

THE IMPACT OF DIGITAL EDUCATION TOWARDS A SUSTAINABLE DIGITAL CONSUMER IN THE ERA OF CIRCULAR ECONOMY

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Abstract: A more sustainable economy and society presume more sustainable behavior in terms of consumption. A change in this behavior could be brought by a change in demand. In other words, a change in the demand could be facilitated by one's financial and digital education. The circular economy implies the reuse and recycling of products and materials over and over again; thus, the life cycle of products and materials is extended. Engaging in recycling should have future benefits. Recycling behavior and sustainability are interrelated, the recycling process is viewed as a key issue in sustainability and prevails as pro-environmental consumer behavior. It is already known that significant changes in individual behavior are essential for society to move toward sustainability. This paper aims to explore from a quantitative perspective if digital education has an impact on consumer behavior in terms of sustainability in the era of the circular economy. This research is useful for all providers, consumers, and stakeholders involved in different businesses.

Keywords: circular economy, digital consumer, financial education, sustainability

1. INTRODUCTION

At present, there are differences between European countries regarding sustainable behavior when purchasing and consuming. Even if the online environment has spread globally, not all users have the same digital and education. Every single country in Europe has access to the internet, thus, consumer education regarding online purchasing is different.

The reuse of products and materials is a sustainable process and could facilitate in the creation of products of higher quality. Nowadays, providers create products that are not so durable because of the costs. Quality assumes a higher production cost, but also a higher profit. Since consumers share the products, they could pay higher costs. Therefore, providers are encouraged to produce more durable products.

The circular economy is accredited as a powerful integrative framework intended to solve different societal problems linked to resource depletion and environmental pollution. Its implementation is rapidly reforming production, manufacturing, recycling, and consumption across various parts of the economy.

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Environmental sustainability refers to natural environmental restrictions such as the availability of clean air and water or energy supply. Social sustainability stabilizes the protection of human rights and equal chances with the guarantee of economic durability and sustainability in terms of money and profit. The economic dimension is sometimes expelled from the definition of sustainability. It is considered a result or final effect [1] and is combined with the social dimensions [2]. The circular economy encompasses sustainability, cost and production effectiveness, profit, and well-being.

This paper aims to explore from a quantitative perspective if digital education has an impact on consumer behavior in terms of sustainability in the era of the circular economy. This research is useful for all providers, consumers, and stakeholders involved in different businesses.

1.2. The connection between sustainability, digital education, and consumer behaviour in the circular economy

The circular economy and sustainability are interconnected, the common element being long-term resource conservation by common consumption. The digital consumer is more aware, informed, and oriented towards a good quality-price ratio. Having all the information instantly available with the help of the internet, the digital consumer is becoming more sophisticated wanting more durable products, that have a higher quality.

1.2.1. Circular economy

The circular economy is an economic model based on the reuse and recycling of materials and products repeatedly, creating a more sustainable cycle. Circular Economy “aims at changing in depth the way we utilize resources, by replacing existing production systems with a linear consumption economy model where materials in raw form are extracted, processed into consumer products, and become waste after consumption, with closed production systems where resources are reutilized and maintained in a loop of production and utilization, allowing to create more value for a longer period” [3].

A definition of the circular economy states that “this is a new paradigm opposite to the standard “linear economy” and has emerged from the necessity to deal with dwindling natural resources and the generation of waste through economic activity” [4].

Production and consumption activities in the economy are fundamentally “linear”, meaning that raw natural resources are utilized to produce goods, and after their usage in consumption or investment activities, waste is caused that needs to be managed. This is called the “take, make and waste” or “open loop” approach toward production. The circular economy is seen as an instrument to reduce the two main problems resulting from the open-loop approach, the environmental damage, and depletion of natural resources, helping to “close the open-loop” [5].

The circular economy framework is seen as a potentially strong strategy for solving the problems built by the linear economy model of different industrial activities and gross economic increase. A circular economy defines an industrial system concentrated on closing the loop for energy and material flows and participating in long-term resource conservation and environmental sustainability [6].

The circular economy is burdened not just with enhancing the efficiency of resource conservation, but as well with reducing waste [7]. It is enabled by two approaches, specifically a closed loop for material circularity in the same way or an open loop for material utilized for other functions. With the challenge of resource availability, the implementation of a circular economy is more and more deployed to meet the demands of a highly digital configuration of social commerce and interactions. Other benefits of a circular economy are energy savings and decreases in greenhouse gas emissions [8].

According to the literature review “when companies pursue circularity principles, they can improve economic, environmental, and social aspects. For instance, some potential benefits are reducing costs and risks, increasing competitive advantage, minimizing environmental impacts, improving resource efficiency and workplace, and developing workers’ skills and knowledge, among others” [9].

1.2.2. Sustainability

The Brundtland report defines sustainability as “a development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [10]. Sustainability refers to “an

awareness of the long-term environmental and social impact of one's actions" [11]. It has three dimensions: environmental or the planet, social or the people, and economic or the profit.

Despite the benefits connected with the implementation of circular economy strategies to reach sustainability and decrease the environmental impact of economic growth, there are still barriers with regard to the implementation. This means that the circular economy goes above material recirculation and extends to other domains like human behavior, innovation, and consumption. The cultural and social facets should be the center of the circular economy debate [12].

System limits are relevant when considering the levels of implementation. Some authors split them into three levels: policy level, organizational level, and individual level [13]. The preoccupation is about system boundary limits at the policy level, with practices to stimulate innovations and material flow. However, there is a lack of attention on social aspects, concentrating on allowing economic growth. At the organizational levels, there is a diversity of circular business models applied just partially or working only in a specific context. Circular business models can fail to refer to the roots of sustainability problems, heading to the third level: the consumer. At this individual level, the cultural change should be referred to, uncovering a circular structural problem [14].

Sustainable consumption is mainly repeated and takes place in recurring contexts. For instance, turning off lights, taking public transport, cooking with or without lids, and taking long or short showers, are all repeated regularly in different contexts, which build and strengthen habits [15]. It is excellent considering that "sustainable consumption", only as "conservation behavior" or "pro-environmental behavior", would be a helpful linguistic construction that maybe comprises lots of behaviors motivated by lots of different goals, distinct one from the other.

1.2.3. Digital education

Sustainable evolution and progress include social well-being, which depends on education. The main human activity in modern post-industrial society is working with technology and information. It is becoming the primary resource of world community growth and has an important influence on evolution in all sectors of life, mainly social communication, science, culture, and education. The primary competencies that cause the level of societal growth include independent and creative thinking and the ability to critically access and filter information. These abilities are significant objectives of education, as they enable one to find rational solutions to specific problems [16].

Qualitative changes in the production domain and global markets correlated with the growth and expansion of digital technologies are mainly reflected in education, which is becoming highly individualized and concentrated on the quality of knowledge and on the holistic development of every person [17]. Multimedia and communication technologies are the reason for applying modern active learning ways aimed at the evolution of critical thinking. The significance of these abilities has become even more substantial because of the forced and quick mass transition due to quarantine restrictions during the COVID-19 pandemic.

The expansion of information and communication technology has conducted truly important changes, new realities and dimensions of the global digital world, and new platforms that have innovative ideas, facilitate effective and instant communication and promote productive collaboration. The usage of digital tools helps users to become more conscious of the markets, to be more realistic, to compare, to have self-control, to self-reflection, and to collaborate. With the emergence of globalization and the growth of technology, individuals have easier access to products and services which they can buy and share [18].

1.2.4. Digital, conscious consumer and eWOM

Consumers are being more and more aware of the environmental influence of the products they buy, mainly because of the way that marketing endeavors have stressed the environmental dimension of sustainability. Consumers are being less aware of the environmental and social impact of the manufacturing and distribution methods behind the products they purchase. The widespread view is that there is a difference between the environmental and social dimensions. Consumers who concentrate on environmental issues are seen separately from those who consider social and economic issues. Yet responsible and conscious consumers consider environmental, ethical, and social criteria together when they buy products [19].

The importance and responsibility of the consumer in connection to the general well-being were acknowledged [20], who defined a conscious consumer as one who "takes into account the public consequences of his or her

private consumption or who attempts to use his or her purchasing power to bring about social change.” Webster says that socially aware consumers should be conscious of social problems, thinks that they can have an impact, and be active in their community.

Roberts [21] included the term responsibility and described a socially responsible consumer as one who “purchases products and services perceived to have a positive (or less negative) influence on the environment or who patronizes businesses that attempt to effect related positive social change.”

Responsibility is an intention to act in a way based on the acknowledgment of one’s own obligation toward oneself and others. Consumer responsibility is a controversial term that has ducted two trends of research led by different expectations resulting from the consumer’s actions. Certain scholars think that action is the obligation of consumers. Consumers have an obligation to be informed about social and environmental problems so that they could make better consumption decisions that are more sustainable, and actively change any purchasing habits that could have a negative influence on sustainability. Other scholars say that the consumer experiences market often lacks the capacity to act due to obstacles that must be resolved [22].

Sustainable purchasing includes procuring durable products that have economic, social, and environmentally friendly features. In the present times, the production of sustainable goods such as energy-efficient appliances, biodegradable products, etc. has increased, but associated benefits have been exceeded by the growth in consumption. Available literature shows that the number of conscious consumers is increasing swiftly, but the level of acceptance of sustainable products and services among them differs. More people have n the openness and willingness to adopt sustainable consumption habits [23]. However, this openness has not been seen in their purchasing behavior. There is a weak association between consumers' present purchase behavior and optimistic attitude towards sustainable buying. While purchasing goods, consumers ignore the societal and ecological outcomes of their purchases. This inconsistency between thinking and actions is the called sustainable attitude-behavior gap [24].

In recent years, digitization has enabled a wave of consumer innovations to appear that challenge energy consumption norms and help approach climate change by shifting, controlling, reducing, or sharing energy use. App-based shared mobility services with growing vehicle occupancy rates and smart home technologies for controlling heating, lighting, and appliances [25]. In addition to emission reduction potential, numerous digital consumer innovations for climate change offer other benefits such as support for local economies, relational networks (ridesharing), and social capital. There are, however, potential risks associated with such innovations. For example, lower control of personal decision-making, the apparition of “rebound effects with a proliferation of energy use from digital devices and their associated infrastructure”, inequality of digital usage and access [26], and privacy and data security concerns.

Traditional ways of exchanging interpersonal information, face-to-face or over-the-phone interactions, often consist of discussions amongst known peers. With the expansion and evolution of the internet, users are accessing content from their mobile phones, and almost 3.6 billion social network users exist globally [27]. Electronic Word-of-Mouth has enabled strangers from anywhere in the world to connect, discuss, produce, and share information easily and quickly. Examples of eWOM are public posts on social media platforms, review sites, blogs, and comment sections of e-commerce sites. By offering new ways of sharing information about products and services, eWOM has enabled consumers to form opinions in digital spaces, which in turn impacts opinions in the offline space. There is high evidence that a big percentage of people depend upon online content created by consumers to make buying decisions. The digital spaces contain not just positive opinions and clear information, but also misinformation and polarization [28]. Negative eWOM can potentially have adverse influences on diffusion. The significance of eWOM regarding the information delivered to the masses is clear. But what is the part that contains digital consumer innovations? eWOM fosters pro-environmental awareness, knowledge, action, and concern.

2. RESULTS AND DISCUSSION

In the following chapter, data was collected from different reliable sources.

2.1. Consumer behavior

Consumer behavior is influenced by one’s beliefs and motivations with regard to a product. Conscious consumers are driven more by quality and well-being.

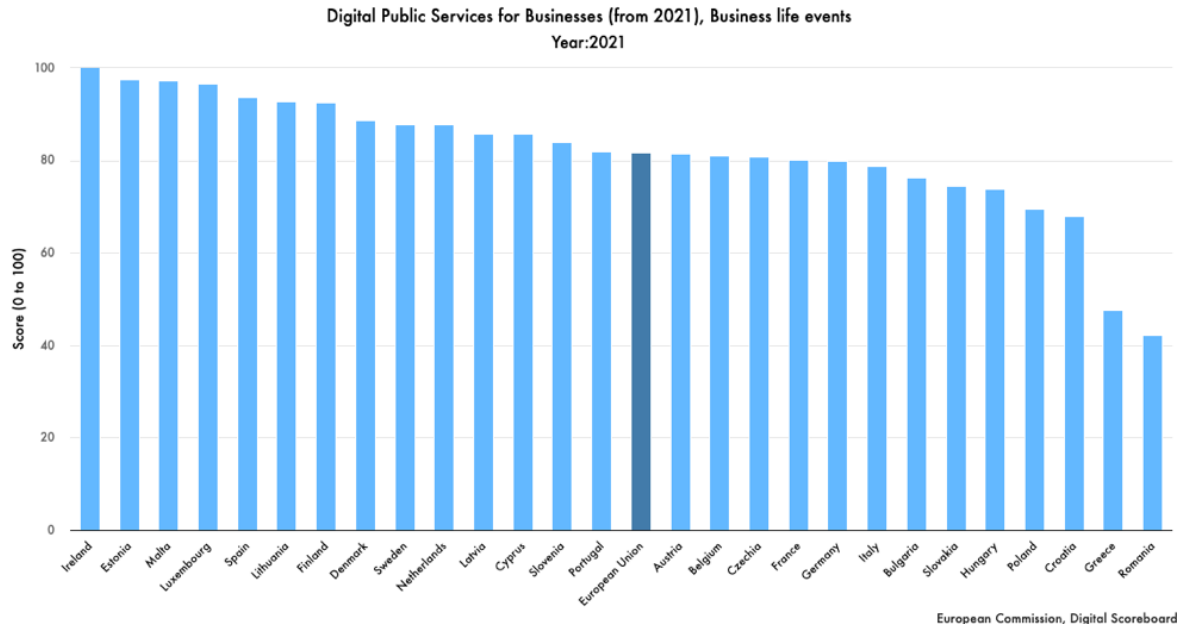
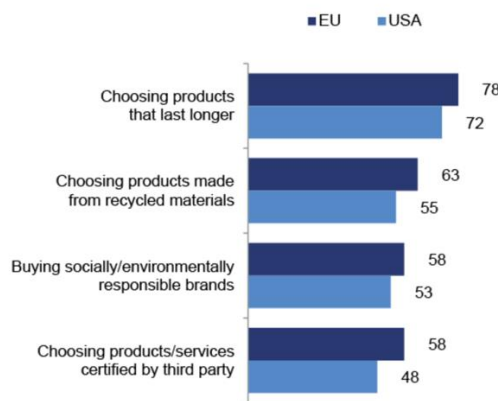


Fig. 1. Individuals ordering physical goods online in 2019, aged 17-64 [29].

The image above Figure 1 shows the consumers that have bought online any of the following physical goods: food or groceries, medicine, household goods, clothes, computer hardware, sports articles, and electronic equipment. More and more users buy online.



*Includes France, Germany, Italy, Spain, Sweden, and UK

Fig. 2. Consumer purchasing behavior in 2020 (EU versus USA) [30].

In Figure 2 it is shown that at a global level, people are starting to choose more environmentally friendly products, that have better quality and are more durable. The biggest percentage is for the products that last longer. Europeans are more interested in sustainable consumption than Americans. A survey was made of 27000 people.

2.2. Circular economy approaches

More and more providers adopt circular economy methods to manage their businesses. The reuse determines providers to produce durable and higher quality products.

In Figures 3 and 4 it can be seen the differences between the high developed countries in Europe and the less developed ones with regards to the implementation of the circular economy patents and sustainable behavior in terms of material reuse. These two factors are interconnected, resulting that in the developed countries, the level of education with regards to sustainability is bigger and more frequently.

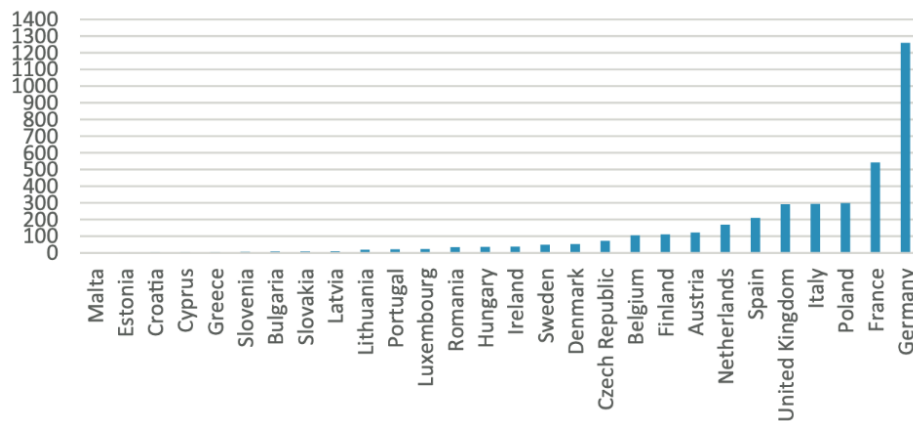


Fig. 3. Patents related to the circular economy since 2000 [31].

As seen in the image above, Germany occupies the first place among the countries that have the most patents related to circular economy. Germany is a leader in Europe regarding technologies and innovations.

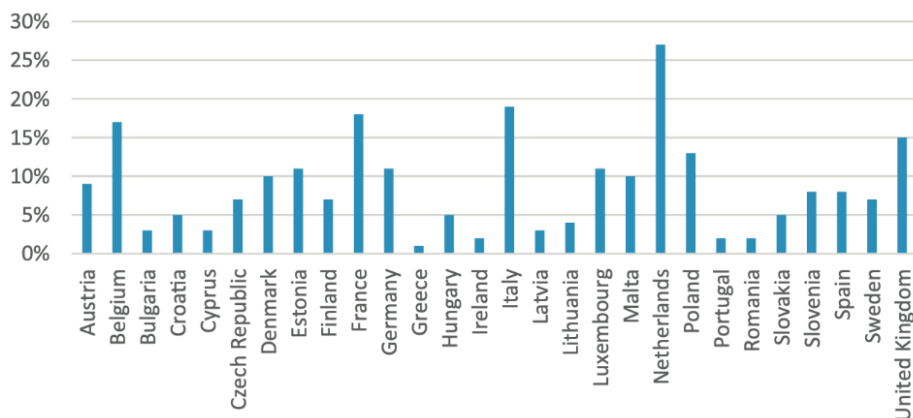


Fig. 4. Material reuse rate in 2020 [31].

The most developed countries in Europe have the highest percentages of material reuse. They have the infrastructure and determination to implement the circular economy model in their societies.

The production of different goods and services is undergoing great changes in the last years developing rapidly as digital technologies enhance communication among the actors along the value chain. The term Industry 4.0 was invented to address the truth that the fourth industrial revolution will depend on digitization rather than just automation as the third did, and that production will be modular inside factories consisting of very “smart” objects. This trend is determined by an application pull that demands standardization of the systems, short progress periods, personalization on demand, flexibility, creating safe and secure production environments, decentralization for decision-making and resource efficiency. At the same time, there is a technology expansion that will enable enhanced automation and mechanization, networking of elements directing to fully digitalized environments and a growth degree of miniaturization.

Industry 4.0 is an integration of the entire product or service life-cycle ranging from the simple raw material acquisition stage, to the end of the life of the product.

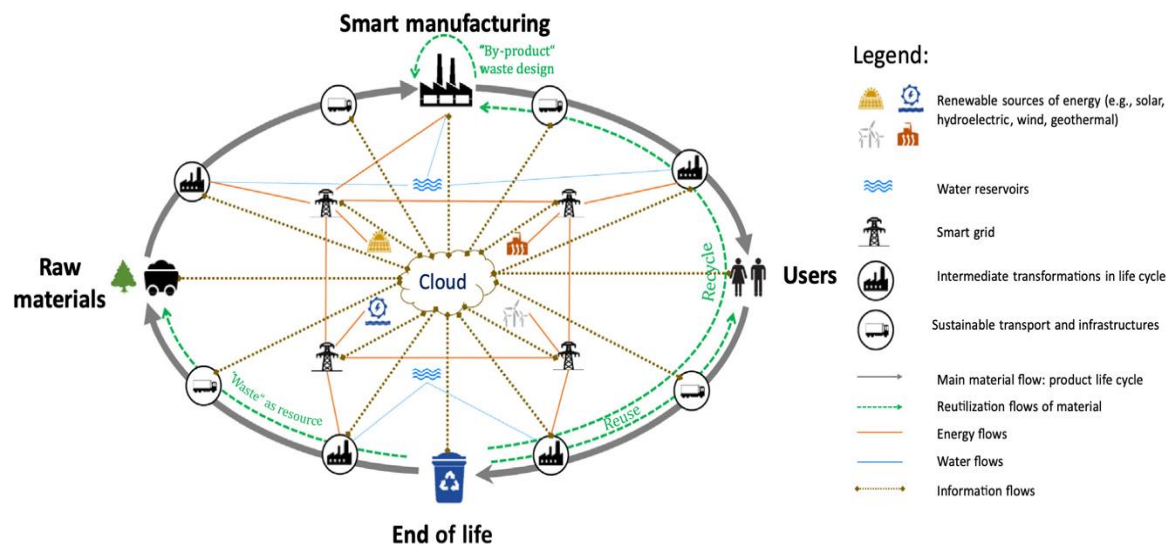


Fig. 5. The life cycle of the products in Industry 4.0 [32].

Figure 5 shows that the reutilization of material flows is a key point toward long term sustainability.

In the present context of ongoing fast changes, the definition of the fifth industrial revolution is beginning to take form. Industry 5.0 is an extension to Industry 4.0 developing into manufacturing practices that concentrate on the personalized demands of individual clients. Thus, the application digitization is a key factor to the expansion of this concept. Therefore, many efforts are made and put into tools to increase personalized demands.

3. CONCLUSIONS

In conclusion, expanding the circular economy model has a positive effect on output, increasing income growth without counter effects on natural resource exploitation. This creates a way for the active usage of this type of policies and norms which enhance the circularity of the economy as a good strategy for sustainable long-run expansion. Circular economy perspectives have a large potential in the visualization and communication of resource usage. They have the potential to 'disclose' hidden waste (that is either ignored or physically displaced by relocation in space and time).

Manufacturers may neglect sustainability and safety for financial gain. An organization's exclusive focus on the circular economy's benefits can result in an increase in sustainable approaches. Circular economic activities are immature and undergoing fast change, policies and control will typically lag. The absence of norms and regulations increases risks. The product uses must also be taken into account. Remanufactured, reused, and recycled materials and products should be subjected to extensive testing.

Several sustainable education programs through different learning activities and practice would offer valuable knowledge and experience for consumers and small industries in bettering social, economic and environmental performance. The knowledge, awareness, empathy, creativity and skills will help businesses to produce and sell smart, sustainable products and services on long term. The instant access to information puts the consumers in the position to compare and choose the best product or service for themselves, based on healthier and eco-friendly standards. Universities, corporations, firms, relevant government officials are important actors that could help by informing both consumers and producers about the benefits of more sustainable products and services and how important is the process to create these. The government should offer advantages to producers who take sustainability into consideration, so that they can sell their products on more markets at affordable prices for everyone. As well, should change the regulations such that different companies would no longer produce harmful products. Recycling should be promoted, thus, resulting a better economic, social, and environmental performance in all areas. These significant actors are useful in raising awareness about the importance of sustainability and innovation. Digital information impacts everyone more or less, therefore, digital education about sustainability will have a positive outcome.

To conclude, the sustainable behaviors consumers engage in are highly stable in the present social context due to the access to instant information and diversity. Sustainable behaviors are hard to change, consumers are very consistent over time and if one adopts sustainability as part of his or her life, it will be long-term. Digital education has a great impact on the consumer because of one's exposure to all kinds of information. Online reviews are a key element in shaping purchasing behaviors. Consumers are always searching for the best deals they can get; the circular economy offers them the opportunity to reuse higher-quality products that normally they could not afford to buy.

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Investigating and exploring sustainable consumption more holistically is becoming more necessary, moving above the study of individual behaviours. It is worth being open to the fact that sustainable behaviour and consumption may be a multifaceted concept, including many behaviours driven by many different goals.

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