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Master Thesis

– The Strategic Role of Chief Financial Officers in the Transition to Circular Business Models –

Striking a Balance between Strategic Leadership and Financial Performance

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IV. List of Abbreviations

AIC	Akaike Information Criteria
AUM	Assets Under Management
CapEx	Capital Expenditures
CE	Circular Economy
CFO	Chief Financial Officer
CSR	Corporate Social Responsibility
EBIT	Earnings Before Interest and Tax
EMA	Ellen MacArthur Foundation
ESG	Environmental, Social, and Governance
EU	European Union
GICS	Global Industry Classification Standard
KPI	Key Performance Indicator
OpEx	Operating Expenditures
PCI	Problem Centred Interview
TMT	Top Management Team
UET	Upper Echelons Theory
VIF	Variance Inflation Factor
WAVG	Weighted Average Investment Volumes

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VII. Abstract

The following study investigates which sociodemographic characteristics of CFOs are beneficial for the transition to circular business models in their companies. The theoretical base for this study is Upper Echelons Theory which focuses on how top management orientations and values influence the strategic choices in firms. A multi methods approach was chosen (qualitative and quantitative) to empirically validate the hypotheses on sociodemographic characteristics. First, data was collected from 97 CFOs from companies supporting a transition to a circular economy. In the second study, qualitative data from expert interviews is used to validate the empirical results and to identify other important influencing factors not previously considered. The study concludes that younger CFOs are positively related to the transition to a circular business model, as are CFOs with lower levels of formal education (bachelor's degrees). This implies for older CFOs that they may subconsciously stand in the way of a transition and that they should therefore become aware of this to avoid it. The expert interviews give reason to believe that it is rather the CFOs' willingness to learn in this specific area that is decisive and that in the future formal education in sustainability matters can be of increased importance. Consequently, it is crucial for CFOs to continue to learn and educate themselves around sustainability and specifically circular economy in order to be aware of the identified benefits but also hurdles of such a transition presented in this paper and to benefit and handle them more easily. CFO tenure yields different relationships in the quantitative (positive one) and qualitative (negative one) parts of the study. Apart from that, the results from the qualitative study suggest that unobservable psychological characteristics of CFOs have a positive influence on the transition to circular business models. These should also be investigated further in the future.

1. Introduction

"Circular economy is an economic system that is regenerative by design. The linear economy is the prevailing model because simply the world is just not in tune or necessarily aware of the circular model and it's economic and societal benefits.", stated Attila Turos the lead of Future of Production of the World Economic Forum in 2019 in the award-winning film Closing the Loop (Closing the Loop Film, 2018).

The circular economy (CE), but also its business models and the transition to these have been explained and developed in detail in the recent literature (Geissdoerfer et al., 2020 Hartley et al., 2020; Kirchherr et al., 2017; Bocken et al., 2018; Kanda et al., 2021). Additionally, benefits like cost savings (Ormazabal et al., 2018; Rizos et al., 2016) or innovation (Sehnem et al., 2022; Suchek et al., 2021) as well as barriers for the transition (De Jesus & Mendonça, 2018; Ranta et al., 2018; Kirchherr et al., 2018) have received greater attention. However, the role of the Chief Financial Officer (CFO) has not been highlighted yet and therefore will be examined in this study. As part of the Top Management Team (TMT) and with authority over financial resources the CFO has a decisive influence on the strategic transition of the business model (Gauss, 1997; Alvarez, 2021; Bouker, 2020). The results of the work, which draws on the Upper Echelons Theory (UET), indicate that the CFO plays a crucial role for a successful transition to a CE business model and decisive socio-demographic characteristics of the CFO in this regard are identified.

The mostly cited definition of CE comes from the Ellen MacArthur (EMA) foundation (Kirchherr et al., 2017; Geissdoerfer et al., 2017) which defines CE as *"an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models."* (Ellen MacArthur Foundation, 2012). Consequently, it is an economic system in which resources are used and reused in a cyclical manner, rather than being extracted, used, and then discarded in a linear way. Waste and pollution are minimized, and materials are

kept in use for as long as possible (Geissdoerfer et al., 2020). All different kind of stakeholders need to be involved in this profound change ranging from customers and companies also to policy makers (Ghisellini et al., 2016; Lieder & Rashid, 2016).

It is therefore no surprise that CE business models have also received attention from regulators (Geissdoerfer et al., 2020). In 2020 the European Union (EU) developed specifically an action plan for the circular economy as they see huge potential in the transition to a CE towards reaching carbon neutrality (European Commission, 2020). Adopting CE principles in only five sectors could save as much CO_2 emissions as eliminating all emissions from transportation worldwide (Ellen MacArthur Foundation, 2020). The EU has made it a key priority, recognizing that the current linear model of resource use contributes to environmental degradation, resource depletion (European Commission, 2020), and plastic pollution (European Parliament, 2019) which further emphasizes the importance of a successful transitioning to these business models. For this reason, further research should be conducted to determine which factors in the TMT are conducive to this transition, and the focus in the following is on CFOs.

CFOs play a critical role in the transition of businesses (Alvarez, 2021), as they are responsible for managing the financial resources of the organization and making strategic financial decisions. They are often key decision-makers in the organization, and their leadership and support are essential for implementing changes and driving the transition towards a more sustainable and resilient business model (Mancuso et al., 2018). However, an investigation of the role of the CFO for the transition to a CE and which of its characteristics have a positive influence on their success has not taken place so far and therefore this will be addressed in a multi methodology approach in this thesis.

Based on the UET, the relationship between the sociodemographic characteristics of CFOs e.g., gender, age, education, tenure, experience, externally vs. internally hired, and the successful transition to CE business models in their companies is investigated. According to UET these observable sociodemographic characteristics are important determinants of firms' strategic management process and performance (Hambrick & Mason, 1984; Hambrick, 2007). With respect to the

implementation of sustainable/environmental practices, past studies indicate that the characteristics of the TMT can lead to stronger executive commitment and a positive impact on sustainability performance (White & Borgholthaus, 2022; Shahab et al., 2020; Hewa Heenipellage et al., 2022; Wiengarten et al., 2017).

However, CE has received little attention in the process. Moreover, CFOs have generally received less attention in the UET literature than CEOs and have often been disregarded in the context of sustainability and especially CE. Recently, Dhir et al. (2023) investigated drivers of sustainable business model innovation based on UET, but did not look specifically at CE business models nor CFOs. Observable sociodemographic characteristics were also only indirectly included in the form of gender diversity and more unobservable psychological factors were investigated. Closing this gap helps to understand which characteristics of the CFO, a significant strategic and financial decision maker, contribute to support a transition to CE business models. This is important as these business models represent an opportunity to achieve the EU's climate goals (Ellen MacArthur Foundation, 2020) and should therefore increase in the future. Consequently, in this study the following research question is investigated:

Which sociodemographic characteristics of the CFO are beneficial for the transition to a CE business models?

Addressing this research gap is important due to several reasons from a theoretical point of view. This study contributes to the broader UET literature focusing on CFOs, business model innovation, and sustainability. To the best of my knowledge, this is the first study to exclusively focus on the CFOs' effect on CE businesses model transformation and additionally, the first study based on UET exclusively focusing on CE business model transformation.

The thesis starts with a literature review about CE business models, and what characterizes the transition to CE business models. Then the UET with particular focus on the role of the CFO in the transition to CE business models are investigated. This review ends with six hypotheses to examine the relationship between CFOs' socio-demographics and the firms' transition to circular business models. After that the data and methodology of the quantitative part are presented as well as the results. The same is done for the qualitative expert interviews.

Afterwards, the findings of the quantitative study and the expert interviews are discussed. Finally in the conclusion, implications are mentioned as well as limitations, the contribution to the literature and possible future research is listed.

2. Literature Review & Hypotheses

Ahead of the literature review about CE business model transition and the role of CFOs in it, in which the hypotheses of the thesis are derived, the basic assumptions of the hypothesis design are first presented.

2.1 Hypotheses Design

The hypothesis design first addresses a basic assumption regarding the dependent variable based on results from the sustainable finance literature before the underlying theory of the hypotheses is presented in a literature review.

2.1.1 Circular Economy Business Model Indicator

In order to investigate the association between CE business model transition and CFO characteristics, UET is used mainly to provide a theoretical framework for the hypotheses tested (see next subchapter). In the absence of a public available key performance indicator (KPI) for CE companies at the time of this thesis, an approximation approach using CE funds and their asset allocation is used in this study. Therefore, this study assumes that analysts of CE funds mainly allocate their assets according to the degree of CE activities in the companies. This is based on the reasoning that managers of environment, social, governance (ESG) funds generally provide their investors with higher ESG exposure and support ESG principles to a greater extent without increasing costs for investors or experiencing reduced profits (Curtis et al., 2021). Therefore, this thesis and the following hypotheses assume that higher investment volumes of CE funds represent a more successful transition to CE business models. For more information, see the methodology section on the CE funds.

2.1.2 Upper Echelons Theory

UET is a managerial perspective that suggests that top managers, including CFOs, play a critical role in shaping the strategic direction and performance of organizations. The core tenet of the 1984 by Hambrick and Mason developed theory is that leaders' experiences, values, and personalities have a critical impact on their

interpretations of situations and therefore influence their decisions (Hambrick & Mason, 1984; Hambrick, 2007). Consequently, also the decision of a business model innovation like investigated in this thesis can be understood through the lenses of UET. Guo et al. (2013) examined the influence of managerial and entrepreneurial skills of managers on the business model innovation across China based on the UET. However, the included attributes of managerial skills and entrepreneurial skills are the so-called non-observable psychological characteristics studied by Hambrick and Mason. In addition to these, observable characteristics and demographics are also part of the theory and oftentimes placed at the centre of studies. These are attributes such as age, tenure, education, gender, and experience (Hambrick & Mason, 1984).

Much research on CEOs' influence on strategic choices has been conducted within UET. On the one hand various studies investigate the influence of observable characteristics on firm outcome like performance, growth, or strategic change (Bromiley & Rau, 2016). On the other hand, like Guo et al. (2013), also different other studies investigate the influence of non-observable psychological factors of the CEO e.g., firm performance or entrepreneurial decisions in the company (Bromiley & Rau, 2016). White & Borgholthaus (2022) find in their recent literature review of UET that there is a movement away from research about CEOs and their characteristics to research about other members of the TMT like for instance CFOs.

Literature explicitly examines CFOs and their characteristics and impact on performance (Mian, 2001) or focuses on their influence on management practices that are part of their control and decision making area. Hiebl (2014) investigate the influence of CFOs' characteristics on management accounting and control and Plöckinger et al. (2016) look at the influence on corporate financial reporting in a literature review. Overall, a significant influence of the CFO on corporate financial reporting can be identified while results however, are sometimes inconsistent and equivocal. But a general support for UET predictions could be found in the literature (Plöckinger et al., 2016). Younger and shorter tenured CFOs tend to support more innovative accounting systems (Hiebl, 2014) while externally recruited CFOs have introduced an innovative ERP system more often as well as less educated ones (Hiebl et al., 2017). Ginesti et al. (2021) look at the relation of a CFOs' socio-

demographics and the intensity of R&D investment in their companies and find support that female CFOs, older ones as well as higher educated CFOs are positively related to the intensity. Recently, Weigel et al. (2022) examine financial managers' characteristics and the organizational ambidexterity, meaning the capability to be efficient and innovative at the same time, in German "Mittelstand" companies and find support for the influence of a business education of the CFOs.

White & Borgholthaus (2022) also identify a slight trend towards UET research that investigates indicators such as environmental and sustainability performance. For example, Shahab et al. (2020) examine CEO characteristics and the relation to sustainability performance and find a positive influence of a research background as well as of financial expertise and foreign exposure while youth is negatively related. Wiengarten et al. (2017) on the other hand examine the influence of different characteristics of the chief executive of corporate social responsibility (CSR) on the financial performance and results show a positive impact of female managers in the position and of ones with experience in this matter. Hewa Heenipellage et al. (2022) also find that previous experience is positively linked to sustainability performance as well as education and exposure to the environment and other countries. Others focus on psychological factors such as various leadership skills in top management and their influence on environmental performance and find that resource and energy management and stewardship's specific leadership skills of insight, planning, control, and timing have a positive relationship (Bendoly et al., 2021)

In the context of CE, Dubey et al. (2019) study the influence of the top management on their suppliers in regards of CE initiatives. This showed a positive influence of management commitment towards sustainability on their supplier relation management practices for CE and thus considered a psychological factor of UET rather than demographic or observable characteristics. Dhir et al. (2023) investigate the drivers of sustainable business model innovation in the TMT based on UET and identify ambidextrous learning. Positively related with this and consequently with sustainable business model innovation is a diverse TMT as well as a university-industry collaboration. To the best of my knowledge, there are no studies based on UET that specifically examine CFO characteristics and their impact on

sustainability performance or innovation, nor studies that generally link TMT and their characteristics to circular economy business model innovations.

2.2 Circular Economy Business Models and its Transitions

In the following, CE business models and transitions to these models are presented for a better understanding of the topic and the hypotheses that follow.

2.2.1 Circular Economy Business Models

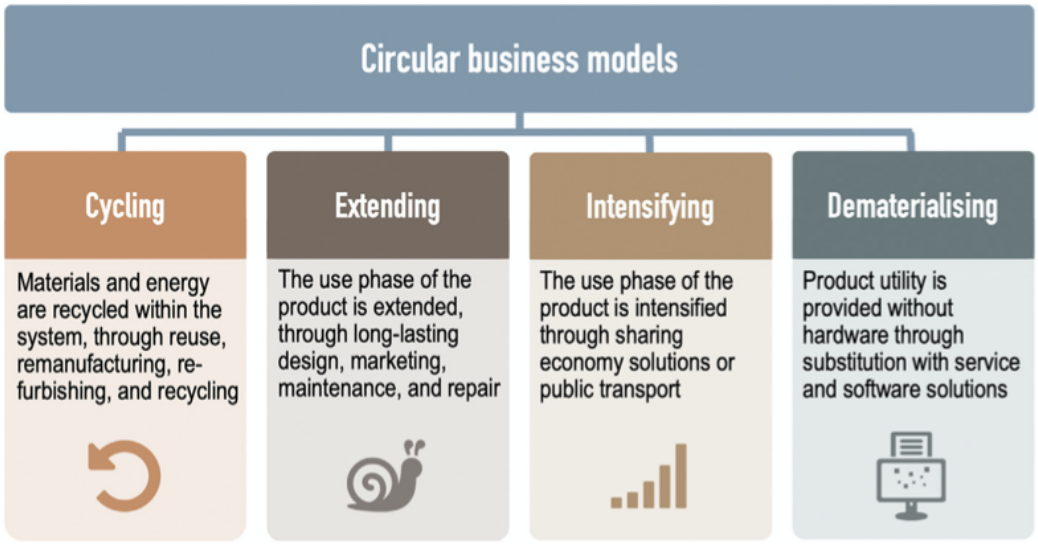
The circular approach aims to reduce the environmental impact of economic activity, improve resource efficiency, and create economic value (Geissdoerfer et al., 2020). Products and materials are oftentimes designed in closed loop concepts already with reuse and recycling in mind and diverse concepts like regenerative design, cradle-to-cradle, biomimicry, and blue economy are interlinked with the theory (Geissdoerfer et al., 2017). Instead of being thrown away, they are recovered and used as feedstocks for new products or reintegrated into the production process. This can involve using recycled materials in the production of new products, repairing, and refurbishing products, or using products for multiple cycles of use before they are eventually recycled (Kirchherr et al., 2017). CE principles can be applied to a wide range of sectors, including manufacturing, agriculture, and resource extraction (Weetman, 2021). By shifting from a linear to a circular model, it is possible to create more sustainable and resilient economic systems that benefit both people and the natural environment (Lieder & Rashid, 2016).

CE business models aim to use as little resources as possible while creating a maximum of value out of them. To reach this it is necessary that these business models redefine value chains and value creation (Schulte, 2013). Past linear business models are based on the concept of producing, using, and discarding resources and products while now resources are aimed to stay in the cycle as long as possible to enhance the yield gained out of them and to increase resource efficiency (Manninen et al., 2018). Many scholars define CE and CE- activities with the 3R-framework: *reduce*, *reuse*, and *recycle* and all three should replace the ‘end-of-‘life of resources (Hartley et al., 2020; Reh, 2013; Sakai et al., 2011). In recent years, this concept is oftentimes extended by *recovery* to the 4R framework (Garcés-Ayerbe et al., 2019; Kirchherr et al., 2017).

CE activities that aim to *reduce* the number of resources used are for example product-as-a-service business models that provide a product or service to customers on a subscription or pay-per-use basis or sharing platforms, rather than selling the product outright which can reduce the amount of waste generated and encourage the use of products for longer periods of time (Stahel, 2019). Business models of *reusing*, repairing, and refurbishing of products instead of discarding them can involve providing repair services, selling refurbished products, or leasing equipment (Weetman, 2021). *Recycling* and resource *recovery* are CE business models that involve collecting and processing waste materials and turning them into feedstocks for new products or energy by setting up recycling facilities or partnering with companies that can use the recovered materials. To conclude closed-loop supply chains are designed in a way that materials are kept in use for as long as possible and waste is minimized. Recycled materials can be reused in the production process, products can be designed for reuse or disassembly, or recovery systems can be implemented for end-of-life products (Ritchie, 2021). It has to be taken into account the emphasis on as long as possible as closed-loop systems without any material or energy leakage ever are just not feasible (Zotti & Bigano, 2019; Skene, 2018).

Kirchherr et al. (2017) on the one hand found an emphasis in the literature on *recycling* and *reuse* but on the other hand that these concepts tend to be replaced by a more systematic framework from 2012 onwards. Systems thinking is necessary for a transition to these circular closed-loop business models as it is profoundly complex (Bocken et al., 2016). Business models define the nature of a company's business (Magretta, 2002), are an essential stimulus for innovation (Teece, 2010), and aim to fit the value logic framework of Richardson meaning to show the value proposition, creation, delivery, as well as the value capture (Richardson, 2008). In combination with the CE frameworks the result are four CE business model strategies: cycling, extending, intensifying, and dematerialising (see figure 1) (Geissdoerfer et al., 2020).

Figure 1:
Circular Business Models Strategies



Note: From*: Circular business models: A review*, by: Geissdoerfer et al., 2020, p.7.

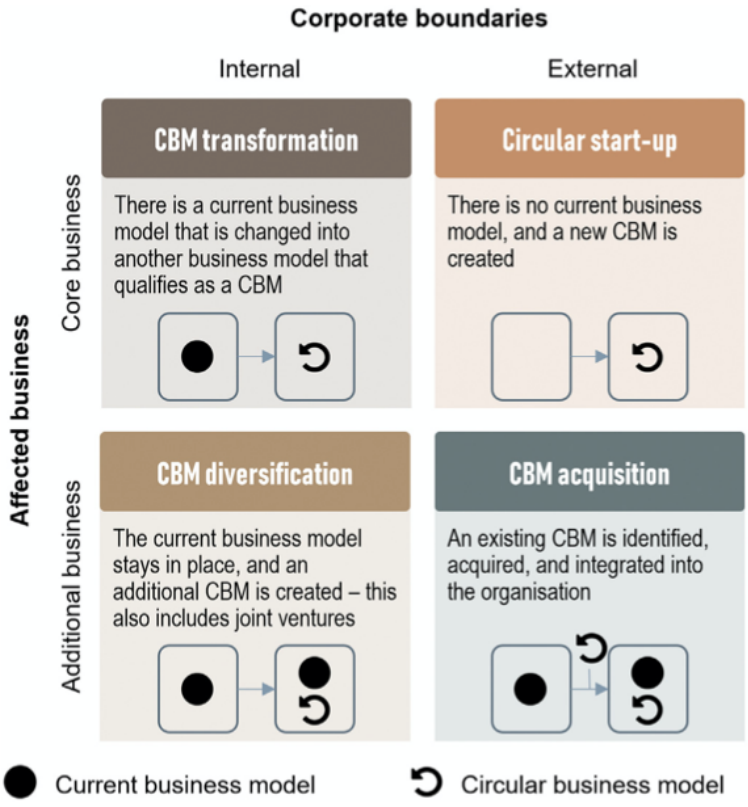
Circularity needs to be the goal or vision in the business model to result in a circular flow of resources by closing the loop between post-use and production (Bocken et al., 2016) through *recycling* and *reuse*, while the design of the product aims to extend the use of it as does repair and *recovery*. Apart from that the product can be used more intensively like in sharing solutions or substituted (= dematerialized) by service and software solutions to *reduce* the resource use (Geissdoerfer et al., 2020). For a detailed overview of how the four circular business models fit the business model value logic framework see appendix 1.

Recently a study of Kanda et al. (2021) went one step further and stated that the business model concept is not suitable to describe CE activities of companies. According to the authors, the concept of circular ecosystems that they introduce is more appropriate. The authors studied mainly Swedish biogas producers in a case study and found that the companies and their value creation are closely interconnected. The authors postulate that the previously defined CE activities such as cycling, extending, intensifying, and dematerializing are better studied with an ecosystem-level perspective, based on the ecosystem business literature (Kanda et al., 2021). In the following, however, the study simply talks about CE business model transitions, as the focus is on the role of the CFO and not on CE business models.

2.2.2 Transition to a Circular Business Model

The transition or innovation to circular business models is often simplistically described as the change from linear to circular business models (Bocken et al., 2018; Rizos et al., 2016). A more holistic description of the transition can be defined *"as the conceptualization and implementation of circular business models, which comprises the creation of circular start-ups, the diversification into circular business models, the acquisition of circular business models, or the transformation of a business model into a circular one. This can affect the entire business model or one or more of its elements, the interrelations between the elements, and the value network."* (Geissdoerfer et al., 2020) (see figure 2).

Figure 2:
Four Types of Circular Business Model Innovation



Note. CBM stands for circular business model. From*: Circular business models: A review,* by: Geissdoerfer et al., 2020, p.8.

In the following all these forms of circular business model innovation are referred to as transition to a circular business model since it is not possible or intended to distinguish for the companies examined whether the circular business model was acquired, is a start-up idea, the business model was only circularly diversified, or

was fully or partially transformed. All companies are considered to be a CE business model transition.

Transitioning to CE business models can not only present positive environmental impacts (Ellen MacArthur Foundation, 2020) but also many opportunities for businesses in the form of an increase in financial and sustainable performance (Kanda et al., 2021). It can improve a company's reputation and brand value by demonstrating a commitment to sustainability and environmental responsibility (Ellen MacArthur Foundation, 2015). This can be especially important in today's increasingly environmentally conscious market, where consumers are increasingly seeking out companies that are aligned with their values (Ritchie, 2021). This increase in prestige and recognition is widely supported by recent studies (Río et al., 2016; Ormazabal & Puga-Leal, 2016; Rizos et al., 2016; Ormazabal et al., 2018).

One of the key benefits found is cost savings (Ormazabal et al., 2018; Rizos et al., 2016; Ritzén & Sandström, 2017). Transitioning to CE can lead to reduced costs by decreasing the need to extract and process raw materials, as well as by reducing waste and increasing resource efficiency (McKinsey & Company & Ellen MacArthur Foundation, 2015). CE could result in cost savings of more than $2 billion per year for businesses in Europe across industries (McKinsey & Company, 2017). And also the European Commission stated cost savings already in 2015 in their overview of the economic and environmental benefits of transitioning to a CE, as well as increased competitiveness of companies and new job opportunities as benefits (European Commission, 2015).

Another benefit found in the literature of circular business model transition is an increased competitiveness based on innovation or the related system change (Donner et al., 2020; Suchek et al., 2021; Sehnem et al., 2022). Adopting CE business models can give businesses a competitive advantage by differentiating them from traditional linear businesses, by making their products more resilient, or by adding new revenue streams through a simultaneous production of different products at once instead of producing waste (World Economic Forum, 2019). Companies that adopt circular business models are more likely to outperform their competitors in terms of financial performance due to reduced risks (Ritchie, 2021).

Cost savings as well as increased financial performance have a direct impact on the financial results of the company and thus on the CFO's area of responsibility who is therefore directly affected by the transition to a CE business model. However, these financial gains do not always come smoothly and without hurdles.

De Jesus & Mendonça (2018) classified the barriers that affect the implementation of CE activities or policies based on 40 papers published from 2006-2015 to group them from hard to soft. They identified hard barriers on the one hand as technical factors, such as technology availability, and training and on the other hand economic factors, such as associated capital requirements, and soft barriers with social, regulatory, and institutional factors (see table 1).

Table 1:
Hard and Soft Barriers for CE Business Models

<table>
<tr><th colspan="3">Hard Barriers</th><th>Soft Barriers</th></tr>
<tr><td colspan="2">Technical Factors</td><td>Economic Factors</td><td rowspan="2">Social Factors
Regulatory Factors
Institutional Factors</td></tr>
<tr><td>Technology Availability</td><td>Training</td><td>Capital Requirements</td></tr>
</table>

Note: Based on *Lost in Transition? Drivers and Barriers in the Eco-innovation Road to the Circular Economy*, from de Jesus & Mendonça, 2018.

In the same year, Ranta et al. (2018) found support for the soft barriers namely a lack of institutional and regulatory support for CE principles and, in addition, a major cultural cognitive barrier to reuse, namely customer preference for new products. The studies by Ormazabal et al. (2018) and Kirchherr et al. (2018) also identified that the main barriers were lack of support from public organizations, insufficient funding, and a lack of customer interest. As the transitioning to a CE business model may involve changes to traditional business models and consumer behaviours, these can present social and cultural challenges and the need to overcome consumer resistance to change (Kirchherr et al., 2018; Weetman, 2021). In addition, regulatory barriers, or a lack of supporting policies to the adoption of CE business models can make the transition more difficult. Kirchherr et al. (2018) found in a large study even in the EU where the regulation in favour of CE (see introduction) is advanced evidence for that by interviewing managers. However, the outside hurdles, regulation and institutional support, for CE business models continue to decrease (Zhu et al., 2019; Monciardini et al., 2022), as does slowly

also society's willingness to change behaviour and purchasing patterns for CE (Camacho-Otero et al., 2018; Parajuly et al., 2020; Hazen et al., 2017).

A remaining internal potential threat to the transition to CE business models can be resistance from managers and employees, especially from companies that are slow to adapt to the changing market landscape. Such reluctance may be due to the emergence of new competitors or the disruption of traditional supply chains (De Jesus & Mendonça, 2018). There is the risk that the transition may not be successful, either due to inadequate planning or other factors which can result in financial losses for businesses (McKinsey & Company & Ellen MacArthur Foundation, 2015). The transition to CE involves the technological complexity of the necessary changes to business processes and supply chains, which are associated with financial costs and investments. These can be particularly challenging for businesses that are highly reliant on traditional linear models of resource use (McKinsey & Company & Ellen MacArthur Foundation, 2015).

2.3 Role of CFOs during the Transition to Circular Business Models

CFOs are not only a crucial part of the TMT who can resist such transitions of implementing CE activities or policies in a company and therefore can be a barrier themselves (De Jesus & Mendonça, 2018). Simultaneously, on the one hand they are accountable for the financial consequences of a potential failure but on the other are responsible to overcome financial barriers faced due to the costs of a transition and to decide about investments. By this they are also drivers for such innovations (Huang et al., 2022). Investments are an essential driver to reduce environmental degradation and resource efficiency (Lehmann et al., 2022). The above describe the intrarole conflict of CFOs between supervisor and supporter of innovations (Huang et al., 2022). Consequently, during business model transitions, the CFO plays a crucial role in ensuring that the transition is financially viable and sustainable but also takes a strategic role to the successful transition of a company's business model (Alvarez, 2021; Bouker, 2020; Hommel, 2012; Gladikowski Jens, 2020).

CFOs are essential in the innovation process of a company, and not only because of their decision-making power regarding the allocation of financial resources (Frigo, 2015). Being part of the C-level management they can communicate the

financial aspects of the transition to stakeholders, such as investors and board members, to secure their support and buy-in (Bouker, 2020). Additionally, on the one hand, as part of the TMT, they have an influence on the general formulation and implementation of the innovation strategy in the company and, on the other hand, CFOs are able to understand and evaluate risk-profit relationships (Frigo, 2015). They identify and analyse the financial risks and opportunities associated with a transition. This can involve evaluating the costs and benefits of different business model options and developing financial strategies to mitigate risks and maximize opportunities (Hommel, 2012). Innovative changes itself always have the goal of a positive economic result (McKinsey & Company, 2017), however, it should be noted that breakthrough innovations have a very different risk-reward relationship than incremental innovations. They have much more risk, uncertainty, and less knowledge inherent but at the same time the result is a higher return on investment in case of success. CE business models are such breakthrough innovations, as they change industries, create new markets and are often based on disruptive technologies (Davila et al., 2014).

In recent years, there has been a trend that CFOs take a lead role concerning the sustainability issues in companies. This is due to the fact that the CFO is not only responsible for the financial management of a company, including financial planning, budgeting, and reporting but has access to all the data in a company (Bouker, 2020) as the company's data converges in the departments that report to the CFO. In addition to financial reporting, non-financial reporting on sustainability aspects has become a central task in the CFO's area of control in recent years (Horváth Management Consultants, 2022).

A CFO can secure the necessary financial resources for the transition through fundraising or strategic partnerships (Bain, 2016). There are a range of financing options available to support the transition and the necessary investments. These options can be broadly divided into debt and equity financing. Debt financing involves borrowing money from a lender, such as a bank or financial institution, and repaying the loan with interest over time. Equity financing involves raising money by selling ownership stakes in the business, such as through the sale of stocks or other securities (Ellen MacArthur Foundation, 2020). In addition to traditional debt and equity financing options, there are also a range of specialized

financing options that are specifically designed to support the transition to a CE. For example, the European Investment Bank has established various products and instruments which provide financing to support the development and transition of CE solutions in Europe (European Investment Bank, 2020). Other specialized financing options include (green) bonds, which are issued specifically to finance projects with environmental benefits for example from BASF or Henkel, and apart from that sustainability-linked loans. In this case the mentioned bonds and loans are exclusively focused on funding CE projects. Also in the Private Equity sector projects and funds especially focusing on companies with CE as a core value driver grow steadily (Ellen MacArthur Foundation, 2020).

To sum up, CFOs have an overview of regulatory requirements, costs, risks but also returns and are critical for the funding of sustainability initiatives. Therefore, in the context of sustainability, CFOs can also play a key role in the area of corporate communication and support as they have the necessary access to crucial data (Starbuck, 2012). They can not only grant the needed investments but also communicate the financial benefits of sustainability to other stakeholders, such as investors, employees, and customers, in order to build support for sustainability initiatives and therefore drive the transition to a more sustainable business model (Shannon, 2021). Moreover, they can demonstrate leadership and commitment to sustainability by setting an example for the rest of the organization and by being a role model and making sustainability a key part of their own personal and professional values (Gauss, 1997).

Consequently, sustainability as an organizational choice of the CFO as part of the TMT would be the outcome of the cognitive biases and values of the CFO. This is the core statement of the UET of Hambrick and Mason (Hambrick & Mason, 1984). This is in line with Shahab et al.'s (2020) finding that CEOs that have financial experience tend to have a positive influence on the environmental and sustainable performance of companies, but the younger the CEOs were the more they tended to take actions that reduce both sustainable and environmental performance. This is based on the idea that younger managers avoid huge investments because they are concerned about their career development (Chevalier & Ellison, 1999) and that they are more focused on profits then on sustainable performance (Tran & Pham, 2020).

However, the initial work from (Hambrick & Mason, 1984) proposes that the older managers become the less open for change and the associated risks they are. They often reject new ideas, whereas younger managers welcome new ideas and innovations (Tanikawa et al., 2017). Hiebl (2014) and Naranjo-Gil et al. (2009) show that younger CFOs are associated with more innovative accounting systems. In addition, younger managers take more risk and are more likely to change structures than older ones, which is why they demonstrate a better sustainable performance (Wang et al., 2015). This is because younger managers are more capable of taking a holistic approach to sustainability (Ameer & Khan, 2020). Although Elmagrhi et al. (2019) argue that older managers have accumulated more knowledge and therefore achieve better results in terms of sustainability aspects, for CE business model transformations we follow the argument that younger managers perform better and put this in our counter hypothesis. This is because a transformation to a CE business model requires a holistic and profound change of processes and structures and involves a lot of risk, factors that are hypothesized to be better handled by younger CFOs. Based on this and in the absence of an official number about CE activities of companies, the first hypothesis assumes that younger CFOs lead to higher investments of CE funds[1] (which is consequently found in the counterhypothesis ***H1$_1$***).

***H1$_0$**: In companies that have a younger CFO, CE funds do not significantly invest more.*

***H1$_1$**: In companies that have a younger CFO, CE funds do significantly invest more.*

Elmagrhi et al. (2019) additionally find that a higher female ratio in the board of directors is positively related to the environmental performance of a company which is in line with the results of Tran & Pham (2020) who could also find a positive relationship between female CEOs and the corporate environmental performance. This can be due to the fact that female CFOs invest to a greater extent in R&D activities, necessary for such innovations (Ginesti et al., 2021), that female managers are in general more likely to follow or introduce sustainable strategies (Haque, 2017) and have a significant positive impact on sustainable investment (Atif et al., 2020). This could be explained by the finding that women are less likely to engage in unethical business behaviour (Boulouta, 2013) and instead engage in

[1] The hypotheses follow the argumentation already described in the hypotheses design chapter. Funds managers deliver ESG, thus also CE, exposure and principles better and base their investment decisions and amount on it.

more socially oriented ones (Eagly & Johannesen-Schmidt, 2001). Based on these results, it is assumed in the second hypothesis that female CFOs have a positive effect on the transitions to CE business models and consequently CE funds invest more in these companies.

***$H2_0$**: In companies that have a female CFO, CE funds do not significantly invest more.*

***$H2_1$**: In companies that have a female CFO, CE funds do significantly invest more.*

A wide range of studies found evidence that links higher education to better environmental performance (Tran & Pham, 2020; Lewis et al., 2014; Amore et al., 2019; Shahab et al., 2020) as the level of education and innovation have a positive relationship, due to more advanced knowledge and skills of these individuals (Hambrick & Mason, 1984). Apart from that, individuals with higher levels of education are expected to be more able to deal with ambiguity (Goll & Rasheed, 2005) which is the consequence of such a radical innovation (Grieco, 2018) and CFOs with post university education also tend to invest more in R&D (Ginesti et al., 2021). Furthermore, higher educated individuals tend to show a more environmentally friendly behaviour (Meyer, 2015). More specifically, Lewis et al. (2014) identify that mangers with MBA degrees tend to publish environmental information more likely and CEOs with a research background promote activities that enhance environmental performance (Shahab et al., 2020). Consequently, the hypotheses are that CFOs with higher education levels (MBA and PhD) have a positive effect on the transition to CE business models and therefore receive higher investments of CE funds.

***$H3a_0$**: In companies that have a CFO with a MBA, CE funds do not significantly invest more.*

***$H3a_1$**: In companies that have a CFO with a MBA, CE funds do significantly invest more.*

***$H3b_0$**: In companies that have a CFO with a PhD, CE funds do not significantly invest more.*

***$H3b_1$**: In companies that have a CFO with a PhD, CE funds do significantly invest more.*

CFO tenure can also influence organizational results (Hambrick & Mason, 1984) because the longer they are in their position the “stale in the saddle” (Hambrick, 2007) they become and therefore value career stability and reputation (Finkelstein & Hambrick, 1990). Longer tenured CFOs see CSR activities as a possibility to enhance their reputation (Minor & Morgan, 2011; Lee et al., 2018; Petrenko et al., 2016) and at the same time they are not as afraid as shorter tenured colleagues to make mistakes due to their experience (Fraser & Greene, 2006). Based on this past

literature the fourth hypothesis regarding tenure is that the longer the tenure of CFOs, the higher investments of CE funds.

***$H4_0$**: In companies that have a longer tenured CFO, CE funds do not significantly invest more.*

***$H4_1$**: In companies that have a longer tenured CFO, CE funds do significantly invest more.*

Apart from that, the experience a manager gained beforehand outside of the company seems to influence the results of the current company (Hambrick, 2007). Coming into the company from outside, a manager is more inclined to change the structures and processes in the company (Hambrick & Mason, 1984). CFOs who are externally promoted are more likely to launch an innovation (Hiebl et al., 2017). This is because CFOs who come into the company from the outside make more changes and innovations than those who have been with the company for years (Wang et al., 2015). Apart from that experience has a positive influence on the adaptation of innovation (Awa et al., 2011) and especially financial expertise of CEOs has shown to have a positive influence on sustainable policies in a company (Shahab et al., 2020). Based on this, the last two hypotheses are that on the one hand CFOs who come into the position externally and CFOs who have prior experience as CFO are more successful in the transition and that their companies gain more investments from CE funds.

***$H5_0$**: In companies with an externally hired CFO, CE funds do not significantly invest more.*

***$H5_1$**: In companies with an externally hired CFO, CE funds do significantly invest more.*

***$H6_0$**: In companies with a CFO with prior experience, CE funds do not significantly invest more.*

***$H6_1$**: In companies with a CFO with prior experience, CE funds do significantly invest more.*

3. Methodology

This study is based on a multi method research design and examines how upper echelon characteristics of CFOs affect the investment amount of CE funds in their companies. The first research design follows the quantitative approach, conducts regressions, and uses secondary data about the CFO characteristics and investment data of CE funds as the primary data collection source. This is based on the theory that the analysts of the funds are able to evaluate the success of the transition to CE business models of the companies and to incorporate this into their investment decisions. The main objective of the first study was to gain an understanding of the sociodemographic characteristics of CFOs that potentially influence successful

transitions to CE business models of companies. UET is the appropriate foundation from which to build the study, as many studies based on it have already been conducted in the context of innovation. In the recent past, research based on UET has also emerged in relation to sustainability, as well as in relation to CFOs, and therefore provides an optimal foundation to investigate the relation to sociodemographic characteristics.

These results are extended by interviews with experts in the field of CE. This second research design follows the qualitative approach and uses problem-centred expert interviews as the primary data collection avenue. This study employed thematic analysis to analyse the data from the problem-centred expert interviews. Thematic analysis is a qualitative data analysis method like grounded theory, narrative analysis or discourse analysis using open and axial coding. Döringer (2021) developed this interview technique of problem-centred expert interviews. The aim is to establish new theories by systematizing and interpreting the individual statements made by the experts. Interpretations take place by incorporating the subjective perceptions of the experts and the knowledge already gathered in the quantitative study. Thus, new theories are developed about the influence of socio-demographic characteristics of CFOs and the transition to CE business models. In doing so, the interviews evaluate findings from the quantitative part, provide deeper specific insights through examples, and contribute experiential knowledge to theory building. Since no research has been done in this area before, the methods complement each other and together provide a bigger picture. This sets an initial foundation on which future research in this area can be built on.

3.1 Quantitative Study

As we have seen, diverse TMT decisions can be studied and related to sociodemographic characteristics based on UET. This is also true for business model innovation. Guo et al. (2013) investigated the influence of managerial and entrepreneurial skills of managers on the business model innovation across China based on the UET. However, the included attributes of managerial skills and entrepreneurial skills are the so-called non-observable psychological characteristics studied by Hambrick and Mason. In addition to these, observable characteristics and socio-demographics are also part of the theory and oftentimes placed at the centre of studies. These are attributes such as age, tenure, education, gender, and

experience (Hambrick & Mason, 1984). In this thesis, only such observable demographics and characteristics are examined for reasons of data accessibility.

3.1.1 Data Sampling

At the beginning of the data collection process, a selection of CE companies had to be made. CE funds should be used for this purpose, as they not only perform an automatic selection and classification of CE companies. Their investment volumes are also a proxy for successful CE transitions (see chapter 2.1.1). For the selection of appropriate funds, the CE funds compiled by the Ellen MacArthur Foundation (2020) in the paper *Financing the circular economy - Capturing the opportunity* were used. CE funds from Blackrock, BNP and Decalia were chosen. The Blackrock fund states as investment target the global selection of companies that contribute to the CE and which meet the CE definitions (BlackRock, 2023), the Decalia fund aims to invest in companies that enable the transition to CE (Decalia, 2023), and the BNP fund is based on an index that tracks companies related to the opportunities of the CE and includes the leaders of this index (Morris, 2023).

For the dependent variable, the investment shares of the companies in the individual funds were used in percent. As mentioned before the underlying assumption is that among other factors the investment amount in a company is greater, the better the performance of the company in the transition to CE. This is based on the funds' investment targets and a control of financial KPIs, which might be other reasons for a higher investment amount in the company, is made. Since some companies are part of two or even all funds, the weighted average (WAVG) of the investment volumes needs to be calculated based on the total assets under management (AUM) of the funds to include all information from all funds and to make the dependent variable comparable even if a company is either part of one, two or three funds (see formula). This WAVG needed to be normalized in a next step so that the sum of all observations was 100 and demonstrated a real artificially created portfolio.

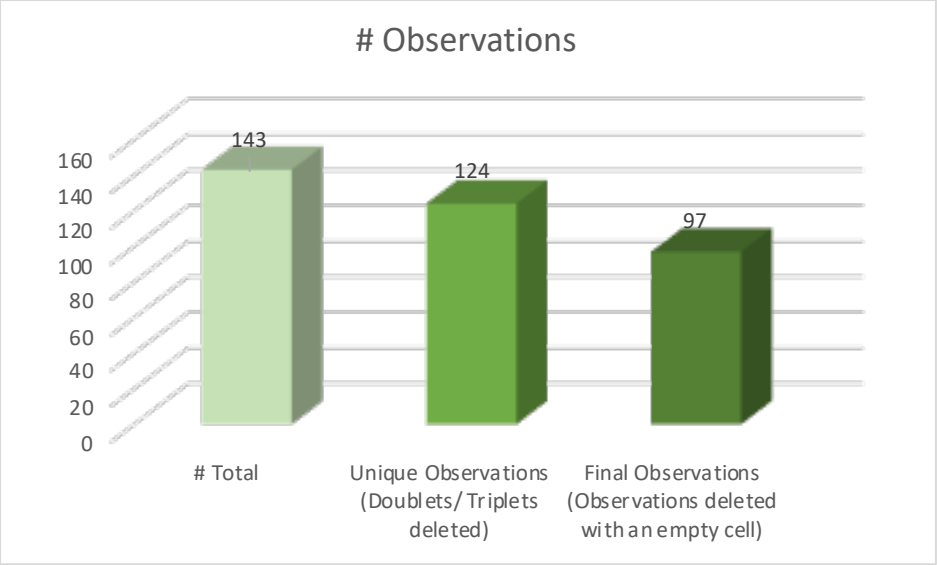
Weighted Average Investment Volmues, WAVG, is calculated as

$$WAVG = \frac{\%_{F\,1} * AUM_{F\,1} + \%_{F\,2} * AUM_{F2} + \%_{F\,3} * AUM_{F\,3}}{AUM_{F1} + AUM_{F2} + AUM_{F3}} \quad (1)$$

where $\%_F$ is the percentage share of the holding in fund x and AUM are the total assets under management of fund x.

The independent variables for the sum of 143 listed stocks from the three funds were gathered by using secondary data from the internet. For each company, the current female or male CFO was researched on the company's website. The CFO's highest educational degree was either identified on the company website in descriptions about the individual or on the LinkedIn profiles of the CFOs. Information about previous experience as a CFO and tenure in the current CFO position were also obtained from LinkedIn, along with information about whether the person was hired internally or externally. The variable age, in turn, stems from global data for most of the companies. For a smaller number, it was either published on the company website or on the websites Market Screener or Wallmine (see table 2). To obtain unique observations duplets and triplets of companies listed in various of the funds were deleted. This happened after computing the WAVG of the independent variables to not falsify this information. Then, of the remaining unique 124 observations, those that had empty cells for any variable were removed. In conclusion, this left 97 valid observations (see figure 3).

Figure 3:
Observation Reduction Step-by-Step



Lastly control variables needed to be included in the regression to exclude them as reasons for higher investment volumes of the CE funds. Financial KPIs and the Global Industry Classification Standard (GICS) sector information about the companies were obtained from Bloomberg and the 31st of December 2022 is used as the cut-off date. In total, data on sectors of the companies, various earnings

before interest and tax (EBIT) figures of the past, performance figures of the past, volatility of the last year, the market cap, operating expenditures (OpEx) as well as capital expenditures (CapEx) of the company and free float percent were chosen as initial control variables for the regressions.

All data were collected in Excel. The final result was a unique dataset that could only be created through a step-by-step and partially manual compilation of sociodemographic data. This peerless database contains information about CE companies and their CFOs and has not been created and used in academia in this way before.

3.1.2 Data Presentation

In table 2, all variables that were used in the regressions from this unique dataset can be seen. It should be noted that for the control variables only those are listed that were also included in the final regression model and which were not excluded for statistical reasons and the goodness of the model.

For the highest level of education, as well as for sector affiliation, gender and internally vs. externally hired, dummy variables were created that become 1 if a person holds this degree as the highest or the company belongs to this sector or gender or is hired from this background and 0 otherwise. In each case, a dummy variable was omitted in the model and its information moved to the constant (MSc, Information Technology sector, female, internally hired). Next to these dichotomous variables, the metric variables age and prior experience in CFO positions were reported in years and the third variable tenure in current position was reported in days. In addition to the dichotomous dummy control variables of the sectors, there were four further metric influence variables based on financial KPIs that were included in the final model. The average return of the last as well as of the last five years as of 31st of December 2022, as well as the volatility of the shares and their free float percentage were used.

Table 2:
List of Variables

Variable	Level of Measurement	Description	Sources
Dependent			
Investment Amount in CE Funds: weighted normalized Investment	Metric	The weighted average of the investment amount in the company in percentage, normalized	Annual Reports of Blackrock, BNP, Decalia
Independent			
CFO Age	Metric	The age of the CFO in years	Global Data, Wallmine, Market Screener
CFO Tenure	Metric	The Tenure of the CFO in days	LinkedIn
Education_Bachelor	Dichotomous	The highest educational level of the CFO is a bachelor's degree (=1) otherwise (=0)	LinkedIn, Company Webpage
Education_MSc	Dichotomous	The highest educational level of the CFO is a master's degree (=1) otherwise (=0) (omitted in the constant)	LinkedIn, Company Webpage
Education_MBA	Dichotomous	The highest educational level of the CFO is a MBA degree (=1) otherwise (=0)	LinkedIn, Company Webpage
Education_PhD	Dichotomous	The highest educational level of the CFO is a PhD degree (=1) otherwise (=0)	LinkedIn, Company Webpage
Previous Experience as CFO	Dichotomous	The CFO has previous experience in a CFO position (=1) otherwise (=0)	LinkedIn
Previous Experience as CFO in Years	Metric	The previous experience as CFO in years	LinkedIn
Externally Hired	Dichotomous	The CFO is externally hired (=1) otherwise (=0)	Company Webpage, LinkedIn
CFO Gender	Dichotomous	The CFO is male (=1) otherwise (=0)	Company Webpage, LinkedIn
Controls			
Control Sectors *Energy* *Materials* *Industrials* *ConsumerDiscretionary* *ConsumerStaples* *Health Care* *Financials* *InformationTechnology* *CommunicationServices* *Utilities*	Dichotomous	The company is part of this GICS sector (=1) otherwise (=0). There are 10 different dummy variables for the 10 sectors (one is omitted in the constant)	Bloomberg
Average Return last year	Metric	The average return of the company made in the last year, reference date: 31.12.2022	Bloomberg
Average Return last 5 years	Metric	The average return of the company made in the last 5 years, reference date: 31.12.2022	Bloomberg
Free Float Percentage	Metric	The free float percentage of the company, meaning the percentage of shares outstanding that trade freely, reference date: 31.12.2022	Bloomberg
Volatility Last Year	Metric	The volatility of the company in the last year, reference date: 31.12.2022	Bloomberg

Note: Includes only control variables which are used in the final regression model.

3.1.3 Descriptive Statistics

The excel file was uploaded in R for further steps. To get an overview of the data, the number of rows and the number of columns is examined first. These are 97, the number of observations, and 59, the number of different variables in the data set. In

the following, the variables that relate to the CFO are analyzed in more detail (for an overview see figure 4).

Figure 4:
Descriptive Statistics of Dependent Variable and Sociodemographic Variables of CFO

Descriptive Statistics: Dependent Variable & Sociodemographics

	Observations	Sum	Mean	Min	1st Q	Median	3rd Q	Max
weighted_Investment_normalized	97		0.01	0.0002	0.001	0.01	0.01	0.05
Gender_Male	97	78	0.80	0	1	1	1	1
CFO_age	97		53.35	38	49	54	57	65
CFO_Tenure_DAYS	97		1,640.84	60	729	1,370	2,159	10,683
CFO_experience	97	63	0.65	0	0	1	1	1
CFO_experience_inyears	97		5.57	0	0	4	8	25
CFO_ed_Bachelors	97	22	0.23	0	0	0	0	1
CFO_ed_MSc	97	20	0.21	0	0	0	0	1
CFO_ed_MBA	97	50	0.52	0	0	1	1	1
CFO_ed_PhD	97	5	0.05	0	0	0	0	1
CFO_External	97	43	0.44	0	0	0	1	1

Note: Any control variables are omitted.

Figure 5 shows box plots for age, tenure, and previous experience. Box plots show the distribution, central tendency, and variability within each variable and additionally, outliers demonstrate extreme values in the data. On average, a CFO is 53.35 years old, this is also indicated by the black line inside the box which is the median. The youngest being 38 and the oldest 65 are indicated by the maximum and minimum values of the whiskers. CFOs have held their current position for an average of 1640.84 days, or approximately 4.5 years of tenure. The narrow box indicates a relatively consistent tenure. The whiskers only extend to 1.5 times the interquartile range which is the colored box. And the point above the maximum value of the whisker are outliers of extreme data points as there were large differences in the tenure. Some had only held the position for 60 days, while others had held it for over 29 years. Previous experience as CFOs had been accumulated for an average of over 5.57 years, ranging from zero to an outlier value of 25 years (for the detailed numbers see figure 4).

Figure 5:
Descriptive Statistics Age, Tenure, Experience

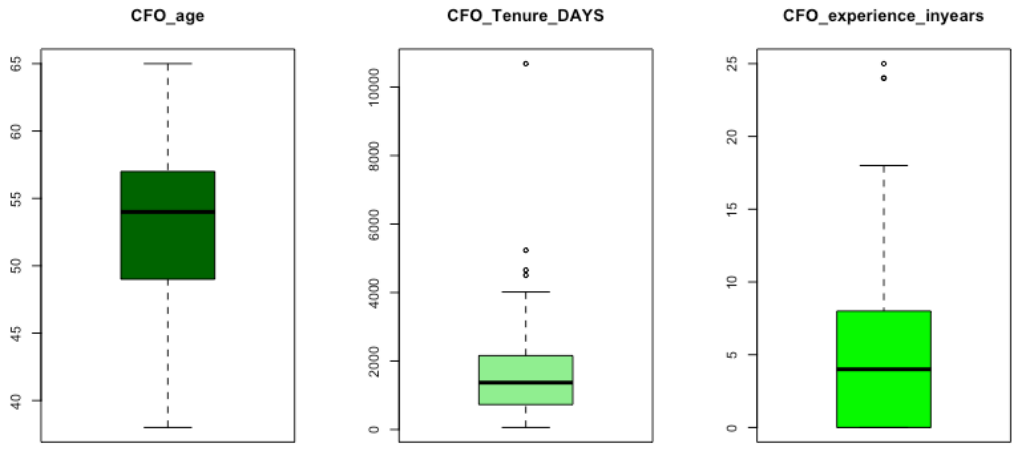


Figure 6-8 show how experience, internal and external recruitment, and the four highest educational qualifications are distributed between the two genders. Information on female CFOs can be found in the columns coded 0 and on male CFOs in the columns coded 1. Nineteen observations are females and 78 males, of these 34 have no previous CFO experience while the majority of 63 has. In this dataset female CFOs, with a probability of over 75%, are more likely to have previous CFO experience than male CFOs (see figure 4 and 6). CFOs were recruited almost equally internally and externally, with 54 and 43 observations, respectively which holds even more for females (see figure 4 and 7). The majority of 50 CFOs holds an MBA as highest educational qualification. Almost equal numbers of bachelor's and master's degrees follow in second and third place, with 22 and 20 degrees respectively, and only a minority of five CFOs has a PhD as highest educational level although these are all male in this dataset (see figure 4 and 8).

Figure 6:
Relation Gender and Experience

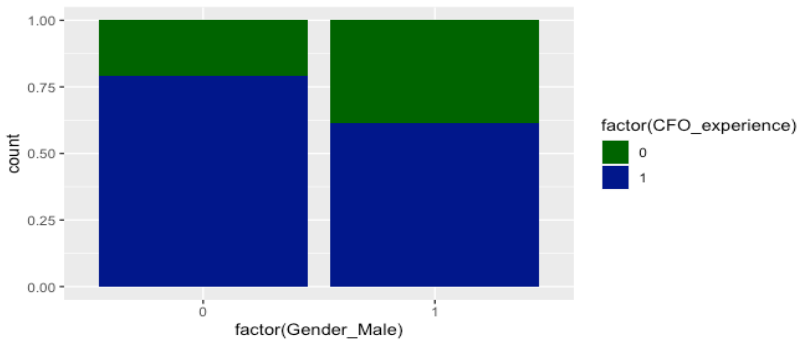


Figure 7:
Relation Gender and Externally vs. Internally Hired

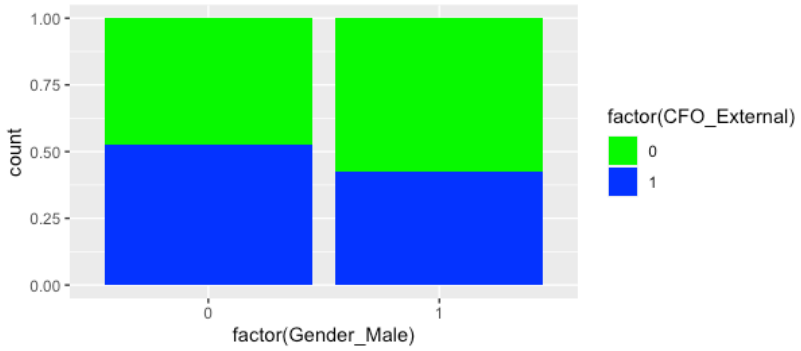
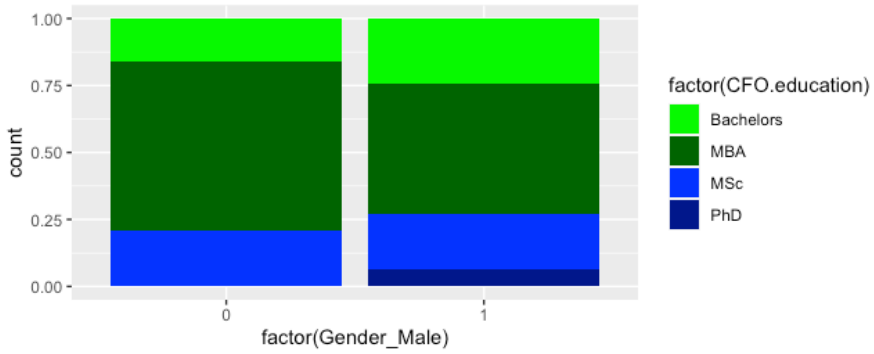


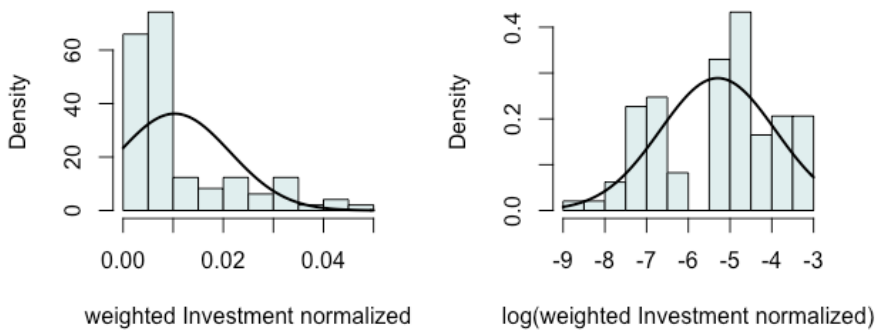
Figure 8:
Relation Gender and Education



3.1.4 Analysis

In a first step, it was checked whether the dependent variable *weighted_Investment_normalized* is normally distributed. If a logarithm is applied to the variable, however, a normal distribution is better represented, which is why it is used further in the process (see figure 9).

Figure 9:
Distribution Dependent Variable: Weighted Investment Normalized

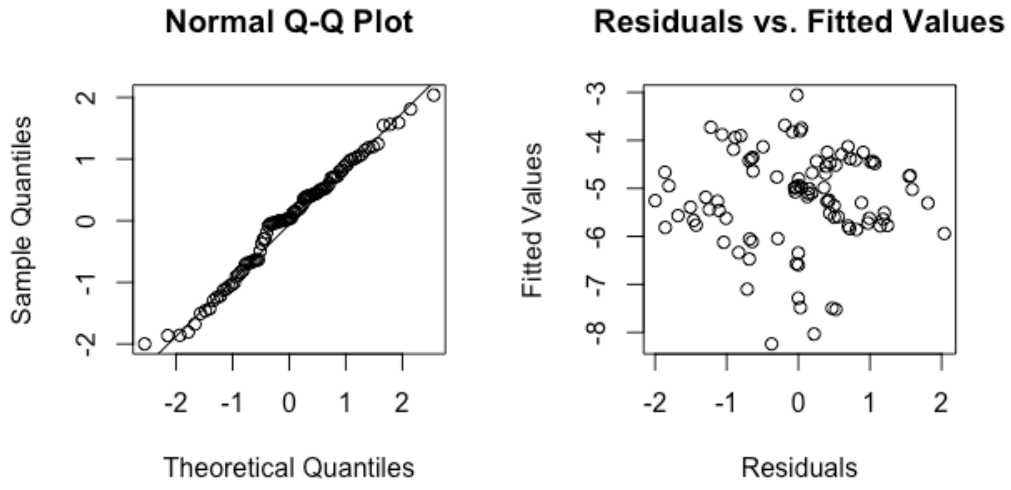


Note: The black line indicates the normal distribution.

Apart from the target variable, other influencing variables were tested for their normal distribution and for *CFO_Tenure_DAYS* it could also be improved by applying a logarithm (see appendix 2). Furthermore, different interaction terms between continuous independent variables but also between binary and continuous independent variables were tested. However, no interactions were found that were statistically significant. Categorical dummy variables for gender, education, internal vs. external recruitment, and sector affiliation were generated for the regressions. There are four categories for different levels of highest education, Bachelor, MSc, MBA, and PhD. The sectors are the first level of the GICS classification and thus there are ten different ones (S&P, 2023). For education, the category master's degree was omitted, for the sectors Information Technology, for recruitment internal, and for gender female. The information of these categories is found in the constant of the regressions.

The residuals of the data are also normally distributed as they approximately follow a straight line in the left graph of figure 10. Moreover, the residuals in the right graph are distributed in a random scatter around the zero line, which shows that the residuals are evenly distributed and have constant variance across the range of fitted values indicating that heteroscedasticity is no problem in the dataset. After removing outliers, identified by Cook's distance (see appendix 3), this statement can be supported with the Breusch Pagan test as its p-value is greater than 5% and thus not significant (see appendix 4).

Figure 10:
Distribution of Residuals and Heteroscedasticity



Due to missing values and high correlations with other variables, any EBIT variables were deleted, as was OpEx. Because of high multicollinearity, two more financial KPIs were deleted leaving the average return of the companies for different time horizons, volatility and the freefloat percentage. Consequently, multicollinearity is no longer a problem as any Variance Inflation Factor (VIF) values are below ten (see table 3). The VIF measures the contribution of individual regressors to multicollinearity in the model, and for values >10 it is large, and a possible removal of the variable may be appropriate.

Table 3:
VIF of Model1_4.7_4

```
> vif(Model1_4.7_4)
                     Gender_Male                          CFO_age             log_CFO_Tenure_DAYS
                        1.429559                         1.584813                        1.558638
          CFO_experience_inyears                       CFO_ed_MBA                      CFO_ed_PhD
                        2.259978                         2.611575                        2.008259
                CFO_ed_Bachelors                     CFO_External               Control_10_Energy
                        2.156204                         1.588371                        1.636956
            Control_15_Materials           Control_20_Industrials Control_25_ConsumerDiscretionary
                        2.002163                         2.325538                        1.602266
       Control_30_ConsumerStaples           Control_35_HealthCare           Control_40_Financials
                        2.128362                         1.665149                        1.246595
Control_50_Communication.Services            Control_55_Utilities             Avg_Return_last1y
                        1.226690                         1.174610                        3.196099
               Avg_Return_last3y                Avg_Return_last5y            FreeFloat_Percentage
                        7.810119                         7.786495                        1.776854
              Volatility_lastyear
                        2.906579
```

Note: These are not the values of the final model. It was further adapted in one last step by conducting a backward selection.

It was further tested with the backward selection function based on the p-value whether the removal of an additional variable would improve the model quality (see table 4). Backward selection avoids a missing variable bias which can happen when doing a forward selection. Since none of the variables about the CFO as well as none of the dummies of the sectors should be removed, only the first recommended variable, the return of the last three years, was deleted. By this step R^2 and adjusted R^2 remain almost constant but the Akaike Information Criteria (AIC) decreases minimally to a final value of 291.9. Previous models had higher AICs and therefore this model has the best quality of all as this criterion has no fixed limit but is used for the comparison of models and indicates that a model is better, the lower its AIC. For the visual improvement see appendix 5. The F-statistic is highly significant with three stars (see appendix 6), which means that the regressors of the model have a causal influence on the dependent variable.

Table 4:
Stepwise Backward Selection

Elimination Summary

Step	Variable Removed	R-Square	Adj. R-Square	C(p)	AIC	RMSE
1	Avg_Return_last3y	0.5515	0.4207	21.0030	291.8719	1.0225
2	CFO_experience_inyears	0.5513	0.4283	19.0381	289.9184	1.0157
3	Control_30_ConsumerStaples	0.5493	0.4336	17.3482	288.3278	1.0110
4	Control_35_HealthCare	0.5475	0.4388	15.6434	286.7159	1.0063
5	Control_50_Communication.Services	0.5455	0.4438	13.9582	285.1280	1.0019
6	Control_10_Energy	0.5421	0.4469	12.4949	283.8264	0.9990
7	Control_55_Utilities	0.5373	0.4484	11.2455	282.7947	0.9977
8	Gender_Male	0.5325	0.4497	10.0092	281.7698	0.9966

3.1.5 Critical Assessment

Since the dependent variable is the investment share of the CE funds in the company, the ability of the analysts of the funds to evaluate the CE activities of the companies has a great influence. Other factors that influence the investment amount are aimed to be removed by adding control variables, but of course not all possible factors can be taken into account and other influences remain. The final model has an R^2 of 55% and therefore the independent variables explain 55% of the variance of the dependent variable. Since a majority of the variance is explained, this result is not poor. However, this dependent variable does not optimally represent the CE activities of the companies. More precise figures on the CE activities of the companies, such as their investment amount in CE or the profit generated by CE activities, were not available for this study and are subject for further research.

Any data on CFOs that comes from the respective company websites can be assumed to be relatively reliable as false information could affect their credibility (Sinanaj & Muntermann, 2013). The same applies to data about these often well-known and successful people sourced from LinkedIn (Harper, 2022). However, it should be noted that information about the age of individuals mainly stems from publicly available online databases and websites and the credibility of this data is not verifiable. Information on the age of CFOs was otherwise not accessible for this study. All control variables that come from Bloomberg can be considered trustworthy.

3.2 Qualitative Study

In the second study, a qualitative approach was followed, and expert interviews were conducted. This was intended to provide in-depth, first-hand knowledge to complement the findings of the quantitative study previously conducted, and together provide the basis for further research in this area.

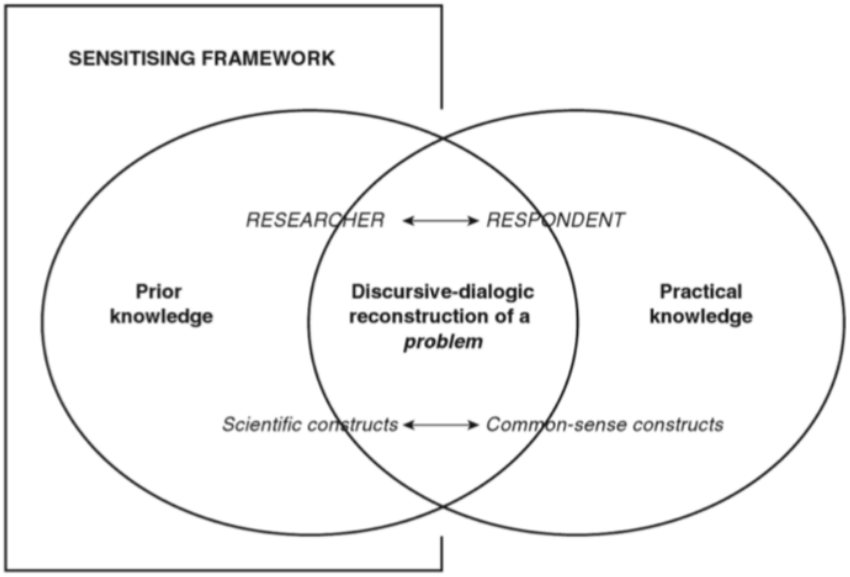
3.2.1 Problem Centered Expert Interviews

The expert interview has been a method of qualitative empirical research since the 1990s and is more widely used in social research in Europe and especially in Germany (Gläser & Laudel, 2010; Kaiser, 2014). In this method, the knowledge of the expert in a certain area is queried based on a thematic guide (Meuser & Nagel, 2009). There are controversial opinions on what characterizes one as an expert and the same is true for expert interviews (Gläser & Laudel, 2009). However, authors agree that experts are people who have knowledge in a specific area and are identified by their position, status or the virtue of their knowledge (Kaiser, 2014).

Bogner & Menz (2009) developed the theory-generating expert interview which is a qualitative interview with a social group. Such an expert interview should avoid closed questions as well as a predefined strict guideline (Meuser & Nagel, 2009). Instead, the interviewer should already have knowledge in the area under investigation and be considered as a co-expert. During the interview, the role of the respondent in the conversation should also be taken into account and *interpretative knowledge* can be revealed through abstraction and systematization of the qualitative interview data. Through the analysis this *interpretative knowledge* becomes evident and for this it is crucial that personal orientation and perceptions of the expert are included. There is no specific design for the interview, which should be adapted flexibly depending on the context, but an interview guide that is open but provides a thematic structure is recommended (Bogner & Menz, 2009). Due to the inductive theory generation through an interpretative generalization of the qualitative data and the presupposition and inclusion of already acquired knowledge, the theory generating expert interview is an optimal approach to compare the already acquired knowledge of the research question with expert knowledge.

The problem centered interview (PCI) by Witzel, on the other hand, is a face-to-face interview in which the interviewer and interviewee work out the research question together in an interactive dialogue (Witzel, 1982). The interviewer applies a sensitizing theoretical framework (see figure 11) in which his/ her prior knowledge is included in order not to influence the results. The dialogue starts with a narrative, which is followed by a structured question part (Witzel & Reiter, 2012).

Figure 11:
The Problem Centred Interview



Note: From *The Problem-Centred Interview*, from Witzel & Reiter, p. 18, 2012.

In the first part, the problem is defined interactively in the dialogue and the knowledge of both parties is integrated. In the second part, specific knowledge as well as things that have not been mentioned so far are asked more precisely in order to enable a systematic comparison of the data afterwards. Through this two-part procedure, on the one hand the perspective of the interviewee can be queried, but at the same time the interviewer has the possibility to ask about specific things that are of interest to him. Witzel himself together with Reiter already mention the PCI as a possibility to implement Bogner and Menz's theory-generating expert interview (Witzel & Reiter, 2012). Bogner and Menz mention PCI as well and state the difference only stems from diverse roles of the interviewee based on different epistemological interests (Bogner & Menz, 2009).

In the following, the problem-centered expert interview will be used, which was developed by Stefanie Döringer 2021 based on her PhD thesis and takes PCI and theory-generating expert interviews together (see table 5), since both aim to establish new theories by systematizing and interpreting individual statements. Combining these two practices makes it easier to elicit interpretive knowledge. Theory-generating expert interviews assess the social importance of tacit expert knowledge and the interview technique of PCI elaborates the individual perceptions of the experts (Döringer, 2021). The problem centered expert interviews provide the optimal basis for obtaining further in-depth knowledge by taking into account already gathered information of the first study and for supplementing this previous knowledge.

Table 5:
Elements of the Problem-Centred Expert Interview

Theory-generating expert interview	Problem-centred interview (PCI)
Defines and discusses the term 'expert'	Highlights the individual perspective
Distinguishes different types of expert knowledge	Provides a specific interview design and set of questions
Aims at inductive theory development	Enables comparability of gathered data
	Proposes inductive-deductive theory building

Note: From *'The problem-centred expert interview'. Combining qualitative interviewing approaches for investigating implicit expert knowledge*, from Stefanie Döringer, p. 269, 2021.

3.2.2 Research Design and Sampling

Based on the table 5, experts are defined according to Bogner and Menz's theory-generating expert interviews (Bogner & Menz, 2009). They structure the social relevance in a field of action through their behavior and knowledge and act on the basis of their knowledge as initiators, supporters or preventers, albeit to varying degrees (Bogner et al., 2018). Experts from practice and academia were selected, with the former either representing those directly affected (CFOs) or working indirectly with them (consultants), and a perspective from politics was included. This was done to avoid bias by talking to only one group (Bogner et al., 2018). Consequently, the expert group included one of the CFOs of the companies investigated in the first quantitative study. Additionally, the former Deputy Prime Minister and former Minister for Economic Affairs, Climate Protection, Energy and Regional Planning of Rhineland-Palatinate, Germany, member of the Green Party and now CEO of a consultancy for CE was part of the expert group. The third expert

is the head of a hub for business transformation towards CE in Portugal and leads an international platform for entrepreneurs in sustainability. This group is expected to provide diverse first-hand knowledge to validate and extend the empirical results.

3.2.3 Conduction of Interviews

Initial contact was made via LinkedIn and deeper contact was then established via email. Interviews were conducted via teams or zoom. The experts only knew in advance that the interview was about CFOs in CE companies. Based on PCI, the interview was to have an individual opening question, followed by an open-ended question on which follow-up questions were built as a third step that would flexibly incorporate specific topics into the interview process. The opening question should provide background information about the contact with CE business models in the expert's formal position and the frequency he or she deals with CE business models to establish a relation to the research question (Döringer, 2021).

For the questions guide of the expert interviews see appendix 7. The open-ended question of the second step were intended to invite the interviewee to describe the role of the CFO during the transition to a circular business model and to give examples that illustrate this, as well as to name sociodemographic characteristics of the CFO that are important focusing on the ones mentioned in the hypotheses. The goal of this question was not only to ask the interviewee to describe the role, but also to provide examples to make him/her think more deeply about it and to further emphasize the narrative nature. To make the results about important socio-demographics comparable the ones studied in the quantitative study were mentioned as explanation for sociodemographic characteristics (Döringer, 2021). To avoid an influence which are socio-demographics are seen as important, the question was asked indirectly and openly (Meuser & Nagel, 2009). This narrative style at the beginning of the interview is sometimes unfamiliar to experts (Döringer, 2021), but it allowed them to detail their personal perception of the strategic role and to even provide examples in a natural flow of speech. As interviewees had also named different socio-demographic aspects of the CFO's role according to importance, it was easier to elaborate on the central ones. If the first interviewees had classified a socio-demographic as particularly important, it was possible to address it in subsequent interviews with new interviewees to get their opinion on it.

In the third part, open-ended questions followed, which began with the technique of *general explorations* in which specific parts of the narrative part were addressed in more detail because they were of particular importance for the research question (Witzel & Reiter, 2012). In particular, the role of the CFO, which the interviewee had just described, was to be characterized in more detail. This was followed by *specific explorations* (Witzel & Reiter, 2012) aimed at further elaborating the interviewer's opinion about the socio-demographic aspects. Here, the interviewer's knowledge already gathered in advance during the quantitative analysis or that was obtained in the narrative part is incorporated (Witzel & Reiter, 2012). The focus here was on, by the interviewee, previously mentioned socio-demographic aspects, which were to be further illuminated by the *specific exploration* strategies of *comprehensive questions* and *mirroring* (Witzel & Reiter, 2012). *Comprehensive questions* were applied to vague statements to highlight make them clearer (Döringer, 2021) and *mirroring*, on the other hand, was used to test ad hoc hypotheses from the first study (Witzel & Reiter, 2012), or hypotheses from other interviews.

The ad hoc questions at the end were intended to directly interrogate the findings regarding age, tenure, and education that were elicited in the quantitative section if they were not previously addressed in the interview. By interjecting these key words, the interviews become comparable (Witzel & Reiter, 2012). Although these different questioning techniques cannot always be separated, they are a powerful way to flexibly adapt the technique to the interview situation and response to interactively generate *interpretative knowledge* (Döringer, 2021).

3.2.4 Analysis

In other forms of expert interviews, the objective is often to summarize the interview data based on previously defined research targets. In the *theory-generating expert interview*, an inductive theory is formed through an interpretative approach. In PCI, a mixture of inductive and deductive methods is used to develop theories. Consequently, also the *problem-centered interview* includes an inductive part. Through open and axial coding, the data is analyzed. The research goals and the inductive reasoning of the material are equally included in the analysis and thus empirical results are gradually extracted (Döringer, 2021).

In the process of open coding, interview data was examined in more detail and important parts of the data are given a descriptive code that thus identifies and labels concepts and themes in the data. Conditional questions are built in to be used for further interpretation (Döringer, 2021). Experts are guided by personal perceptions and orientations. Consequently, these can be regarded as implicit decision-making maxims. By looking at *interpretative knowledge*, one can work out the relevance of individual sociodemographic aspects of CFOs and in the further procedure it is important to understand why individual sociodemographic aspects are seen as critical (Witzel & Reiter, 2012). The experience and institutional background of the experts must also be taken into account (Döringer, 2021). This background information, which served as a basis for explaining the intentions and perceptions of the experts, was largely derived from the narrative introductory part of the interview.

In the next step of axial coding going across the code was used to theorize the role of CFOs during the transition and the socio-demographic aspects that facilitate it. This was done by discovering differences, similarities, and connections in the data (Döringer, 2021). Codes and the categories created were juxtaposed to see how they differ in relation to the interviewee's affiliation with practice, research, and policy and to identify socio-demographics that are considered essential. Finally, the descriptions of the CFO role were synthesized, and the results of the core socio-demographic attributes were contrasted with the results of the quantitative analysis to derive a theory in this regard.

4. Findings

In the following the results of both the qualitative and the quantitative study are presented.

4.1 Quantitative Study

Three variables related to CFO have significant influence: age, tenure, and having a bachelor's degree as highest educational level (see figure 12). To interpret these results of the variables age and bachelor's degree and to determine their influence on the dependant variable modified by a logarithm, a tailor approximation must be used (see formula 2 below). This gives the percent increase (or decrease) in the dependant variable for every one-unit increase in the independent variable.

Tailor approximation, % change in $y_{coefficient}$, is calculated as

$$\%\ change\ in\ y_{coefficient} = (e^{coefficient} - 1) * 100 \quad (2)$$

where coefficient is the identifier of the observation.

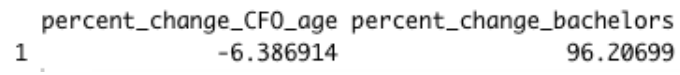
Figure 12:
Final Output Regression (Short Version)

	Dependent variable:
	log_weighted_Investment_normalized
	FINAL OUTPUT (SHORT)
Gender_Male	0.265
	(0.314)
CFO_age	-0.066***
	(0.024)
log_CFO_Tenure_DAYS	0.275*
	(0.142)
CFO_experience_inyears	0.005
	(0.025)
CFO_ed_MBA	0.482
	(0.340)
CFO_ed_PhD	0.720
	(0.664)
CFO_ed_Bachelors	0.674*
	(0.362)
CFO_External	0.351
	(0.264)
Constant	-0.844
	(1.502)
Controls	Yes
Observations	94
R2	0.552
Adjusted R2	0.421
Residual Std. Error	1.022 (df = 72)
F Statistic	4.216*** (df = 21; 72)
Note:	*p<0.1; **p<0.05; ***p<0.01

Note: here the final regression is shown in a short version, the sector and financial control variables are omitted.

If age increases by one year, then this has a 6% negative effect on the dependent variable, ceteris paribus (figure 13). This result is statistically significant with three stars at a confidence interval of 1% (figure 12). Consequently, $H1_0$ stating that younger CFOs do not receive significantly higher investments can be rejected and the counterhypothesis $H1_1$ in favour of higher investments for younger CFOs is accepted. Regarding education CFOs only having a bachelor's degree was the only statistically significant variable. It has a 96% positive influence on the dependent variable (figure 13) however, with low statistical significance at a confidence interval of 10% (figure 12). No support can be found for a rejection of the hypothesis $H3a_0$ that an MBA or $H3b_0$ that a PhD lead to significantly more investment of CE funds.

Figure 13:
Results Tailor Approximation Significant CFO Variables

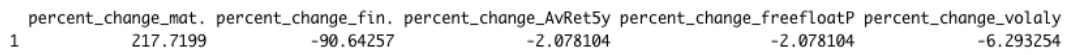


	percent_change_CFO_age	percent_change_bachelors
1	-6.386914	96.20699

The variable tenure is logarithmized like the dependent variable and therefore it is a log-log model for this variable. The output of 0.275 for tenure (see figure 12) means that a 1% increase in tenure will increase the weighted normalized investment by 0.275%, ceteris paribus. This is significant for an alpha of 10% and means that the hypothesis $H4_0$ stating that longer tenured CFOs do not receive significantly higher investments can be rejected and the counterhypothesis $H4_1$ that longer tenured CFOs do receive significantly higher investments can be accepted on a 10% significance level. No statistical significance can be found for *H2* in relation to gender as well as for *H5* (externally hired) and *H6* (prior experience) and therefore their null hypotheses cannot be rejected.

In relation to control variables, not surprisingly, some were with influence on the outcome variable. This is not unexpected as these were included in the regression for this very reason, to remove their influence. The sector a company belongs to can be decisive if it is easier to establish CE business models or not. Consequently, the sector materials was found to have a highly significant positive influence and belonging to financials a highly negative one. In terms of the financial control variables, both *FreeFloat_Percentage* on a 5% significance level and *Volatility_lastyear* with on a 1% significance level have a negative influence (for the full regression result see appendix 6). The results for the tailor approximation calculated in R state for example that the dependant variable, *weighted_Investment_normalized* decreases by 6% when the volatility in the previous year increases by one (see figure 14).

Figure 14:
Results Tailor Approximation Significant Control Variables



	percent_change_mat.	percent_change_fin.	percent_change_AvRet5y	percent_change_freefloatP	percent_change_volaly
1	217.7199	-90.64257	-2.078104	-2.078104	-6.293254

To conclude, the findings suggest that age has a statistically significant negative impact on the dependent variable and that having a bachelor's degree has a positive one as well as the variable tenure.

4.2 Qualitative Study

The results of the qualitative study (appendix 8-10) that emerged from an open and subsequent axial coding of all interviews provide support for *H1*, that younger CFOs are more successful in the context of circular business model transformations.

"[…] [A]nother one that is doing […] tremendously. And he is quite young again. They are entrepreneurs." (see appendix 8, Antonio Vasconcelos, 2023).

Furthermore, as in the quantitative study, *H3a* and *H3b* are not supported meaning a MBA or PhD degree are not crucial for such a transformation. But rather the interviews showed that knowledge and willingness to learn independent of formal education are decisive.

"I would you say that they are quite knowledgeable. It does not mean that they have a lot of courses. But they are quite knowledgeable, they read a lot, they try to see things, even hearing different types of people, see things through different lenses. […] It's the learning process. It's the learning process. You know, I studied, and I study each and every day. That's the point. The point is not so much the titles, right? In terms of education." (see appendix 8, Antonio Vasconcelos, 2023).

"It is based on the intrinsic motivation, on the own initiative, on the own interest of the CFO to look at this topic, as well as many other sustainability topics, because that's what it's all about […]" (see appendix 9, Rainer Verhoeven, 2023).

Instead, the qualitative study revealed that in the future for the TMT a formal education in sustainability and CE matters can be much more important than today.

"Actually, there are also sustainability studies today and the like. The point is, the question is, how far does someone who, let's say, that focuses on marketing and sustainability into a leading function in a DAX or MDAX company. That is

difficult because other criteria are even more important at the moment. That may and will probably change in the future. I think that the topics of sustainability are becoming more and more important." (see appendix 9, Rainer Verhoeven, 2023).

"The ones that know a lot about the topic are oftentimes women that started in marketing with the topic of sustainability. They started off as sustainability advisors, but now they are called to the leading functions because they understand how to do life cycle assessment, because they understand it as a craft, because they have the knowledge how to differentiate the fine details to greenwashing and know what the EU Commission is considering. […] So you have to be in the board, if you are dedicated to the circular economy, have this deep insight in life cycle questions, in product passport, in what comes to us in the norms, to questions of digital images, digital twins, about good software, or the question of how AI can develop the topic of circularity. So, there are increasing questions that are responsible in the leadership positions that you have to ask, that you have to answer, that you have to know as an expert." (see appendix 10, Eveline Lemke, 2023).

In the case of *H4* about tenure, experts seem to have a different opinion from the results of the quantitative study and see long tenure in the position as an obstacle to transformation.

"Much more difficult much more difficult to do it because if they have long experience and the day you are used to do things in a different in a quite traditional way. It's very difficult to change." (see appendix 8, Antonio Vasconcelos, 2023).

As in the quantitative study, no support was found in the expert interviews for the *H2* (gender), *H5* (externally hired) and *H6 (*previous experience). But the qualitative study showed a lot of support for the CFO being a transformational leader and role model with an entrepreneurial and risk-taking mindset who unites a majority.

"And the guy that really leads, that articulates all the others at the top. […] He's like a, some sort of shift disruptive. Yeah, transfer officer, whatever. So, it's the leader. You see the point. I think who really thinks about all the transformation."
(see appendix 8, Antonio Vasconcelos, 2023).

"People that do not, are not at all afraid to... they are very confident that the innovation that they try to find continuously is the way to win the game and this goes very against the traditional top executives that, you know, as a career as a role model that is a pyramid runs a pyramid to replicate people. And this is a completely different mindset, right? Because these people in the eye, one after the other, we see people with a lot of tenacity, they are doers, achievers, and they want to understand then how to bring the thing up to the boards, okay? And to take in their hands the thing, not to make others execute."
(see appendix 8, Antonio Vasconcelos, 2023).

"They are entrepreneurs, they risk, you see, they risk, and they take the business to a completely different level."
(see appendix 8, Antonio Vasconcelos, 2023).

Also experience abroad seems to be in favour.

"The characteristic of this people is typically if I understand well the question is people that have worlds so people that went outside and stop different realities. I remember the CEO, the young CEO of the Esporão Wine, he had worked in London in investment banking. He worked in music production. He and even slightly a musician, he had lived in the lands where they make the wine."
(see appendix 8, Antonio Vasconcelos, 2023).

"Basically, for all the topics that concern sustainability and circular economy, an open mindset is needed. And for that you need people who have already proven themselves in difficult situations elsewhere flexibility in their heads to allow themselves to do such things. I don't think there is the old-fashioned CFO anymore, who only cares about the finance, accounting, tax, treasury and controlling. The CFO function is much more holistic today, thank God. And in this respect, the CFO is also the co-pilot in the end in the plane and must therefore

also be able to control the company. There actually helps a stay abroad, there simply helps a little bit extraordinary and outside of the normal training."
(see appendix 9, Rainer Verhoeven, 2023).

Additionally, family businesses seem to be more favourable for CE business model innovation.

"That's why I say mid-sized companies also is very interesting. Because, you know, members of the family and they took the leadership."
(see appendix 8, Antonio Vasconcelos, 2023).

"And he has dealt with the "Mittelstand". And the Mittelstand is still in Germany, for the most part, I have to look up the number now, but something over 65 to 70 percent family-run. These are also my customers [in her CE consultancy]."
(see appendix 10, Eveline Lemke, 2023).

And simultaneously external factors such as a systemic momentum that creates need for a resource as well as political and regulatory support are necessary.

"And that's why these systems, these economic systems, are very suitable for a popular economic analysis of the question of what the factors are and under which systemic momentum, we call it a systemic momentum, when a system can develop further, there have been development steps, which among other things are also highlighted very precisely by Ellen MacArthur and by the performance economy of Professor Stahel. And these moments or momenta in which a strong development of such cases is taking place, are always those in which additional state-regulated interventions are being taken."
(see appendix 10, Eveline Lemke, 2023).

"But the systemic momentum, the social need to collect steel scrap is a total breakthrough for these business cases."
(see appendix 10, Eveline Lemke, 2023).

"[…] and they must follow them with this deep economic view but are dependent on economic foundations. Does politics make the right decisions for a framework

that makes another fast development possible, or does politics make decisions that prevent the whole thing? And as far as the circular economy is concerned, we have, I would say, in the last few years, come back to a bit of a break-up."
(see appendix 10, Eveline Lemke, 2023).

"Because you have the, as you know, you have the boundaries and the principles around the business that should be fully involving the business. It changes completely the way you innovate; you transform the business, you lead."
(see appendix 8, Antonio Vasconcelos, 2023).

5. Discussion

In this study the aim was to answer the research question: *Which sociodemographic characteristics of the CFO are beneficial for the transition to a CE business models?* For this purpose, a quantitative as well as a qualitative study were conducted to answer the proposed hypotheses.

The result for age indicates that younger CFOs manage the transition better in the eyes of funds' analysts as they receive significantly more investment. Older CFOs might lack the abilities to learn new behaviours and to accept new ideas related to such a business model transition (Chown, 1961). This supports the line of thinking that younger CFOs welcome new ideas and innovations more which was also stated by experts in the interviews (Tanikawa et al., 2017), take more risk and are more likely to change structures than older ones. Consequently they perform better in sustainable matters than their older counterparts (Wang et al., 2015). Older CFOs tend to not take long term decisions like business model transformations and at the same time do not care that much about environmentally responsible behaviour of the organization when they get closer to retirement (Oh et al., 2016). Consistent with that, Tran & Pham (2020) found that in small and medium- sized companies a younger CEO has a positive impact on corporate environmental performance.

For education only the dummy variable bachelor as highest educational level was statistically significant even if only to a confidence interval of alpha equal to 10%. This suggest that a bachelor education of the CFO leads to more investment from CE funds than higher educational levels of a MBA or PhD as neither $H3a_0$ nor $H3b_0$ can be rejected. Higher educated CFOs could be more inclined to maximize profits

than to follow CSR practices (Lee et al., 2018) and therefore this could be the reason for a negative relationship between education and corporate social performance (Zhihua, 2010). The finding in this paper does not contradict previous studies that found a positive relation between education and environmental and sustainable performance (Tran & Pham, 2020).

Precisely, Tran & Pham (2020) found that both a basic educational level and a professional educational level have a positive influence on environmental performance. Basic education means in the highest case the completion of upper secondary school and professional education means in the maximum the attendance of a university or a college. Since colleges only include bachelor's degrees and universities include both these and master's degrees, no granular distinction is made between these levels, nor to an MBA or PhD degree. Consequently, also in this study, support for the influence of professional educational level, namely a bachelor's degree, could be found. Also, Meyer (2015) studied college students and thus students in their bachelor's degree and found that each additional year on campus had a positive effect on the students' environmentally friendly orientation. It seems that a bachelor's degree is important to create a certain environmental awareness of CFOs, but that higher educational degrees do not have any more significant positive influence on the transition of business models and thus on the investments of CE funds. Dhir et al. (2023) found that for sustainable business model innovation ambidextrous learning is decisive. Consequently, it is possible that the success of CE business model transition is not linked to a high educational level but to learning in general.

The CFOs' highest level of formal education is not the decisive factor according to the expert interviews. Instead, the CFOs' general level of knowledge in the area of sustainability is decisive. For the experts, it is important that the CFOs are inquisitive, curious, and willing to learn, regardless of their formal academic title. These unobservable characteristics have also been studied based on UET in the past and research revealed that a higher learning goal orientation of the leader is associated with a transformational leadership style (Carlos & Mayo, 2008). When the TMT demonstrates an ambidextrous learning orientation, focusing on exploration and exploitation at the same time, then this helps the innovation of sustainable business models. Simultaneously it supports a transformational

leadership style (Dhir et al., 2023). This is in line with the experts' opinions as they see the CFOs of these companies as progressive, innovative transformational leaders. And in fact it has been shown in the past that transformational leadership is an important mediator in a change in management practices in an organization (Turner & Merriman, 2022).

Longer tenure translates positively into significantly more investment from CE funds and therefore in a better transition to CE. Long-tenured managers were found to be more aware of the company and less likely to be deviated from core competitiveness (Miller, 1991) and as stated previously CE transition is a chance to increase competitiveness (Donner et al., 2020; Suchek et al., 2021; Sehnem et al., 2022). At the same time the longer the tenure of office is, the more familiar CFOs are with the company and the less likely they are to make mistakes in corporate decisions like the ones related to a transition to CE (Fraser & Greene, 2006) which can be a reason for the analyst of the CE funds to invest more in these companies. Ting et al. (2015) found that the longer the tenure the more financial risk are managers willing to take which is necessary in CE business model transformations. Additionally, the longer the tenure the more likely are managers to enhance their reputation with CSR practices (Werther & Chandler, 2005; Lee et al., 2018) or show a better in CSR performance in their companies due to their experience in the position (S. K. Huang, 2013).

For the variable tenure, the result of the qualitative study differs from that of the quantitative study as the experts saw CFOs with more tenure less willing to change the way they are doing business. They are less willing to make risky investments the longer their tenure, as this could jeopardize the position and reputation they have built up (Matta & Beamishi, 2008). This result is consistent with past studies that find shorter tenured TMT associated with better environmental performance (Fabrizi et al., 2014). Additionally, one expert pointed out that the companies of his examples and the circular business model transformations he deals with in his work are always mid-sized family businesses and his experience shows that transformations in these companies can be implemented very successfully. Among other reasons, the participation of the family in this business can be an idiosyncratic motivator and an emotional value that also positively influences business model innovation (Weimann et al., 2020). This should be the starting point for future

research about the influence of family businesses for CE business model transformations.

In general, the expert interviews revealed that the CFOs seem to show psychological UET characteristics like an entrepreneurial mindset, an attitude to tackle things themselves and a certain willingness to take risks as well as self-confidence. Zhang (2020) found that the entrepreneurial orientation of CEO leads to more CSR innovation which includes business models innovations. A high risk-taking propensity means more acceptance for the unknown and for decision making without full information (Ting et al., 2015). In addition, CFOs with a foreign exposure seems positive according to the experts. This is a sociodemographic characteristic that has also been studied in the past showing that it can be helpful to open the mind. Shahab et al. (2020) for example found that CEO education or work experience abroad tends to help towards increasing sustainable performance in their companies. The propositions that a higher risk-taking as well as an entrepreneurial mindset and certain experience abroad have a positive impact on CE business model transformation can be the foundation for further testing in future research.

Apart from that, the interviews revealed that not only the CFO's and TMT's psychological and sociodemographic UET characteristics are decisive for CE business model innovation, but that simultaneously external and internal factors in the company need to be in favour. On the one hand, a systemic momentum that creates an increased need for a certain resource, as well as political and regulatory support are necessary. On the other hand, internally an availability of the needed financial resources is important (see appendix 8-10).

6. Conclusion

This study finds that on the one hand age of the CFO has a negative impact on the investment volume of CE funds and based on the reasoning of this thesis it indicates that younger CFOs achieve a better CE performance. Additionally, a longer tenure in the position as CFO has a positive impact as well as a bachelor as highest educational level. Willingness to learn and knowledge in topics of sustainability and CE seem to more important than formal education. Apart from that, other psychological characteristics of the CFO like an entrepreneurial mindset and being a role model that can unite people in the company for CE are decisive. Also, the

legal form of the company seems to impact CE business models. A tendency towards family businesses as the leaders in CE business model transformation could be discovered. Nevertheless, a systemic momentum, political support, and the necessary financial resources need to be available. Consequently, in the transition to CE business models CFOs need to strike a balance between their roles as strategic leaders and supervisor of financial performance. This study has theoretical and managerial implications which will be outlined in the following, as well as limitations and possible future research.

6.1 Theoretical Contribution

The results of this research add to the literature in a threefold way. First of all, it adds to the UET literature not focusing on the CEO but on another role namely the CFO. Therefore, the thesis contributes to the broader literature about the effects of CFOs on organizational results. While until now the literature has focused on the impact of CFOs and their characteristics on diverse management practices (Hiebl, 2014; Plöckinger et al., 2016) or the performance of companies (Mian, 2001) this study shows their influence on sustainability outcomes. Second, extending previous UET research which indicates that CFO characteristics influence innovation (Hiebl et al., 2017; Ginesti et al., 2021; Weigel et al., 2022), the thesis shows that CFO characteristics also influence sustainable innovation such as the adoption of CE activities. Future research on sustainability and sustainable innovation may therefore pay closer attention to the influence of CFOs. Thirdly, to the best of my knowledge, this is the first study to exclusively focus on the CFOs' effect on CE businesses model transformation and additionally, the first study based on UET exclusively focusing on CE business model transformation. Only Dhir et al. (2023) investigated the drivers of the TMT for sustainable business model innovation based on UET. Therefore, this paper adds to the literature by corroborating evidence that CFOs and their characteristics influence CE innovation of companies.

6.2 Managerial Implications for CFOs

We have seen that age is a highly significant influencing factor and is negatively associated with the investments and the transition to CE. This means for CFOs who are older, they should be explicitly aware if they are standing in the way of such a transition and if this has to do with not wanting to take the risk that would come with it and should actively find out what the reasons are for their potential resistance. Furthermore, we have seen that low formal educational levels do not

mean that a transition is not successful, on the contrary. CFOs with a lower level of education than their colleagues can therefore be very confident in the context of CE business model transitions. Crucial is their general willingness to learn and especially their readiness to learn specific knowledge for the transition to a CE business model. All CFOs should follow this and pursue continuous education in sustainability issues. If they haven't been in the position long, CFOs should also ask themselves whether they fully support the transition to CE or are holding back for some reason. For instance, because they think they do not want to take this risk in order not to jeopardize their position.

During the expert interviews, these views on age and education were supported. On tenure, however, the experts felt that shorter tenure was better, as CFOs otherwise could get resistant to change. This was overall connected to family businesses which were not looked at in the quantitative study. CFOs should therefore generally make sure if the governance form of the company they are working in influences their support for CE business model transitions. Based on the experts the CFO should also make sure to act as a role model who as a progressive and innovative transformational leader implements the change in the company and gets the whole firm on board and who stops taking into account only financial KPIs but also sustainable ones.

The expert interviews also confirmed that companies in CE should rather be seen in a systems thinking approach and CFOs therefore also have to adapt their actions to the companies in their environment, to their cluster. In addition, the already identified barrier to transition in the form of regulatory hurdles was supported. Even in the EU, which is very supportive of the circular economy in regulatory terms, this still seems to be a challenge for transition. On the other hand, the reputational benefits of a transition to CE business models were explicitly highlighted. These external circumstances, challenges and benefits have to be taken into account by CFOs in their decisions towards CE business model transitions and influence CFOs besides socio-demographic and psychological characteristics.

6.3 Limitations

There are some limitations that need to be considered. First, the quality of the data of the quantitative model must be addressed. A part of the data does not come from

company websites or LinkedIn profiles of CFOs, sources that can be considered relatively reliable, but from publicly available databases. This is especially true for the highly significant variable age. Not only are the sources not fully reliable but the variable also comes from several different sources. Furthermore, the dependent variable is not the optimal choice for measuring the success of the transition. Including financial indicators improves the meaningfulness of the variable, which is also shown by model quality criteria such as the F-statistic, but a variable such as the investment amount in CE projects in relation to the total investment amount, for example, would be a more precise number.

In addition, when looking at the data, it should be noted that the regional scope is mainly focused on the Western hemisphere as 94 out of 97 observations are from the US or Europe. However, this does not reflect the reality, as many companies in China, for example, are also well ahead in terms of circular economy (Fan & Fang, 2020; Zhu et al., 2019). However, the data of Asian companies in the three funds were hardly accessible and were therefore largely removed in the course of the step-by-step data preparation. It should also be noted that only observable sociodemographic characteristics were included and no unobservable psychological characteristics of CFOs. In the expert interviews, it became apparent that these psychological characteristics could potentially provide intriguing insights into CE business model transformations and could have a decisive influence.

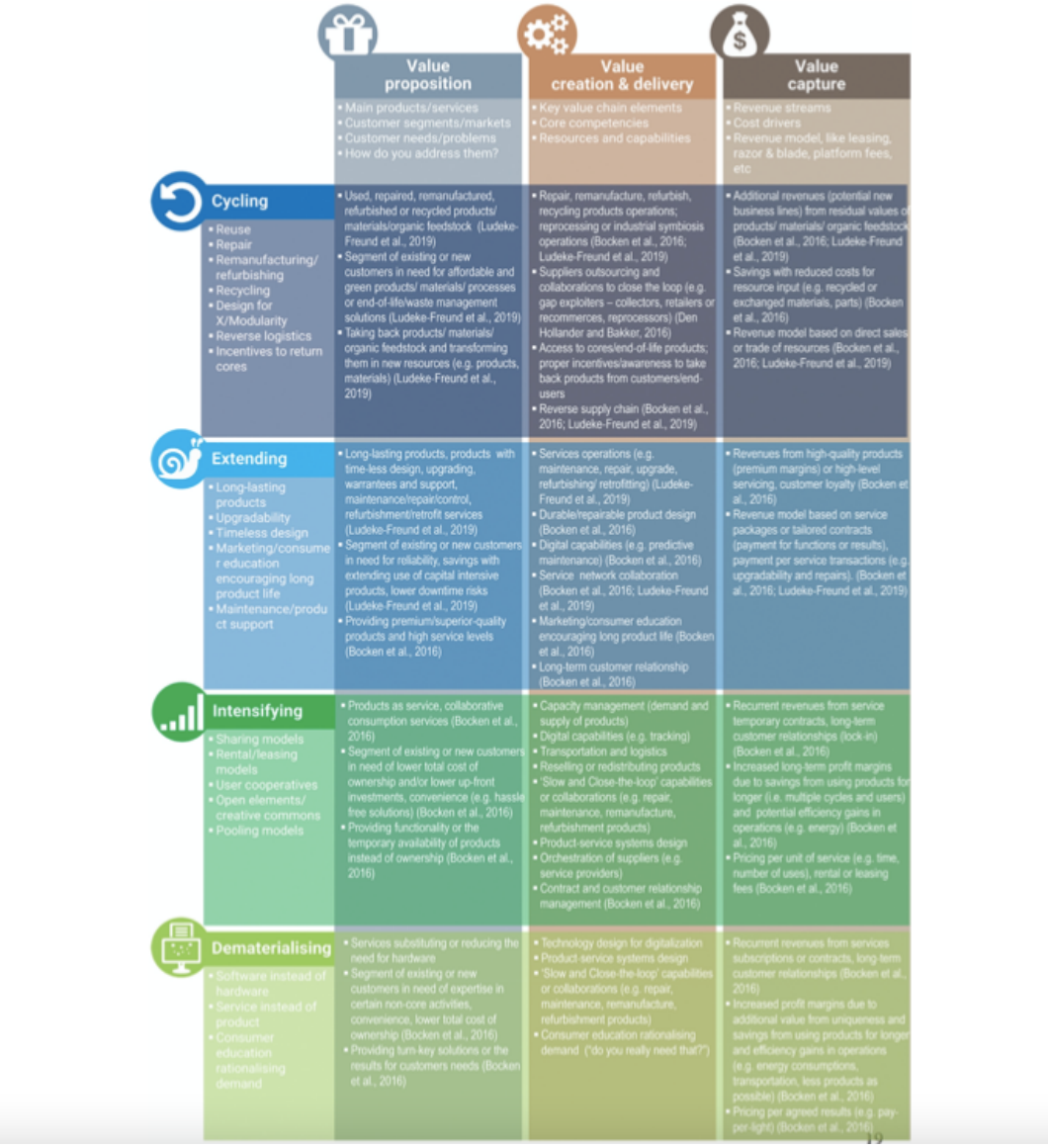
6.4 Future Research

Future research should be conducted generally in the context of CE and UET. Optimizing the dependent variable with respect to CE in future studies could further clarify results. In addition to the observable socio-demographic characteristics studied here, it would also be interesting to look at unobservable psychological characteristics, such as positive management beliefs about the importance of sustainable practices (Dubey et al., 2019), entrepreneurial mindset or risk aversion. In addition, a regional extension of the research would be exciting, especially to the Asian region, because CE efforts are on the rise there. Furthermore, research in family businesses could also reveal further thrilling insights. As the CE business model transformations are not studied at all based on TMT characteristics would an enlargement of the research to other TMT members be promising and would complement this study exclusively about the strategic role of the CFO.

VIII. Appendix

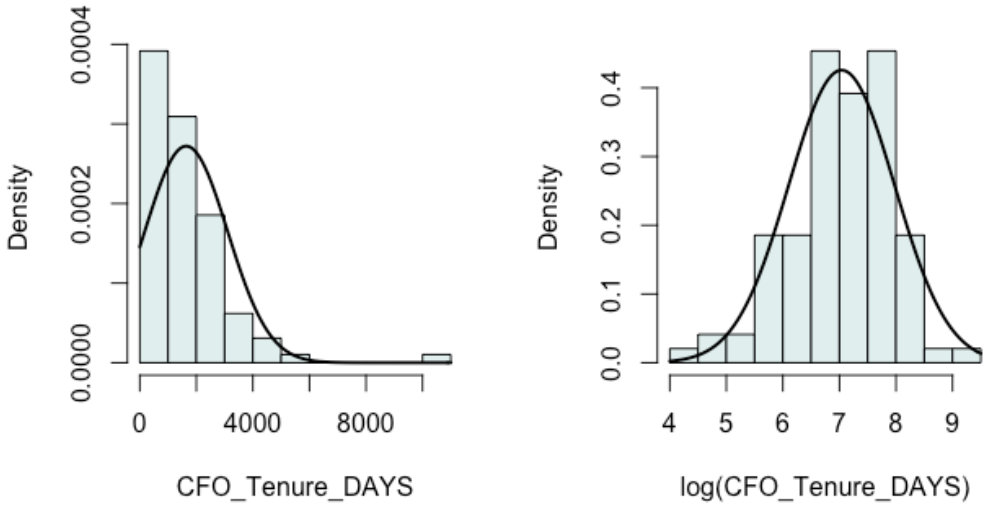
Appendix 1:

Key Business Model Considerations for the Circular Economy, Framework Developed from Richardson (2009) and Our Definition of Circular Business Model Outlined Above.

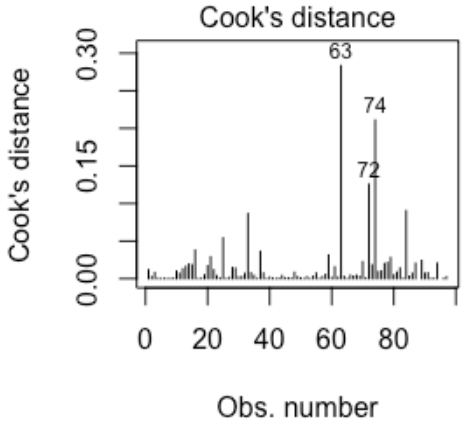


Note. From: *Circular business models. A review*. By: Geissdoerfer et al., 2020, p. 19.

Appendix 2:
Normal Distribution Variable Tenure: Normal vs. Log



Appendix 3:
Cook's Distance to Detect Outliers



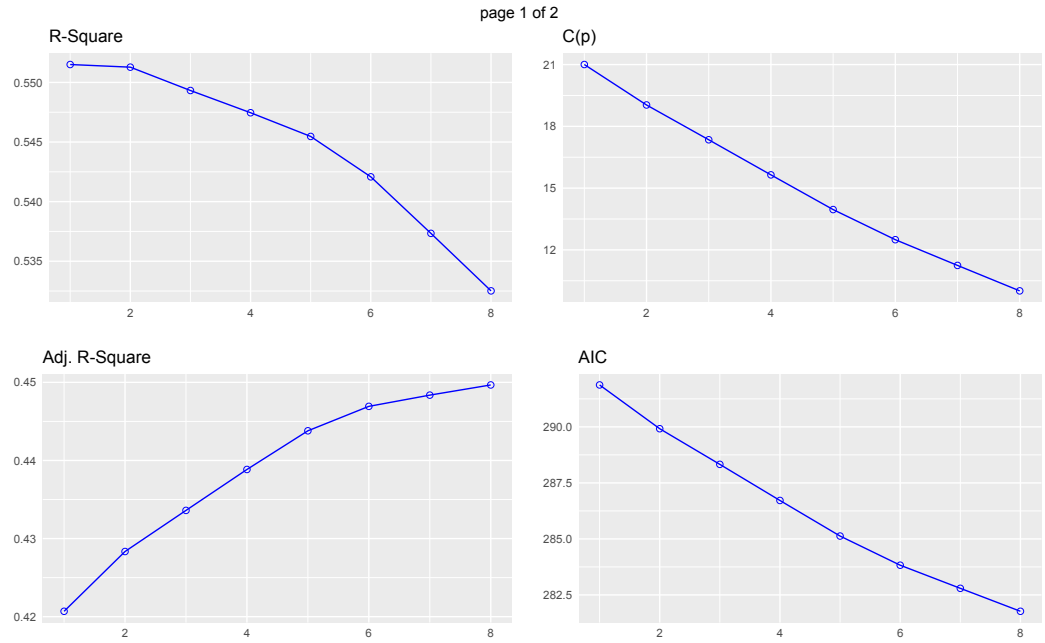
Appendix 4:
Breusch-Pagan Test Result for Homoscedasticity

```
        studentized Breusch-Pagan test

data:  Model1_4.7_4
BP = 33.803, df = 22, p-value = 0.05143
```

Appendix 5:

Backward Selection Based on P-Value



Appendix 6:

Final Output Regression (Full Version)

	Dependent variable:
	log_weighted_Investment_normalized
	FINAL OUTPUT (FULL)
Gender_Male	0.265
	(0.314)
CFO_age	-0.066***
	(0.024)
log_CFO_Tenure_DAYS	0.275*
	(0.142)
CFO_experience_inyears	0.005
	(0.025)
CFO_ed_MBA	0.482
	(0.340)
CFO_ed_PhD	0.720
	(0.664)
CFO_ed_Bachelors	0.674*
	(0.362)
CFO_External	0.351
	(0.264)
Control_10_Energy	-1.075
	(1.306)
Control_15_Materials	1.156***
	(0.384)
Control_20_Industrials	0.415
	(0.369)
Control_25_ConsumerDiscretionary	0.486
	(0.468)
Control_30_ConsumerStaples	-0.227
	(0.399)
Control_35_HealthCare	-0.391
	(0.513)
Control_40_Financials	-2.369***
	(0.812)
Control_50_Communication.Services	-0.736
	(1.127)

Control_55_Utilities	-1.156
	(1.113)
Avg_Return_last1y	-1.737
	(1.264)
Avg_Return_last5y	0.028***
	(0.009)
FreeFloat_Percentage	-0.021**
	(0.009)
Volatility_lastyear	-0.065***
	(0.013)
Constant	-0.844
	(1.502)
Observations	94
R2	0.552
Adjusted R2	0.421
Residual Std. Error	1.022 (df = 72)
F Statistic	4.216*** (df = 21; 72)
Note:	*p<0.1; **p<0.05; ***p<0.01

Appendix 7:

Question Guide Expert Interviews of Second Study

Part of Problem-Centered Interview	Question	Intention
Opening Question	*In your work in the field of sustainability, are you often in contact with circular business models and if how regular?*	Background information on formal role, about the contact with CE business models and the frequency of contact with CE business models
Open-Ended Questions	*Could you tell me what the strategic role of the CFO during a transition to a circular business model is, possibly give examples and thirdly also address important socio-demographic aspects (age, gender, tenure in the position, previous experience as CFO, being internally or externally hired) of the CFO that you believe facilitate the transition?*	Description of the role of the CFO in the transition, get examples of role, name important sociodemographic characteristics
General Explorations	*So based on what you just said you see the role of the CFO during the transition as being an innovative and progressive leader?*	More details about the role of the CFO based on what was already mentioned
Specific explorations		Further elaboration about the opinion on the important sociodemographic characteristics
Comprehensive questions	*You mentioned in your example that he was very young. Does that mean you think a younger CFO would facilitate the transition in general?*	Applied to vague statements to make them clearer
Mirroring	*Overall, it seems that the longer the CFO is in office, the better?*	Used to test ad hoc hypotheses or hypotheses from other interviews
Ad-hoc Questions	*What do you think could be the influence of long tenure of the CFO in the current position?*	Directly address findings about age, tenure, and bachelor education from the first quantitative study when they were not mentioned before

Appendix 8:

Interview Antonio Said and Coded

Said	Coded
0:00:00 Sina: In your work you gain a lot of experience in the field of sustainability and in your work, you also get in contact with circular economy business models. If so, could you also just give me an idea how often or how regular? Antonio: When you say how regular? Or how often means exactly? Sina: For example, how often a year are you in contact with circular economy business model ideas or companies, just how used you are to the concept. 0:00:56 Antonio: Okay. I work each and every day with coordinating a hub between Catolica and Planeteers, Catolica Porto and planeteers. We have 50 members as partners, including businesses, business clusters, municipalities, et cetera. And we work, typically, our main differentiator approach is to work with business leaders to differentiate and to create amazing value creation by using sustainability to guide their strategies. So, the topic is how to raise, and this is a quite a new topic yet, which is quite amazing, you know, is how to take sustainability to the board level and involve all the organizations in transformation. Circular economy specifically, we consider as a subset in which we create approaches and new strategies to enable sustainability, but it's part of the equation.	Bring sustainability to the board level and include the whole board in business model transformations -> work every day. Circular business model a subgroup
0:02:34 Sina: Yeah, and it's perfect because you already mentioned the board members who are very important for this transition. And that's also the part of my thesis. Specifically, I'm looking at the role of the CFO. And because of that, my next question would be, so it's a very long question, but I will break it down after I read it out once. Could you tell me what the strategic role of the CFO during such a transition to circular business models is and maybe possibly give examples of CFOs and real-life cases that you experienced in your work. And thirdly, also address important socio-demographic aspects of the CFO that you believe facilitate the transition. And with socio-demographic aspects, I mean things like, for example, the age, the tenor in the company, maybe the gender, the years of experience the CFO has or also if they are coming from outside in the company or if they are internally promoted.	
0:03:32 Antonio: Okay, I will, so we need of course you need to remind me about the details of the question. I would start with an umbrella topic, which is the following. In my work, what's... So, I will tell you something that the CEO of a main beverage company, the co-leader in their segment it's like a mass segment of beverages, okay? And he told me in this part, even as a partnership with the main international brands. And what he told me is the following, we do a lot of things in terms of efficiency, etc. Maybe we do more than what we communicate, but there is a small detail. And the small detail is we at the board level manage the business with an EBIT ruling, the decision. So, this has to do, if you want, with the CFO role, but in real speaking, okay? And the problem we feel is that we do not know how to lead with sustainability. So, we do not use any tool, any metrics to guide our decision process. And this summarizes it all, which is businesses are, there is a tremendous momentum right now in sustainability, it is even a bit awkward, or even a problem to mention that you are not into sustainability, right? Yeah, you need to comply a lot in more and more compliance is raising like hell the levels right the thresholds by the EU Commission. The point is what these guys say is but how do I run the business with this system? And so, the main thing that is being our let's say, my day is about taking the board and the CEO in particular to lead the business with lenses that include sustainability. It's like, as a top executive internationally says, it's like wearing a new pair of lenses and seeing a completely new reality. Because you have the, as you know, you have the boundaries and the principles around the business that should be fully involving the business. It changes completely the way you innovate; you transform the business, you lead. takes us, when I think of CFO, I must say that until now I had no particular assignment guided by or with a strong influence of a CFO, curiously, but several with a strong influence of CEOs that wanted to change the rules of the game. Also, I can say that transformations in our experience, transformations are much more, are much effective if we have the blessing of having mid-sized players that have companies that want to be really progressive, are or want to be even more progressive. And this takes us back to a guy, a leader, sometimes he's not called the CEO. I remember now a food company that is extremely dynamic, working in the middle of multinationals in the condiments business and they are really, really innovative etc. And the guy that really leads, that articulates all the others at the top is, I believe, he has not even announced himself as CEO. He's like a, some sort of shift disruptive Yeah, transfer officer, whatever. So, it's the leader. You see the point. I think who really thinks about all the transformation. What is the is the name of the of the title right of the person yeah, CFOs is that we need to fully integrate. As this is a system of equations, we need to stop running the business only on pure financial metrics and we need to bring in new angles, new skill sets even for CFOs.	Problems: Sustainability important: Often do not know what and how to do things. Only financial metrics and KPIs in place Benefit: Important to have sustainability: Stakeholder perception Regulatory issues Such transformations much more effective for mid-sized players Which want to be progressive? Dynamic, innovative Disruptive innovative leader Leader who guides the transformation Role model Title not important or position

0:09:19 Sina: Yeah, so to sum it up with the role, what you said is it's very important to have a leader in this transition that is very innovative and wants the company to change and kind of take the first step and have not, if you look at the CFO, not only look at pure financial metrics, but also take these other things into account and take the first step as kind of a role model. Antonio: Yes, he will have to use more and more the CFO or to have good competencies in investment evaluation, because from the type of work that includes the system of equations with sustainability, social and environmental, and then other things in circularity, they need to evaluate the business more and more in a smarter way. So, the financial element, but with a broader equation, is very important. For instance, in circularity, there is something called system dynamics is a way of... You know, if you have a cluster of businesses in which you try to make use of all waste and try to upcycle all waste and bring in new business models, so it becomes like a cluster of business models in which you articulate several business models in combination to generate abundance, et cetera, which is quite regenerative circularity, let's say. These types of approaches that use system dynamics are system, you know, system of equations that are much broader than the traditional financial evaluation of a business because you have several businesses, business model combined, and you need to evaluate the overall system in terms financially. So, it's the same type of rules that apply.	Evaluate business models in new ways. Include sustainability. Not only financial evaluation Different businesses are closely linked in circular business models. Financial evaluation of the whole system is necessary
0:12:20 Sina: If you look at the examples you already mentioned of these leaders that are important, who are kind of a role model, when we go back to the part with the socio-demographic aspect, is there something that in your experience you remember that, I don't know regarding the age or their experience etc. that stood out for you and what you could say also regarding for example their education.	
Antonio: The characteristic of this people is typically if I understand well the question is people that have worlds so people that went outside and stop different realities. I remember the CEO, the young CEO of the Esporão Wine, he had worked in London in investment banking. He worked in music production. He and even slightly a musician, he had lived in the lands where they make the wine. You see? A whole set of things that constitutes the, you know, some transformative path for these people. So, it's the cultural elements that come together. People that do not, are not at all afraid to... they are very confident that the innovation that they try to find continuously is the way to win the game and this goes very against the traditional top executives that, you know, as a career as a role model that is a pyramid runs a pyramid to replicate people. And this is a completely different mindset, right? Because these people in the eye, one after the other, we see people with a lot of tenacity, they are doers, achievers, and they want to understand then how to bring the thing up to the boards, okay? And to take in their hands the thing, not to make others execute.	Variety of work experience Working abroad -> foreign exposure Not afraid -> less risk averse? Confident Tenacity Doers, achievers Do everything on their own
0:15:04 Sina: Yeah, okay. And you mentioned the CEO in this case was very young. Is that something that you experience more often that they are younger? Antonio: Yes. Yes. Yes. We have now another one that is doing tremendous is doing tremendous doing tremendously. And he is quite young again. They are entrepreneurs. You see, it's you know they are several times they are owners what I realize is another great receipt they are owners and entrepreneurs you know if you appoint someone from the outside to come and lead a business it's not exactly the sense you are speaking about people that want to take their business to another level. Of course, there are also people that are managing maybe less disruptive, more receivers. But it's already a second level. The first ones, it's very curious. That's why I say mid-sized companies also is very interesting. Because, you know, members of the family and they took the leadership, they are entrepreneurs, they risk, you see, they risk, and they take the business to a completely different level.	Younger CFOs Entrepreneurial Mindset Owners of the business Family businesses New generation in family business to transform the business?

0:16:41 Sina: But in these businesses, then in general, the people, they are in the company already quite a long time and for years and have kind of experience in the company itself. Antonio: Much more difficult much more difficult to do it because if they have long experience and the day you are used to do things in a different in a quite traditional way It's very difficult to change.	Longer tenure bad because people don't want to change the way they were doing things before
0:17:12 Sina: And regarding their education, would you say that they are quite well educated? Antonio: I would you say that they are quite knowledgeable. It does not mean that they have a lot of courses. But they are quite knowledgeable, they read a lot, they try to see things, even hearing different types of people, see things through different lenses. Sina: So, you would not say that it's important that they have, I don't know, the highest education or a lot of degrees. It's just their internal... Antonio: It's the learning process. It's the learning process. You know, I studied, and I study each and every day. That's the point. The point is not so much the titles, right? In terms of education.	Knowledge in the field is important not educational level
0:18:29 Sina: Very interesting. That here the education is not maybe the decisive point.	
Antonio: You know, we have a Portuguese guy that just died. That had like four years of education. Yeah, four years. It was considered Mr. Coffee; he was the most one of the most amazing Executives every fortune. Sina: Was he the founder of Delta coffee? Yes. Oh, yeah. Yeah, I read about it.	
Antonio: Yeah So it's the tenacity. It's, it's the entrepreneurship, you see, entrepreneurial character is guys that of course, survive the entrepreneurial path. And you see, we are speaking about people that survives, right, that they are in business after many, after many years of trying and trying to survive, right? Yeah. So that's tenacity. And that's the extra thing of trying to find new ways. New parts. Yes. Yeah. And the difference from others. Sina: Very interesting. So, it's more their internal, also kind of their character that they succeed in. Antonio: You can train that, but I believe there is an element of culture in those people, in the culture, that is very difficult to completely replicate. 0:20:18 Sina: Very interesting. Also, your examples in that regard. and helpful because it's very in, I mean before my interviews I also I did a quantitative study, and the results were very much in line with what you were saying. Overall, in connection with the education that formal education is not part here but more...	People with endurance? Character not learned behavior.
Antonio: One comment that I would make to you. These people that I'm talking about they typically take the CFO role in their hands. So, these leaders they cannot say you know the CFO will do these calculations, this analysis. It's impossible. They are thinking the business is rapidly. So, they typically know well how to incorporate the financial elements. They do not run this purely through financial lenses. Okay. It's fully embedded in their skill set.	They are CFOs in their companies

Note: conducted May 10 2023.

Appendix 9:
Interview Translation Rainer Verhoeven Said and Coded

Said	Coded
Sina Zach: 0:00:00 To start I have a question to dive into the topic: Due to your work in a company with a circular business model, do you frequently come into contact with other circular business models or deal with them, and if so, how regularly? Rainer Verhoeven: We have a lot to do with it. And if you talk about yourself, do you talk about the CFO or the company? Sina Zach: 0:00:20 No, I talk about you as CFO. Rainer Verhoeven: Yes, then I would say I have a lot to do with it. I am actually involved in many projects. For example, we are building a new recycling plant in Georgia, in the construction of this project. I am not the sponsor in the board, but I am still very intensively involved in the construction of the project. I always try to get the threads of the reporting, CSRD for example, in a certain term. What is necessary in reporting? Where can we improve? Where can we actually offer more circular economy? We generate around 5% of the copper world market demand if I only stay with copper. And we are very proud that we are now producing roughly 45% of copper from recycled materials. I have been doing recycling for several decades, I don't know exactly, but for a very long time. Sina Zach: 0:01:17 Would you generally consider the role of the CFO in the context of the circular economy as very important in the company? Rainer Verhoeven: 0:01:29 I see the CEO as the one who has the political contacts, who is also on the market a lot. The whole M&A topic is driven by the CEO, while I am, I think, at least a link between what we do outside. I am also very much involved in the topic of investor relations here and how we connect that to the inside. So, in this respect, in my opinion, the CFO is, like with many other topics, also a very important link in the circular economy.	Contact with different CE projects in the company. CFO role connected with sustainability reporting. CFO has an external focus? CFO important in CE matters.
Sina Zach: 0:02:28 And now a slightly more unusual question. Are there any socio-demographic aspects of the CFOs that are crucial in this context? So, things like age, but also experience in the position as CFOs in the previous position, whether you came from a foreign company or were promoted from within, or also, for example, formal training at universities. Rainer Verhoeven: 0:03:03 It is based on the intrinsic motivation, on the own initiative, on the own interest of the CFO to look at this topic, as well as many other sustainability	Intrinsic motivation of the CFO. Interest in the topic.

topics, because that's what it's all about, and it fits quite well into the sustainability picture, to look at it as a whole for the company. So, there is, for example, an employer branding. I have to and will have to actively participate in this, so that we can really get the visibility of our company to the outside world. This enables us to recruit employees in a reasonable way in the future. At first glance, Aurubis looks like Old Economy, with a lot of metal, with huts where it steams and sizzles. At the same time, this company is the core of the whole energy revolution. Without our metals, the whole thing doesn't work. I would like to see an intrinsic motivation and an interest in such technology-driven topics that a CFO should bring along. I claim to be able to say that I have a very strong technical affinity. And I think that's very important to participate in the topic of Circular Economy and to push it forward. Because as a board you have to carry it on into the company. It doesn't help if we believe in it, but the company doesn't really take part. You have to be able to inspire people for this topic.	Willingness to learn about the topic?
Sina Zach: 0:05:14 So would you say that not your position at ThyssenKrupp before was not the reason for your CE activities, even though you already had a lot to do with technology, that it is simply your interest and that the drive comes from within you? Rainer Verhoeven 0:05:30 You could say that, yes.	Drive from within.
Sina Zach: 0:05:33 Then a question, I have also seen that you were abroad a lot. Would you say that this opened your mindset in the context of circular economy initiatives and sustainability initiatives? Rainer Verhoeven: 0:05:53 Basically, for all the topics that concern sustainability and circular economy, an open mindset is needed. And for that you need people who have already proven themselves in difficult situations elsewhere flexibility in their heads to allow themselves to do such things. I don't think there is the old-fashioned CFO anymore, who only cares about the finance, accounting, tax, treasury and controlling. The CFO function is much more holistic today, thank God. And in this respect, the CFO is also the co-pilot in the end in the plane and must therefore also be able to control the company. There actually helps a stay abroad, there simply helps a little bit extraordinary and outside of the normal training.	Open mindset is necessary. Supported by being abroad? Being flexible CFO is not the old role anymore. More holistic role.
Sina Zach: 0:07:20 To get back to the topic of formal training, you would say that it doesn't matter how long you were at university, if you even did a PhD, how you react to sustainability or circular economy initiatives? Rainer Verhoeven: 0:07:42	Formal education in
I have a nasty answer to that, I think. Actually, there are also sustainability studies today and the like. The point is, the question is, how far does someone who, let's say, that focuses on marketing and sustainability into a leading function in a DAX or MDAX company. That is difficult because other criteria are even more important at the moment. That may and will probably change in the future. I think that the topics of sustainability are becoming more and more important. We are also talking about diversity in the company and so on. I think so. But at the moment we have not really arrived in our society in the Western world. And we are already quite far ahead in the whole topic of sustainability in Germany. That is still completely different. So, if you talk to the Americans, that's still a pretty strange word for them, while the French are already very far again at this point. So, coming back to the question, I think that education can be quite important in the future. In fact, I, and this is true for many of my colleagues, certainly at the time when we were in your role and were on the road in the studies, had hardly any points of contact with the topic of Circular Economy and Sustainability.	sustainability matters is not decisive at the moment. But will be in the future?

Sina Zach 0:09:33 I have another question. Do you think that circular economy initiatives are sometimes easier to take place in family businesses or rather the initiative is taken in bigger listed companies? Rainer Verhoeven 0:10:06 Basically, it always depends a bit on the business model. If I were now, for example, in the plastic industry or in the basic material chemistry, then you would probably lead a completely different discussion, because the topic of circular economy is still very far away. It is not yet far enough, while in the metal industry, and this applies to aluminum, steel, as well as copper and non-iron metals, for years now, precisely because of the value that is in these materials, in these recycling materials, an economic advantage. Basically, the whole topic of sustainability always starts with economic value. It has to be worth something for a company in some way. That applies to a big company, like a small company. I actually think that it is often better for big companies, because you have a little more leeway. There is good research and development work, there is the possibility to push projects forward, which may not work out, because in the end it turns out that it is not meaningful. You have another resource available, simply also human resource-wise. You can set it up differently. And so also this battery recycling topic. I don't think there are many small companies that go beyond the ideation phase, in which many are currently working on battery recycling. They need at some point, and you can see that too, that there are the big OEMs today, for example, who put in what we call gambling money in these small companies. They need enough financial volume at some point to be able to drive their research work forward in a meaningful way. And that is often not the case with small companies. They often find their niches. These are often companies that are very much driven by technology. The owner of the company, for example, is Someone who had a great idea, who developed something great, but if he can't build the company properly, then such companies fail very often, precisely because they don't get the proper infrastructure. So, I would tend to say that it is rather the big, larger companies that can do this, to tackle these complex and difficult issues of recycling. Take the topic of plastics. I see a	CE business models only develop when there is value for the business. Big companies can develop CE ideas better due to resources. Family businesses often with innovative ideas.
BASF, a Covestro, a Lanxess much more at the front than any small company when it comes to plastic recycling. Yes, and that's nice, because the big companies have a better leverage because of the size of their company.	
Sina Zach 0:13:24 Those would have been all the questions. Rainer Verhoeven: It was very fast. Sina Zach: Yes, great, thank you very much. Rainer Verhoeven: Great, then all the best and see you soon.	

Note: The interview was conducted in German and was translated into English. Conducted on March 30 2023.

Appendix 10:

Interview Translation Eveline Lemke Said and Coded

Said	Coded
Sina Zach: 0:00:00 I know that you have a Circular Economy consultation. Could you give me an idea how often you or your work as a politician Circular Economy companies or business models? Eveline Lemke: Permanently. Sina Zach: 0:00:31 So, every day. Eveline Lemke: 0:00:33 Permanently. From my life experience, I grew up as a steel wholesaler and steel scrap. That's what Circular Economy is about today. Steel scrap trade. It's all a definition of a term. So, I really grew up there. As a minister I had the responsibility for the topic of circular economy in the Ministry of Economy. And that was a green-led government, that already brought an understanding of circular economy. There I also passed the first circular economy law in the federal council. Until then we still had the waste hierarchy and the waste legislation where it wasn't called like that yet. Insofar that was of course an activity and in the consultation I do today and with what we do in Think Tank we are constantly dealing with questions of business cases and economic issues. That's why I can say that determines my entire working day.	Experience every day, in the past firsthand in the economy, in politics and in the own consultancy
Sina Zach: 0:01:39 So you are an expert in this regard. The next question is very, very long and consists of three parts. I will read it all at once and then I would like to go into the individual parts again. So could you tell me what role the CFO plays in the conversion to a circular business model and mention any examples from your experience. And thirdly, also socio-demographic aspects that you may have noticed. So that could be the explanation of something like age, experience in the position as CFO, gender, previous experience, or whether the person was funded within the company was promoted or came in from outside and these aspects that have an influence in this context.	
Eveline Lemke: 0:02:23 Okay, that's very open and free now, but maybe I can help you a little bit so that you can find and quote further research. So basically, I'm a strategist and we do strategic advice here and in northern Germany they say the *fish stinks from the head* (a saying in German, means that problems often are caused by the leaders). So, if a transformation is not wanted by the boss, CEO or CFO, or by the supervisory board or the companies, that means that nothing can be done about the people in charge of the company, then it will be nothing. I would recommend literature to you, if you are looking for demographic questions and for the question of the power of implementation and leadership, which also refers to the power of implementation and strength of strategic decisions in connection with the personality structure of leading leadership in a company. You can find them there. The link is not Circular Economy in particular, but the link is how strongly a leadership person acts. And whether the strategic approach with which she does this and whether she can bring all the committees she needs in a society, that is a question of leadership.	The TMT is crucial for such a transformation. Strong actions of leaders But without support nothing?
Eveline Lemke: That starts with the legal form of the company, that is my second point, which	The legal form of the company decisive for CE
you have to follow. The legal form of the company, which has been established and built up for the circular business cases, are quite widespread in the German "Mittelstand". But you see here that the decision of the legal form has brought a significant change in the structure to continue circular economy models in a certain way. My two evidence points are the research in the field of leadership strength. There are areas where researchers deal with Machiavellian characters, with narcistic characters, with strong and authentic leaders, with socially entrepreneurial leaders, who now bring in new and new leaders. I would recommend you look at this research. You always come to a conclusion that leaders who manage to bring the consensus of the whole company behind them, to implement their strategy better. This also applies to circular economy and to new models. And the second view, as I said, has a different perspective, and you will follow it	businesses. German "Mittelstand" companies beneficial for CE businesses. Different characteristics of leaders can be beneficial to bring the consensus of the whole organization.

Eveline Lemke: Now, maybe to the third area, my personal experience, and to give you examples. Here we are now going back to 35 years of almost professional experience in the field of sustainability and circular economy. We are working against a stigma. The stigma is that you can't make money with sustainability and circular economy. That is the myth, so to speak. They would have to be sponsored. We are in the community, in which I act explicitly against it, to say that the case alone shows that it is possible. And we also collect research and show with our think tank that this is the case. And that's why I would like to point you to our research. This is a look into the history of the most successful large circular systems that exist. We have made two public publications on this, which are publicly accessible. You can also find them on our website and on our platform. I will send you the link to it. In which systemic changes are circular cases particularly successful? The most successful we know is the history of gold. You have certainly seen it on our platform. But of course, steel and aluminum are considered as a worldwide circular business case with a high success rate. And the question is, what do we measure success on? We measure success on the duration of the existence of this business, i.e., gold for over 30,000 years, steel and iron, also, since the Iron Age, pretty well documented, that there is a reuse and re-melting of iron and metal and non-iron metals. And that's why these systems, these economic systems, are very suitable for a popular economic analysis of the question of what the factors are and under which systemic momentum, we call it a systemic momentum, when a system can develop further, there have been development steps, which among other things are also highlighted very precisely by Ellen MacArthur and by the performance economy of Professor Stahel. And these moments or momenta in which a strong development of such cases is taking place, are always those in which additional state-regulated interventions are being taken. So, let's assume in the Second World War, that concerns the steel collection, so in the Second World War, bombs were to be produced in Europe and especially in Germany. It's still the case today. At the moment when they want to build tanks or planes, especially for aluminum, it is also true, for the aluminum system of aircraft construction, it has been a major moment driver. Then these systems start to behave extremely well as a case, as a business case. And then the question is, the socio-demographic questions that they had. Are they women, are they men, are they young, are they old, are they innovators, are they Machiavellian leaders or what, I don't know, I don't play such a big role anymore. But the systemic momentum, the social need to collect steel scrap is a total breakthrough for these business cases. And we experienced that, not only in these whole metal sectors or also in the noble metal areas, but we have also experienced that in the paper industry, we are currently experiencing this in parts of plastic, of plastic recycling.	Stigma: You cannot make money with sustainability and CE - wrong Successful circular systems when a systemic change happens. Need for materials and resources is high and then CE business models become successful? Sociodemographic characteristics are not the decisive factor anymore but the systemic momentum.
Eveline Lemke: We experience it where the strong, very strong regulations are in place and where the description of the legal proceedings is very precise and leaves few holes. The personal leadership and a little bit of a slip-up. The personal leadership is at stake. Or the question is, is this a sustainability business and do we have to work against this myth? It doesn't matter anymore. That means, we can say, and I would like to tell you, that innovation is always difficult. It still applies, the fish stinks from the head. but also need this systemic momentum,	Systemic momentum, regulation, leadership, all is necessary at the same time.
which is supported by state rules in a diverse way and a corresponding demand in the market. And if all of this comes together, if they have everything, then it really comes to a breakthrough.	
Eveline Lemke: I would also like to say that women innovators, women who make sustainability, often run against this glass wall of stigma. The latest example I would like to mention, publicly, because it was publicly known, they have had female leadership figures who have dealt with the topic of sustainability. And especially the Circular economy, as the board of directors, Mr. Brudermüller of the BASF, is supposed to be supported. But they have fired the female board member who supervised the topic of sustainability and did not replace her. And after that, the board announced that sustainability and CE could not be used to earn money. And then again, in the entire business policy of a large stock company, including the shareholders of the majority of the owners of this company, completely fallen back into this old myth, with it I can't make money, we want to stay in the old vision of We Create Chemistry. The BASF shows this very clearly. That leadership forces that don't get the entirety of the leadership personalities in all committees, in the boards and in the supervisory councils on their side. They can be as committed as they want, they fly out of the curve, they can't do it either. So, the majority of the company, you have to be able to unite them behind you. It depends on each company, which has to take financial resources into their own hands to make a transformation. And you can't get financial resources in a big society if you can't mobilize an internal majority for it. That means, if I were to say, where would you have a look at it? And that might be your question. We will also have good interview partners to show such examples.	Without support from the whole organization, managers cannot be successful in sustainability matters? Holds even more for women?

Eveline Lemke: Then there will also be associations. I would refer you to the area of the newly formed association because you can gain experience there. That is of course the Federal Association of Renewable Energies with Simone Peter, which can tell many of these innovation stories. Solar industry is also a circular industry. They flew out of the curve because there was no political majority. 135,000 jobs have been lost. That is the biggest narrative you can have about this transformation. The same is something that is to be feared in the wind power industry now. Here I want to give another example that is run by families but does not act entirely in free trade on the stock market. who hold most of the shares and are still in the board but want to leave the perspective. How they can further define their majority, their heads, and the direction of company, so that shareholders don't say afterwards, profit has a higher value, more money had to be taken out, and we don't want to continue to do only economic sustainability, but that is central to the economic sustainability, renewable as an energy transition. Here there is a change in the legal form of the company, which is announced publicly. It is the conversion of the stock market company fortunately into a commodity society on stocks, so-called KGAA (special legal form for companies in Germany). With this, a generational change can occur, this is a demographic transition, you asked about that. So, after that, an innovator generation, that's how it was here, there were innovative minds, they started the business, are now 25 years on the market, 26 years on the market, will soon retire and now plan this transition to the next generation and then change their society so that they can continue to maintain a power as a shareholder to continue to be able to stay in the core of the event and not give everything to the stakeholder economy and the shareholders who only want to see a return on investment. I think these two examples I just mentioned, they are both public, you can do your own research. You can do good research and certainly address your own questions and questions that have been asked or video statements that are public, look at them, they prove it quite well. And in general, I can say that these two examples are valid for what I have observed over the years with my experience and in which I accompany companies. That means, to ask the personalities, if they cannot assert themselves internally in a company where they can also live out what drives them. Or to find a new legal form and to find co-owners with a share of ownership who must go exactly this way but want to. That means, this is an absolutely deep business question. and they must follow them with this deep economic view but are dependent on economic foundations.	Family businesses follow CE business models? Innovators, entrepreneurs create such businesses Always at risk to lose the sustainable focus?
Eveline Lemke: Does politics make the right decisions for a framework that makes another fast development possible, or does politics make decisions that prevent the whole thing? And as far as the circular economy is concerned, we have, I would say, in the last few years, come back to a bit of a break-up. The topic has been re-understood. The topic is now being understood because of the safety elements. And I would like to give you that as another systemic element. The security, you heard it yesterday, the government (in Germany) has a security strategy. The government is making a raw material strategy. The question is where do we get everything from so that we can do it at all? How do you take care of your own, recycled raw materials from the anthropogenic warehouses? From the human warehouses. Globalization doesn't work anymore, because we see that the raw materials are being torn out of our hands as garbage. They can be used as raw materials elsewhere, but a large population like us can do it ourselves. And now politics has called for and is doing so, to take up the idea of safety and raw material supply as an essential element. And that has a great influence on what will happen in these areas in Germany in the future, or in Europe, in terms of battery recycling, in terms of production and production, in terms of industrial development in the area of circular economy. As we see in the solar industry, for example, the Americans give higher subsidies and then the solar industry wants to migrate there. Solar industry is a core area of the circular economy. And that's why these are actually the points that play an almost larger role. What is also interesting and certainly a new field for your demographic question.	Political support is important. Regulations need to be in favor

Eveline Lemke: The ones that know a lot about the topic are oftentimes women that started in marketing with the topic of sustainability. They started off as sustainability advisors, but now they are called to the leading functions because they understand how to do life cycle assessment, because they understand it as a craft, because they have the knowledge how to differentiate the fine details to greenwashing and know what the EU Commission is considering, you know that too, So you have to be in the board, if you are dedicated to the circular economy, have this deep insight in life cycle questions, in product passport, in what comes to us in the norms, to questions of digital images, digital twins, about good software, or the question of how AI can develop the topic of circularity. So, there are increasing questions that are responsible in the leadership positions that you have to ask, that you have to answer, that you have to know as an expert. And that means we have a topic here, that is then the socio-demographic aspect, which I would say, the people, especially women, many women from the marketing sector, who have worked on the topic of sustainability before, they know and see these aspects, they see what is coming, and they are now growing, also in the background of quotas, also quotas in supervisory councils. I am always asked for such positions because there are few people who can go deep into these topics and give a strategic advice and a conclusion. But this is exactly the area where I present my expertise, which is in demand, because no one can do that. I started my 35-year-old life in the steel industry, but always with this focus and worked more and more from the practical side. And these are the leaders of the future who will be able to solve this problem. And they must. I don't have an exact estimate of how many men and women there are more students in marketing. And if you take both together and say, you want to find out how many women work on this topic, then you come up with a hypothesis, I will now insert as a hypothesis, which would be to be checked. In the second row from the sustainability department, it could theoretically be more women with exactly this expertise that is now needed, who will then grow up in leadership positions because they bring the expertise and not because they are a woman. So, they were interested in it, but now it is so important for survival that they then also come to this position. I think it's an interesting thesis, so a bit of my observation, I	Deep sustainability knowledge will be even more necessary in the future in leading positions. Oftentimes these are women. But these women oftentimes struggle to unite majorities? Reasons are time, family, no money. Agile leadership is more important in the future
Eveline Lemke: The ones that know a lot about the topic are oftentimes women that started in marketing with the topic of sustainability. They started off as sustainability advisors, but now they are called to the leading functions because they understand how to do life cycle assessment, because they understand it as a craft, because they have the knowledge how to differentiate the fine details to greenwashing and know what the EU Commission is considering, you know that too, So you have to be in the board, if you are dedicated to the circular economy, have this deep insight in life cycle questions, in product passport, in what comes to us in the norms, to questions of digital images, digital twins, about good software, or the question of how AI can develop the topic of circularity. So, there are increasing questions that are responsible in the leadership positions that you have to ask, that you have to answer, that you have to know as an expert. And that means we have a topic here, that is then the socio-demographic aspect, which I would say, the people, especially women, many women from the marketing sector, who have worked on the topic of sustainability before, they know and see these aspects, they see what is coming, and they are now growing, also in the background of quotas, also quotas in supervisory councils. I am always asked for such positions because there are few people who can go deep into these topics and give a strategic advice and a conclusion. But this is exactly the area where I present my expertise, which is in demand, because no one can do that. I started my 35-year-old life in the steel industry, but always with this focus and worked more and more from the practical side. And these are the leaders of the future who will be able to solve this problem. And they must. I don't have an exact estimate of how many men and women there are more students in marketing. And if you take both together and say, you want to find out how many women work on this topic, then you come up with a hypothesis, I will now insert as a hypothesis, which would be to be checked. In the second row from the sustainability department, it could theoretically be more women with exactly this expertise that is now needed, who will then grow up in leadership positions because they bring the expertise and not because they are a woman. So, they were interested in it, but now it is so important for survival that they then also come to this position. I think it's an interesting thesis, so a bit of my observation, I	Deep sustainability knowledge will be even more necessary in the future in leading positions. Oftentimes these are women. But these women oftentimes struggle to unite majorities? Reasons are time, family, no money. Agile leadership is more important in the future

have a lot to do with women. It's incredible how many women are put on this topic. But they run away from men with their expertise. And they still seem to be unable to organize in the majority. And that's something I would like to ask about in observation number two and hypothesis number two. Are there more men or more women who can organize internal majority for these innovation topics in societies? I can't answer that. My example AboWind shows, that it was a boy's group, that also came from the profession of Joschka Fischer, who said back then in Hesse, we need wind power, and his own crew then said, hey, but you always have to do it. Let's start. So, of course, they are all older now and so on. They have now set up huge companies, but I would say that the character was that of innovators when they set off on the journey. And that's why I can make the hypothesis that women are getting divorced, women are being sacrificed, like the example of BASF. Both women, before Ms. Sokale and now, what's her name, a woman, she has such a complicated name, I'll look it up for you, but the last distinguished representatives on the topic of sustainability. And you could see it right on them, the majority organization does not succeed, because the men are further, better connected and because the topic of sustainability is more like, well, someone has to serve that, and we'll let someone do it who can argue that and knows his way around it. But we don't want that and then we serve it. So, that would be hypothesis 2, which would be to check, women organize bad majorities. What do I use to justify this hypothesis? not even the 30% of seats in the local parliaments, in the state parliaments and in the Bundestag. We are still below this quota. It is a self-imposed political goal that we occupy a few women, 50-50, in all parliaments, in all decisions, also in societies. So, now we can determine, neither in the societies is this the case, in the leadership positions, nor is this the case politically. We know from political research that women often do not have the time to organize majorities because they are already double- burdened, because they have children and a job and then also organize majorities. Organizing majorities is networking in their free time, yes, and that's where women bring the children to bed. So, we know from political research that when women are double-income and can't organize majorities yet, and they can't do it in public, how can they do it in society, in large companies? There are the boys' groups sitting there in the evening and drinking their beer. The women are happy when they do the home office, then bring the children to bed, and then fall over. But they can't hang on the phone or organize majorities for a certain political direction in a company. That's why I'm starting with this thesis based on my political experience and based on the experience and knowledge from political research on the role of women in majority formation. And I'm giving it to you now, so to speak, and say, we have a research gap, very clearly, there is a research gap in the field of gender research, women and sustainability, implementation of sustainability or economic positions in large societies. And we don't focus on these research gaps here because we said to ourselves, it is more important to us, we will not be able to achieve much with this knowledge. I'm getting older and I want to see that we can make progress. So, I have to convince the men and then I help men and women in their businesses to convince them that they can achieve the transformation. So, I have shifted that to another level. Not that I fight off in an organization where I fail again, because I'm still a woman with a nice face, but I help all those who bring the power to organize a majority in a company. I don't mean the public. That's my job. That's why I give you these two theses as questions, which you can dive into further and which you can perhaps also formulate as an observation and address as a concrete question. You could sharpen this by saying, have you observed that women, when organizing for most of the cycle economy, tend to fail more than men? If it's not women, what does it mean? Does it mean that they have fewer shares in society, that means that they have less power in a business sense. So, a capital giver with power has more power, so the money speaks. Or so, and basically, we know, now we come to another fact, there you can find wonderful research. Who owns the capital? Do you know that? Have you ever looked it up? The capital of the world, who owns it, men, or women?

Sina Zach
0:27:40
I'm sure it's men.

Eveline Lemke
0:27:43
Yes, so we know that the capital of the world doesn't even belong to 1% of women.

Sina Zach
0:27:49
Yes.

Eveline Lemke
0:27:50
There is great research on this, look it up. If we now, systemically speaking, combine these arguments again and say, what does the power, the ability to enforce, in the companies do? you have to have money, if you have money, you have power. You have to have time, then you can convince people. If you have both, money, and time, you are especially powerful. So, who has more of these conditions at the moment? So, the money is more with the men, less with the women. The time is more with the men, less with the women, but it changes, because more and more men are doing family work. And now comes the third point, the opposite, who now has more expertise on the topic of imperialist economy. The women have that soon because a whole generation is growing in there. So, the expertise is not there yet. And then we may have a turning momentum. Then we may have a change. Because the guy with money, everyone is talking about it today, he will burn it. We are at the transition. Fossil fuels money, are lost investments, are burned capital. That means the men burn possibly the fossil capital and the expertise of the women that comes after, will possibly lead to a transformation of capital when they come up with a new idea. But I would assume that it will take a generation or two before there is a development step again and women have worked their way to this position. That's why we should ask these questions. So, with the hypothesis, who owns the money, it's not a hypothesis, we know that you can do some research. But of course, they build an argumentation with it, which clearly shows where the influence is to enable a transformation. And with that they sharpen their question. And I would always answer it like that. I wouldn't say, the woman is poor, that's not true at all. The woman is a stronger gender, and the men are always emotionally overloaded. Men react completely, so that may come in addition. New research, ah, look at them. That also turns in the narrative, thank God. Otherwise, they said, oh, women cry. And men don't cry because it's so classic. And that's turning. So now men can cry too. And you can tell that they also have emotions. But, if we look at society, who overreacts emotionally, and who overreacts deadly, who beats, yes, the latest studies show that half of German men, and especially young men, accept that men are allowed to beat women and oppress them with violence. That means, this study also shows again, men do not have their emotions under control. So, and then it comes together, so 1% of the capital is with men, who are not really in control of their emotions and who may also be betting and lowering their money. What development trend will we have for the future? Prognosis. Those who have their emotions under control, because otherwise you will not become the boss and you will not get to the boss's floor, and you will not work up. I would say that this is a characteristic that you have to bring with you. Strong emotional control competence as a guiding element in dealing with people. No Machiavellianism, the macho, the alpha that comes there and discriminates people and sexualizes and is violent. that can still remain and understand as a member of the human race, like in an agile world which is a world that changes rapidly, is volatile, and has high-speed demand, so that they can make and react to it in an agile way. And agile decisions also put power in the sense of capital in front, and that means that they have the power of conviction for those who come after them with capital. So, I have a system of thinking analytics that I present to you, you notice that, where two unfounded hypotheses are still in the room, because there is too little research. The rest of my argumentation is quite cleanly documented in terms of research, So really well paid. And, yes, and yes, that's it.

Sina Zach 0:32:30 I have one more question, because you mentioned it earlier at AboWind, that it was family-run. Did you have to deal with family-run companies more often, or was AboWind an exception for you? Eveline Lemke: It's not. I can say, and I recommend you the research of Professor Simons, of the Frankfurt Business School, on the Hidden Champions. We really have to think about it now, it's been so long, but I found it totally fascinating research. He has examined who the actual pillars of the German economy are. And he has dealt with the "Mittelstand". And the Mittelstand is still in Germany, for the most part, I have to look up the number now, but something over 65 to 70 percent family-run. These are also my customers. And family-run companies, I would say now, for example, the company Orten in Mosel, which I also advise, is still the owner of this company, which is focused on e-mobility and the conversion of trucks in the field of e-mobility and now also makes hydrogen conversion. It is absolutely driven by owners, driven by families, but of course it also has to be seen in this constellation that he keeps the money together. That means, the question is, how do you always get enough money for innovation together? It doesn't matter where you are, and the research of Professor Simon's to the Champions shows that a high degree of specialization, so the higher the specialization is, the more likely you have a world market-leading position. This also applies to circular economy. If you look at all the questions about gold or recycling for electrical devices, electronic items, then that's a great special knowledge. Then family-owned companies have a chance to prevail. And where we are talking about electro-recycling, The biggest German electrician is also a family manager. And it was Mr. Schweitzer, the Schweitzer family, who was also president of the German Industry and Trade Chamber. Eric Schweitzer was also president. Meanwhile, they have also divided up their family consortium. Why don't I come up with a name now? It's not possible that I can't tell you the biggest German expatriate. I can say that. This is a memory gap. Okay, write it down. It's the Swiss family. The moment you google it and then you have ericschweizer.de, you have the president. Yes, just like in the construction the company Tomra, for example, they	Family-run businesses are leading in CE business models

build the systems for sorting, sorting technology. They come from Scandinavia, but they are also family-led. We are noticing many international cases. I am noticing that the adoption of Tönniesmeyer, the Tönniesmeyer family, was bought by Lidl. Lidl is also family-led. It is no longer called Lidl, but Schwarzgruppe. But that is also an example of family-led and highly specialized and bring the circle of competence together. That means, here the research is still valid, and the phenomenon that Professor Simons observed in family businesses. That's why this research is also great, if you look at it. She induces this, and you see the same patterns. So, it's really like a pattern of families, a pattern of head driven, a pattern, you must organize the majority, a pattern, you have to have money, a pattern, you have to have the knowledge, where does it all come from? And those who have all of that and at the same time turn on the politics and the right attitude, bingo, there it goes. Sina Zach 0:36:49 Yes, okay, perfect. Yes, it helps me a lot, there is an incredible amount of information, but very, very helpful and very deep insights too. I think that's a great thing. Eveline Lemke 0:36:52 Exactly. Maybe you can start with Professor Stahel about the performance economy. Because Professor Stahel also studies the health economy. The health economy is also a lot more circular. And he studies case examples endlessly with which performance, and that's why he calls it so, perfection of detail. I think you can find many arguments about that. And he is an essential leader who brings together this knowledge for the Ellen MacArthur Foundation. And you will certainly get an interview from him. He does a lot with students and endless video material and so on. You can also find that in ongoing sources. Sina Zach: Perfect. Great. That sounds very good. Thank you very much for taking the time and for your very deep knowledge. Eveline Lemke: You're welcome, come back to me and I'm happy to get in touch. Sina Zach: 0:38:16 Thank you. Have a nice day. Thank you. Have a nice day. Bye.	

Note: The interview was conducted in German and was translated into English. Conducted on June 15 2023.

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