What is Innovation? A review of 3 common types

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Innovation is a central part of hacker/maker culture. What does it mean to innovate? The reasons may be personal or for entrepreneurial purpose, but the meaning is the same. In this blog post, I will briefly examine 2 type of innovation, and will review a third type of innovation. There are certainly other type of innovation, but I will focus on these in the nexus of science and technology.

1. The discovery of a natural property, such as electricity or magnetism, and the development of a product, such as the lightbulb, or inductor.

2. The modification/or redevelopment of an existing product, such as the incandescent bulb, to make a more efficient light, such as a CFL or LED.

3. The transplantation of an existing product- such as a lightbulb, into another product, such as a car, to produce the headlight.

The third type of innovation interests me the most, because there are brilliant inventors in many different fields. But it is a bit wayside or unnatural for some people to be receptive to an idea like powering a a headlight by an internal combustion engine, even with a battery. I'm sure the idea eventually caught on, considering its practicality but how long did it take for the idea to be adopted? This is the core struggle of innovation. It not only faces a struggle in its own right- that of developing something new or modified for a new enhancement, but also faces a public adoption, where many more applications can be used, and is often a main reason for promoting a technology, as opposed to niche features.

Open-source ideology, is a very great concept. If one looked back into the history of open source, one finds a very strong push to establish what I believe was the first linux operating system:

from https://www.hipeac.net/vision/2021/ (111MB)

smaller 6-page version here: https://cdn.hackaday.io/files/1777167603401344/192-197%20-%20Copy.pdf

"The first point is to understand that

there are fundamentally two separate

families of open source licence. What we call permissive licences (Apache, MIT, BSD) basically allow your users to take what you have provided, use it, modify it and even sell it. They do not even have to tell you what they are doing with it. Most

annoyingly, they can take what you have

started and, when they make something better

out of it, they do not have to share it with anyone else. Particularly at the beginning of the open source movement, this was seen as a major problem, and so called reciprocal licences were developed (GPL, LGPL). This second family of licence asks the user to make systems built using what they have received openly available under the very same licence."

Why was it a "major" problem? To start, Ubuntu and the Linux kernel didn't exist then. Today, a free and easily downloadable ISO is almost taken for granted. I do not know how many developers there were who wrote the first kernel-3 at least? Since then there have been thousands of projects and forks of projects. That is obviously normal because there was no need to develop anything "centralized" anymore, once the software is developed, the hardware is a matter of aesthetics. Yet, as more developers seek to adopt open-hardware projects, I think of some islands of development that are stratified in their capability. There could be perhaps, more "mega-projects" to develop some commonality in terms of a desired hardware components, such as an a mini-ITX-like motherboard in a Raspberry Pi form factor. Of course I am plugging my own laptop project now, but its more about suggesting any mega-project that has a lot of features that a generation of developers would want to use. This isn't to say there is not already a lot of effort towards something like this. What would an open-hardware product look like? Maybe it would use a open RISC core like the Berkeley Out-of-Order Machine https://boom-core.org/ If someone wanted to develop an open-source monitor, what kinds of materials would be needed? This is one suggestion https://hackaday.com/2017/04/12/can-you-build-an-e-ink-display-from-scratch/ I'm sorry if this post bothers anyone; it may sound a bit critical, but I am

trying to better understand why people like to hack, and whether it is how often it is for personal enjoyment, or whether it is for a social cause- e.g to produce something that others would want. It's perfectly fine either way, and I'm not trying to discourage any personal projects at all. On the contrary, I just try to engage with some who are interested in working on building something like a beehive: https://en.wikipedia.org/wiki/Eusociality#In_humans

One can definitely ignore this academic question. It interests me.

So it seems like I've strayed a bit from innovation. Looking up the Wikipedia definition, I found a mention of "organization" in the first sentence: "**Innovation** is commonly defined as the "carrying out of new combinations" that include "the introduction of new goods, ... new methods of production, ... the opening of new markets, ... the conquest of new sources of supply ... and the carrying out of a new organization of any industry".["

A new organization? Sorry, new world order folks, not that type :)

But it represents something that happens in Silicon Valley once in a generation. Some might consider the first iPhone a pinnacle moment in Silicon Valley, bringing together many technologies in a very portable package. https://en.wikipedia.org/wiki/IPhone_(1st_generation) The camera, email, the web, phone calls. At least a very slick, publicized and watershed moment in our cultural habits.

https://en.wikipedia.org/wiki/Technological_convergence

"also known as digital convergence, is the tendency for technologies that were originally unrelated to become more closely integrated and even unified as they develop and advance. For example, watches, telephones, television, computers, and social media platforms began as separate and mostly unrelated technologies, but have converged in many ways into interrelated parts of a telecommunication and media industry, sharing common elements of digital electronics and software.

The concept is roughly analogous to convergent evolution in biological systems, such that (for example) the ancestors of whales became progressively more like fish in outward form and function, despite not being fish and not coming from a fish lineage."

Convergence & Innovation. What do they have in common? Convergence requires innovation.

What drives convergence? Convenience

Why do we need convenience? There are some good reasons for and against, but I will not explore that here.

What are some new types of convenience? Not needing huge rechargeable batteries and a phone that uses less power, which reinforces the former.

One of Linux's longest running distros, https://en.wikipedia.org/wiki/Slackware has a paradoxical raisin d'etre:

"The name "Slackware" stems from the fact that the distribution started as a private side project with no intended commitment. To prevent it from being taken too seriously at first, Volkerding gave it a humorous name, which stuck even after Slackware became a serious project.[12]"

Without knowing anything much about the merits of the distro itself, a slack ethic presents a conundrum for a moderately successful open-source project. If one designed a project so well, there would be more demand to maintain it, perhaps beyond the capabilities or interest of the original developer. However, by having a distro readily forkable, it can be diversified without losing its center. That said, if the license were permissive, some of those changes wouldn't necessarily find their way back into a "mainline distro"- it would be splintered beyond intero-operability.

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