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The Invention/Discovery Team *Notes from the Field*

by Anthony J. Le Storti

INTRODUCTION

Harvard business professor and author Rosabeth Moss Kanter has said, "To stay ahead, you must have your next idea waiting in the wings." This call for continual innovation resonates positively with business leaders in competitive markets. In fact, rather than an idea waiting in the wings, what they would probably prefer is a bulging stream of ideas gushing down the "pipeline." But innovation is more easily desired than accomplished.

Businesses are responding to this challenge—more or less. Some companies are responding very well and have become models of innovation; others barely seem to be

heeding the call. Many, perhaps most, are trying to figure out how to respond to this "creative imperative."

This article presents some observations I have made over the years while facilitating the creative thinking of many groups in their struggles to innovate. Specifically, I would like to focus on a relatively new phenomenon of organizational creative efforts: the Invention/Discovery Team (I/DT).

FUNCTION AND FIT

Also known as "innovation teams," Invention/Discovery Teams are small groups of carefully selected, cross-functional profes-

sionals, often assisted by a creativity specialist. They work intensely for a relatively brief time on promising initiatives commissioned by senior management. If sponsored properly, they are well supported in their efforts and given priority treatment. As the name implies, the major goal of I/DTs is the invention and/or discovery of potential new products, services, programs, and technologies. Their focus, however, is generally not on line extensions, but on substantially new ideas—often the next generation of products and services. The invention side of their title calls on them to use their experience and creativity to generate new concepts and develop

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DIRECTOR'S NOTE

In June the Alliance co-sponsored a Symposium on Creativity under Time Pressure, together with the Consortium for Corporate Entrepreneurship.

One of the prominent experts who spoke at the Symposium was Anthony Le Storti, who has contributed an article summarizing some of the important conclusions from his observations on invention and discovery.

Also included in this issue are the "Takeaway" highlights from three Roundtable meetings held during the past year, devoted to techniques for

stimulating creativity and achieving breakthroughs. Our colleague Peter Koen, Associate Professor at the Howe School, figured prominently in these meetings as facilitator. Our next issue will feature a full length article by Peter summarizing the key conclusions and recommendations from his extensive research on breakthroughs.

The Alliance is inaugurating a Seminar Series in Technology Management, in collaboration with the Columbia University School of Engineering. The first Seminar will be on October 29th at

Columbia, and will feature Dr. Boaz Ronen speaking on the use of technological value drivers to increase shareholder value.

Dr. Ronen, Professor of Technology Management at Tel Aviv University, is Visiting Professor at the Howe School this semester. Dr. Ronen gave an abbreviated version of this presentation at the November 2002 SATM Advisory Board Meeting and Roundtable. The enthusiastic reception prompted us to invite him to give an extended version to a wider audience. See "Upcoming Events" on page 8.

Larry Gastwirt

them to the point where they can be presented as viable innovative options. Often, however, their creative efforts uncover possibilities in terms of beginning research or licensing and acquisition prospects, thus accounting for the discovery side of their work.

The I/DT is positioned as a fast track vehicle for innovation, and as such, it can be an important element in a corporation's "portfolio" of innovation strategies. These portfolios may include:

Research & Development Laboratories: These are viewed as the standard pillars of creativity and innovation. R&D labs, however, have many roles in today's business environment. These include new research, developing concepts suggested by other functions (e.g., marketing), and "fixing" existing products or product ideas. Some research indicates that only about 19% of viable new product ideas have their source in R&D.¹

Advanced Concepts Teams: These may be special teams within R&D or they may be separate entities. The challenge for these teams is to explore the frontiers of their domains in order to discover and develop cutting edge concepts and technologies.

Expeditionary Teams: Often composed of top executives or of individuals who report directly to the top, these teams could also be called "discovery and acquisition" groups. Their chief function is to scan the horizon for newly developed product ideas and/or small companies with great potential, either of which their larger company might acquire.

Skunk Works: Based on archetypal teams at Apple and Lockheed Martin, these research groups may be large versions of the Advanced Concept Team with the added dimension that they often work in almost complete secrecy. While advanced concept work may focus on "pure" science, skunk works often have very concrete business objectives that would provide their companies with a competitive edge in dynamic markets.

Consumer Science: These days, this initiative can go far beyond focus groups and surveys. Using ethnographic research or "empathic design," these teams are often the prompters, if not the sources, of new concepts.² Their function is to conduct in-depth investigations into the needs of consumers; as such, they represent the tips of the organization's antennae. Combined with a good information infrastructure and an aggressive intellectual property department, consumer science offers an important complement to the other initiatives.

Empowered Personal Research: Pioneered by innovative giants such as 3M, this approach allows and encourages individuals to use some portion of their work time (5-15%) for personal investigations that could lead to new concepts. Individuals are usually given autonomy in their efforts, although there may be overarching mandates for productivity and/or benefits programs that provide incentives for prompt idea development.

Grass Roots Innovation Networks (GRINs): Self-organized by individuals interested in investigating and developing their creativity, GRINs are usually unauthorized, although they may receive some managerial encouragement. These "study groups" connect by e-mail, intranets and brown bag lunch meetings. Some receive a small amount of money or support for speakers or workshops. Examples of such groups include DuPont's "Oz Network," 3M's "Grass Roots Innovation Team," and Rohm & Haas's "All Things Considered."

What I have noticed is that really high-performing teams have leaders of creativity. These individuals significantly contribute to the work of their teams, but rather than losing themselves in the work, they work as hard on empowering and facilitating the work of their team members. The result is that team output exceeds expectations.

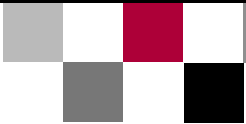
LESSONS

Major corporations configure their innovation portfolios with a mix of the above approaches and utilize them as ongoing processes. The ID/Ts are a different entity in that they are ad hoc groups usually formed for a relatively brief period of time yet given high-stakes missions. The life cycle of an I/DT may only extend for about three months. Within that time frame, such teams/task forces may meet only once or twice per week for half-day or full-day sessions. Yet expectations for these teams are significant, ranging from those for high-level R&D activities to Skunk Works to Advanced Concepts work. Within a relatively short time period, they are expected to develop very viable, novel concepts that could be implemented, marketed or validated for further research almost immediately.

LEADERSHIP

A number of significant lessons have come from the I/DT experience. These lessons are not inconsistent with the findings from research, for example, that conducted by Amabile and Gryskiewicz on R&D laboratories.³ The first of these lessons is the importance of team leadership. The I/DT leader must constantly have one eye on the work and the other eye on team dynamics. This person must be a model of dedication, inquiry and the organizational vision. Sponsors forming such teams should keep in mind the distinction between the creative leader (someone who is a strong individual creative thinker) and the leader of creativity (someone who brings out the creativity of others). What I have noticed is that really high-performing teams have leaders of creativity. These individuals significantly contribute to the work of their teams, but rather than losing themselves in the work, they work as hard on empowering and facilitating the work of their team members. The result is that team output exceeds expectations.

Included within team leadership is the con-



cept of process leadership or facilitation. Invention/Discovery Teams function well when they follow good process strategies and utilize diverse sets of creative and critical thinking tools. Teams made up of even seasoned professionals may still be subject to internal pressures to rush to answers. They often ignore the great potential benefits of creative problem formulation. Their idea generation may be too "scattered." And, as their enthusiasm for their ideas builds, it may not be balanced by strong critical judgment and testing of those ideas. Knowledgeable internal or external consultants can provide a cognitive "structure" for such teams. They can both provoke idea generation and provide the discipline of critical judgment. Additionally, these process leaders can provide guidance for gaining acceptance of new ideas, a skill often lacking in subject area specialists.

THE MANDATE

A second lesson is that the mandate or charge given to I/DTs must be carefully chosen, and it must be presented clearly. The mandate is the team's challenge. It should be significant, worthy of the team's efforts, and important to organizational strategy. It should magnetize the thinking of team members; it should motivate and guide team action. Confusion with regard to the mandate (on the part of management or the team) will likely lead to disappointing or less significant outcomes. If team members are fuzzy about their goals, they should seek quick clarification. Managers should be ready to modify and/or reframe their mandates in order to better direct teams.

TACTICAL FREEDOM

While the mandate should be very clear, it should provide only a sense of direction. I/DTs function best when allowed great latitude as to how to pursue their goals. Senior management should maintain strategic autonomy and set direction, but high-stakes teams such as I/DTs require opera-

tional freedom and the ability to make decisions on the run. Such autonomy allows teams to pursue work as they see fit, to set their own priorities for investigation, and to change direction as opportunities present themselves. Research has shown how valuable such freedom can be to the overall creativity of the effort.⁴

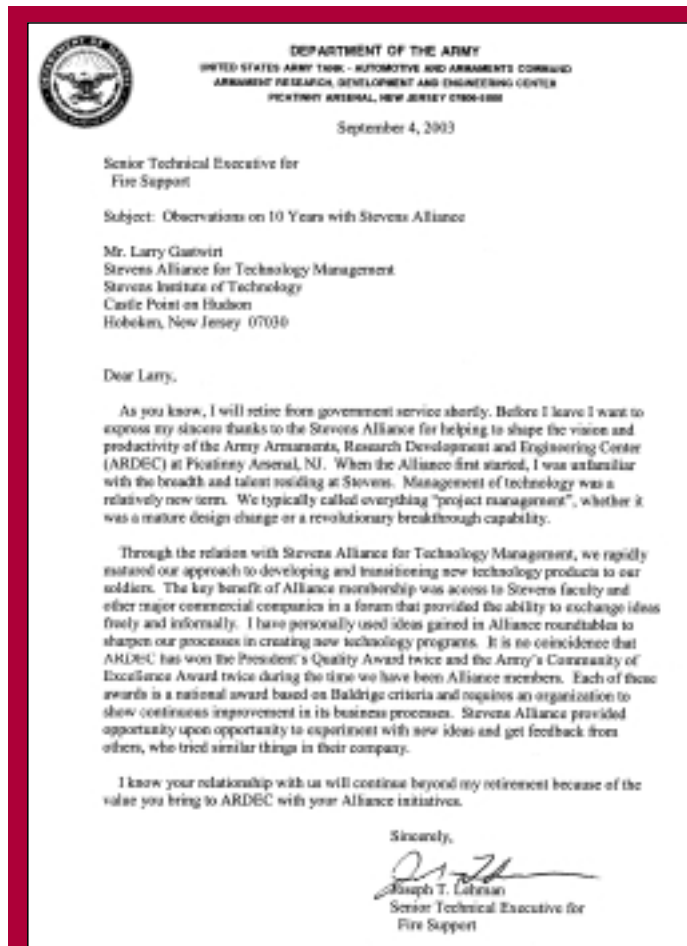
The value of tactical freedom reinforces the importance of a clear mandate, especially one that emphasizes the purpose of an initiative as contrasted with tasks as initially envisioned. Business conditions and the creative process are fluid and often unpredictable. But a strong team, guided by a clear mandate and sense of purpose and empowered with tactical freedom, can better adjust to rapid changes and unforeseen opportunities.

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INFORMATION AND LEARNING

Knowledge and information have always been crucial to invention and discovery. But in today's world, the access to and processing of information is a sine qua non of creativity. Invention/Discovery Teams, with their high-stakes challenges and short timelines, have an extraordinary need for abundant and up-to-the-minute information. Such information may include key content data, technological developments, the status of intellectual property, or competitive intelligence. Whatever information I/DTs need must be provided as expeditiously as possible. Information flow is so important that some I/DTs have a dedicated information specialist as a full-time team member; other teams are given priority access to information resources.

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Farewell to Joe Lehman

The Alliance would like to note the retirement this month of Joseph Lehman, Senior Technical Executive for Fire Support of the Army Armament Research, Development and Engineering Center at Picatinny Arsenal. Joe has had a distinguished career of 42 years, during the last ten of which he served on the SATM Advisory Board and the Technology Transfer Working Council. We have gained much from Joe's participation over the years, and his wisdom will be greatly missed. All of his friends at the Alliance wish him a healthy and joy-filled retirement.

Joe wrote a letter last month on his observations on 10 years of working with the Alliance. We are very happy with what he had to say about SATM's contributions to Picatinny, and hope you will excuse our shameless pride in printing his letter.

Roundtable Meeting Take-Aways

During the past year the Alliance has devoted three Roundtable meetings to techniques for stimulating creativity, invention, and breakthroughs. Peter Koen, Associate Professor at the Howe School, figured prominently in these meetings, serving as facilitator. The "Takeaway" highlights from the meetings are abstracted below.

Achieving Breakthroughs: Organizational Structure and Knowledge Creation (Oct. 2002)

The October, 2002 Roundtable meeting was held at ISO in Jersey City. Peter Koen began by defining breakthroughs as new, high(er) risk, high profitability products, in contrast to incremental or continuous innovation.

The organizations represented were asked how they deal with inspiring breakthroughs:

- ARDEC uses brainstorming with management filtering. There is interaction between management and the inventor. Their process is inconsistent. Although they generally have visionary leadership, there is difficulty in getting leadership support for genuinely new ideas.
- Unilever Bestfoods has an extensive process for understanding consumer insight. They practice "seeing themselves in customers." They try to identify "lead" users (see below) but have difficulty identifying true lead users.
- Teknor Apex uses their adapted stage-gate process for concept through commercialization. They do much work to identify customer needs. Their current problem is that their front-end process is yielding more of a "tunnel" than a "funnel", with too many projects remaining in the pipeline too long.
- ISO utilizes more of a "shotgun, random blast" approach. They use market inputs, customer comments, panels and the knowledge of senior management to generate a strategic set of ideas. Their experience suggests that the best input is received from panels. ISO's major issue is that they are not adequately filling the pipeline.
- AT&T does most of its breakthrough work in their centralized Labs. They apply their portfolio management process (monthly) to

balance the Company's investments. Their major issue is allocating the required resources to breakthrough projects.

Following is a list of highlights from Peter's materials which were distributed to attendees:

- An "options" model (what is the cost to get to the next step?) to reduce risk is becoming more and more popular.
- In doing business cases for understanding breakthroughs, financial evaluations seem to dominate the efforts.
- Peter believes that Christensen's conclusion that "Disruptive technologies need to be managed separately from sustaining technologies" does not work.
- There is disproportionate wealth creation from discontinuous opportunities, with more profit definitely derived from breakthroughs.
- Peter presented a 4-box framework for considering how to achieve breakthroughs. He summarized case studies of how companies organize for breakthrough, e.g. Lucent used venture funded projects for commercialization, which folded due to its not being reflected in increased shareholder value; Proctor and Gamble established a separately funded Corporate Ventures group, but had difficulty in the transfer of ideas to business units.
- Peter described the Lead User Approach, usually attributed to 3M but also used by Ethicon, ExxonMobil, and Goodrich. Lead User -- not synonymous with lead customer! -- provides a focus methodology employing users outside normal vision of company. The process starts by looking at trends in the market. With this knowledge, it is important to "swim with the fishes," i.e. visit customers with similar needs but in different markets outside the company's area.
- Peer reviews of breakthrough proposals is definitely a growing trend.
- Critical requirements for breakthrough success appears to be independent funding, dedication of employees, peer evaluations all done within the business

With reference to the subject of Knowledge Creation, Peter made the following comments:

- Definitions are critical for understanding,

i.e. there is a difference between data, information and knowledge.

- Explicit knowledge may be transferred through language (word, graphics, etc.), although the language for tacit knowledge -- the requirement for innovation -- is not the primary mechanism for sharing.
- In order to transmit tacit knowledge, you have to know someone (trust).
- Organizations are being successful in exchanging tacit knowledge by using Technology Communities of Practice. These are voluntary communities focused on core competencies, which are identified typically from knowledge mapping techniques.
- New ideas occur from the intersection of unmet, and often unarticulated, customer needs and a shared vision of the future.
- Successful knowledge creation companies are using Project Snapshots to capture current and past learnings of projects.

Tools and Techniques for Achieving Breakthroughs (January 2003)

The January, 2003 Roundtable meeting was held at ARDEC, Picatinny Arsenal. The meeting followed up on the discussion of the November, 2002 Roundtable, with the purpose of gaining insight into tools and techniques tried by Sponsor organizations, successfully and unsuccessfully, for generating breakthroughs. Peter Koen returned as facilitator, beginning the session with a brief summary of the highlights of his research on achieving breakthroughs. Some of the points not covered in the preceding summary are:

- The innovation process consists of three distinct parts: front-end, product development, and commercial exploitation. Peter's research is aimed at the front-end process.
- Breakthroughs, in contrast to incremental or continuous innovation, are generally associated with the potential for 5-10x (or greater) improvement in product performance, or 30-50% (or greater) reduction in cost.
- Alternate statement of the innovator's dilemma: "Industry leaders do not embrace disruptive technologies, but will continue to invest heavily in sustaining technologies. Yet, a company that is doing all the right

things will eventually go out of business." How does a company satisfy customers, lower its costs, improve distribution, etc., and still free up and isolate the resources required for achieving breakthroughs?

- On corporate breakthrough organizations: "need skin in the game" to be successful.
- Peter recommends that to maximize chances of success, people on breakthrough teams need to dedicate 100% of their time to the breakthrough project.
- Managers must be prepared to dedicate business people (and "best" people) to front-end groups. Peter recommends dedicating key business people 100% for short periods of time. CEOs are bipolar -- they usually support the concept of forming a breakthrough team, but balk at the selection of "the best" people.
- Hold breakthrough teams to milestones, especially for market dimensions such as acceptability and value. Emphasize the team, rather than over-relying on the champion.
- Successful companies make the innovation process (organization, management, etc.) a key part of operations.
- Peter summarized the "wisdom of the sages" concerning practices associated with success in "Holy Grail" breakthrough projects:
 - Create and manage projects by interspersing business and technology personnel on project teams.
 - Select project opportunities based on market and technology trend analysis.
 - Select project opportunities based on science-based core competencies.
 - Set aggressive goals.
 - Employ (external) scientific peer review.
 - Focus (in contrast to spreading too thin).
 - Maintain constancy of purpose.
 - Process optimization which includes management oversight, fact-based fast kills and metrics.
 - Do very early prototyping and field trials.
 - Employ full time project team populated with inventors with demonstrated track records.

Highlight comments from participants:

- ISO is looking for a correlation between margins and reliance on breakthroughs. Peter responded that high margin companies do not necessarily need more breakthroughs.
- Teknor Apex is reviewing the practices presented by Peter to achieve "Holy Grail" projects. They currently employ a mix of some of the recommendations.
- Phillips believes that early prototyping is key to determining viability/value of "Holy Grail" projects.
- ARDEC contributed that "Holy Grail" projects

need a champion. More importantly, champion needs to enlist both business and technology teams. In this connection, Lem Tarshis reminded the group of the Alliance innovation research conducted with Jack McGourty, which found that as important as having a champion was the need to make sure that the organization fosters an environment of "advocacy".

- Larry Gastwirt commented that some financial slack is needed to fund a full time project team.
- ARDEC asked if it might be better to use available novice talent rather than overly committed experts. Peter believes that this is not recommended -- use your best.
- ARDEC posed the question: should an organization go for the aggressive goals or use spiral development (incremental goals)? Based on his experience, Lem's advice is to define an aggressive goal, and then make incremental steps (road mapping) to achieve it.
- The group felt that core competencies/capabilities need to be defined and regularly reviewed.

Application of Learnings from June Symposium on Creativity under Time Pressure (September 2003)

The September, 2003 Roundtable meeting was held at ISO in Jersey City. The meeting was a follow-up to the June 2003 Symposium on Creativity under Time Pressure that the Alliance co-sponsored with the Consortium for Corporate Entrepreneurship, and focused on the practical implementation of the learnings from the Symposium. Joining Peter Koen as co-facilitator was Anthony (Tony) Le Storti, an expert in the field from IDEATECTS in Doylestown, PA. Peter had chaired the June Symposium and both he and Tony were presenters. A collection of supplemental literature articles on the subject were distributed, along with copies of the Roundtable presentations

Peter kicked off the meeting by asking participants for their definitions of creativity under time pressure. They responded with the following, which Peter agreed were all embraced by the definition:

- Thinking out of the box with tight time schedules.
- Doing something differently but on-time.
- Using novel approaches to solve time constrained problems
- Bringing novel approaches under time constraints.

Bob Kostelak also made the accepted point that there are many different kinds of creativity.

Peter reviewed some of the key Symposium

learnings, the creativity literature, and his own research. Based on his research, managers know what they need to do, but most do not follow through. Some key points:

- A product is creative when it is both novel and appropriate to the tasks.
- To achieve creativity, need (1) "domain-related skills", (2) creativity-related skills and (3) task motivation.
- Research does not show that one can simply assign a "good person" and make him/her creative under any circumstances.
- Creativity skills embrace four cognitive styles (generator, conceptualizer, optimizer, and implementer), and effective creativity requires a blend of individuals having different styles.
- Research shows that the diversity of team members is a key factor in successful creativity. Larry Gastwirt commented that as far back as the early 1980's Exxon Chemical was assessing the work styles of members of various teams (innovation teams, management teams), and had made deliberate attempts to take diversity into account in assigning team members and in understanding and shaping the dynamics of existing teams.
- There are two types of motivation -- extrinsic and intrinsic. Rewards are extrinsic motivators.
- The conclusion, however not surprising, is that creativity comes from the combination of creative talent, a strong focus, and a clear and motivational vision. In practice, companies often do not focus, i.e. put the right or adequate resources on breakthrough projects.

Tony Le Storti reviewed his Symposium presentation entitled "Fast-Tracking Innovation". He described the military's deliberate combining of domain knowledge, creativity expertise, and motivation. His main points are well presented in his paper that appears in this issue.

Significant discussion occurred. In summary:

- Peter commented that establishing an end-date on a breakthrough project is another critical factor for success.
- Also, managers must put concerted, focused manpower on the project; "percent of commitment (focus) depends on criticality of need".
- If asked to choose a leader of a critical breakthrough project from engineering, marketing or previous Profit and Loss experience, Peter's research has shown that P/L experience works best.
- As for a recommended process, Peter and Tony concurred that management must create a team properly (personnel having the right skills and diversity); appoint a team leader with appropriate skills; and put the members through team-building training.
- High performance is motivated by being listened to and appreciated. ■

The Invention/Discovery Team...

Continued from page 4

Learning and creativity are so intertwined that it is sometimes difficult to see where one leaves off and the other begins. This is especially so with regard to the concept of insight. And for initiatives seeking high-level creativity, insight is the desired goal. Insight is that phenomenon in which a person moves from a state of not knowing or from one perspective on a situation to a (radically) new understanding. With regard to problem solving, either the solution appears or the problem is so reconceptualized that a solution is imminent.

The search for insight is at the core of Invention/Discovery Team initiatives. If such teams knew all they needed going in, one might legitimately ask why they have not already produced the inventions or discoveries. Even with expert team members, to be successful, I/DTs must acquire or produce new knowledge. Team members must often have to "learn like crazy" during their short time together, and they have to construct new meaning by combining their knowledge, talents and expertise. Sometimes learning comes about through a fresh approach to research and information analysis. Sometimes it comes about through "unlearning," through the challenging of assumptions or a dramatic redefinition of the nature of the problem.

CHALLENGES

Another lesson learned from the I/DT experience is that there are some challenges to the successful running and support of such teams. Because their time together is relatively short and their stress levels high, team members must be sufficiently freed from other responsibilities to permit their full engagement in the team's work. Because they are usually valued and highly committed members of the organization, freeing them from normal responsibilities is not always easily managed. But I/DT leaders should not have to negotiate release time for team members. If the initiative has enough priority to require such a team, senior man-

The search for insight is at the core of Invention/Discovery Team initiatives. If such teams knew all they needed going in, one might legitimately ask why they have not already produced the inventions or discoveries.

agement, as part of its sponsorship, should ensure that team members will be able to devote sufficient time to the task at hand.

Bruce Tuckman's model of team life cycles (forming-storming-norming-performing) may especially apply to Invention/Discovery Teams. Given the intensity of the I/DT experience, conflict can be predicted, yet exceptional performance is required. It helps to explicitly discuss and establish the team's norms early, including how conflict will be constructively handled. Moving the team from its formation through rough periods and on to high performance requires the constant attention and direction of the team leader and process leader.

And while the apparent challenge is the invention or discovery of new ideas and processes, perhaps the greatest challenge is gaining acceptance for them. New concepts, especially radical ones, tend to activate the organizational "immune system." Fortunately, I/DTs are usually commissioned at relatively high levels within the organization (sometimes even by the CEO). Thus, the idea validation process is often expedited and streamlined. I/DTs often report out their work at presidential or vice-presidential levels rather than negotiate layers of bureaucracy that, by their nature, impede or kill off creative ideas.

But even a high level forum for ideas does not guarantee that good ideas will be moved forward expeditiously. Corporate culture often constrains the decision making process. In today's organizations, champions who will keep ideas alive and in front of decision makers seem a necessity for innovation. As in the past when intermediaries were often instrumental to the successful adoption or promulgation of novel

concepts⁵, today organizational champions, who advocate and fight for innovative concepts, may be crucial to the success of the creative process.

SUMMARY

There is great potential in Invention/Discovery Teams. Often, in a relatively few days, powerful ideas take shape and substantial learning occurs. Additionally, team members usually relate that participation on such teams is in itself very gratifying, and they value the camaraderie that develops. Every Invention/Discovery Team is unique, however, and must be led and supported in ways peculiar to it. The work is tough and not without cost. But as a key vehicle for filling the pipeline with new products and processes, I/DTs are well worth their investment costs. ■

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The author: *Anthony J. Le Storti*

(ajls@ideatects.com) is executive consultant for IDEATECTS, Inc., a consulting firm specializing in creativity, leadership development and the dynamics of human systems.



Book Review

CODE NAME GINGER: THE STORY BEHIND SEGWAY AND DEAN KAMEN'S QUEST TO INVENT A NEW WORLD.

AUTHOR STEVE KEMPER,
HARVARD BUSINESS SCHOOL PRESS, 2003.

By Jack McGourty

So many new technologies today are over-hyped before they become available to the public. For this reason, a book like this can be overlooked or just plain avoided. However, if you like modern day technological adventures chronicling the heat of invention and innovation, this book provides a reasonable measure of fun and a number of important lessons.

Steve Kemper, a freelance journalist, has written the story behind the SEGWAY, an invention that straddles the boundary between human and mechanical transportation.

For those who have not been paying attention, the SEGWAY Human Transporter is an invention based on an idea by Dean Kamen, a prolific (and some would say brash) inventor who happens to have a very keen sense for identifying unmet needs in the marketplace. This uncanny sensibility has led to several medical equipment inventions, including a self-balancing wheel chair that offers individuals with physical disabilities more independence and accessibility to the world around them. The SEGWAY (which during its early development was called Ginger after Ginger Rogers) is a self-balancing scooter-type vehicle that was designed by the same engineers working on the new wheelchair (called the IBOT).

The book details Kemper's accounts of his early and secret access to Kamen, and many of the teams who worked on the SEGWAY (and IBOT) during 18 months in its early design and development period. Unfortunately, this access was denied later in the product development cycle because Kamen believed that Kemper had leaked some details to the press. So the last two years of the book are based on third-hand accounts from venture capitalists, the press, and the like. The author discloses this fact upfront and I do not think it diminishes the story.

A fair question the reader should ask is what lessons will I take away from this book? After all, there are many great books written about the messy and tumultuous process of innovation. Is there any

technology and the people involved.

Secondly, the chronicle of Kamen's dealings with venture capitalists and other outside investors sheds light on what it takes in today's world to fund innovation. Surely, no one can argue after reading this account that even brilliant engineers have to be brilliant communicators. Finally, Kemper's keen eye for detail provides an insightful account into the early "fuzzy" front end of the product development process -- from how the idea is born through the agonizing search for alternative solutions to the problem to be solved. The book is replete with stories on how engineers grapple with one problem after another with associated conflicts, wrong turns, and joyous celebrations for even the slightest progress.

...Kemper's keen eye for detail provides an insightful account into the early "fuzzy" front end of the product development process -- from how the idea is born through the agonizing search for alternative solutions to the problem to be solved.

thing new here? The answer is yes for several reasons.

First, the introduction of the SEGWAY is current and is fresh in our collective minds. In fact, as this review is being written, the SEGWAY is in the midst of its first recall for a problem with the balancing technologies when power supply becomes too low. The reader can easily connect the emerging technology with current societal issues and many of the characters are familiar, thus providing new insights into both the

Whether the SEGWAY itself will dramatically change transportation, as we know it, is a question to be answered in the future. However, if you are responsible for managing new technologies and getting them to market, this book provides a view of what the roadmap from idea to market actually looks like ... and it's not an easy ride. ■

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UPCOMING EVENTS

Seminar – Increasing Shareholder Value using Technological Value Drivers

The inaugural seminar of a Seminar Series in Technology Management, in collaboration with the Columbia University School of Engineering, will take place on Wednesday evening October 29th at Columbia. The speaker is Dr. Boaz Ronen, Visiting Professor, Howe School of Technology Management.

The topic of increasing shareholder value is usually thought about in terms of financial drivers such as mergers and acquisitions, public offerings, etc. Dr. Ronen's unique methodology approaches the issue using the technological drivers that we focus on in the Alliance, such as new product introduction, time to market, more focused product/service mix, and the proper use of costing and pricing practices.

You can register on-line at http://www.engineering.columbia.edu/about_seas/events/

Combined Roundtable and SATM Advisory Board Meeting

The next SATM-ELI Roundtable meeting will be held on Monday, November 17 from 1:00 - 5:00 PM at Lucent Technologies in Whippany, NJ. The topic is Workplace Transformation for the Knowledge Economy. The meeting will be facilitated by Brad Allenby, Vice President for Environment, Health and Safety at AT&T.

The meeting will be combined with the 2003 SATM Advisory Board meeting, which will take place during the first hour. During the Advisory Board meeting we will hear from the Executive Leadership Institute with the first results derived from the Global Technology Confidence Indicators analysis. All attendees are encouraged to attend the entire combined meeting, and to partake in a buffet luncheon that will be available from 12:00 to 1:00.

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

INFORMATION

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ELI- Executive Leadership Institute
Wesley J. Howe School of Technology Management
Stevens Institute of Technology
1 Castle Point on Hudson, Hoboken, New Jersey 07030

Editor
Dr. Jack McGourty

SATM Director
Dr. Lawrence Gastwirt

ELI Dean
Dr. Michael R. Cooper

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