

Innovation Hype, Trends and Levers

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Innovation is the industrial religion of the early 21st century¹. Hewlett-Packard commands us to *Innovate!* while *SAP Makes Innovation Happen*². The United States' National Innovation Initiative believes that *innovation is the single most important factor* in determining America's success through the 21st century³, while the European Union's doctrine is to *increase the level of innovation* to become the most competitive and dynamic knowledge-based economy⁴.

Why do we see this surge in innovation belief? Is this just hollow branding? Does the Innovation-hype replace the Internet-hype of a few years ago? Our answer is that clearly there is some hype, however innovation is changing in several dramatic ways which require a new understanding, a written expression, and a list of do's and don'ts. The changes are dramatic due to their breadth and consequences – what innovation is, who innovates, how innovation is achieved – are all changing and expanding. However, the changes are neither sudden nor surprising as they result from long-term and global economic, societal and technological shifts which have become apparent in the last decade or so. Actually, our understanding of innovation has been influenced by a Sloan Management of Technology program that one of the authors participated in, a decade ago. When discussing innovation, the MIT faculty were already emphasizing the central role of people, including customers and lead users, the importance of collaboration, accepted technologies and dominant designs, and the consequences of technology and innovation cycles⁵. Since then, much new and good material has been published⁶, and we personally have learned a lot from our own extensive experience.

In this paper, we wish to integrate all these ideas and experiences into a very concise framework. First we focus on the evolution of innovation in recent years, concentrating on what is new, under the label *Innovation Trends*. Then, we choose a few managerial areas, for example, strategy and R&D, and reason how the innovation trends should influence managerial practices. We call these areas *Innovation Levers*. And that's it.

Innovation Trends

Traditionally, innovation has been defined as the introduction of something new, a new idea, method, or device⁷ (don't forget the adaptation of something established by adding novel elements). Recent definitions emphasize usefulness and value, so innovation is defined as the intersection of invention and insight – read, *laboratory* invention and *marketplace* insight – leading to the creation of social and economic value⁸. This short definition reminds us that innovation is not a goal by itself but the means to create value. Additionally, it also ingrains some of the new thinking about innovation – relatively open, not necessarily technological, focussed on humans but

also tradable. Aiming to formulate a more comprehensive description we ask three questions – What is innovation? How is innovation done? Who innovates?

What is innovation? Non-Product Innovation!

Product and technological innovation continue to take place and to dominate managerial thinking on the subject. However, in most industries, differentiable new product breakthroughs are increasingly rare, and new products are more rapidly copied and commoditized⁹. In addition, services have become the largest sector of the economy, producing about three quarters of GDP and almost all newly created jobs of the western economies¹⁰. In response, *non-product innovation* takes center stage. It creates value through new processes, new business models, new services and other innovations. Business processes are improved or reinvented to great effect; Dell's built to order, Toyota's total quality management and Wal-Mart's cross-docking are famous examples of such process innovation¹¹. New business models are as transformative as new technologies. For example, the Xerox PARC spin-offs, including 3Com and Adobe, succeeded because they disengaged from the Xerox business model and experimented with business models to support their technology¹². A recent example is Google's AdWord keyword-auction business-model that is clearly a great creator of value. Similarly, service innovation improves efficiency and creates new offerings in the largest sector of modern economies, through technology, self-service, and personalization. Brilliant examples include eBay and its reputation management system and Apple's iTunes.

An area of special interest for non-product innovation, already hinted at by our examples, is Information and Communication Technology (ICT). It continues to provide better performance and new products. However, as it matures and provides pervasive platforms, such as the Internet and enterprise computing infrastructure, we expect it to enable much innovation that is not technology focused¹³. Multi-disciplinary integrative innovation ties existing components into new services, new processes and new business models. Examples include Amazon's services for retailers and RosettaNet, a supply network for electronic component and semiconductor manufacturers. These and other non-product innovations are quickly capturing the innovation spotlight. However, our thinking is still biased towards technological product innovation and R&D labs, a point we will return to in discussing levers for innovation.

How is innovation done? Collaborative Innovation!

For decades, innovation resources were scarce. Not any more. Our favorite example is ICT¹⁴ – during the 1960s and 1970s where electrical engineering and computer science skill were scarce, and the market opportunities were confined to proprietary technological systems. R&D funding and processes, as well as business models were optimized for these circumstances with internal, centralized, research labs, this is termed *closed innovation*. Since the late 1980s, ICT skills, venture capital and ICT platforms are more widely and readily available, making the old ways inefficient and calling for externally focused and collaborative innovation processes, or *Open Innovation*. In other areas, similar forces are apparent, in particular maturing technologies, the emergence of global R&D resources, expanding market opportunities and pervasive collaboration technologies, all point towards

*collaborative networks of innovation*¹⁵. Within these networks, companies are learning how to weave internal and external funding, ideas, innovation practices and skills into dynamic and flexible market ecosystems. In addition to innovators and financiers, innovation networks include Transformers and Brokers – transformers convert inputs from innovators into valuable business innovations, and Brokers find and connect ecosystem players by buying, selling or enabling innovation services. Good examples of transformers are Dell, IBM and Infosys, and as for brokers, we will return to presently.

For innovation markets to be dynamic and flexible, an innovation currency is required. Indeed, *Intellectual Capital* (IC) is becoming central to modern economies as physical resources are now plentiful. Consider the following evidence¹⁶: three-quarters of the value of publicly traded companies in the US come from intangible assets, almost double its share in 1980; global technology licensing revenue is growing and estimated to be \$100B annually; the number of patents awarded is growing and new players are constantly joining – for example, Microsoft files about 3,000 a year, up from 5 in 1990, and China who trebled the number of patents a year since 2000. At the same time, public IC is created by standardization bodies, open source communities and companies who donate patents to influence standards. And finally, the brokers of the innovation networks are emerging as IC trading networks – for example Patent Café, Yet2.Com – and IC experts – such as Knowledge Campus and PLX-Systems – that specialize in the valuation and commercialization of IC.

Innovating within these collaborative ecosystems and intellectual property markets is clearly very different from the R&D-driven innovation we are used to. We will discuss the new required skills in the next section. But before that, we conclude the discussion about innovation trends with asking who are the innovators of the early 21st century?

Who innovates? Democratizing¹⁷ Innovation!

The individual has always been the ultimate source of new ideas. We believe that people, and personal autonomy, are becoming ever more central to innovation as a consequence of societal and technological trends. Current values and culture favor personal freedom and autonomy, driving individuals towards taking charge of their own work – for example through self employment – and participating in collaborative innovation. This is made possible by the pervasive ICT platforms that reduce communication costs within and across organizations¹⁸. Open source projects are a prime example of both trends – the wish for personal autonomous impact and the availability of the technology and project management techniques for large scale distributed innovation. Another great example is eBay's admission that its strategy is molded by its customers, who, for example, initiated second hand car trading, this now accounts for 30% of its sales¹⁹. This is a phenomenal demonstration of what we have known for a while: customers are great innovators, if you let them do so²⁰. As for these forces within organizations, consider Merck's internal R&D markets, IBM Research's bottom up ideation practices²¹, and HP's internal markets for technology forecasts²².

Innovation Levers

Innovation is changing – hopefully you are now convinced of that – and the change is mostly towards expansion – more innovation types (process, service, business-model in addition to product innovation), more ways of innovation (ecosystem-focused, collaborative, adding and sometimes replacing internal innovation), and more innovators (lead users, service personnel and others in addition to R&D staff). It is time now to be practical and to ask for the dos and don'ts of this new industrial religion. How should we take advantage of this change, of this expansion? How should a company tie-in with these broad trends? How should companies innovate?

We suggest a simple method to answer these questions, reflect on key areas relevant to innovation and link them to the innovation trends. We call each such area an Innovation Lever and suggest, for this short paper, five levers – Strategy, Customers, R&D, Culture and Metrics.

Strategy – A company's strategy should determine what innovation types it pursues. If either differentiation or focus is the main thrust, we expect innovative products; for cost leadership, process innovation is typically central. This is still true with non-product innovation, as the differentiator should strive for new business models and new services, while process improvements remain central for cost leadership. However, the changing ways to innovate – what we labeled as the *Collaborative Innovation* trend – should impact strategic thinking. Strategy should nowadays focus on leveraging the ecosystem. A company needs to identify its ecosystem role, potential for collaboration with other players, opportunities for ecosystem-wide innovation, and its own added value. For example, eBay is a Dominant Exchange that respects the power of customer communities; IBM Global Services is a Customer Integrator that ties IBM and competitors' technology into a customer solution²³. Innovation can replace domination-strategies to enable growth of both the entire ecosystem and your own company.

Customers – Of course, customers are critical for the success of innovation, and effectively meeting customer needs should be the most important innovation goal. And, of course, this is not new. What is new – discussed under both the *Collaborative* and the *Democratizing* trends – is the more active role that customers take in defining and refining new products, services and processes. A company should establish constructive and enduring relationship with its customers and lead users that face new needs and can initiate new solutions long before the general market. For example, P&G expects half its new products to originate from customers²⁴. Building these relations can use customer communities. These are more accessible today through the Internet and collaboration technologies than ever before. Companies should build the incentives, organization and culture to indeed innovate with their customers.

R&D – R&D organizations have traditionally been the focus of innovation within corporations. As non-product innovation increases, R&D departments need to build new resources, skills and practices in order to keep this role. Innovation related to processes, services, business models, and of course markets may be quite remote from what many of us working in Research are used to do. This is going to be a long, challenging change. On a short-term perspective, R&D should learn to take advantage of the new R&D resources in Eastern Europe, China and India, learn to participate in,

and create value from professional communities, standard setting initiatives and open source projects. At the same time, companies need to learn how to harvest innovation externally, through startups, joint ventures and commercialization of IP. And, we need to change our culture, not only in R&D, so this is our next Lever.

Culture – There is a wide agreement that innovation is fostered by certain human-resource management practices and culture. Encouraging internal motivation, high autonomy in the conduct of work, a sense of ownership and control, challenging work, and sufficient resources have been found to promote creativity and innovation²⁵. We believe, as we discussed under the *Democratizing Innovation* trend, that these will become even more important. However, what is in particular new is coming from the *Collaborative* and *Non-product* trends – collaboration and market relevance and the culture to enable them are critical for innovation. Collaboration – between organizations, between groups, and between individuals – should be encouraged through organizational, social and technological means. Many companies use innovation clubs, forums, blogs, and many other collaborative efforts to create a collaborative culture. A culture of market relevance should be encouraged by building entrepreneurial skills, mechanisms for continuous interactions with the markets, learning and experimenting. In most contexts, a culture of self-reflecting scientific and engineering expertise should be strongly augmented with a culture of external collaboration and market relevance.

Metrics – Finally, measurement of innovation should adapt to the changes we've discussed. In order to reflect the complexity and uncertainty of the environment, metrics should balance multiple dimensions. For example, success should be rewarded over multiple time horizons – the reward of short-term success is necessary to initiate innovation, while retaining long-term goals is paramount. Similarly, novelty, growth, and revenue should be measured, as well as profitability even at the very early stages²⁶. New measures should look at business *learning*, because market relevance is central. For example companies should measure market knowledge in addition to technological skill, and try to measure market experimentation²⁷; these are related to the *Non-Product Innovation* trend. Measuring the ecosystem is another new and important challenge, relating to the *Collaborative Innovation* trend. Companies should gauge the expectations of ecosystem participants, what we call *mindshare*, and measure collaboration, for example, by surveying professional communities.

We started this paper by claiming that innovation is the industrial religion of the early 21st century. We expressed the fundamental beliefs and a very short list of commandments. Now, it is for each of us to practice.

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- ¹ Following Gregory Daines of Cambridge University, as quoted in the Economist's survey of innovation, 2004.
- ² SAP Innovation Report 2003
- ³ An initiative of the Council on Competitiveness, representing US industry and academia, 2004.
- ⁴ The EU's Lisbon Accord, 2000.
- ⁵ Among my teachers were Jim Utterbak (Innovation), Ed Roberts (Entrepreneurship), Ralph Katz (HR), Gabriel Bitran (Services), Michael Cusumano (Strategy), Edgar Schein (Change), and John Hauser (Marketing).
- ⁶ Including several books: Christiansen, *The Innovator's Dilemma*, 1999; Christiansen, *The Innovator's Solution*, 2005; Chesbrough, *Open Innovation*, 2003; von Hippel, *Democratizing Innovation*, 2005.
- ⁷ Merriam-Webster online dictionary.
- ⁸ Following the National Innovation Initiative.
- ⁹ Adrian Slywotzky quoted in *The Economist's survey of business innovation*, April, 2004.
- ¹⁰ Fitzsimmons J and Fitzsimmons M, *Service Management: Operations, Strategy, and Information Technology*, 5th edition, McGraw-Hill, 2005.
- ¹¹ Michael Hammer, *Operational Innovation*, HBR, April 2004.
- ¹² Henry Chesbrough, *Open Innovation*, 2003.
- ¹³ Mature steam and electricity technologies enabled much non-technological innovation (reference missing).
- ¹⁴ Following Chesbrough's *Open Innovation*.
- ¹⁵ Forrester Research's Big Idea report "Innovation Networks", June 2004, and follow-on reports, 2005.
- ¹⁶ From the Economist's survey of patents and intellectual property, 2005.
- ¹⁷ von Hippel, *Democratizing Innovation*, 2005.
- ¹⁸ Following Tom Malone's *The Future Of Work* (2004) that shows how reduced communication costs and the importance of personal autonomy increases decentralization in decision making in organizations.
- ¹⁹ *The Economist*, June 2005.
- ²⁰ Eric von Hippel, *Lead Users: A Source of Novel Product Concepts*, *Management Science* 32, no. 7 (July):791-805, 1986.
- ²¹ Tom Malone, *The Future Of Work*, 2004.
- ²² *The Economist's Technology Quarterly*, December 2005.
- ²³ Following Hax, and Wilde, *The Delta Project: Discovering New Sources of Profitability*, 2001.
- ²⁴ P&G's CEO A.G. Lafley is quoted as saying that 50% of P&G's products may be licensed from the outside, up from 35% currently (reference missing).
- ²⁵ Various papers by Theresa Amiable; for example, *Assessing the Work Environment for Creativity*, *Academy of Management Journal*, 39(5), 1996; a review of the literature: Michael Mumford, *Managing Creative People: Strategies and Tactics for Innovation*, *Human Resource management Review*, 10(3), 2000.
- ²⁶ Clayton Christiansen, *The Innovator's Solution*, 2004.
- ²⁷ Andy Neely, *In search of a metric system for innovation*, *Financial Times*, October 7 2004.