

Panel
Escaped from the Lab:
Innovation Practices in Large Organizations

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Abstract

What are the effective practices for taking new ideas and innovating them into products based on software while avoiding the challenge of under-delivering on too high expectations? Often, the feasibility of "The Grand" project is assumed based on scope/scale-limited tech trials. Feasibility is further constrained by "market pressure" on both schedule and resources resulting in costly projects that linger on and never deliver. Panelists will discuss how invention translates into innovation and product while mitigating the risks of software development, the conflicts of organizations and the lure of market opportunity.

Categories & Subject Descriptors:

K.0 Computing Milieux
K.1 Project and People Management
K.4.3 Organizational Impacts

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1. Steven Fraser (*panel impresario*), sdfraser@acm.org

Innovation takes many forms – and success depends highly on context. "The lab" suggested by the title of this panel includes corporate, university, and government facilities since innovation is not limited to product-driven organizations. Tech transfer may be achieved by face-to-face meetings (one-on-one, workshops, conferences), prototypes, pilot projects (to mitigate risks), customer interactions, the transfer of personnel and other catalysts. While innovation has traditionally been achieved by "research and development," some organizations have successfully executed "acquisition [of companies] and development" strategies. We

believe that fostering tech transfer and innovation collaborations between product teams and research organizations – particularly those in universities – is essential for both the quality and diversity of ideas – and to attract and retain new technical expertise as post-graduates decide on their first post-graduation role (either within a corporate or an academic setting).

STEVEN FRASER joined the Cisco Research Center in San Jose California in July 2007 as a Director (Engineering) with responsibilities for developing and managing university research collaborations. Prior to joining Cisco Research, Steven was a Senior Staff member of Qualcomm's Learning Center in San Diego leading software learning programs and creating the corporation's internal technical conference – the *QTech Forum*. Steven also held a variety of technology management roles at BNR and Nortel including: Process Architect, Senior Manager (Disruptive Technology and Global External Research), and Advisor, Design Process Engineering. In 1994 he spent a year as a Visiting Scientist at the Software Engineering Institute (SEI) collaborating with the Application of Software Models project on the development of team-based domain analysis (software reuse) techniques. Fraser is the Corporate Support Chair for OOPSLA'08, the Tutorial Chair for XP2008 and the Tutorial Co-Chair for ICSE'09. Fraser holds a doctorate in EE from McGill University in Montréal – and is a member of the ACM and a senior member of the IEEE.

2. Ethan Hadar, ethan.hadar@ca.com

"Researchers are from Venus and Developers are from March:" Can they effectively produce innovative ideas?

In an enterprise scale organization, bridging the gap between visionary strategic and tactical implementation teams is not trivial due to the inherited timeframes of the development cycles of these two agendas.

Industrial development teams focus on delivering tactical short-term solutions, and cannot afford to be delayed by strategic thinking without evidence-based success. Strategic research, or long-term goals, as in our case, might hinder them from doing so. It is not just a matter of feasible tasks prioritization, meaning ones that can be accomplished within 18 months duration, rather detecting what is actually important, and practically doable in a market constraint environment. Is it worth the attention?

Actively self-selecting a project generates a great buy-in. However, a person that selects the project, will probably choose a topic that serves his or hers immediate needs and can be measured/supported by the individual's direct management. Most likely, it will be one that can be done within the scope of up to 18 months (R&D horizon).

To make it a little bit more interesting, add the fact that people move around, roaming from one position to another. A research project that is tightly coupled to personal self-selection, and not fully backed-up by leadership with deep (product related) breath will probably run out of air. So, if we work with Universities, where doctoral research lasts for three years or more, we need to minimize the distance between the planets by constructing a dynamic flexible bridge.

Since the planets orbit at high speed, the dynamics of the strategic to tactical connecting bridge should be carefully maintained. In CA Labs, the managers are involved in constant adjustment and alignment of goals and deliverables. Some of our principles are:

- Passionate research teams built from R&D developers and managers, product management, CA Labs researchers, and university faculty and students
- Execution based on incremental research approach and constant delivery, agile development style, using a "slice-and-dice approach" that defines the research deliverables incrementally, constantly aligning expectations
- Constantly evangelizing the project to executives and senior management
- "Excitement generation" of innovative spirit within the development organization by means of educational sessions and internal champions
- Motivate research partners to present results throughout research lifecycle to foster commitment and collaboration

In conclusion, successful transition of innovation from "labs" to "products" is dependent on the formation of motivated collaborative teams that include tactical thought leaders generating sustained commitment from company execs.

ETHAN HADAR is VP Research at CA Labs, based in Israel. His responsibilities include leading strategic research in architecture, design and modeling, in collaboration with CA R&D groups and academia. Ethan's recent research inter-

ests include architecture and design in Service Oriented Architecture (SOA); Architecture Centric Evolution (ACE); Object Oriented Design (OOD); Knowledge Management Architecture; Multidisciplinary Applications in ITIL; and "Time to Value" projects that accelerate the assimilation of tools within CA customers' sites. Prior to joining CA, Ethan was the principal architect at Mercury Interactive, now HP Software, where he developed new methodologies in software engineering, service oriented architectures, and object oriented technology. Ethan served as faculty at the Netanya Academic College, as well as adjunct faculty at the Technion, Israel Institute of Technology. Ethan has over 18 years of experience in consulting and mentoring R&D teams on topics related to software architecture and product design. He holds a Ph.D. from the Department of System Analysis and Operations Research at the Technion.

3. Dennis Mancl, mancl@alcatel-lucent.com

The most important achievement for a successful innovation is its "escape from the lab." In today's communication-rich environment, moving a technology from the mind of the inventor to the global marketplace ought to be easier than ever, but at least three obstacles loom. These obstacles are information overload, winner-take-all management, and mash-up culture.

So what are the best ways to get an innovation over the wall? There are two basic approaches that must be done in parallel. On one hand, create the artifacts that the users need and make them accessible: user tutorials, killer examples, open source downloads, and O'Reilly books. But at the same time, build a bridge to the technology through a set of human resources: gurus, trainers, coaches, and other technology transfer agents.

DENNIS MANCL is a Distinguished Member of Technical Staff at Alcatel-Lucent in Murray Hill, NJ. His interests range from software requirements practices to legacy code transformation techniques. He has worked 27 years in many roles in the technology transfer process.

4. Bill Opdyke, opdyke@acm.org

What are some of the key enablers for successfully transitioning & leveraging advanced technologies into product development? Based on my experience, enablers include:

- Business Need and Cool Technology
- Product/ project champion.
- High caliber technical staff.
- Supportive executive management - kept "in the loop".
- Researchers who can talk the language of business and can forge alliances with sales, marketing and product development.
- Flexibility, persistence, communication and collaboration skills - and a willingness to take on a range of roles.

In large organizations, there are typically many stakeholders whose concerns need to be addressed in order for such a transition to be successful. Executives, middle managers and technical staff differ considerably in their span of concern, willingness to embrace new ideas and tolerance for risk; there are also considerable differences among marketing, R&D and support organizations. Satisfying customer needs is critical for marketplace and financial success; understanding and addressing customer needs is especially challenging in highly competitive markets and where innovations often redefine the markets. Finally, there can be unforeseen technology risks, many of which surface during technology & market trials and product development, but some of which may not surface until attempting a broader deployment.

Innovation can be fun – but it is not for the faint of heart!

BILL OPDYKE has spent much of his career focusing on the technical and organizational issues related to transitioning advanced software technologies and software engineering techniques into product development. At Motorola, he is part of an advanced technology team focusing on home networking related middleware and on techniques for improving productivity and reducing costs of software developments. While at Bell Labs, he was technical lead on several advanced development projects where he gained a keen appreciation for the challenges in leveraging emerging technologies and in extending existing products to meet emerging market needs. He also spent several years as a faculty member at North Central College. His doctoral research at the University of Illinois, focused on object-oriented refactoring (supporting the process of change to object-oriented software).

5. David A. Owens, daveo@exovate.org

The Constraints of Chaos

Innovators often fail to consider how the “context of innovation” is likely to constrain innovation efforts. While we readily acknowledge and assume that we’ll need to transcend individual-level creativity constraints to get to a new place, we tend to spend little effort examining (or managing) the many other kinds of constraints on our development efforts. As we have all surely experienced, a wealth of individual creativity in a team or organization does not ensure successful innovation.

For example, we know that innovations are pursued by social beings interacting in social units (i.e., teams); yet we don’t often challenge or change the social practices in our organizations that will affect teams’ ability to innovate.

We know that the innovation process is performed within an organizational structure that we can know and control; and yet we rarely examine how the demands of that structure helps or hurts our ability to innovate. We know that the competitive landscape of an industry poses significant constraints on the particular innovations that are likely to

be strategically significant; yet we rarely explicitly share the big picture of our firm’s strategic vision with our development teams. Finally, every innovator knows that market adoption is the ultimate arbiter of the true value of an innovation; and yet we ignore the fact that our “propositions for change” (i.e., our innovations) must be even more compelling to the adopters—those whom we are asking to change by accepting our innovations—than they compel the innovators themselves. Innovation is difficult to do since it is, ultimately, a complex social activity that occurs in a complex social context. But it doesn’t have to be that difficult to understand. What’s required is a willingness to move beyond our own intuitive or disciplinary view of what makes innovation work, and to remember to apply what we already know about the psychology, the social-psychology, the sociology, the political science, the economics, and the anthropology of innovation.

DAVID OWENS has served as CEO at Griffin Technology Inc for the past year while on leave from his faculty role at Vanderbilt University’s Graduate School of Management. Griffin Technology is the largest consumer products firm in the MP3/iPod accessories market. Dave earned his Ph.D. in Management Science and Engineering through a joint fellowship program between the Graduate School of Business and the School of Engineering at Stanford University. He also holds an M.S. in Engineering Product Design and a B.S. in Electrical Engineering from Stanford. Before pursuing his Ph.D., Owens became registered as a Professional Electrical Engineer while working at the San Francisco International Airport after which he worked as a product design engineer at IDEO Product Development Inc. in Palo Alto, California.

6. Dirk Riehle, dirk@riehle.org

In most companies, research is separated from product units to prevent immediate product needs from usurping research and innovation. For effective transfer, however, research units need to consult with product units during the development of the research prototype. Unfortunately, product units are typically too busy to worry about research projects. Hence, product engineers are rarely assigned to engage with research projects early, or if they are, they frequently are too busy to do it properly.

At SAP, we have been complementing the traditional top-down process of research-to-product unit transfer with a self-organizing bottom-up process that we call open collaboration. Open collaboration is characterized by the following three core principles:

- Egalitarian: Everyone can participate; no borders to joining a project are erected.
- Meritocratic: Contributions are evaluated based on merit; seniority is less important.
- Self-organizing: The collaborators choose their own collaboration processes.

Open collaboration happens, when forward-looking engineers from product units engage with researchers on their own free will rather than as the result of a top-down assignment. We have found that letting engineers choose by themselves is critical to the success of the engagement.

Most product units have engineers who are curious about the next big thing and who are happy to engage with a research project if they think it makes sense. Such engagement takes place while the research project is going on, and product unit engineers contribute by providing valuable real-world insight. Product engineers can generally ensure that the research prototype will be compatible with the product unit's need. At the same time early engagement ensures familiarity with and buy-in into the research project by the product unit, which significantly eases later transfer.

This strategy is counter-intuitive to most senior managers. After all, if no engineer gets assigned to engage with the research project, it won't happen. We observe the opposite: By self-selecting, product engineers seek out and find exactly those research projects that have the highest likelihood of success and where they can contribute the most.

At SAP, we use two key technologies for fostering the process of open collaboration: software forges and wikis. In [1] we describe how using SAP's internal software forge research projects can find volunteers from product units to help them with their prototype. Our preliminary results promise a significantly eased research-to-product transfer. In addition, for non-source code related collaboration, we heavily rely on wikis. Both wikis and software forges are built on the principles of open collaboration: Everyone can join, there is no or little status hierarchy, and collaborators make up their own processes [2].

We have found that open collaboration has created self-organizing processes within SAP across departmental boundaries that foster innovation and increase the chances of successfully transferring research projects to product units. Our next step is to enhance open collaboration in SAP's rich and flourishing ecosystem of customers and partners.

DIRK RIEHLE leads the Open Source Research Group at SAP Labs in Palo Alto, California (Silicon Valley). Before this, he was the co-founder of an on-demand business software startup in Berlin, Germany, which used agile methods and strategically employed open source software. A fan of

wikis since their inception, Dirk started the Wiki Symposium, a conference dedicated to wiki research and practice. He holds a Ph.D. in computer science from ETH Zurich and an MBA from Stanford Business School. He welcomes email at dirk@riehle.org and blogs at www.riehle.org.

[1] Dirk Riehle et al. "Bringing Open Source Best Practices into Corporations Using a Software Forge." IEEE Software, 2009 (to appear).

[2] Dirk Riehle. "Bringing Wikipedia to Work: Open Collaboration within Corporations." In Proceedings of Wikimania 2008.

7. Linda Rising, risingl@acm.org

I'm a believer in the power of small, step-by-step change initiatives. I have seen organizations struggle to make innovation happen by investing heavily in a large, break-the-bank venture and watched helplessly as the well-intentioned but desperate development crashed and burned. I have seen the same organizations be changed forever by the evolving grassroots effort of a handful of enthusiastic evangelists. I don't believe in silver bullets. I believe that there are some organizations that are resistant to change, but the bottom line is, as Margaret Mead has already observed: Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.

This, of course, is the foundation of the book that Mary Lynn Manns and I unleashed on the world in 2005. We are both enthusiastic proponents of the pattern language describe in *Fearless Change* and both believers in the evolutionary approach it outlines.

LINDA RISING has a Ph.D. from Arizona State University in the field of object-based design metrics and a background that includes university teaching and industry work in telecommunications, avionics, and strategic weapons systems. An internationally known presenter on topics related to patterns, retrospectives, agile development approaches, and the change process, Linda is the author of numerous articles and four books—*Design Patterns in Communications*, *The Pattern Almanac 2000*, *A Patterns Handbook*, and *Fearless Change: Patterns for Introducing New Ideas*, co-authored with Mary Lynn Manns.