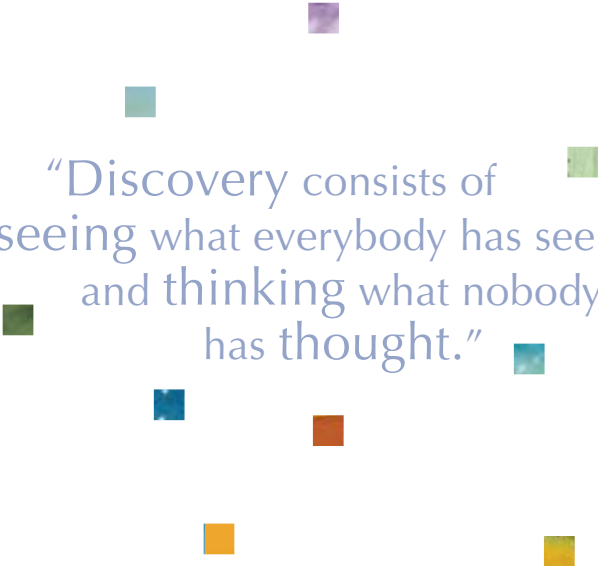


EXCERPT FROM



“Discovery consists of  
seeing what everybody has seen  
and thinking what nobody  
has thought.”

KAUFFMAN Thoughtbook 2009

Fourth in an ongoing series, the *Kauffman Thoughtbook 2009* captures what we are thinking, learning, and discovering about education, entrepreneurship, and advancing innovation. This collection of more than forty essays is written by the talented Kauffman Foundation associates, partners, and experts who are pursuing the principles and vision set by our founder, Ewing Kauffman.

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## Open Innovation: Rx for Improved Human Health

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It's a term being used a lot these days. Open innovation (OI) encapsulates the power of the informed user to drive innovation in new product design. It enables users to build new products that suit themselves, as opposed to manufacturers, which develop new products for profit.

This shift to user-driven innovation leads to explosive growth in products and features in disciplines ranging from “Threadless,” a community of t-shirt designers and buyers, to a group of engineers building the best kite-surfing kits on the market. In each area where it is observed, OI democratizes innovation processes—shifting enormous control to the user—and has explosive power when combined with digital communications networks.

Threadless epitomizes these elements of OI. This community of people loves shirts, from designing them, to buying them, to talking about them. Thousands of Threadless users spend their free time creating t-shirt designs—artistic, funny, ironic, textual, visual—and submitting those designs in standard formats, free of charge, to the group's Web-based forum for voting by the other users. Winning designs are printed in limited quantities, then made available for sale back to the community. The company behind the process makes a tidy profit by dint of

creating and maintaining the community through trust and transparency, but the innovation and design happen at the user level, not the manufacturer level.

This user empowerment is recapitulated in other genres, including content, with the advent of ubiquitous digital music and photography, and even in engineering fields like robotics and materials science.

### A Foundation for Open Innovation

Open innovation isn't a "natural" outcome of digital systems and users, however. It sits on a set of pre-conditions, fundamental infrastructural elements that allow OI to emerge in some systems faster than in others.

OI starts with interoperable information and low transaction costs. Digital content is a good example: We use it effortlessly today. Think about taking a digital picture on your Cape Cod vacation and sending it to a Web-based photo-sharing site so your family in another state can see your amazing view of the water. It's easy. You can even do it using your phone.

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This ease is possible for two key reasons: First, most digital cameras produce standard file formats that most computers can read, manipulate, and upload; and second, there are essentially no fees imposed on camera users as they read, manipulate, and upload files—or on the users who view the pictures on the Web. The pictures represent interoperable information available at low transaction costs. And they result in even more innovations: user-created calendars, picture books, postage stamps, and even more t-shirts.

However, user-driven innovation can be strangled into oblivion if the information is neither interoperable nor available at low transaction costs. The most obvious example of this is the way technical and legal decisions either enable or disable OI: If users don't put the photos on the Web, the whole process is stillborn. If users don't grant rights in advance, creative re-use becomes illegal, and the process dies.

Thanks to the access principle, business explodes when users can spend their time and money innovating, not negotiating permission to use the network. It's why the Web, despite its significant disadvantages in functionality and user base at launch compared to Prodigy or AOL, crushed both of them in only a few years. The access principle, as applied in the network, fostered innovation because it shifted power from the owners to the network users.

### Applying Open Innovation in New Ways

Using the access principle's lessons, we have the opportunity to bring the gains we've seen in user-driven commerce and culture to pursue improved human health. We can finally begin to attack the persistent tragedies of rare and neglected diseases, to understand how drugs really work, and to understand how to prevent disease. It will happen when we stop being drug *consumers* who passively accept manufacturers' innovations and instead become *user-innovators* of health care, driving the markets ourselves. But this is not what we see happening. The knowledge network isn't emerging to create these opportunities.

The time has come to change the way we cure disease. We are no longer asking whether a gene or a molecule is critical to a particular biological process; rather, we are discovering whole networks of molecular and cellular interactions that contribute to disease. And, soon, we will have such information about individuals, not just the population as a whole. Biomedical knowledge is expanding rapidly—

yet the system to capture and translate that knowledge into saving human lives still relies on an antiquated and risky strategy of focusing the vast resources of a few pharmaceutical companies on just a handful of diseases. We need a system that empowers the individual to innovate.

This goal will require investment in creating the pre-conditions for user-driven innovation. The information in life sciences, health care, and drug discovery is far from interoperable, nor is it available at low transaction costs. Those roadblocks frustrate the emergence of innovative, user-centric systems, which means that our open systems serve us far better in the search for shoes than in the search for cures.

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The science-user network differs from culture and commerce: It is grounded in pre-existing knowledge that is, in many cases, already locked up like the scholarly literature or the research tools in scientists' freezers. It will require re-formatting something that already is under control—legally and technically, we must change the network infrastructure to foment a user-driven revolution and explosion in value.

### Transforming Health Care Through Open Innovation

Five key elements are required: a network, a user base, a set of standard technologies, a low level of legal control, and a lot of content. The Internet and the Web offer the technical foundation, but we need more robust systems to manage the scientific research demands. We need the user base of scientists to dramatically increase, flinging open the door to include anyone who wants in, and we need tools that are simple enough for an interested non-scientist to start asking questions and doing research. We have standard technologies, but we need new systems that let the home user innovate

## About the Commons

### Science Commons: Making the Web Work for Science

Science Commons designs strategies and tools for faster, more efficient Web-enabled scientific research. It identifies unnecessary barriers to research, crafts policy guidelines and legal agreements to lower those barriers, and develops technology to make research data and materials easier to find and use.

Its goal is to speed the translation of data into discovery—unlocking the value of research so more people can benefit from the work scientists are doing. For more information, visit [sciencecommons.org](http://sciencecommons.org).

### Creative Commons: Using Private Rights to Create Public Goods

Creative Commons provides free tools that let authors, scientists, artists, and educators mark their creative work with the freedoms they want it to carry. It sets creative works free for certain uses. Like the free software and open-source movements, Creative Commons' ends are cooperative and community-minded, but its means are voluntary and libertarian. It offers creators a way to protect their works while encouraging certain uses of them—to declare "some rights reserved." Visit [creativecommons.org](http://creativecommons.org) for more information.

at a level comparable to an MIT scientist. We have policies that lower the legal barriers in theory, but we need funders to create incentives for individual scientists to share information and tools in reality.

And, though we have content—lots and lots of content—we need a lot more, coupled with open-source knowledge management systems and community-driven innovation. Only through the mixture of content, community, and tools can we make the alchemical transformation of raw data into usable knowledge and a scalable process.

Through this transformation, we will create a world of users who drive innovation in our approach to drug discovery and health care. Our goal should be to enable life sciences innovation that we cannot even imagine, that we did not design for. We should constantly focus on creating systems with explosive potential for innovation, and we should draw our inspirations from the systems that have proven to carry that potential.

My organization, Science Commons, is among a set of organizations working at this intersection of law, technology, policy, and business. We join a network of organizations, including the iBridge<sup>SM</sup> Network, Innocentive, CollabRx, Public Library of Science, BioMed Central, Coriell Cell Culture Repository, Addgene, and more. The Ewing Marion Kauffman Foundation is a common thread throughout this network. We're all working to shift the innovation engines to the users. It's time to bring open collaboration and open innovation systems out of the social network and into the cause of human health.