

A synopsis of Steven Johnson's book "Where Good Ideas Come From: The Natural History of Innovation": How to leverage what works

Author's note This whitepaper is the added material for Chapter 7 of *W.I.S.E. Choices at Work* which discusses the idea of creating options when no options seem obvious. In the book, I mention the idea of opening up one's mindset to thinking creatively. This whitepaper provides approaches for expanding thinking and developing new ideas. I originally wrote this document in 2018.

Introduction Steven Johnson's book "Where Good Ideas Come From" came out in 2010, so it's not new. I don't know exactly how it found its way into my pile of reading, but I am grateful that it did. The construct and framework use familiar thinking to provide powerful concepts for people tasked with creating good ideas. In creating this review, I have added ideas from other books and thought leaders that reinforce this book's concepts.

Overview Steven Johnson has written 11 books in the areas of science, technology, and the internet. He has also co-created several influential websites, including the pioneering online magazine [FEED](#), the [Webby Award](#)-winning community site, [Plastic.com](#), and most recently the [hyperlocal](#) media site [outside.in](#).

In his book, Johnson uses a technique developed by literary historian Franco Moretti, called "distant reading." This approach takes a long view of innovation to discern seven key factors that help nurture innovation. He looked at innovation starting with double entry accounting in the 1400s up through the World Wide Web. The factors are:

1. Adjacent Possibility
2. Liquid Networks (the adjective is important)
3. Slow Hunch
4. Serendipity
5. Error
6. Exaptation
7. Platforms

This list is not novel by any stretch. Johnson illustrates how each factor helps foster innovation. He then provides examples of how the factor contributed to specific innovations. From my perspective, the above list offers ideas for action along with guiding principles. He closes the book with the idea that networks of people working in an open source manner are more likely to create good ideas.

A Growth Ecosystem Speeds Up Idea Generation and Adoption

Johnson opens his book talking about the abundance of life in coral reefs, the 'metabolism' of cities, and the 10/10 rule. He talks about the abundance of life to discuss the intricate and efficient ecosystem of the coral reef that allows many species to thrive. The metabolism of cities shows that bigger cities generate ideas at a faster clip than smaller cities. The 10/10 rule says it takes 10 years for a technology platform to be built and then 10 years for it to achieve mass audiences. This rule applied to AM radio up through HDTV. Then YouTube used platforms to reach mass appeal in 2 years. Ecosystems, networks, and platforms are key to creating good ideas.

Adjacent Possibility

The idea of using incubators to help newborn babies started in Paris in the 1870s. Back then, one in five babies died before learning to crawl. This statistic was worse for low birthweight babies. Stephane Tarnier, an obstetrician, noticed incubators for hatching chicks at the zoo. He developed a simple incubator to provide stable temperature for low birthweight infants. His incubator halved the mortality rate versus non-incubated babies. This adjacent possibility evolved to today's sophisticated incubators with additional technology to optimize conditions and monitoring of key health information.

This technology migrated to developing countries where large numbers of infants are at risk. Unfortunately, a survey found most incubators unusable. They had too much technology with no available repair technique. A design team looked at another adjacency and found that even in very remote areas, local people could keep trucks and other vehicles running. The designers looked at this and identified a way to make an incubator using automotive parts and technology. Their incubator uses a car battery, dashboard fans, and door alarms. The locals can keep these up and running, thus helping infants.

This second adjacency illustrates the need to look at 'possibility' besides adjacency. Getting incubators to developing countries was relatively easy. Getting incubators that could stay running required different thinking. They looked at what other technologies the local people had that stayed operational. This same adjacent possibility mindset allowed medicine to be delivered using the void spaces of cases of Coca-Cola® bottles that were shipped to remote locations.

Liquid Networks

A good idea comes from a network of connections. Johnson talks about the spillover that occurs when people create new linkages between ideas that results in more ideas. He says that the bigger the network, the better. In addition, the networks should be plastic in the sense of being flexible and adaptive.

He uses the world of physics to describe liquid networks. A network relies on connections being made. A gaseous network allows lots of connections but has lots of instability, so the connections are quite temporary. Solids, on the other hand, have lots of stability but don't

allow very many connections. A liquid provides enough stability to create a connection while allowing for enough connections.

For example, the early hunter gatherers had the chance to make connections but lacked stability to have ideas to build. Walled fortresses and monasteries provided stability but did not allow for many new connections, if any. The emergence of cities allowed lots of ideas to flourish. Twenty years ago, Jared Diamond wrote a book called "Guns, Germs and Steel: The Fates of Human Societies" that underscores this point. He describes how domestication of animals, especially beasts of burden, enabled agriculture and the rise of specialization, especially in the areas of science and technology. In 2016, Eric Weiner's book "The Geography of Genius: Lessons from the World's Most Creative Places" highlights the value of cities in lots more detail.

Sharing ideas allows for connections and debate that sharpens the idea. Many times, this occurs in what Ray Oldenburg calls "Third Place." In essence, one's "first place" is the home and those that one lives with. The "second place" is the workplace — where people may actually spend most of their time. Third places are "anchors" of community life that facilitate and foster broader, more creative interaction. Starbucks or any coffee shop is a popular "third place."

Slow Hunch

The image of a lone genius getting an 'Aha' moment provides lots of inspiration despite it being largely untrue. The liquid network factor of people working together to build ideas usually takes the lone genius aspect away. Investigating the true timeline of innovations suggests ideas need time to form. The reason that the 'Aha' moment concept persists is that the idea seems 'obvious' in hindsight and therefore must have happened quickly.

A seminal example is T.H. Huxley, a supporter of Charles Darwin, exclaiming, "How stupid not to think of that," after hearing the theory of natural selection. A review of Darwin's copious notes reveals that his ideas on evolution incubated for at least a year and that the seeds of his theory were sown years earlier during his journey on the H.M.S. Beagle to the Galapagos. He also mentions that reading the ideas of Thomas Malthus influenced his thinking. So much for a lone genius getting an 'Aha.'

Johnson suggests that for the slow hunch to create a good idea, it needs lots of kernels of ideas and the ability to put the kernels on the 'back burner' for slow cooking. The concept of keeping notebooks helps with capturing kernels. (More on this in the serendipity section.) 3M has the '15% time' and Google built on this concept to create 20% Innovation Time Off to enable people to work on their hunches. Of course, we know that 3M's Post-It® notes came from this. Google's Gmail and News products have come from their program.

Serendipity

Good ideas need connections to other ideas that have not been previously connected. This implies that some level of randomness or even chaos needs to happen. Many good, if not great, ideas happen when people were 'daydreaming' or just dreaming. Examples include: Einstein daydreamed about riding on a beam of light and what that might be like, and Kekule, who discovered the ring shape of benzene, had the shape come to him in a dream about Ouroboros the Greek mythology serpent who ate his tail. In both cases, the ideators had been working on a slow hunch for some time before their idea came together during a daydream.

The American Heritage Dictionary defines serendipity as "The faculty of making fortunate discoveries by accident." Making accidents 'on purpose' would be somewhat reckless and might even defeat the idea of things being random. In the 18th century, John Locke created the concept of a commonplace book to capture ideas, quotes, and other kernels of ideas. Furthermore, he established an index of the contents that juxtaposed dissimilar ideas. He could retrieve ideas and then saw other ideas that were different but related based on the filing system. Thus, random connections were being made. Not all became great ideas, but the odds go up...

Reading multiple books at the same time can help create this effect. Bill Gates takes what he calls a reading vacation, where he reads a stack of books on a variety of topics to create a stew of ideas. If you don't have time for a reading vacation, then you can engage in syntopic reading. You do this by reading 3-4 books on a similar topic in parallel to create new combinations. Reading a traditional newspaper creates a mash up of ideas based on how the editors have used the available space. After you finish reading, take a walk or engage in a non-thinking task can often lead to ideas aggregating.

Error

William Stanley Jevons, an inventor and economist, described the ubiquity of error in a book called "The Principles of Science." He said this:

"It would be an error to suppose that the great discoverer seizes at once upon the truth, or has any unerring method of divining it. In all probability the errors of the great mind exceed in number those of the less vigorous one. Fertility of imagination and abundance of guesses at truth are among the first requisites of discovery; but erroneous guesses must be many times as numerous as those that prove well founded. The weakest analogies, the most whimsical notions, the most apparently absurd theories, may pass through the teeming brain, and no record remain of more than the hundredth part."

This book, written in 1874, fundamentally outlined a basic tenet of 21st century startups: fail fast.

Examples of successful failures abound, ranging from penicillin to Post-it Notes® 'glue' that does not stick to Teflon®. The latter has

spawned a whole industry for W.L Gore and Associates. And for the record, Gore's initial invention happened by accident when he yanked the heated rod of Teflon versus a slow, steady pull.

Exaptation

Steven Jay Gould and Elisabeth Vrba coined the term exaptation, meaning "to take something designed for one use and adapting it to something completely different." Gutenberg did this when he took the wine press concept and applied it to his invention, called the printing press. Hypertext markup language (HTML) originally designed to help academia provide the backbone of the internet. Watson and Crick used ideas from biochemistry, genetics, information theory, mathematics, and sculpture to identify the structure of DNA — one discipline alone would not have discovered it.

In some ways, exaptation may be the culmination of liquid networks and serendipity coming together. (And perhaps some error?) More connections increase the odds of seeing something that can be exapted.

Platforms

Johnson uses the concept of ecosystem to define a platform. His example is the beaver as an 'ecosystem engineer.' The beaver builds a dam in a stream to protect its lodge. The pond that protects the lodge becomes a home to all types of aquatic life that needs slow moving water. Ducks and geese use the ponds along their migration. Trees whose roots are now inundated slowly die, creating softer wood for woodpeckers to find insects and hollow out nests. Their abandoned nests allow song birds a new home. The 'platform' of the wetlands allows many to thrive. Built into this ecosystem is that the 'waste' of one species gets recycled by another.

Innovation thrives when platforms exist. The internet age has many examples. Tim Berners-Lee only needed to invent HTML because he could take advantage of ARPANET's already created TCP/IP (Transmission Control Protocol/Internet Protocol) platform. YouTube took advantage of stacked platforms to thrive: JavaScript, Flash, and the internet. Twitter created its API (Application Programming Interface) and made it openly available. This enabled others to develop many applications, like photo uploading and geolocation that empowered the platform. The original 140 character limit came from the SMS phone text platform.

Conclusion:
The 4th
Quadrant

Johnson concludes the book by hypothesizing where good ideas will come from in the foreseeable future. He used a framework adapted from Yochai Benkler's book "The Wealth of Networks." He plots the history of good ideas regarding whether individuals or networks of people created them and whether they were market based or non-market based.

	Individual	Network
Market	1	2
Non-Market	3	4

He uses a lens of 200 years for each snapshot starting in 1400. Given the lack of effective mass communication, initially individuals created most of the good ideas. The 'split' between market and non-market skewed to Non-market. Profit was not the motive. From 1600 to 1800, the bias remains in the Non-market space and moves to split evenly between networked and individual. The period from 1800- present shows an explosion in the 4th quadrant. He sees this as the future of innovation.

He respects intellectual property but advocates for institutions such as National Labs, universities, and open source to enable innovation.

Implications for Individuals

Long before Hillary Clinton co-opted the “It takes a village” phrase, many African cultures used the phrase regarding what it takes to “raise a child.” Using a slight amount of exaptation: ‘It takes an ecosystem to create a good idea.’

In the last paragraph of the conclusion, Johnson acknowledges that many of his readers cannot change the innovation ecosystem in which they operate. Here is his advice to individuals:

“The patterns are simple, but followed together, they make for a whole that is wiser than the sum of its parts.

- Go for a walk.
- Cultivate hunches.
- Write everything down, but keep your folders messy.
- Embrace serendipity.
- Make generative mistakes.
- Take on multiple hobbies.
- Frequent coffeehouses and other liquid networks.
- Follow the links.
- Let others build on your ideas.
- Borrow, recycle, reinvent.

Build a tangled bank.”*

* This last reference related to the coral reef.