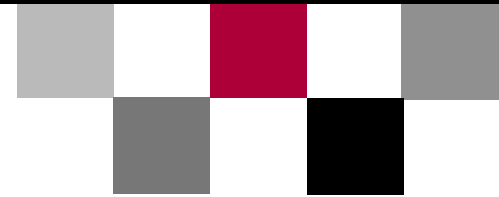# Competing in the Knowledge Economy:
The Network-Centric Firm

Joseph Roitz and Braden Allenby

1. Introduction

Over time, it has become apparent that the context within which firms and industrial systems function differs in fundamental ways from the past. The complexity of the operating environment has increased dramatically; the role of information and knowledge as both essential inputs, and critical outputs, is evident; the pressure of competition is ever more intense; technological evolution, and concomitant surprises from disruptive technologies, is more rapid and unpredictable; and globalizing capital and labor markets, financial systems, and demand and supply structures are new, relatively unknown, but powerful forces buffeting individual firms.

Under these circumstances, it is not surprising that the internal and operating structures of firms evolve as they try to remain viable and meet new and unexpected challenges. Thus, the decentralization of power and authority in firms, and the creation of networks of information which enable localized decision-making and response, are appropriate adaptive responses to an unpredictable and rapidly changing external environment if done properly. These efforts to evolve are often tentative -- not surprising, given the new circumstances -- and, perhaps more importantly, are often challenged explicitly and implicitly by those who are either unable to manage the necessary change, or for whom the change poses an institutional or personal threat.

In some ways, this is understandable, for both current firm structures and management styles tend to reflect the more recent dominant economic paradigm, the manufacturing economy. Thus, knowledge workers work within systems that presuppose that thinking -- knowledge creation -- occurs only during certain hours of the day, and never on vacation or weekends. The globalization of firms and economic activity has made time and place obsolete as meaningful determinants of whether work is being done, yet firms still require most workers to trundle in and out of facilities each day (a.k.a. "commute"), at a significant cost of time for both individual and firm.

DIRECTOR'S NOTE

The articles in this edition deal with the timely topics of working in dispersed, "virtual" environments, and outsourcing. Both trends are becoming increasingly prevalent, as organizations search for ways to operate more effectively in ever more complex and more competitive environments.

The trends are, clearly, related. Effective outsourcing, especially when applied to technology development, relies on an infrastructure of information networks that enables working in dispersed environments. Four SATM Roundtable meetings have been devoted to these subjects over the last 15 months.

The Roitz-Allenby article treats one aspect of the network-centric firm, telework/virtual offices. AT&T has some 10 years of experience in this area, and the authors summarize the benefits gained and some of the important learnings. The article by Karen Lojeski provides insight, based on her current research, into the practices needed to ensure that innovation is sustained against the backdrop of outsourcing.

We are pleased with the juxtaposition of these two articles, for they exemplify so well what the Alliance offers: the sharing of best practices by leading-edge business practitioners, and the actionable results of relevant research studies underway at the Howe School. The articles represent important contributions in their own rights; together, they illuminate complementary facets of an important larger theme.

Larry Gastwirt

Competing in the Knowledge Economy...

Continued from cover

Still, if something isn't broken, why fix it? The answer in this case is obvious. Network-centric organizations, in which space and time are not bound by four walls and the traditional nine-to-five work schedule, are more flexible, more efficient, more productive in terms of both labor and capital, and more adept at both using knowledge, and producing knowledge

In this paper we will focus many of our comments on a particular aspect of the network-centric firm, telework and virtual offices. But it is important to recognize that these practices are only one dimension of a much more fundamental shift in the economy, and in firm structure generally, and cannot be effectively managed as just a standalone initiative. To take an

of work away from static, place-based configurations. Over one-third of AT&T managers (39%) now work from home at least once a week, including those in a virtual office. Another 24% do so occasionally, as needed to meet the demands of the job.

...the decentralization of power and authority in firms, and the creation of networks of information which enable localized decision-making and response, are appropriate adaptive responses to an unpredictable and rapidly changing external environment...

and services as outputs. When work is structured around networks instead of buildings and clocks, productivity and job satisfaction simultaneously increase while the costs of real estate go down.

Networks allow diverse, dispersed teams to rapidly collaborate and the company to recruit talent that cannot or will not relocate, including those within non-traditional labor pools such as seniors and the disabled. Moving the work to the worker (instead of the worker to the work) wherever practical reduces congestion and air pollution. And if work is not tied to buildings or any particular location, then companies and communities can better prepare for and react to disasters. Our experience and data suggest strongly that an organization organized around networks, not buildings, is a more efficient, effective, flexible and resilient organization.

Data indicate that employees of such firms are more productive on both a per-person and a per-hour basis -- and they, and their families, are happier with their work to boot. So the simple answer is that those firms that learn to manage as knowledge-based economic producers, rather than pretend that they're still automobile assembly plants in the 1950's, will prosper. Their laggard competitors will fail. Schumpeter's gale of creative destruction may be fierce, but it is not illogical.

obvious example, if a firm implements virtual offices but puts none of its critical information (e.g., company practices, voucher systems, purchase and accounting functions, personnel forms) on-line, and if it fails to beef up its information and technology systems support team to manage a dispersed environment, it will fail. Adjustment to new economic conditions is seldom trivial.

2. Telework and Virtual Officing – Benefits and Barriers

AT&T has over ten years of statistically valid, longitudinal data on employee telework, beginning when telework was viewed as a tactical response to the Clean Air Act, through today's emphasis on business efficiency, business continuity and the necessity of operating in a global knowledge economy. The following information is adapted from "Creating a Network-Centric Future: Summary of 2003 AT&T Employee Telework Research" by Allenby and Roitz.

In 2003, the percentage of AT&T managers who telework full time in a "Virtual Office" increased to 22% -- more than doubling since 2001. Virtual officing is one of the best indicators of the movement to a network-centric enterprise, since it represents an almost complete movement

Among other things, these data illustrate that one of the most common misconceptions about telework -- that it will somehow stop ad-hoc "water cooler" collaboration -- is more fear than reality. Most teleworkers do not disappear into cyberspace, to be intermittently spotted at Parisian Cafés or Utah canyons. They still spend a substantial amount of time in the office, working face-to-face with their coworkers, or traveling to meet with customers or business partners in person (indeed, assuming that all work must take place within the confines of a particular building is practically building in an exclusion of input from the external world). We've found that even workers who work full time from home still visit corporate offices as often as every week. The key point is that telework doesn't dictate that work be done from home; it simply allows it to be done from the optimally productive location -- or by talented employees who cannot or will not relocate.

In 2003, AT&T received over $180 million in operational benefit from telework. Most of this -- about $150M -- is due to increased productivity, while real estate reductions -- about $30M -- are also significant and an important component of the internal driving force for change. Telework also produces harder to quantify but still important business benefits in

2003 Telework Frequency – AT&T

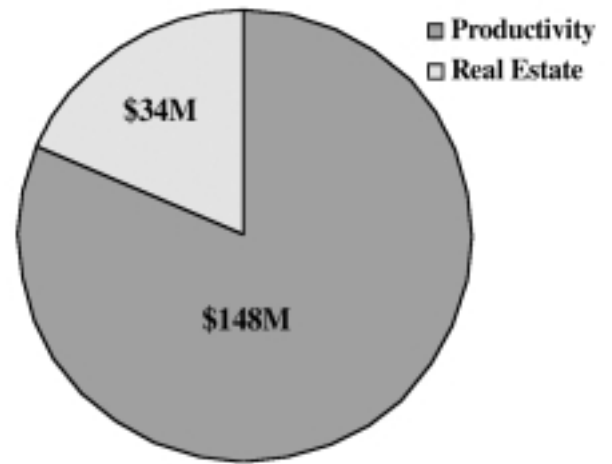|	
Occasional *(1-4 days/month)*	24%
Frequent *(5+ days/month; not VO)*	17%
Full time Virtual Office	22%
Mean	9.5 days/month
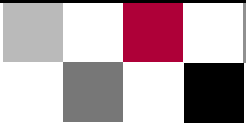
areas such as business continuity, recruitment, retention, and employee morale/job satisfaction.
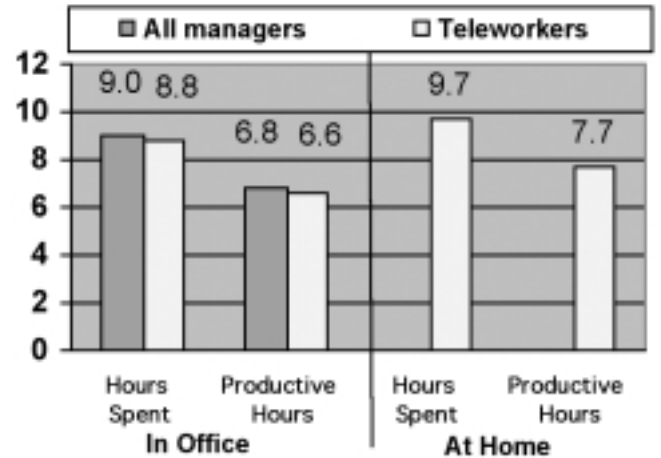
Beginning with teleworker productivity, AT&T managers over the years have consistently reported gaining about one extra productive hour each day they work at home. Much of the increase is from the time saved by not commuting, but gains also arise from removing many of the distractions in the traditional office. Working at home provides a quiet environment for concentration and an increased ability to manage one's own time by avoiding unnecessary interruptions (necessary interruptions being as close as the telephone or Instant Messenger). Telework allows activities that formerly were mutually exclusive, such as waiting on the plumber and building the budget spreadsheet, to be done simultaneously. And telework gives the knowledge worker the freedom to work at those times when they are at their most productive, creative and energetic.

Network-centric organizations, in which space and time are not bound by four walls and the traditional nine-to-five work schedule, are more flexible, more efficient, more productive in terms of both labor and capital, and more adept at both using knowledge, and producing knowledge and services as outputs.

At the risk of beating a dead horse, productivity even surfaces when employees are asked about the major advantages of telework, slightly edging what conventional wisdom says is the top benefit of telework, work/family balance -- and in an industrial-age structure, these two needs tend to be thought of as mutually exclusive. An unsurprising product of a network-centric structure is a high-trust management style, focused on results rather than appearances. Financially, teleworkers say both they and the firm save money by

The Business Benefit of Telework to AT&T - 2003

☐ Productivity
☐ Real Estate

$34M

$148M

2003 Work Hours

☐ All managers   ☐ Teleworkers

In Office: Hours Spent 9.0 / 8.8, Productive Hours 6.8 / 6.6
At Home: Hours Spent 9.7, Productive Hours 7.7

We perform several tests to help validate this self-reported data on productivity. Non-teleworkers are asked the same questions on work hours and productive hours, and their results compared. Special studies show that our employees who work full time in virtual offices are more likely to be rated as promotable (by management) than their peers who work in traditional offices. Where we've been able to capture data from control groups or before-and-after virtual officing installations, we've seen from 10% to 20% increases. Benchmarking provides a rash of similar experiences.

the arrangement, even though many teleworkers use their personal broadband and home office equipment to work from home (but save on gasoline, automotive wear and tear, dry cleaning, and the like).

All of these advantages directly contribute to job satisfaction. Almost 2 out of 3 teleworkers (63%) report substantially increased job satisfaction after beginning to work from home, and even more (72%) report substantially increased satisfaction with their lives outside of work (only 3% say that their satisfaction has decreased, a side effect of our self-selection process for teleworkers). Again emphasizing the link

Major Advantages of Telework

(% saying Major Advantage):

Improves productivity	73%
Balance work and family	72
Promotes trust	67
Company saves money	66
Keep / attract best people	60
Employee saves money	56
Shows that the firm cares	55

between telework and productivity, almost 1 out of 3 teleworkers (31%) say that the arrangement has had a positive effect on their careers, while 60% of tele-workers say that telework has had no effect. Only 8% have experienced a negative impact.

With benefits like these, why isn't every-one teleworking? For one thing, not every employee has a suitable work environment at home, the classic example being the spouse who gives piano

has become more ubiquitous, many if not most of the systems required to do work have migrated to the intranet, and remote access to the network (via Virtual Private Networks) has become easy and inex-pensive. New technologies such as Voice over IP hold the promise of signifi-cantly reducing the barriers to telework due to lower cost, faster deployment and true location transperancy (as in tele-phone numbers that seem to be located in Manhattan but ring in Arkansas).

Major Reasons More Employees Don't Telework:

% Saying Major Reason

Reduced visibility	44%
Need to interact with others	41
Management style	40
Don't have equipment	37
Loss of camaraderie	35
Lack of broadband access	32
Lack of trust	29
Separation of work/personal life	26
Isolation or loneliness	23
Produces overwork	19
Employees don't ask	16
Help desk	14
Reduced productivity	13
Cost	12

Those firms that learn how to operate in the knowledge economy first will gain significant competitive advantage over their peers, a dynamic that will also operate at the level of national economies.

lessons. One of the most fundamental telework principles is that the arrange-ment should be transparent to customers and coworkers. Beyond this, our data show that "people" factors such as reduced visibility, the need for human interaction and management style are the chief reasons telework participation is not higher. This is not unexpected -- our par-ticipation data over time shows that employees usually start out teleworking only occasionally, increasing their fre-quency as they learn how to interact and manage virtually. Technological factors -- high barriers in the past -- have now become second-tier issues as broadband

3. Conclusion

Telework and the more general work-place transformations that occur as firms evolve from a manufacturing, place and time-based model towards a network-cen-tric model are, on the one hand, relative-ly trivial extensions of what already hap-pens today, as global firms with signifi-cant operations around the world learn to operate 24/7 with spatially and tempo-rally separated employees and contrac-tors. On the other hand, the shift is a complex one involving many different organizations in a firm, and requires an intelligent and coordinated strategy if it is

to succeed. Those firms that learn how to operate in the knowledge economy first will gain significant competitive advan-tage over their peers, a dynamic that will also operate at the level of national economies. Some will no doubt continue to fight the evolution of the network-centric firm, or of implementation strate-gies such as telework and virtual offices. But the efficiency of the network-centric model, appropriately adapted to particu-lar sectors and firms, is inexorable, and over time will become the new operating model of the knowledge economy. ■

About the Authors:

Joseph Roitz (jroitz@att.com) is AT&T's Telework Director. Under his leadership, the program has grown to generate over $180M in annual business benefit. The program has won multiple awards, and Network World magazine called AT&T the "ultimate telework poster child." Prior to this assignment, Joe held a broad range of positions in Technology Management, Operations, Engineering, R&D, Finance, Quality and Communications.

Dr. Braden Allenby (braden.allenby@asu.edu) was a key player in the AT&T initiative to implement the "virtual office" scenario in his position as Vice President for Environment, Health and Safety. Brad and his team were responsible for assessing, resolving and implementing this concept on all fronts: technology, process, policy and the soft side of career, environment and psychological impacts. He left AT&T in 2004 to become Professor of Civil and Environmental Engineering, and of Law, at Arizona State University.

Managing Outsourcing Strategies to Ensure Sustainable Innovation Performance

Karen Sobel Lojeski

A company's commitment to innovation is directly related to its long-term success. With the outsourcing of business functions in order to cut costs, streamline processes, and improve competitive standing, many have speculated on the link between outsourcing and innovation.

Corporate executives have long argued that outsourcing non-critical activities to focus on core competencies leads to higher productivity and increased innovation. Carly Fiorina, Chairman and CEO of Hewlett-Packard, has been widely quoted as saying, "There is no job that is America's God-given right anymore." Her company and many others employ outsourcing strategies in an effort to make their operations more efficient and able to sustain innovation over the long haul.

Politicians have inevitably entered the out-sourcing - innovation debate. Some talk of the need to ensure free trade so that competition can flourish and innovation can thrive. Others argue that for the US to remain the dominant competitive world leader, jobs at home must be made more secure and less subject to the corporate need for low cost labor. Lou Dobbs, in his book "Exporting America", goes so far as to say that it is a "matter of national security".

The varied views reflect a debate being held at the national and industry levels. Few, however, have attempted to assess outsourcing's impact on innovation at the micro or company level, although some insightful anecdotal evidence is beginning to appear in mainstream business media. Business Week's October 11, 2004 cover reads, "The Innovation Economy: Special Report – The Technologies and New Ideas That Are Changing the World." One of the issue's articles, "Scouring the Planet for Brainiacs", stresses that worldwide innovation networks, comprised of in-house as well as outsourced

workers, are the new keys to R&D's "vitality and competitiveness". It is filled with stories about how companies including Microsoft, IBM, and others, are using global sourcing as a way to develop higher levels of innovation. Another source, The Centre for Research in Innovation and Competition at the University of Manchester asserts that "Firms, even large multinational corporations, can no longer expect to be totally dependent on their in-house research and technology resources to maintain innovative performance".

In contrast, The New York Times on December 19, 2004 described Dell Computer's homegrown assembly strategy. According to their account, all of Dell's assembly plants remain in the US and the company is arguably the most competitive, efficient computer company in the world. Experts from all fields agree that Dell, like no other company of its kind, has managed to figure out the productivity puzzle without hiring a single off-shore and/or outsourced assembly laborer.

In an effort to further enhance its competitiveness, Dell continuously asks its workers to innovate in its quest for higher efficiencies and lower costs. In a recent effort to drive increased productivity, one experienced assembly employee, who had been with the company for many years and knew how each and every second of assembly time was spent, suggested the re-design of one of Dell computer's innards, an innovation that enhanced the product while speeding up assembly time. Innovation, in this case, was achieved through constant collaboration among in-house, on-shore workers.

So which strategy should a company use, and when? On the one hand, companies claim to have expanded their innovative capabilities through outsourcing. On the other, a powerhouse like Dell attributes much of its success to a strategy that keeps their assembly plants here in the US and uses local workers to innovate. How can executives get beyond the multitude of anecdotes in business periodicals, newspapers, consulting journals, and television talk shows and under-

stand the impact that outsourcing can have on innovation within their own organizations? What should companies do to maximize innovative performance and at the same time achieve optimum cost structures?

Our research may hold some insights. For over two years, we have been interviewing senior executives and surveying project teams in a diverse set of companies -- from large, multinational corporations to smaller organizations -- about these and related topics. Our findings reflect analysis of 17 different organizations representing the financial services, manufacturing, healthcare, government, software, and outsourcing industries. We currently have analyzed over 200 cases and our initial results, with respect to the impact of outsourcing on innovation, suggest that executives need to focus on some basic and historically important issues as they source from the global market.

Although the long-term effects of extensive outsourcing on innovation are as yet unknown, our findings indicate that certain factors that have been important to innovation in the past are affected when the backdrop of outsourcing is imposed. Executives need to understand these factors and monitor the effects of changes in the business's culture of innovation.

PriceWaterhouseCoopers' recent report, "Innovation Study," showed that highly innovative companies come in many different shapes and sizes: from technology to textiles, engineering to education. The successful companies were differentiated from their relatively less successful counterparts in a number of key factors, grouped under three categories: innovation climate, people, and the process of innovation. We find that these key factors are affected by outsourcing in varying ways and degrees. Understanding the relationships will be vital to achieving future innovation performance in a climate of outsourcing.
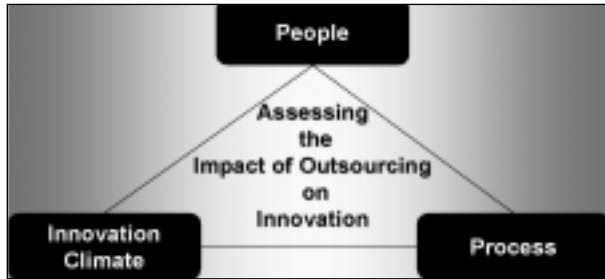
The major conclusions of our research, in the context of the key innovation factors, are contained in the eight key findings summarized here.

Managing Outsourcing Strategies...

Focus on the Basics: Innovation Climate, People, and Process

Factor 1. The Innovation Climate

The innovation climate can be described as the "feeling" one gets when walking through the company's doors. It is the atmosphere established by a leadership that is committed to the pursuit of new ideas and the encouragement of individuals to set loose their creative juices. If a person believes that the climate is open and that their input is valued, then individuals are more likely to use their capabilities to innovate.

Outsourcing often involves distancing leaders from followers and peers from peers. The proverbial "doors" to the company offices are often virtual, and are sometimes difficult to discern. Leaders can find it challenging to hang on to coherent, well-defined messages regarding creativity and openness.

Key Finding 1: Our analysis shows that those who feel more distant from one another, whether in the form of geographic or socio-emotional distance or both, tend to be less innovative.

Key Finding 2: There is a significant and positive relationship between innovation and project success. In cases where team members felt free to use creative ideas toward achieving their goals, project success, measured by on-time, on-budget, and customer satisfaction performance, was significantly higher than among those that perceived the innovation climate to be negative.

When companies outsource some or all of their operations, innovators throughout the entire organization are often subject to mixed messages with regard to the stability of their own positions. In April 2004 a former Agilent employee said in an interview

with Fast Company, "We've had throwaway clothes, throwaway cars, and now we have throwaway people." When outsourcing becomes part of the organizational strategy, it is likely to influence the innovation climate. This leaves individuals, as well as the company as a whole, susceptible to related risks of innovative inhibition and other defensive mindsets.

The behavior of role models and leaders is crucial in sustaining a positive innovative climate.

Key Finding 3: There is a strong relationship between a positive innovation climate and leadership. Team members who believed they were free to express new ideas and use unique problem-solving techniques also believed that their leadership was strong, highly effective, and cared about their organizational future.

Key Finding 4: Our data also show that those who feel more distanced from their fellow team members perceive their leaderships to be less effective.

Given these confluences between innovative behavior, distanced workers, and leader effectiveness, the need for good managers becomes even more critical. To maintain a vibrant innovative climate, especially when teams are distanced by space and time or psychological factors, leaders need to focus on ways to reinforce innovator confidence, while outsourcing continues.

Frequent communication, messages of encouragement, and visits in person to those responsible for the ideas of tomorrow, will help to stave off widespread negativity. Exemplars must serve as cultural liaisons, helping followers, who have varying backgrounds both demographically as well as organizationally, to get to know one another. This will help create a free-flowing atmosphere conducive to the generation of new ideas.

Factor 2. People: Trust Is the Key

Historically, when stable, established, business models prevailed, trust was considered a traditional, unthreatened quality of most organizations. Trust in leadership,

team members, and the innovative climate, all contributed to high levels of new product and service developments. In the PwC study referenced above, trust was found to be the single most significant factor influencing successful innovation.

As companies outsource to disparate global provider networks, however, trust is often one of the first things impacted in a significant and negative way -- opening the possibility for erosion of innovative performance.

Key Finding 5: There are strong and significant relationships between trust levels and feelings of distance among team members. Those who feel less distanced from one another have higher levels of trust.

Key Finding 6: High levels of trust correspond significantly to positive innovative behavior. This supports the finding in the PwC report that trust is a key input to innovation.

Key Finding 7: There is also a highly significant correlation between trust and leadership, underlining the need to focus on this aspect of the link between outsourcing and innovation.

In what Business Week termed "worldwide innovation networks", distance and cultural anomalies become interwoven into a set of complex corporate relationships while individuals are left to their own devices to assess whether their new found co-workers can be trusted. In these uncharted waters, some find it hard to conceptualize the notion of trust and how to measure it, let alone how to minimize the lack of trust that can emerge. In an interview with a large multinational financial services company, that uses worldwide outsourcing extensively, one executive described it in this way: "I have thought about this a lot. I am not sure how to assess if I trust someone or not. I am trying to use old markers to evaluate virtual workers and this does not work."

Most managers told us that trust in an outsourcing arrangement is most often measured by on-time, on-budget project deliverables. While this is one facet of why individuals and organizations tend to trust one

another, other factors such as building rapport and personal risk-taking on behalf of others, are just as important -- if not more so, over the course of time and multiple projects and partnerships. It is no coincidence that the trust measures of on-time, on-budget performance are also key criteria in most service level agreements. It makes sense that the SLA or contractual obligations are used as substitutes for traditional trust measures in globally and organizationally disbursed environments. But in doing so, teams and organizations alike might be losing innovative potential.

To guard against the detriments that lack of trust can have on innovation, leaders need to create shared team experiences that support cultural understanding and relationship-building and emphasize common goals. Seeding teams with a few members that have worked together in the past, who are specifically trained to develop trust among new members coming into projects without previous working history, will lead to longer lasting social networks within global partnerships.

Factor 3. The Innovative Process

Creative individuals take information from diverse sources and find patterns in that information, which lead them to solve problems in new ways. A successful power broker on Wall Street described this phenomenon in the following way:

"Analysts today have 5 terminals on their desks, maybe more. I like taking all the paper-based reports, articles, research, and anything else I can get my hands on and lay them all out on a big table. I walk around and look at the different pieces of information and try to find the pieces to a puzzle. In this way I can determine what companies are likely to be good investments. I like the fact that I can see everything all at once. I can't find complex patterns on a computer screen, one image at a time."

Piecing together puzzles, a cornerstone of

innovative thinking, depends on a "system-wide view" of the domain. As connections between system elements increase, information flowing along those connections increases and new possibilities emerge, possibilities that would not have been produced purely by logical analysis. Outsourcing sometimes takes components of an organizational system and de-couples them from the rest. By separating certain individuals, departmental functions, and business processes, innovation may be affected because certain key connections, as described above, may never be made.

On the flip side, outsourcing provides companies the opportunity to add more experts to their resource pool. By adding new nodes to the network in the form of other organizational entities, the chances of increasing innovative performance may improve. As new people are added to the mix of problem solvers, companies can benefit from their fresh perspective and ties to a common goal. It is this promise that drives the creation of the global innovation networks described in "Scouring the Planet for Brainiacs." These networks consist of in-house engineers, contract designers and manufacturers, university scientists and dozens of technology suppliers.

> *Key Finding 8:* *Innovation is positively related to goal interdependence, face to face interactions, and clear communications between culturally distinguished team members and organizations.*

Leaders and outsourcing managers should ensure that the goals of team members are closely linked. Project mangers should consider holding face-to-face meetings when possible, especially at critical junctures in the project and to prepare for important customer interactions. In addition, frequent, active discussions about the business context (the system-wide view) and how each team member is connected to it in a meaningful way, will expose innovators to issues they need to understand in order to effectively exercise their creative powers.

In summary, the issue of outsourcing and innovation has been a topic of discussion by businessmen, pundits, and politicians for quite some time. However, until recently, their focus has been on macro-level issues -- concerns that are critical to things like economics and free trade, but that do not necessarily help executives to understand the innovation impacts of outsourcing within their own organizations. While outsourcing has provided increased short-term profit due to lowered labor costs, what has been its longer-term effects on innovation? If, in the long-term, competitive advantage turns more on innovation than on labor costs, how can outsourcing strategies be effectively executed to ensure sustainable innovation performance? While the answers to these questions are still forming, executives can find guidance for managing outsourcing while sustaining -- or enhancing -- innovation performance from our research.

First, *companies must maintain a positive innovation climate. This can be challenging in environments where concrete blocks and street addresses no longer define the organizational space. Leaders are critical. They must focus on infusing the innovative atmosphere with positive reinforcement and cultural experiences that help distanced workers acclimate to their teams and in turn, together create radical or incremental innovations.*

Second, *companies must work with innovators worldwide to promote trust and shared responsibility. Trust is the most important factor in the innovation of new products and services, yet it is the first thing that is tested and often lost in global relationships.*

Lastly, *organizations need to proactively and clearly illuminate the broader business context for dispersed and compartmentalized workers. It is only when complex puzzles take shape, and combine with creative flair, that innovation thrives.*

Karen Sobel Lojeski (klojeski@stevens.edu) has held leadership positions in industry for 20 years. She currently serves as the Program Executive for the Business and Technology Program at the Howe School of Technology Management at Stevens Institute of Technology, where she is completing her PhD in Technology Management.

SATM
STEVENS ALLIANCE FOR TECHNOLOGY MANAGEMENT

2004 IN REVIEW

The Alliance conducted eight major meetings in 2004. Our annual conference, on the topic Retaining and Motivating Key Technical Personnel, was held at AT&T in May.

Five Roundtable meetings were conducted:

- Managing the Outsourcing of Technology Development and Support (ARDEC, Feb.)
- Sustaining Innovation While Outsourcing Technology Development (ISO, April)
- Working Virtually: What does it mean? How does it function? (Lucent, July)
- Strategic Alignment of Information Technology and the Business (Unilever, Sept.)
- Selected Faculty Research Presentations (Stevens, November)

Two Seminars were co-sponsored in collaboration with the Columbia University School of Engineering:

- Strategic Project Leadership (Prof. Aaron Shenhar, March)
- Strategic Alignment of Information Technology and the Business (Prof. Jerry Luftman, Nov.)

UPCOMING EVENTS

ROUNDTABLE MEETING, FEBRUARY 8

The Alliance begins its fifteenth year with the first Roundtable meeting of 2005, on Tuesday, February 8 from 2:00 - 5:00 PM at ARDEC, Picatinny Arsenal. This meeting begins a new series devoted to taking a comprehensive, systemic approach to the general theme of innovation. The specific aim of this initial meeting will be to map the key elements and interrelationships embodied in the innovation process, and to identify the specific interests of Sponsors, which will shape the agenda for subsequent meetings. Tony Le Storti of Ideatects will be special guest facilitator.

The remaining Roundtable meetings for 2005 will be held on April 19, July 12, September 20, and November 15.

SEMINAR SERIES IN TECHNOLOGY MANAGEMENT, MARCH 23

The fourth seminar of this series, sponsored in collaboration with the Columbia University School of Engineering, will be on Wednesday evening March 23rd from 6:30-9:00 PM at Columbia University. The speaker will be Dr. Frank Castellana, on the topic strategic management of biotechnology and pharmaceutical companies.

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

INFORMATION

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