

A THEORETICAL APPROACH TO DIGITAL UTILITY TECHNOLOGIES IN BORDER AND PERIPHERAL TERRITORIES

APROXIMACIÓN TEÓRICA A LAS TECNOLOGÍAS DIGITALES DE SERVICIOS PÚBLICOS EN TERRITORIOS FRONTERIZOS Y PERIFÉRICOS

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ABSTRACT: Digital technologies have created a new social and economic paradigm, which has created new scenarios and responses, generating a new wave of changes that will have profound repercussions. We can highlight the latest models and forms of work by creating employment and new forms of management and processes. To study digital technologies of general utility and their link to the border and peripheral territories in greater depth, we have carried out a historical study and a comparison with these territories, finding that the three main criteria defined to carry out a correct and exhaustive classification of utility technologies are the availability of constant improvement, the capacity to generate innovations and the disposition of omnipresence, which means that companies and organizations linked to border territories are those that mainly participate in finding advantages in the establishment of «teleworking», thus being able to have the opportunity to fix talent without worry-

ing about the restrictions of location and those that also participate in finding the opportunity to optimize costs and production. This issue can also be applied to the relocation of the company or organization or even to specific processes.

KEYWORDS: digital technologies; General Purpose Technologies (GPT); border and peripheral territories.

RESUMEN: Las tecnologías digitales han creado un nuevo paradigma social y económico, que ha originado nuevos escenarios y respuestas, generando una nueva ola de cambios que tendrá profundas repercusiones. Podemos destacar los últimos modelos y formas de trabajo creando empleo y nuevas formas de gestión y procesos. Para profundizar en el estudio de las tecnologías digitales de utilidad general y su vinculación con los territorios fronterizos y periféricos, hemos realizado un estudio histórico y una comparación con estos territorios, encontrando que los tres principales criterios definidos para realizar una correcta y exhaustiva clasificación de las tecnologías de utilidad son la disponibilidad de mejora constante la capacidad de generar innovaciones y la disposición de omnipresencia, lo que significa que las empresas y organizaciones vinculadas a los territorios fronterizos son las que principalmente participan en la búsqueda de ventajas en el establecimiento del “teletrabajo”, pudiendo así tener la oportunidad de fijar el talento sin preocuparse de las restricciones de localización y las que también participan en la búsqueda de la oportunidad de optimizar los costes y la producción. Esta cuestión también puede aplicarse a la deslocalización de la empresa u organización, o incluso a procesos específicos.

PALABRAS CLAVE: transformación digital; tecnologías de utilidad general; territorios frontera y periféricos.

1 Introduction

In the 21st century, we cannot conceive of everyday life without using digital technologies or information and communication technologies (ICT) as tools that make our lives easier [9]. Not only have they transformed the way we communicate, work, acquire knowledge, etc., but all economic sectors

have experienced a disruption in their processes with the implementation of digital technologies [14].

Technology is the result of science and engineering that, when applied through different tools and methods, generates a product or service capable of satisfying some of the needs posed by human beings to make their daily lives easier [19]. In the beginning, technology was not conceived as a social fund of knowledge in which the objective was to coexist and collaborate with our environment. Still, it was defined as an instrument of human control over their environment, with its respective negative consequences for sustainability [22]. To understand the general use of digital technologies, we will first look at digital technologies.

Technology is one of the current media that generates the most externalities and spillovers, and we must not forget that it is a non-rival and non-excludable good, i.e. it is a public good, so its exchange or distribution cannot be protected; this means that, within the framework of nations, these technologies can be accessed in an «equitable» way [7].

The advance in digital technologies is the fastest spreading innovation in history [16]. This advance has transformed societies through improved access to commerce and public services, connectivity, financial inclusion and process automation, and increased use as a means of expression and communication. Digital technologies can represent a great equalizer [21], and we can see this among developed countries, as their differences in use, innovation, and development are minimal between these countries; the problem with this theory is that it leaves out the rest of the nations, with which we can find a more significant gap in these concepts. Education, health and public services are three of the sectors that stand out the most in the benefits obtained from implementing these technologies in their processes, mainly due to the significant effect on society in general [17].

Digital technologies have created a new social and economic paradigm, which has created new scenarios and responses, generating a new wave of changes that will have profound repercussions. We can highlight the latest models and ways of working, with the creation of new jobs, new forms of management and processes. To study digital technologies of general use and their link with border and peripheral territories in greater depth, in the following section, we

will present the current context of the new technologies, moving on to a third section where we will observe the link between the concept and peripheral and border areas. We will end with a fourth section dedicated to conclusions.

2 Current context of «General purpose technologies» (GPT)

2.1 General purpose or general utility technologies

We have referred to the fact that technologies are a set of knowledge, so TPMs can be defined as sets of applied inside a higher order because they derive from more specific technological applications of a lower order [5]. The theoretical framework states that useful technologies are considered to be those that can connect with other technologies, achieving complementarity, derived innovations, configuring convergence processes between these technologies, new business models and sources of efficiency that lead to economic growth [23].

Three main criteria have been defined for a correct and exhaustive classification of utility technologies: to be considered as such, they must have constant improvement, generate innovation (innovation spawning) and have pervasiveness, i.e. can extend to all economic activities, producing a series of benefits and efficiencies in production processes, such as cost reduction or the facilitation of invention. Thus, TPMs, which are applied to many economic activities and sectors, bring about fundamental structural changes in the economy as a whole and in the way economic life is organized. This widespread impact on all industries generates «long waves» [18] of economic development, and each wave is capable of building archetypal models of business management and organization [3].

The Internet represents the dominant GPT in the long wave of digitization [20]. Still, if we analyze in more detail, we can classify two waves, the first comprising the 1970s to 1990s, while the second is in the present day, with the decades of the 21st century. Although the internet continues to dominate, this second wave is characterized by the emergence of blockchain, IoT and artificial intelligence and its three technological strands: robotics, machine learning and symbolic systems [6, 10]. These new trends have created competitive dynamics in digitization that has made innovation and development grow at a faster rate than in the past.

2.2 Current economy and social developments in GPTs

As described above, the internet represents the dominant general-purpose technology and is the basis for many other new digital technologies or their development. The importance of ICT technologies for social and economic wellbeing today is paramount, and this will become evident during the pandemic in 2020 and 2021 [13], with the internet and telecommunications being the only guarantee for the continuity of many fundamental aspects of society, such as education, employment, socialisation, telemedicine and economic activity as a whole.

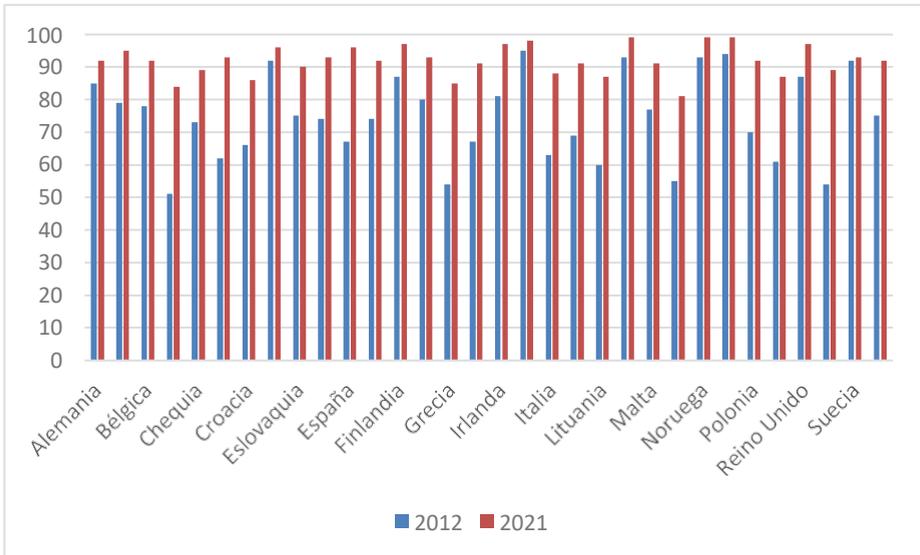


Fig. 1. Percentage of households with Internet access by European countries. Comparison between 2012 and 2021.

The internet and ICTs have become fundamental to social, personal and business use. This can be seen very well in Figure 1, where a time comparison of today versus 2012 shows that all European countries have registered increases in their percentages. The development of these technologies has represented great benefits for companies on multiple levels: improvements in productivity, access to national and international markets, and the implementation of

innovative business models. But we should also not forget those «companies» in the public sector, such as public administrations, which with the continuous implementation of new technologies and the digitization of their processes, ensure more excellent quality and access, as well as making them more flexible and agile, favouring the growth of economies.

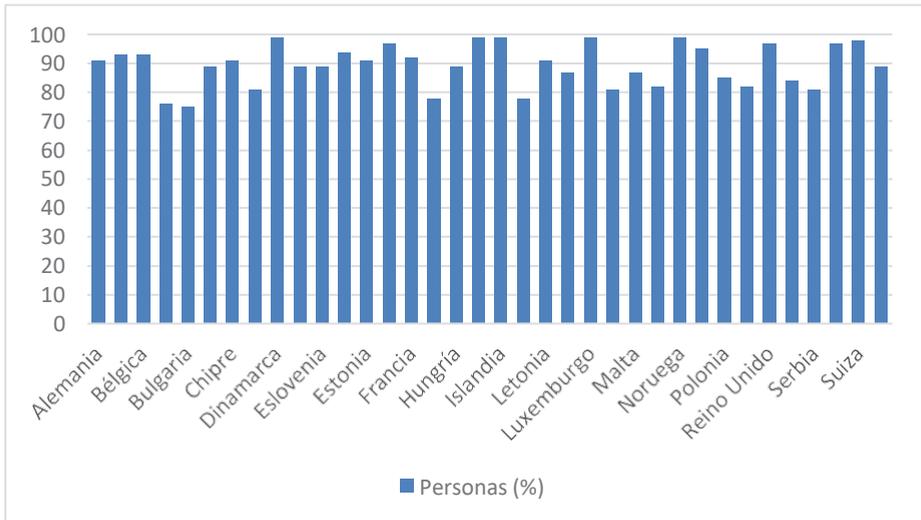


Fig. 2. Internet usage in the last three months by European countries (2021).

In contrast to historical precedents, this digital wave has been largely corporate led, with the interaction between governments and corporations being almost non-existent or delayed [4]. This digital disruption by certain companies has led to the creation of tech giants, leaving governments secondary in importance to their technological expansion. The tech giants have created their stream of innovation and development of new ideas and products to meet emerging global needs, bringing these companies to the international frontier of technology and innovation. Thanks to their value propositions in digital innovation, these digital giants are at the forefront of digital market dominance, so they are wealth creators. Still, they are also complicit in growing inequality in the age of digitalization.

This generation of inequalities has two focuses. The first is aimed at the imbalance between technological giants and companies. The ones most affected by this situation are small companies or start-ups, which are often unable to compete or reach a sufficient level of digitization and development to remain in the market, which means that they end up closing or not progressing and that these giants can create an oligopoly in specific sectors. The second situation of inequality would be caused, according to recent studies, by the bias, displacement and substitution of medium-skilled employment in the long term, and something more novel, also of capital, that digitalization would be exerting [2].

3 Linking up with border and peripheral areas

Technology is a public good, not exclusive or rival, so digital technology tends to evolve and innovate for this constantly. It seeks to expand digitization in all areas, social, economic and geographical [15]. To develop better advances and new digitization methods that achieve more excellent comparative benefits; if we talk about barriers or borders in terms of digital technologies, we could say that territorial borders are blurring or even disappearing to give way to organizational barriers [11]. The benefit and importance of ICT or the different technologies developed in this wave of digitalization are so substantial that the available quest of states and companies is for optimal collaboration, with the sole objective of moving forward.

Many of the developments that have taken place with digitization are aimed at connection and communication between areas, regions, states or organizations, such as the facilitation of cross-border data flows, infrastructure integration, the development of digital platforms and trade facilitation measures [12]. All this shows that the intention is to remove as many barriers and borders as possible. An example that has been highlighted before is the effects of the pandemic, strict confinement that meant that education and work had to be done from places other than the usual centre. Thanks to digitization and advances in digital technologies, this has been made possible and, in many cases, with very positive results, giving rise to a new labour market mentality. More and more companies are finding advantages in the implementation of

«teleworking», as it allows them to look for more and better talent without worrying about location restrictions and also allows them to optimize costs and production; this can also be applied to the offshoring of the company or of specific processes, in pursuit of the above [1].

Numerous global organizations have initiated efforts to design or revise their digital integration strategies. If we look at the Pacific Alliance, *«it has proposed the design of a regional digital market strategy that allows for greater market scale, better coordination of resources and lower transaction costs»* [8]. Regulatory harmonization between different geographic markets could reduce transaction costs and increase the quality of communications. This can be seen in our geopolitical context, where the European Union, since the formation of the Digital Single Market strategy, has managed to increase its level of digitization more than other OECD countries that are not part of this space; the digitization rate has grown at a compound annual growth rate (CAGR) that is on average 1.12 times higher than that of OECD countries that are not part of this space.

4 Conclusions

Starting from the concept of technologies of general utility, which are no other technologies than those defined as a set of higher-order knowledge in the sense that they derive from more specific and lower order technological applications, we have focused on technology as one of the current means that has generated and generates more externalities and overflows without forgetting that it constitutes a non-rival and non-excludable good, that is to say, that it is a public good and therefore its exchange or distribution cannot be protected, making these technologies accessible in an equitable manner within the framework of nations.

Focusing on the economic value of the technology, we have made progress in developing these technologies in and for peripheral and cross-border territories.

Based on the study carried out, we can see that three main criteria have been defined to carry out a correct and exhaustive classification of utility technologies:

To be considered valuable technologies, they must constantly improve (improvement).

- They must generate innovation (innovation spawning).

- They must be available and pervasive (pervasiveness).

Although the three classification criteria are involved in the development of frontier territories, it is the third of these, the so-called pervasiveness, which provides the capacity to extend to all economic activities, producing a series of benefits and efficiencies in production processes. This provision has significant roots in peripheral and cross-border areas, eliminating as many barriers as possible.

With all of the above, companies and organizations linked to border territories are mainly involved in:

- Finding advantages in the establishment of «teleworking», thus having the opportunity to fix talent without worrying about location restrictions.
- Finding the opportunity to optimize costs and production is an issue that can also apply to the offshoring of the company or organization, or even of specific processes.

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