

Open Science

from traditional research to open innovation platforms

The practice of science is becoming more open through new platforms that encourage open collaboration and open access publishing, as well as new types of legal frameworks for sharing resources and knowledge. Open platforms facilitate global crowdsourcing for complex scientific problems and may drive new business models for the development of science and technology in the future.

FROM VERTICAL TO HORIZONTAL STRUCTURES

- Ideas come from everywhere
- Solution seekers, not problem solvers
- Work as group experiment, anti-Nobel prize

1 Encourage solution finders, not just problem solvers

PING QUOTIENT
MOBBABILITY

Measures your propensity, ability, and responsiveness to reach out to others in a network

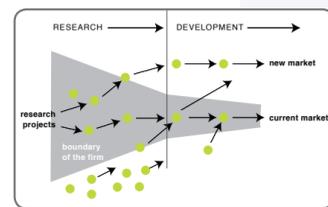


COOPERATION RADAR

Ability to sense the best collaborators for a given task

OPEN HEALTH INNOVATION MODELS

- Innovation funnel
- Activist state
- Virtual pharma model



Source: Henry Chesbrough, *Open Innovation*, 2006

Linux Meets Lipitor

- Steve Weber, Professor, UC Berkeley
- Collaborative Drug Discovery
- Institute for OneWorld Health
- National Cancer Institute's caBIG

PPPs Go Mainstream

The success of public-private partnerships (PPPs) in treating neglected diseases leads biopharma to reinvent itself. PPPs provide a viable business model for the mainstreaming of drug discovery and development.

Open Science Platforms

- TDWiki.org
- BioBricks
- InnoCentive

8 Cooperate to compete



Biocitizenship & Support Economies

from institutional approaches to user-led collaborations

New social affinities based on biological experiences give rise to biocitizens seeking voice, not choice. Large institutions (whether corporate or government), armed with one-size-fits-all approaches to health, social, and business issues, confront the demands from active consumers or biocitizens for greater engagement, collaboration, and feedback.

CONSUMERS BECOME ENGAGED BIOCITIZENS

- Technology/policy orphans
- Desire for recognition
- Digital citizenship



10 Embrace the broadening meanings of health

HACKER ETHIC

- Creativity
- Virtue
- Sharing

People as Infrastructure

- Imaginatik.com
- Headshift.com
- YourEncore.com

INFLUENCY

Ability to be persuasive in multiple social contexts and media spaces

MULTI-CAPITALISM

Fluency working with different capitals (i.e., natural, intellectual, social, financial)

5 Engage with failure

TOOLKITS FOR USER-LED INNOVATION

Attributes include learning-by-doing, simple tools, customizable models, and scalability

3 Embrace a "not invented here" mindset

IP Bubble Bursts

Patenting everything possible proves to be the wrong strategy as the anti-biomedical commons gets in the way and IP busting by activist states produces new social goods.



EXPERIENTIAL AND SUPPORT ECONOMIES

- Market failures
- Knowledge transfer networks/transliteracy
- Active mobs form to support group health



2 Expand your engagement with lead users and biocitizens

Open Platforms for Lead Users

- Dell's Idea Storm
- Innovate with Kraft
- patientopinion.org.uk
- WaveMetrics' Igor Pro 6
- indexaward.dk

Ecological Risk

from narrow to broad definitions of risk

As risk shifts from large institutions to individuals, the burden of risk and responsibility placed on consumers will grow. The definition of risk will expand beyond a narrow, technological scope to encompass social, cultural, and political dimensions. Biocitizens will push back on the "risk society" and new tools for risk engagement will become common.

POROUS BOUNDARIES OF THE FIRM

- Beyond risk management
- Valorized intangibles
- Reputation systems

New Market Makers

Unusual stakeholders in the global health economy leverage their core competencies in technology, distribution, and marketing. New framings of health and risk emerge.



Source: flickr.com/ramson

PROTOVATION

Fearless innovation in rapid, iterative cycles

EMERGENSIGHT

Ability to prepare for and handle surprising results and complexity

REFRAMING RISK AND EXPERIMENTATION

- Risk and profit sharing (public/private partnerships)
- Collaboratories
- Audit societies

Undisciplined Health Knowledge
Knowledge production in health moves away from traditional disciplines as new ideas are generated in networks, not institutions. Innovating at the edges of disciplines fosters change beyond health care.



NEW NETWORKS DRIVE NEW BUSINESS MODELS

- One-to-many networks
- Person-to-person sousveillance
- Social Business 2.0
- Novartis IP for diabetes strategy



IP Management and Risk

- Yet2.com
- Ovalideas
- Collective.com
- GeoRSS

7 Cultivate transparency

New Health Commons

from individual to pooled resources

The language of the "commons" is becoming a new metaphor for understanding the power of networks. Biocitizens, scientists, non-governmental organizations, businesses, and universities will continue to pool assets and knowledge to create shared, commons-based resources and public goods that can drive new services and products.

NEW GROUPS, NEW NORMS

- Sharing resources
- Alienability
- Reputation systems as social technology
- New mental maps & tools for digital networks

Knowledge Commons

- The Neurocommons Project
- Intota
- Science Commons

9 Tap the collective intelligence in networks

OPEN AUTHORSHIP

Creating content for public consumption and modification

Open-Access Publishing

- Public Library of Science (PLoS)
- Health InterNetwork Access to Research Initiative (HINARI)
- Medknow Publications



RISK COMMONS

- Food: obesity as collective problem
- Health: futures market for children's health
- Data: collective, pooling

Open Business Models Derived from Commons

- IBM's open source strategy, Apache
- Mayo Clinic's innovation lab
- Takaful (Islamic insurance)

Self-Organized Payors

Biocitizens shift the burden of empowerment from individuals to the commons. Shared biological identities evolve from health affinities to self-organized markets and emerge on the landscape as new payors.



Tuangou: Group Shopping

Data Mashups Make the Invisible Visible

- New York City's "Healthcare That Works"
- fluwikie.com
- wikihealthcare.jointcommission.org

Platforms for Resource-Poor Environments

- Innovation Network for Communities
- ThinkCycle
- Open Architecture Network

Expanding Costs

from constraints to opportunities

Constraints get reframed as opportunities that influence and shape the direction of innovation. Long lead times associated with traditional innovation strategies will help drive open innovation platforms that can reduce costs and the time required for new innovations to reach the market.

COMPETITION TO COOPERATION

- Breaking the silos
- Post-disciplinary practice and research
- IBM and Toyota cooperative strategies
- Internal hierarchical dysfunction vs. external cooperative environment



Unnatural Disasters

The world's next pandemic reveals the fragmentation of health systems and implicates governments and corporations in an ecology of health risk.

SIGNAL/NOISE MANAGEMENT

Filtering meaningful information, patterns, and commonalities from massively-multiple streams of data

Policy Entrepreneurs For Innovation Systems

- Center for the Management of Intellectual Property in Health Research and Development
- UK Design Council's RED Project for Open Health
- Brazil's Associação Saúde Criança Renascer

6 Define and maintain new commons

INNOVATION SANDBOX

- Base of the pyramid
- Exploiting blurred boundaries and new categories
- Alternative financing

Hybrid Business Models

- India's Narayana Hrudayalaya Hospital
- Scojo Foundation
- India's Society for the Promotion of Area Resource Centers (SPARC)

The Institute for the Future's Health Horizons Program has designed the *Open Health Map of Disruptive Innovation* as a tool to help you put an Open Health strategy into practice. Open Health is a new paradigm for thinking about potential partnerships, stakeholders, and sources of innovation in the global health economy.

Use this tool as a simple road map, pointing to signposts in an evolving innovation landscape that you can't afford to overlook. Or use it on a deeper level to provoke strategic conversations that explore how Open Health will shape your own organization over the next ten years. Work with its companion report, the *Open Health Toolkit: A Framework for Innovation* (SR-1117B), to consider the possibilities.

TAKE A TOUR OF THE INNOVATION LANDSCAPE

This map organizes Health Horizon's research into a matrix describing five external DRIVING FORCES shaping the future context of innovation in health. These forces cross five columns or ELEMENTS of Open Health strategies: networks and culture; ethos and practices; innovation systems; business models and strategies; and tools and platforms. At the intersections where driving forces converge with the elements of an Open Health strategy are potential DISRUPTORS that you can't afford to ignore.

DISRUPTORS: These are potential wildcards out on the horizon that may disrupt the innovation landscape. Think through how you might respond to these disruptions.

SIGNALS: As the meaningful details that comprise the map's landscape, signals are indicators, innovations, and examples that suggest larger trends. Track these across the map and see what kind of story they tell together.

INNOVATORS: Interspersed throughout the map, these examples of early adopters of open innovation strategies let you know what works today, and what has potential for tomorrow.

10 These ten core principles are critical to developing successful Open Health strategies. Think of them together as a diagnostic list that you can use to build metrics to measure progress and success.



INSTITUTE FOR THE FUTURE

For more information about the Health Horizons Program or the *Open Health Map of Disruptive Innovation*, visit our Web site at www.iftf.org or contact:

Dawn Alva
Business Development Manager
650-233-9585
dalva@iftf.org

Ten Principles: Putting Open Health Into Practice

Applying an open innovation approach to health will require embracing new business models, new skills, and new institutional cultures. We have compiled a list of ten core principles that we think are important to consider in developing a successful Open Health strategy:

1 Encourage solution finders, not just problem solvers:

Open Health innovation systems require the ability to determine where and how to find solutions in a world characterized by global crowdsourcing.

2 Expand your engagement with lead users and biocitizens:

Companies that listen to active consumers and incorporate their contributions into R&D processes stand to gain from the insights and innovations of these individuals and communities.

3 Embrace a “not invented here” mindset:

Think of “not invented here” as a badge of honor, signifying the success of open innovation built upon greater transparency and collaboration with outsiders.

4 Redefine innovation beyond just the new:

“Innovation” is not simply a new invention or the creation of new things. For example, in Open Health, reaching society’s poorest within tight constraints is an equally important innovation.

5 Engage with failure:

Failure is a necessity—and a valuable part of innovation. Organizational culture, as well as societal norms, must embrace failure as a critical element for developing new innovations and better health systems.

6 Define and maintain new commons:

Today’s global health crises require a new commons approach that responds to market and public sector failures. Developing new business models downstream from health commons will prove valuable.

7 Cultivate transparency:

As trust in corporations has declined, customers have come to value transparency. Open Health strategies require addressing information asymmetries and opening channels for customer engagement to regain trust.

8 Cooperate to compete:

In the global health economy, social dilemmas arise that require an emphasis on cooperation rather than competition. Firms will need to cultivate cooperative strategies and novel partnerships in order to succeed.

9 Tap the collective intelligence in networks:

A firm’s intellectual property may lie in the power of dynamic groups, not just patents or the lone genius. Open Health requires greater incentives for sharing information and cooperating collectively.

10 Embrace the broadening meanings of health:

Individuals and communities are forging new meanings of health and wellness. Concepts, practices, and strategies must be retooled to meet the needs created by these new definitions.

networks & culture

Open Science flattens organizational hierarchies

Open approaches to innovation will require companies to move beyond the traditional concept of “problem solving” to a new paradigm of “solution finding.” These solutions will come from outside of established laboratories or research and development groups. All of a firm’s employees—or customers, suppliers, other partners, or even strangers to the firm—may be sources of innovation. “Crowdsourcing” will allow large networks of people to provide solutions to a company’s innovation challenges. The power of the group, rather than individual efforts, will generate the intellectual property most highly valued.

Firms engage with biocitizens

Corporations and governments worldwide are losing the trust of consumers and, in turn, people are asserting new rights, exercising new responsibilities, and demanding recognition. Expanded understandings of risk, genetics, and sustainability issues are driving the emergence of social affinities based on biological factors. Biocitizens require new forms of engagement, and organizations like the Genetic Alliance have become important umbrellas for biocitizens’ projects.

Corporate social responsibility (CSR) goes mainstream

Discussions about global social issues (such as poverty, health, and the environment) are becoming commonplace in corporate boardrooms and on Wall Street. As a result, firms will need to rethink risk management and the social distribution of the consequences of both failure and success in innovation. New media platforms will make these processes increasingly transparent. A company’s reputation for CSR will also affect its recruiting efforts; top talent will come from a generation that views these issues as an essential part of their work ethos.

New norms help build new health commons

With the rise of the Internet, new commons will emerge to respond to challenges and dilemmas of digital networks. Commons, as spaces between the market and public sector, require new norms but will provide new framings of health and related risk. New health commons will offer effective responses to the perverse incentives and fragmentation within existing health markets.

Cooperation complements competition in the global health economy

While competitive models will not fade away, new relationships among players in the global health economy will emerge to address global health crises. Challenges, such as how to achieve better health outcomes (domestically and internationally) at less cost, will require new forms of partnerships and a stronger emphasis on cooperative models. As Toyota demonstrated by re-inventing its relationship with its suppliers, deployment of cooperative business strategies will mitigate the risks of potential disruptive events.

ethos & skills

Collaboration-based skills create ethos of openness

Open Health requires a culture in which skills that encourage the transition from individual recognition to team-based, collaborative efforts are valued. *Mobbability* includes having a talent for organizing and collaborating with many people simultaneously. Using one’s *ping quotient* may involve the propensity and ability to respond to requests for engagement. Having a *cooperation radar* means having the ability to sense intuitively who will make the best collaborators on a particular task.

Biocitizens emphasize relationship value

As biocitizens demand voice, not just choice, they reject a traditional system of transaction economics. In a world of distributed capitalism, relationship value takes on greater importance. *Influency* promotes relationships based on one’s ability to be persuasive in multiple contexts, with a sophisticated understanding that each context requires a different persuasive strategy and technique. *Multi-capitalism* describes fluency in working with natural, intellectual, social, financial, and other capitals. The hacker ethic valorizes both creativity and sharing as important ethical values.

Risk necessitates a balanced approach to Open Health

Innovation will require deliberate willingness to experiment and engage with failure. Viewing failure as a necessary learning tool and building block will help organizations address risks, collaborate with non-obvious participants, and enhance the capacity of their resource pool. Two skills will prove valuable in responding to new sources of innovation and risk in a changing paradigm: *protovation*—fearless innovation in rapid, iterative cycles; and *emergensight*—the ability to prepare for and handle surprising results and complexity.

Cooperative efforts provide new answers to social dilemmas

Commons-based and participatory approaches, which reach across a variety of institutions and media, can provide innovative solutions to complex social dilemmas. Skills like *open authorship* will help create new health commons to address systemic problems in health and health care. Open authorship means creating widely-accessible content that anyone can modify.

Sensemaking increases success in environments with scarce resources

Cost constraints are present in any Open Health environment, and scarce resources are a given. As a result, the ability to discern what is useful and what wastes time is critical. *Signal/noise management* means filtering meaningful information, patterns, and commonalities from many vast sources. *Longbroading*—seeing the big picture of higher-level systems and cycles—involves looking ahead to the long-term implications of decisions, interactions, and actions.

innovation systems

Innovation moves beyond traditional R&D

Innovation will move beyond the walls of laboratories or research and development groups to take advantage of a broader landscape of inputs, talent, and interactions. Boundaries—whether they are geographic in nature, or represent the lines between disciplines, departments, and product categories—will blur and new pathways to “connect and develop” will open up. This shift will require a new conceptual framework for intellectual property that parallels its move away from rigid limitations.

Companies embrace user-led innovation

Users who intimately understand how a company’s product or service impacts their health can provide valuable insights to innovators willing to listen. This goes beyond market research to fostering interactions with users as part of the innovation process to co-evolve and co-create new innovations or market offerings. How companies think about users will also evolve as users shift from being highly engaged individuals to becoming part of assertive biocitizen groups that demand rights to conditions that produce good health.

Innovation systems reframe and redistribute risk

Open innovation in the global health economy will see individual risk get shifted to the network or health commons. The inherent risk of experimentation may be mitigated in new kinds of “collaboratories”—interactive environments and processes that reframe individual companies’ risks and challenges as issues of the commons. Bringing different stakeholders together to pool intellectual property, talent, and resources will facilitate breakthroughs and innovations in health. This commons-based approach to risk will reduce the barriers to entry and drive innovation in new directions.

Different health commons emerge

The complex constellation of shared perceptions of risk, combined with new technologies and media, will create new health commons. Health concerns that matter to individuals will become issues for collectives that include a broader range of stakeholders. As these stakeholders get mapped to different health commons (e.g., obesity, children’s health, food safety), we may see new kinds of innovation systems and business models open up that leverage new kinds of talent, capabilities, and infrastructure.

Constraints become opportunities

Innovation in health care can be stalled by constraints that often dominate demands for policy change (like ever-increasing costs and fragmentation of care). But for companies at the edges, these represent opportunities to bring new ideas and tried solutions from other industries to health care. Innovative solutions to tight cost constraints in resource-poor settings can be scaled up and provide answers to problems of access in other settings.

business models & strategies

Open access leads to multi-disciplinary strategies

For organizations that adopt Open Health strategies to leverage unprecedented access to shared information, a key objective will be to develop hybrid approaches to existing problems. Because open platforms will, by their nature, involve multiple disciplines across many industries, new business models will reflect this dynamic. Cracks in the intellectual property regime are already appearing and may open up new opportunities for open source biopharma models that can bring products to market faster and at lower cost.

Biocitizens help leverage market failures

Biocitizens will use open platforms to address market failures and promote new business models for orphan diseases and neglected issues. Social networking tools and increased connectivity will lead to the formation of smart mobs that share information to establish support groups and generate new disease management and advocacy strategies. When institutions and markets fail to meet the needs of end users and the public, support economies will emerge.

New networks respond to risks

As a growing burden of risk is placed on consumers, they will seek new ways to pool risk across networks of participants. Organizations will quickly recognize the value of this approach and will develop new models and strategies in response. Bottom-up risk mitigation will grow in prevalence as mobile technologies and web 2.0 platforms proliferate. Businesses will also use mechanisms such as IP pooling to drive down the financial risks of innovation.

Models based on pooled knowledge emerge

Organizations will develop new commons and collaborative markets that will serve as platforms from which new business models can be derived. These platforms will share ideas, intellectual property, and expertise to uncover the real advances necessary for lasting changes in health. Knowledge commons that span multiple disciplines and utilize design approaches will drive new innovations in health care settings. Consumer-citizens can also pool data and health knowledge to build solidarity insurance programs much like contemporary Islamic insurance products (takafuls) or micro-insurance.

Developing countries provide new models

Recent innovations in social and health services in developing countries offer examples of creative, hybrid business models that can ensure sustainable funding while providing quality services to the poor. In India, Narayana Hrudayalaya Hospital provides free heart surgeries for the poor but maintains impressive profit margins; SPARC, India’s slum dwellers association, has demonstrated how even the poor can participate and reap benefits from the stock market.

tools & platforms

Open science platforms foster new collaboration

Open science platforms facilitate cross-disciplinary and external collaboration to tackle the world’s pressing public health concerns. Web-based, networked innovation platforms provide streamlined expert-sourcing and connect outsiders to specific projects inside companies. Open platforms and open science together may facilitate mechanisms that lower the financial barriers to innovation and help overcome market failures. Companies will partner with citizen-scientists to develop new products, and depend on lead users to improve on existing ones.

Open platforms enable the co-creation of health

Moving beyond a “one-size-fits all” approach to health will require new platforms that allow end users to express their needs and desires, and to engage earlier in the design and development of new products and services. Opportunities for more user-centric innovation are accelerating with platforms like Dell’s Idea Storm on the industry side, and patientopinion.org.uk addressing government health services in the United Kingdom. Other platforms will focus on the distribution of knowledge and tools that empower lead users of technologies to become co-creators of products and services.

Managing risk leverages intellectual property

Open innovation represents a challenge to industries where intellectual property is coveted most highly. Yet the patent portfolios of most firms do not generate shareholder value. Firms at the leading, creative edge of Open Health will find ways to open up and build platforms that derive value from assets “sitting on the shelf.” Citizen-consumers will also use new web-based platforms to highlight threats, opportunities, and risks they deem important.

Mashups make the invisible visible

User-friendly new media tools and technologies make possible community mapping projects that combine environmental and personal health data for a specific geographical area. These efforts at data visualization will allow individuals to conceptualize complex issues in a manageable, actionable format. Smart networks will emerge to respond to these issues. Bandwidth limitations may reshape domestic regulatory programs, replacing a top-down, closed platform with a more cooperative, participatory approach to health and health care policy.

Resource-poor environments emerge as important innovation sandboxes

Platforms for crowdsourcing and leveraging collective intelligence in networks for problem solving respond to inherent constraints of human capital and knowledge. Some of the more innovative open innovation platforms are already emerging from resource-poor environments. The lessons learned in these environments will extend to other markets and geographies as lessons and solutions diffuse through highly connected innovators around the world.



The Institute for the Future’s Health Horizons Program has developed a new paradigm for disruptive innovation in the global health economy—we call it “Open Health.” This paradigm leverages the concepts and successes of open innovation and open source software, and applies them to the world of health. Open Health strategies will redefine the research and development process and will require a radically new way of thinking about innovation systems, the institutional culture of firms, partnerships, and collaborations, and the very meaning of health itself. The implications of Open Health are relevant to all stakeholders in the global health economy, be they beauty, food, consumer electronics, biopharma, health care, or medical technology companies. As it diffuses across industries, Open Health will inspire new approaches to meeting significant global health problems, and it will provide a framework for generating and sustaining new business models of tomorrow.

We have identified ten core principles that serve as a foundation for implementing Open Health strategies. This map presents these principles in the context of emerging trends and innovation leaders. It describes the external forces that are driving Open Health and emphasizes the networks and culture, the ethos and skills, the business models and strategies, and the tools and platforms that will shape innovation systems in the global health economy over the next decade.

The *Open Health Map of Disruptive Innovation* (SR-1117A) is your guide to putting Open Health into practice. Use it, along with its companion piece, the *Open Health Toolkit: A Framework for Innovation* (SR-1117B), to build the capacity to innovate to solve health’s pressing problems.

HEALTH HORIZONS PROGRAM
www.iff.org
124 University Avenue
Palo Alto, CA 94301
650.854.6322

