

The digital mode of production

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The Internet ignores the three basic concepts of physics: time, mass and space.

Arno Penzias, Nobel Prize in Physics, 1978

Digitalization

The key to understand the challenge raised by Penzias resides in the process known as digitalization, word that has not yet been included in the (Spanish) official dictionary, but means: the action to convert any kind of information into electric impulses that later on would be stored, copied, processed and even distributed within seconds through the communication networks. These electric impulses are represented by “ones” if positive and by “zeros” if negative. Due to global agreements, the combination of ones and zeros makes possible to represent any kind of information, which may be data, texts, sounds or images. Digitalization has been taking proper shape on the last 40 years based on the so-called processor of digital signs, which power has increased exponentially to such extent that today we can convert into ones and zeros from a text document to a whole movie. But digitalization is not anymore just the conversion of information into ones and zeros; today, due to the global public digital network called Internet, digitalization enables liberating the information from its physical containers (from paper up to portrayed objects), which means, from the mass. Besides, being free from the constraints of space and time, we can access to that information from any place of the world, at anytime. Therefore, the power of digitalization resides in changing the way the world works, including some of the economic laws, on which our companies base their suppositions and take their decisions, as we will see later on.

Generation of wealth in the industrial economy

In the industrial economy, during the 20th century, we have witnessed how the capital, under the form of money or productive goods (machines and factories) has been the principal source of wealth generation. Some form of physical capital used to be required to make an idea viable, to make it reach the marketplace, to be commercialized. Labor was another production factor, but it was hired hourly and was easily replaceable due to more labor supply and due to the division of labor into repetitive tasks easy to accomplish. Due of this relation between capital and labor, the capital's owner was the one who had the right to get the surplus value generated by the transaction of the goods produced in the marketplace.

The digital revolution

Nothing would have changed if the so-called digital revolution would not have occurred. This has not been a technological revolution, as many people think, rather it has been an economic revolution. During a long process of almost four decades, the cost of digitalization and telecommunications (digital transmission to any place of the world) decreased so dramatically that it has become available to almost any company of the planet, no matter its size, geographical location and how much capital it possess. During the early 60s, an IBM 360 computer used to cost around USD 2 million. Only the large corporations were able to use them. Currently, we can get a much more powerful

computer for less than USD 500. On the same way, the telecommunications that had a cost of tens of thousands of dollars per month are costing today sometimes less than 50 dollars per month. The digital revolution has been the most important economic phenomena of the late 20th century. Unfortunately, it does not mean that all the companies understand its benefit. The power to liberate our ideas from the restrictions of space, time and place has to be combined with the comprehension of the potential offered by digitalization along with some imagination, in order to exploit this potential to generate wealth. This change represents an opportunity for all kind of entrepreneurs, anywhere they may be from. Nevertheless, only few of them begun understanding this business world revolution, and unfortunately much less of them understand it in our country. While they understand it less, more advantages will remain for those who start first.

Wealth generation in digital economy

Digitalization, as we have seen, has drastically affected the information. The cost to search for it, to find it and to access to it has decreased. Copying digitalized information has a marginal cost of production equal to zero. Let us try to conform it by using our computer: find any kind of file, and make a copy of it into another directory. The new copy is identical to the original one, it has all its attributes, and it cost zero to make it. Let us try to do the same thing in the physical world, and we will see that there, every copy of the original one has a certain cost in material, production and labor. As the access to the information falls drastically, the marketplaces react as when any good become cheaper, in other words, its consumption increases. We can see this happening daily everywhere: millions of people around the world, at school, at home and at office searching, finding and downloading information. But that is only the tip of the iceberg. Underneath the surface, in the production chains all over the world, an economic phenomena of large proportions has been producing. Some companies have discovered on the past years that, due to digitalization, they could use digitalized information as a very low cost material to transform it from different kind of products into exclusively physical products: products based on information, for example software, digital movies, distance education, mobile communications and so on. Other companies have found out that they could incorporate intangible components to their physical products, so they would enrich their products in order to achieve better profit in some market segments. In this case, these products contain information through design, image, selection of materials, the technology applied in its manufacture, the non-physical service associated to the product (digital services), the name of the creators, the innovation of the solution and so on. Finally, other companies have found that, due to the use of digitalized information in their key processes, they could reduce drastically cost and time of such processes as well as the necessary cost and time to innovate their products and services. The case of the car manufacturers who ten years ago spent years from conceiving the model to selling it in shops is well known; today, this process starts being measured in months. In brief, these are the changes that configure what is known in many places as digital economy. An economy where the companies' principal value generator is not anymore their physical or financial capital, but their digital capital; that means, the sum of own or rented ones and zeros that contain all forms of information, which, combined with imagination, allow giving more and more value to their clients, with cheaper and cheaper costs.

The consumer of intangibles

The consequence of the drop in production cost and the possibility to have access to information is a huge impact in the production cost and distribution of intangible products. Intangible products are those which principal attributes are design, technology and image. That is why their main material is the information in all its forms: data, text, sound and image. Drop in production and distribution of intangibles generates in turn important changes in all sectors. The key to understand these changes is in the consumer itself. Human beings are the only ones that consume intangibles on Earth. No other living being does it. Human brain handles abstraction levels that till now exceed our complete comprehension, but several marketing specialists understand them quite well. Men have always been insatiable consumers of intangibles. Let us see an example: the cave paintings of Lauricocha. We can see Andean hunting scenes of camel relatives in these ten thousand years old works of art. What for the ancient Peruvians have painted those cave walls? Just to reflect their experiences, and to transmit them generation after generation. Nevertheless, ten thousand years ago, only chosen few could have access to this experience recorded on the walls. Nowadays, the digital revolution permits anyone having access to the Internet to get intangible products. Due to this huge consumer of intangibles we can observe the phenomena of the global, local and combined brands all over the world. We consume intangibles like mobile digital communication, personalized education, digital music, computer programs, designer clothes, designer shoes, labeled drinks, labeled food, restaurants offering exclusive menus, intelligent devices, intelligent materials, art reproductions, etc.

A ton of copper for a portable computer

The comprehension of the digital revolution enables us to understand why Peru has to sell one ton of copper to get the necessary devices to buy a portable computer. An interesting analysis for the economists of the old traditional economy would be to evaluate on which of all those processes one can obtain a bigger contribution margin for each dollar obtained by selling consumption goods (commodities), like copper tons at internationally fixed prices, or by selling intangibles made of technology, design and image. The entrepreneurs of the digital economy understood this well, and that is why, in the last decade, they have been migrating their production chains towards the production and distribution of intangibles (technology, design and image), outsourcing the production of the necessary physical components for their products to countries like ours. Cases like this are everywhere.

Knowledge and wealth generation

In the capitalist mode of production, who obtains the surplus value is the owner of the capital, the (physical) production goods, the factory and the machines. The worker sells his labor in order to get a wage. But in the digital economy, the wealth depends basically on the intangibles incorporated to the products; it does not depend anymore on the physical components. The production of intangibles does not depend on capital, neither on (physical) production goods. It depends on talent, intellectual capacity, imagination, and these are products of human brains, which do not belong to the factory owner, but to each knowledge worker. If the wealth generation source changes, the right to obtain the surplus value changes too. Somebody could say that the knowledge has always been used in the industrial production, but the surplus value continued belonging to the capital's owner. This happened while demand exceeded industrial goods supply, like it happened during the first half of the 20th century, when demand for cookers,

refrigerators, cars and other typical products of the industrial economy far exceeded supply. In this scene, a manufacturer could keep unchanged the design, image and technologic attributes of his products for years. Nowadays, the scene is different, supply of industrial products has increased and has become globalized to such an extent that currently it seems that supply exceeds demand. What happened is that, in the late 20th century, consumers were much more educated and informed regarding world demand, and they increased their requirements on supply for products that would meet their requirements better. This demand got an excellent answer from some companies from different places of the world that, understanding the principles of digital economy, converted the innovation into a strategic process of their businesses, busting products and processes, in order to replace them daily by other ones better and new. In this dramatic race for innovation, as never before in human history, companies require talent, intellectual capacity and imagination. The wealth source is currently into the brains of the knowledge workers: designers, teachers, marketing professionals, leaders, managers, scientists, inventors, analysts, craftsmen, experts, consultants, instructors, trainers, artists, communicators, sportsmen and other knowledge jobs. These knowledge workers started changing the rules of the surplus value distribution in the digital economy. As Marx would say, this is the origin of the destruction of the old industrial economy. We can perceive clearly its effect on the industries that use knowledge intensively, like software, computer games or digital cartoons, where knowledge workers in charge of researching, developing and fine-tuning the new and successive versions, receive all together the bigger part of the business revenues, that several times exceeds the total amount of the dividends received by the owners of the physical capital. Acting as co-owners of the intellectual capital of the company, they are modifying the social agreement in the digital economy.

Digital mode of production

As we have seen, innovative companies are using intensively their intellectual capital to satisfy the more demanding segments of the world demand. However, the knowledge by itself was not able to change the old industrial economy. It had also to be transformed by the digital revolution. The conversion of all the forms of information (data, texts, sounds and images) into ones and zeros enabled the companies to shorten the innovation cycle. This is possible because digitalization allows expanding people skills, converting them into more effective individuals, and converting work groups into high performance teams. Besides, digitalization enables generating a really integrated company by keeping the leaders directly informed without intermediaries by all the company members, and in turn it allows the business leaders sending the required signals to any part of the business, regardless of geographical location and right time. Finally, digitalization enables companies to extend towards their partners, suppliers, distribution channels and clients, integrating people, applications and objects from the various companies that form their so-called “business-model”. This infrastructure achieved by companies based on the use of digitalization becomes their digital capital, and constitutes the basis of the value generation, and therefore the principal source of wealth generation. We are witnessing the emergence of a new way of generating wealth, based on ones and zeros accumulated and used by the companies for generating value for their clients. We call this new way to produce value and to generate wealth the digital mode of production.

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