

Article

The Role of the Accounting and Control Professional in Monitoring and Controlling Sustainable Value

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Abstract: This study explains the role of the accounting and control professional in monitoring and controlling sustainable value. The general conclusion of our research is that the accounting and control professional should play a leading role in this process. Our findings explain how this role can be designed, state the current obstacles to implementing this role successfully, and indicate the necessary steps to deal with these obstacles. We argue that the most critical obstacle to implementing this crucial role is the current mindset of the accounting and control professional, which is mainly focused on financial value. We discuss the factors impacting the needed mindset change, distinguishing between internal and external factors. Our study is based on 13 parallel focus group discussions with 55 senior finance, sustainability, and strategic professionals. Our research responds to calls in the literature for further research on the role of the finance professional in sustainability accounting and control. It also contributes to the current academic discussion about management accounting and control, focusing on sustainability.

Keywords: accounting & control professional; management control; sustainable value creation; diagnostic control system

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1. Introduction

Research shows that the accounting and control professionals' (ACPs') level of involvement in monitoring and controlling sustainability is low and that there is a broad consensus in academia and practice that ACPs need a more significant role to embed sustainability in corporate strategy and practice. We have defined the ACP as the internal finance professional responsible for financial accounting and management accounting, also referred to as the financial controller and the business controller, respectively. The involvement of the ACP in monitoring and controlling sustainability becomes even more relevant due to upcoming regulation like the Corporate Sustainability Reporting Directive (CSRD) of the European Union. The CSRD obligates large organizations to include a sustainability section in the annual report in accordance with the European Sustainability Reporting Standards. Also, the vast majority of investors conduct a structured and formal review of ESG disclosures [1], confirming the relevance of the topic.

In our previous empirical study (as part of a PhD research project) on the design of management control systems focused on the creation of sustainable value, we concluded that the level of involvement of the ACP is particularly low in relation to the diagnostic control system, being one of Simons' four levers of control. According to Simons, a diagnostic control system is defined as follows [2]:

“The ability to measure the outputs of a process (1), the existence of predetermined standards against which actual results can be compared (2), and the ability to correct deviations from standards” (p. 59).

Based on the above we have defined the following research question:

What could be the role of Accounting & Control Professionals regarding diagnostic control systems focused on sustainable value creation?

The research question will be answered by making a gap analysis between the current role and the desired role of the ACP, followed by recommendations on how to implement this desired role.

Our research demonstrates that ACPs should play an active role in monitoring and controlling sustainable value. Our findings indicate that ACPs should have a challenging position in the target-setting process, be responsible for the reliability and compliance of the actuals, and analyze and monitor the actuals' progress against the targets. Based on our results, we argue that the most crucial obstacle to implementing this essential role is the current mindset of the accounting and control professional, which is mainly focused on financial value. In our discussion, we further detail and clarify the factors impacting the needed mindset change, distinguishing between internal and external factors. In doing so, we have also included the role of belief systems in our discussion.

This work contributes to sustainability accounting and management accounting literature. In general, it advances our understanding of designing a sustainable diagnostic control system as part of the management control system, answering the call for more management accounting and control research in the area [3–5]. In particular, it responds to the call in literature to perform empirical research on the role of ACPs in sustainability accounting and control [6–8], enabling us to deepen and nuance our understanding of the topic. Based on our empirical investigation, we explain the nature and characteristics of this role, its activities, the possible criticalities ACPs may face, and the competencies (technical and soft) that should be developed when taking this role. Furthermore, the study provides tools for practitioners to design and use a diagnostic control system to support the transformation of organizational practices that can contribute to realizing sustainable goals.

The remainder of the paper is organized as follows. In the next section we analyze current literature on our research topic, followed by our methodological section, where we explain how the empirical data were collected, analyzed, and validated. After that, we present the empirical findings and discuss how they augment extant limited understandings about the role of ACPs regarding diagnostic control systems, focusing on sustainable value. In our conclusions, we explain our contribution to the current literature, acknowledge the study's limitations and offer directions for further research.

2. Literature Review

Although a growing body of empirical research has emerged over the last decade on sustainability in relation to accounting and control [9–12], knowledge of how companies design or use management control to support sustainability strategy appears to be limited, providing considerable scope for further research [5,10,13,14]. In particular, the role of the ACP in this respect is underexplored in the literature [6,7], although there is a broad consensus in academia and practice that ACPs need a more significant role to embed sustainability in corporate strategy and practice. A recent systematic literature review on our research topic by Ascani et al. [6] clearly shows the current low involvement of the ACP in sustainability accounting and reporting versus a potential for high involvement in the future in the literature. So, while there is a consensus that ACPs should or may play a role in sustainability accounting and reporting, there is uncertainty regarding the role that ACPs should play [15,16]. In this regard, Schaltegger and Zvezdov [7] argue that “accountants are involved in sustainability accounting in a way that has not been investigated in literature to date” (p. 350) and suggest that “the main implication for

future research is investigating how accountants could be more strongly involved in sustainability accounting and reporting” [7] (p. 353). Ascani et al. [6] highlight that “further research should be undertaken for an in-depth investigation into the nature and the characteristics of this role, the activities related to it, the possible criticalities a management accountant may face, and the competencies (technical and soft) that should be developed when playing this role” (p. 19).

There is also ambiguity as to why this role is currently not taken by ACPs. Williams [17] suggests that the low involvement of management accountants could be due to the current inadequacy of their skill sets; management accountants need to be skilled in sustainability to be able to “measure, evaluate, record, interpret, and report organizational sustainability information” (p. 282). In this regard, Egan and Tweedie [16] show that ACPs also lack the mindset needed to support sustainability practices and struggle to find a common vocabulary with other organizational actors, such as engineers. Furthermore, the authors show that when ACPs engage in sustainability initiatives, they appear reluctant to embrace innovations: they support non-accountants in the data collection and reporting, but they do not work creatively with colleagues of other departments to develop innovative accounting solutions. Schaltegger [18] argues that ACPs do not play a role in decisions about what sustainability information should be collected and created. This may be because conventional management accounting systems are not able to provide sustainability information, while non-accountants have developed a new range of measurement and management tools to explicitly address sustainability issues.

To avoid ambiguity in our research on “monitoring and controlling” and “sustainable value”, we have defined these multiple interpretable concepts in our study. Our monitoring and controlling concept is based on the diagnostic control system, being one of Simons’ [2] four levers of control, as defined in our introduction.

We realize that the four levers of control of Simons [2] function together in one control framework, and therefore, analyzing one lever in isolation seems problematic from a methodological perspective. Simons [2] posits that in the LOC framework, all four control systems, working together, are necessary to provide an effective control environment. These four control systems are briefly explained in Table 1.

Table 1. Simons’ LOC framework [2].

Systems	Definition
Belief	Statements communicating the basic values and premises for action of the firm
Boundary	Statements defining acceptable or unacceptable domains of activity
Diagnostic Control	Monitoring activity through deviations from preset standards of performance
Interactive Control	Regular involvement in subordinate activities by management to encourage dialogue and creative behaviors and address strategic uncertainties

However, the diagnostic control system can also be seen as a standalone control framework as first introduced by Anthony [19], with a primary focus on the cybernetic control mechanism, allowing us to further zoom in on the particular conclusion of our prior empirical study and create focus in our research approach. We have chosen the diagnostic control system of Simons because Simons uses the diagnostic control system to implement strategy using critical performance variables. This connection of strategy to the diagnostic control system is crucial for the successful implementation of a sustainable strategy. Another reason for choosing Simons is that his framework is one of the most widely used management control frameworks in management accounting literature.

Sustainable value is a concept open to many interpretations and is often seen as a clichéd term. We have defined the creation of sustainable value as finding a balance between creating ecological, social, and economic value [20], referring to the Triple Bottom Line approach that comprises these three pillars of sustainability [21,22]. According to this definition, companies are challenged to behave in an environmentally sustainable and socially responsible manner while maintaining and improving shareholder value.

3. Research Method

3.1. Data Collection

As the research question is exploratory, the study used a qualitative research methodology. We conducted focus group discussions (FGDs) to collect our data to enable our exploratory qualitative analysis. This research technique is based upon Merton [23], who describes an FGD as a group of people who share a common theme and discuss a certain research question under the supervision of a moderator. In terms of the choice of this research technique, focus groups offer the unique advantage of letting respondents articulate their perspectives while simultaneously allowing for a discussion when respondents' personal views converge or diverge from those of others in the group. Stewart and Shamdasani [24] also indicate that FGDs are an appropriate technique to assess obstacles when implementing innovation, which is a significant theme in our study. As our findings illustrate, such groups allow rich insights to emerge regarding the research question. All FGDs were held in parallel to avoid differences in knowledge of the research topic due to new developments over time. Thirteen FGDs were conducted that included 68 professionals (including 13 moderators) who were recruited from various industries and institutions. A purposive sampling approach was followed to ensure that they collectively represented a diverse mix of demographic and professional backgrounds relevant to answering our research question. No incentives were offered for participating in the focus groups, and all invited respondents were free to accept or decline the offer to participate at any time. All those who chose to join provided informed consent before data collection. Appendix A contains the details of the final sample of participants in the FGDs. The final sample was sufficiently diverse, comprising men and women drawn from 45 different firms and institutions across a wide range of industries and collectively representing a broad spectrum of professional experience. The participants consist of senior finance professionals (CFOs, Senior Controllers, Audit Partners, etc.), senior sustainability professionals, general management, and senior researchers and educators on the research topic. Moderators of the FGDs were all professors or senior researchers using a semi-structured moderator guide to facilitate the FGD. The moderator guide explicitly instructed the moderators about the use of the research question and related definitions to ensure consistency in understanding the research question by the participants. Significant effort was taken to balance the appropriate group size and composition of the focus groups. In line with recommendations [25–27], all focus groups consisted of four or five respondents from different firms. Every FGD consists of at least one finance professional and one sustainability professional or general manager, thus providing a broad range of perspectives on the research questions. Although female participants were in the minority, at least one female participant was represented in each group. Taken together, the collective heterogeneity in personal and professional backgrounds helped obviate potential concerns regarding confounds during data collection. All participants and their organizations were guaranteed anonymity in the diffusion of the findings. All FGDs were videotaped and transcribed. Since the FGDs were held in the middle of the COVID-19 pandemic (25 November 2021), we were forced to organize them via an online event. Albeit online communication has its downsides, we believe that at the time of our event, online communication and meetings were fully established as effective alternatives for live events, and therefore do not limit our analysis. On the contrary, the upside is that all FGDs were videotaped, so we were able to include body language in our analysis.

3.2. Data Analysis

Data were analyzed through a theory-building coding process. Several iterations of open coding [28] led to the emergence of a role for ACPs regarding sustainability. The open coding process resulted in 703 selected fragments and 153 open codes. The open codes were created to represent the meaning of the selected fragments, taken from the perspective of the sensitizing concepts “diagnostic control systems” and “sustainable value creation”, not using a preset code book with theoretical control elements. We grouped the codes and fragments of the open coding process during the axial coding process into seven relevant code groups. A code group in the axial coding group consists of codes and fragments of the open coding process with a common theme. Theorization of the code groups was ultimately developed via the selective coding process. Other coding iterations were performed in the selective coding process to categorize and relate findings to the diagnostic control system. In doing so, the analysis builds on Nicolini’s [29] method of “zooming in” on the local accomplishment of practices, where attention was drawn to doings and sayings, artifacts and goals driving the accomplishment of practices, and “zooming out” by focusing on practice interconnections.

3.3. Validation of the Findings

As a final theoretical saturation check, member checks [30] were conducted by sharing our findings with all participants and moderators to evaluate whether the interpretation aligned with the participants’ experiences. From all 13 FGDs, we received feedback from at least one participant. Minor revisions were made based on the feedback, but there was broad consensus across participants and moderators that our draft findings captured all the main elements of the discussions.

We used dedicated qualitative research software (ATLAS.ti version 22) to accommodate the three coding procedures. In the next section, the findings that emerged from the analysis are presented, which help provide deep insights into the role of the ACP regarding monitoring and controlling sustainable value.

4. Findings

One of the joint conclusions of the FGD is to assign the responsibility of this process to ACPs, since this process is a core ACP competency. However, several obstacles were recognized during the FGDs which clarify why this role is currently not taken by ACPs. The current ACP mindset was mentioned as the biggest hurdle to transitioning this role from the sustainability department to the ACP. The first indication for this argument became apparent while analyzing the output of the axial coding process and was later confirmed by the qualitative analysis of the selective coding process. We grouped the codes and fragments of the open coding process in code groups during the axial coding process. A code group in the axial coding group consists of codes and fragments of the open coding process with a common theme and is further divided into sub code groups. One of the code groups was labeled “obstacles ‘Soll’ role ACP”. The outcome of this code group is summarized in Table 2.

Table 2. Overview of code group “obstacles ‘Soll’ role ACP”.

Sub Code Group	# Fragments	%
ACP Mindset	74	53%
Lack of uniform reporting standards	28	20%
Lack of sustainable knowledge of ACP	25	18%
Lack of capacity ACP	9	6%
Limitations of the IT system	4	3%
Total	140	100%

The table states that 74 selected fragments refer to the ACP mindset as an obstacle for ACPs to take ownership over the sustainable accounting and reporting process, which is more than half of the selected fragments for this code group. We realize that we cannot draw firm conclusions based on this quantitative analysis due to our qualitative approach. However, we consider this a strong indication that the current ACP mindset might be the most essential obstacle for them to take ownership of the sustainable accounting and reporting process, which will be further analyzed and confirmed in our following qualitative analysis.

Apart from obstacles, some elements were also identified to accelerate the involvement of ACPs in the accounting and reporting process of sustainable value. Although these elements will contribute to ACPs' transition to the "Soll" role, it is also confirmed that more fundamental changes are needed to change the ACPs' mindset towards realizing the complete transition to this role. The appropriate tone at the top is a decisive factor in embedding sustainability in the ACP mindset, but constructive cooperation between the sustainability department and the ACPs is also crucial in this respect.

Figure 1 represents an overview of our empirical findings on the role of the ACP concerning the diagnostic control system focused on sustainable value.

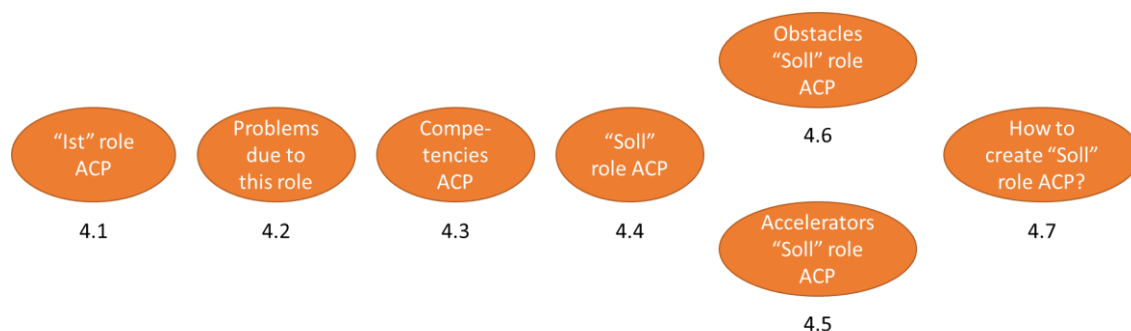


Figure 1. Overview of our empirical findings.

In Sections 4.1–4.7, Figure 1 will be explained and motivated in detail, and supported with empirical evidence. Quotes will be referenced to the corresponding participant (P) and focus group discussion (FGD).

4.1. "Ist" Role ACP

Our findings indicate that currently, ACPs mainly focus on financial information and that they do not see sustainability as part of their responsibility, as is explained by P4 (Group Controller), FGD4:

"Well, I think because the role of the finance professional is still seen today as that you are not concerned with sustainability KPIs or pre-financial KPIs. You just look at topics like turnover. That's what you're dealing with."

All other selected quotes regarding the current role of the ACP show a similar picture. In our FGD there is a common understanding that ACPs currently consider the sustainability manager or department responsible for the sustainability data, reporting, and analysis, as explained by P4 (Academic Finance & Control Lecturer), FGD2:

"Well, I think that finance will mainly stay in that traditional finance role. Traditional financial reporting and analysis. And that they would like to leave the other part that is about sustainability to departments that deal with sustainability."

4.2. Problems Due to This Role

Our findings demonstrate that the sustainability manager is generally not considered an accounting and control expert, as shown by the following quote from P4 (Group Controller), FGD4:

“And what you did see is that the sustainability report was often organized by sustainability people, who simply have less affinity with numbers and accounting.”

Therefore, sustainability managers leading the accounting and reporting process of sustainable information often leads to a highly manual process, leading to higher risks of mistakes in the sustainability information and accounting process. The following quote from P1 (Senior Associate with focus on NFI assurance), FGD3, who works as an auditor on non-financial assurance, illustrates this risk:

“For example, for one client where they [sustainability department] measure the change in CO₂ compared to a certain year, they have a very complicated calculation in Excel, where data come from different systems. And there’s one person who owns that KPI and says, here you are, this is the calculation. When we go through this, we see mistakes and we go back ... but nobody from the organization had taken a second look. So they hadn’t seen it themselves. You encounter a lot less mistakes like this in the financial processes.”

In this case, the mistakes were unintentional and due to inaccuracy. However, other errors are made due to insufficient awareness of the basic accounting rules and policies; for example, restating one’s comparative information in case of significant business changes like mergers and acquisitions, as expressed by P1 (Director Investor Relations & Strategic Finance), FGD2:

“If you look at the figures purely from the perspective of a sustainability team, I occasionally hear, ‘Oh, we sold a business unit, so we are going to achieve our objectives [lower footprint].’ That’s not how we [finance] look at numbers.”

Although we can also consider this inconsistency in comparative information to be an unintentional error, the border to greenwashing is a thin line, especially when one takes into account that the regular segregation of duties and other checks and balances are often not in place, as explained by a senior manager audit and assurance, P3 (Senior Manager Audit and Assurance), FGD5:

“...what you often see in large SMEs—200 million plus turnover—there are often only one or two people in the sustainability department who really have to push and pull such an organization to determine those [sustainable] KPIs. Then, to speak with your example, it is the sales department that sets its own targets.”

Lastly, when decision-making is based on inaccurate (either intentional or unintentional) information, it impedes the process of taking the appropriate corrective actions to improve results.

4.3. Competencies ACP

When we consider the ability to measure the outputs of a process, our participants have a common understanding that this is one of the core ACP competencies, with a long tradition of designing accounting processes to report reliable and compliant information. Although it is recognized that the ACP’s primary focus is measuring financial output, measuring non-financial output is another of their capabilities, as recognized by P3 (Finance Consultant), FGD2:

“I also do compare it a bit with the balanced scorecard. That was—at one point, every company had a balanced scorecard. The financial part was always easy. And then you had the project, and people, and external markets...That was

much more vague, but yes, you just start measuring. And then finally...you see a trend.”

Regarding the existence of predetermined standards against which actual results can be compared, it is noted as one of the ACPs’ strengths by P4 (Director Finance Operations), FGD9 (confirmed by the sustainability manager (P1) of this FGD):

“So when we talk about setting goals, measuring achievements, making analyses, initiating and monitoring possible improvement actions—yes, that’s basically our [ACPs’] strength”

During several FGDs it was argued that ACPs are seen as important professionals in this process because they have a critical mindset from an independent position. They do not just take information for granted but will critically review the reliability of reported information and challenge set goals, which also has a positive impact on the accuracy of the management information.

One last relevant competency mentioned was the ACPs’ IT skills, as stated by P3 (Group Finance Director), FGD1:

“...but why can we facilitate this well? Because we [finance] are very familiar with the IT environment to set up reports...”

4.4. “Soll” Role ACP

The general understanding in the FGDs is that ACPs should be responsible for measuring the results of sustainability, but what this responsibility entails differs per FGD. Some participants argue that ACPs should measure and report the sustainable values, as explained by P1 (Director Group Reporting & Accounting), FGD13:

“Measuring and reporting [of sustainable information] is beyond any doubt simply the role of accounting & control.”

However, the common understanding is that who is measuring is not so relevant and should be approached pragmatically. It is argued that in some cases measuring sustainable information requires specialized sustainable knowledge, which is often missing in ACPs. In that case, it makes more sense to let the sustainability department measure the outputs. In other cases, specialized IT knowledge is necessary to access and unlock sustainable data. The business intelligence department is often referred to as the department with the specialized IT knowledge. However, apart from these differences in the practical application of measuring, there is a common understanding that ACPs are responsible for the checks and balances, as in the financial process, to make sure that the measured output is reliable and compliant with reporting standards or regulations, as expressed by P1 (Senior Associate with focus on NFI assurance), FGD3:

“I think they can also play a major role in setting up processes and guaranteeing the quality of data. Because what I often see now is that within the financial processes there are segregation of duties, different reviews, many different controls that are in place. And then you have the sustainability information, and someone prepares this info and sends it to you and just hopes that it is without mistakes.”

Regarding comparing actual results against predetermined standards or targets, we distinguish between setting the targets and analyzing the actual results against the targets. In setting targets, different opinions were discussed in the FGDs. In a minority of the FGDs, it was argued that ACPs should play an active role in actually setting sustainable targets. Other participants stated that ACPs only play a supporting role in setting the targets. However, the most common understanding in the FGDs is that management or business owners are responsible for setting sustainable targets, but that ACPs should play a challenging role in the target-setting process. The following quote from P4 (CFO), FGD1 reflects this common understanding and the discussion about the exact role of ACPs in this process:

“I notice that in my position [CFO] I am quite busy with it [sustainability], but also the people who report to me. They challenge the sustainable targets which are set by other departments, including assisting these department to improve lagging actual results, just like you do with a commercial department. So I think the facilitating role, or the reporting role, is a bit too modest.”

This quote also represents the general understanding of ACPs' role in analyzing the actual results against the targets and their role in correcting deviations from standards. In particular, the “just like you do with a commercial department” part explains the key message of this quote, referring to the role ACPs play in setting targets, analyzing actual results, and monitoring progress in the regular financial streams. Parallel to this process, ACPs should challenge and check the explanations for lagging sustainable results on reasonability and reliability, whereas the business owner remains responsible for the results. This also means that the business owner is responsible for initiating corrective actions for lagging results, but ACPs will monitor and challenge the progress and should also facilitate the analysis. The core competencies of ACPs regarding the diagnostic control system as described in Section 4.3 are measuring, reporting, analyzing, and having a critical and independent mindset and IT skills. These competencies match thoroughly to the activities described as the ACPs' “Soll” role regarding diagnostic control systems. These competencies generally do not belong to sustainability professionals as described in Section 4.2. From that perspective, it seems obvious that a dominant role regarding the diagnostic control systems is attributed to ACPs and generally recognized in other FGDs as well.

Our last main finding of the ACPs' “Soll” role relates to the distinction between financial control and business control. This distinction is not discussed in all FGDs. However, the general opinion is that financial control is mainly responsible for the checks and balances of the actuals to assure reliability and compliance of the data. On the other hand, business control should be responsible primarily for the challenging and analyzing role.

4.5. Obstacles to the ACPs' “Soll” Role

Although in our FGD several obstacles were identified, the most dominant barrier in our findings refers to the current ACP mindset, as shown in Table 2. If we further zoom in on obstacles in the ACP's way of thinking, the ACP characterizations, as shown in figure 2, were recognized in the FGDs.



Figure 2. Identified ACP characterizations.

These characterizations do not only come from non-financial participants but are often brought up by financial professionals themselves. For example, the following statement is from a head of finance and control (P1, FGD4):

“And I think we are very quickly inclined to only think in euros, because we have been doing that for decades...”

We realize that a mindset is difficult to grasp. It is often more a feeling than something concrete. P3 (Group Finance Director), FGD1 clearly explains this feeling about the ACP mindset:

“But we, financial people, are often black-and-white-thinking people. We struggle to step over our own shadow. I’ve noticed this with reports in the past as well. If it contained non-financial figures or KPIs, the enthusiasm to deal with them diminished. A lot of bookkeepers, accountants and controllers are like, that’s not ours. We are just financial people. That’s what you also get with sustainable information. It makes a lot of sense for the finance professional to be responsible, but there’s something, maybe in the education or the personality of people who work in the finance department, that takes them out of their comfort zone.”

This “feeling” represents a common conclusion in most of the FGDs.

The next obstacle mentioned in the FGD is a lack of uniform reporting standards. Although the general understanding of the FGD is that a lack of uniform reporting standards is a relevant reason that ACPs are not yet involved in the process of measuring sustainable value, a few participants indicate that there are standards, but that they are not used for some reason. P1 (CFO), FGD10 states:

“There is a well-developed standard for CO₂ emissions, but not many companies report on this yet.”

Based on the general understanding of the FGD, there is a lack of uniform reporting standards. However, one can also conclude that the majority of ACPs are not aware of the current standards, since there is this well-developed standard for a material topic like CO₂ emissions. This is also confirmed by P2 (Senior Manager—Sustainability—Risk Advisory), FGD3, who called the introduction of the CSRD “the best-kept business secret”. We argue that this unfamiliarity of ACPs with current sustainability reporting regulations and standards also refers to the ACP mindset. We will further reflect on this in our discussion section (Section 5).

The following identified obstacle is the lack of ACPs’ knowledge about sustainability. Although a common understanding of the FGD is that ACPs need to close their knowledge gap by additional training and education, some participants doubt whether ACPs are capable of mastering sustainability knowledge because of the specialized knowledge required. For example, an audit partner at Energy Utilities and Energy (P4, FGD12) expressed this as follows:

“I agree with you on that. But the man or woman in the factory who explains the difference between CO₂ emissions firing at 1200 and 800 degrees to me—you can tell me anything. So the question is whether a finance function can actually test and validate this.”

The last two mentioned obstacles were a lack of capacity within the finance department and limitations of the IT system. The highly manual process of current sustainability accounting makes integrating accounting and control and sustainability very time-consuming. However, it is recognized that large software suppliers are currently heavily investing in accounting practices regarding sustainability, as expressed by P3 (Partner & Head ESG), FGD4:

“I recognize what you say about the spreadsheet culture. But you also see now that SAP has invested hundreds of millions in recent months in building a number of modules very quickly that should help in sustainability accounting.”

4.6. Accelerators to the ACP “Soll” Role

Next to obstacles, we also recognized accelerators in our findings for our defined ACP “Soll” role. The most frequently mentioned accelerator is upcoming regulation (e.g., CSRD) which will obligate many companies to report on their sustainable activities. These reports also need to be provided with an audit opinion. Since the sustainability information needs to comply with regulations, including an audit trail, the common understanding is that ACPs can no longer hide from taking this responsibility, as expressed by P4 (Assurance Director Sustainability), FGD6:

“I was also always in the financial audit, and then I moved into sustainability. I’m now five and a half years in sustainability, and I think over the past two/three months I have had as many CFO conversations as I had in the five years before that, and yes, driven by CSRD, EU taxonomy, those kind of stuff.”

However, since many ACPs are not aware of the CSRD, as mentioned in the previous section, it is questionable how this regulation will impact ACPs’ activities on short notice. Another accelerator which was often mentioned is pressure from investors or banks to provide sustainable information, supported by the following quote from P4 (Group Controller), FGD4:

“We have included sustainability targets in our bank covenants. In the field of waste separation, CO₂ emissions, car use, etc.”

It is expected that the additional bank requirements have a significant impact on the CFO’s awareness of sustainability accounting and control, especially when a company needs to be (re)financed, since the CFO mostly runs financing activities. The last common recognized accelerator is pressure from the market (either from the end consumer or in the value chain) to report on sustainable results transparently. Pressure from the value chain also implicates that not only do large companies need to provide sustainable information, but also that the SMEs are forced to do so, as is stated by an auditor with a focus on sustainability, specialized in SMEs (P2, FGD9):

“What I see in the market for that is that yes, now they [the SME entrepreneurs] are becoming more receptive to that, since they also receive more questions from the value chain.”

4.7. How to Create the ACP’s “Soll” Role

As explained in earlier sections, our findings show a gap between the ACPs’ “Ist” and “Soll” roles regarding sustainability. Based on our analysis, we explain in the current section how to deal with this gap to develop the “Soll” role in the future. The most dominant obstacle for the “Soll” role refers to the current ACP mindset. Therefore, we will start to explain the participants’ views on how to change this mindset. On top of this mindset obstacle, directions to deal with some more instrumental obstacles (lack of knowledge, capacity, and tools) were explained. These instrumental tools and solutions also partly contribute to changing the ACP mindset.

One of the most crucial elements mentioned to create the “Soll” role is excellent cooperation between ACPs and sustainability professionals within the organization, as stated by P4 (Assurance Director Sustainability), FGD6:

“I think we also said that working with the sustainability experts is quite key as well. Yeah, and utilizing the competencies that they have and we [ACPs] bring in the methodology, and the thinking about the way accounting and control works with the numbers.”

This seems obvious, but appears to be more complicated than expected. First of all, the characterizations of ACPs and sustainability professionals do not seem to match. As described in Section 4.4, the ACP mindset is characterized by words like “not change-minded”, “risk averse”, “runs behind”, etc., while their competencies are described as “data experts”, “strong analytical skills”, “used to compliance”. On the other hand, the

sustainability professional seems to be the opposite and is described as “a sustainable entrepreneur” (P2 (Program Manager Sustainability), FGD5) with “less affinity with numbers” (P4 (Group Controller), FGD4). These conflicting characters often frustrate the cooperation between these two groups. Another complicating factor is the lack of capacity within the finance department, making the finance department reluctant to take on additional responsibility. The sustainability professional seems reluctant to transfer the responsibility of the accounting and control process of sustainable data to ACPs due to a lack of sustainability knowledge and affinity with ACPs. The consequence of this dynamic is that the sustainability manager adopts the responsibility for this accounting and control process and invests in additional capacity and knowledge. As a result, the sustainability department grows and runs the risk of becoming a separate silo in the organization. This risk is recognized in our findings, as stated by P1 (Senior Manager Sustainability Assurance), FGD6:

“I agree with P4 (Assurance Director Sustainability). What I have seen at a lot of companies is that ESG and people involved in ESG are completely separate from the financial team. If you have any questions, you are not directed to the financial team”.

The following question is: How do we realize the finance column to be involved in sustainability and facilitate constructive cooperation between ACPs and the sustainability professionals? An essential element in this regard is the tone at the top. In several FGDs it is recognized that the (supervisory) board needs to embed sustainability in their strategy and confirm its importance. Although tone at the top starts with the CEO, the FGDs emphasize that the CFO in particular also needs to embrace sustainability and empower and support the finance department to take the responsibility for the accounting and control process of sustainable data. This tone at the top should facilitate and stimulate constructive cooperation between ACPs and sustainability professionals. Instead of seeing themselves as opposite conflicting characters, which leads to silo thinking, they should view themselves as having complementary competencies, and they should be convinced that they need each other to successfully account and control for sustainable value. In this cooperation, ACPs should be responsible for the accounting and control process regarding sustainable value, whereas the sustainability professional must support and facilitate the ACPs with sustainable knowledge. This also changes the current role of the sustainable professional from leading in the accounting and control process to being supportive and encouraging. Oft-heard statements in the FGDs are that the sustainability department should aim to embed sustainability in the organization’s business processes instead of taking operational responsibilities, which leads to a growing sustainability department. To force this “limited” role, the sustainability department should be as small as possible. This becomes apparent in the following discussion in FGD6:

P4 (Assurance Director Sustainability): “I had an interesting conversation with one of my clients this week. He is a sustainability manager at the company, and he said ‘I’m the only person in my unit within sustainability, and I don’t allow other team members. I just don’t want other team members because the organization has to do it.’”

Apart from the tone at the top facilitating this critical cooperation between the sustainability professionals and ACPs, some more instrumental elements are also required to create the ACPs’ defined “Soll” role. To close the ACPs’ sustainable knowledge gap, it is suggested that they be provided with additional education and training on sustainability. Education and training are not only related to the current ACPs in practice, but also concern including sustainability in the curricula of academic education related to ACPs, as stated by P1 (Lecturer–researcher), FGD5:

“Whether it is in the Accountancy or the Finance & Control program, but we have to start with the young people and that we have to increase the sense of urgency there. And that they then follow their program with a different mindset and that we can make big steps together.”

What also becomes apparent in this quote is that education and training not only aim to close the knowledge gap, but also contribute to changing the ACP mindset towards sustainability.

The last, more instrumental element to create the ACPs' "Soll" role is to invest in additional capacity within the finance & control department and IT systems. The tone at the top, especially support from the CFO, is also crucial here to realize these expansions, as stated by P2 (Program Manager Sustainability), FGD5:

"There is never capacity until a director says there is capacity, which helps a lot."

4.8. Summary of Findings and Preliminary Conclusions

Based on our findings, we conclude that ACPs should play a leading role in the diagnostic control process focusing on sustainable value creation. In this process, ACPs should challenge objectives, take the responsibility for the checks and balances on the actuals, and monitor progress of actuals against targets. The current ACP mindset, lack of sustainable knowledge, and lack of uniform reporting standards are recognized as the most important obstacles to fulfilling this role. To overcome these obstacles, support from the top (tone at the top), constructive cooperation between the sustainability department and ACPs, and additional investments in IT and ACP capacity are crucial. The findings in Section 4 are visually summarized in Appendix B. The implication of our conclusions to the relevant literature will be discussed in the following section.

5. Discussion

Using Simons' [2] diagnostic control system, this paper has examined the role of ACPs in monitoring and controlling sustainable value. Whereas previous research indicates that high ACP involvement in sustainability accounting and reporting is needed, we pay particular attention to the complexity and dynamics in the design of the ACP role in this process. In this section, we discuss the theoretical implications of our empirical findings. We show how our findings and analysis contribute to a better understanding of the design of a diagnostic control system as part of a management control framework aimed at creating sustainable value. Within this framework, we focus on the cooperation between ACPs and the sustainability department. We also provide theoretical insight into the need for a change in the ACP mindset to fulfill their accounting and control role in this respect effectively.

5.1. Designing a Sustainable Diagnostic Control System

Our FGDs demonstrate a difference between the current ("Ist") and the future ("Soll") role of ACPs regarding monitoring and controlling sustainable value. The FGDs show that in the current situation, the sustainability department is leading the diagnostic control system regarding sustainability, whereas in the desired situation, the ACP should have this leading role in close cooperation with the sustainability department. In Appendixes C1 and C2, we visualized these "Ist" and "Soll" roles in Simons' [2] diagnostic control system.

Our research only focuses on the diagnostic control system as one of Simons' four levers of control (LOC) [2]. According to Simons, "diagnostic control is difficult to implement if there is a high degree of novelty in the process to be controlled" (p. 72). This makes it difficult to set a motivating target which is not too easy (people do not strive for potential) or too difficult (people give up). One way of dealing with this complication is to start measuring the actuals before setting a target. By analyzing the drivers of the actual results, the rationale of the performance can be explained, and a more realistic target can be set in the following periods. This way of target setting is also recognized in one of the FGDs. However, the novelty of creating sustainable value is also associated with high strategic uncertainties, since it is difficult to determine the impact of our actions on

ecological and social value in the long term. Strategic uncertainty is also inherent in the often-long-term character of sustainable goals (e.g., SDGs, Paris agreement, etc.). Due to these complications in applying a sustainable diagnostic control system, it is essential not to solely rely on this system but also include the other levers of control, especially concerning the strategic uncertainties. It is widely accepted in the literature that control systems are interdependent [31,32].

Simons [33] argues that “the power of these levers in implementing strategy does not lie in how each is used alone, but rather in how the forces create a dynamic tension” (p. 302). The opposing forces between the systems create this dynamic tension. Belief and interactive control create positive and inspirational forces, while boundary and diagnostic control create constraints and ensure compliance. Since strategic uncertainty is one of the difficulties in applying a sustainable diagnostic control system, we argue that the active use of interactive control systems is needed to address these strategic uncertainties. The characteristics of diagnostic and interactive control systems show a remarkable parallel to the characterizations and competencies of ACPs and the sustainability department as described in our findings. ACPs tend to focus more on constraints and ensuring compliance, while the sustainability department can be seen as a positive and inspirational force preaching the sustainable gospel. This parallel seems to confirm our finding that ACPs should have a leading role in the sustainable diagnostic control process. This parallel also indicates that the sustainability department should play the leading role in the interactive control system, although this is not confirmed in our findings since we have not included interactive control systems in our research. Based on this parallel, ACPs and the sustainability department should increase the effectiveness of the control system by their opposing forces, creating a dynamic tension in their cooperation. However, our findings show that the opposing forces and related current dynamic tension between ACPs and the sustainability department might lead to silo thinking instead. The border between creating positive and negative dynamic tension is a thin line, but it seems to be a crucial one. This is also recognized in the literature, since the two types of control are often described as positive vs. negative, indicating a good vs. bad connotation rather than cooperation [34]. According to Simons [2], the opposing forces should form the yin and the yang of effective strategy implementation, referring to Chinese philosophy where positive and negative forces are opposing principles into which creative energy arises and whose function creates the world as we now know it. This also confirms our recommendation that constructive cooperation between ACPs and sustainability professionals is needed to develop the influential “Soll” role for ACPs regarding a sustainable diagnostic control system. Although interpreting tensions between ACPs and sustainability professionals as different intra-professional discourses, they are not insurmountable given sufficient time, commitment, and ongoing interaction between professionals [35]. However, our findings indicate that a change in the ACP mindset is needed to create this constructive collaboration. In the next section, we will further discuss this change in mindset.

5.2. Change in ACP Mindset

Our conclusion that ACPs should play an important role in effectively and efficiently operating a sustainable diagnostic control system is also recognized in the literature [6,18]. Our findings indicate that fundamental (change in mindset) and instrumental (additional knowledge and investments) changes are needed to implement this role successfully. Despite the current instrumental attempts (e.g., development of a wide variety of sustainable reporting frameworks), our main argument is that this role cannot be implemented without a change in the current ACP mindset. Several authors recognize this argument in the literature. Deegan [36] argues that accountants are not inclined to change and therefore concludes that including sustainability in the regular accounting processes is doomed to fail [36]:

“As such, and at least in the mind of this author, quests to ‘modify’ financial reporting processes to incorporate a recognition of social and environmental impacts are somewhat illogical – they are prone to failure from the outset” (p. 457).

Schaltegger and Zvezdov [7] recognize defensive, adaptive, and constructive roles as three potential types of involvement of accountants in managing and using sustainable information. They argue that sustainability information has a significant influence on many companies, which inevitably results in reshaping companies, which in turn can lead to changing power structures. The authors motivate that defensive accountants fear losing power, which impacts their behavior. This line of critique is also recognized by several other authors in this field. Larrinaga-Gonzalez and Bebbington [37] suggest that ACPs are likely to resist initiatives that “undermine the existing power of accountant-generated accounting” (pp. 285–286). ACPs may exercise their organizational influence to constrain the “environment to a safe and controllable issue” [38] (p. 233). According to Schaltegger and Zvezdov [7], ACPs may tend to occupy and use a gatekeeper role in the information flows to retain or tweak (in the extreme, even beyond moral or legal boundaries) information to retain existing power structures. By retaining or tweaking sustainability information, accountants can be seen as a threat to a transition to a sustainable business model. Based on our identified characterizations of ACPs as shown in Figure 2, we recognize this risk. We believe that changing the ACP mindset by convincing them of the relevance and importance of sustainability for the organization is essential to change their role from being defensive and blocking sustainable information to being constructive and embracing and monitoring sustainable value.

Following this argument, Schaltegger [18] claims that, apart from educational and training challenges, a new and fundamentally broader understanding of the role of management accountants is required to build beyond conventional management accounting to address sustainability issues.

However, the obstacles to our defined ACP “Soll” role are often explained by instrumental issues in the literature [6].

Egan and Tweedie [16] state that the recurrent conclusion that accountants require training in sustainability underemphasizes the significance of elements as “clear direction, and capitals from the top, and accountants’ willingness to practically engage with other professional staff and in other organizational fields” (p. 1767).

Based on our findings, we support the conclusions of Deegan [36], Schaltegger [18], and Egan and Tweedie [16] that a fundamental change is needed, and that instrumental solutions alone are not sufficient to realize the described ACP “Soll” role. Egan and Tweedie [16] refer to “habitus” and “feel for the game” and recognize that ACPs are reluctant to change, noting that “there are certain elements in the ‘routine’ nature and mindset of accounting practices that tend to constrain more innovative sustainability practices” (p. 1765). On the other hand, their case study emphasizes how organizational capitals and fields affect accountants’ capacity to change their mindset and strategies in the way sustainability agendas require, indicating that the accountants’ mindset is a part of nurture rather than nature. However, we believe that the characteristics of Figure 2 are more deeply embedded in the ACP mindset and therefore more difficult to change. First of all, this is based upon Table 2 in which the ACP mindset is by far the most dominant obstacle. However, it can be explained by the historical development of the accounting profession. The earliest surviving descriptions from the current debits and credits double-accounting system originate from the Franciscan monk Luca Pacioli, as part of his famous work *Summa de Arithmetica, Geometrica, Proportioni et Proportionalita*, published in Venice in 1494. Our current sophisticated monetary accounting system has been developed over several centuries. This financial double entry system is designed to account for current and probable future flows of resources. However, it does not work for externalities, which are “one-sided transactions” based on notional costs to calculate the sustainable impact, but for which no entity’s resources are consumed or no legal or constructive liabilities are incurred or assumed. Such externalities would probably not have been contemplated

when the double-entry system was developed many hundreds of years ago. However, this line of thought, dominated by a neoclassical economics approach, is still the leading philosophy of today's economics curricula at universities and business schools [39]. As a result, this way of thinking is thoroughly internalized by ACPs. Combined with their reluctance to accept change, we imagine that ACPs are not open to thinking in non-monetary values via alternative accounting methods.

On the other hand, the groundbreaking management accounting innovation by Kaplan and Norton [40] of the BSC in the 1990s successfully introduced the concept of non-financial metrics (customer, internal processes, learning and growth). However, the underlying assumption of the BSC is that these non-financial metrics are the main drivers to creating long-term financial value, not fundamentally changing the current status quo of linear financial thinking. However, we can learn from management accounting practices in general, and from the BSC in particular, that ACPs are used to measure and account for non-financial metrics for which compliance to accounting standards is not necessary. This seems to contradict our findings that a lack of uniform reporting standards is another important hurdle for the involvement of ACPs to develop an effective sustainable diagnostic control system, since ACPs are used to measuring and accounting for metrics, not explicitly using accounting standards, at least since the 1990s. This contradiction is further reinforced by the fact that although there is no worldwide uniform reporting standard like IFRS for sustainability, there is a proliferation of sustainable reporting standards. On one of the most material topics (GHG emissions), the GHG protocol is an internationally accepted and widely used framework to measure GHG emissions for scope 1, 2, and 3, which originated in 2004. Moreover, IFRS is also relatively young compared to the long history of our current accounting system and appeared to be no barrier to applying financial accounting in the centuries before IFRS. This makes us believe that the alleged absence of uniform sustainable reporting standards is not the actual obstacle. We tend to believe, also based on our findings, that it is more about unawareness and unfamiliarity with the sustainable reporting standards by ACPs than the absence of these standards. We argue that this unawareness is caused by the ACPs' current financial focus, which makes them less receptive to the development of sustainable reporting standards.

After the ACP mindset and the lack of uniform reporting standards, the lack of ACPs' sustainable knowledge is mentioned in Table 2 as an obstacle. This argument is also widely recognized in the literature [6,7,41]. Although we earlier described sustainable knowledge as an instrumental tool to acquire competencies and skills in sustainability, sustainable knowledge can also be a tool to change the mindset of employees as part of employee socialization. Employee socialization refers to how individuals internalize the organization's values, beliefs, expected behaviors, and social norms [42,43], consistent with Simons' [2] belief system. Training and development processes may encourage greater social cohesion and identification with organizational values and objectives [42,44]. In this respect, sustainability is an integrated part of the organizational values and objectives to enhance embedding sustainability in the ACP mindset based on training. This reveals the importance of the tone at the top, since top management plays a decisive role in setting organizational values and objectives, also confirming our findings. This is also recognized by Egan and Tweedie [16]. This conclusion also confirms our finding that support from the top is needed to invest in additional capacity within the Finance & Control department. Egan and Tweedie [16] do not further specify "tone at the top" in this respect. Our findings show that support from the CFO in particular is needed to allocate additional organizational capital to ACPs to create the needed additional capacity. If sustainability is mainly embraced by the CEO, there is a risk of creating a sustainability silo, as described in our findings.

Other elements of employee socialization mentioned in the literature are mentoring, orientation and induction programs to acclimatize new managers to acceptable behaviors and norms [42,45], and social events [42,44]. These elements can also contribute to

changing the ACP mindset. We believe that the sustainability department should play a leading role in the employee socialization process due to their in-depth knowledge of sustainability.

Employee socialization can be viewed as an element of the comprehensive control concept of social controls. Social controls typically imply that managers seek to more indirectly influence subordinates' behavior by shaping their mindset in the hope that they will internalize the values and beliefs of the organization and act accordingly [2,46]. The aforementioned tone at the top, interactive controls, and employee socialization contribute to internalizing the values and beliefs of the organization and form elements of social controls. Next to these elements of control, the employee selection process is also mentioned as an example of a social control element [46–49]. Including affinity with sustainability as a criterion in the selection process to hire ACPs could therefore also contribute to changing the ACP mindset.

Our findings also indicate that regulation requirements, requirements from investors, and pressure from the market can be viewed as accelerators to form the ACPs' "Soll" role. These accelerators could also advance the needed change in the ACP mindset by impacting the tone at the top. Our findings show that regulation and investor requirements force the CFO to report reliable and compliant data on sustainability. It can also be argued that pressure from the market impacts the vision and strategy of the organization. A significant difference with the social controls described before is that these accelerators are all external factors and cannot (directly) be influenced by management. Another potential external factor in accelerating the ACPs' "Soll" role, as mentioned in our findings, is the role of education. As became apparent in our findings, sustainability should be an important element in the curricula of economics, not only aiming to close the knowledge gap, but also contributing to changing the ACP mindset towards sustainability.

Figure 3 shows an overview of elements to change the ACP mindset, split into social controls, which can be influenced by management, and external factors, which cannot be influenced by management.

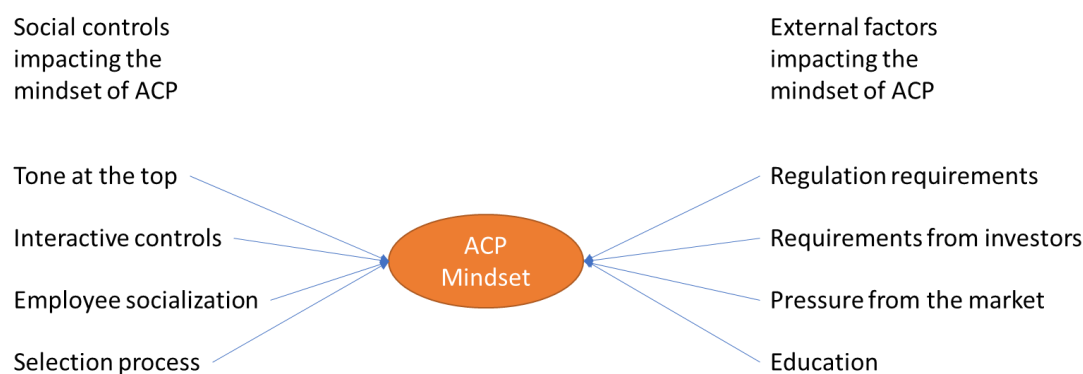


Figure 3. Social controls and external factors impacting the ACP mindset.

Although the external factors could potentially enhance the necessary change in the ACP mindset, we argue that relying too much on these external factors will not be sufficient. It is expected that the implementation of the CSRD as a potential game-changer for ACPs will be postponed by the European Commission by two years, which will significantly delay the potential impact. Also, the pressure from the market does not seem to have the power to change the current economy rapidly enough.

As explained earlier in this section, economic educational reform is still in its early stages. A fundamental change is also needed here to impact the mindset of future ACPs. Deegan [36] finds that many universities incorporate sustainability in their accounting curriculum by adding one or two weeks of accounting for corporate social responsibilities

towards the end of a financial accounting course, which seems insufficient in his view. We share his opinion.

In general, we argue that the impact of the external factors on the ACP mindset is insecure and will not lead to significant breakthroughs in the ACP mindset in the short term. We therefore recommend that companies who want to have ACPs play an active and effective role in a sustainable diagnostic control system focus on the social controls to change the ACP mindset towards sustainability and to build a constructive collaboration with the sustainability profession.

6. Conclusions and Directions for the Future

Although there is a broad consensus in academia and practice that ACPs should or may play a role in sustainability accounting and reporting, there is uncertainty regarding the role that ACPs should play [15,16]. This study responds to this uncertainty by answering the following research question:

What could be the role of Accounting & Control Professionals regarding diagnostic control systems focusing on sustainable value creation?

Our research contributes to the literature in several ways. As stated in the literature review, Ascani et al. [6] highlight that “further research should be undertaken for an in-depth investigation into the nature and the characteristics of this role, the activities related to it, the possible criticalities a management accountant may face, and the competencies (technical and soft) that should be developed when playing this role” (p. 19). These recommendations form the core of our empirical study. We also answer the call from Schaltegger and Zvezdov [7] that “the main implication for future research is investigating how accountants could be more strongly involved in sustainability accounting and reporting” (p. 353). The distinction between technical and soft competencies to be developed appeared to be crucial in our findings. We conclude that a fundamental change in the ACP ethos is essential to fulfilling this role adequately, referring to soft competencies. We also recognize a need to develop technical skills. However, we argue that without a different way of thinking, these technical skills will not materialize. On the other hand, we perceive that technical skills and external factors contribute to overcoming the continued dominance of the ACPs’ financial discourse. Apart from the specific role of the ACPs, our study provides insights on how to design and organize a diagnostic control system focusing on sustainability as part of a management control system, answering the call for more management accounting research in this area [3–5]. Next to the diagnostic control system, this study also includes interactive controls and belief systems in the discussion, extending the theoretical conceptualization and dynamics of Simons’ LOC [2] regarding sustainability, thereby further deepening the study and conclusions of Narayanan and Boyce [50]. It does so by explaining the interaction and cooperation between top management, the sustainability department, and ACPs regarding these three LOC, incorporating the yin and yang principle into the discussion.

This paper also has important managerial and practical implications. It provides ACPs and other practitioners with rich insights into the challenges and recommendations of configuring a sustainable diagnostic control system. It draws attention to how ACPs can engage in driving the sustainability agenda and identifies specific resources and processes that organizations might use to encourage such engagement. It shows that enabling ACPs to participate in sustainability initiatives is a fundamental process and requires sufficient economic–organizational material and symbolic capitals and time to allow engagement with novel tasks and other professionals. It also demonstrates that adapting ACPs’ habitus may depend on the ability of both ACPs, sustainability managers, and top management to develop the “feel for the game” that comes from engaging with other professional outlooks, further specifying the analysis of Egan and Tweedie [16].

Although the results from this exploratory study are illuminating, there are of course limitations to the research which call for further empirical investigations. It is inherent to

FGDs that participants' experiences cannot be further questioned, analyzed, or discussed by the researcher, as can be done with in-depth interviews. Further research, performing in-depth interviews at frontrunner companies where the cooperation between ACPs and the sustainability department is successfully organized, could help in deepening and enhancing our findings. This also opens possibilities to analyze the impact of the other levers of control on the diagnostic control system regarding sustainability, as well as other interdependencies between the four levers. Due to the specific aim of our FGDs, a couple of interesting topics could only briefly be discussed. The impact of the CSRD on ACPs, developments in sustainable IT tools, and the necessary changes in accounting education are a few of those topics in which further empirical research could be very insightful and could also contribute to the design of the ACP's role in the future. Finally, given the relative novelty and rapid developments of the topic, it would also seem necessary to examine the further development of the role of ACPs in sustainable diagnostic control systems in corporate practice over time.

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Data Availability Statement: The data are not publicly available due to the fact that involved empirical data comprise the confidential FGD reports.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

FGD 1	Gender	Position
Moderator	m	Professor Sustainable Entrepreneurship
Participant 1	f	Non Executive Board member in Food and Agribusiness
Participant 2	m	Manager Strategy and Sustainability
Participant 3	m	Group Finance Director
Participant 4	m	CFO

FGD 2	Gender	Position
Moderator	f	Professor Circular Business
Participant 1	f	Director Investor Relations & Strategic Finance
Participant 2	m	Chief Customer Officer
Participant 3	m	Finance Consultant
Participant 4	m	Academic Finance&Control Lecturer

FGD 3	Gender	Position
Moderator	f	Sustainability & Circular Economy Researcher
Participant 1	f	Senior Associate focus on NFI assurance
Participant 2	m	Senior Manager - Sustainability - Risk Advisory
Participant 3	m	CFO
Participant 4	m	Finance Consultant

FGD 4	Gender	Position
Moderator	m	Researcher Lecturer Consultant
Participant 1	f	Head of Finance and Control
Participant 2	m	General Manager EMEA
Participant 3	m	Partner/ Head ESG
Participant 4	m	Group Controller
Participant 5	m	Interim CFO

FGD 5	Gender	Position
Moderator	m	Lecturer-researcher
Participant 1	f	Lecturer-researcher
Participant 2	m	Program manager Sustainability
Participant 3	m	Senior manager Audit & Assurance
Participant 4	f	Integrated Reporting Officer

FGD 6	Gender	Position
Moderator	f	Professor Purposeful Marketing
Participant 1	f	Senior Manager Sustainability Assurance
Participant 2	m	Group ESG and Sustainability Manager
Participant 3	f	Technical Accounting & Oversight
Participant 4	m	Assurance Director Sustainability

FGD 7	Gender	Position
Moderator	m	Lecturer-researcher
Participant 1	f	Finance Consultant
Participant 2	m	ICT-Sustainability lecturer - researcher
Participant 3	m	Founder - CEO
Participant 4	m	Expert Accounting & Policies

FGD 8	Gender	Position
Moderator	f	Program coordinator ResearchCentre
Participant 1	f	Theme Director Sustainability
Participant 2	m	Senior Vice-President & General Manager
Participant 3	m	Finance&Control Lecturer
Participant 4	m	Director Corporate Accounting

FGD 9	Gender	Position
Moderator	m	Senior Scientist - Strategic Business Analyst
Participant 1	f	Sustainability Manager International
Participant 2	m	Auditor with focus on sustainability
Participant 3	m	CFO
Participant 4	m	Director Finance Operations

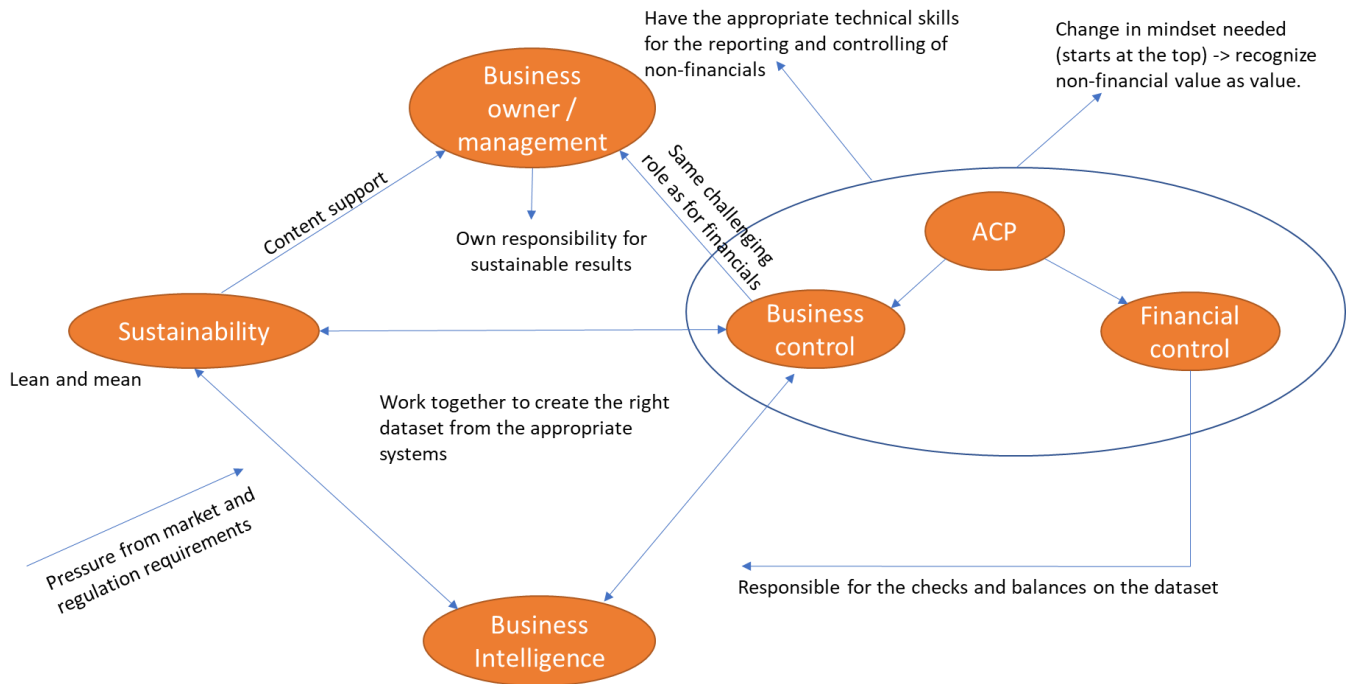
FGD 10	Gender	Position
Moderator	m	Professor Financial Control
Participant 1	f	CFO
Participant 2	m	Entrepreneur in the energy / climate business
Participant 3	m	Audit manager Sustainability
Participant 4	m	CEO

FGD 11	Gender	Position
Moderator	f	Professor Smart Sustainable Manufacturing
Participant 1	f	General Manager Sustainability
Participant 2	m	Sustainability lead
Participant 3	m	Director of Finance & Operations
Participant 4	m	Lecturer-researcher

FGD 12	Gender	Position
Moderator	f	Program coordinator ResearchCentre
Participant 1	f	Professor Sustainable Finance & Accounting
Participant 2	m	Chief Customer Officer
Participant 3	m	CFO
Participant 4	f	Audit Partner Energy Utilities and Resources
Participant 5	m	CFO

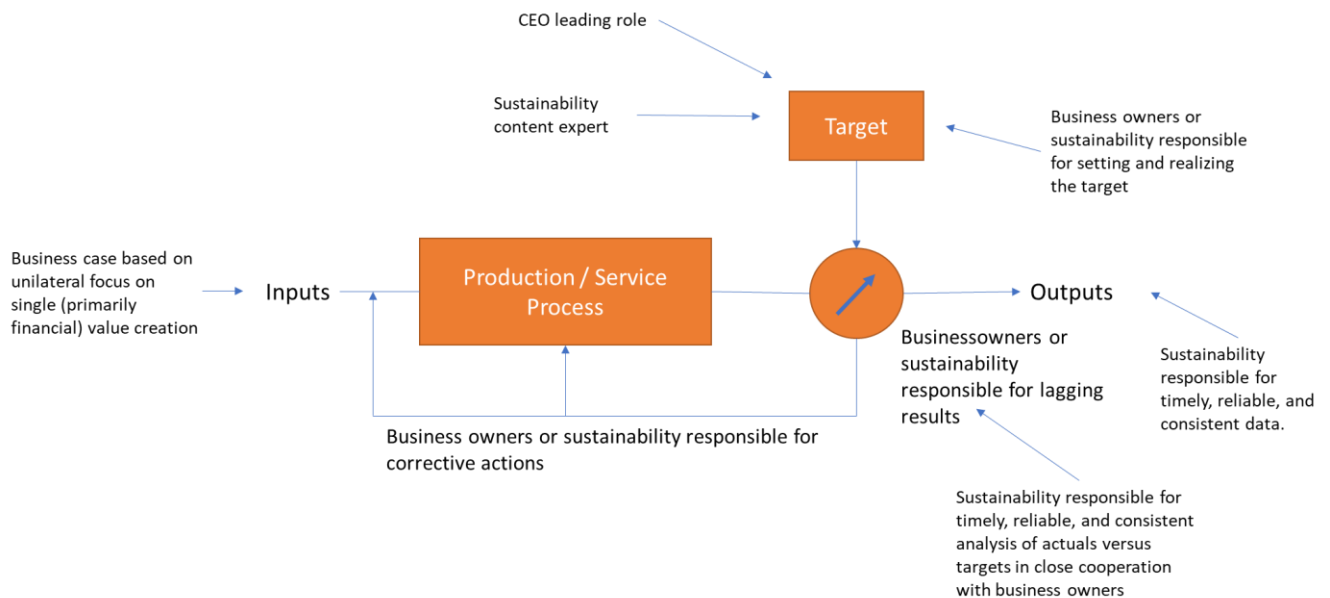
FGD 13	Gender	Position
Moderator	f	Professor Finance & Business Innovation
Participant 1	f	Director Group Reporting & Accounting
Participant 2	m	CEO
Participant 3	m	Senior Manager Audit & Assurance
Participant 4	m	Head of Reporting & Control
Participant 5	m	Group Controller

Appendix B. Summary of Our Findings

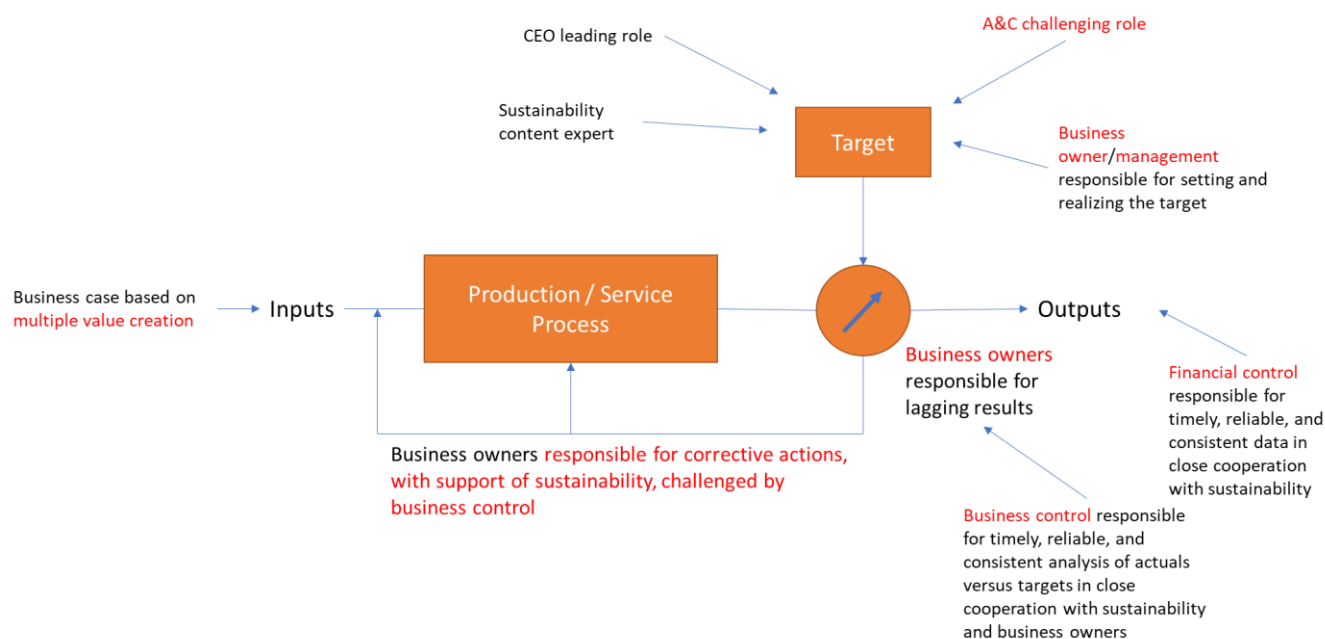


Appendix C. Sustainable Diagnostic Control System “Ist” versus “Soll”

Appendix C.1. Sustainable Diagnostic Control System (“Ist”)



Appendix C.2. Sustainable Diagnostic Control System (“Soll”) (Changes Highlighted in Red)



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