follows. Many of the embedded ideas, people or terms are linked to “The Brain” interface that indexes the Kurzweil.net site; interesting in itself. - wrc]

*A coming era of personalized genetic medicine, breakthroughs that radically extend the human lifespan, nanomedicine, and the merger of our biological species with our own technology were among the future visions presented at TIME's "The Future of Life" conference.*

Published on KurzweilAI.net March 31, 2003

In a celebration of the 50<sup>th</sup> anniversary of the discovery of DNA, *TIME* magazine recently held a conference on The Future of Life that brought together the architects of the genomic revolution to chart the future of biotech and its ramifications on mankind.

Richard Dawkins, Simony Professor for the Public Understanding of Science, Oxford University, said we will have "complete genomic maps for many thousands of species by 2010." Shortly thereafter, "we should be able to put together the genome for the 'missing link' between humans and chimpanzees, or something very close, and actually bring the missing link back to life." He also speculated about bringing "Lucy" (a celebrated hominid fossil), or at least a close genetic clone of Lucy, to life. His goal: to kiss Lucy.

Craig Venter, President of The Center for the Advancement of Genomics and founder of Celera, the first company to sequence the human genome, provided evidence for an exponential improvement in DNA sequencing comparable to Moore's Law in electronics. Sequencing the human genome originally cost \$3 to 5 billion. "In the last few years, we've gone from that down to less than \$100 million and now because we have the genetic code once or twice, we can re-sequence all the genes in somebody for around maybe \$300,000 now."

It's falling in cost by a factor of two to three each year and will "within a decade, get us down to \$1,000." This will open the door to fully personalized medicine, in which people will routinely scan their entire genome and keep it on a postage-stamp-sized memory device, along with their entire medical record. This will allow medicine to focus on preventing disease, rather than just treating it once symptoms appear.

Venter described the opportunities for biological forms of energy production. A species that lives in very harsh conditions, called *Archia*, is very effective at converting CO<sub>2</sub> to methane or hydrogen. A synthetic species could be devised from a synthetic chromosome that would, similar to *Archia*, produce hydrogen. By modifying the genes for photosynthesis, this process could be made highly efficient.

He described ways of preventing synthetic microorganisms from evolving into inadvertently destructive strains. He also described safeguards that can be engineered to discourage tampering by bioterrorists. As we go from the genome to its expression in proteins (the "proteome"), we have a tenfold increase in complexity, he said. The 100 trillion cells in the human body include about 300,000 proteins, so the proteome project will be far more complex than the genome project.

During the session "Lifespan: How Long? How Fun?" I presented my ideas on the potential to use this and other new knowledge to radically extend the human lifespan. The knowledge we have today may be regarded as a "bridge to a bridge to a bridge." Most of the deaths in contemporary society are caused by degenerative processes—coronary artery disease, type II diabetes, stroke, and cancer—that can be slowed, halted, and even reversed. This knowledge can keep us healthy until the full flowering of the biotechnology revolution, which is just now beginning to unfold. That in turn can keep us going until we have the opportunity to literally rebuild our bodies and brains with nano-engineered methods that are far more powerful than those used by our biological systems.

There are approximately ten different processes identified to underlie human aging. In each case, we can identify emerging methods that can counteract these processes. For example, human somatic-cell engineering will provide the means to replace our cells with telomere-extended versions, essentially rejuvenating our tissues with age-reversed versions of our cells and tissues. As another example, the recent discovery of the "FIR" (Fat Insulin Receptor) gene provides the promise of a drug that will allow people to eat as much as they want yet remain slim while gaining the health benefits of being slim (including many of the health benefits of caloric restriction).

This result has already been demonstrated in mice, and the FIR gene appears to be the same in mice and humans. The initial process of creating vulnerable plaque in the coronary arteries has been identified and specific enzymes that would block this process, and thereby effectively halt coronary artery disease, have been described. As we rapidly increase our understanding of the information processes underlying

each disease, we will have the opportunity to develop sharply focused medications that effectively block these long-term degenerative processes. There are developing scenarios to deal with each source of degenerative disease and aging process.

With the advent of nanotechnology as applied to biology, we will gain the means for maintaining human health and vitality indefinitely. As we reverse-engineer human biological processes, we are discovering that reengineering these processes can improve on their effectiveness many thousand-fold. For example, a human macrophage can take hours to destroy a bacterium (I've actually watched this process with one of my own white blood cells). Analysis of Robert Freitas' conceptual design for a nanoengineered robotic macrophage shows that it could be hundreds or thousands of times more effective than a macrophage.

A "respirocyte" robotic replacement for our red blood cells, also designed by Freitas, would be thousands of times more effective than its biological equivalent. With these respirocytes, we could sit at the bottom of a pool for four hours or do an Olympic sprint for 15 minutes without taking a breath. Freitas' detailed analyses have shown the feasibility of a DNA repair robot that could reverse the progressive increase in genetic errors, another source of aging. Ultimately, nanoengineered robots inside the human body, traveling through the bloodstream, have the potential to reverse all known disease and aging processes.

I pointed out that we will make more progress over the next several decades than is expected by most observers, because of the common failure to take into consideration the exponential increase in the paradigm shift rate (rate of progress). We're doubling the rate of progress every decade, so the next 30 years will be like 140 years of progress at today's rate of progress.

The Baroness Susan Greenfield, Director of the Royal Institution of Great Britain, expressed strong skepticism for these scenarios, stating that such technology has yet to be developed, and that I was underestimating the complexity of these genetically-based processes. However, I pointed out that there is only about 30 million bytes of useful information in the human genome.

### **Trillion times increase in hardware and software by 2030**

Jaron Lanier, Chief Scientist, Advanced Network and Services, Inc., composer and visual artist, and the person who coined the term "virtual reality," expressed skepticism about our ability to handle the complexity of information processes in simulating biological and neurological processes. He asserted that we are not making exponential progress in software—compared to the rapid exponential pace of hardware (which is doubling every year or so)—and that this will be needed to handle the complexity of biological systems.

He proposed a different way of organizing software to keep up with hardware's enormous growth in power: rather than engineering each module with rigid functions and interfaces, we should build each module to communicate through a pattern-recognition paradigm with other modules, pointing out that this is how biology works, allowing for softer edges to the overall competency of a very complex system.

However, Bill Joy, Chief Scientist and Corporate Executive Officer, Sun Microsystems, was even more "optimistic" than I was about the ability to advance the power of software, indicating that software quality was advancing at the same exponential rate (i.e., doubling every year) as hardware. By 2010, we will see a thousand-fold increase in the price-performance of hardware, as well as a thousand-fold increase in the effectiveness of algorithms, he believes. A cellular simulation that takes a year of computation today will be able to be done in eight hours in 2010. This will allow "realistic simulations of cellular processes." This will continue and by 2030, we will see another factor of one million in hardware as well as software (in comparison to 2010), for an overall improvement of one trillion. He provided some examples of ratios of one trillion to one to provide perspective on how profound this is. A speedup of one trillion to one would reduce the entire history of the universe to one week. It is the "ratio of the power of an atomic weapon to a match head" or the "ratio of Bill Gates' wealth to a nickel." These powers of computation and algorithmic sophistication will allow "modeling complex biological systems at the level of physics by 2030."

Joy was very concerned, however, with the downsides of these very powerful technologies. He acknowledged that substantial increases in human lifespan were likely, but he was concerned with the empowerment of destructive individuals such as terrorists with these enormously powerful technologies.

We need to consider today the impacts that these very powerful technologies will have in the future, he added. Some of the answers we will like, such as far more powerful treatments for disease. Some of the answers we won't like, such as providing far more powerful weapons to terrorists.

Paul Saffo, the panel moderator, asked the panel and the audience how long they expected to live. Relatively few people in the audience indicated an expectation to live past 120 years. My response of "at least a thousand years" was definitely close to the 100 percentile mark among this group. Assuming we all live as long as we expect to live, I should win this argument by default.

Commenting on the complexity of life, Lanier expressed his long-term fascination and love for cephalopods (e.g., octopi). He made the point that despite their separate line of evolution, "some structures evolved in a very similar manner to humans." Examples include their eyes and features of their brain, including a cerebellum. Other features evolved very differently. For example, they gave up their skeletal system. An octopus can squeeze its entire body through a small hole.

### **The Internet and multicellular life**

Larry Smarr, Director, California Institute of Telecommunications and Information Technology, drew a comparison between the growth of the Internet and the original evolution of multicellular life. Evolution discovered that there were advantages to organizing what had been individual cells into networks of multicellular organisms, which greatly facilitated communication among cells to improve the survival of the cells. Shortly after multicellular life started, "nervous systems evolved to further improve intercellular communication."

Similarly, the Internet has hooked together what had been separate computers that can now share information over long distances, he pointed out. The growth of the Internet has many biological features and has been developing like a multicellular organism, including a nervous system.

He predicted that rather than designing systems as we largely do today, we will create systems that have the dynamic qualities of living systems. This was similar to a point made by Lanier.

Smarr said we are beginning to understand the coding of genes and how they express themselves in metabolic networks. We are a long way, however, from truly understanding the flows of information in complex biological systems, he said.

During the session "The Next Frontier," I had the opportunity to present my ideas on the merger of our biological species with our own technology. I pointed out that there are already many cyborgs among us. The FDA recently approved a computerized neural implant for Parkinson's Disease that replaces the biological neurons destroyed by that disease. This surgically implanted device communicates with its neighboring biological neurons in the same way that the original biological neurons do in the patient's "ventral posterior nucleus."

As another example, there are already four major conferences on "BioMEMS" (Biological Micro Electronic Mechanical Systems) covering contemporary efforts to place tiny diagnostic and therapeutic machines in the human body and blood system. One scientist has already cured type I Diabetes in rats with a nanoengineered device that releases insulin and blocks antibodies. A similar approach should work in humans. With continuing advances in miniaturization and the ongoing acceleration of the power of computation and communication technologies, during the 2020s we will be able to develop "nanobots"—tiny yet intelligent devices the size of human blood cells. They will be able to navigate through the bloodstream, combat pathogens, and reverse human disease and aging processes.

Most significantly, these nanobots will be able to directly interface non-invasively with our biological neurons to greatly expand human experience and intelligence. By interfacing directly with our sensory system from inside the nervous system, nanobots will be able to provide full-immersion virtual reality. By creating virtual interneuronal connections, nanobots can literally expand the 100 trillion limit on our interneuronal connections, which is where human thinking takes place.

To see the article in its entirety go to (permanent link to this article):  
<http://www.kurzweilai.net/meme/frame.html?main=/articles/art0554.html>

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We hope you learned something from this and/or stimulated an action that leads to new opportunities for you and your organizations.

We would like to finish with a request that our readers' thoughts and prayers are for those who are involved in the war with Iraq. This includes those soldiers directly involved, their families, and also the people in Iraq who are innocent of the actions of their leaders.

Previous issues of our newsletters can be found at [www.paragondevelopment.com/resources.html](http://www.paragondevelopment.com/resources.html).

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[WWW.paragondevelopment.com](http://WWW.paragondevelopment.com)