

Establishing a Regional Blockchain Innovation Cluster in Health Care

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Abstract

Blockchain technology has great potential to revolutionize healthcare data management. The technology is sufficiently complex, however, making it essential that a large number of people with a broad range of skills will be required to implement the technology. Innovation clusters will be the primary means of producing blockchain breakthroughs in healthcare by bringing together computer scientists, medical experts, and business people in the pursuit of a common goal. Healthcare innovation clusters are most likely to be centered around medical universities, but will also include in close geographic proximity technology, business, and medical insurance organizations.

Introduction

An innovation cluster comes about from bringing together a collection of people and institutions with distinct skills in a manner designed to encourage both innovation and a local economy that develops wealth and prosperity. Clusters are grouped in tight geographical regions so people can get together easily and do a lot of collaboration. Blockchain technology has the potential to revolutionize healthcare through innovations in multiple areas including privacy, data security, interoperability, and smart applications (1–5). Healthcare clusters generally are located around universities and medical research institutions, bringing together researchers, business people, and entrepreneurs. An innovation cluster isn't just focused upon the creation of new ideas, it is also focused upon bringing good ideas to market and generating economic value. The four components of an innovation cluster are expertise, diversity, interaction, and application. Innovation projects aim at providing framework conditions and access to finance for research so that innovative ideas can be turned into products and services that create growth and jobs (6).

Innovation Cluster Characteristics

The primary characteristics of an innovation cluster are cooperation, communication, a shared overall vision, and a culture of innovation. Creating a regional systematic innovation cluster requires organizations, even those initially thought to be competitors, to work together in networks requiring cooperation and communication. Then, a culture of innovation that is focused on a shared purpose can create a successful innovation cluster. When industries cluster, regions have higher employment, higher growth of wages, more businesses, and more patents (7).

Innovation clusters can form from a wide variety of organizations, including businesses, governments, and university systems. Businesses can create innovation clusters by engaging in a non-zero sum game where their products not only work together, but where cooperation is required. A good example of this is Silicon Valley, where new ideas and technologies build symbiotically upon a shared foundation of technological hardware, protocols, and software.

Governments can also help create regional clusters, with leadership from the government providing strong incentives for systematic innovation. Tallinn, Estonia has become a global leader in blockchain innovation due in large part to a favorable financial and regulatory environment that has encouraged Internet, and now blockchain innovation.

Universities can also develop regional innovation clusters by developing cooperative projects. In the case of healthcare, Boston has become an innovation cluster through cooperation between Harvard, the Massachusetts Institute of Technology, and regional medical clinics and hospitals. Together, they are developing one of the first blockchain based electronic medical record systems that will break down old silos of data storage and make medical information secure, private, and readily available.

Setting Up a Healthcare Innovation Cluster

Developing routines at the start of an innovation cluster can help create a system of management that encourages ongoing innovation. The purpose of managed innovation is to create favorable conditions to maximize the chances of ongoing innovation.

Resource availability is a key component of successful innovation. Silicon Valley's success highlights how a combination of readily available software engineers, hardware engineers, entrepreneurs, and venture capital can create a favorable environment for technology innovation. In Boston, the availability of top physicians and top engineers combined with solid financial backing from the government has resulted in a robust healthcare innovation cluster in blockchain technology.

Setting up a regional healthcare innovation cluster involves assembling a group of people and organizations with diverse skills. Getting human business and research talent together in close proximity to facilitate collaboration is essential (8). Finally, a corporate culture, developed by instituting routines, needs to encourage both defect reduction and innovation (9).

Getting Participation

Although the primary foundation of innovation clusters may be a group of businesses, or a university system, or a government, the most successful innovation clusters include all three of these components. In Silicon Valley, private businesses work closely with academic institutions and the government. Stanford and the University of California at Berkeley work collaboratively with business, and in many cases the foundation for a business is developed when the entrepreneur is in school. For example, Google was founded by Larry Page and Sergey Brin while they were students at Stanford.

Creating a Shared Purpose

Shared values and beliefs can be intentionally created, changed, and adapted to support innovation. For innovation to thrive within an organization, the focus has to be on the people first, and the technology second. A formal process to evaluate how change happens within the organization should first measure its effects upon people, their morale, and their behavior (10).

Routines are the primary way to create a shared culture and sense of purpose. They are embedded patterns of behavior and beliefs that are regular and predictable. Routines encompass actions, activities, behaviors, and interactions. They are triggered patterns of activity that create organizational culture (11). Routines increase stability and reduce uncertainty. An example of an innovation routine is first giving employees a routine process, which provides stability of their day to day work. This action routine is combined with a management culture that provides enough autonomy for employees to feel free to experiment and innovate, which reduces uncertainty by decreasing the fear of disciplinary action (12). Routines embedded into an overall innovation strategy can be particularly helpful in building a process of sustained incremental innovation built upon a single disruptive innovation (13).

Organizational Management and Funding

Management is responsible for development of the organization's innovation strategy. This consists of developing a set of mutually reinforcing routines designed to achieve a specified outcome. Research and development, sales, marketing, production, and finance all need to be aligned together to achieve a competitive goal (14).

Management is also responsible for ensuring the organization remains fiscally profitable. Innovation too often consists of isolated research and development teams. An innovation strategy aligns multiple organizational resources with business strategies in order to achieve fiscal profitability.

In healthcare, disruptive innovations are frequently the product of government funded research or government funded competitions (15). However, in some healthcare sectors such as the pharmaceutical industry, the majority of funding comes from private industry (16). It is anticipated that while disruptive blockchain technologies in healthcare may be funded by governments, a program of sustained innovation likely will be funded by the value capture obtained by private industry.

Bibliography

1. Brodersen C, Kalis B, Leong C, Mitchell E, Truscott A. Blockchain: Securing a New Health Interoperability Experience. 2016 Aug; Available from: https://www.healthit.gov/sites/default/files/2-49-accenture onc_blockchain_challenge_response_august8_final.pdf
2. Krawiec RJ, Housman D, White M, Filipova M, Quarre F, Barr D, et al. Blockchain: Opportunities for Health Care. 2016 Aug; Available from: <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/public-sector/us-blockchain-opportunities-for-health-care.pdf>
3. Ekblaw A, Azaria A. MedRec: Medical Data Management on the Blockchain [Internet]. PubPub. 2016 [cited 2017 Jun 13]. Available from: <https://www.pubpub.org/pub/medrec>
4. World Health Organization. Electronic Health Records. From Innovation to Implementation - eHealth in the WHO European Region. Denmark: World Health Organization; 2016. p. 22.
5. Yue X, Wang H, Jin D, Li M, Jiang W. Healthcare Data Gateways: Found Healthcare Intelligence on Blockchain with Novel Privacy Risk Control. J Med Syst. 2016 Oct;40(10):218.
6. European Commission. Framework for state aid for research and development and innovation. 2014 May 21; Available from: http://ec.europa.eu/competition/state_aid/modernisation/rdi_framework_en.pdf
7. Sallet J. Innovation Policy in Tough Times on Tight Budgets: The case for regional innovation clusters. [Internet]. Science Progress. 2010 [cited 2017 Jul 1]. Available from: <https://scienceprogress.org/2010/10/innovation-policy-tight-budgets-and-tough-times/>
8. Regalado A. In Innovation Quest, Regions Seek Critical Mass - MIT Technology Review [Internet]. MIT Technology Review. 2013 [cited 2017 Jul 1]. Available from: <https://www.technologyreview.com/s/516501/in-innovation-quest-regions-seek-critical-mass/>
9. Klein G. Helping Our Organizations. Seeing what others don't. 1st ed. New York; PublicAffairs: PublicAffairs; 2013.
10. Nichol PB. Assessing Enterprise Readiness. The Power of Blockchain for Healthcare: How Blockchain Will Ignite The Future of Healthcare. 1st ed. Newington, CT USA: Peter B; 2017. p. 179.
11. Becker MC. Organizational routines: a review of the literature. Industrial and Corporate Change. 2004 Aug 1;13(4):643-78.

12. Blakcori F. The Role of Formal Routines in Organizational Innovation. International Journal of Business and Social Research [Internet]. 2014 Feb 22; Available from: <http://thejournalofbusiness.org/index.php/site/article/view/363>
13. Pisano GP. In Defense of Routine Innovation [Internet]. Harvard Business Review. 2014 [cited 2017 Jun 30]. Available from: <https://hbr.org/2014/06/in-defense-of-routine-innovation>
14. Pisano GP. You Need an Innovation Strategy [Internet]. Harvard Business Review. 2015 [cited 2017 Jun 30]. Available from: https://hbr.org/2015/06/you-need-an-innovation-strategy?referral=03758&cm_vc=rr_item_page.top_right
15. CCC Innovation Center [Internet]. [cited 2017 Jul 1]. Available from: <https://www.cccinnovationcenter.com/>
16. Bodenheimer T. Uneasy alliance—clinical investigators and the pharmaceutical industry. N Engl J Med. 2000 May 18;342(20):1539–44.