The Strange Economic Behavior of the Information Era

Marcelo Sampaio de Alencar
Institute for Advanced Studies in Communications
Federal University of Campina Grande
Campina Grande, Brazil
Email: malencar@iecom.org.br

Abstract—This article relates some economic concepts to physical phenomena, to explain some peculiarities of the Internet economic environment. It discusses how the Internet economy violates classic principles, well established by important economists. The evolution of the World Wide Web is discussed, and some points contradict the usual history of the Internet. The origins of Amazon, Google, Facebook, and other engines are discussed, and it is shown that most of them derived from simple features of the UNIX system. 1

Index Terms—Economy, Internet, Big Data.

I. I N T R O D U C T I O N

COMMUNICATION is one of the main characteristics of the human beings, and is ubiquitous since the dawn of the homo sapiens. What differentiates the current communication from that of the past century, for example, are the communication means and transmission technologies. The Internet had 500 million users in the World, in 2000, hit three billion users, in 2015, and will have 25 billion connected devices, by 2020. The fundamental reason to build those systems is the search for information and the need to communicate.

The article introduces some economic concepts in a non-orthodox way, relating them to physical phenomena, to explain some peculiarities of the Internet economic environment. It discusses how the Internet economy violates classic principles, well established by Adam Smith, Karl Marx, and other important economists. The evolution of the World Wide Web is discussed, along with some interesting anecdotes, that contradict the usual history of the Internet. The origins of Amazon, Google, Facebook, and other engines are discussed, and it is shown that most of them derived from simple features of the UNIX system.

Section 2 presents information on Big Data and other interesting concepts. The first information database, the Library of Alexandria, is discussed in Section 3. A short history of the World Wide Web is presented in Section 4. Section 5 discusses the relation between the Universe and the Economic world. The market forces are considered in Section 6, and the changing market is the subject of Section 7, which is followed by the conclusions.


Big data is a term that describes large or complex databases, for which the traditional data processing applications are inadequate. Therefore, the research on big data may include analysis, capture, data curation, search, sharing, storage, transfer, visualization, and information privacy. For example, the company IBM published in its site that cloud, mobile and data businesses will reach $40 billion, by 2018, and the scale of data will reach 40 zettabytes, as depicted in Figure 1 [1].

III. T H E B I G D A T A O F A L E X A N D R I A

Alexandria was founded by Alexander, the Great, in 332 a.C, and became the main port and commercial center of Egypt. The Library of Alexandria was built by Ptolemy I Soter in 331 a.C, and brought the city to the cultural level of Rome and Athens. Every manuscript brought by merchants
or philosophers, was confiscated, classified, copied and incorporated to the library.

The library had between 500 and 700 thousand documents, and was the equivalent of the Internet, more than two thousand years later. The first page of each parchment was called "protocollon", the origin of the usual term protocol. It was the first Platonic academy of Egypt, and Euclid, Aristarchus, Eratosthenes, Ptolemy, Hypatia and Archimedes were among its alumni.

After the killing of Hypatia, a Greek mathematician, astronomer, and philosopher, head of the School of Alexandria, depicted in film as shown in Figure 5, several philosophers left Alexandria to India and Persia. Egypt was then a part of the Byzantine Empire and the West spent a thousand years to recover from the loss of information.

IV. THE WORLD WIDE WEB

Another significant fact occurred, in 1985, when the National Science Foundation (NSF), USA, decided to invest some money to build networks to serve the academic and research community.

The Bitnet, operated since 1981, and the National Science Foundation Network (NSFNET), started in 1986.

The Bitnet (Because It’s Time Network), managed by the Corporation for Research and Educational Networking (CREN), Washington, was a big computer network used mainly for electronic mail that reached 2,500 universities and research institutes around the world.

The NSFNET, later part Internet, used the family of protocols TCP/IP, developed for the Defense Advanced Research Projects Agency (Darpa). Leonard Kleinrock designed the Interface Message Processor, which was used to transfer the messages over the network.

V. THE ECONOMIC WORLD AND THE UNIVERSE

The way the economic world works is, in some sense, similar to the way the universe behaves. Leaving aside metaphysical considerations, the current theory of supposes an initial stage in which there was a uniform distribution of matter in the universe [2].

The economy probably originated from the activity of human beings, hunter-gatherers, who used to roam the world, searching for food and shelter. They shared almost everything, and the wealth was uniformly distributed. The collisions
between the Hydrogen molecules could have created regions of higher density, capable of attracting matter.

As soon as the tribes initiated agricultural activities, and the humans settled down, the economic model changed. From a uniform distribution, the wealth began to concentrate in fewer, and more productive, hands.

The universe resembles the economy, in which a given concentration of wealth ignites the formation of new companies, as illustrated in Figure 6.

The agglutination of matter in specific points of the universe ignited the stars. The fusion process produced Helium nuclei and the life-cycle of the stars had begun, as shown in Figure 6. Villages of workers were established around the agricultural centers, which evolved to cities, with craftsmen and merchants, and the economy diversified [3].

The star life-cycle creates, by the fusion process, several chemical elements, which can be expelled during spectacular explosions, called supernovas. This process spreads heavy matter throughout the universe. The construction of cities allowed that the craftsmen and merchants lived together, and the formation of a consumer class for diversified products.

The matter expelled by the supernovas eventually was brought together, to form planets and other bodies, which revolved around the stars. The stars orbited more massive stars, forming galaxies, usually with super-massive cores, and the process is depicted in Figure 8.

The growth of the cities somehow diversified the economy, with new products and the creation of specialized jobs to absorb the workers mainly from the countryside. The companies displaced the economic power from the feuds to the towns, or cities, creating the bourgeoisie, which was detrimental to the feudal power.

The concentration of mass to form super-massive objects is equivalent to the formation of big companies, which engulf the smaller ones until huge conglomerates are created. Those giants, generally, work for certain periods of time, which depend on the stability they acquire.

The companies, in the model, work as the stars, orbited by the consumers. Big companies are like giant stars. They are born, grow and, eventually, degenerate and die.

Stars with adequate mass density last for billions of years. They are similar to well-managed companies, that sell high demand products, and last for decades or centuries. Super-massive companies can consume their elements rapidly, and disappear in short time, as illustrated in Figure 9.

Hyper-massive companies can consume the economy, forming black holes and causing economic breakdowns, as was the case with the Internet Bubble (.com), in 2000, which is shown in Figure 10. As an example, the Internet Bubble was a historic speculative bubble covering roughly 1997-2000 [4].

VI. THE MARKET FORCES

In economics, the invisible hand is a metaphor used by Adam Smith to describe unintended social benefits resulting from individual actions. The metaphor is more directly linked to production, to the employment of capital in support of domestic industry [5].

But Smith also quoted, in his book “Theory of Moral Sentiments”, that: “The chief part of human happiness arises from the consciousness of being beloved” [6].
For Smith, the most famous Scottish moral philosopher and a pioneer of political economy, the aspiration to be worthy of approval belongs to our sentiments from the beginning. This is one of the driving forces of social engines, such as Facebook and Whatsapp.

The production market was well defined in Smith’s time. The craftsmen produced artifacts, the farmers engaged in agriculture, raising living organisms for food or raw materials, and the merchants offered products in the market [7].

The market was very simple, and it was always possible to clearly identify what a product really was. Smith also noted that specialization was the key to improve the production, which led, years later, to the Industrial Revolution.

By the time Karl Marx published his famous book “Capital”, the machines began to mass-produce the objects, at lower prices, creating unemployment. Marx understood the acting market forces, at that time, and gave an interesting innovative interpretation of the phenomenon, putting the economic cycles in the center of the process [8].

Anyway, the fact is that, in the past, there were real products, make by the industrial sector, and the producers, the vendors and the clients were perfectly identified. Few areas required any sort of interaction between the client and the producer.

Only recently, gas stations and takeout restaurants began to explore the work of their clients, who became part of the productive process. After the Internet, and the associated services, created by Timothy Berners-Lee, in 1989, which were integrated in a platform, named Mesh, in 1990, and then dubbed World Wide Wed (WWW), the sale of products changed radically.

VII. THE CHANGING MARKET

The main change was not the remote sale, a process that existed for centuries, and that always relied on the mail (posts), nor the commercialization of software, which is done since the computer was made available to the public, in the sixties, nor the bypass of the vendor, to establish a direct link between the producer and the client [5].

What really changed in the electronic commerce was the production relation between the manufactures and the consumer. The success platforms, that, in 2014, maintained 87% of the American population connected to the Internet, were those for which the users themselves created a considerable part of the final product.

The social networks are products created, mostly, by their clients, who feed them with information, which enhances them and improves their values. The users invite friends to participate, which is a marketing and propaganda strategy, and also help the development process, suggesting new features, which is the work of the company programmers. A new form of industry, called e-industry, is evolving.

Dynamic changes in the enterprises’ environment, including enhancement of traditional market towards the market space available on the Internet, and development of new information technologies create new possibilities to realize business ventures defined as e-entrepreneurship.

A factor that fosters e-entrepreneurship is innovation. In the Internet era, models of open innovations are usually applied, and innovations are transformed into the shape of collaborative dimension of creation. It was indicated, by recent studies, that joint creation and innovation with the customer is a major factor in the development of e-entrepreneurship behaviour [9].

The users also serve as success and penetration indicators for the platforms, and consume third part products that are marketed by the social networks.

The market value of a social engine, such as Facebook, is difficult to assess, but is usually based on the number of hits produced by the users. And the wealth of the information tycoons is created by those users, who work day and night to improve their products, which are perishable.

But, actually, little is created in that area, since UNIX was invented, based on the Multics operational system, in 1965, by a group of programmers, which included Ken Thompson, Dennis Ritchie, Douglas McIlroy and Peter Weiner [10].

Mark Zuckerberg, owner of Facebook, and Buyukkukten Orkut, who designed the Orkut social engine for Google, for example, only copied functionalities from other platforms that used UNIX commands, and convinced the users to work for them – for free.

Facebook is nothing more than an application of the UNIX commands mail and talk, as well as, Google is only a more
sophisticated version of the commands gopher and archie, from the beginning of the nineties.

Facebook was preceded by Altavista, Bol, UOL, Yahoo, Opera, Mosaic, and so many others, that used to do the same thing. Some of them disappear, others specialized in different activities.

Twitter, for instance, a success of some years ago, is equivalent to the application Bulletin Board System (BBS), with the file restricted to 140 characters, which is only another use for the mail UNIX command [11].

There are networks specialized in attracting researchers and professional from industry, such as, Academia.com, ResearchGate, Quora and LinkedIn. And dating websites, like Twoo, Match.com, Eharmony, Zoosk, and so on. All of them appropriating the the client’ work, and providing them with 15 minutes of fame everyday.

The most interesting of all, to the amazement of Karl Marx, is that the entrepreneurs end up creating a sort of industry in which the clients themselves work for, several hours a day, only for the sake of being there, and meet other clients, who do the same thing.

VIII. CONCLUSION

The social network mirrors the model envisioned by Adam Smith for the efficient market, in which there are very specialized producers, who create their web-pages as a production line, over time.

But, for the despair of the classical economists, and violating all canons of the Economics, platforms such as Facebook are virtual monopolies, with products available to the public at zero cost [12]

Is it interesting to mention that, according to Karl Marx, in the state monopoly capitalist theory, the supermassive companies, having achieved a monopoly or cartel position in most markets of importance, will fuse with the government establishment.

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