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Investigation of the relationship between circular economy and Hofstede's cultural dimension models in European context

How are Hofstede's cultural dimensions influencing the circular economy indicators in the European Union?

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How are Hofstede's cultural dimensions influencing the circular economy indicators in the European Union?

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Master of Management in International Business

Abstract:

In a globalized world where humankind faces an unprecedented challenge due to the climate crisis, a new vision of economic models has emerged to overcome the upcoming challenges: the circular economy. This paradigm shift aims to put the people, the planet, and profit at the center of decisions through environment regeneration and waste and pollution minimization. However, a globalized context puts severe stress on implementing new economic models as humans face different experiences, values, and cultures.

While the scientific literature acknowledges the influence of cultural dimensions on sustainability practices, little research exists on the specific relationships between cultural dimensions and the circular economy. Hence, through a Pearson correlation analysis, a timeline analysis and a literature review, we have explored the potential link between the circular economy indicators extracted from Eurostat and Minkov-Hofstede's cultural dimensions model, a reviewed model of Hofstede's cultural dimensions model.

We have found that the individualist-collectivist cultural dimension significantly correlates with multiple circular economy indicators, especially indicators of competitiveness and innovation. We have also explored the underlying mechanism behind such correlation, such as individualist values, beliefs, and experiences.

In contrast, we found that the flexibility-monumentalism cultural dimension, formerly known as the long-term orientation, held a weaker overall correlation with the circular economy indicators, except for the circular material use rate and the greenhouse gas emissions from production activities. We have tried to identify the latent reasons behind these relationships.

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Abreviations list

CF: Consumption footprint

CMUR: circular material use rate

Flex-Mon: Flexibility-Monumentalism cultural dimension

GPWPC: generation of plastic wastes per capita

GPaWPC: generation of plastic packaging waste per capita

GHG-PA: greenhouse gases emissions from production activities

Ind-Col: Individualism-Collectivism cultural dimension

MF: material footprint

Patents-RR&SRM: Patents related to recycling and secondary raw materials

PI&GAV-CES: Private investment and gross added value related to circular economy sectors

RP: resource productivity

RRPW: recycling rate of packaging waste

RRMW: recycling rate of municipal waste

TRRM: trade in recyclable raw material

WEEE-RR: recycling rate of waste of electrical and electronic equipment

WGPC: waste generation per capita

WPECES: working population employed in circular economy sector

Chapter 0. Introduction

Today's world is at a crossing point. While international partnerships have reached an unprecedented level of development and interconnection (OECD, 2021), we see that limits have been reached, whether through the scope of global warming or geopolitical conflicts.

Through trade, international organization, and increased electronic communication speed, globalization enabled the development of once-disadvantaged countries by providing business and development opportunities. This has significantly improved the living conditions and lifted millions out of poverty. For instance, globalization had a positive impact on food security as industrial agriculture improved the supply chain of food distribution and led to fewer starvation (OECD, 2022) throughout the previous decades. Nevertheless, globalization has its disadvantages. As it was a catalyzer of human interaction, especially in a business context, globalization enabled industrialization and human activities which contributed to climate change.

The environmental impact of globalization increased emissions of polluting elements, habitat destruction, and biodiversity destruction (Harvard Business School, 2021), leading to a world where climate will bring more uncertainty in the interaction between organizations and stakeholders. A significant consequence of climate change that is commonly overlooked is its social impact. As the sea levels rise, heat waves and drought are becoming more and more recurrent, and food insecurity is increasing, human health, quality of life, and interaction are becoming more vulnerable to uncertainties (Imperial College London, n.d)

Hence, mankind is at the forefront of its biggest challenge yet and strong decisions and action plans must be undertaken. The United Nations (UN) has elaborated an action plan where 17 sustainable development goals need to be met to tackle global warming and improve sustainability (UN, 2016). It was during the United Nations Conference on Sustainable Development in 2012 in Rio that the SDGs saw the day. The reason underlying such an ambitious project was to develop a common and efficient international framework for tackling the environmental, political, and social crisis linked with global warming.

The 17 SDGs include a wide range of issues to tackle, such as hunger, poverty, education, water quality, clean energy, and climate action (UN, 2016). In this context of climate

uncertainty, companies and organizations face new constraints that will significantly impact their business activity if no action is undertaken. These environmental, social, and governance constraints force companies to undertake the path of innovation, and especially sustainable innovation, to thrive in the upcoming environment of uncertainty we will be living in.

Sustainable innovation is a word that carries a lot of meaning. According to Charter and Clark (2007), sustainable innovation can be defined as "a *process where sustainability considerations (environmental, social, and financial) are integrated into company systems from idea generation through to research and development (R&D) and commercialization. This applies to products, services, and technologies, as well as to new business and organizational models*". Sustainable innovation aims to reduce the negative impact of human activities on the environment while bearing in mind the social aspect of individuals throughout the innovation process and maintaining financial profitability to sustain the process (Hermundsdottir & Aspelund, 2020).

In this scope of sustainable innovation, a systemic innovation will be investigated in this paper, the circular economy. According to The Ellen McArthur Foundation, which is regarded as the main reference foundation in the circular economy ecosystem, the circular economy is "*a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources*".

The circular economy is a holistic concept. It is difficult to define it in a single way. According to Kirchherr et al. (2017), there are over a hundred definitions of circularity. Over the last decade, the circular economy has seen a rise in popularity in scientific literature. For instance, in the review paper of Halog and Anieke (2021), "*A Review of Circular Economy Studies in Developed Countries and Its Potential Adoption in Developing Countries*", we see that there were more Circular Economy articles published in 2020 than the 3 previous years combined.

The circular economy plays at international scale. We saw rising nations, such as China, investing tremendous resources and financial means into the implementation to become the leader in the field of circular economy (Mathews & Tan, 2016). In Europe, countries such as

Austria, Belgium, Germany, Luxembourg, and the Netherlands are leading the board of the circular economy (Marino & Pariso, 2020). Developing nations also view the circular economy as an alternative to the current economic model to develop a nation's sustainable wealth and well-being (Ahmed et al., 2022).

The circular economy promotes the 3Rs: Reuse, Reduce, Recycle. It proves useful for countries such as China, which faces serious shortages of natural resources and environmental pollution (R. Yong, 2007). The circular economy comes here not only as a solution to improve the environmental impact but also to reduce the interdependency that countries might face due to their lack of critical resources available (Yong, 2007). While the circular economy provides an answer at a global scale for the climate crisis, it is important to understand that people have different cultures, values, and traditions and that a given solution might not be interpreted in the same way between a Chinese and a German. Hence, being aware of one's culture and viewpoint on sustainable innovation is essential to improve the holistic approach to such complex problems as climate change.

To better understand one's culture and system of value, the cultural dimensions model of Hofstede plays a crucial role. Hofstede's cultural dimension perspective enables a fundamental understanding of cultural dimensions that could support the circular economy and sustainable transition. Hence, we see that humanity is facing a global challenge with climate change. One solution to that challenge could be the sustainable innovation of the circular economy. However, humans thrive in very different contexts and realities such as their socio-economic reality or the political reality of given countries. To better understand the potential relationship that could exist between humans and the circular economy, this paper shall focus on the relationship between the circular economy indicators and the cultural settings of individuals.

Thus, through these first assumptions, the problem can be formulated as follows: **How are Hofstede's cultural dimensions influencing the circular economy indicators in the European Union?**

Chapter 1. Circular Economy

1.1 Circular economy model

1.1.1 Origins

Over the last decades, a new vision of the industry has emerged: the industrial ecology. This new doctrine encompasses the notion that the human industrial system and natural ecosystem have a similar characterization of flows of material, energy, and information (Rizos et al., 2017). Hence, industrial ecology aims to deal with human activities and sustainability by bringing a holistic approach as it emerges from various disciplines (Rizos et al., 2017).

One of the first postulates of the industrial ecology was that to achieve a sustainable industrial economy where materials and energy optimization is achieved, it would be necessary to have technological and structural changes combined with economic and cultural evolution (Aurez & Georgeault, 2019; Rizos et al., 2017).

To respond to the challenge asserted by the industrial ecology, new visions of economic concepts have emerged, such as the functionality economy, the cradle-to-cradle system, or the blue economy (Rizos et al., 2017).

Industrial ecology has provided many different solutions to sustainability challenges. However, these solutions remain very specific and need to be more cohesive. To connect these visions more, a new economic model emerged, the circular economy, which would integrate the new sustainable visions into its model (Aurez & Georgeault, 2019; Rizos et al., 2017).

The concept of circularity isn't a recent phenomenon. It can be traced back to the pre-industrial era when societies systematically kept products in the economic loop (Aurez & Georgeault, 2019). However, Pearce and Turner first conceptualized the circular economy as an economic model in the scientific literature in 1990 in their paper "*Economics of Natural Resources and the Environment*", where they critically examined the linear economy, in which we produce, consume, and reject waste without valuing it (Rizos et al., 2017).

The circular economy approach differs drastically from the linear economy. While in a linear economy, the process is to extract, produce, consume, and reject wastes without integrating the scarcity of resources (Rizos et al., 2017), the circular economy differs by acknowledging that

the economy evolves in a closed system with limited resources and thus adapting its approach to such constraints of resources scarcity (Aurez & Georgeault, 2019).

To achieve sustainability, the circular economy integrates multiple concepts from various economic visions, such as the functionality economy, the blue economy, and the cradle-to-cradle system (Aurez & Georgeault, 2019; Rizos et al., 2017), through a closed loop of material flows intended to reduce the consumption of virgin raw materials and generate a positive environmental impact (Rizos et al., 2017).

One of the intentions of the circular economy is to reduce unwanted externalities, such as waste and pollution, as much as possible. In theory, inputs and outputs are not lost in the closed-loop process, and here, wastes and discarded products are valued as a new resource that can be used to extend the life cycle of products (Aurez & Georgeault, 2019; Geissdoerfer et al., 2017; Rizos et al., 2017).

While the waste aspect provides a solid first understanding of the circular economy's intentions, the model goes beyond waste management. The whole idea of the circular economy is to extend the life cycle of products in order to reduce resource consumption, waste, and pollution. To do so, the circular economy process will encourage productivity innovation, long-lasting design, improved product use rate (Potting et al., 2017), and many more strategies that will be explained in the upcoming sections.

1.1.2. Definition

The circular economy is a concept that operates at the micro, meso, and macro levels (Hysa et al., 2020) and is influenced by numerous models from various disciplines (Rizos et al., 2017). Hence, it takes a holistic approach to resource scarcity, sustainable development, and global warming. Such a broad approach makes it difficult to generate a common framework for the concept, and there are currently over a hundred definitions for it (Ghisellini et al., 2016).

Nevertheless, academic literature agrees that the Ellen McArthur Foundation plays a pivotal role in spreading the circular economy, as it is a common platform for articles, books, and debates (Ellen McArthur Foundation, 2024).

According to the Ellen McArthur Foundation, "*The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources*".

Kirchherr et al. (2017) have studied more than a hundred definitions of the circular economy. They have aggregated all the definitions into a single definition, which states that "*The idea of circular economy considers it as a transformative economy redefining production and consumption patterns, inspired by ecosystems principle and restorative by design, which increases resilience, eliminates waste and creates shared value through an enhanced circulation of material and immaterial flows*".

Despite the lack of a common vision about the definition of the circular economy (Ghisellini et al., 2016; Kirchherr et al., 2017), it seems that things are changing for the better. Recently, the International Organization for Standardization (ISO) released the ISO59004:2024, which solely focuses on the circular economy (ISO, 2024). The circular economy is here defined as an "*economic system that uses a systemic approach to maintain a circular flow of resources by recovering, retaining or adding to their value while contributing to sustainable development*" (ISO, 2024). This new standard will help researchers develop a common vision of the circular economy. It establishes a new definition, principles, and guidance for actions and implementations (ISO, 2024).

1.1.3 Goals and Principles

The core objectives of a circular economy are to attain four primary goals for a sustainable society: resource efficiency, sustainable economic growth, environmental protection, and social development (Marino & Pariso, 2020).

According to Suchek et al. (2021), to achieve such goals, the circular economy has to rely on three principles identified by the Ellen McArthur Foundation:

- *Preserving and enhancing natural capital, controlling finite stocks, and balancing flows and renewable resources*

- *Optimizing resource earnings through making products, components, and materials in use at the highest level of utility for the greatest possible length of time in the technical cycle and the biological cycle*
- *Stimulating the effectiveness of systems by identifying and excluding negative externalities at the outsets*

1.1.4 Closing the loop

Hence, the principles of the circular economy will translate into a closed-loop system. The purpose of such a system is to avoid as many unwanted externalities as possible, such as waste and pollution, and improve resource efficiency (Camilleri, 2018). To illustrate such a loop, we have provided a diagram (See **Figure 1**) from the Ellen McArthur Foundation that illustrates the principles mentioned previously well. While this diagram gives an overall vision of the processes for a closed-loop system, we will explore the key processes required for such systems into three main key points.

First, the circular economy aims to use fewer primary resources by improving productivity efficiency by including recycled material and recovered components, making more efficient use of resources, and utilizing renewable energy sources (Rizos et al., 2017). Then, once the materials are imputed into the loop system, the goal here will be to extend the life cycle of the products as long as possible. This can be achieved through an improved, long-lasting design, remanufacturing, refurbishment, and repurposing of products and components (Rizos et al., 2017).

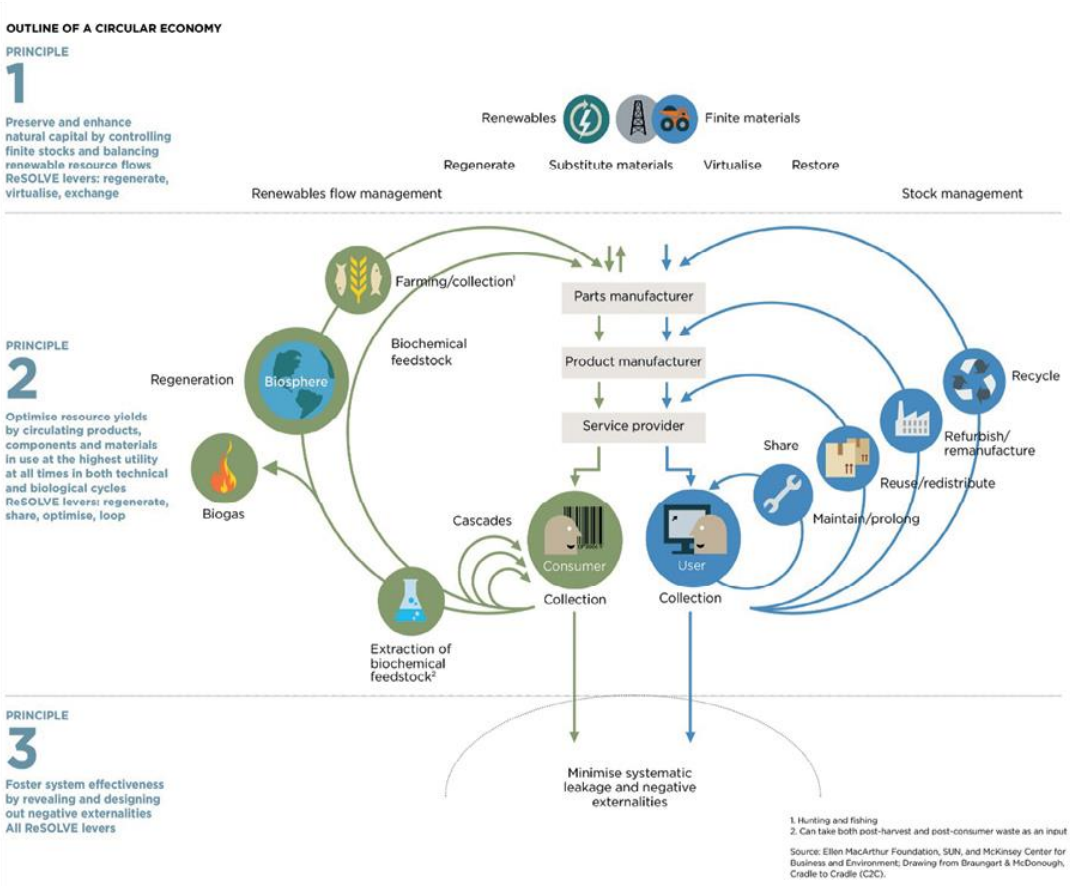

Figure 1 - The butterfly diagram (Ellen McArthur Foundation, 2019)

Source: Ellen McArthur Foundation

Finally, when the product ultimately reaches its end of life, according to the Cradle-to-Cradle principles, it will either be recycled into raw material and injected back into the loop or incinerated to recover the energy (Potting et al., 2017). The circular economy intends to change consumption patterns, improve knowledge sharing, and improve the utilization pattern of products and business practices by transforming products into services (Rizos et al., 2017).

1.1.5 The 10 Rs strategy

A common strategy used to explain the circular economy was the 3Rs: Reduce, Reuse, and Recycle. While this original strategy remains true, it has since evolved into a strategy of 10Rs (Potting et al., 2017). The reason behind that evolution was to provide a more detailed and comprehensive approach to achieving circularity (Kirchherr et al., 2017).

The 10Rs strategy is depicted as follows: Refuse (R_0), Rethink (R_1), Reduce (R_2), Re-use (R_3), Repair (R_4), Refurbish (R_5), Remanufacture (R_6), Repurpose (R_7), Recycle (R_8), and Recover (R_9) (Potting et al., 2017). The order in which the strategies are presented represents the importance of their impact on circularity (Kirchherr et al., 2017; Potting et al., 2017), as the Refuse strategy will have a greater impact on circularity than the Recover strategy, where products will be incinerated, thus stopping the re-injection in the circularity loop (Potting et al., 2017).

The Refuse strategy aims to change the product's function by making it unessential or by offering a radically different approach to the same function (Potting et al., 2017). Such a strategy could be illustrated by a ban on oil for thermic vehicles, thus making it redundant and offering a radical solution to the function of electric vehicles. The Rethink strategy seeks to increase the product use rate, thus depleting the resource intensity for the function linked to the product (Potting et al., 2017). Shared car companies could illustrate such an example.

The Reduce strategy intends to improve the efficiency of product manufacture and use by requiring fewer natural resources and materials (Potting et al., 2017). The Re-use strategy looks to fulfill the original function of a discarded but still functional product by a new consumer (Potting et al., 2017). The Repair strategy aims to improve the repair and maintenance of defective products so that consumers can still enjoy the original function for which their products were designed (Potting et al., 2017). On the same idea, if the products need restoration, the Refurbish strategy seeks to restore them and bring them up to date (Potting et al., 2017).

Nevertheless, if the products are discarded, the Remanufacture strategy will retain the abandoned products and use them as inputs in a new product that fulfills the exact same function (Potting et al., 2017), such as the Michelin tire fleet where used tires are remanufactured into brand new tires (WBCSD, 2021). However, in the case of discarded products that cannot be used for the same product function, another new function will be used for the products, as depicted in the Repurpose strategy (Potting et al., 2017). Such Repurpose examples include Terracycle’s solution, where cigarette butts are transformed into plastic palettes (WBCSD, 2021).

The Recycle strategy is designed so that discarded products that haven't found a new function will be recycled into new raw materials of similar or lower quality (Potting et al., 2017). If the products cannot be recycled, the Recover strategy is the final step, in which unrecyclable products will be incinerated for energy recovery (Potting et al., 2017). Hence, the circular economy goes way beyond simple recycling. It is a whole product life assessment that wants to provide many solutions to reduce waste generation as much as possible. The 10Rs mentioned hereby represent the circuit that a product should take to improve its circularity.

1.1.6 Circular Economy Practices

As seen previously, the circular economy is a recent economic model that integrates multiple practices and solutions that emerged from the industrial ecology (Rizos et al., 2017). To achieve a closed-loop system with the 10Rs strategy, we shall explore common circular economy practices identified by Aurez and Georgeault (2019). These elements are ecodesign, sustainable supply chain and consumption, industrial symbiosis, and the functionality economy.

Ecodesign

In an eco-design mindset, the goal is to create a product that takes into account the environmental impact all along its life cycle, from factory to landfill, and reduce as much as possible the negative externalities linked with it (Aurez & Georgeault, 2019). The purpose of eco-design is to rethink and extend the life cycle of products by reducing the quantity of resources required for production, improving product reparability, reconditioning, and recycling (Aurez & Georgeault, 2019).

Such processes are good for companies. They can improve competitiveness thanks to the savings made with the reduced demand for raw materials and the cost diminution linked with the end-of-life management of products. With ecodesign, companies can also respond to evolving market trends and create new ones, as well as improve their profit margin and brand image (Aurez & Georgeault, 2019).

Sustainable supply chain and consumption

The purpose of a sustainable supply chain and consumption is to develop or improve trade flows by considering the development of supply lines that use sustainable and renewable

resources and processes and respect human conditions (Aurez & Georgeault, 2019). While the supply chain has to implement drastic changes in its processes to achieve sustainability, its success relies on consumer personal decisions. What drives the sustainable supply chain is the customer consideration of environmental impact throughout the life cycle (Aurez & Georgeault, 2019).

Industrial Symbiosis

The main purpose of industrial symbiosis is to close the flow of raw materials between companies on an industrial park or regional scale (Aurez & Georgeault, 2019). This means that the purpose is to minimize companies' waste generation (solid wastes, energy wastes, information wastes) and generate a valuation from improved waste management.

Two types of symbiosis have been identified: mutualization symbiosis and substitution symbiosis. Mutualization symbiosis aims to improve the material flow by sharing practices on inputs and outputs. These practices result, for example, in joint orders or shared logistics for incoming flows and common waste collection for outgoing flows (Aurez & Georgeault, 2019). On the other hand, substitution symbiosis focuses on the outgoing flows of companies that could result in incoming flows for other companies (Aurez & Georgeault, 2019). In other words, the substitution symbiosis highlights that the waste flow of a company can be an incoming flow of raw material for another company.

The Functional economy

In the linear economy, it is common practice to purchase and acquire possession of a new product. The functional economy differs by abandoning the possession aspect, or the sale, and focusing on the products' uses or the service they can offer. The purpose of the functional economy is to generate the highest use value as long as possible with as few resources as possible (Aurez & Georgeault, 2019).

Hence, the functional economy is a new proposition of consumption patterns in which consumers rent a service rather than purchase a good. Such a model can be a good solution to planned obsolescence, as companies will have a new incentive to create a long-lasting product that can be easily repaired and improved (Aurez & Georgeault, 2019). Adopting such a vision of an economic model reinforces the positive environmental impact. When companies were solely focused on sales, in this new model, the main focus wasn’t on improved production but

on the maintenance, reparability, and performance of their services, thus requiring fewer raw materials and generating fewer wastes (Aurez & Georgeault, 2019).

1.2 Legal Framework and Political Actions in Europe

The forerunner document that initiated the circular economy in Europe is the "*Circular Economy Action Plan*" (COM/2015/0614) dating from 2015. This first action plan focused on 54 actions that were already achieved or are under process (IEEP, 2022). The policy areas of this action plan focus on chemicals, industry, plastics, sustainable development, recycling, and circular economy development at the European and international levels (European Commission, 2015). That first document aims to kickstart the transition toward a sustainable society while creating synergies between the environment and the economy.

The European Union is well aware of the potential of the circular economy. According to the European Commission, the Circular Economy Action Plan (COM/2015/0614) drawn up in 2015 was already able to create 4 million jobs, generate €145 billion in value-added, and promote €17,5 billion worth of investment while only representing approximately a tenth of the total economic value of the EU zone (Marino & Pariso, 2020).

Nowadays, Europe is at the forefront of circular economy development, with Austria, Belgium, Germany, Luxembourg, and the Netherlands leading the path (Marino & Pariso, 2020). The legislative text that acts as a beacon for European policy in terms of ecological transition is the European Green Deal, which was initiated in 2019.

The purpose of that text is to give a sustainable framework for the environmental transition. The objectives are as follows: No net emissions of greenhouse gases by 2050 and 55% reduction by 2030, Economic growth decoupled from resource use, and no person and no place left behind. To achieve such bold goals, Europe has released funds up to € 1 trillion (European Commission, 2019).

Despite this, the European Commission still decided that the initial circular economy action plan was not sufficient, so they decided to release a new action plan complementary to the first one. The New Circular Economy Action Plan (COM/2020/98), divided into 35 objectives, saw its day in 2020.

According to the Institute for European Environmental Policy, the objectives of this new legal text are:

- To make sustainable products the norm in the EU,
- Focussing on sectors with larger resources demands and high potential for circularity, such as vehicles, textiles, plastics, packaging, electronics, etc.
- Improving the waste reduction
- Empowering consumers and public buyers
- Improving the processes of circularity for people, regions, and cities
- Leading global efforts on circular economy

1.3 Tracking the Circular Economy Indicators

To monitor all these objectives, the European Commission revised in 2023 the Circular Economy Monitoring Framework (CEMF). This framework is composed of 6 sections that track a total of 22 indicators that are capital to a successful transition towards the circular economy. The five sections are presented as follows: Production and consumption, waste management, secondary raw material, competitiveness and innovation, and global sustainability and resilience. These indicators are insightful for the study of the link between circular economy and cultures as they provide clear indicators that can be linked back to the 10Rs strategy elaborated by Potting et al. (2017). We have tried to identify these potential links between the indicators and the 10Rs strategy in the following table (See **Table 1**).

Hence, we see that through the circular economy indicators cover multiple strategies of the circular economy, and when looking at the overall indicators, the entirety of the strategies are included in the total amounts of indicators. However, it is important to highlight that while the waste management section talks about the recycling rate, Eurostat does not specify the definition of recycling. Therefore, we have decided to include in our perception of recycling all the strategies linked with the life cycle expansion (R_3, R_4, R_5, R_6, R_7).

In conclusion, we see that the EU is undergoing serious initiatives to implement the circular economy in Europe, and it already has two action plans, a global vision with the European Green Deal and tracking devices with the CEMF. Despite all of that, the EU is not free of any criticism, as the current actions are still insufficient. Countries in the EU zone do not face the same reality and challenges, which creates disparities among countries in the implementation of the circular economy (Marino & Pariso, 2020).

Table 1: Linking circular economy indicators with 10Rs strategy

10 Rs strategy	Production & Consumption						Waste Management			Secondary Raw Materials		Competitiveness & Innovation			Global Sustainability	
	RP	MF	WGPC	GPWPC	GPaWPC	GMWPC	WEEE-RR	RRPW	RRMW	CMUR	TRRM	Patents-RR&SRM	PI&GAV – CES	WPECES	GHG-PA	CF
R_0 refuse	•			•	•					•	•	•			•	•
R_1 rethink	•	•				•				•	•	•	•	•	•	•
R_2 reduce	•	•	•	•	•	•				•	•	•	•		•	•
R_3 re-use							•	•	•				•			
R_4 repair							•	•	•				•	•		
R_5 refurbish							•	•	•				•	•		
R_6 remanufacturate							•	•	•				•	•		
R_7 repurpose							•	•	•				•	•		
R_8 recycle	•	•					•	•	•		•	•	•	•		
R_9 recover											•	•	•	•	•	

• = potential link between a circular economy indicator and a R strategy

Source: Author

RP = resource productivity; **MF** = material footprint; **WGPC** = waste generation per capita; **GPWPC** = generation of plastic wastes per capita; **GPaWPC** = generation of plastic packaging waste per capita; **WEEE-RR** = recycling rate of waste of electrical and electronic equipment; **RRPW** = recycling rate of packaging waste; **RRMW** = recycling rate of municipal waste; **CMUR** = circular material use rate; **TRRM** = trade in recyclable raw material; **Patents-RR&SRM**= Patents related to recycling and secondary raw materials; **PI&GAV-CES** = Private investment and gross added value related to circular economy sectors; **WPECES** = working population employed in circular economy sector; **GHG-PA** = greenhouse gases emissions from production activities; **CF** = Consumption footprint

Important notice: 6 circular economy indicators have not been included in this table as they won't be investigated in this paper. For further details, see the "Data Refinement" section.

1.4 International Context of the Circular Economy

The circular economy is a concept that gained tremendous momentum in the previous decade. The scale of such a vision is not limited to a particular group of people or a region but is instead an international solution to an international climate crisis. The development of circular initiatives is witnessed throughout the world. For instance, China initiated decisive actions in the circular economy and is among the first countries to launch national circular economy policies (Yong, 2007).

On the other hand, Ahmed et al. (2021) also investigated the development of a circular economy in Bangladesh, and they drew divergent conclusions on its impacts, such as the economic disparities of circular business models or the inhibiting role that corruption plays in the application of this new economic theory.

The European Union, and especially the European Commission, play a pivotal role in this new circular doctrine with policies such as the two Circular Economy Action Plan (COM/2015/0614; COM/2020/98) and the European Green Deal (COM/2019/640).

Hence, the circular economy is a global phenomenon. However, despite having an overall shared vision and principles, such as the 10Rs strategy or the loop principle, the circular economy has yet to have an international policy agreement (Geng et al., 2019). Instead, what we see are very different approaches to the circular economy. For instance, China, Japan, and South Korea have national policies to enable the circular economy, while Brazil, India, and the United States have a bottom-up[1] approach (Geng et al., 2019).

All these different approaches yield different impacts. However, something that has yet to be investigated is culture's role in enacting the circular economy. As Kirchherr et al. (2018) stated in "*Barriers to the circular economy: Evidence from the European Union*", cultural barriers play a fundamental role in inhibiting the circular economy advancement, such as consumers' lack of interest and hesitant business culture (Suchek et al., 2021).

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[1] *"Enterprise-specific business processes can be defined through a bottom-up approach. This could be achieved by focusing on the individual activities within a business and grouping these activities according to the level and criticality of interaction between the activities"* (Bititci & Muir, 1997).

1.5 Limitations and Challenges

The circular economy theory relies heavily on the principles of sustainable development, which considers people, planet, and profits to be pillars of the concept (Geissdoerfer et al., 2017). Nevertheless, the theory is still nascent, as it only gained popularity in the last decade (Halog & Anieke, 2021). This necessary juvenile phase that the circular economy is currently going through makes it vulnerable to criticism, and challenges are present (Corvellec et al., 2022; Halog & Anieke, 2021; Guldmann & Huulgaard, 2019; Suchek et al., 2021). The purpose of this section is not to take down the circular economy concept but rather to highlight the gaps and dissonances to understand better what are the challenges that the circular economy will have to answer to perfect the theory and make it furthermore efficient and successful in transitioning the economy, the environment and the people to a more sustainable society.

The first limitation of the circular economy is the vagueness of the concept. Currently, there are more than a hundred definitions of the concept (Kirchherr et al., 2017). What it implies is that there is no shared vision of what a circular economy should be. Of course, some elements consistently come back, such as the 3Rs or the closed loops. Nevertheless, such vagueness and lack of common frameworks make the circular economy susceptible to misinterpretation, which could lead to severe problems where companies pretend to be circular while being not even a glimpse circular, just like with the greenwashing phenomenon (Marrucci et al., 2022).

The circular economy is often presented as a win-win situation for every stakeholder of society (Corvellec et al., 2021). This is why we see strong pushes from governments and supra-national organizations such as the European Union. It answers the climate crisis that will benefit everyone, in principle, while having minimal to no impact on consumers. Thereby, such a vision is problematic as it emphasizes synergies and opportunities while shifting attention away from trade-offs and constraints (Völker et al., 2020). Such an optimistic representation of the circular economy makes it a reassuring discourse for policymakers about the future (Hobson, 2016).

However, as Murray et al. (2017) stated, "*It is unclear how the concept of the circular economy will lead to greater social equality, in terms of inter- and intra-generational equity, gender, racial and religious equality and other diversity, financial equality, or in terms of equality of social opportunity. These are important moral and ethical issues which are missing from the construct*". Switching to a circular economy will generate a significant shift in the socio-

economic web. Organizations will have to rethink and reshape processes, which will ultimately lead to new opportunities but also to manipulation of workforces and trade-offs, which makes it unclear to prospect the potential financial and social opportunities for a portion of the workforce (Murray et al., 2017; Rizos et al., 2017).

Another crucial element of the Circular Economy is the barriers to the implementation of such an economic model. Gupta et al. (2020) investigated the barriers to sustainable innovation. What comes out in this paper is that sustainable innovation is challenging to implement due to the multiple barriers that organizations will have to face. In their paper, they have identified six main category barriers: Technological barriers, economic and financial barriers, regulatory and institutional barriers, social and cultural barriers, organizational barriers, and market and networking barriers.

Barriers are a common phenomenon in any activity. Nevertheless, an unexpected element is the challenges of social barriers. Indeed, as the circular economy incorporates the values of sustainable development, where people, the planet, and profits are at the center of everything, we see that the circular economy's impact and accessibility are limited when it comes to people and its impact is difficult to assess (Corvellec et al., 2021). To illustrate the lack of accessibility, Ahmed et al. (2022) studied the implementation of the circular economy in Bangladesh in their paper "*Circular economy model for developing countries: Evidence from Bangladesh*". An appealing finding in this paper is that circular business models have less positive impact on local SMEs than larger globalized companies, potentially exacerbating social disparities (Ahmed et al., 2022).

The reason behind that is that SMEs face management reluctance, lack proper financial and human resources, lack technological support, and have an indifferent perception towards environmentally friendly products (Saha et al., 2021). To overcome such barriers, an organization must have sufficient funds and means, hence creating considerable advantages for larger companies with better assets (Ahmed et al., 2022). In conclusion, circular business models are extremely hard for SMEs to implement appropriately. In this context, the circular economy creates an unfair advantage for companies that are already very large. Thus, the circular economy handicaps the social upliftment of those of modest means who would like to start their own circular business (Ahmed et al., 2022).

Chapter 2 Cultural dimensions

2.1 Hofstede cultural dimensions

Understanding culture among groups of individuals is no easy task. Culture is a dynamic phenomenon that includes values, norms, beliefs, and attitudes among a group of people that evolve in a region, a country, or ethnicity over time with sometimes radical changes (Hofstede, 2011; Schwartz, 2008). Hence, it is essential to underpin that culture is an elusive concept. To lessen the uncertainty, researchers came up with cultural dimensions so that the complex reality of culture can be reduced into a few meaningful concepts (Kaasa, 2021). Nevertheless, it is crucial to understand that such models do not intend to find a unique and best set of cultural dimensions (Kaasa, 2021), as the construction of such a concept is a purely subjective human invention to explain an objective reality (Hofstede, 2002).

One of the authors cited the most in the cross-cultural field is Hosfstede. He defines culture as follows: "*Culture is the collective programming of the mind that distinguishes the members of one group or category of people from others"* (Hofstede, 2011).

According to Hofstede (2011), culture can be conceptualized into six dimensions:

- Individualism-Collectivism
- Power Distance
- Uncertainty Avoidance
- Masculinity Versus Feminity
- Long-Term Versus Short-Term Orientation
- Indulgence Versus Restraint

Individualism-Collectivism

This dimension represents the degree of integration of individuals into a group (Hofstede, 2011). Individualistic individuals are linked with *independence, inner-directedness,* and *personal interest,* while collectivism is related to greater *emotional dependence, the importance of family,* and *group interest* (Kaasa, 2021).

Power Distance

This dimension focuses on the less powerful members of an organization and their perception and expectation of power distribution (Hofstede, 2011). An organization with small power

distance would see power relationship as something that must be legitimized, while an organization with large power distance see power as a fact, despite being good or evil, hence causing greater acceptance of inequalities (Zemojtel-Piotrowska & Piotrowski, 2023).

Uncertainty Avoidance

Uncertainty avoidance is about a society's tolerance for ambiguous situations and to what extent individuals of a society feel comfortable in unknown situations (Hofstede, 2011). Cultures with high uncertainty avoidance will tend to have codes, laws, and rules when facing ambiguous situations to create as much structure as possible (Zemojtel-Piotrowska & Piotrowski, 2023).

Masculinity Versus Feminity

Zemojtel-Piotrowska & Piotrowski (2023) depict this dimension as follows: "*In the organizational settings, masculine culture is manifested in a stronger focus on work as challenging, getting praise for professional achievements and greater opportunity for promotion and getting higher salaries and what is observed among both sexes. In the feminine societies, people of both sexes strive for socially oriented goals, like social care, good relations in the workplace, security at the workplace, or work-life balance".*

This dimension is the most challenging and problematic as it addresses the diversity versus similarity of gender roles (Zemojtel-Piotrowska & Piotrowski, 2023), which have shown weakening predictive properties over time due to poor replicability (Minkov & Kaasa, 2022).

Long-Term Versus Short-Term Orientation

This dimension does not come from Hofstede but from Michael Bond and his work on Chinese students in 1987, which was initially regarded as the Confucian dynamism (Zemojtel-Piotrowska & Piotrowski, 2023).

As Hofstede (2011) stated: *"the long-term pole corresponds to Bond's Confucian Work Dynamism. Values found at this pole were perseverance, thrift, ordering relationships by status, and having a sense of shame; values at the opposite, short-term pole were reciprocating social obligations, respect for tradition, protecting one's 'face', and personal steadiness and stability."*

However, the sampling methodology used is considered as flawed as the cultural dimension is based on the opinions of a student population, which may not accurately represent the cultural values of the broader population (Fang, 2003). The concept of Confucian dynamism is also regarded as a Western vision of Chinese culture, which may bias the capture of culture and philosophy (Fang, 2003).

Indulgence Versus Restraint

The latest dimension is from Hofstede and Minkov and depicts attitudes toward gratification or controlling human needs related to enjoying life (Zemojtel-Piotrowska & Piotrowski, 2023). An indulgent society sees free gratification of basic human desires regarding enjoying life and having fun, while a restrained society tends to have strict social norms and regulations toward gratification (Hofstede,2011).

2.1.1 Limits and challenges

The cultural dimension model of Hofstede is dynamic, just like culture, as it evolves. Concepts arise, such as long-term versus short-term and indulgence versus restraints cultural dimension. Others are susceptible to strong criticism, such as Feminism versus Masculinism, and long-term vs short-term.

Fang (2003) criticized the model by evocating a flawed sampling methodology for the long-term vs short-term cultural dimension and the Western vision and influence of the authors on the model, which may bias the understanding of cultures and philosophy.

Meanwhile, Heydari & Laroche (2021) highlight that the cultural score is a valuable tool for comparing countries. However, the model is not suitable for studying human behavior at the individual level as the scores are only available at the country level, and cultural beliefs and values can vary among individuals within a society (Heydari & Laroche, 2021; Signorini et al., 2009).

To overcome such differences, a score of cultural dimensions at individual levels would need to be developed. Countries change, people migrate, and technology changes, implying that undoubtedly, cultures evolve (Heydari & Laroche, 2021)

Finally, Signorini et al. (2009) highlighted multiple flaws in Hofstede's cultural dimensions. They highlighted that the model tends to oversimplify complex cultural phenomena. It can lead to cultural stereotyping by creating assumptions about individuals based on generalizing their cultural background (Signorini et al., 2009).

Indeed, some cultural dimensions have faced criticism (Fang, 2008; Heydari & Laroche, 2021; Signorini et al., 2009). It is therefore important to recall again that cultural dimension is a subjective construction of the mind designed to understand objectively the nature of human beings, and thus, it is not free from any flaws (Hofstede, 2011). As culture evolves and adapts, so the model of cultural dimension should be (Hofstede, 2011; Kaasa, 2021; Minkov, 2017).

Many researchers took inspiration from the cultural dimensions models of Hofstede to develop a new approach to overcome the criticism and provide a more holistic approach (Kaasa, 2021) or a more simplistic approach (Minkov, 2017). Notable researchers in the cross-cultural field include Minkov, Schwarts, and Inglehart. Their approach will be investigated in the next section as they provide an updated vision of the cultural dimensions.

2.2 Hofstede-Schwartz-Inglehart cultural dimensions

In this recent approach, Anneli Kaasa (2021) discussed the lack of a holistic approach in the cross-cultural field. She highlighted that the cross-cultural field had researchers such as Hofstede, Schwartz, and Inglehart, who provided significant findings. However, their findings were usually distinct from one another, and the research methodology tended to see their findings as separate approaches.

The purpose of this model is to respond to the oversimplification and stereotypization criticism that was made on Hofstede's cultural dimensions (Signorini et al., 2009) and to merge the main cultural dimensions theories into a single framework (Kaasa, 2021).

What Kaasa wanted to provide in her paper "*Merging Hofstede, Schwartz, and Inglehart into a Single System*" is that these models could be merged (see **Figure 2)** as the cultural dimensions of the authors were complementary and thus owing to give a holistic approach to the cross-cultural field of research (Kaasa, 2021).

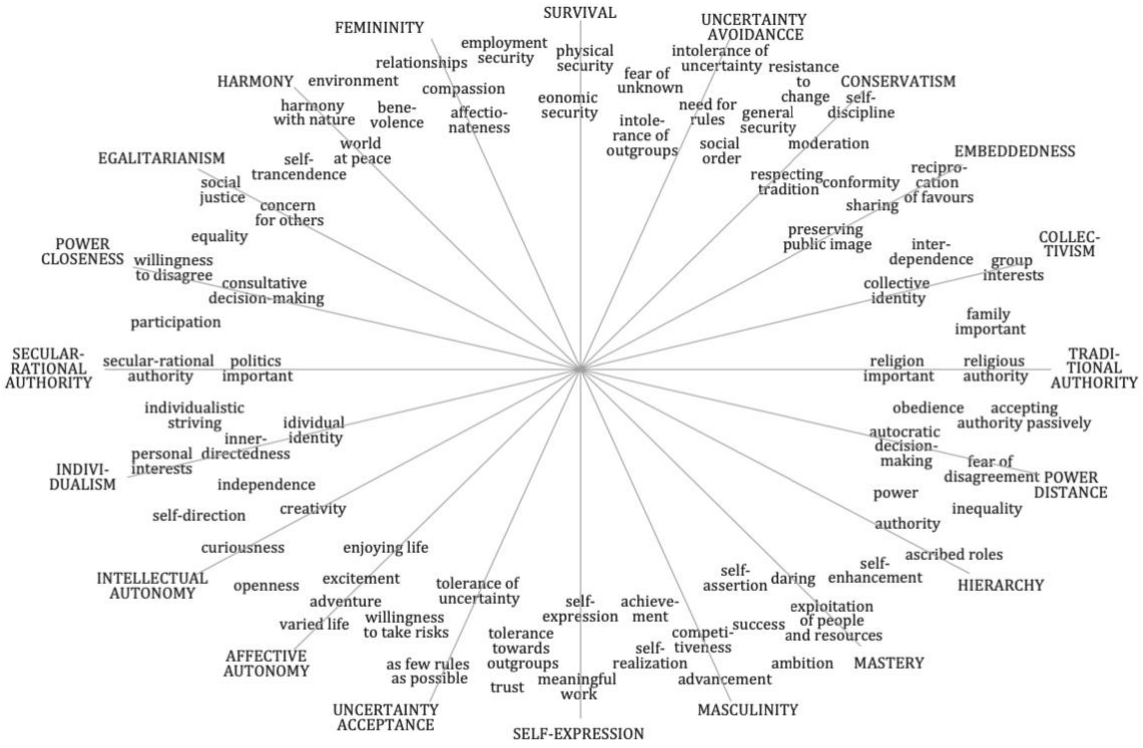

Figure 2: Placement of Hofstede's, Schwartz's, and Inglehart's dimensions in the space of various items as a projection on the two-dimensional figure.

Source: Kaasa, 2021

Hofstede's contribution to the model

In this model, the cultural dimensions of Hofstede are the following:

- Uncertainty Avoidance Vs. Uncertainty Acceptance
- Collectivism Vs. Individualism
- Power Distance Vs. Power Closeness
- Masculinity Vs. Feminity

There is no mention of the latest cultural dimensions, "*Long-term vs. Short Term Orientation*" and "*Indulgence vs. Restraint*". The reason behind this decision to exclude these dimensions from the new model is due to the lack of empirical replicability (Kaasa, 2021). Empirical studies and analysis of Hofstede's model with six dimensions were insufficient, and thus, it is hard to tell if the two latest dimensions overlap with the original four dimensions or not (Kaasa, 2021). As these cultural dimensions were explained in the previous section, they shall not be reasserted again as a matter of redundancy and to maintain the flow of the analysis.

Schwartz's contribution to the model

The contribution of Schwartz's cultural dimension in this model is presented as follows:

- Hierarchy Vs. Egalitarianism:
- Mastery Vs. Harmony
- Intellectual and Emotional Autonomy Vs. Conservatism and Embeddedness

Hierarchy Vs. Egalitarianism

These dimensions are related to the use of power and the preferred degree of hierarchical relation in society (Kaasa, 2021).

In these dimensions, the values linked with Hierarchy are power, wealth, and authority, while the values linked with egalitarianism are concern for others, welfare, social justice, and equality (Kaasa,2021). This dimension is close to Hofstede's Power Distance cultural dimension. This is why they are placed next to each other in the two-dimensional figure of merged cultural dimensions.

Mastery Vs. Harmony

The purpose of these two dimensions is to understand how humans interact with their environment, humans, and nature. While Harmony puts stress on fitting in the world as it is, understanding and appreciating it without intentionally trying to change it (Schwartz, 2004), Mastery is the polar opposite. "*It encourages active self-assertion to master, direct, and change the natural and social environment to attain group or personal goals*" (Schwartz, 2004).

In the Mastery dimension, we find values such as Exploitation of people and resources, self-assertion, success, ambition, and daring. In the Harmony dimension, we find values such as world peace, unity with nature, and protection of the environment (Schwartz, 2004). These cultural dimensions overlap with the masculinity-feminity cultural dimension (Kaasa, 2021).

Conservatism and Embeddedness Vs. Intellectual and Affective Autonomy

Schwartz (2004) theorized that humans are either embedded in the social group or completely autonomous. While conservatism stresses the maintenance of the *status quo* with respect to social order, security, self-discipline, and moderation, embeddedness aims to highlight cultures where relationships and bonds among individuals are considered essential. An embedded

society will highly value reciprocation of favors, sharing, preserving public image, and interdependence. In this type of society, individuals are seen as entities embedded in the collectivity (Schwartz, 2004).

The counterpart of Conservatism and Embeddedness is Intellectual and Affective Autonomy. According to Schwartz (2004), "*Intellectual autonomy encourages individuals to pursue their own ideas and intellectual directions independently. Examples of important values in such cultures include broadmindedness, curiosity, and creativity. Affective autonomy encourages individuals to pursue effectively positive experiences for themselves. Important values include pleasure, exciting life, and varied life*". Hence, in such societies, individuals are seen as autonomous entities with a higher tolerance to risk uncertainties (Kaasa, 2021). These dimensions overlap with the individualistic and uncertainty acceptance dimensions of Hofstede, and thus, it explains why they are located next to each other on the cultural map.

Inglehart's contribution to the model

Overall, the purpose behind Inglehart's work was to show a dynamic shift from traditional to contemporary societies thanks to economic development (Inglehart, 1997). His contribution to the model is expressed through the following cultural dimensions:

- Survival Vs. Self-Expression
- Traditional Authority Vs. Secular Rational Authority

Survival Vs Self-Expression:

As Kaasa (2021) stated, "*This dimension is deeply related to Maslow's theory of human motivation*". Such dimension emphasizes Maslow's hierarchy of needs fulfilled by society. The model overlaps with the uncertainty avoidance cultural dimension (Kaasa, 2021).

Under the strong influence of the survival dimension, we will have a society that prioritizes physical and economic security. As Kaasa (2021) noted, "*Such society comprises feeling threatened by foreigners and ethnic diversity, which lead to an intolerance of other groups*". Meanwhile, societies falling under the self-expression dimension will have already fulfilled these fundamental needs and will be more assertive to answer the following fundamental Maslow's needs of self-expression. This is reflected in society as a catalyzer of tolerance, interpersonal trust, and security (Inglehart, 1997).

Traditional Authority Vs. Secular Rational Authority

According to Inglehart and Baker (2000), this dimension is about the relationship of societies with the source of authority. In a traditional society, religion plays a key role in the arrangement of social interactions and is often at the top board of authority. In such societies, religion and family are of high importance as well as social conformity, and accepting and trusting authority passively (Kaasa, 2021).

On the other hand, secular rational authority is based on rationality, democracy, and scientific knowledge (Inglehart, 1997). Under such dimensions, societies tend to move from an obedient relationship with authority towards a participating relationship with authority. This dimension embeds values such as individualistic striving, challenging authority, and a high perception of importance in politics (Kaasa, 2021).

In conclusion, the work of Kaasa (2021) provides a better understanding of cultural dimensions with a more holistic approach. This model, combined with the insights of some of the most renowned authors of the cross-cultural field, brings a unique model that enables a better understanding of human society. However, as highlighted by Kaasa in her paper, this is just a theoretical framework, and the model needs to undergo empirical validation. Hence, this model will not be used in this paper as it lacks sufficient data to answer the research question. Nevertheless, this model provides great insight and holds promises for forthcoming studies.

2.3 Minkov-Hofstede cultural dimensions

Another promising model in the field of cross-cultural studies is the Minkov-Hofstede model. This model differs from the Hofstede-Schwartz-Inglehart model, as seen previously, in its simplicity and representability of geographical clusters. Unlike the previous model, this one differs by the fundamental postulate that two main cultural dimensions are sufficient to explain the entire cultural spectrum of societies (Minkov, 2017; Minkov & Kaasa, 2022). These two dimensions are *Individualism-collectivism* and *Flexibility-Monumentalism.*

Concerns about the replicability in the real life of individuals

This cross-cultural model emerged from Minkov's work and was based on Hofstede's cultural dimensions. The underlying reason behind that work was that criticism was abundant regarding Hofstede's work. According to Minkov, cultural dimensions lack serious replicability in the real life of individuals (Minkov, 2017).

For instance, the dimensions of Masculinism Vs. Feminism and uncertainty avoidance were studied, and the outcome was that the replicability of both models was not assured, and some values were overlapping each other, creating further confusion and thus suggesting that they are problematic dimensions (Merritt, 2000; Minkov, 2017).

Hence, Minkov initiated a study where replicability was at the center. To process such studies, he investigated every single dimension of Hofstede's model. The outcome claims that some values were unreplicable or redundant (Minkov, 2017; Minkov & Kaasa, 2022). For instance, the reliability and independence of the power distance dimension from individualism-collectivism could not be established (Minkov, 2017). Another example is the correlation between Uncertainty Avoidance and its values of *societal anxiety* and *societal preferences for strict rules.* It was asserted, but only in European Countries. The replicability was not found trustworthy for Asian countries (Minkov, 2017).

Finally, the cultural dimension of masculinity vs. feminity predictive properties could not be asserted as it is more an artifact of an antecedent viewpoint (Minkov, 2017). A notable element to pinpoint is that Minkov makes no mention of the last cultural dimension of Indulgence Vs. Restraint. Hence, the remaining dimensions are *individualism vs. collectivism* and *long-term vs. short* term dimension, renamed here as *flexibility vs. monumentalism* (Minkov, 2017).

Individualist-Collectivist

The individualistic vs collectivist cultural dimension represents the integration of individuals into the social group and society (Hofstede, 2011). Such cultural dimensions embed values such as *the high importance of family, group interest,* and *emotional dependence* in collectivist societies, while on the other pole of individualistic societies, we find values such as *personal interest, independence,* and *inner-directedness* (Kaasa, 2021).

Flexibility-Monumentalism

In the meantime, the flexibility vs monumentalism dimension reflects the way a society deals with self-regard, self-enhancement, and self-stability in the face of change (Minkov & Kaasa, 2022). The difference between the former long-term orientation and the flexibility-monumentalism cultural dimension is that the lattest cultural dimension methodology is not

based on the Confucian dynamism methodology criticized by Fang (2003) but on the World Value Survey (Minkov & Kaasa, 2022).

Under the flexibility cultural dimension, former long-term orientation, societies tend to thrift gratification, adopt flexible and adaptable behavior under different situations, advocate self-sufficiency, and hide positive feelings, such as self-esteem and pride, with a strong focus on self-improvement (Minkov, 2017; Minkov & Kaasa, 2022).

In opposition to a flexible society, the monumentalism cultural dimension, former short-term orientation, tends to prioritize immediate gratification, adopt a consistent behavior under different situations, develop strong networks of interdependent individuals, and embrace positive feelings such as self-esteem and pride with a focus on self-contentedness (Minkov, 2017; Minkov & Kaasa, 2022).

Geographical representation

According to Minkov & Kaasa (2022), the central insight is that *"this model has a close analog in dimensions of behaviors measured across the world countries"* (see **Figure 3)**. Hence, unlike the previous models, the Minkov-Hofstede model can show, with better ease, the high replicability of real-world phenomena, such as the Confucian culture of Eastern Asia (yellow), Western culture (blue tones), or the Arab world (green) through the geographical proximity (Minkov & Kaasa, 2022).

The geographical proximity is insightful as it helps to understand the development of human culture in a region. To illustrate that, the distinction of Eastern Asia in the graph highlights the cultural distinction of the Confucian philosophy, and it is the only cultural map to provide such insight (Minkov, 2017).

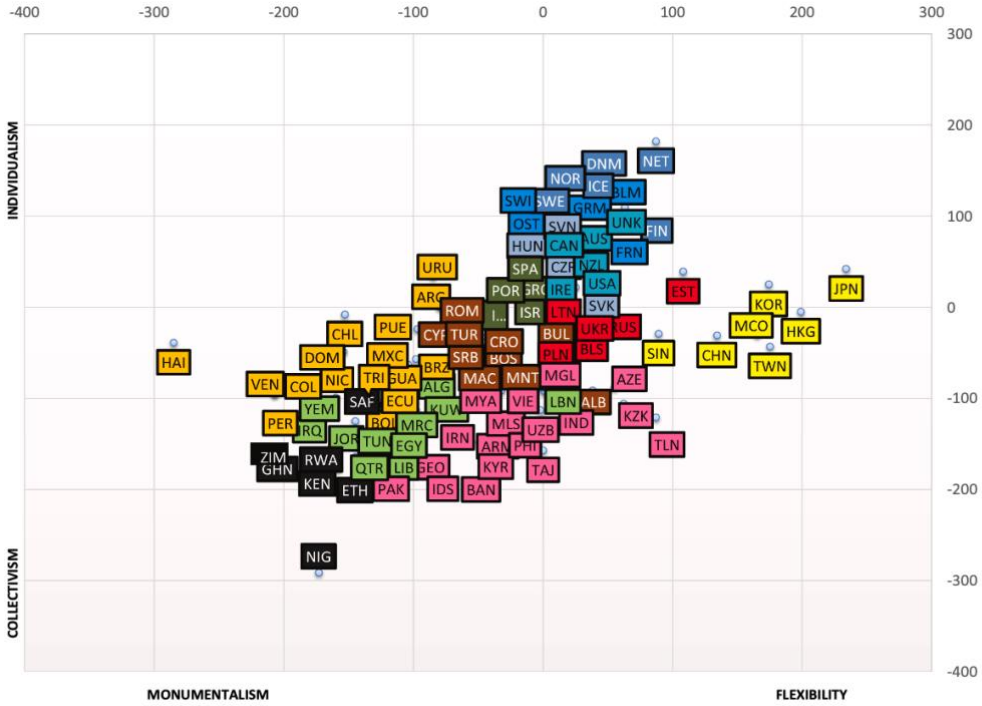

Fig. 1. A Cultural Map of the World: Monumentalism-Flexibility (Horizontal Axis) versus Individualism-Collectivism (Vertical Axis)

Figure 3: A Cultural map of the world: Monumentalism-Flexibility (Horizontal Axis) versus Individualism-Collectivism (Vertical Axis)
Source: Minkov & Kaasa (2022)

In 2022, Minkov and Kaasa decided to review this initial study and pushed the research with another 47 countries to enrich the database. The outcome was similar, and the model was reinforced. Overall, the model appears to be insightful for the research question. It fixed the criticism made to Hofstede about the flawed methodology (Fang, 2003), the geographical representation of the cluster is replicable (Minkov, 2017; Minkov & Kaasa, 2022), the cultural dimensions do not overlap with each other (Minkov, 2017) and sufficient data is available to process the analysis.

The model offers potential valuable insights for the analysis of cross-cultural dynamics and social norms and, therefore, will be taken as the fundamental framework to answer the research question of this paper.

Chapter 3 The role of culture in shaping economic model

Hence, we have seen that the cultural dimension is a subjective framework of human characteristics that aims at understanding objective phenomena (Hofstede, 2011). However, how does this translate to the circular economy?

In this section, we will explore what the literature states about the link between cultural dimensions and circular economy. The purpose of that section is to draw a vision of the current state of the scientific literature and identify potential gaps.

In the paper "*The dimension of green economy: Culture viewpoint*" (Lee et al., 2022), the relationship between Hofstede's cultural dimension and the green economy is investigated. The study suggests that cultural dimensions of Individualism, long-term orientation, and uncertainty avoidance have a positive impact, while the cultural dimensions of power distance, masculinity, and indulgence have a negative influence on the green economy (Lee et al., 2022).

The positive impact of individualism can be attributed to the adoption of environmentally friendly behaviors and support for green initiatives, which align with the values of personal freedom and independence (Lee et al., 2022). The influence of uncertainty avoidance can be explained by the promotion and adoption of green practices aimed at mitigating environmental uncertainty, which is connected to the risk aversion characteristic of this cultural dimension (Lee et al., 2022). Lastly, a long-term orientation fosters a focus on sustainable resource development and conservation, as societies with this orientation tend to be more future-oriented (Lee et al., 2022).

Meanwhile, the negative impact of power distance may be asserted by hierarchical structures of social groups, which may hinder the implementation of new sustainable policies (Lee et al., 2022). Due to the values of competitiveness and assertiveness of masculine cultures, economic growth might be prioritized over environmental concerns (Lee et al., 2022). Finally, the indulgent culture, which prioritizes immediate pleasure, might be less inclined to support green initiatives as they are immediately constraining (Lee et al., 2022).

However, when diving into specific segments of green economy, such as corporate social responsibility proliferation, the relationship seems to change direction (Halkos & Skouloudis, 2017). For instance, while uncertainty avoidance had a positive impact under green economy

settings (Lee et al., 2022), under CSR settings, uncertainty avoidance had a negative impact (Halkos & Skouloudis, 2017). This inversion phenomenon is also observed in the indulgence versus restraints cultural dimension, and the impact of power distance, individualism, and masculinity cultural dimensions seems to be insignificant (Halkos & Skouloudis, 2017).

Hence, the relationship between cultural dimensions and sustainable development, to a large extent, is complex and not well understood (Graafland & Noorderhaven, 2018). However, the cultural dimensions of individualism and long-term orientation seem to hold consistent results of significant influence (Graafland & Noorderhaven, 2018; Lee et al., 2022; Sedita et al., 2022). This consistency of cultural dimensions comforts Minkov's prediction about the confusion and overlapping influence of cultural dimensions among each other (Minkov, 2017; Minkov & Kaasa, 2022).

Regarding the influences of cultural dimensions on the circular economy, Some authors have investigated specific indicators, such as waste management and recycling (Halkos & Petrou, 2019). However, the literature remains limited, and research needs to be conducted on the influence of culture on the circular economy (Beaurain et al., 2023).

Beaurain et al. (2023) conducted a considerable analysis of the cultural dimension of the circular economy and provided a literature review. The outcome of the literature review indicates that the circular economy faces a strong technocentric bias (Beaurain et al., 2023; Corvellec et al., 2022). It is mainly focusing on the technical and environmental aspects, often neglecting the cultural aspect (Beaurain et al., 2023). This negligence undermines the effectiveness of the circular economy, as public policies do not sufficiently address culture and values (Beaurain et al., 2023).

Indeed, the circular economy is a broad concept, and its measurability is not commonly acknowledged at the international level. However, the European Union provides a clear framework of indicators that help measure the circular economy, the "*Circular Economy Indicators"* (CEI), initiated by the European Commission (Eurostat, 2024).

This indicator provides information on the performance of countries of the European Union. Such indicators are divided into 5 categories: Production and consumption, waste management, secondary raw materials, competitiveness and innovation, and global sustainability (Eurostat,

2024). To better understand the relationship between cultural dimensions and circular economy, we shall dive into relationships based on these indicators.

Therefore, there seems to be a gap in the literature regarding the influences of cultural dimensions on the circular economy, particularly in how these cultural aspects interact with the indicators of production and consumption, waste management, secondary raw materials, competitiveness, and innovation under the scope of the circular economy indicators of the European Commission.

As the cultural dimensions of masculinity, uncertainty avoidance, indulgence, and power distance, tend to show inconsistency in results, the research will only focus on the cultural dimensions of individualism-collectivism and flexibility-monumentalism theorized in the Minkov-Hofstede model by Minkov (2017).

The following research questions will be explored to investigate the research gap.

RQ 1: **How strong is the relationship between the circular economy indicators and the individualist-collectivist and flexibility-monumentalism cultural dimensions from the Minkov-Hofstede model?**

RQ 2: **What is the underlying mechanism behind the influence on the circular economy of the individualist-collectivist and flexibility-monumentalism cultural dimensions from the Minkov-Hofstede model?**

Chapter 4. Methodology and Data:

The purpose of this research paper is to explore the potential link between the circular economy and the cultural dimensions of the Minkov-Hofstede model. To do so, we have dived into the circular economy, the cultural dimensions, and the potential links that can exist between each other. We found that while the cultural dimensions were studied in the broad field of industrial ecology and sustainability, no research was conducted on specific circular economy indicators (Beaurain et al., 2023).

We also found that the literature does not seem to agree on the influence of cultural dimensions on sustainable practices, as previous studies have found contradictory findings (Graafland & Noorderhaven, 2018; Lee et al., 2022; Sedita et al., 2022). These reasons could be explained by overlapping cultural dimensions (Minkov, 2017) or by the vast field of research within industrial ecology.

We have indicated that the cultural dimension used in this paper will be the Minkov-Hofstede model as it answers the criticisms made on the original cultural dimensions model made by Hofstede. We have also highlighted that in order to investigate the circular economy, specific metrics had to be selected, and the selected metrics were from the *circular economy indicator* dataset from Eurostat. The dataset provides metrics only for countries of the European Union. Thus, the forthcoming analysis will be conducted only for countries members of the European Union.

To answer the research questions mentioned previously, the approach adopted for the research will be a quantitative methodology as the data is extracted from Eurostat, which is considered a secondary source. The purpose of that approach is to identify indicators that show statistical strength and relevance through a Pearson correlation table. Once identified, an analysis will be conducted to understand the underlying mechanism better, as the Pearson correlation displays correlation but not causality (Armstrong, 2019).

4.1 Methodology

This section outlines the approach used to investigate potential linkages between circular economy practices and cultural dimensions. To achieve this, we will employ a three-step process:

1. **Correlation Analysis:** We will begin by constructing a correlation matrix. The method used will be the Pearson correlation analysis. This matrix will display the correlation strength and significance between the individualist-collectivist and flexibility-monumentalism cultural dimensions and the indicators associated with the circular economy, as derived from the Eurostat datasets. The correlation analysis will be conducted on Excel and will serve as an initial exploration, identifying potential relationships between these variables.

2. **Temporal analysis:** Due to the significant influence that COVID-19 had on the global economy, it is essential to take into account the event and identify if it revealed any impact on the correlation strength between the cultural dimensions and the circular economy indicators. As some metric outcomes can change rapidly over time, the levels of infrequency can have a significant impact on the analysis (Hannan & Tuma, 1979).

   Thus, to do so, the correlation analysis will be investigated in a time series ranging from 2012 to 2021 on the selected indicators in the previous section. The time series design is commonly used for macro-sociological research (Hannan & Tuma, 1979). If any significant shift of correlation is observed, it shall be investigated.

3. **Discussion and literature review:** to understand the potential relationship and underlying mechanism between the circular economy and cultural dimensions, a literature review will be done to provide a better understanding of the correlations identified. Nevertheless, it is essential to highlight that while a correlation asserts a relationship between two variables, it does not necessarily imply causality (Armstrong, 2019).

This three-step process allows us to systematically identify the most promising circular economy indicators for further investigation, ultimately leading to a more focused and informative analysis of the relationship between circular economy and culture.

4.2 Sample & Data

4.2.1 Data collection process

To address the research question, two datasets were needed: one detailing performance indicators of the circular economy and another providing scores from the Minkov-Hofstede cultural dimension model.

The search for the circular economy dataset involved several approaches. Initially, a search was conducted on the Ellen MacArthur Foundation's website, where a dataset called Circulitics was identified. However, access to this dataset was not granted due to time constraints imposed by the foundation. Subsequently, a broader search was performed on Google Dataset. After evaluating various datasets, only one viable option remained: the Circular Economy Indicator dataset from Eurostat. Other datasets were either too niche or expensive, while Eurostat provided clear, coherent, credible, and readily accessible data suitable for the analysis.

Regarding the data for the Minkov-Hofstede model, it was extracted in the paper from Minkov and Kaasa (2022) "*Do dimensions of culture exist objectively? A validation of the revised Minkov-Hofstede model of culture with World Values Survey items and scores from 102 countries*". This paper offers a well-validated set of cultural dimension scores, giving us confidence in the reliability and relevance of the data we're using.

4.2.2 Dependent variables: Circular economy indicators

The data regarding the circular economy indicators were collected on Eurostat. The Europeans Green Deal (COM/2019/640) dedicated an entire section to monitoring the circular economy, revised in 2023. This dataset comprises 22 indicators in 5 categories: production and consumption, waste management, secondary raw material, competitiveness and innovation, and global sustainability and resilience. The data range from years as early as 2000 up to 2023. However, the data range could be more consistent over the years, as some indicators are annual, others are bi-annual, and some start as early as 2000, while others only begin after 2012. Hence, each circular economy indicator has entries ranging from 240 observations up to 300 observations.

The European Green Deal's Circular Economy Monitoring Framework offers several advantages for this research. First, it provides a centralized and readily accessible data source. Second, the framework employs a consistent set of indicators directly relevant to circular

economy performance. Furthermore, it encompasses data for all 27 European Union member states, enabling a comprehensive analysis. Finally, the extended timeframe, with data reaching back to 2000, facilitates longitudinal studies of circular economy performance across the European Union.

4.2.3 Independent variable: Minkov-Hofstede model dataset

After the establishment of initial datasets from Eurostat concerning the circular economy, it is imperative to develop a dataset encompassing the cultural dimension scores delineated by the Minkov-Hofstede model.

As a matter of recall, the Minkov-Hofstede model is composed of only two cultural dimensions: *Individualism-collectivism and Flexibility-monumentalism* (Minkov & Kaasa, 2022). These cultural dimensions are resumed as follows by Minkov and Kaasa, 2022:

Individualism	**Collectivism**
Considerable individual freedom and protection of individual rights	Strict rules of behavior and no deviation from collective norms
Sexual freedom, preclusion of corruption, and privileges	Deviation from heterosexuality banned, promotion of nepotism and privileges of powerful people
Autonomous thinking	Collective thinking
Challenging conventional ideas	Impededness of innovation is considered outside of the traditional box
Higher innovation rate (Bukowski & Rudnicki, 2019)	Lower innovation rate (Bukowski & Rudnicki, 2019)
Score > 0	Score < 0

Flexibility	**Monumentalism**
Prioritize thrift with delay of gratification	Deemphasize thrift with instant gratification
Advocate self-sufficiency	Creation of networks of economically interdependent individuals
Flexible and adaptable behavior across different situations	Consistent behavior across different situations
Depression of positive feelings such as self-esteem and pride with a focus on self-improvement	Encouragement of positive feelings such as self-esteem and pride with a focus on self-contentedness
Score > 0	Score < 0

Hence, the data collected from the Minkov-Hofstede cultural dimension model represents the score for the 27 member states of the European Union. Nonetheless, some countries have to be excluded from the analysis as the Minkov-Hofstede model of cultural dimensions does not display any score at the current status of research. These countries include Latvia, Luxembourg, and Malta. This exclusion ensures that our analysis is based on complete and comparable data sets, thereby maintaining the integrity and validity of our findings.

The score of individualism-collectivism and flexibility-monumentalism derived from the Minkov-Hofstede model is presented as follows (see **Figure 4**):

	Ind-Col	Flex-Mon		Ind-Col	Flex-Mon
Belgium	110	63	Cyprus	-24	-97
Bulgaria	-6	19	Lithuania	15	10
Czechia	70	17	Hungary	72	-9
Denmark	140	51	Netherlands	182	87
Germany	102	46	Austria	95	-2
Estonia	39	108	Poland	-15	9
Ireland	27	17	Portugal	30	-24
Greece	30	17	Romania	-19	-64
Spain	58	2	Slovenia	110	15
France	86	57	Slovakia	22	25
Croatia	-33	-32	Finland	88	71
Italy	5	-36	Sweden	133	21

Figure 4: Cultural scores in Individualism-Collectivism
and Flexibility Monumentalism for European countries
Source: Minkov & Kaasa (2022)

4.3 Data refinement

Given the presence of overlapping and confusing circular economy indicators, coupled with a lack of sufficient data for others, and to enhance data interpretability, the dataset will necessitate further refinement. The data sets extracted from Eurostat (2024) were initially presented as follows in **Figure 5**.

To improve the analysis, we might consider transforming the data to a per capita level instead of using country-level data. This is because the indicator scores vary significantly between countries, even within the same cultural cluster. Analyzing the data per capita would allow for a more meaningful comparison, the dataset will integrate the following indicators for the analysis of this paper:

Figure 5: Circular Economy Indicators

Source : Eurostat (2024)

Patents related to recycling and secondary raw materials per capita

Initially, patent data related to waste management and recycling was considered. However, this metric proved unsuitable because it simply reflected the total number of patents filed per country, not innovation capacity per capita. Since Germany has a significantly larger population than Portugal, a direct comparison would not be meaningful due to the inherent bias towards countries with more people.

To address this issue and assess the innovative capacity of individual countries, the data was reworked. This involved dividing the total number of recycling and raw material patents by the national population, effectively creating a "patents per capita" score.

Therefore, this metric now reflects the relative intensity of innovation in waste management and recycling technologies on a per-person basis. A higher score implies a greater capability for innovation in a country on a personal basis. This approach allows for a more balanced comparison between countries with different population sizes.

Private investment and gross added value related to the circular economy sector (CE Invest&GVA) per capita.

The initially proposed indicator, "Private investment & gross added value related to the circular economy sector," required refinement. While it captured the total investment and gross value added within a country, this approach hindered comparability across nations. The reason lies in a size bias, where countries with larger populations inherently have higher total values. This skewed the results, making direct comparisons misleading.

To address this limitation and facilitate meaningful comparisons, the indicator was reworked. The total investment and gross value added (GVA) figures were divided by each country's population. This transformation provides a per capita measure, effectively normalizing the data for population size.

Therefore, this revised indicator now reflects the average level of investment and GVA per person associated with the circular economy sector. Countries with higher per capita values can be inferred to have a greater overall investment in the circular economy, suggesting more developed circular economic structure.

Percentage of Working population employed in the circular economy sector

The initial metric, "persons employed in the circular economy," also faced limitations. While it offered a raw count of people working in this sector, it suffered from the same size bias as previous indicators. This means countries with larger populations naturally have higher total employment figures, making direct comparisons irrelevant.

To overcome this hurdle and enable meaningful analysis, the data was reworked. The total number of people employed in the circular economy sector was divided by each country's total labor force. This transformation provides a share of the workforce metric, effectively normalizing the data for population size. Therefore, this revised indicator now reflects the proportion of a country's workforce directly involved in the circular economy. Countries with a higher share of their workforce employed in this sector can be interpreted as being better positioned for circular economy implementation. This suggests a more established infrastructure and a larger pool of skilled workers in this domain.

Trade in recyclable raw material per capita

While the original “Trade in recyclable raw material” indicator evaluates the overall tonnage trade value of recycled material for European Union countries (Eurostat, 2024), it is currently assessed only at the country level, introducing a size bias. To address this bias and enhance the dataset's coherence, the indicator needs to be revised to improve comparability between countries. Therefore, it was decided to adjust the indicator to a “per capita” level. This adjustment involved dividing the trade in recyclable raw material score by each country's population.

Indicator selection

Finally, after the refinement and modification work on the indicators, some indicators have to be pulled away from the analysis. The selection of circular economy indicators was based on their relevance, data availability, and consistency. Indicators such as the generation of waste excluding major mineral wastes and the recycling rate of municipal waste excluding major mineral wastes were excluded due to their overlapping nature, which could introduce redundancy in the analysis. Additionally, the food waste indicator was removed due to insufficient data, while indicators such as the contribution of recycled materials to raw materials demand and EU self-sufficiency for raw materials were deemed irrelevant to the core analysis.

4.4 Limitations

As a matter of transparency, the limits of the methodology must be acknowledged. Highlighting the limitations helps to clarify the boundaries of the research and it ensures that the findings are interpreted accurately to their context.

Homogeneity of European countries and aggregation of external influence

First is the limited geographic scope of the dataset. The dataset is composed exclusively of countries of the European Union. While the experienced reality can vary from one country to another, it is commonly agreed that to belong to the European Union, countries have to reach a certain standard of living, whether economic, democratic, or social.

Hence, the European Union guarantees a high standard of living, especially within the scope of the European Union. It also guarantees stable institutions and democracy, the right to law, human rights respect, protection of minorities, a functioning market economy, and efficient administrations and institutions (EurLex, 2024).

Such preliminary conditions common to all European Union countries can interfere with the correlation relationship as the external factors influencing the relationship could be aggregated under European influence.

Western cultural cluster focus

The scope of the analysis focuses on countries that belong to the Western cultural cluster (Minkov & Kaasa, 2022). Therefore, the Minkov-Hofstede cultural model displays scores of countries from a similar cluster and there are no major differences in scores in the dataset. To illustrate that, in the Minkov-Hofstede model, European countries tend to have positive scores in individualism and flexibility cultural dimensions.

There are entire panels of countries that show drastically different scores, such as the sub-Saharan countries, Latin America, and the Arab world (Minkov, 2017; Minkov-Kaasa, 2022). Such aggregated scores of Western culture inhibit the investigation of the underlying mechanism as the entire spectrum of cultural dimensions is not present in our dataset.

It is also important to acknowledge that the cultural dimension models were designed by authors of Western cultural origins. While the authors were aware of the biases induced by their cultural backgrounds, it is crucial to understand that the cultural dimension model is still a vision of the world seen by Westerners.

Correlation and Causality

Finally, it is crucial to highlight that while a correlation establishes a relationship between two variables, the relationship does not necessarily induce causality (Armstrong, 2019). Therefore, it is important to highlight in the results that there could be associations between the variables. However, it shouldn't be interpreted as causal relationships. To determine causality, it requires further research and analysis beyond correlation.

Chapter 5. Results & Analysis

In the upcoming section, we will present our results. To ensure consistency in the analysis, only results showing at least a moderate correlation ($r > 0.500$ or $r < -0.500$) with p-values < 0.05 will be investigated further. However, if the results show a correlation close to the threshold of $r = 0.500$, under the condition that it falls under a 10% tolerance margin, they will still be included in the analysis as long as the p-value $< 0,05$. This approach will allow the inclusion of correlations that are close to the threshold and likely to offer valuable information.

Afterward, we'll dive into the results interpretation of the potential correlation that can exist between circular economy and cultural dimensions.

5.1 Correlation table analysis results.

Variable	Individualism – Collectivism	Flexibility – Monumentalism
Production and consumption		
1. RP	**0,476***	0,185*
2. MF	0,039*	0,134****
3. WGPC	0,086*	0,380*
4. GPWPC	0,319*	0,361*
5. GPaWPC	0,423*	0,380*
6. GMWPC	0,413*	0,119*
Waste management		
7. WEEE-RR	-0,172*	-0,095*
8. RRPW	0,405***	0,328*
9. RRMW	**0,637***	0,423*
Secondary raw material		
10. CMUR	**0,551***	**0,539****
11. TRRM	0,406*	0,133*
Competitiveness and innovation		
12. Patents-RR&SRM	**0,467***	0,405*
13. PI&GAV-CES	**0,598***	0,351*
14. WPECES	**-0,481***	-0,234*
Global sustainability and resilience		
15. GHG-PA	0,285*	**0,490***
16. CF	-0,144*	-0,042*

p-value two tail: * p < .001 **p < 0.05 *** p < .15 **** > p > .20

Figure 6: Correlation table results

5.1.1 Individualism - Collectivism

5.1.1.1 Production and consumption

Overall, the results display various correlation strengths but with a common strong statistical significance as $p < 0.001$.

- Material Footprint (MF) and waste generation per capita (WGPC) have almost null correlation as r (MF) = 0.039 and r (WGPC) = 0.086.

- The generation of plastic (GPWPC), packaging (GPaWPC), and municipal (GMWPC) wastes displays a stronger correlation, with r (GPWPC) = 0.319, r (GPaWPC) = 0.423, and r (GMWPC) = 0.413.

- Resource productivity (RP) shows a correlation of r (RP) = 0.476. While this indicator does not fit under our threshold of r = 0.500, it still falls under the 10% tolerance margin. Thus, it will be kept for further investigation.

5.1.1.2 Waste Management

- The recycling rate of waste of electrical and electronic equipment (WEEE-RR) shows a weak negative correlation r (WEEE-RR) = -0.172 with a strong statistical significance as $p < 0.001$.

- The recycling rate of plastic waste (RRPW) displays a moderate positive correlation as r (RRPW) = 0.405. However, the statistical significance is weaker as $p < 0.15$.

- The recycling rate of municipal waste (RRMW) shows a strong correlation as r (RRMW) = 0.637 with $p < 0.001$. Such a strong correlation requires further investigation to understand better the relationship between individualism and the recycling rate of municipal waste.

5.1.1.3 Secondary raw material

- The indicator of trade in recycled raw material (TRRM) has an overall moderate correlation r (TRRM) = 0.406 with a strong statistical significance as $p < 0.001$.

- The circular material use rate (CMUR) displays a strong correlation r (CMUR) = 0.551 with strong statistical significance as $p < 0.001$. The indicator falls under the threshold conditions, the relationship between individualism and the circular material use rate shall be explored for better understanding.

5.1.1.4 Competitiveness and Innovation

This section is the most promising as the entire section displays significant correlation with strong statistical significance in each indicator.

- The patents related to recycling and secondary raw materials (Patents-RR&SRM) have a correlation of r (Patents-RR&SRM) = 0,467 and $p < 0.001$. While it does not respond to the initial threshold of r = 0.500, it still falls under the tolerance margin of 10% and $p < 0.05$. Hence, the relationship with individualism will be studied.

- The private investment and gross added value in the circular economy (PI&GAV-CES) sector also display a strong correlation as r (PI&GAV-CES) = 0.598 with $p < 0.001$. As it falls under the condition of the threshold, it will be investigated further.

- The working population employed in the circular economy indicator (WPECES) has a negative correlation of r (WPECES) = -0.481 with $p < 0.001$. It does not directly fall under the threshold condition. However, as it still respects the tolerance margin of 10% with $p < 0.05$, it will be kept for further investigation.

5.1.1.5 Global sustainability and resilience

The results in that section do not yield any significant correlation scores.

- Greenhouse gas emissions from production activities (GHG-PA) have a weak correlation as r (GHG-PA) = 0.285 with $p < 0.001$.

- Consumption footprint (CF) has a negative, weak correlation score of r (CF) = -0.144 with $p < 0.001$.

5.1.1.6 Overall results of the relationship with individualism-collectivism

In conclusion, the results of the relationship between individualism and circular economy indicators seem to vary depending on the category asserted. For instance, the production and

consumption and waste management categories seem to have mixed results depending on the indicator. On the other hand, the secondary raw material category and the competitiveness and innovation category tend to display a clear relationship with individualism, as most of the scores in these relationships show a strong correlation. Finally, global sustainability and resilience do not seem to hold any relationship with individualism, as all the correlations remain weak overall.

5.1.2 Flexibility – Monumentalism

5.1.2.1 Production and Consumption

The results of the relationship between the production and consumption indicators and the flexibility cultural dimension show correlation scores that can be considered weak or very weak.

- The resource productivity (RP), the material footprint (MF), and the generation of municipal waste per capita (GMWPC) commonly show very weak correlation as the scores are respectively r (RP) = 0.185, r (MF) = 0.134, and r (GMWPC) = 0.119. It is important to notice that while RP and GMWPC have strong statistical significance as $p < 0.001$, MF has a very weak statistical significance as $p > 0.20$.

5.1.2.2 Waste Management

The relationship between waste management and flexibility has varying results, ranging from a very weak correlation to a moderate correlation.

- The recycling rate of waste of electrical and electronic equipment (WEEE-RR) relationship is considered as very weak as r (WEEE-RR) = -0.095 with $p < 0.001$.
- The recycling rate of plastic waste (RRPW) has a weak correlation as r (RRPW) = 0.328 with $p < 0.001$.
- The recycling rate of municipal waste (RRMW) has a score that implies a moderate correlation as r (RRMW) = 0.423 with $p < 0.001$.

5.1.2.3 Secondary raw material

The results in this section show correlation scores that have significantly different strength intensities.

- Trade in recycled raw material (TRRM) shows a weak correlation as r (TRRM) = 0.133 with $p < 0.001$.
- The circular material use rate (CMUR) relation with individualism shows promising scores as r (CMUR) = 0.539 with $p < 0.05$. As CMUR respects the conditions of the threshold for further analysis, this indicator relationship with the flexibility relationship will be investigated.

5.1.2.4 Competitiveness and Innovation

In this section, the correlation among indicators seems to range from weak to moderate relationships.

- The patents related to recycling and secondary raw materials (Patents-RR-SRM) has a moderate correlation as r (Patents-RR-SRM) = 0.405 with $p < 0.001$.
- The private investment and gross added values in the circular economy sector (PI&GAV-CES) and the working population employed in the circular economy sector (WPECES) both have weak correlations with the flexibility cultural dimensions as r (PI&GAV-CES) = 0.351 and r (WPECES) = -0.234 with $p < 0.001$ for both indicators.

5.1.2.5 Global sustainability and resilience

The results hereby show the opposite correlation of strength intensity.

- The consumption footprint (CF) has a very weak correlation as r (CF) = -0.042 with $p < 0.001$.
- Greenhouse gases emissions from production activities (GHG-PA) indicators seem to display a far stronger correlation as r (GHG-PA) = 0.490 with $p < 0.001$. Hence, the GHG-PA indicator does not fall under the threshold condition. However, as the correlation is still in the tolerance margin of 10% with $p < 0.05$, the relationship of the GHG-PA indicators with the flexibility cultural dimension shall be investigated further.

5.1.2.6 Overall results of the relationship with flexibility-monumentalism

The results of the relationship between circular economy indicators and the flexibility-monumentalism cultural dimension seem to vary from one indicator to another. However, a

global tendency of weak correlation is observed. However, as some indicators are sufficiently moderate, they warrant further investigation.

5.2 Discussion

In this section, we shall investigate the relationships that revealed significant correlation scores by analysing the correlation timeline trendline and finding an explanation through a literature review.

5.2.1 Individualism-collectivism cultural dimension relationship

5.2.1.1 Resource Productivity

Results

Our findings reveal a significant positive correlation ($r = 0.476$) with strong statistical significance (p-value < 0.001) between resource productivity and the individualism cultural dimension. This suggests that societies characterized by high individualism exhibit greater resource productivity, potentially translating into better economic output from raw materials.

Timeline

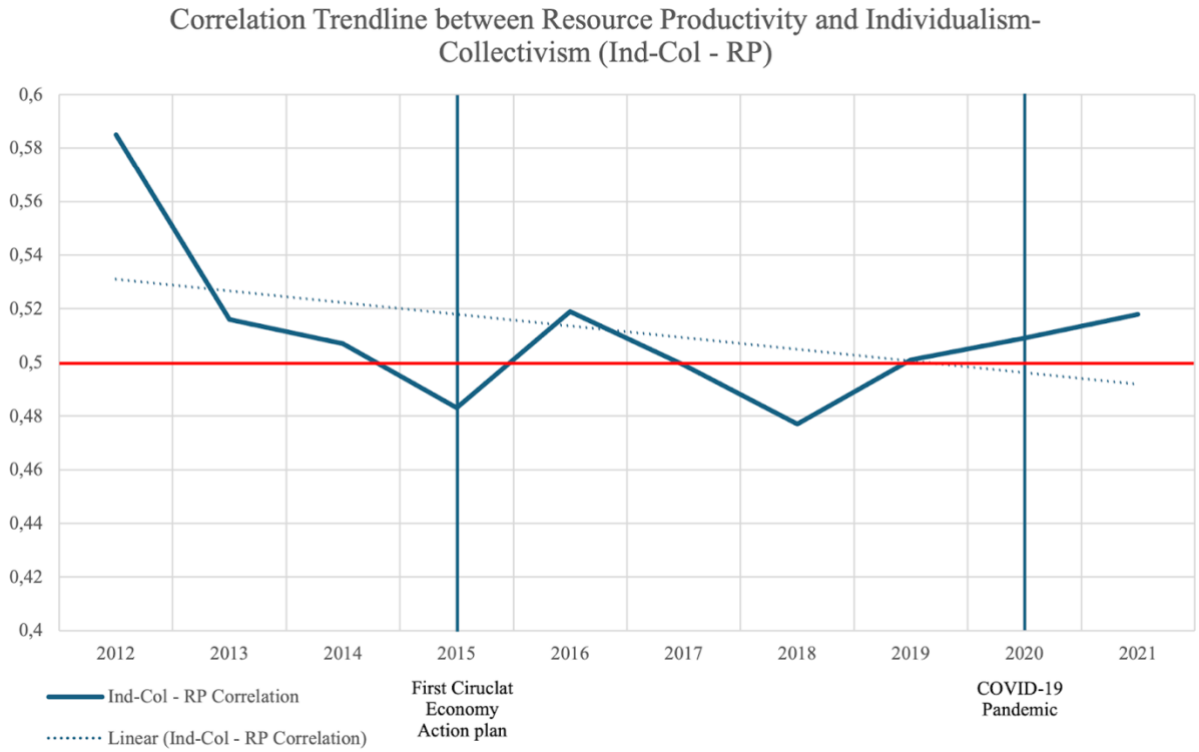

Figure 7: Correlation Trendline between Resource Productivity and Individualism - Collectivism (Ind-Col - RP)

Overall, the correlation trend between resource productivity and the individualist-collectivist cultural dimension seems to show variations over time. However, the variation remained relatively still, as the biggest shift in correlation was under 0.06 points between 2012 and 2013.

Nevertheless, the correlation's overall tendency seems to weaken over the years, as the overall trendline has a negative slope, indicating that the relationship between resource productivity and individualism-collectivism is weakening over time.

Interpretation

The scientific literature tells us that individualism positively impacts resource productivity. The underlying mechanism behind that is due to the social status attached to the cultural dimensions. Individualist societies are more focused on the status of personal achievement, whether social or monetary, which fosters an environment where individuals will be more inclined to productivity and innovation (Gorodnichenko and Roland, 2011).

However, the scientific literature is not unanimous on the influence of individualism as the sole cultural dimension fostering resource productivity. Collectivist cultures tend to be as productive as individualist cultures. What differs is the motivation. While an individualist society will have performance-based incentives, a collectivist society will find its resource productivity leveraged by creating affiliation and tying close relationships with stakeholders (Thiessen, 1997).

It is crucial for countries that want to be more circular to improve resource efficiency to attain sustainable resource management and enhanced resource autonomy (United Nations Environment Programme, 2020). Hence, the managerial implication implies being well aware of the cultural situation of the organization to improve resource productivity. As the European countries have varying scores on the individualist-collectivist cultural dimension, it will imply a subtle mix of performance-based incentives and close social relationships with stakeholders. By doing so, resource extraction will be diminished, and the resource life cycle will be improved if done according to the circular economy principle.

5.2.1.2 Recycling Rate of Municipal Waste (RRMW)

Results

The analysis found a strong positive correlation (r = 0.637) between individualism and recycling rates for municipal waste with a strong statistical significance (p-value < 0.001). This suggests that individualistic cultures might recycle municipal waste at a higher rate. To understand this relationship better, we must dig deeper and see what is driving this connection.

Timeline

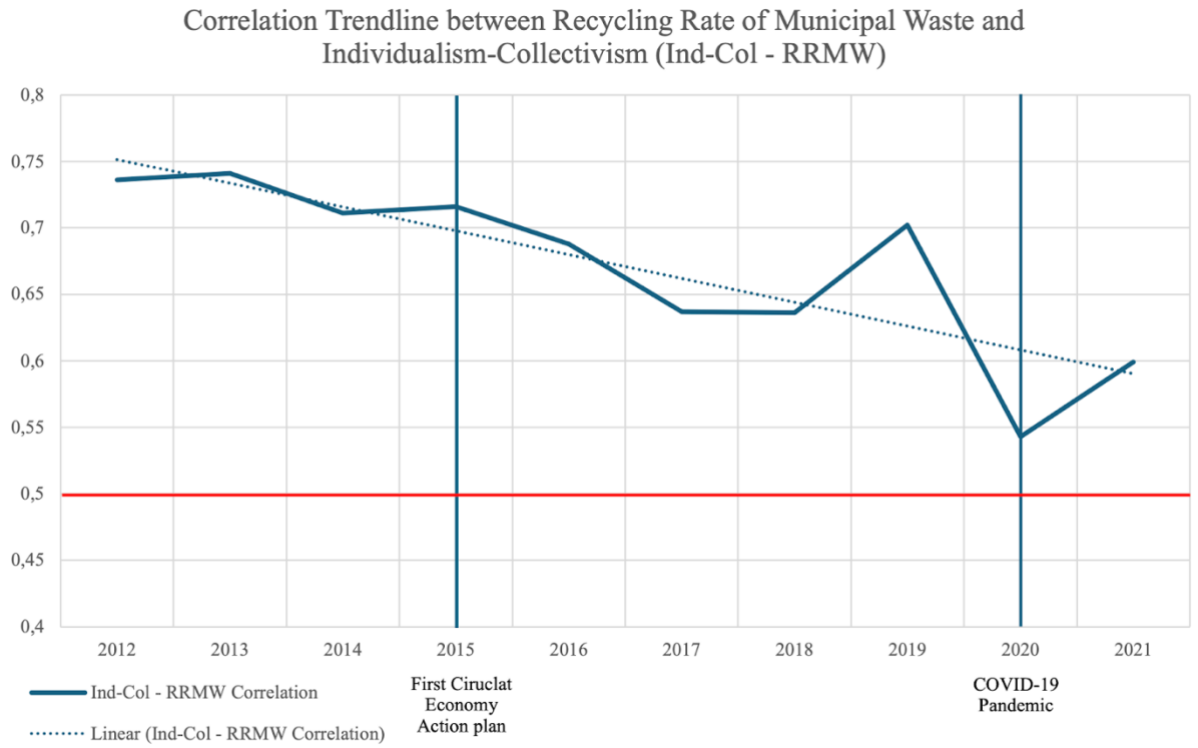

Figure 8: **Correlation Trendline between Recycling Rate of Municipal Waste and Individualism-Collectivism (Ind-Col - RRMW)**

There seems to be a downshifting trend in the correlation strength between the individualist-collectivist cultural dimension and municipal waste recycling rate. The correlation was very high in 2012 (r = 0.740) and is still high in 2021 but with a significant decrease (r = 0.599). Overall, the correlation strength is still strong.

There does not seem to have been any strong impact on the First Circular Economy Action Plan in 2015. However, the COVID-19 pandemic seems to have had an impact on the correlation strength, as the correlation went from r = 0.700 to r = 0.543.

Interpretation

Hence, it can be inferred that there is a positive relationship between individualist cultures and the recycling rate, but is it pure chance or causality? The literature tells us that, indeed, individualism may impact environmental practices, especially recycling practices (Crociata et al., 2015). However, there have to be other factors that interfere with individuals' waste management behaviors.

According to Mintza et al. (2019), social norms and environmental awareness are the key factors accounting for the link between municipal waste recycling rates and individualistic behavior. The case study conducted a comparative analysis of Germany and Japan, both global frontrunners in waste recycling (Mintza et al., 2019). The findings suggest that individualistic norms and values influence personal behavior more than they do in collectivist cultures.

The reason for this is that individualism places a strong focus on social norms like personal autonomy, self-interest, and freedom, which can boost motivation to get involved in issues that matter to people (Crociata et al., 2015). Therefore, in countries with a well-developed sense of environmental awareness and individualistic cultures, citizens may be more likely to take personal action to tackle environmental problems, such as participating in recycling programs or adopting circular economy practices.

The implications of these findings are significant. They indicate that for the successful implementation of circular economy policies in more individualistic countries, it is essential to understand the prevailing social norms. If a country does not consider environmental concerns within its social norms, the effectiveness of such policies will likely be limited.

5.2.1.3 Circular Material Use Rate (CMUR)

Results

The correlation table displays a moderate correlation ($r = 0.551$) with a high statistical significance (p-value < 0.001). This might insinuate that individualistic countries tend to have better circular material use rates. This relationship warrants further investigation to explore the underlying mechanisms and potentially confirm or refute the observed association.

Timeline

There do not seem to have been any strong shifts in correlation strength over the last decade between the circular material use rate and the individualistic-collectivist cultural dimension.

The First Circular Economy Action Plan of 2015 and the COVID-19 pandemic do not seem to have significantly impacted the correlation strength.

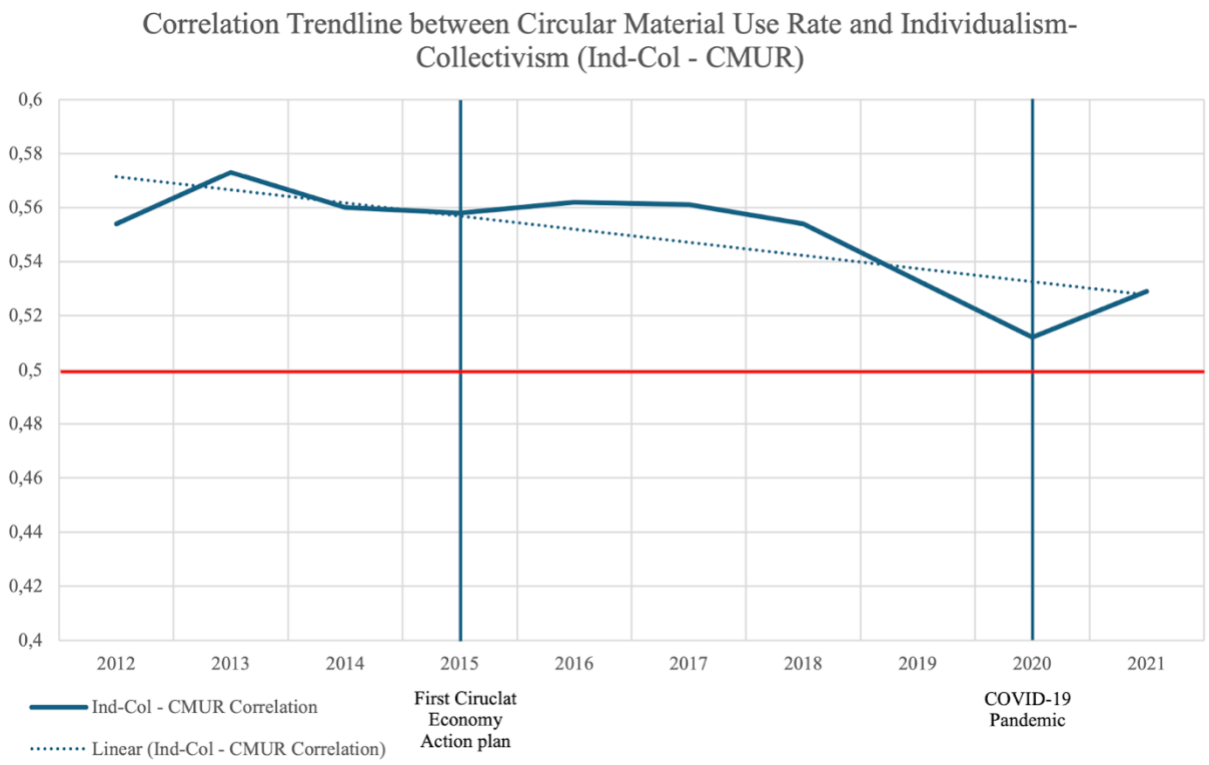

Figure 9: **Correlation Trendline between Circular Material Use Rate and Individualism- Collectivism (Ind-Col - CMUR)**

Interpretation

One of the explanations behind the positive relationship between the circular material use rate and individualism could find its origin in the analysis of Polyportis et al. (2022). It states that in individualist societies, what drives the consumer acceptance of recycled products is the own individual's interests, purposes, experiences, and values rather than social situations, which is a better driver for the collectivist individual's decision-making. Hence, individualism can be leveraged to increase the circular material use rate. However, it is crucial to understand what drives that decision and what experiences, values, and purpose are attached to that decision.

Therefore, the correlation between CMUR and individualism in Europe is positive because of not only the sole individualist cultural dimension but also the experience and values attached to Europeans' environmental awareness.

The triggering event that enabled the environmental awareness of Europeans can be traced back to the 2008 financial crisis. This major event made Europeans more skeptical about financial and environmental institutions which resulted in a greater concern for environmental issues (Halkos et al., 2018). This event, among many others, generated a trickle-down effect for Europeans, reinforcing European legislation for environmental matters and greater social activism for sustainable matters (Halkos et al., 2018), such as the climate strikes in 2019.

In conclusion, individualism clearly correlates to the circular material use rate. However, the perception of the risks associated with global warming and environmental awareness are *sine qua non* conditions as these factors shape individual experiences, values, interests, and purposes, which are crucial for the individualist cultural dimension.

5.2.1.4 Patents Related to Recycling and Secondary Raw Material (Patents-RR&SRM)

Results

The correlation table revealed a correlation coefficient of $r = 0.467$ (p-value < 0.001) between Patents-RR&SRM and the individualistic-collectivist cultural dimension. While this correlation falls outside the threshold for in-depth examination based on our predefined criteria due to its weakness, it still falls under the tolerance margin. To explain such correlation scores, it is important to consider the potential impact of COVID-19 on this relationship.

Preliminary analyses using data from previous years consistently demonstrated a stronger correlation between PI&GAV-CES and the variable of interest, meeting the criteria for further investigation. Given the disruptive influence of COVID-19, it is assumed that the pandemic might have temporarily weakened the correlation observed in the current data set. Therefore, it has been decided to include PI&GAV-CES in the broader analysis. This will allow us to assess the potential influence of COVID-19 on the relationship.

Timeline

The correlation strength between the individualist-collectivist cultural dimension and patents related to recycling and secondary raw material Indicators shows high variability. The correlation strength varies from r = 0.328 in 2015 to an all-time high in 2019, where r = 0.662.

The first circular economy action plan in 2015 seemed to have a strong impact on the indicators as the correlation strength shifted significantly downward to reach an all-time low, from r = 0.544 in 2013 to r = 0.328 in 2015. However, after implementing the action plan, the trend went upward consistently to reach its highest point in 2019, where the correlation strength was at r = 0.662.

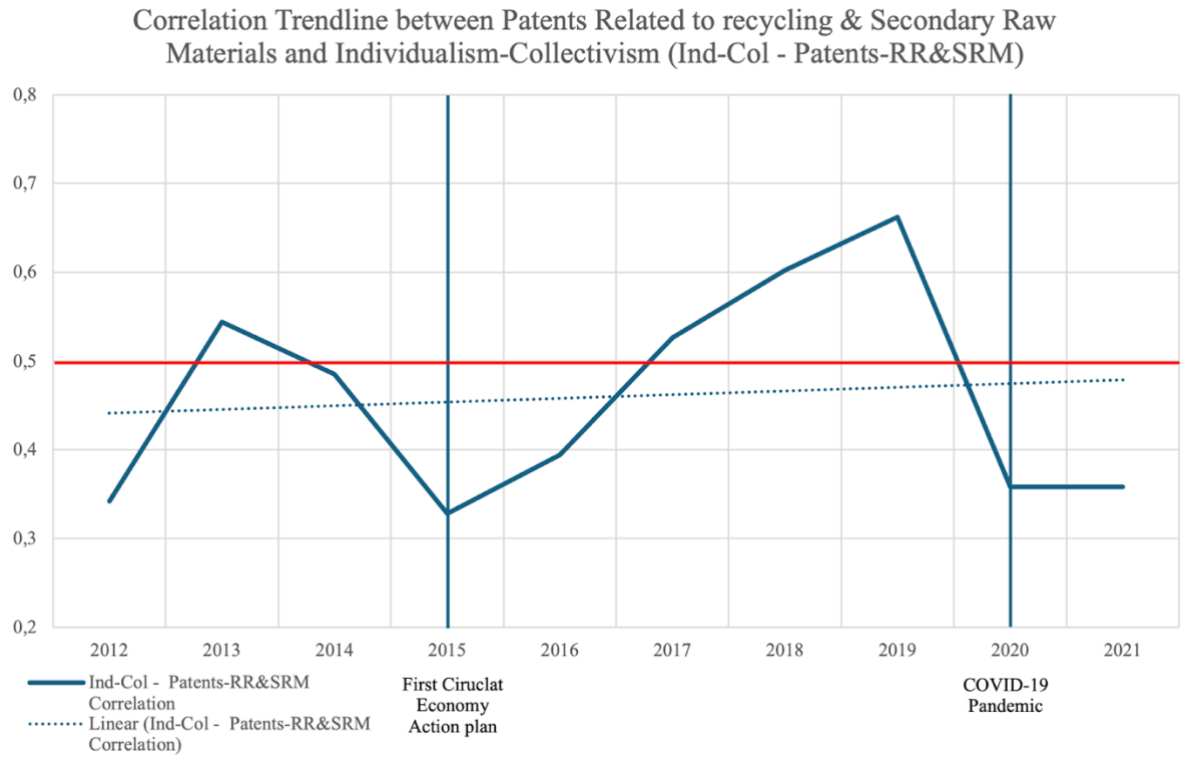

Figure 10: **Correlation Trendline between Patents Related to Recycling & Secondary Raw Materials and Individualism-Collectivism (Ind-Col - Patents-RR&SRM)**

The COVID-19 pandemic also strongly impacted the correlation, reaching its lowest point (r = 0.358) in 2020. Such a significant decrease in correlation strength indicates that major events significantly influence the relationship with individualism. While it is unclear why the first circular economy action plan had an impact, the influence that COVID-19 had on the present relationship can easily be understood. COVID-19 has had a considerable economic, financial, and social impact on a global scale, and it is responsible for significant changes in society, such

as the acceleration of digitalization and home-working, as well as new consumption patterns that seek sustainable alternatives. All these societal shifts could have influenced the innovation demand for solutions related to the pandemic and could explain why the correlation decreased as the circular economy might not have been seen as urgent during the COVID-19. Such variabilities in the correlation pattern provide grounds for further research in subsequent studies.

Interpretation

The scientific literature commonly acknowledges the relationship between patent creation and individualism (Hartinger, 2023; Kaasa & Vadi, 2010; Taylor & Wilson, 2009).

The literature indicates that the correlation is not only positive but also strong. The underlying mechanism behind this assertion is linked to the values, behaviors, and beliefs of individualist societies. In individualist societies, people tend to have a stronger inclination towards personal initiatives and achievements, valuing freedom and personal development. These values create a behavioral environment where cultural influences shape behaviors conducive to innovation and patent creation (Kaasa & Vadi, 2010).

According to Hartinger (2023), individualism encompasses specific values and behaviors that enhance a society's capacity for innovation. Individualist societies tend to reward breakthrough innovations. Independence, uniqueness, and personal achievement are highly esteemed in such societies (Hartinger, 2023). Consequently, this creates a social environment where risk-taking and innovative behaviors are highly valued by individuals (Hartinger, 2023). For example, the overall perception of star innovators and entrepreneurs in high-risk ventures is generally positive in individualist societies.

Another factor enabling innovation in individualist societies is the widespread dissemination of knowledge (Hartinger, 2023). In these societies, individuals devote more time and effort to active learning and staying abreast of new technologies (Hartinger, 2023). This approach to learning emphasizes continuous improvement and staying updated, thereby creating fertile ground for innovation (Hartinger, 2023).

Personal motivation and achievement are also crucial in the innovation context of individualist societies. Motivated by personal goals and aspirations, individuals are more likely to excel and push the boundaries of creativity, thereby fostering innovation (Hartinger, 2023).

Finally, according to Taylor and Wilson (2009), due to personal social incentives and recognition, individualist societies provide a more tolerant environment and infrastructure for innovators. Such infrastructure includes research facilities, funding opportunities, and networking platforms, which are essential for supporting innovative activities.

According to Hartinger (2023) and Taylor & Wilson (2009), individualism fosters independent thinking, risk-taking behavior, knowledge diffusion, personal motivation, and a tolerant environment with supportive infrastructures. These elements contribute to a positive relationship between patent creation, innovation, and individualism.

However, collectivism is not impervious to innovation. Understanding the driving factors behind behaviors in different cultural settings is crucial. According to Taylor and Wilson (2009), collectivist societies can also be innovative in specific contexts. For instance, collectivism has shown higher levels of innovation at the national level under patriotic or nationalist settings, but it can have inhibiting effects on innovation when collectivism extends to local community or family contexts (Taylor & Wilson, 2009).

Nevertheless, despite the positive correlation between innovation and individualism, all authors agree that individualism alone does not explain the innovation rate of societies. There are numerous other factors influencing this relationship, including government policies, availability of financial resources, patent protection policies, and market demand for new technologies (Hartinger 2023; Kaasa & Vadi 2010; Taylor & Wilson 2009), just to name a few. Thus, while a positive correlation exists, causality cannot be definitively established due to the complexity and ambiguity of factors influencing the relationship.

5.2.1.5 Private Investment and Gross Added Value Related to Circular Economy Sector (PI&GAV-CES)

Results

The analysis revealed a significant positive correlation ($r = 0.598$, p-value < 0.001) between PI&GAV-CES and individualism. This suggests a potential association between individualistic cultures and higher levels of investment and value generation within the circular economy sector. Given the strength of this correlation, this relationship warrants further investigation to explore the underlying mechanisms that might explain why individualistic societies exhibit this trend.

Timeline

The correlation is quite stable over time. The correlation strength between the individualist-collectivist and private investment and gross added value in the circular economy sector remains quite strong over the previous decade, around r = 0.630.

The first circular economy action plan in 2015 had a slight impact on the correlation, but the augmentation remains relatively small. COVID-19 does not have any significant impact.

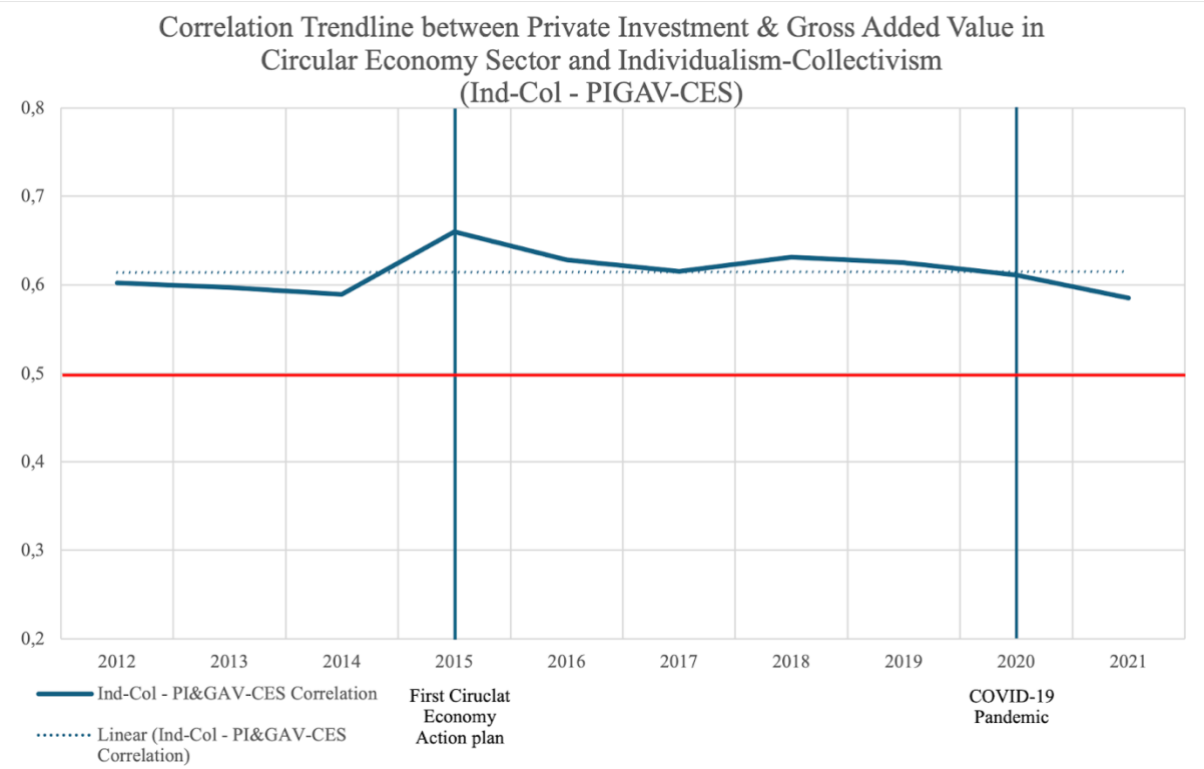

Figure 11: Correlation Trendline between Private Investment & Gross Added Value in Circular Economy Sector and Individualism-Collectivism (Ind-Col - PIGAV-CES)

Interpretation

To better understand this correlation, it is important to review what behavioral finance science says about cultures, particularly individualism. This decision is driven by the lack of information available on circular economy investment and cultural dimensions.

Scientific literature in behavioral finance states that in individualistic societies, people tend to have strong risk aversion due to the lack of support infrastructures in case of failed investments. Conversely, collectivist societies exhibit a stronger propensity for risk because they offer strong

safety nets for individuals in case of failure (Statman et al., 2008). However, some of the strongest financial markets, such as Wall Street in New York, with the highest financial results, volume, and consistency, are found in individualistic countries (Chui et al., 2010). Why is this the case?

According to Chui et al. (2010), the reason why investments perform so well in individualistic societies is linked to investors' overconfidence gained from abundant information. This result provides seemingly contradictory insights. While Statman et al. (2008) suggest stronger risk aversion in individualistic societies, Chui et al. (2010) state that investors are overconfident.

These insights are not necessarily contradictory. The link between these two findings is the role of financial institutions and the integrity of financial markets (Chui et al., 2010).

This phenomenon can be explained as follows. Although individuals in individualistic cultures tend to be more risk-averse, their values and beliefs often reward personal initiative and achievement, leading them to overcome this risk aversion (Kassa & Vadi, 2010). To mitigate risk, they actively seek and acquire more information about investments, as individualistic societies strongly favor knowledge diffusion (Hartinger, 2023). This creates a demand for an environment where institutions provide clear and trustworthy information. Financial institutions play a crucial role in this by facilitating the flow of information and reducing trading costs, thereby enhancing confidence in individual investment capabilities (Chui et al., 2010).

However, how does this apply to investment in the circular economy sector? Overall, there seems to be little information available in the scientific literature. Darsono et al. (2021) investigated the link between cultural dimensions and sustainable stock exchanges in the Asian region. Their findings indicated a similar positive correlation between individualism and sustainable investment, but they did not explore the underlying mechanisms of investing in the circular economy.

In conclusion, there currently appears to be no explanation available for the motivation behind investment decisions in the circular economy under an individualist cultural setting. Nevertheless, one plausible explanation for investment in specific sustainable matters may relate to environmental awareness and its crucial role in decision-making within individualistic societies (Mintz et al., 2019).

5.2.1.6 Percentage of Working Population Employed in Circular Economy Sector (WPECES)

Results

The correlation table reveals a moderate negative correlation (r = -0.481) between WPECES and individualism, with a significance level of $p < 0.001$. This suggests a potential association between collectivistic cultures and a higher percentage of the working population employed in the circular economy sector.

The strength of the correlation (r = -0.481) warrants further investigation. We aim to explore the underlying reasons why collectivistic societies might exhibit a higher employment rate in the circular economy sector.

Timeline

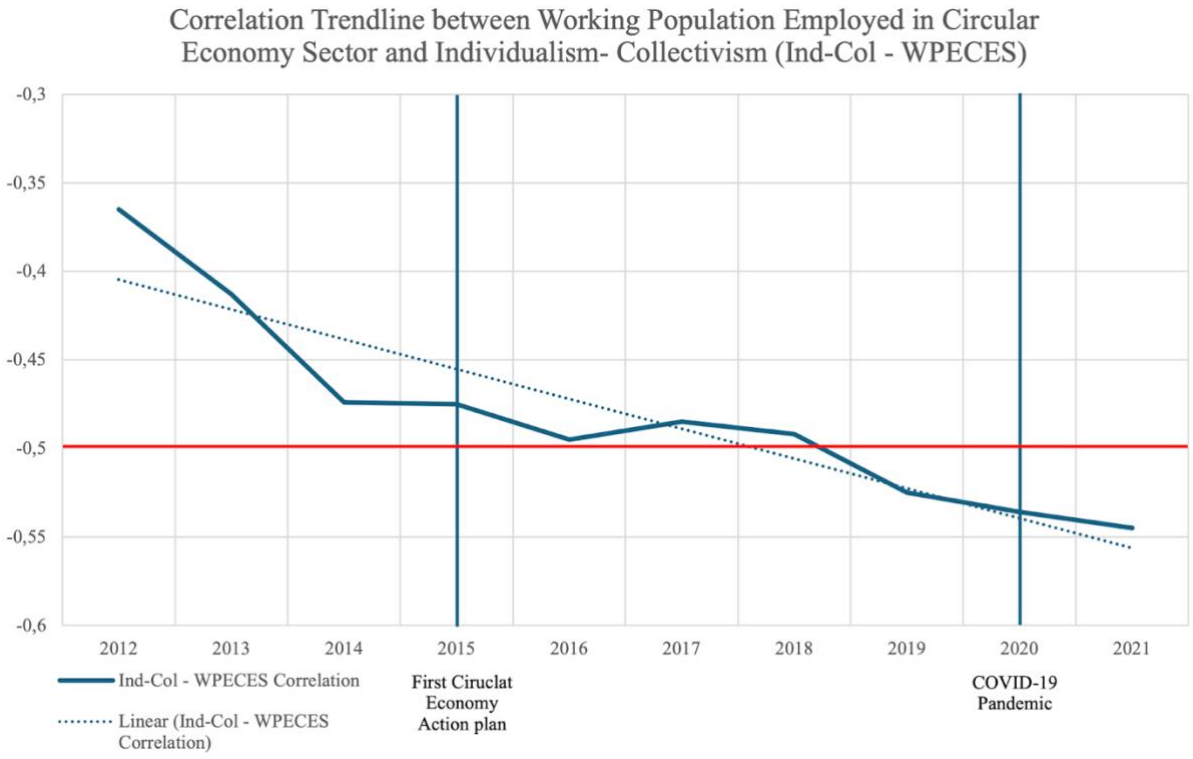

Figure 12: Correlation Trendline between Working Population Employed in Circular Economy Sector and Individualism- Collectivism (Ind-Col - WPECES)

Overall, the trend seems to gain strength every year. The negative correlation has consistently gained strength over the last decade and went from r = -0,365 in 2012 to r = -0.545 in 2021.

The First Circular Economy Action Plan in 2015 and the COVID-19 pandemic in 2020 did not seem to have any substantial impact either.

Interpretation

Cultural background plays a crucial role in shaping values, norms, and behaviors. According to Graham et al. (2009), individualistic societies highly value independence, self-reliance, and personal achievement. This emphasis creates a strong focus on pursuing personal goals, translating into economic behaviors that seek opportunities and maximize personal gains. In these societies, the labor market is driven by personal advancement, higher status, and financial rewards.

Conversely, values, motivations, and economic behaviors in collectivist societies differ significantly. While individuals in individualistic societies base their decisions on potential social status gains, those in collectivist societies prioritize group welfare and social relations, as empathy and community are stronger in such settings (Sharma et al., 2020).

The values, motivations, and economic behaviors of collectivist societies align more closely with the principles of the circular economy. Motivations such as altruism, which translate into selfless behavior for the collective well-being of communities, foster the circular economy (Herminio et al., 2021). Additionally, social inclusion, collaboration, mutual benefits, and equity are core values of the circular economy (Horbach & Ramer, 2019).

Therefore, the negative correlation between circular economy employment and individualism could be explained by the motivations of workers in individualistic settings and the values inherent in circular economy jobs. The values, motivations, and economic behaviors of the circular economy tend to align better with the collectivist cultural dimension.

However, it is crucial to highlight that the labor market and cultural dimensions lack substantial literature and have a significant gap in research. This creates a considerable opportunity for further study and exploration in this area.

5.2.2 Flexibility Monumentalism cultural dimension relationship

5.2.2.1 Circular Material Use Rate (CMUR):

Results

The correlation table displays a score that reveals a strong relationship (r = 0.539) with strong statistical significance (p < 0.05) between the circular material use rate (CMUR) and the flexibility cultural dimensions. Such scores suggest that countries with stronger scores in flexibility cultural dimension, the former long-term orientation, tend to perform better in the use of recycled materials in the economy. Thus, the results suggest that flexible societies could display a better management of virgin raw material extraction, encompassing the circular economy 10Rs strategy.

Timeline

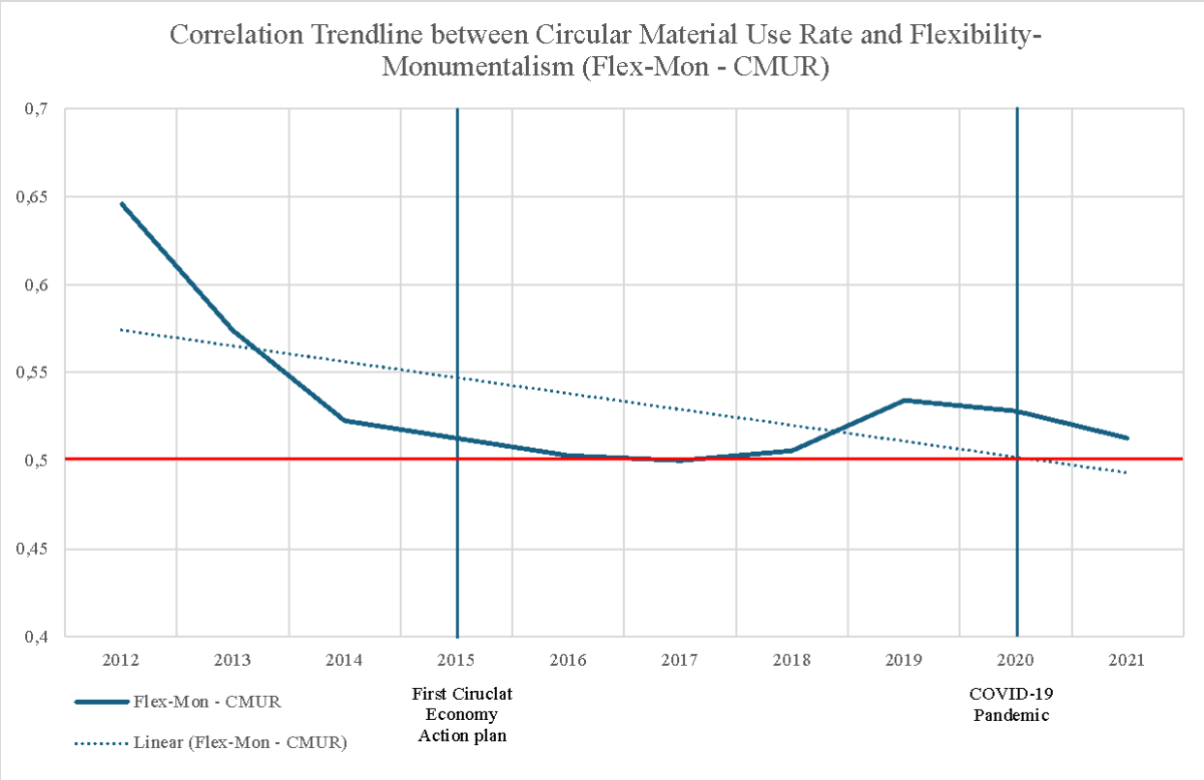

Figure 13: Correlation Trendline between Circular Material Use Rate and Flexibility-Monumentalism (Flex-Mon – CMUR)

Overall, the trendline seems to show a descending trend over the last decade. The biggest downshifting seems to happen between 2012 and 2014. Afterward, the correlation seems to stabilize above r = 0.500. The trendline doesn't seem to be impacted by any major events occuring over the last decades.

Interpretation

To understand the relationship, it is important to recall that flexible societies prioritize thrift with delayed gratification, self-sufficiency, and flexible and adaptable behaviors in the face of change (Minkov, 2017; Minkov & Kaasa, 2022).

Despite a thorough literature review on specific implications of using secondary raw material and flexibility cultural dimension, it did not reveal any studies directly addressing the relationship. However, the literature on the relationship between sustainability and flexibility in the cultural dimension seems to gather common findings.

As environmental consciousness requires a long-term vision of the world, cultures with flexibility (i.e., long-term orientation) mindset are more likely to develop an environmental consciousness (Gul, 2013). Additionally, the delay of instant gratification and strong self-control make individuals more likely to resist consumption (Nepomuceno & Laroche, 2015).

Hence, with strong environmental awareness, strong self-control, and delay of instant gratifications (Gul, 2013; Nepomuceno & Laroche, 2015), the cultural dimensions of flexibility create a cultural context that will enable better implementation of CSR policies (Wang & Bansal, 2012).

It could be assumed that as the flexibility cultural dimension has a positive influence on CSR, it will also have a positive impact on the circular material use rate of a country. However, as the literature lacks information on that specific relationship, it is crucial to acknowledge the gap, and is a potential field of study for further research.

5.2.2.2 Greenhouse gas emissions from production activities

Results

The relationship between the flexibility cultural dimension and the greenhouse gas emissions from production activity (GHG-PA) shows a moderate correlation ($r = 0.490$) with strong statistical significance ($p < 0.001$). This implies that countries that are under the flexibility cultural dimension tend to have higher greenhouse gas emissions from production activities.

Timeline

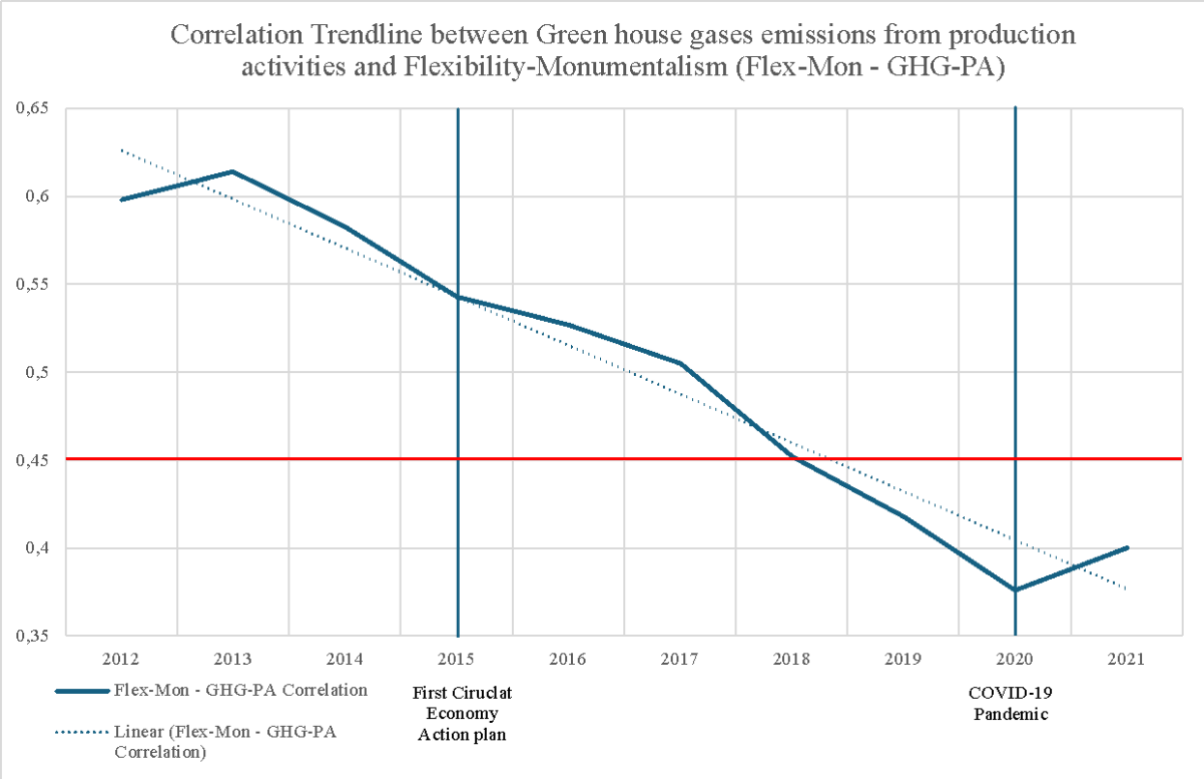

Figure 14: Correlation Trendline between Greenhouse Gases Emissions from Production Activities and Flexibility-Monumentalism (Flex-Mon – GHG-PA)

The timeline hereby displays a strong negative slope in the correlation trendline. While the correlation between flexibility and GHG-PA was really strong in 2013, it has since gone through a considerable and consistent downfall in correlation strength as the correlation went from strong to weak. The timeline provides insightful and contradictory results with the score of the correlation (r (GHG-PA) = 0.490).

Regarding the influence of Covid-19 and the first circular economy action plan, the impact seems to be minor on the correlation trendline.

Interpretation

To better understand the relationship between GHG-PA and the flexibility cultural dimension (i.e., long-term orientation), and especially the strong negative slope in the correlation trendline, it is important to understand first what is the relationship between economic activity and flexibility. As the cultural dimension emphasizes delayed gratification coupled with flexible and adaptable behavior, the longer-term orientation is an enabler of innovation (Flammer & Bansal, 2017). This creates fertile ground for value creation and entrepreneurial

activities (Delmas et al., 2015; Flammer & Bansal, 2017). Such fertile ground for entrepreneurial activities implies that the aggregated number of companies will generate more pollution (Qureshi & Ahsan, 2022), which could explain why the relationship between GHG-PA and flexibility was that strong in 2012 ($r = 0.614$).

However, the timeline still shows a negative slope trend in correlation strength. Such a phenomenon could be explained by the incentives of the financial markets, and especially the investors. As environmental awareness and skepticism towards the financial market have surged after the consecutive sub-prime crisis and the debt crisis in the EU zone in 2008 and 2010 (Halkos et al., 2018), the requirements and expectations of investors have considerably changed for better corporate environmental performance (Qureshi & Ahsan, 2022).

This resulted in the penalization of companies as investors were more reluctant to invest in polluting companies due to their higher emissions (Qureshi & Ahsan, 2022). Thus, as flexible societies tend to show flexible and adaptable behaviors across different situations (Minkov & Kaasa, 2022), and there is a positive relationship between corporate sustainability and financial performance (Delmas et al., 2015). This dynamic could result in a strong downshifting trend between GHG-PA and Flexibility as companies had financial incentives to reduce their greenhouse gases emission.

5.2.3 Summary of results

This section aims to provide a summary of the discussion and findings on the potential relationships between the circular economy and cultural dimensions. The results present first the cultural dimensions linked with the circular economy indicator. Then, we shall recall the correlation score and its p-value, followed by the trendline analysis results, the interpretation of the relationship results, and the authors' citations.

Table 2: Summary of key findings (1/2)

Individualism - Resource productivity	• $r = 0.476$; $p < 0.001$ • timeline: stable correlation over time and weakening trendline • Individualism is boosted by status and personal achievement incentives, while collectivism is boosted by strong stakeholder relationships. The managerial implication is to adopt a mixed approach of personal and stakeholders incentives to achieve efficient resource management for the circular economy. • Gorodnichenko & Roland (2011); Thiessen (1997); United Nations Environment Programme (2020)
Individualism - Recycling rate of municipal waste	• $r = 0.637$; $p < 0.001$ • timeline: weakening correlation over time with negative impact of COVID-19 and weakening trendline • The recycling rate of municipal waste could be positively affected by individualism through environmental awareness developed by individualist social norms (personal autonomy, self-interest, freedom), thus suggesting that circular economy policies must align with these social norms in individualist countries to be effective. • Crociatoa et al. (2015); Mintza et al. (2019)
Individualism - Circular material use rate	• $r = 0.551$; $p < 0.001$ • timeline: stable correlation over time and weakening trendline • In individualist societies, consumer acceptance of recycled products is not driven by any social situation but by personal interests, values, and experiences. One critical experience in recent history was the 2008 financial crisis, which exacerbated skepticism towards financial and political institutions, and resulted in stronger environmental awareness. • Halkos et al. (2018); Polytropis et al. (2022)
Individualism - Patents related to recycling and secondary raw materials	• $r = 0.467$; $p < 0.001$ • timeline: Strong variation of correlation overtime with impact from the First Circular Economy Action Plan and COVID-19, weak positive trendline • Individualist societies reward personal initiatives, achievements, value freedom, and personal development. Combined with that, individualist societies strongly favor knowledge sharing and active learning while displaying a more tolerant environment and supporting infrastructure for innovators. This generates a social environment that enclines risk-taking, independent thinking, and innovative behaviors, which ultimately generates an environment conducive to innovation and patent creation. • Hartinger (2023); Kaasa & Vadi (2010); Taylor & Wilson (2009)

Table 2: Summary of key findings (2/2)

Individualism - Private investment & gross added value in circular economy sector	• r = 0.598; p< 0.001 • timeline: stable correlation over time and null slope trendline • Individualist societies tend to show strong risk aversion with investments due to limited support in case of failed investment, unlike collectivist societies, where safety nets are more available. However, the strongest financial institutions are located in individualist countries. This is explained by the abundance of trustworthy information provided by financial institutions and the tendency in individualistic settings to reward personal initiative, achievements, and knowledge diffusion. However, there is little information available on how these dynamics apply to circular economy investments. • Statman et al. (2010); Chui et al. (2010); Kassa & Vadi (2010); Hartinger (2023); Darsono et al. (2021); Mintza et al. (2019)
Individualism - Working population employed in circular economy sector	• r = -0.481; p < 0.001 • timeline: strengthening correlation over time and strong negative slope trendline • The scientific literature on the impact of individualist societies on the circular economy labor market is lacking. However, an explanation could be that the jobs linked to the circular economy align more with the principles of collectivist societies, as they encompass social inclusion, collaboration, mutual benefits, and equity as core values of both the circular economy and collectivist cultural dimension. However, as the topic lacks literature, the assertions might not hold true. • Graham et al. (2009); Herminio et al. (2021); Horbach (2019); Sharma et al. (2020)
Flexibility - Circular material use rate	• r = 0.539; p < 0.05 • timeline: variation of correlation over time and negative slope • Flexible societies tend to display values of strong self-control, delayed gratifications, and adaptability to new contexts. Hence, these values foster a robust environmental consciousness among flexibility societies, ultimately leading to better implementation of CSR practices, which could generate preferences for circular materials. However, the link between circular material consumption and long-term orientation is under-researched, indicating a need for further studies. • Gul (2013); Minkov (2017); Minkov & Kaasa (2022); Nepomuceno & Laroche (2015); Wang & Bansal (2012)
Flexibility - Greenhouse gases emissions from production activity	• r = 0.490; p < 0.001 • timeline: weakening correlation over time with minor impact of COVID-19 and strong negative slope trendline • The flexibility cultural dimension shows a strong negative trend in correlation. Initially, flexible cultural dimensions foster entrepreneurial activities, which lead to higher pollution from production activities. However, the 2008 financial crisis led to a stronger environmental awareness among investors, who started to penalize high-emission companies, resulting in a strong reduction of emissions linked with the strong adaptability of flexible societies. • Delmans et al. (2015); Flammer & Bansal (2017); Halkos et al. (2018); Minkov & Kaasa (2022); Qureshi & Ahsan (2022)

Chapter 6. Limitations

Through this paper, we aim to understand the relationship between the circular economy indicators and the cultural dimensions of the Minkov-Hofstede model. While the circular economy is broad, culture is even more expansive. Hence, the analysis in the discussion section aimed at explaining the relationship dynamic that can exist between the indicators and the cultural dimensions of individualism and flexibility (i.e., long-term orientation).

However, it is important to acknowledge that the insights found in that section represent only a fraction of the complex dynamics between the circular economy and culture, as the cultural dimensions are a subjective construction of the mind seeking to describe an objective reality (Hofstede, 2011).

The model used, a Pearson correlation table, is a good model to establish relationships between two variables (Armstrong, 2019). However, it is crucial to highlight that a correlation does not automatically imply a causality. While this paper aimed to provide insights into the establishment of relationships between the circular economy indicator and cultural dimensions, further research will be required to establish causality between the variables.

Finally, as the circular economy indicators in this paper are only related to European countries, the relationship is certainly influenced by a Westernization bias. European countries generally have high Human Development Index scores and belong to the same cultural cluster as Western countries in the Minkov-Hofstede model (Minkov & Kaasa, 2022). Hence, it is essential to acknowledge that while some indicators show a significant correlation, the context certainly has an influence on the relationship. Therefore, it will be interesting and necessary to investigate if the relationship remains similar in the context of broader cultural dimensions.

Chapter 7. Managerial implication

In this paper, the relationship between cultural dimensions and the circular economy was investigated. With the findings extracted, we can suggest some implications and recommendations for managers and policymakers.

When implementing new policies regarding the circular economy, it is essential to acknowledge the cultural context of the targeted stakeholders. Indeed, we found in that paper that culture can play a pivotal role in welcoming and accepting such new policies.

For instance, in an individualist context, environmental awareness is a strong conductor of sustainable policy enthusiasm. While this assumption might sound trivial, it is crucial to understand that environmental awareness might not hold the same impact in collectivist societies as the motivations of individuals will not be the same.

Hence, if managers want to implement circular initiatives in individualist cultural contexts, it is essential for them to understand and develop first the environmental awareness of their stakeholders.

To better understand environmental awareness, it would be interesting to develop a standardized environmental awareness index for managers to work with. This index would help the manager to understand the environmental awareness status of their organization and adapt their behaviors based on that score.

Once the research is done, the managers could improve the policy designs by taking into account the cultural context and the expectations of the targeted audience. By aligning with local values and behaviors, policy acceptance could be improved, and the risk could be mitigated as any potential cultural resistance could be anticipated.

Such a tool would also be beneficial for policymakers as it would help them adapt their policies based on the cultural context and ensure more effective implementation and greater public acceptance.

The cross-cultural field of research can generate multiple managerial and political implications. In a global context, managers need to understand the behaviors and beliefs that culture can have on individuals.

Chapter 8. Conclusion

When diving into the research question of the relationship between circular economy and cultural dimensions, we discovered that while the relationship exists, the intensity varies depending on the specific circular economy indicator. Additionally, the impact of the cultural dimensions is not uniform.

The individualism cultural dimension displays promising findings as the relationship was significant with multiple indicators. The competitiveness and innovation indicators, the secondary raw material indicators, the resource productivity, and the recycling of municipal waste have promising scores and open the door for further research on the causality of the relationship. Hence, it seems that our findings seem to corroborate with the scientific literature (Graafland & Noorderhaven, 2018; Lee et al., 2022; Sedita et al., 2022) as the individualism seems to hold an impact on the circular economy indicators.

However, the results for the flexibility cultural dimension hold different results. In our research, the latter cultural dimension displays an overall weak correlation as only two indicators were extracted, the circular material use rate and the greenhouse gas emissions from production activity, and the timeline analysis exhibit a correlation score that is drastically decreasing. Therefore, the results do not seem to align with the scientific literature and the influence that flexibility has on circular economy indicators (Graafland & Noorderhaven, 2018; Lee et al., 2022; Sedita et al., 2022).

Hence, to answer the research question about the status of the relationship between circular economy indicators and the cultural dimension model, we can state that the individualism cultural dimension unveils some promising results as the relationship in some indicators is considerable. However, the relationship with the flexibility cultural dimension is not the same as the overall results depict a weaker relationship.

Through these results, we have investigated the potential underlying mechanism behind these correlations. We found that the relationship with individualism could be explained by personal motivations, social norms, environmental awareness, significant events, knowledge spreading, and transparency and trust from institutions. Meanwhile, the flexibility cultural dimension influence could be explained by the impact of delayed gratification and adaptability in the face of new contexts, such as shifting expectations from investors.

However, it is important to acknowledge that these results were drawn from a dataset of the European Union, which tends to display similar scores in cultural dimensions and circular economy indicators, which might ultimately lead to some bias, whether social, cultural, or economic. It is also important to say that the results were extracted from a correlation table and thus, no causality can be asserted yet.

These factors offer valuable insight for future research on the role of cultures and their impact on implementing circular economy policies. As we have identified the relationships between circular economy indicators and cultural dimensions, it would be interesting to dive deeper into these specific relationships and establish potential causalities. It would also be interesting to research external factors influencing the circular economy, such as the material import dependency or the availability of geostrategic resources. Finally, it would be needed to develop a standardized international circular economy index so that the comparability between countries could be simplified and extended to a global scale.

The circular economy is a promising answer to the climate crisis. However, it needs a common aggregated framework that could unlock its full potential by offering a shared vision and best practices for sustainable development.

The aspirations held by the circular economy are a source of hope for overcoming the upcoming challenges. To realize these aspirations, it is crucial to develop a global vision of the circular economy. Governments, private industries, and communities need to come together to improve the development, education, and promotion of circular economy matters. Through such strong initiatives, we can harness the potential of the circular economy, which would ultimately lead to a future where ecology, social justice, and sustainable opportunities would be the pillars of human interactions, inspiring and motivating us all.

Chapter 9. Bibliography

Ahmed, Z., Mahmud, S., & Acet, H. (2022). Circular economy model for developing countries : evidence from Bangladesh. *Heliyon*, *8*(5), e09530. https://doi.org/10.1016/j.heliyon.2022.e09530

Armstrong, R. A. (2019). Should Pearson's correlation coefficient be avoided ? *Ophthalmic And Physiological Optics/Ophthalmic & Physiological Optics*, *39*(5), 316-327. https://doi.org/10.1111/opo.12636

Aurez, V., & Georgeault, L. (2019a). Chapitre 4 : Définition de l'Economie circulaire [Kindle]. Dans *Économie circulaire : Système économique et finitude des ressources* (2e éd., p. 157-182). De Boeck Superieur.

Aurez, V., & Georgeault, L. (2019b). Economie de Flux ou Economie de Stocks Restants : Deux Visions Economiques : Origine du concept de l'Economie circulaire [Kindle]. Dans *Économie circulaire : Système économique et finitude des ressources* (2e éd., p. 28-40). De Boeck Superieur.

Beaurain, C., Chembessi, C., & Rajaonson, J. (2023). Investigating the cultural dimension of circular economy : A pragmatist perspective. *Journal Of Cleaner Production*, *417*, 138012. https://doi.org/10.1016/j.jclepro.2023.138012

Bititci, U. S., & Muir, D. (1997). Business process definition : a bottom-up approach. *International Journal Of Operations & Production Management*, *17*(4), 365-374. https://doi.org/10.1108/01443579710159950

Camilleri, M. A. (2018). The circular economy's closed loop and product service systems for sustainable development : A review and appraisal. *Sustainable Development*, *27*(3), 530-536. https://doi.org/10.1002/sd.1909

Charter, M., Clark, T., & The Centre for Sustainable Design University College for the Creative Arts. (2007). *Sustainable innovation : Key conclusions from Sustainable Innovation Conferences 2003–2006 organised by the Centre for Sustainable Design*. https://www.cfsd.org.uk

Chui, A. C., Titman, S., & Wei, K. J. (2009, 23 février). *Individualism and Momentum Around the World*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1150076

Corvellec, H., Stowell, A. F., & Johansson, N. (2021). Critiques of the circular economy. *Journal Of Industrial Ecology*, *26*(2), 421-432. https://doi.org/10.1111/jiec.13187

Crociata, A., Agovino, M., & Sacco, P. L. (2015). Recycling waste : Does culture matter ? *Journal Of Behavioral And Experimental Economics*, *55*, 40-47. https://doi.org/10.1016/j.socec.2015.01.005

Darsono, S. N. A. C., Wong, W., Ha, N. T. T., Jati, H. F., & Dewanti, D. S. (2021). Cultural Dimensions and Sustainable Stock Exchanges Returns in the Asian Region. *Journal Of Accounting And Investment*, *22*(1), 133-149. https://doi.org/10.18196/jai.v22i1.10318

De Morais, L. H. L., Pinto, D. C., & Cruz-Jesus, F. (2021). Circular economy engagement : Altruism, status, and cultural orientation as drivers for sustainable consumption. *Sustainable Production And Consumption*, *27*, 523-533. https://doi.org/10.1016/j.spc.2021.01.019

Delmas, M. A., Nairn-Birch, N., & Lim, J. (2015). Dynamics of Environmental and Financial Performance. *Organization & Environment*, *28*(4), 374-393. https://doi.org/10.1177/1086026615620238

Effects of Globalization on the Environment. (2021, 15 avril). Business Insights Blog. https://online.hbs.edu/blog/post/globalization-effects-on-environment

Ellen McArthur Foundation. (s. d.-a). *Circular economy introduction*. https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview#:~:text=The%20circular%20economy%20is%20a,remanufacture%2C%20recycling%2C%20and%20composting.

Ellen McArthur Foundation. (s. d.-b). *The butterfly diagram : visualising the circular economy*. https://www.ellenmacarthurfoundation.org/circular-economy-diagram

EUR-Lex. (2024). *Accession criteria (Copenhagen criteria)*. https://eur-lex.europa.eu/EN/legal-content/glossary/accession-criteria-copenhagen-criteria.html

EUR-LEX - 52015DC0614 - EN - EUR-LEX : Closing the loop - An EU action plan for the Circular Economy. (2015). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614

EUR-LEX - 52019DC0640 - EN - EUR-LEX : The European Green Deal. (2019). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN

EUR-LEX - 52020DC0098 - EN - EUR-LEX : A new circular Economy action plan for a cleaner and more competitive Europe. (2020). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52020DC0098

European Commission. (2015). *First circular economy action plan*. Environment. https://environment.ec.europa.eu/topics/circular-economy/first-circular-economy-action-plan_en

European Commission. (2019a). *Circular economy action plan*. Environment. https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

European Commission. (2019b). *Finance and the Green Deal*. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/finance-and-green-deal_en#documents

European Commission. (2019c). *What is the European Green Deal ?* https://ec.europa.eu/commission/presscorner/api/files/attachment/859152/What_is_the_European_Green_Deal_en.pdf

Eurostat. (2024). Information on data - Circular Economy Indicators [Base de données]. Dans *Eurostat*. https://ec.europa.eu/eurostat/web/circular-economy/information-data

Fang, T. (2003). A Critique of Hofstede's Fifth National Culture Dimension. *International Journal Of Cross Cultural Management*, *3*(3), 347-368. https://doi.org/10.1177/1470595803003003006

Flammer, C., & Bansal, P. (2017). Does a long-term orientation create value ? Evidence from a regression discontinuity. *Strategic Management Journal*, *38*(9), 1827-1847. https://doi.org/10.1002/smj.2629

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm ? *Journal Of Cleaner Production*, *143*, 757-768. https://doi.org/10.1016/j.jclepro.2016.12.048

Geng, Y., Sarkis, J., & Bleischwitz, R. (2019). How to globalize the circular economy. *Nature*, *565*(7738), 153-155. https://doi.org/10.1038/d41586-019-00017-z

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy : the expected transition to a balanced interplay of environmental and economic systems. *Journal Of Cleaner Production*, *114*, 11-32. https://doi.org/10.1016/j.jclepro.2015.09.007

Gorodnichenko, Y., & Roland, G. (2011). Individualism, innovation, and long-run growth. *Proceedings Of The National Academy Of Sciences Of The United States Of America*, *108*(supplement_4), 21316-21319. https://doi.org/10.1073/pnas.1101933108

Graafland, J., & Noorderhaven, N. (2018). National culture and environmental responsibility research revisited. *International Business Review*, *27*(5), 958-968. https://doi.org/10.1016/j.ibusrev.2018.02.006

Graham, J. R., Shier, M. L., Jones, M. E., & Gray, E. (2009). Individualism : Perceptions of people experiencing difficulties integrating into labour markets. *ResearchGate*. https://www.researchgate.net/publication/261796079_Individualism_Perceptions_of_people_experiencing_difficulties_integrating_into_labour_markets

Gul, M. C. (2013). Long-term Orientation, Perceived Consumer Effectiveness, and Environmentally Conscious Consumer Behavior : The Case of Turkey. *International Journal Of Marketing Studies*, *5*(5). https://doi.org/10.5539/ijms.v5n5p24

Guldmann, E., & Huulgaard, R. D. (2020). Barriers to circular business model innovation : A multiple-case study. *Journal Of Cleaner Production*, *243*, 118160. https://doi.org/10.1016/j.jclepro.2019.118160

Gupta, H., Kusi-Sarpong, S., & Rezaei, J. (2020). Barriers and overcoming strategies to supply chain sustainability innovation. *Resources, Conservation And Recycling*, *161*, 104819. https://doi.org/10.1016/j.resconrec.2020.104819

Halkos, G., & Petrou, K. N. (2019). Evaluating 22 EU member states' 'waste culture' using Hofstede's and Schwartz's cultural dimensions. *International Journal Of Sustainable Development And World Ecology/˜ The œInternational Journal Of Sustainable Development And World Ecology*, *26*(4), 313-328. https://doi.org/10.1080/13504509.2019.1567616

Halkos, G., & Skouloudis, A. (2017). Revisiting the relationship between corporate social responsibility and national culture. *Management Decision*, *55*(3), 595-613. https://doi.org/10.1108/md-12-2016-0868

Halkos, George, Petrou, Kleoniki, & Laboratory of Operations Research, Department of Economics, University of Thessaly. (2018, décembre). *'Waste culture' assessment using Hofstede's and Schwartz's cultural dimensions – an EU case study Munich Personal RePEc Archive*. https://mpra.ub.uni-muenchen.de/90506/

Halog, A., & Anieke, S. (2021). A Review of Circular Economy Studies in Developed Countries and Its Potential Adoption in Developing Countries. *Circular Economy And Sustainability/Circular Economy And Sustainability*, *1*(1), 209-230. https://doi.org/10.1007/s43615-021-00017-0

Hannan, M. T., & Tuma, N. B. (1979). Methods for Temporal Analysis. *Annual Review Of Sociology*, *5*(1), 303-328. https://doi.org/10.1146/annurev.so.05.080179.001511

Hartinger, K. (s. d.). Individualism, creativity, and innovation : Discussion Paper Series. *Gutenberg School Of Management And Economics & Research Unit "Interdisciplinary Public Policy"*.

Hermundsdottir, F., & Aspelund, A. (2021). Sustainability innovations and firm competitiveness : A review. *Journal Of Cleaner Production*, *280*, 124715. https://doi.org/10.1016/j.jclepro.2020.124715

Heydari, A., Laroche, M., Paulin, M., & Richard, M. (2021). Hofstede's individual-level indulgence dimension : Scale development and validation. *Journal Of Retailing And Consumer Services*, *62*, 102640. https://doi.org/10.1016/j.jretconser.2021.102640

Hobson, K., & Lynch, N. (2016). Diversifying and de-growing the circular economy : Radical social transformation in a resource-scarce world. *Futures*, *82*, 15-25. https://doi.org/10.1016/j.futures.2016.05.012

Hofstede, G. (2011). Dimensionalizing Cultures : The Hofstede Model in Context. *Online Readings In Psychology And Culture*, *2*(1). https://doi.org/10.9707/2307-0919.1014

Hysa, E., Kruja, A., Rehman, N. U., & Laurenti, R. (2020). Circular Economy Innovation and Environmental Sustainability Impact on Economic Growth : An Integrated Model for Sustainable Development. *Sustainability*, *12*(12), 4831. https://doi.org/10.3390/su12124831

Inglehart, R. (1997). Modernization, postmodernization and changing perceptions of risk. *International Review Of Sociology*, *7*(3), 449-459. https://doi.org/10.1080/03906701.1997.9971250

Inglehart, R., & Baker, W. E. (2000). Modernization, Cultural Change, and the Persistence of Traditional Values. *American Sociological Review*, *65*(1), 19. https://doi.org/10.2307/2657288

International Organization for Standardization. (2024). *Circular Economy — Vocabulary, principles and Guidance for Implementation* (ISO 59004 : 2024). https://www.iso.org/obp/ui/en/#iso:std:iso:59004:ed-1:v1:en:term:3.1.6

Kaasa, A. (2021). Merging Hofstede, Schwartz, and Inglehart into a Single System. *Journal Of Cross-cultural Psychology*, *52*(4), 339-353. https://doi.org/10.1177/00220221211011244

Kaasa, A., & Vadi, M. (2010). How does culture contribute to innovation ? Evidence from European countries. *Economics Of Innovation And New Technology/Economics Of Innovation & New Technology*, *19*(7), 583-604. https://doi.org/10.1080/10438590902987222

Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the Circular Economy : Evidence From the European Union (EU). *Ecological Economics*, *150*, 264-272. https://doi.org/10.1016/j.ecolecon.2018.04.028

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy : An analysis of 114 definitions. *Resources Conservation And Recycling*, *127*, 221-232. https://doi.org/10.1016/j.resconrec.2017.09.005

Lee, C., Wang, C., & Ho, S. (2022). The dimension of green economy : Culture viewpoint. *Economic Analysis And Policy*, *74*, 122-138. https://doi.org/10.1016/j.eap.2022.01.015

Marino, A., & Pariso, P. (2020). Comparing European countries' performances in the transition towards the Circular Economy. *Science Of The Total Environment*, *729*, 138142. https://doi.org/10.1016/j.scitotenv.2020.138142

Marrucci, L., Corcelli, F., Daddi, T., & Iraldo, F. (2022). Using a life cycle assessment to identify the risk of "circular washing" in the leather industry. *Resources Conservation And Recycling*, *185*, 106466. https://doi.org/10.1016/j.resconrec.2022.106466

McSweeney, B. (2002). Hofstede's model of national cultural differences and their consequences : A triumph of faith - a failure of analysis. *Human Relations*, *55*(1), 89-118. https://doi.org/10.1177/0018726702055001602

Minkov, M. (2017). A revision of Hofstede's model of national culture : old evidence and new data from 56 countries. *Cross Cultural & Strategic Management*, *25*(2), 231-256. https://doi.org/10.1108/ccsm-03-2017-0033

Minkov, M., & Hofstede, G. (2010). Hofstede's Fifth Dimension. *Journal Of Cross-cultural Psychology*, *43*(1), 3-14. https://doi.org/10.1177/0022022110388567

Minkov, M., & Kaasa, A. (2022). Do dimensions of culture exist objectively ? A validation of the revised Minkov-Hofstede model of culture with World Values Survey items and scores for 102 countries. *Journal Of International Management*, *28*(4), 100971. https://doi.org/10.1016/j.intman.2022.100971

Mintz, K. K., Henn, L., Park, J., & Kurman, J. (2019). What predicts household waste management behaviors ? Culture and type of behavior as moderators. *Resources, Conservation And Recycling*, *145*, 11-18. https://doi.org/10.1016/j.resconrec.2019.01.045

Murray, A., Skene, K., & Haynes, K. (2015). The Circular Economy : An Interdisciplinary Exploration of the Concept and Application in a Global Context. *Journal Of Business Ethics*, *140*(3), 369-380. https://doi.org/10.1007/s10551-015-2693-2

Nepomuceno, M. V., & Laroche, M. (2015). When Materialists Intend to Resist Consumption : The Moderating Role of Self-Control and Long-Term Orientation. *Journal Of Business Ethics*, *143*(3), 467-483. https://doi.org/10.1007/s10551-015-2792-0

OECD. (2021). *HIGHLIGHTS • WWW.OECD.ORG/DAF/COMPETITION Highlights from the 2021 OECD/ICN Report on International Co-operation in Competition Enforcement*. https://www.internationalcompetitionnetwork.org/wp-content/uploads/2021/01/OECD-ICN-Report-on-International-Co-operation-in-Competition-Enforcement.pdf

Polyportis, A., Mugge, R., & Magnier, L. (2022). Consumer acceptance of products made from recycled materials : A scoping review. *Resources, Conservation And Recycling*, *186*, 106533. https://doi.org/10.1016/j.resconrec.2022.106533

Potting, J., Hekkert, M., Worrell, E., & Hanemaaijer, A. (2017). *CIRCULAR ECONOMY : MEASURING INNOVATION IN THE PRODUCT CHAIN*. https://www.pbl.nl/uploads/default/downloads/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544.pdf

Qureshi, M. A., & Ahsan, T. (2022). Do investors penalize the firms disclosing higher environmental performance ? a cross cultural evidence. *Environmental Science And Pollution Research International*, *29*(36), 55147-55160. https://doi.org/10.1007/s11356-022-19716-8

Rizos, V., Tuokko, K., & Behrens, A. (2017). *The Circular Economy, a Review of Definitions, Processes and Impacts*. https://circulareconomy.europa.eu/platform/sites/default/files/rr2017-08_circulareconomy_0.pdf

Saha, K., Dey, P. K., & Papagiannaki, E. (2021). Implementing circular economy in the textile and clothing industry. *Business Strategy And The Environment*, *30*(4), 1497-1530. https://doi.org/10.1002/bse.2670

Schwartz, S. (2006). A Theory of Cultural Value Orientations : Explication and Applications. *Comparative Sociology*, *5*(2-3), 137-182. https://doi.org/10.1163/156913306778667357

Schwartz, S. H. (2004). Mapping and interpreting cultural differences around the world. Dans *BRILL eBooks* (p. 43-73). https://doi.org/10.1163/9789047412977_007

Sedita, S. R., Blasi, S., & Yang, J. (2022). The cultural dimensions of sustainable development : A cross-country configurational analysis. *Sustainable Development*, *30*(6), 1838-1849. https://doi.org/10.1002/sd.2351

Sharma, R., Mehta, K., & Vyas, V. (2020). Responsible Investing : A Study on Non-Economic Goals and Investors' Characteristics. *Applied Finance Letters*, *9*(SI), 63-78. https://doi.org/10.24135/afl.v9i2.245

Signorini, P., Wiesemes, R., & Murphy, R. (2009). Developing alternative frameworks for exploring intercultural learning : a critique of Hofstede's cultural difference model. *Teaching In Higher Education*, *14*(3), 253-264. https://doi.org/10.1080/13562510902898825

Suchek, N., Fernandes, C. I., Kraus, S., Filser, M., & Sjögrén, H. (2021). Innovation and the circular economy : A systematic literature review. *Business Strategy And The Environment*, *30*(8), 3686-3702. https://doi.org/10.1002/bse.2834

Taylor, M. Z., & Wilson, S. (2012). Does culture still matter ? : The effects of individualism on national innovation rates. *Journal Of Business Venturing*, *27*(2), 234-247. https://doi.org/10.1016/j.jbusvent.2010.10.001

Tiessen, J. H. (1997). Individualism, collectivism, and entrepreneurship : A framework for international comparative research. *Journal Of Business Venturing*, *12*(5), 367-384. https://doi.org/10.1016/s0883-9026(97)81199-8

United Nations. (2016). *THE 17 GOALS | Sustainable Development*. https://sdgs.un.org/goals

Völker, T., Kovacic, Z., & Strand, R. (2020). Indicator development as a site of collective imagination ? The case of European Commission policies on the circular economy. *Culture And Organization*, *26*(2), 103-120. https://doi.org/10.1080/14759551.2019.1699092

Von Moltke, A.-K., Van Voore, M., Mills, S. L., Van Der Ven, C., & United Nations Environment Programme. (2020). Sustainable Trade in Resources : Global Material Flows, Circularity and Trade. Dans *unep.org*. https://wedocs.unep.org/bitstream/handle/20.500.11822/34344/STR.pdf?sequence=1&isAllowed=y

Wang, T., & Bansal, P. (2012). Social responsibility in new ventures : profiting from a long-term orientation. *Strategic Management Journal*, *33*(10), 1135-1153. https://doi.org/10.1002/smj.1962

Watkins, E., Meysner, A., & Institute for European Environmental Policy. (2022). *European Circular Economy Policy Landscape Overview : A report for PBL Netherlands Environmental Assessment Agency*. https://ieep.eu/wp-content/uploads/2022/11/European-Circular-Economy-policy-landscape-overview.pdf

What are the impacts of climate change ? (s. d.). Imperial College London. https://www.imperial.ac.uk/grantham/publications/climate-change-faqs/what-are-the-impacts-of-climate-change/

World Business Council for Sustainable Development. (2017). *8 Business cases for the circular economy*. https://www.wbcsd.org/wp-content/uploads/2023/12/8-Business-cases-for-the-circular-economy.pdf

Yong, R. (2007). The circular economy in China. *Journal Of Material Cycles And Waste Management, 9*(2), 121-129. https://doi.org/10.1007/s10163-007-0183-z

Żemojtel-Piotrowska, M., & Piotrowski, J. (2023). Hofstede's Cultural Dimensions Theory. Dans *Springer eBooks* (p. 1-4). https://doi.org/10.1007/978-3-031-08956-5_1124-1

Appendix:

Appendix 1: Circular Economy Indicators Definition (Eurostat, 2024)

Material footprint

The indicator quantifies the worldwide demand for material extractions (biomass, metal ores, non-metallic minerals and fossil energy materials/carriers) triggered by consumption and investment by households, governments and businesses in the EU. Raw material consumption indicator (RMC) is a measure of material footprints. It represents the amount of material in terms of Raw materials equivalent (RME) needed (or, the amount of extraction, domestic and abroad, required directly and indirectly) to produce the products consumed in the geoFigureical reference area. It is calculated as Raw material input (RMI) minus exports in RME (calculated at the aggregate product level, by material). The indicator RMC gives insight into the quantity and type of materials required to meet the EU's demand for products.

Resource productivity

The indicator is defined as the gross domestic product (GDP) divided by domestic material consumption (DMC).

DMC measures the total amount of materials directly used by an economy. It is defined as the annual quantity of raw materials extracted from the domestic territory of the local economy, plus all physical imports minus all physical exports. It is important to note that the term 'consumption', as used in DMC, denotes apparent consumption and not final consumption. DMC does not include upstream flows related to imports and exports of raw materials and products originating outside of the local economy.

Waste generation per capita

The indicator is defined as total waste generated in a country including major mineral wastes (all NACE activities plus households), divided by the average population of the country.

Generation of waste excluding major mineral wastes per GDP unit

The indicator is defined as all waste generated in a country (in mass unit), excluding major mineral wastes, per GDP unit (in euro, chain linked volumes (2010)). The ratio is expressed in kg per thousand EUR.

Generation of municipal waste per capita

The indicator measures the waste collected by or on behalf of municipal authorities and disposed of through the waste management system. It consists to a large extent of waste generated by households, though similar wastes from sources such as commerce, offices and public institutions may be included.

Food waste

The indicator is defined as the amount of food waste generated per year divided by the average population of the country.

Food waste is measured as fresh mass all along the food value chain, including production sites, processing and manufacture, retail and distribution, restaurants and food services and households.

Recycling rate of municipal waste

The indicator measures the share of recycled municipal waste in the total municipal waste generation. Recycling includes material recycling, composting and anaerobic digestion. The ratio is expressed in percent (%) as both terms are measured in the same unit, namely tonnes.

Recycling rate of all waste excluding major mineral waste

The indicator is calculated as recycled waste (RCV_R) divided by total waste treated excluding major mineral wastes (TRT), multiplied by 100. It is expressed in percent (%) as both terms are measured in the same unit, namely tonnes. Recycled waste is waste treated, which was sent to recovery operation other than energy recovery and backfilling (for simplification referred to as recycling). Waste data are adjusted for waste collected in one country and recycled in another country. The amount of recycled waste is adjusted as following: waste treated in domestic plants plus waste sent out of the country for recycling minus waste imported and treated in domestic recycling plants. Waste treated is based in Waste Statistics Regulation and the imports and exports of wastes are based on Foreign Trade Statistics and reported according to the Combined Nomenclature (CN-codes). The indicator covers both hazardous (hz) and non-hazardous (nh) waste from all economic sectors and from households, including waste from waste treatment (secondary waste) but excluding most mineral waste. Major mineral waste is excluded in order to avoid situations where trends in ordinary waste generation can be drowned out by massive fluctuations in the generation of wastes in the mineral extraction and transformation sector. This also permits more meaningful comparison across countries, as mineral waste accounts for very substantial quantities in countries characterized by major mining and construction sectors.

Generation of packaging waste per capita

'Packaging' in this context means all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non-returnable' items used for the same purposes shall also be considered to constitute packaging. 'Packaging waste' means any packaging or packaging material covered by the definition of waste in the Waste Framework Directive 2008/98/EC, excluding production residues (Art.3(1): 'waste' means any substance or object which the holder discards or intends or is required to discard).

Generation of plastic packaging waste per capita

This indicator includes plastic packaging waste. 'Packaging' in this context means all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Non-returnable' items used for the same purposes shall also be considered to constitute packaging. 'Packaging waste' means any packaging or packaging material covered by the definition of waste in the Waste Framework Directive 2008/98/EC, excluding production residues (Art.3(1): 'waste' means any substance or object which the holder discards or intends or is required to discard).

Recycling rate of packaging waste by type of packaging

The indicator is defined as the share of recycled plastic packaging waste in all generated plastic packaging waste. Packaging waste covers wasted material that was used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer, excluding production residues.

The ratio is expressed in percent (%) as both terms are measured in the same unit, namely tonnes.

Recycling rate of plastic packaging waste counts exclusively material that is recycled back into plastic (material recycling / generation).

Recycling rate of waste of electrical and electronic equipment (WEEE) separately collected

The indicator is calculated by dividing the weight of waste of electrical and electronic equipment (WEEE) that enters the recycling/preparing for re-use facility by the weight of all separately collected WEEE (both in mass unit).

Circular material use rate

The indicator measures the share of material recycled and fed back into the economy - thus saving extraction of primary raw materials - in overall material use. The circular material use, also known as circularity rate is defined as the ratio of the circular use of materials to the overall material use. The overall material use is measured by summing up the aggregate domestic material consumption (DMC) and the circular use of materials. DMC is defined in economy-wide material flow accounts. The circular use of materials is approximated by the amount of waste recycled in domestic recovery plants minus imported waste destined for recovery plus exported waste destined for recovery abroad. Waste recycled in domestic recovery plants comprises the recovery operations R2 to R11 - as defined in the Waste Framework Directive 75/442/EEC. The imports and exports of waste destined for recycling - i.e. the amount of imported and exported waste bound for recovery – are approximated from the European statistics on international trade in goods. A higher circularity rate value indicates means that more secondary materials substitute for primary raw materials thus reducing the environmental impacts of extracting primary material.

Contribution of recycled materials to raw materials demand - end-of-life recycling input rates (EOL-RIR)

The indicator measures, for a given raw material, how much of its input into the production system comes from recycling of "old scrap" i.e. scrap from end-of-life products. The 'end-of-life recycling input rate' (EOL-RIR) does not take into account scrap that originates from manufacturing processes ("new scrap").

Trade in recyclable raw materials

The indicator measures the quantities of selected waste categories and by-products that are shipped between the EU Members States (intra-EU) and across the EU borders (extra-EU). Five classes have been selected: plastic; paper and cardboard; precious metal; iron and steel; copper, aluminium and nickel. The indicator includes the following variables: • Intra EU trade of selected recyclable raw materials (measured as the Imports from EU countries). • Imports from non-EU countries and exports to non-EU countries of selected recyclable raw materials (as regards extra-EU trade). The indicator is based on International Trade in Goods Statistics (ITGS) published by Eurostat. The scope of the "recyclable raw materials" is measured in terms of relevant product codes from the Combined Nomenclature used in International Trade in Goods Statistics (see list of codes selected).

Private investment and gross added value related to circular economy sectors

The indicator includes “Gross investment in tangible goods“ and “Value added at factor costs“ in the following three sectors: the recycling sector, repair and reuse sector and rental and leasing sector.

Gross investment in tangible goods is defined as investment during the reference year in all tangible goods. Included are new and existing tangible capital goods, whether bought from third parties or produced for own use (i.e. capitalised production of tangible capital goods), having a useful life of more than one year including non-produced tangible goods such as land. Investments in intangible and financial assets are excluded.
Value added at factor costs is the gross income from operating activities after adjusting for operating subsidies and indirect taxes. It can be calculated as the sum of turnover, capitalized production, other operating income, increases minus decreases of stocks, and deducting the following items: purchases of goods and services, other taxes on products which are linked to turnover but not deductible, duties and taxes linked to production. Value adjustments (such as depreciation) are not subtracted.

The indicator is calculated in three steps as follows:

Conceptual framework. The delineation of economic activities related to the circular economy was determined by means of a sector classification based on the purpose of each sector.
The relevant activities were identified and matched against the integrated system of economic classification, drawing upon existing lists of goods and services for the environmental sector.
Produce the estimates based on official statistics, in particular structural business statistics, PRODCOM, national accounts, the Labour Force Survey and others.

Persons employed in circular economy sectors

The indicator measures "Number of persons employed" in the following three sectors: the recycling sector, repair and reuse sector and rental and leasing sector.

Jobs are expressed in number of persons employed and as a percentage of total employment.

Number of persons employed is defined as the total number of persons who work in the observation unit, i.e. the firm (inclusive of working proprietors, partners working regularly in the unit and unpaid family workers), as well as persons who work outside the unit who belong to it and are paid by it - e.g. sales representatives, delivery personnel, repair and maintenance teams. It excludes manpower supplied to the unit by other enterprises, persons carrying out repair and maintenance work in the enquiry unit on behalf of other enterprises, as well as those on compulsory military service.

Patents related to recycling and secondary raw materials

The indicator measures the number of patents related to recycling and secondary raw materials. The attribution to recycling and secondary raw materials was done using the relevant codes in the Cooperative Patent Classification (CPC) (list of CPC codes selected). The term 'patents' refers to patent families, which include all documents relevant to a distinct invention (e.g. applications to multiple authorities), thus preventing multiple counting. A fraction of the family is allocated to each applicant and relevant technology.

Consumption footprint

The indicator consumption footprint estimates the environmental impacts of EU and Member States consumption by combining data on consumption intensity and environmental impacts of representative products. The indicator covers five areas of consumption: food, mobility, housing, appliances, and household goods. Consumption intensities are calculated based on consumption statistics.

Greenhouse gases emissions from production activities

This indicator presents greenhouse gas emissions of all production activities undertaken in the EU economy. Notably, this indicator includes emissions from international air transport undertaken by EU resident airlines and excludes emissions by private households.

The indicator is measured in kilograms of CO2-equivalents per capita.

Material import dependency

This indicator provides the ratio of imports (IMP) over direct material inputs (DMI) in percentage. The term 'material import dependency' shows the extent to which an economy relies upon imports in order to meet its material needs. Material import dependency cannot be negative or higher than 100%. Values equal to 100% indicate that there are no domestic extractions during the reference year.

EU self-sufficiency for raw materials

The Self-sufficiency (SS) indicator measures how much the EU is independent from the rest of the world for several raw materials. The indicator has been calculated based on actual yearly quantity data for domestic production, exports and imports, using the formula:

Self-sufficiency = 1 - (net) Import Reliance, where Import Reliance (IR) is defined in the EU Critical Raw Materials methodology as Net imports / (Net imports +Domestic Production).

The values of Self-sufficiency indicator could range from 0 to 100%.

Due to increasing demand for certain materials (such as silicon, copper, tellurium and indium), even if 100% were recycled, the EU would still not be self-sufficient. The indicator should be considered in a broader context considering potential disruption of supply in the context of economically sensitive key areas.

Appendix 2: Minkov-Hofstede's Cultural Dimensions Scores (Minkov & Kaasa, 2022)

Table 3
Scores on individualism-collectivism and flexibility-monumentalism for 102 countries and territories.

Country	Abbreviation	Individualism-collectivism	Flexibility-monu
1. Albania	ALB	*−91*	*38*
2. Algeria	ALG	*−83*	*−95*
3. Andorra	AND	*108*	*−8*
4. Argentina	ARG	**0**	**−80**
5. Armenia	ARM	*−127*	*−38*
6. Australia	AUS	**83**	**41**
7. Austria	OST	**95**	**−2**
8. Azerbaijan	AZE	*−88*	*55*
9. Bangladesh	BAN	*−173*	*−39*
10. Belarus	BLS	*−13*	*27*
11. Belgium	BLM	**110**	**63**
12. Bolivia	BOL	*−106*	*−116*
13. Bosnia	BOS	*−43*	*−47*
14. Brazil	BRZ	**−56**	**−83**
15. Bulgaria	BUL	*−6*	*19*
16. Canada	CAN	**78**	**31**
17. Chile	CHL	**−8**	**−153**
18. China	CHN	**−31**	**134**
19. Colombia	COL	**−81**	**−182**
20. Croatia	CRO	*−33*	*−32*
21. Cyprus	CYP	*−24*	*−97*
22. Czech R.	CZR	**70**	**17**
23. Denmark	DEN	**140**	**51**
24. Dominican Republic	DOM	**−49**	**−154**
25. Ecuador	ECU	*−100*	*−102*
26. Egypt	EGY	**−141**	**−111**
27. Estonia	EST	*39*	*108*
28. Ethiopia	ETH	*−164*	*−145*
29. Finland	FIN	**88**	**71**
30. France	FRN	**86**	**57**
31. Georgia	GEO	*−134*	*−103*
32. Germany	GRM	**102**	**46**
33. Ghana	GHN	*−156*	*−205*
34. Greece	GRC	**30**	**17**
35. Guatemala	GUA	*−57*	*−98*
36. Haiti	HAI	*−39*	*−285*
37. Hong Kong	HKG	**−5**	**199**
38. Hungary	HUN	**72**	**−9**
39. Iceland	ICE	*119*	*45*
40. India	IND	**−101**	**17**
41. Indonesia	IDS	**−171**	**−78**
42.Iran	IRN	*−107*	*−73*
43. Iraq	IRQ	*−99*	*−160*
44. Ireland	IRE	**27**	**17**
45. Israel	ISR	**16**	**2**
46. Italy	ITL	**5**	**−36**
47. Japan	JPN	**42**	**234**
48. Jordan	JOR	*−115*	*−120*
49. Kazakhstan	KZK	**−106**	**62**
50. Kenya	KEN	**−177**	**−158**
51. Kuwait	KUW	*−86*	*−71*
52. Kyrgyzstan	KYR	*−148*	*−49*
53. Lebanon	LBN	*−92*	*1*
54. Libya	LIB	*−128*	*−111*
55. Lithuania	LTN	*15*	*10*
56. Macao	MCO	*−30*	*165*
57. Malaysia	MLS	**−89**	**−1**
58. Mexico	MXC	**−63**	**−104**
59. Mongolia	MGL	*−53*	*13*
60. Montenegro	MNT	*−91*	*−32*
61. Morocco	MRC	*−103*	*−99*
62. Myanmar	MYA	**−73**	**−55**
63. Netherlands	NET	**182**	**87**
64. New Zealand	NZL	**68**	**37**
65. Nicaragua	NIC	*−91*	*−134*
66. Nigeria	NIG	**−291**	**−173**
67. North Macedonia	MAC	*−41*	*−51*
68. Norway	NOR	**112**	**36**

Table 3 (*continued*)

Country	Abbreviation	Individualism-collectivism	Flexibility-monumentalism
69. Pakistan	PAK	*−171*	*−122*
70. Peru	PER	**−117**	**−187**
71. Philippines	PHI	**−126**	**−4**
72. Poland	POL	**−15**	**9**
73. Portugal	POR	**30**	**−24**
74. Puerto Rico	PUE	**−29**	**−90**
75. Qatar	QTR	*−125*	*−145*
76. Romania	ROM	**−19**	**−64**
77. Russia	RUS	**−21**	**48**
78. Rwanda	RWA	*−134*	*−133*
79. Serbia	SRB	**−33**	**−44**
80. Singapore	SIN	**−29**	**89**
81. Slovakia	SVK	*22*	*25*
82. Slovenia	SVN	*110*	*15*
83. South Africa	SAF	**−105**	**−126**
84. South Korea	KOR	**25**	**174**
85. Spain	SPA	**58**	**2**
86. Sweden	SWE	**133**	**21**
87. Switzerland	SWI	**105**	**−21**
88. Taiwan	TWN	**−43**	**175**
89. Tajikistan	TAJ	*−157*	*0*
90. Thailand	TLN	**−121**	**87**
91. Trinidad	TRI	*−98*	*−134*
92. Tunisia	TUN	*−90*	*−102*
93. Turkey	TUR	**−18**	**−52**
94. Ukraine	UKR	**14**	**19**
95. United Kingdom	UNK	**93**	**56**
96. Uruguay	URU	*34*	*−85*
97. United States	USA	**33**	**11**
98. Uzbekistan	UZB	*−113*	*−2*
99. Venezuela	VEN	**−95**	**−207**
100. Vietnam	VIE	**−78**	**−1**
101. Yemen	YEM	*−99*	*−130*
102. Zimbabwe	ZIM	*−143*	*−209*

Abstract :

In a globalized world where humankind faces an unprecedented challenge due to the climate crisis, a new vision of economic models has emerged to overcome the upcoming challenges: the circular economy. This paradigm shift aims to put the people, the planet, and profit at the center of decisions through environment regeneration and waste and pollution minimization. However, a globalized context puts severe stress on implementing new economic models as humans face different experiences, values, and cultures.

While the scientific literature acknowledges the influence of cultural dimensions on sustainability practices, little research exists on the specific relationships between cultural dimensions and the circular economy. Hence, through a Pearson correlation analysis, a timeline analysis and a literature review, we have explored the potential link between the circular economy indicators extracted from Eurostat and Minkov's cultural dimensions model, a reviewed model of Hofstede's cultural dimensions model.

We have found that the individualist-collectivist cultural dimension significantly correlates with multiple indicators, especially indicators of competitiveness and innovation. We have also explored the underlying mechanism behind such correlation, such as individualist values, beliefs, and experiences.

In contrast, we found that the flexibility-monumentalism cultural dimension, formerly known as the long-term orientation, held a weaker overall correlation except for the circular material use rate and the greenhouse gas emissions from production activities. We have tried to identify the latent reasons behind these relationships.

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