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SATM-ELI

STEVENS ALLIANCE FOR TECHNOLOGY MANAGEMENT
EXECUTIVE LEADERSHIP INSTITUTE

You Can't Get to High Performance from Here

by Martin Stankard

Top performing firms like Wal-Mart, Southwest Airlines, and Dell Computers differ from the likes of Sears, United Airlines and Compaq. Their performance edge is not the sum of many small improvements in each function (such as serving two cents worth of peanuts instead of a two dollar TV dinner.) Their outstanding results spring from a better design for how all the parts of the business and its supply chain work together as a system.

Management techniques like six sigma, process re-engineering, seven habits, and dozens more do not lead to competitive advantage. As all competitors adopt each new technique, performance differences wash out and then, on to the next fad.

You cannot get to high performance -- defined for purposes of this article as an increase of 100% in relevant performance measures -- by improving parts of a business here and there. Instead, you must apply basic system principles to get the parts of your business working together as a system. The purpose of that system will be to generate and share wealth by delivering products and services that attract, satisfy and retain customers. This article uses

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Stevens Executive Leadership Institute launches inaugural Technology Confidence Index

ELI MANAGEMENT TEAM

The Executive Leadership Institute (ELI) at Stevens Institute of Technology focuses on the alignment of technology management with business objectives, bringing together Stevens Institute and global corporations. ELI has just launched its innovative Technology Confidence Index, which measures the confidence which senior international executives have on how technology impacts their businesses.

The quarterly Technology Confidence Index materializes the primary element of the ELI mission of building an international knowledge base defining the impact of technology management on business. This knowledge base will result in technology management tools, reports, analyses, conferences and seminars which will help senior executives address business challenges and improve returns on technology investments.

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DIRECTOR'S NOTE:

At our 2003 Conference on business process redesign, Martin Stankard, keynote speaker, employed an engaging everyday analogy to convey his message on achieving high performance business systems. Dr. Stankard's presentation received high marks, and we are grateful that he's taken the time to condense his argument here for a wider audience.

In the Spring 2003 Issue we introduced our readership to the collaborative initiative between SATM and the Executive Leadership Institute, ELI. For this issue, the ELI Leadership Team describes the Technology Confidence Index that has just been launched, and illustrates the benchmarking opportunities it will provide. The SATM-ELI partnership will bring new opportunities to Alliance Sponsors through this novel tool and the other ELI offerings summarized within.

Larry Gastwirt

STEVENS Institute of Technology

an every day analogy -- that of a bicycle -- to help you see how all parts of your business can work as a whole to deliver high performance.

A Bicycle as a System

Imagine that all the parts of a bicycle are spread out on the floor. (These parts are analogous to the parts of your business). You cannot ride the parts; they are not yet a bicycle. If you assembled the parts loosely without using proper tools, they might look like a bicycle but would not perform when someone tried to ride it. When you use the right tools to put each part into proper working relationship with the other parts you get a working bicycle. With all parts working as a system, the resulting bicycle increases human mobility by 500% over walking.

So a working bicycle achieves high performance judged by its effect on increasing human mobility. The whole bicycle boosts human mobility in a way that none of its parts or groups of parts can. Fitting the parts into a ride-able bicycle does not change any part. So ride-ability must arise from how the parts work together – because assembling them only changed how they interact within a high performance design.

Many tools are useful for helping parts of a business work well together as a system. These include leaders who create a common mission and a cooperative and agile culture, deployed strategic plans, cross-functional teams, process mapping, line-of-sight measurement systems and compensation linked to shared, whole-business outcomes such as total customer satisfaction.

You cannot ride parts of a bicycle but you can ride the whole thing. The riding properties of a bicycle are its emergent properties -- the properties of a system not possessed by any group of its parts. *The emergent property of a properly designed and functioning business is high performance in accomplishing its mission, even if no groups of its parts are high performing.*

A properly assembled bicycle outperforms one that looks identical but is only loosely assembled. *Similarly, two firms can look identical but perform very differently.* Suppose both firms have excellent talent, up-to-date management approaches, willing and able workers and the like. But one gets all parts working together systematically toward a common mission, while the other puts walls around each part and creates internal competition over resources, promotions, and recognition. Which do you think will produce the better results and why?

Because business is like a race to satisfy customers, consider racing the bicycle. To pick a race you can win, you would carefully assess different races to enter, their courses, prizes, likely competitors and past finishing times. You would also size up your own capability, riding experience and bicycle operating condition. Suppose that the race course itself runs all up hill; no down hill runs. A careful check of your bicycle finds handlebars and brakes missing. Time and resources are short so you can only fix one gap in the system; which will it be, handle bars or brakes? Of course you fix the handlebars, because you cannot ride the bicycle without them. The brakes can wait because this race is all uphill.

Every system has at least one performance bottleneck. If it did not, that system would yield infinite performance, which is impossible. (The missing handlebar is the bottleneck in the above story.) If you improve each of the hundreds of parts in a bicycle but do not fix the missing handlebars, you cannot win. *Business improvement efforts that do not eliminate system-level performance bottlenecks are all wasted. Improvements must be designed to relieve whole-system bottlenecks.*

To get to high performance by designing a better management system you must understand basic principles that govern organizational performance. Figure 1 shows a well-validated high performance management system model, known as the Baldrige criteria for performance excellence. Three hundred-plus firms whose management systems satisfy Baldrige requirements produce over 100% higher operating income than their comparable non-Baldrige peers.

Stankard's Baldrige Bicycle

Figure 1 simplifies the Baldrige system into a high level flow chart that shows how all major parts of a business work as a system. The purpose of the system is to win competitive races for satisfied customers against tough competitors. Overlaying the bicycle onto the Baldrige diagram as in Figure 1 helps clarify the principles of a high performance business. Let's now proceed to how the parts of the Baldrige bicycle work together as a high performance business.

The Strategic Front Wheel

On the left of Figure 1 a triangle links leadership, strategic planning and customer and market focus into a strategic triad. This triad represents the activities of leaders who set overall organizational mission and direction. Once leaders decide which markets and customers to focus on, they listen to customers and non-customers to learn what they care about. They spot future opportunities for the organization and create a cultural climate that encourages effort to achieve those opportunities. Finally, they set priorities and define strategies to win the race for customers by offering products and services with superior value.

The leaders also work with others throughout the organization to deploy and implement strategy and overall direction through action plans. As these leaders work, they serve as role models for high performance core values that show all members of the organization the behaviors expected in a high performance organizational culture.

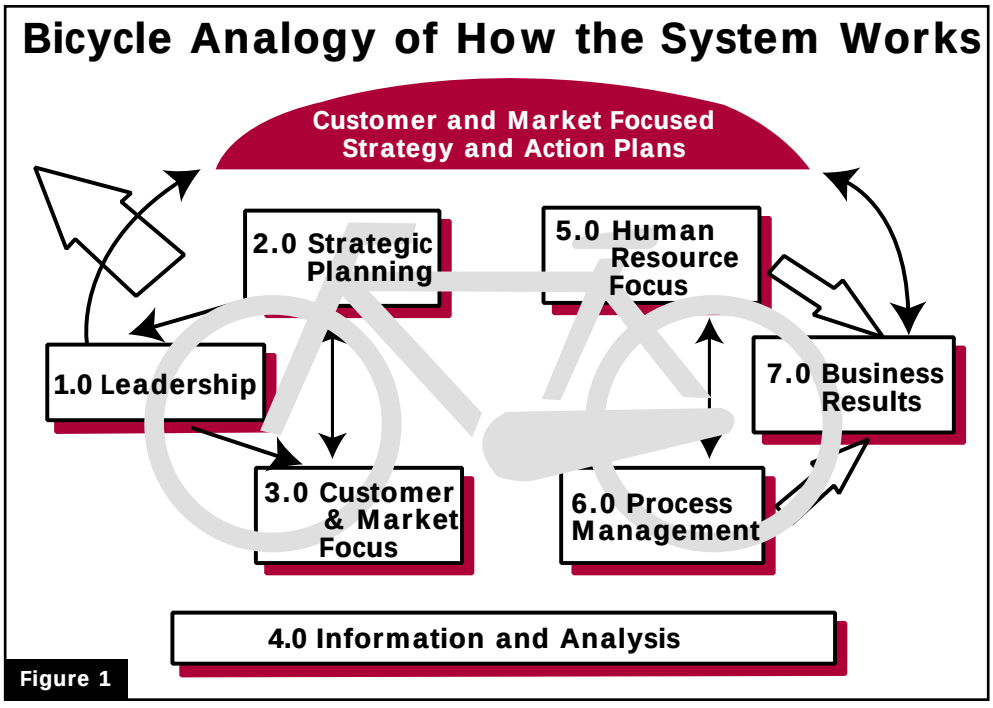


Figure 1

Imagine the strategic triad as the front wheel of the Baldrige bicycle pointing in the direction of future profit opportunity (shown by the large, left-pointing arrow). The choice of which race to enter considers who you want as future customers, who you will compete with and how your organization will create wealth. The choice of race also depends on the prize, how good you are, how tough the course is, and how strong the competition will be.

Once in a race, steering the front bicycle wheel represents strategic choices that keep the bicycle on course toward the finish line. The front wheel, handlebars and rider form a continuous feedback cycle for guiding the system, avoiding obstacles, and getting to the finish. If the finish line is out of sight, the rider follows a road map or route -- analogous to a business's strategic plan. *Pursuing a business strategy without continuous checks and corrections is like riding a bicycle blindfolded.* Next, refer to the result triad and back wheel of the bicycle on the right hand side of Figure 1.

Rear Wheel: The Power of Results

The second triangle, the result triad, involves a motivated work force operating and improving the ongoing processes of the business to generate results that beat the competition. Just as a rider's pedaling turns the rear wheel to push the bicycle forward, the management system feeds profits and cash flow forward to propel the business in its strategic direction (defined in the strategic triad on the left.)

The Frame: Aligning Direction and Power

The bicycle frame aligns the front and rear wheels of the bicycle. This parallels how a business aligns future strategic direction and opportunities in the strategic triad with ongoing results and cash flow from the result triad. The frame of the bicycle represents two linking and alignment elements of the Baldrige system.

Along the bottom of Figure 1 between left and right triads, information and analysis collects and analyzes data from all parts of the system to measure progress against strategic objectives. Information and analysis also provides facts for leadership reviews, corrective actions and strategy and process adjustments to link and align strategic and result triads.

Across the top of Figure 1 the arc between strategic and result triads depicts detailed action plans that link system-wide strategies to every work unit and process. Action plans provides the second linking and aligning component of the frame tying strategic (front wheel) and operational (rear wheel) parts of your business into a system. Action plans at the top of the diagram also correlate with measures contained in information and analysis at the bottom.

Personal involvement of leaders in action planning and progress reviews strengthens organizational values and a sense of shared mission. Leadership involvement, planning, information, communication and corrective action are like a sense of balance in bicycle riding. They create a strong organization and keep the frame and other parts of the bicycle stable in spite of shocks and bumps as it races to the finish line. *A business without such a leadership system is like a biker with no sense of balance -- wobbling all over the place and headed for a fall.*

Implications for Business Performance

No subset of bicycle parts can increase mobility as well as the whole system does. *To design high performance in your business, involve people from the whole business in agreeing on their mission. Have them flowchart how all units of the business work together as a system to achieve that mission. Avoid the impulse to improve isolated parts of the business until everyone understands how they all work together as a system to accomplish the mission and make all stakeholders winners.*

Use appropriate tools to get relevant parts of a business working as a system. *Find out how excellent companies use leadership, values and culture, planning, involvement, teams, measurements and broadly-based incentives to get organizational units working together to achieve high performance.*

Buying all the best parts of a bicycle irrespective of cost or origin will not yield the best bicycle. Each new part is not designed to amplify the effectiveness of all the other "best" parts in the system. *Avoid the common trap of adopting benchmark methods and best practices in each unit in the belief that they will produce the best results overall.*

A system's purpose or mission determines which parts it must include. *Defining your mission in customer and supplier terms makes them integral parts of your business as a system. Include cooperative customers and suppliers in your planning and improvement activities. They will define your competitive advantage and enable it.*

A bicycle will not improve mobility across open water. *As your business succeeds, monitor the environment for shifts that could turn the strengths of your current management system into handicaps.*

Continued on page 6

To design high performance in your business:

- Involve people from the whole business in agreeing on their mission. Have them flowchart how all units of the business work together as a system to achieve that mission.
- Avoid improving isolated parts of the business until everyone understands how they all work together as a system to accomplish the mission.
- Find out how excellent companies use leadership, values and culture, planning, involvement, teams, measurements and broadly-based incentives to get organizational units working together to achieve high performance.
- Avoid the common trap of adopting benchmark methods and best practices in each unit in the belief that they will produce the best results overall.
- Include cooperative customers and suppliers in your planning and improvement activities.
- Understand your customers' customers and your suppliers' suppliers.
- Monitor the environment for shifts that could turn the strengths of your current management system into handicaps. Listen to well-informed critics outside of your system.
- Run Baldrige assessments to check if all parts of your business work together properly to implement high performance.
- Avoid incentive and measurement schemes that reward a few important winners and make all others unimportant.
- Understand basic system principles and then continuously work toward designing the best business you can.
- Consider how your organization and management impacts the feelings of individuals. ■

ELI...

Continued from cover

This article describes the Technology Confidence Index and its derivation, provides examples of the type of benchmarking opportunities available through the Index, and summarizes other ELI offerings. Through the SATM-ELI partnership, Alliance Sponsors will be afforded new and exclusive opportunities to examine their own companies and compare their results to benchmarks.

The Technology Confidence Index

The quarterly Technology Confidence Index is derived from ELI's Global Technology Confidence Indicators (GTCI), based on data obtained from the exclusive Global Senior Executive Panel, described below. Data are collected through an on-line assessment in a simple point and click environment that takes about 12 minutes to complete. Panel members provide their views and opinions on how technology affects their businesses, within the following technology confidence categories: General Economic Factors, Globalization and Standards, Human Capital, Technology Alignment, Technology Innovation, and Strategic Technology Management. Questions never ask for proprietary information or data which may be viewed as sensitive or confidential. All responses are kept in the strictest of confidence.

The Global Senior Executive Panel

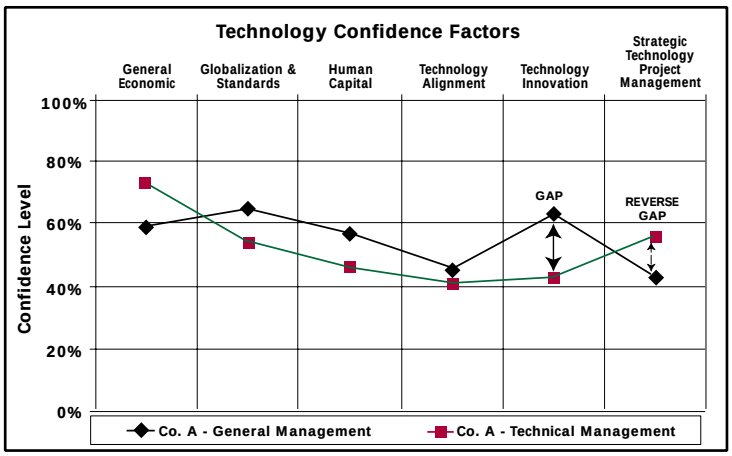
The Global Senior Executive Panel consists of top-level executives that have been carefully assembled to represent a diverse set of the world's largest organizations, across multiple industries. Panel members represent Global 2000 companies and organizations, most of which have a minimum of $1 billion in sales.

The panel is unique in that it has been carefully built to include a mix of both technical senior managers (CTO, CIO, VP, etc.) and business senior managers (CEO, CFO, COO, etc.) -- the highest ranking corporate positions. Organizations represented on the panel are strongly encouraged to have at least one technical and one business executive join the Global Senior Executive Panel, as this will improve the value for each participant and their corporation as a whole.

To ensure the integrity of panel representation, membership is by invitation only and by referral from existing Panel members. Finding the right new Panel members is actively pursued, including through the newly founded SATM-ELI partnership.

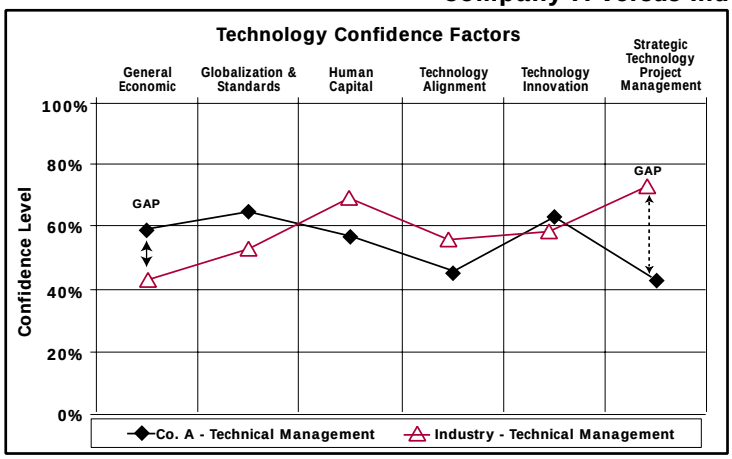
Panel members receive customized reports comparing their responses to confidential peer groups, such as their respective industries. They also can compare their responses to other technical executives and other business executives. These reports provide

GTCI Measurement Roadmap - Business & Technical Management



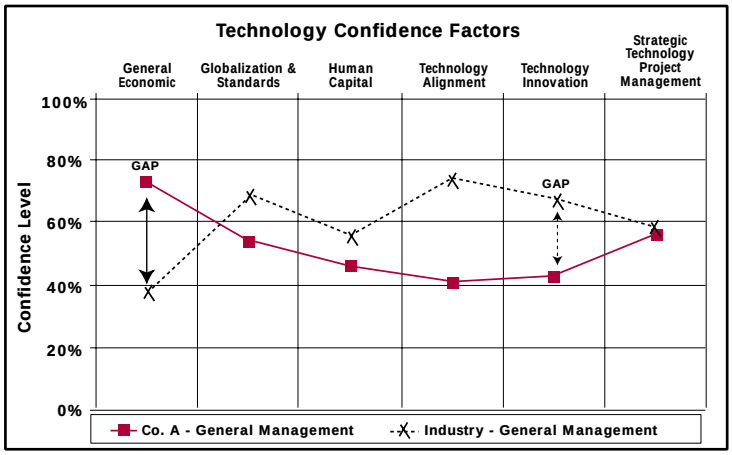
The first roadmap identifies gaps in technology confidence at a company, between their technical executives and their business executives.

GTCI Measurement Roadmap - Technical Management: Company A versus Industry



The second roadmap identifies gaps in technology confidence between technology management at a company and technology management in the respective industry.

GTCI Measurement Roadmap - General Management: Company A versus Industry



The third roadmap identifies gaps in technology confidence between general management at a company and general management in the respective industry.

sources of competitive advantage to Panel members.

Technology Confidence Gaps

A major feature of the Technology Confidence Index is the measurement of the size and nature of technology confidence gaps between senior technical executives and senior business executives. Identification of the size and nature of these gaps will provide executives the knowledge of which areas to focus on to achieve better alignment of technology management with business objectives.

The three representative "GTCI Measurement Roadmap" charts provide graphical portrayals of gaps for each technology confidence factor.

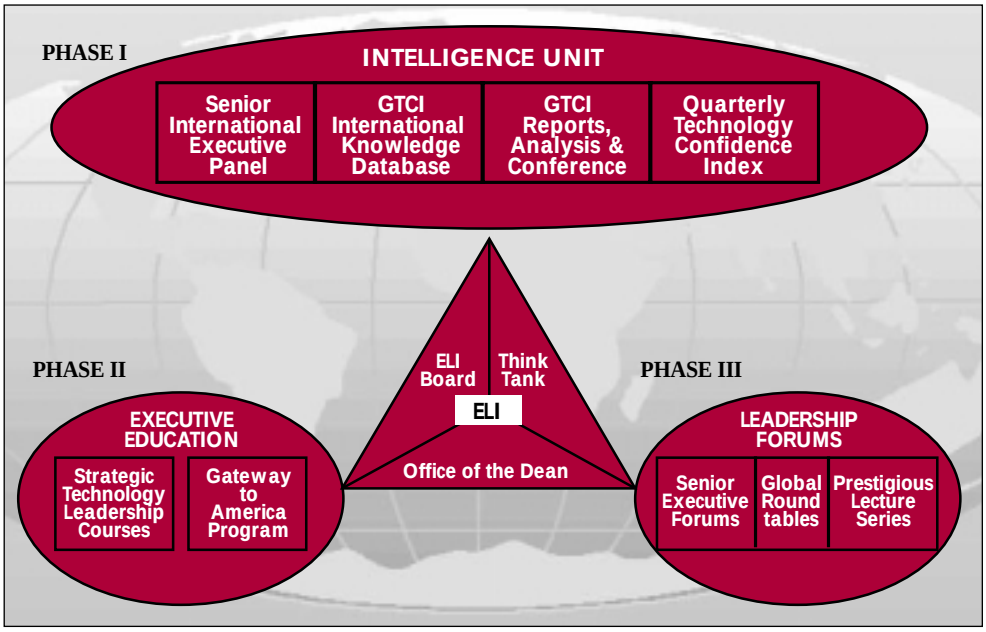
Each roadmap identifies opportunities for Panel Members to compare their own results with benchmarks.

Quarterly responses from the panel make up the international knowledge base, from which the index is derived using predictive models. Over time the index will track and project technology trends within and across industries. Months of intensive research and development have gone into the launch of the inaugural assessment for the Technology Confidence Index, to ensure the usefulness and effective application of index findings to real corporate needs. Reports will highlight areas of opportunity for senior executives and will serve as tools for leveraging available technologies efficiently.

The inaugural GTCI assessment was launched in May 2003 and was available on-line for completion by Panel Members through early June. The first reports and analyses derived from the data will be released this summer. Quarterly index summaries are to be published by a business publication partner; Panel members will receive complimentary customized reports, and complete published reports and analyses will also be available.

The next assessments are scheduled for September 2003, January 2004 and quarterly thereafter. The first annual GTCI conference is scheduled for March 2004, and will provide an in-depth review of major findings from the Technology Confidence Index through its first year.

ELI - PROGRAMS & STRUCTURE



A major feature of the Technology Confidence Index is the measurement of the size and nature of technology confidence gaps between senior technical executives and senior business executives.

Additional ELI Programs

The Executive Leadership Institute also offers Executive Education Programs, including Strategic Technology Leadership courses. These courses are designed to educate senior technology management in matters of business and strategy, in order to achieve improved alignment between the technology and strategic business objectives of their organizations.

Also available is the 'Executive Gateway to America' program. This concentrated ten day program is designed for senior executives from international countries that are looking to penetrate American markets. A focus is placed on technology management plus business education, American business practices and culture, and providing personal introductions to American business and political leaders. This program also provides excellent opportunities to American corporations looking to develop relationships with companies in international markets.

The illustration provides an overview of ELI programs and its structure.

ELI Management Team

The ELI vision was brought to Stevens Institute by its Founding Dean, Dr. Michael R. Cooper, who has over 25 years of corporate experience, most recently as President, CEO and Chairman of the Opinion Research Corporation. Dr. Cooper and the ELI management team collectively have over 100 combined years of corporate experience.

Dr. Larry French, the ELI Technology Director, is a seasoned operations and technology executive with over 25 years experience, most recently as CTO of North America Philips.
Dr. French has held top positions at leading technology companies, including Philips and RCA, as both a senior technical executive and a senior

Continued on next page

ELI...

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business executive. His dual experience has provided essential insight for shaping the focus of the Technology Confidence Index.

Dr. Derek B. Smith, Director of the GTCI program, was former President of "The Economist" Asia/Pacific, and brings over 24 years of experience to ELI. Dr. Smith's experience with the Economist Intelligence Unit has given shape to the GTCI program, including the building of its Global Senior Executive Panel and laying the framework for the international knowledge base and GTCI reports and analyses.

C. Olivia Parr-Rud, Director of Advanced Analytics, brings over 22 years of corporate experience to the ELI team. Ms. Parr Rudd has held senior management positions at Fleet Bank and National Liberty Insurance and she is a published expert in the fields of data mining, modeling and segmentation. Her expertise ensures thorough and meaningful analyses of the ELI knowledge base and its data.

Eric Koomen and Diala Pharon head up ELI marketing and communications, and have implemented developing the Global Senior Executive Panel. They bring experience in corporate sales and marketing.

ELI partnership providing new opportunities for SATM Sponsors

In partnering with SATM, opportunities available through ELI are now open to SATM Sponsors. These opportunities include the ability to become members of the Global Senior Executive Panel and to receive complimentary, customized technology confidence reports and analyses. The Alliance Advisory Board meeting in November is tentatively scheduled to focus on the early analyses derived from the Technology Confidence Index, and in particular the gaps found in technology confidence between technical and business executives. ■

***To find out more about the SATM - ELI partnership**, contact Dr. Lawrence Gastwirt.*

For further information regarding ELI, please visit the web site: **www.eli.stevens.edu.**

For more information about GTCI and the Technology Confidence Index, please visit the web site: **www.gtci.stevens.edu**.

High Performance...

Continued from page 3

Favorable competitive environments shift sooner or later, requiring adjustments in mission and system design. Understand your customers' customers and your suppliers' suppliers. Listen to well-informed critics outside of your system and turn embarrassment into learning. Prepare now to win the next race -- it is coming right up.

Every part of a bicycle is its most important part because if you omit any part the bicycle will not win under some conditions. Likewise each part of a management system is the most important part in some situation. *Run Baldrige assessments to check if all parts of your business work together properly to implement high performance. Avoid incentive and measurement schemes that recognize or reward a few important winners and make all others unimportant; they are a plague that destroys the system.*

You cannot benchmark your way to high performance: copying is not design. Copying answers from someone else's examination may get you an excellent grade, but when you need to use the knowledge you passed the test on, you don't have it. *Avoid the type of thinking that concludes that, because the winner of the last bicycle race rode a red bike, painting your bike red will make you a winner next time. Such thinking just perpetuates the parade of management fads that never get anyone to high performance. Instead, understand basic system principles and then continuously work toward designing the best business you can.*

Beyond The Bicycle

A business is a social system while a bicycle is a mechanical one. Individuals, work units, teams, and even whole businesses have purposes, while parts in a bicycle lack purpose -- they merely function. Purposeful units can learn many functions, develop their own capabilities and even change missions. Interacting levels of purpose make a business much more complex and interesting than a bicycle. *However the basic system principles apply to all systems.*

Feelings drive action. "White hat" organizations that systematically generate feelings of pride, work satisfaction, and trust *may evolve* into high performance systems. "Black hat" organizations that create feelings of loss, fear, jealousy and distrust *never work as systems* and lose to the white hats in the end. *Consider how your organization and management impacts the feelings of individuals. Good feeling will put their diverse skills, experiences, attitudes, personal missions, drives and idiosyncrasies to work generating astounding business performance.* ■

Resources

This article is based on Martin Stankard's book, *Management Systems and Organizational Performance*, Quorum Books, Westport, CT, 2002.

See also *The Baldrige Criteria for Performance Excellence*, National Institute of Standards and Technology (NIST), 2003. Updated annually; available by download from www.quality.nist.gov

The author:

Martin Stankard has helped well over 300 training and consulting clients upgrade their management thinking and improve organization-wide performance. His assignments range from improving operating processes to helping management teams apply systems thinking to lead entire firms to performance excellence. He has taught at the Wharton Business School and holds Ph.D., M.B.A., and B.S. degrees from The University of Pennsylvania.

Book Review

NATURAL-BORN CYBORGS: MINDS, TECHNOLOGIES, AND THE FUTURE OF HUMAN INTELLIGENCE

AUTHOR: ANDY CLARK

PUBLISHED BY OXFORD UNIVERSITY PRESS IN 2003

By Jack McGourty

Every once in a while a book comes out that puts select emerging technologies in perspective intellectually, philosophically and socially. Andy Clark has written such a book. By integrating the latest research in cognitive science and computing technologies, the author provides technology managers with a front-seat view of the true impact that these technologies will have on human cognition and behavior.

Clark, who presently heads up Indiana University's Cognitive Science Program, has been working in this interdisciplinary area for many years. Starting with recent brain research, Clark weaves a scenario where computing technologies become deeply "dovetailed' to the biological system thus allowing human information processing to become a composite of the biological system and non-biological tools. An evolutionary process, through advancement of the technology itself in conjunction with changes in culture, education, and society, yields a technology that in fact becomes transparent to the user.

Thus for a technology to become transparent - easy to access, use, and purchase - this co-evolutionary process must occur. Clark gives several historical examples of technologies that have become transparent to the user over time. For example, recent word processing packages, web browsers, and personal digital assistant software permit users to do tasks while doing the kinds of cognitive activities people are good at - recognizing patterns, modeling simple dynamics, and manipulating objects in an environment. By thinking about new computational technologies from this evolutionary perspective, it allows us to think about what is wrong with early designs of such tools. For example, early models of VCRs forced us to apply cognitive tasks that we are not as good at such as recall and execution of a seemingly arbitrary sequence of operations.

Through several such examples, Clark promotes a central thesis that posits the idea of "human cognition as subsisting in a hybrid, extended architecture" that includes aspects of the human brain and what he labels the cognitive technological envelope. He challenges researchers, designers, and technology leaders to learn in detail how the brain dovetails its problem solving activities to these evolving computer technologies. There is a need to work under the premise that individual cognition is not limited to one's biological system, but can be surprising malleable, ready to change and expand.

Throughout the book, Clark provides several visions of near future technologies for individuals to bond with including invisible computing, tangible computing, wearable computing, and augmented reality. Consider augmented reality where selected technologies - global positioning, liquid electronic displays, and digital search and database applications – collectively allow the physical and informational worlds to merge in a seamless manner. Imagine the surgeon, seeking to repair some part of an individual's body, readily seeing ultrasound scans or brain image information projected on the appropriate area. Or, someone suffering from an early stage of Alzheimer's disease can look up at a person heading towards them and see identifying information in glasses outfitted with small digital displays.

Clark, while enthusiastic about the possibilities of this co-evolutionary process and increasing bio-technical merger, notes the need to be cautious. He devotes a chapter to the potential dangers and constraints of this bio-technological merger. For example, he cites the need to be careful that we not allow the digital divide to become deeper - the cyber haves versus the cyber have-nots. Threats to privacy, specters of overload, and social alienation need to become part of the design considerations of these human-centered technologies. According to Clark, yes we need to be careful, but he believes that by understanding our basic human nature to " annex, exploit, and incorporate non-biological" systems into our cognitive profiles, we should be able to shape these biotechnological unions for the better. ■

Clark weaves a scenario where computing technologies become deeply "dovetailed' to the biological system thus allowing human information processing to become a composite of the biological system and non-biological tools.

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STEVENS ALLIANCE FOR TECHNOLOGY MANAGEMENT
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ACTIVITIES

The first half of 2003 has been a busy and productive period for the Alliance. Our Roundtable meeting in January dealt with techniques for achieving product or service breakthroughs. The March meeting was devoted to our periodic review of faculty research sponsored by the Alliance. The three projects reviewed dealt with the determinants and implications of conflict in project teams, transactional versus transformational approaches to project leadership, and web interfaces to sensor-actuator networks.

In May we held our fourteenth Annual Conference, sponsored jointly with the Executive Leadership Institute, on the topic of business process redesign. In June we co-sponsored a symposium on creativity under time pressure with the Consortium for Corporate Entrepreneurship. And in July, about the same time as this edition of our newsletter is issued, we will be holding a Roundtable meeting on developing "blockbuster" new products -- our fiftieth Roundtable meeting since the series began in November 1992.

Upcoming events include Roundtable meetings scheduled for Monday, September 15 and Monday, November 17. The November meeting will be combined with our annual Advisory Board Meeting, and will focus on the early results derived from the ELI Technology Confidence Index analysis. The inaugural seminar in a series to be held at Columbia University is also planned for the second half of the year.

For further information on these and other Alliance activities, contact Dr. Lawrence Gastwirt: **212-794-3637 • lgastwirt@aol.com**

INFORMATION

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http://howe.stevens-tech.edu/SATM
http://eli.stevens.edu

To download articles from past SATM newsletters, go to
http://howe.stevens-tech.edu/SATM/Newsletters.html

To send comments on this newsletter, or to submit an article for future publication, please e-mail Dr. Jack McGourty at **jm723@columbia.edu**

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