Decoding the Source of Wealth Creation

Dr Arpita Basak[1] and Dr A. Srihari Krishna[2]

[1]Department of Business Management, Faculty of Administrative Sciences, Tishk International University, Erbil, Iraq.

[2]ITM Vocational University, Vadodara, India.

Correspondence: Dr Arpita Basak, TIU, Department of Business and Management, Erbil, Iraq.
Email: arpita.basak@tiu.edu.iq

Abstract

It is quite difficult to decode the secret of wealth creation in the modern society. Hitherto, the wealthiest people owned diamond mines, coal mines, gold mines, silver mines, oil wells, gas fields, etc. In the past two decades, however, the world has become more and more intellect and less and less material. Against this backdrop, majority of the billionaires were created from the technology space. Nevertheless, the route they chose to become billionaires was not the same. Especially, in the software sector where source code holds the key to wealth creation majority chose to keep it closed to mint wealth. A proprietary software generates revenues into the future for the owner through licensing mechanism. But those who chose to keep the source code open had collaborated with like-minded people and still made it to the elite list of billionaires. It means to say that both business models work provided they are robust and scalable to stay relevant to the target customers. The real money is not in producing software, but it is in the service you create using the software.

Key Words: open source, wealth creation, collaboration, open community, business models, patents, billionaires

1. Introduction:

Human beings by default are born to be unhappy. They have a special trait called "ambition" which separates humans from all other formats of life on planet Earth. It is this ambition which powers them to do something different and better in their active life to achieve something noteworthy. The upshot: producing novel ideas that result in new products, services, and concepts that solve problems of the society and economy. As monetary wealth is a key metric to determine one's success in professional life, all innovators try to protect their intellectual property (read: original ideas) with a patent so that none can misuse and abuse them to their own advantage. A patent gives the patentee (owner) the right to stop others from copying, manufacturing, selling, or importing his/her ideas without prior permission. Patent licensing generates fees for the innovator in the form of royalties to make, use, or sell the original ideas either exclusively or on non-exclusive basis.

1.1 First Among Equals:

If the number of patent filings is an acceptable metric of human achievement, Thomas Alva Edison was superlative by any standard. In 1931, at the time of his death, he held 1,093 patents (1,084 utility patents and 9 design patents) to his credit. After a gap of 82-years, this American record was broken by Lowell Wood in 2016 when he received 1,085th utility patent. However, the real king of patents globally is none other than Shunpei Yamazaki - a Japanese inventor who broke the record of Edison in 2004. As of May 2021, Yamazaki held 5,614 patents cutting across data processors, display services, memory chips, and semiconductors. Going by the same logic, corporate species also generate ideas from their employees to get them patented. IBM leads the world by being the frontrunner in research and innovation for the 28th consecutive year with 9,130 patents by end 2020. In the past decade, the technology pack created maximum billionaires driven by those engaged in producing software (refer to Fig 1: Sector-wise growth of billionaire wealth).

1.2 Software Licensing:

Software that is developed with an intent to meet commercial requirements can be either proprietary (read: closed-source) or free and open-source. In the context of proprietary software, the owner usually hides the source code but sells the license for a fee. This enables the owner to retain the copyright to the property while allowing the organization/end users to utilize the software under some pre-set conditions. As the number of installations increase because of the ease of use and its competitive cost, the software becomes popular enriching the owner. Microsoft, Oracle, and SAP earned sinful monopoly-type profits for an extended period as they dominated their respective segments. On the contrary, the top developers who believed that frontline closed source companies were exploiting the market revolutionized the software industry. They came up with free and open source software

(FOSS) with the firm belief that this could be a better alternative in terms of bringing world-class products. Software - whether it is open-source or otherwise – can be monetized in varied formats: a) revenue generation from outright sale or rental income; b) revenue generation from outright sale or rental income from providing support services (value-adding in nature); and c) prevention of unauthorized usage of software to plug the leakages of revenues. Commercializing close-end software is a straightforward but as regards FOSS new business models had to be discovered to make the business viable so as to garner a host of individuals and corporates to come together and work for a common cause.

2. Open Source:

The technology group gave birth to the concept of open source. Since the dawn of computing, programmers and engineers had collaborated to create new technology. "Open Source" is a radical approach to developing computer programs built on the principles of collaboration, openness, and community-oriented growth. Open source facilitates a free exchange of ideas within a society by eliminating barriers between innovators, resulting in artistic, science, and technical development. Originated from the domain of software development, the word "open source" is a collaborative model created by a group of people. The software's source code is available to all; anybody may read, alter, and distribute it. Users of an application with open source access can repair broken connections, improve the design, and improve the original code. People are encouraged to participate and contribute to the software's improvement. The open source model goes beyond software development as its principles are used in automobile production, architecture, design, and hardware to name a few. As the framework of open software does not require approval, programmers in cloud computing, block chain technology, and big data are able to make significant progress as they patch and update an application's source code in a fraction of the time it would normally take. When it comes to closed source software, the organization or code authors must be informed, and users need to wait a long time for any improvements to be made to the application. Companies are adapting to open source approaches and sharing the work involved with external users who can contribute and discover new possibilities for the shared data due to the massive volume of data that emerging technology feeds from. In recent years, the spirit of open source has spread as technology innovators, developers, and programmers have created applications to facilitate global collaboration among users in a variety of fields.

2.1 Open Source Movement:

The adage "It takes a village to raise a boy" is perfectly illustrated by open source. Open Source has evolved into a movement and a way of life that extends much beyond contributing code. The open source movement uses open source software's values and decentralized production model to discover new solutions to issues in their respective industries and societies. The internet's history is the history of open source. During 1950s-60s, scientists relied on open and collaborative research on early internet technology and telecom network. Advanced Research Projects Agency Network (ARPANET) facilitated peer review and an open input process which subsequently became the basis for the digital internet. The user groups shared the source code and built upon that. Forums aided in the facilitation of discussion and the creation of open communication and collaboration principles. Since its inception in the early 1990's when the internet was still in its infancy, the network was embedded with the principles of cooperation, peer review and transparency. Open source goes much beyond coding and has established itself as a catalyst for innovation because it is inexpensive and scalable model. The open source movement is paving the way for new ideas and solutions. The major advantage of open source is that it is independent of which organization we work for; where we live; how we look; and how deep are our pockets.

The open source community acknowledges and appreciates the special skillset every member brings to the table. It offers plethora of opportunities for everyone to get involved irrespective of the fact whether they have programming skills, enjoy translating, are extremely organized, or have a strong sense of community. To perfect a product's usability in different arenas of its functionality, we need talent from diverse backgrounds. It is well known that platforms based on user collaboration have relatively lesser bugs and performs better. Open source proponents argue that by allowing anybody and everybody with access to a product's source code to make changes, the program can become more accessible and error-free in the long-run. Open source projects include Android, Bitcoin, Linux, Mozilla Firefox, and WordPress to name a few. Open source products act as educational resources, learn from, and want to build even better codes by making their source codes accessible to one and all.

2.2 Economics of Open Source:

There is a wealth of software under the category of open source and the best part of it is that none owns this communal wealth. However, some players are smart enough to transform this communal wealth into personal / corporate wealth. The community of maintainers of open source software do not have a model to unlock revenue from the assets they create. Corporates that leverage open source software to facelift their products and services milk this communal wealth to generate income. The sustainability of open source projects requires the maintainers to earn regular income. Else, they would not commit their resources of time and effort on a full-time basis and the progress would be tardy. Any relationship would last long when all the parties involved have something to give and something to take. The system cannot count on the inclination of amateurs to create time to strengthen the

communal wealth of open source software just because it is their hobby. When corporate users derive value out of open source software, they should give back to the maintainers to sustain the ecosystem of open source. In the worst case scenario, the expenses of maintainers should be compensated by the beneficiaries.

2.3 Is Open Source Free?

The general misconception is that developing an open source product entails giving it away free of cost. Although many open source projects are free, developers have the right to charge for their work. However, the license states that they are not permitted to copyright or patent the derivative work, nor are they permitted to keep any portion of its code secret. The upshot: others can create for free derivative works that perform the same role better. According to the term "open source", none can discriminate against a group by refusing to share the edited code or preventing others from editing their already-edited work. Anyone can obtain and change open-source code using this method of software development. The open-source group of people who work with the program receive these modifications and distribute them back to the developers. As a result, the names of all people involved in code modification are revealed, and the code's evolution is recorded over time. This approach makes it difficult to determine who owns a piece of code, but it is consistent with the open-source movement's ideology. These objectives encourage the development of high-quality projects as well as collaboration with other like-minded individuals to develop open-source technology.

3. Literature Review:

Open source software became a major force to reckon with during late 1998 and 1999 when the mighty IBM also chose to invest in the growth of Linux platform. Google entered this space around 2005 through its Open Source Programs Office (OSPO). Subsequently, even Microsoft joined the bandwagon through the CodePlex in spite of vehemently opposing open source campaigns in the past. A comprehensive review of literature on the open source software is conducted in this section. Broadly, we can categorize the studies on open source into three types. Specifically, the first set captured studies which focused on motivation of individuals to contribute to open source projects. The second segment detailed how the network configuration of the ecosystem influenced the performance of open source software. The third stream covered the impact of legal dimension on the project performance of open source software.

3.1 Motivation of Players:

Participants in the open source software development will be deprived of any financial gains. Nevertheless, they are encouraged to contribute because of strong culture of motivation (intrinsic and extrinsic) which was studied by earlier researchers. Since the 1970s research aimed to understand the intrinsic motivation of contributors to open source projects and Ryan and Deci (2000) realized that they were self-driven by the sheer enjoyment of the task at hand rather than any external rewards. Their source of satisfaction according to Lakhani and Wolf (2003) was the passion for programming and a sense of achievement because they felt challenged engaging in such projects. As these factors cannot sustain the interest of the participants in the long-run, extrinsic factors such as monetary rewards, profits, and reputation also played a key role. Von Krogh, Haefliger, and Spaeth (2003) delved very deep into the critical factors that enabled the contributors to commit for large open source projects. They found out that the reputation associated with participation, learning opportunities because of collaborating with bright minds, and the desire to control the evolving technology gave them the real kick. These participants also believed that the frontline software companies would tap the talent pool of open source software projects according to Zhou and Mockus (2012).

3.2 Network Configuration:

The performance of open source projects was primarily driven by the characteristics of the underlying network which was at play. One set of researchers applied social network analysis to figure out the collective actions by studying group dynamics within and across the projects. As regards inter-projects, researchers Singh, Tan, and Mookerjee (2011) studied over 2000 open source projects for a five-year period hosted on sourceforge.net and concluded that internal cohesion amongst the participants of a project had a significant impact on its performance. Generally, participants preferred to work with those with whom they were connected in a previous project according to Hahn, Moon, and Zhang (2008). Sowe, Stamelos, and Angelis (2006) studied participants in intra-projects and classified them into three roles: knowledge seekers, knowledge contributors, and knowledge brokers. They concluded that knowledge brokers were instrumental in cascading information flow and distribution.

3.3 Legal Angle:

In the third category, research studies focused on the influence of external factors like policies and legal hurdles on open source software. Specifically, they covered two critical arenas: characteristics of open source licenses and the enforcement of intellectual property lawsuits. According to Subramaniam, Sen, and Nelson (2009), there were more than 60 software licenses that prevailed globally where the creator had restricted the right of usage or revisions. They found that restrictions were preferred by the software administrators and users while the developers did not view them favourably. In another study on the impact of intellectual property rights

enforcement on open source projects conducted by Wen, Forman, and Graham (2013), they discovered that there is an increase in the cost of open source software which debilitated the interests of participants across the board.

4. Research Methodology:

The approach of this research paper is exploratory in nature by using case study methodology to understand how participants in the open source software space come together to collaborate on a development project; why do they engage in such activities that do not appear to be promising; and what is it that sustains their interest in the long-run to bet on open source ideas.

5. Case Study Analysis:

A case study is a well-established research design to comprehend a complex issue where in-depth study is possible in a real life scenario. We have taken four case studies of live companies in the open source software and did in-depth research to figure out whether there is a possibility of wealth creation or erosion in these projects. Case analysis under this exploratory format was done for companies such as Wikipedia, Red Hat, MuleSoft, and GitHub. All these companies were built on the foundation of open source culture and over a period of time they attracted millions of professional developers who created and strengthened the open communities. The software biggies either loved them or hated them but could never ignore them. Gaints in the software space started funding them initially and later on acquired them because they understood the potential of these targets.

5.1 Rise and Rise of Wikipedia:

Wikipedia and thousands of other wikis run on MediaWiki, a free open-source wiki program. Anyone can access, update, and share: No editor owns an article because all editors voluntarily license their work to the public, and all submissions can and will be mercilessly edited and redistributed. It always follows copyright laws and avoids plagiarizing from any source. Borrowing non-free media is often permitted as fair use, but free alternatives should always be sought first. Hundreds of individual developers have contributed to making it a feature-rich, stable, and scalable platform that can power some of the world's largest collaboratively edited reference projects. Although wiki software is a form of content management system (CMS), it differs from most other systems in one important way. There are no clear leaders or copyright owners. As a result, it is well-suited to collaboration. Editing an article is also simple since all changes are made directly to the article's main text. Users that come across papers that are fraudulent, inaccurate, or incomplete may report them to Wikipedia or edit the text in real time.

Ben Kovitz was a programmer experimenting with WikiWikiWeb before introducing it to Larry Sanger in January 2001. At that time, Sanger was working on an online encyclopaedia named Nupedia as a software developer for a company called Bomis. Although the Nupedia project failed to gain traction, Sanger recognized that the wiki model could be used to build a more inclusive Web encyclopaedia. Sanger proposed to Bomis' creator, Jimmy Wales, that they build their own wiki encyclopaedia using a version of the UseModWiki engine that powered WikiWikiWeb, which they eventually rechristened as Wikipedia. On 15th January 2001 Wikipedia was formally introduced with Jimmy Wales' aiming to provide "free access to the sum of all human information."

Wikipedia has held workshops in a variety of countries in the past two decades to enable more people to contribute to their native languages, as well as develop its resources to make it easier for them to write, post, and cite articles. Hundreds of thousands of individual authors donate their time and expertise for the benefit of the Wikipedia project, writing and revising articles for free. The knowledgebase that has resulted is not only massive, but also extremely common. Unlike traditional encyclopaedias, the content of Wikipedia is entirely generated by its users; you do not need to be a specialist or an academician to contribute articles. Wikipedia is used by a wide range of people, from students writing school papers to professionals doing research and interested individuals.

Wikipedia's content purports to present a balanced viewpoint; in reality, non-bias is codified as an official site policy. There is no structured peer-review process for submitted articles; instead, Wikipedia relies on its group of users to edit, correct, and police the information that other users make. Other users can edit and add to an article after it has been written by one user. Information is vetted for both accuracy and appropriateness in this manner. However, the site's user/editors adhere to broad editorial guidelines. These rules state that each entry must be about a subject that is encyclopaedic and worthy of inclusion, with the aim of avoiding "notable" topics, as defined by Wikipedia. Entries must not reveal knowledge that has already been created or recognized; they cannot present original works or information that is not available elsewhere. Finally, entries should not be biased or take a side in a debate; all points of view and views should be represented equally in an essay. Adding an article to Wikipedia is as simple as clicking a link and typing the text; articles can also include photos and other media.

The world's largest online encyclopaedia, Wikipedia reached a significant milestone over six million entries in 2020 for its English edition. This achievement came nearly 19 years after the website's inception, is a testimony to "what humans can do when they work together." Wikimedia is a non-profit organization that runs the world's most popular online encyclopaedia. While Wikipedia is available in a variety of languages, the English-language version has the most entries. English version of the website receives around 255 million pageviews every day, according to publicly available data (over 10 million monthly users) making it one of the top ten English-language

websites on the Internet. Wikipedia is the eighth most visited website in the world, according to web analytics company SimilarWeb. Wikimedia foundation for the year ending June 2020 clocked revenues of $127 million with net assets of over $180 million backed by a strong donor base. The cofounders of Wikimedia - Larry Sanger and Jimmy Wales are not internet billionaires because they intended to keep knowledge free without the support of advertisers.

5.2 The Unstoppable Red Hat:

Red Hat was founded in 1993 with a vision for better enterprise software. In the open source business model, the Linux operating system company, Red Hat was a frontrunner. Linux is an alternative to Microsoft Windows that can operate on desktop PCs with a full set of Office apps or as the heart of a server running Oracle database software. Red Hat was built on the idea of solving a problem. It engaged IT executives, open source advocates, developers, and partners to build the foundation for a technological future: Red Hat® Linux, followed by Red Hat® Enterprise Linux®. But that was just the beginning as the world's top enterprise open source solutions provider, Red Hat delivered high-performance Linux, cloud, and container technologies through a community-driven strategy. The company distributes open source software for free, but its clients who need maintenance, support, and installation must pay a support fee so that Red Hat can sustain itself.

Red Hat products are available through annual subscriptions making it easy for customers to track and budget their purchases. Customers can choose from a plethora of apps and hardware platforms to install comprehensive, fully supported setups. Initially, the company had a graphic mascot called "The Red Hat Man". Next, it was a secret-agent figure Shadowman" to suggest the company's rogue spirit of sneaking open source beyond the barriers of proprietary technology. "Shadowman" became a symbol of the open source movement and the embodiment of Red Hat's own culture. Monolithic software vendors such as Microsoft and Oracle impose proprietary standards on consumers and developers. On the contrary, Red Hat reversed the problem by turning development up to the community which promises freedom and choice that comes at a competitive price tag.

Open source communities had mastered the art of swiftly developing, cooperating, and solving common IT problems. However, individual clients have certain unique demands that cannot be addressed by open source communities. Red Hat had for more than 25 years assisted enterprises by blending community software innovation with the stability of an enterprise life cycle and technical support. Red Hat's enthusiasm advanced the open source movement that is today at the forefront of application development, performance, and security. Thanks to Red Hat experience and expertise, more than 90% of Fortune 500 firms use its technology and services. The success story of Red Hat is because of a passionate community of contributors, partners, and consumers. It is the collaboration of Red Hat with some of the world's most inventive businesses which resulted in converting good ideas into great ones. The company for the fiscal year 2019 had earned revenues to the tune of $3.40 billion before it was acquired by IBM for $32 billion.

5.3 MuleSoft's Horsepower:

Enterprise-level firms over the past two decades underwent a tremendous transition in their technology systems. To handle their operations, these firms shifted from complex custom-built large systems in favour of a plethora of third-party software and solutions. The benefits of this paradigm shift technologically was significant in terms of better agility, faster delivery, and sharp rise in IT investment. The need to connect all these disparate systems - including legacy and custom-built applications has been a major pain point for businesses globally. MuleSoft spotted a rich opportunity to address this issue when it was founded in 2006 by Ross Mason. The primary aim was to make it easier for businesses to connect their apps, data, and devices through Application Programming Interfaces (APIs). MuleSoft is a data integration platform that performs analytics and ETL (extract, transform, and load) procedures while bringing together several data sources and applications.

MuleSoft firmly believes in open source and open standards. The most widely used open source integration platform in the world is the Mule ESB. It is a growing community that enables 1,600 organizations globally spread across 60 nations supported by 175,000 Mule developers. MuleSoft has also developed connectors for SaaS applications, allowing users to analyze SaaS data in conjunction with cloud-based and traditional data sources. This architecture follows the current data integration pattern of using connectors, APIs, and dataflows as building pieces to simplify integration. Third-party applications, SaaS solutions, databases, cloud storage, and in-house data sources can all be used to analyze and mine data throughout a business. The resulting application networks assist businesses in accelerating app launch and modification cycles, as well as securing and managing access, allowing them to do more – and faster — with their resources.

MuleSoft's name refers to the drudgery, or "donkey labour," of data integration, which its technology was created to minimize. The name was chosen with care to convey the organization's platform capabilities. MuleSoft allows business to communicate data effortlessly and securely between devices and systems, allowing them to develop faster and provide more personalized experiences for their customers. A key business of MuleSoft is to streamline connections between a company's headquarters, salesforce, partners, customers, and suppliers, allowing firms to

interact more efficiently between stakeholders. As a result, even the largest corporations may now move forward with the speed and agility of smaller start-ups, preparing for true digital transformation.

MuleSoft serves businesses that own the world's most well-known brands across financial services, government, healthcare, higher education, telecommunications, and retail verticals. Healthcare providers, insurers, and life sciences companies, for example, may now speed up innovation and enhance patient outcomes. Web, mobile, and connected devices can be used by educational institutions to provide teachers and staff with the resources they need to alter the learning experience. In addition, merchants can better track in-store activities to provide more personalized customer experiences. MuleSoft has become one of the fastest-growing corporate software firms in history because of all of this. In 2013, the cloud-based software company Salesforce showed interest in MuleSoft's 'integration cloud' when it invested in the latter's series E round of funding. This was followed by two more rounds of investments into MuleSoft, with the second round of investments valued at $1.4 billion. In May 2018, Salesforce acquired MuleSoft in a $6.50 billion deal making the owner Ross Mason enjoy the windfall gains because of his 10% stake.

5.4 Network of GitHub and Spoke:

GitHub was established in 2008 by Tom Preston-Werner, Chris Wanstrath and PJ Hyett as a version management and collaboration tool for programming that allowed people to collaborate on projects from any location. GitHub became the home for software development teams and is the place where they collaborate and build. GitHub is not just a low-cost option, but it also has a vibrant open-source community. As it is a cloud-based solution, the code is easily accessible across the entire client business, making everyone's contributions easier. GitHub is a web-based Git repository hosting service with a graphical interface. It is the largest coding community in the planet where a piece of code or a project gets a lot of attention.

Programmers may find source codes in a variety of languages and make and track modifications using Git, a command-line interface. One of the most popular DevOps technologies for source code management is Git. It is a free and open-source version control system that may be used to efficiently manage small to large projects. Git is a version control system that allows numerous developers to collaborate on non-linear development projects. GitHub is an ever-increasingly popular programming platform for sharing code. It's a programmers' social networking site that many businesses and organizations use to help with project management and collaboration. It is the most popular source code site with over 60 million new repositories established in the year 2020.

The popularity of GitHub had necessitated the need for outside funding for the first time in 2012 when the company raised $100 million at a valuation of $750 million. In July 2015, Sequoia Capital led the second round of funding to pump in $250 million shooting the valuation to stratospheric heights at $2 billion. Microsoft since 2012 used GitHub majorly for hosting a variety of open source projects and development tools like Chakra Core, MSBuild, .NET Core, PowerShell, PowerToys, Visual Studio code, Windows Calculator, Windows Terminal and a significant portion of its documentation. Eventually, Microsoft could not resist its temptation and gobbled up GitHub for $7.50 billion pole vaulting all the cofounders into the Bloomberg Billionaires Index.

6. Conclusion:

It is a good idea to invest in one's own intellectual capability as proprietary knowledge can be monetized sooner or later. Either we can charge regular royalty or generate windfall gains when prospective investors are willing to buyout loss making companies for an abnormal price because the business had garnered large volume of subscribers. However, it should not be presumed that every inventor/innovator would try to enrich himself/herself by protecting the intellectual property either by providing access to the source code or denying it. There are many instances in the corporate world where individuals/corporates gave away their unique knowledge in public interest. In the technology space, some individuals/companies did yeoman service to humanity by giving away their proprietary knowhow free of cost. For instance, Nils Bohlin who was an engineer with Volvo in 1959 had come up with a breakthrough idea: V-type three-point safety belt. Though it was a standard industrial practice to patent the designs so as to protect it from copycats, Volvo chose to gift this seat belt design to competitors to facilitate mass adoption and save millions of lives. The trailblazer Elon Musk intially patented all the Tesla's unique ideas to thwart competition from big automobile companies. However, in the year 2019, he changed his stand in an endeavour to fight climate change and accelerate the advent of sustainable transportation. In the spirit of open source movement, he released all the patents of Tesla and made it abundantly clear that "no patent suit against anyone who in good faith uses our technology".

The world's technology is powered by the open source software. In most fields of computing, open source has become inexorably adopted during the last decade. Facebook, Google, Amazon, and practically every other modern technology company would not exist if it were not for open source. Open source has become the cornerstone of cloud computing, software-as-a-service, next-generation databases, mobile devices, the consumer internet, and even Bitcoin, thanks to an outstanding community of inventive, top-notch programmers. The owners of open source had to discover new business models to make it viable with clear revenue streams so as to attract

the attention of prospective investors. Redhat was taken over by IBM for $32 billion, Github by Microsoft for $7.50 billion, Mulesoft by Salesforce for $6.50 billion, Suse by EQT Partners for $2.50 billion, and Magento by Adobe for $1.70 billion to name a few deals. In all these cases, owners of open source software became billionaires though they were operating not so profitable businesses.

Figure 1: Sector-wise Growth of Billionaire Wealth
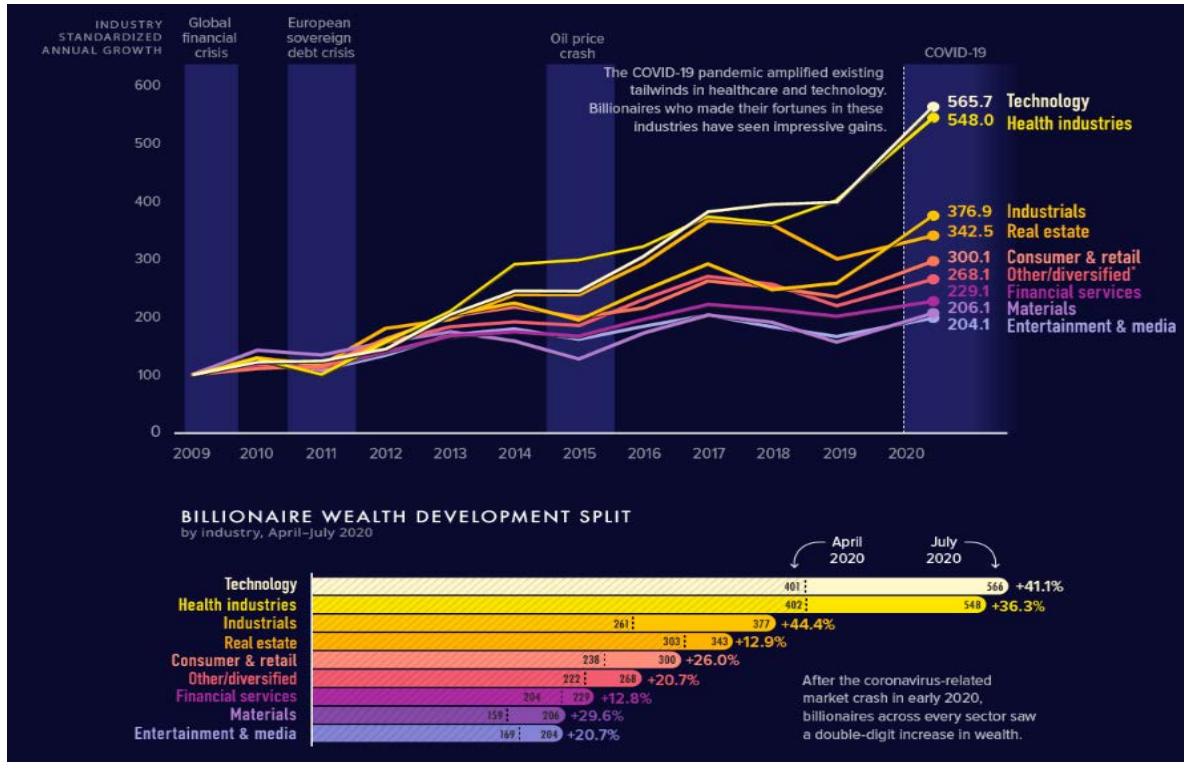
Source: www.visualcapitalist.com

References:

Antoniades, I.P., Samoladas, I., Stamelos, I., Angelis, L., and Bleris, G.L., (2005). Dynamic Simulation Models of the Open Source Development Process, in S. Koch (ed.), Free/Open Source Software Development, 174-202, Idea Group Publishing, Hershey, PA.

Archived from the original on July 1, 2009. Retrieved May 30, 2010."Differences between Wikipedia, Wikimedia, MediaWiki, and wiki".

Bell, Douglas (August 13, 2019). "Volvo's gift to the world, modern seat belts have saved millions of lives", *Forbes*.

Elliott, M.S., (2006). Examining the Success of Computerization Movements in the Ubiquitous Computing Era: Free and Open Source Software Movements, in K.L. Kraemer and M. Elliott (eds.), Computerization Movements and Technology Diffusion: From Mainframes to Ubiquitous Computing, Information Today, Inc.

Elon Musk (June 12, 2014), "All our patent are belong to you", www.tesla.com.

Elon Musk (February 2, 2019), "No patent suit against people who use our tech in good faith", www.ndtv.com.

Free Software Foundation (FSF) (n.d.) (2011). The GNU general public license (GPL) v3.0. Available: http://www.gnu.org/licenses/gpl.html.

Goldman, R. and Gabriel, R.P., (2005). Innovation Happens Elsewhere: Open Source as Business Strategy, Morgan Kaufmann Publishers, San Francisco, CA.

Hancock, Terry (2008-08-29). "What if copyright didn't apply to binary executables?". Free Software Magazine. Retrieved 2016-01-25.

Hicklin, Andrea (November 5, 2010). "UC Berkeley students help improve Wikipedia's credibility". *Berkeley News*.

Hahn, J., Moon, J.Y., Zhang, C. (2008): Emergence of new project teams from open source software developer networks: impact of prior collaboration ties. Inf. Syst. Res. 19(3), 369– 391.

Iannacci, F. (2005b). Beyond Markets and Firms: The Emergence of Open Source Networks, First Monday, 10(5).

Jarice Hanson (2016). *The Social Media Revolution: An Economic Encyclopedia of Friending, Following, Texting, and Connecting*. ABC-CLIO. p. 375. ISBN 978-1-61069-768-2

Kim, A.J., (2000). Community-Building on the Web: Secret Strategies for Successful Online Communities, Peachpit Press.

Kling, R., and Scacchi, W. (1982). The Web of Computing: Computer Technology as Social Organization, in M.C. Yovits (ed.), Advances in Computers, 21, 1-90.

Link, George (December 7, 2018), "Is open source wealth distribution fair?", www.opensource.com

Lakhani, K.R., Von Hippel, E. (2003): How open source software works: "free" user-to-user assistance. Res. Policy 32(6), 923–943.

Open Source Initiative (n.d.) (2011). Open Source Initiative. Available: http://www.opensource. org/.

Open Source Initiative (n.d.) (2012) Open source licenses by category. Available: http://www.opensource. org/licenses/category.

Reed, Sam (December 19, 2019). "Announcing MediaWiki 1.34.0". *mediawiki-announce* (Mailing list). Archived from the original on December 19, 2019.

Subramaniam, C., Sen, R., Nelson, M.L. (2009): Determinants of open source software project success: a longitudinal study. Decision. Support System. 46(2), 576–585.

Von Krogh, G., Haefliger, S., Spaeth, S. (2003): Collective action and communal resources in open source software development: the case of freenet. Academy of Management.

Walker, John (2012). "Thought: Do We Own Our Steam Games?". Rock, Paper, Shotgun. Retrieved 2014-12-27.

Wen, W., Forman, C., Graham, S.J. (2013): Research note-the impact of intellectual property rights enforcement on open source software project success. Inf. Syst. Res. 24(4), 1131–1146.

Lakhani, K., Wolf, R.G. (2003): Why hackers do what they do: understanding motivation and effort in free/open source software projects.