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Justifications for Decision-supporting Calculations: A Field Study of Why and How Management Accountants Provide Details and Explanations

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Justifications for decision-supporting calculations: A field study of why and how management accountants provide details and explanations

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Abstract

We conducted a field study during three years at a management accounting department in the product development area of a car company. Through an interventionist case study, we could follow in great detail two episodes around decisions and calculations concerning the technical concepts of new cars. This study provides two contributions to prior literature. First, we demonstrate that accountants had their own preferences, which influenced their recommendations and supporting calculations. Second, we show how management accountants tried to enhance justification for their calculations by providing (or leaving out) details (such as supplementary analyses or breakdowns of overall numbers) and explanations (for example, about the sources of particular input data or technical features of the calculation method). This exploratory study extends the literature on information preparers, accounting information, and justification tactics to the area of management accounting.

Keywords: justification, persuasiveness, calculations, product development decisions, management accountants' work

1 Introduction

A key part of management accountants' tasks is to provide recommendations to managers about future courses of action, based on calculations of financial consequences (AICPA, 2017; IMA, 2019). Such calculations may involve significant financial impact, much uncertainty, and incompleteness because not all considerations that managers consider important may be reflected in the numbers. Managers are likely to critically review the information that supports the recommendations that management accountants, because managers need to decide whether

and how to act on those recommendations (Rowe, Shields, & Birnberg, 2012). Anticipating such reviews, management accountants would likely try to enhance the justifiability of their recommendations and supporting calculations similar to, for example, auditors who are providing justification for their recommendations that will be reviewed by other auditors and client managers (Kadous, Leiby, & Peecher, 2013; Kennedy, Kleinmuntz, & Peecher, 1997; Koonce, Anderson, & Marchant, 1995; Shankar & Tan, 2006).

The accounting literature has investigated many settings in which information preparers use accounting information to try and persuade other actors (Hamilton & Winchel, 2018; Rich, Solomon, & Trotman, 1997; Trotman, Bauer, & Humphreys, 2015). The positions of the information preparer and information receiver are usually relatively clear, such as managers wanting to show to auditors and investors the company is doing well, or auditors wanting client managers to accept more careful statements that require lower-profit adjustments. Factors that matter for persuading receivers of information are, for example, argument structure and likability (Fanning & David Piercey, 2014), the provision of a professional favor and the auditors' approach (Brown & Fanning, 2018), social validation and communication style (Perreault & Kida, 2011), and justifiability (Kadous et al., 2013). Information preparers may try to deliberately use such factors as persuasion tactics (Wolfe, Mauldin, & Diaz, 2009), but at the same time, receivers may be aware that the preparer has specific interests and considerable discretion for providing information. Using persuasion tactics may "backfire" if this increases receivers' skepticism and reduces how much they accept the information that is provided (Bhattacharjee & Brown, 2018; Nelson & Rupar, 2015). However, we know very little about these issues in management accounting settings. While management accountants likely also want receivers of the information to accept their recommendations, we do not really know if they have their own preferences, similar to other information preparers, and if these might influence their calculations. Furthermore, we know very little about how management accountants try to increase the justifiability of their recommendations and supporting calculations.

In this paper, we break away from the idea of management accountants as objective providers of neutral calculations and we look at management accountants who might, just as some other information preparers, have preferences and use accounting information to promote particular decisions. Our first research question is whether management accountants have their own preferences and, if so, how those would influence the recommendations and supporting calculations they provide to managers. Secondly, we investigate how management accountants may enhance justifiability of their recommendations and supporting calculations. In particular,

we focus on the effects of the providing of details and explanations to increase justifiability. Justifications provide support for an expressed viewpoint and aim to persuade the target audience that this viewpoint is valid (Shankar & Tan, 2006). Justifiability increases if the supporting information recognizes trade-offs, includes benchmarks, and provides evidence of extensive effort searching information and developing the advice (Kadous et al., 2013). More specifically, if a proposal is supported by a calculation, which also includes some details and explanations about how this has been conducted, this proposal may become more persuasive (Kadous et al., 2005; Loraas, 2009). Such information suggests objectivity and competence. Furthermore, the details and explanations allow information receivers to better understand and assess the calculation. However, providing a calculation with details and explanations may also make the proposal less persuasive. Such information may reveal the limitations of the calculation, which can be used to discredit it. Providing details and explanation may also raise mistrust and disbelief, if information receivers feel that such information is used as a persuasion tactic. The provision of details and explanations may also influence social processes in which the calculation is discussed, attacked, revised, respected, or discarded (Rowe et al., 2012). So in the end, it is not clear whether and how providing details and explanations may help management accountants to provide justifications. Our second research question is, therefore, how management accountants provide details and explanations to enhance the justifiability of their recommendations and supporting calculations, especially if their own preferences may have influenced those calculations.

We conducted an exploratory case study for investigating management accountants' preferences and justifications. This complements prior research, which has focused on other settings in which information preparers use accounting information to persuade other actors. Furthermore, prior research has mostly used experiments and has looked predominantly at the reactions of receivers of information. Our study also complements prior research that has looked in detail at how management accountants prepare and use information, but in relation to other issues than the present study, such as for performance evaluation (Goretzki, Mack, Messner, & Weber, 2016; Goretzki & Messner, 2019; Huikku & Lukka, 2016). We conducted an interventionist case study to get detailed and surprising insights. In a real-life setting, working together with management accountants and being involved in the creation of calculations, we could observe up close how they expressed their own preferences and prepared, discussed, defended, and negotiated their calculations.

2 Management accountants, preferences, and justifications

We consider the situation in which managers will take a formal decision about future actions and management accountants create calculations about the financial consequences of alternative scenarios. But organizational life is not straightforward. A formal "decision" does not determine everything and is not an end point, but does have tangible impact: for the time being, some pathways for action are constrained; there's more funding, time, and other resources for doing some things but less for other things; there is time in formal meetings to talk about some issues but not about others. At the same time, people may still do things differently than what has been "officially decided" and use degrees of freedom that the decision leaves. And later, new things happen that awaken old and raise new doubts, that initiate tweaking earlier calculations and starting new ones, and that lead to revising earlier decisions.

Calculations of future financial consequences are based on uncertain estimates and other soft information that may include unintentional or intentional mistakes. "Soft" information refers "subjective information from interviews and surveys without sufficient verification" (Rowe et al., 2012, p. 260) and so it is soft or subjective because "the estimates, predictions, and assumptions may not be readily verifiable" (Kadous, Koonce, & Towry, 2005, p. 652). It is easily possible change soft information in one direction or another because it is difficult to formally, objectively verify the information (Bertomeu & Marinovic, 2016). "Hardening" is about creating enough confidence in the information so that people are willing to act on it (Rowe et al., 2012).. This is a social process involving activities such as challenging, verifying, and reworking the information, until people were willing to use it. Hardening meant that "group members who have different individual interpretations of the information come to agree on an interpretation that the quality of the information exceeds a minimally acceptable level" (Rowe et al., 2012, p. 261) and, therefore, they are willing to let the accounting information inform their actions.

In this context, we look at two issues: Are management accountants neutral analysts or do they also have their own preferences for decision outcomes, which would influence their calculations? How do management accountants enhance the justifiability of their calculations?

Management accountants and preferences

One question is to what extent management accountants have their own preferences. The profession promotes and requires objectivity of management accountants (AICPA, 2017; IMA, 2019). They should have the role of independent advisors without an own opinion apart from what their calculations tell. Although the literature does address behavior of management accountants that seems to deviate from independence, neutrality, and objectivity, this has

another background than management accountants having their own preferences. Management accountants have dual roles that involve advising but also policing, and this duality is challenging (Maas & Matějka, 2009). Goretzki, Lukka and Messner (2017) investigated how management accountants used informational tactics to deal with the competing responsibilities as corporate watchdog on behalf of the central finance function and as a business partner for local management. They describe how management accountants skillfully used informational tactics such as choosing when to inform headquarters, framing information, and even withholding information.[1] They find, for example, that accountants considered very carefully when, how and what to report to which other organizational actors. They "act differently to different directions in order to enact their accountabilities and meet the expectations of their different stakeholders" (p. 23). But however tactically they behaved, they wanted to create an image of a trustworthy informer and the information they provide should appear truthful to those confronted with it. "If controllers go too far with their tactical behavior and tell 'barefaced lies', they risk harming their image and identity as 'producers of truthful knowledge'. Hence, the tactics that controllers employ must remain somewhat 'hidden' to others" (p. 3). Other studies showed, for example, that management accountants may engage in quite elaborate forms of data misreporting (Fauré & Rouleau, 2011; Maas & Matějka, 2009) or budgetary slack building (Davis, DeZoort, & Kopp, 2006; Indjejikian & Matějka, 2006) to address the expectations of managers for their advising role. However, the challenges of combining both roles lie in dealing with what *others* want from them, but these do not imply tensions because of management accountants also having their "own opinion."

On the other hand, why would management accountants be different from auditors, CFOs, managers, analysts or other information preparers? It is not obvious at all why this would be the case, but there is very little empirical evidence (Mahlendorf, Matějka, & Weber, 2018). Hence, our first research question: do management accountants have their own preferences and, if so, how would those influence the recommendations and supporting calculations they provide to managers?

Management accountants and justification

If management accountants would not be neutral information providers, but also have their own preferences as to what they would like to have happen, then management accountants might try to provide recommendations and supporting information that fit their preferences. But how would they do that? The recommendations and supporting information will likely be

[1] They use the term "controllers" to include job titles such as management accountants, management controllers or financial managers.

presented and discussed with managers, from various departments and different hierarchical levels. Managers likely critically review the information the management accountants provide, especially if the financial consequences are significant, there is considerable uncertainty for predicting future consequences, and the financial consequences may not include all considerations managers believe are important (Jørgensen & Messner, 2009). Managers may also be skeptical about the recommendations and supporting information if they believe persuasion tactics have been used. Anticipating critical review, management accountants likely want to increase the justifiability of their recommendations and supporting information.

Specifically, when presenting their calculation to managers, they may try to make their calculations more persuasive by providing details and explanations on how a particular calculation has been conducted. These may, for example, concern more detailed underlying analyses, sources of particular input data, or technical features of the calculation method. The context is important: incomplete calculations about the future which need to be crafted for a particular situation, so there is no clearly defined and enforced format or information flow (Goretzki et al., 2017). There is considerable flexibility for the management accountant, both for conducting the calculation as well for providing information about it.

People do not have blind trust in numbers and, therefore, disclosing details and limitations may be more persuasive than hiding them. Kadous et al. (2005) investigated a setting in which proposals for a particular course of action could be quantified or nonquantified. A quantified proposal included a calculation of the expected net dollar benefit or cost associated with a proposed course of action, as well as information about how the calculation had been conducted. A nonquantified proposal only included qualitative information without a calculation or any numbers on costs and revenues. They investigated the persuasiveness of both kinds of proposals. Persuasiveness was measured by asking research participant to indicate the likelihood that they would support the proposal (which concerned a change in operating procedures, namely to postpone routine, but expensive, maintenance on machinery). They found that quantification enhanced the perceived competence of the preparer, which increased the plausibility that a favorable outcome could result from the proposed action and increased the persuasiveness of the proposal.

On the other hand, quantification also triggered the receivers of the information to critically review and analyze the calculation's details, which reduced the plausibility that a favorable outcome could result from the proposed action and reduced persuasiveness (Kadous et al., 2005). Plausibility that a favorable outcome could result from the proposed action increased persuasiveness. Moreover, the strength of quantification on persuasion depended on

whether the data was subjective or objective, and if the proposal's preparer's incentives went along or against with the firm's incentives (i.e., whether information is provided by a particular actor or interest group with own agendas that have an incentive to mislead). Both variables moderated the relationship between quantification and critical analysis. Thus, "individuals do not exhibit blind trust in numbers and are unlikely to be inappropriately persuaded by quantified proposals" (Kadous et al., 2005, p. 648).

Furthermore, providing details and explanations may also be met with skepticism if receivers of the information realize the information preparer has a lot of discretion and can strategically provide (and hide) details and explanations. If it is seen as an persuasion tactic (Friestad & Wright, 1994). In another context, for example, the numerical format for presenting accounting information (the presentation of numerical information as either an absolute number or in relative terms) affected investors' risk judgments, but less when investors knew that format was discretionary and could be used as a persuasion tactic (Nelson & Rupar, 2015). Investors understood that management might strategically select the numerical format to obscure performance and enhance valuations. However, seeing through such tactics and investigating the information provided more carefully requires effort and this only happened when investors had sufficient cognitive capacity available (Nelson & Rupar, 2015). As another example, client managers tried to use a social validation argument as a persuasion tactic to influence auditors. This was effective at influencing auditor judgment (i.e., auditors assessed an internal control deficiency as less severe) if the client managers were not alumni of the audit firm. However, with alumni-affiliated client managers, the auditors looked in more detail at the information provided and this persuasion tactic backfired, resulting in a diminished persuasion and increased auditor skepticism (Bhattacharjee & Brown, 2018).

Thus, it is not clear if and how providing details and explanations may help management accountants to better justify their recommendations and supporting calculations. This leads to our second research question: how do management accountants provide details and explanations to enhance the justifiability of their recommendations and supporting calculations, especially if their own preferences may have influenced those calculations?

3 Research method

Because of the exploratory nature of our research questions, we conducted a field study in a single organization. In-depth field studies can be an appropriate method to understand such how and why questions (Ahrens & Chapman, 2006). The initial topic of the research was cost management in product development, in particular through methods such as product modularity that go beyond target costing (Davila & Wouters, 2004). We wanted to know what kinds of

methods were being used, how technical approaches such as modularity and platforms were used for cost management purposes, how these approaches were implemented, how accounting departments and accountants were implicated, and what some of the issues were. One of the researchers had already conducted research in this area and realized there were many open questions about how and why modularity, product platforms and such approaches were used.

We aimed to conduct the study at a car company because of the importance of cost management during product development in that industry (Anderson, 1995; Ansari, Bell, & Okano, 2006; Ibusuki & Kaminski, 2007; Mahmoud-Jouini & Lenfle, 2010). The particular company we approached was known for at least one key project in the area of modularity and platforms for cost management. We aimed to conduct an interventionist study, because this could provide access to the organization at an unparalleled level (Jönsson & Lukka, 2007), which we considered important because the topic required an in-depth understanding of complex product development processes and cost management methods that are used in car companies, which we expected to be very difficult to obtain by "only" visiting the company.

The company, which we will call *AutoCompany* in this paper, provided the opportunity to do the intended kind of interventionist study, involving two researchers who are also the authors of this paper. They were employees of the same university. The senior researcher visited the company but was basically offsite and coached the research process. The other researcher was mostly onsite, working in the controlling department of AutoCompany. The university received funding from AutoCompany to be able to employ that researcher. Neither of the researchers received any personal financial compensation from the company. The research project lasted for three years, which we will refer to as 20xx, 20xy, and 20xz in the following.

At AutoCompany, the researcher was working as a colleague, being involved in the daily business of the controlling department. Besides taking intensive notes, conducting interviews, and collecting various kinds of data (such as company documents, presentations, and emails), the researcher was involved in several strategic tasks in the context of modular architectures. He regularly met with the senior researcher and with a top manager of AutoCompany's controlling department, and the three met roughly every six months to discuss progress and the further direction of the research project.

Over time, the research topic become more focused and also shifted. Parallel to the early work in the company, we continued developing our understanding of the literature and we conducted a structured literature review about the current understanding of modularity for cost management purposes (Stadtherr & Wouters, 2017). Motivated by open questions in the literature and practical requirements of AutoCompany, one part of the research (outside the

scope of the present paper) focused in more detail on target costing and specifically addressed the inclusion of market-based cost targets for product development activities and model-specific investments. For another part of the research, the focus shifted. The topic we had in mind from the beginning of the project was transfer prices for coordinating design choices in multiple target-costing projects (Israelsen & Jørgensen, 2011). This seemed also a relevant topic for the company during earlier discussions about the intended research topics. However, it became clear later that this would not be a fertile area to work on, because it was not and unlikely to get on AutoCompany's agenda. We also realized that that another topic was providing very interesting research openings, namely the attempts of the management accounting department to get more influence on product development, and we realized this could also potentially provide interesting contributions to the literature.

In the second half of the research project, the researcher was actively involved in producing several calculations around decisions for AutoCompany's future modular architecture's strategy. Several themes resonated with us, such as that these calculations where surrounded with enormous uncertainty and it was anyway impossible to model and quantify all relevant considerations. We also noticed the very different preferences people had, not based on the financial numbers, and how the accountants fought to get attention for their viewpoints and calculations. This triggered further reading of prior research on quantification, persuasiveness, justification, and incompleteness of accounting information, more thinking, discussing ideas with colleagues, and collecting data. We gradually realized that one element that was important in the company and that intuitively seemed to matter theoretically had not received much attention, namely how management accountants can justify their calculations and persuade managers, and more specifically, how details and explanations of the calculation matter for the justification and persuasiveness of the calculation. We selected two episodes at AutoCompany as fruitful and valuable empirical sources, in which the researcher played an active role as a controlling representative of AutoCompany. But to clear: we investigate the preferences of other management accountants than the researcher, and other management accountants were driving how the analyses were produced, discussed, and changed. Being so closely involved allowed us understand the preferences of those management accountants and to understand the intricate details of the calculation that supported those preferences.

Analyzing the information and guiding the research happened in layers. From the beginning, both researchers kept their own separate research diaries. This was a way to reflect on what was going on in the organization, the research process, interesting topics and angles for the potential theoretical contribution of the study, and emerging theoretical ideas. For the

researcher on site, the research diary was also one medium for collecting data by making notes on events, conversations, meetings, and so on. Next to the research diary as a Word file, he made handwritten notes during the day in hardcover notebooks. The research diary and these notebooks turned out to be important and helpful assets that contained much information that enabled us to write the empirical part of this paper.

When the focus of the research had reached the stage described above, the researcher started to write extensive summaries of each of the two episodes, including hundreds of references to internal documents, such as presentations, protocols, and emails, and to the notes in the research diary and handwritten notebooks. These summaries grew to around 45 pages in total and were mainly structured chronologically. The researchers used these summaries for discussing the findings and how these could be relevant for potential theoretical contributions. This was the basis for writing next versions of these extensive summaries, now more structured around on the interesting aspects the researchers had identified, such as: what did the management accountants want, how did the company deal with uncertainty, how were rough assumptions derived and included in the calculations, how and why were such assumptions (not) presented, discussed, and accepted or rejected during decision-making processes? In parallel, we started writing discussing, rewriting, etc. our texts on theory development in the form of a paper (writing theoretical ideas was always going on "in the background" in the research diaries). This was inspired by both the literature and our empirical findings, and it triggered bringing additional and more specific information into the summaries.

Thus, the initial focus of the study and the research method were motivated by the researchers' understanding of the literature on cost management and product development, the research focus become more specific over time, and the process of finding the specific ideas for the current paper was characterized by intense iterations between the literature, the data and our own evolving ideas and texts.

4 Case analysis

We will present calculations from two episodes. These calculations showed the estimated financial implications of several decision alternatives for the company's future product strategy. The financial calculations were surrounded by much uncertainty and other departments, in particular engineering, production, procurement, and marketing and sales provided additional arguments. The calculations were discussed at several hierarchical levels, sometimes more than once, and finally ended up at the executive board level that made a formal decision. We describe these episodes, although these were not end points but continued with subsequent analyses, discussions, and decisions.

These episodes were happening in the context of the AutoCompany's modular product strategy, which it described as "overall guidelines for utilizing car projects with the goal to realize synergies as well as to master and reduce complexity across cars and car segments." The basic idea was that many different car models could be based on a common modular architecture. A modular architecture consisted of several platforms and modules. A platform refers to the lower part of the car body, where the engine, transmission, axles and seats are connected. It provides the common base of cars with similar dimensions, but different platforms are needed for cars of significantly different sizes. A module was defined in the company as a "technical group of components that form a functional and logical unit, which is completely interchangeable." Modules were meant to be used by all car projects which were part of the same modular architecture, sometimes with adaptions. A key intended benefit of the modular strategy was to save costs. AutoCompany is part of a larger company (*CarCorporation*) and shared modular architectures with two other brands, which we will name *VehicleFirm* and *CarEnterprise*. Each of the three brands was responsible for the development of one architecture, and all brands were, at least partly, involved in the next episodes.

AutoCompany was in the beginning of developing a new modular architecture, which would cover several vehicle types (sedans, station wagons, SUVs) in several size segments.[2] The two episodes concerned decisions and calculations around this new modular architecture. The first episode describes decisions to potentially having common platforms for models from different brands. The second episode concerns a decision about how to design battery electric vehicles next to traditional combustion engine vehicles.

In the background was the attempt of management accountants to gain more influence in product development. Car development projects at AutoCompany often went considerably over budget and attempts from management accountants to influence decisions and reduce cost overruns had not been too successful. If the engineers in development or production asked for more money, management often approved additional budgets. Since the company had been growing and had been very profitable, most people did not seem to consider this a problem. However, management accountants were warning that growth was declining, profit margins were under pressure, and more stringent technological requirements were going to increase development costs even further. Quite ineffectually, they were trying to warn that things were going in the wrong direction, that financial problems were imminent and things needed to change. They were trying to gain more influence.

[2] Segment is the European term for vehicle classes. For example, minicompact, subcompact, compact, mid-size, large, minivans and sports utility vehicles (SUV) correspond to cars in the A-F, M, and J segments. Instead of letters, we use numbers for segments in the case to disguise information.

Episode 1: Common platforms?

AutoCompany and other brands of CarCorporation were sometimes offering car models in the same size segments, which were based on separate modular architectures and shared almost no technology (apart from engines). This episode describes the investigation of the financial consequences if AutoCompany would base future car models in two segments on common platforms with VehicleFirm and CarEnterprise.

Two project teams for both segments consisted of managers from several functional areas of the two brands involved: controlling, development, production, marketing & sales, purchasing, and quality management. The project teams were led by a representative of AutoCompany's general management department, who directly reported to AutoCompany's CEO. Next to the controlling manager as the formal project team member, the researcher was another management accountant, who was involved in conducting analyses and also participated in most of the meetings. We will describe this episode from their perspective of these management accountants.

The project team's results were presented to a management committee that could formally take decisions (the project team could only give recommendations). Almost all project team members were also part of this management committee, but not all members of this management committee were in the project team. Next, results were presented to a top management committee and, finally, to AutoCompany's executive board.

The issue of potentially going to a common platform of these two brands in Segment 3 had a history in CarCorporation. At the start of several earlier product development projects, this possibility had also been investigated and rejected. And so, during the first meeting with some cost experts at AutoCompany, one person said: "Okay, so we are doing it again. This discussion is coming back every few years." The controlling manager early on expressed his doubts about AutoCompany adopting a common platform that would be provided by VehicleFirm. "Here [in Segment 3], I am really not sure if it would be clever to go on VehicleFirm's platform." However in Segment 5, this controlling manager's idea about the desired outcome of the exercise was very different. He expressed to his controlling colleagues a clear preference for changing the status quo and going to a common platform for both brands. "We have to somehow achieve to get all these … vehicles on one platform – no matter if it's then going to be developed by [AutoCompany] or [CarEnterprise]. It makes absolutely no sense to develop two platforms for this segment. There is simply so much savings potential here. We simply cannot ignore it anymore." When later the resistance from several other project team

members mounted, he said to colleagues in controlling "if we succeed putting both cars on one platform, then we will have achieved a something really for the company."

Calculation of material cost differences

A key element of the calculation was the comparison of the variable costs (basically the material costs) if AutoCompany would adopt a common platform that would be developed by VehicleFirm or CarEnterprise. These comparisons was made on the basis of the current cars, even though the decision at hand concerned future cars. There was simply too much uncertainty about future cars for a meaningful cost comparison. Therefore, the management accountants aimed to examine the financial impact in each segment if the *current* product generations would have been based on only one instead of two platforms. They started with available material cost comparisons, which were regularly made at CarCorporation, which compared *specific configurations* of car models and did not provide a representative average of the material costs of the actual model configurations sold.

The two-year-old comparison in Segment 3 indicated that VehicleFirm's material costs were about $600 lower than AutoCompany's costs.[3] The management accountants checked and updated this cost comparison to the current situation, which required an adjustment of only a few percent. The available cost comparison in Segment 5 was also updated, but this reduced the cost difference by about one third. The management accountants argued that this was due to technical changes since the original material cost comparison was made. This analysis for Segment 5 indicated that AutoCompany's material costs were almost $3000 lower than CarEnterprise's costs. These results are shown as the first three bars in Figures 1 and 2.

Insert Figures 1 and 2 around here.

The next step was to identify variable costs that could be avoided (or would increase) if AutoCompany adopted a common platform with VehicleFirm or CarEntreprise. The variable cost difference was split into two parts. Some technical differences between cars of the two brands could continue to freely exist in case of a common platform. AutoCompany could still use particular more expensive parts, for example, to differentiate its brand from VehicleFirm. Therefore, these kinds of differences and associated costs would not be affected by having a common platform. This is the fourth, light-blue bar in Figures 1 and 2. Other technical differences were not flexible and inherent to the platform. For example, AutoCompany would have to adopt particular more expensive parts that inherently belonged to CarEnterprise's

[3] In Segment 3, AutoCompany's model was more expensive and offered more performance and functionality than VehicleFirm's related model. However in Segment 5, CarEnterprise's model was more expensive and offered more performance and functionality than AutoCompany's related model.

platform, so these costs mattered for the further calculation. This is shown as the final, dark-blue bars in Figures 1 and 2.

This version of the calculation suggested that each unit would become about $2000 more expensive, if AutoCompany would adopt CarEnterprise's platform, and the other way around, CarEnterprise would be able to save this amount per unit. This triggered further discussions with CarEnterprise's controlling manager, who strongly disagreed with these numbers. In the following weeks, the management accountants looked into technical differences in more detail and came to different conclusions, shown in the next version of the calculation in Figure 3. The relevant cost difference was reduced to around $350 per unit. For example, CarEnterprise's expensive transmission was one reason for the earlier large cost differences. The further discussions led to the assumption that the future platform would be able to accommodate several kinds of transmissions and AutoCompany would not be forced to also adopt the expensive transmission if it were to have a common platform with CarEnterprise. Reversely, CarEnterprise would not achieve cost savings with the transmission if it were to have AutoCompany's platform in common. As a result, the cost difference for the various transmissions moved from the dark-blue to the light-blue area. Similar assumptions for other parts had the same effect of significantly reducing the relevant cost difference.

Insert Figure 3 around here.

Calculation of the overall financial impact

The material cost difference is one element for the calculation of the final impact. Figure 4 shows the calculated impact if AutoCompany would adopt a common platform that would be provided by VehicleFirm. The first bar shows an impact on variable costs of $900 million, based on the rounded number of $400 per car (also indicated in Figure 1) and a total number of 2.25 million cars. The second bar mentions scale effects with a question mark, suggesting it would be a small, negative impact, but without quantifying this. The third bar mentions "fixed costs" which refers to investments in development and tools that are specific for a car model. A common platform would require fewer such investments, saving 400 million. Finally, negative "profit effects" are shown, referring to contribution margins that could not be realized anymore if a car would be based on a common platform. Figure 4 indicates a question mark for the total effect ("group impact"), suggesting that it might be slightly positive, not that clear, perhaps not worthwhile.

Insert Figure 4 around here.

Figures 5 and 6 have a similar structure. These calculations suggested that significant financial benefits could be achieved if AutoCompany would adopt CarEnterprise's platform,

while the other way around (CarEnterprise adopting AutoCompany's platform) was shown as neither positive nor negative. Figure 5 shows the scenario if AutoCompany would give up its own platform. This looked very positive: increases in variable costs were limited, significant cost savings were possible due to scale effects and investment savings, and there was even a positive effect for contribution margins. Moreover, it was suggested that this result was fairly robust, because reducing it by –20% did not matter for the conclusion. Figure 6, showing the scenario if CarEnterprise would give up its own platform to adopt AutoCompany's platform, looked only neutral, so not particularly attractive. There were savings in variable cost, scale effects, and investments, but these were all eradicated by a significant loss of contribution margin. Note that the small cost difference of $350 per unit, as shown earlier in Figure 3, was the reason for the limited negative impact of variable costs in Figure 5 and the limited positive impact in Figure 6 (the first green bars in these figures).

Insert Figures 5 and 6 around here.

Seeing these Figures, several presentation features stand out. Figures 1, 2 and 3 show that the calculation is based on existing, established material cost comparisons. The figure includes boxes with detailed numbers on various topics (besides the axles and transmission) that added up to the overall numbers for cost differences, such as 23 + 37 + 42 + 76 + 6 = 184 (fourth bar in Figure 1). It also highlights how the different bars of the calculation were related and internally consistent. It shows that the rounded numbers of $400 and $350 for the material cost differences per car were used in subsequent calculations, thereby connecting Figure 1 to Figure 4 and Figure 3 to Figures 5 and 6. When the management accountants presented these calculations to the project team and later to top management, they pointed out that the material cost difference per car was similar in both ($400 and $350 per unit). Similarly, Figure 4 includes details and explanation that demonstrate internal consistency of numbers in several different ways, such as 400 × 2.25 Mio = 900 Mio (first bar), or 340 + 260 – 200 = 400 (third bar).

What happened?

The controlling manager presented the calculation for Segment 3 to the top management committee and explained and motivated the method and the assumptions. The management accountants' impression was that people were relieved that the financial evaluation they provided suggested to not change the status quo, which was also what the other members of the project team had recommended. As the project leader stated: "finally, there is a reason why we do the things how we do them." The formal decision to maintaining separate platforms in Segment 3 was taken by the executive board of CarCorporation. Before the meeting in which this was decided, a top manager in finance at CarCorporation contacted the project team. The

official document for that meeting only included the summary calculation, similar to Figure 4, and he wanted details of the calculation to be available for the meeting of the executive board of CarCorporation as back-up material. The project team leader was also going to be present at that meeting and asked the management accountants for further details that would enable him, if needed, to explain the variable cost difference in more detail. After the meeting, the same top manager in finance contacted the management accountants and requested more detailed information. In several rounds via email and telephone, they provided additional details and explanations. It was clear that CarCorporation asked this information to document why they had decided to not change the status quo and to be able to answer potential future questions about this decision.

Segment 5 was another story. The calculations (Figures 5 and 6) suggested that significant financial benefits could be achieved if AutoCompany would adopt CarEnterprise's platform, while the other way around (CarEnterprise adopting AutoCompany's platform) was shown as neither positive nor negative. Besides these calculations, other project team members emphasized various other considerations that were not included in the calculations, such as qualitative statements about specific technical disadvantages and brand image effects. The project team did not come to a common recommendation. After presenting the project team results, neither the management committee nor the top management committee made a formal decision. However, they decided to start the new modular architecture conceptualization anyway, and initially not to consider requirements for Segment 5 vehicles for AutoCompany. A few months later, the CEO of AutoCompany mentioned that he now recognized the necessity of a common platform in Segment 5 and a few weeks later, the CEO of CarCorporation stated in a meeting that future Segment 5 vehicles of both brands should be based on a common platform. A few months later, it was officially decided this common platform would be developed under the responsibility of CarEnterprise. We will now look in more detail at how the management accountants constructed calculations and provided details and explanations that supported this outcome, which was line with the controlling manager's preferences.

Zooming-in: intricate details

It is especially interesting to see the how the calculation in Segment 5 was constructed, because here the controlling manager had a preference that was quite different from what other team members wanted and which would imply a drastic change from the current status quo. AutoCompany's controlling manager wanted to get to a common platform and did not mind if this would be CarEnterprise's platform. CarEnterprise's controlling manager did not want to give up their platform and agreed with AutoCompany adopting that, too.

Example: Classifying the axles. The separation between two kinds of variable cost differences (the avoidable and unavoidable variable cost differences) was sometime difficult to make, and the management accountants often ended up having very detailed technical discussions with cost experts and making assumptions that were defensible, but which could also have been made differently. For example, major variable cost differences resulted from the fact that AutoCompany used more expensive axles than VehicleFirm in Segment 3, and CarEntreprise used more expensive axles than AutoCompany in Segment 5. In Segment 3, the controlling manager decided to classify the axles as a conceptual difference that was inherent to the platform. So, if AutoCompany would provide the common platform, all cars would have to use the more expensive axles and the costs for VehicleFirm could increase; reversely, if VehicleFirm would provide the common platform, all cars would have the less expensive axles and AutoCompany would save material costs. Axles are shown in the dark-blue bar in Figure 1. However in Segment 5, the controlling manager took a very different position and argued that it was absolutely not understandable for him why axles were inherent to the current platforms. He assumed that AutoCompany could still use the less expensive axles if both brands were going to adopt CarEnterprise's platform, and likewise, CarEnterprise could still use its own axles if AutoCompany's platform would be the common one. So this time, axles were in the light-blue bar in Figure 3 and did not impact the cost comparison.

These choices for classifying the axles (and also the classification of the transmission, mentioned earlier) had the following effect on the results of the calculation for Segment 5. AutoCompany had the lower-cost platform, and the extra costs for AutoCompany from adopting a common platform would be limited. Reversely, the cost savings for CarEnterprise because of adopting a common platform would also be limited. Both effects favored the outcome of AutoCompany adopting the CarEnterprise platform and CarEnterprise not adopting AutoCompany's platform.

Example: Assumptions about powertrains and substitution effects. AutoCompany offered a stronger and larger powertrain that it could not sell anymore with VehicleFirm's platform. It would not fit into VehicleFirm's platform because of geometrical limitations that were fundamental to the modular architecture, and even significant additional development investments would not solve this problem. Although it was unclear if and to which extent that powertrain would be important for the future product generation, AutoCompany's controlling manager decided to evaluate this issue on the basis of today's product generation. The management accountants gathered pricing-, cost-, and installation rate data about the various powertrains. They assumed that all customers who had purchased the strongest powertrain

would buy the next strongest powertrain instead, and they calculated the contribution margin losses accordingly. In other words, they assumed no sales volume losses (100% substitution rate), and they estimated the lost contribution margin to be $1000 million, shown in Figure 2.

Compare this to the calculation for Segment 5. Here too, the issue was the possibility of offering a very powerful powertrain. CarEnterprise would not be able to offer a particular strong powertrain anymore if it would adopt AutoCompany's platform. Figure 6 indicated a revenue loss of $750 million. CarEnterprise's controlling manager had communicated this number in a brief email AutoCompany's controlling manager and mentioned it was based on "significant loss of sales volume." In other words, less than 100% substitution was assumed, but without providing any further details and explanation. Despite the significant impact of this assumption and the inconsistency with Segment 3, details were neither provided by CarEnterprise's controlling manager, nor required by AutoCompany's controlling manager. AutoCompany's immediately agreed to include this in the calculation, and when he later presented this to the management committee, he mentioned only briefly the different assumption about substitution. The readily acceptance of this number was also surprising for another reason: it would probably be avoidable. The management accountant could reasonably have assumed that it would be technically possible to develop a platform in such a way that including the large engine would still be possible. This would require significant extra product development investments, but these would be less than the very large contribution margin loss. Moreover, earlier, similar assumptions had been made about transmissions. However, this was not considered and this omission could have made the inclusion of the very large contribution margin losses even more debatable—but it didn't. Obviously, the assumption about substitution effects favored the outcome of CarEnterprise not adopting AutoCompany's platform.

Example; Quantifying scale effects. Another interesting difference is the quantification of scale effects. Figure 4 indicates scale effects as having a small, negative impact, but without quantifying this—Figure 4 shows a question mark. Figures 5 and 6 shows a financial impact of scale effects of $400 million. The management accountants had based the quantification on a one-year-old existing scale effect quantification for several comparable models. That calculation had another purpose, but it also quantified scale effects and showed cost impacts between 3% and 12% of a car's material costs, which had previously been accepted by CarCorporation's top management. The management accountants applied these percentages to the platforms' current material costs, which resulted in a positive scale effect of $400 million, regardless which platform would be cancelled. This assumption favored the outcome of AutoCompany adopting CarEntreprises's platform in Figure 5. It also favored that

CarEnterprise would adopting AutoCompany's platform (which is not what the controlling managers wanted), but this effect could be sufficiently countered in total in Figure 6.

Example: Features and business cases. Another interesting and subtle difference within Episode 2 exists between the calculations shown in Figures 5 and 6. This concerned a particular feature of the car. CarEnterprise offered this feature as an expensive option, which the vast majority of customer ordered. AutoCompany offered this this feature standard on all cars. Figure 5 concerns the situation that AutoCompany adopts the platform of CarEnterprise. In that case, AutoCompany would also offer the feature as a paid option. AutoCompany estimated a positive impact of $100 million, as shown in Figure 5. AutoCompany argued that this would be comparable to business practices of all their competitors. It used data about current prices, costs and adoption rates from CarEnterprise to estimate a business case. The parameters for the calculation of this number were also provided in Figure 5, which allowed verifying that the different parts were internally consistent: 314,000 units × 65% × (0.5 × $2000 – $500) = $102,050,000. Figure 6 concerns the situation that CarEnterprise adopts AutoCompany's platform. In the case, the feature would become standard on all cars. CarEnterprise assumed a contribution margin loss of $250 million, shown in Figure 6 ("Cancelling option X"), without providing further explanation or details. While the business case for AutoCompany and the estimation of revenue losses for CarEntreprise might be plausible on their own, it is remarkable that the combination of both numbers was accepted without further questioning, despite their inconsistency, significance, and the lack of any details for CarEnterprise's estimated revenue losses. Moreover, as above, it would have been reasonable to assume that a product development investment of far less than $250 million could solve this problem and enable CarEnterprise to offer this feature in the same way as they currently did.

Episode 2: An integrated or split architecture for battery electric vehicles?

This episode concerned a decision about the technical concept for future battery electric vehicles (BEVs). At the start of developing the new modular architecture, the question arose how BEVs would be implemented in AutoCompany's product portfolio. The fundamental decision was whether to have an integrated or separate modular architectures for conventional cars and BEVs. This episode covers around one year. During the first nine months, nearly all arguments on the table strongly recommended to develop an integrated architecture, but over time, a financial calculation was developed that became more influential. The formal decision at the end of this episode was to develop separate architectures.

The project team had a comparable composition as in the first episode, and the structure of how this team reported several times to management was also similar. Again, one of the

researchers was part of the project team as a controlling representative in cooperation with another controlling colleague and a controlling manager.

In the beginning of this episode, the project team leader and the representatives from engineering, marketing, and production expressed a clear preference for an integrated architecture. They mentioned flexibility as the main reason: AutoCompany would be able to manufacture both conventional cars and BEVs on the same production lines and could easily react to changes in the sales mix. With two separate architectures, they claimed separate production facilities would be needed for both types of cars, which would require much larger investments and changing the production mix would take much longer, because that would require further investments. The project team showed Figure 7 in the first meeting with the top management committee, suggesting qualitatively that much lower investments were needed for an integrated design. It was also acknowledged that the integrated architecture would cause some disadvantages for conventional cars, such as a higher weight, but the formal decision taken by the top management committee was still that the option of the separate architectures was not expedient.

Insert Figure 7 around here.

The management accountants started trying to quantify some of the arguments, especially the difference in investments, which was supposed to be an advantage of the integrated design, and the difference in variable costs, which was expected to be the main financial disadvantage of the integrated architecture. As the controlling manager said "I am really tired of being the only one who talks sometimes against [an integrated design]. It is completely obvious that all the other departments already have made a decision." He wanted to achieve that the disadvantages of the integrated design, as well as the advantages of the split design with two separate modular architectures got much more attention.

Negotiating investment estimates

The calculations presented here concerned cars in one particular size segment. Three departments provided the project team with their first estimates of the required investments for both concepts, which indeed indicated significantly higher investments for the separate architectures. Production simply stated it would need everything double to be able to build both kinds of cars and estimated twice the investments for the separate architectures. Development and purchasing also estimated almost a double investment. At this stage, the project leader asked for a figure to show the quantified investment differences to top management, but the controlling manager refused to provide this, claiming that these estimates were not good enough. The management accountants provided only a qualitative diagram, similar to Figure 7.

The management accountants tried to gather more reliable investment estimates, but not all attempts were successful: They analyzed the cost situation of today's modular architecture, and the project team leader tried to derive correlations among investments, sales volume, and the number of derivate vehicle models. But using these values to estimate the investments for the various concepts was not accepted by the project team's other members.

In the following weeks, development managers came up with more detailed estimates for development costs. They presented their development cost estimations on more than ten slides to AutoCompany's executive development manager, they provided and explained this analysis to the whole project team, and the management accountants decided to incorporate these numbers in their economic evaluation. This more detailed analysis showed that development cost differences between the concepts were smaller than earlier estimated. The production managers also produced new and more detailed numbers. Their conclusion still was that the separate architectures would cause higher production investments, but the extraordinarily large difference was gone. But, they insisted to also mention that they believed the company's production site was not large enough to implement the separate architectures that required much larger production facilities. The purchase manager in the project team refused to provide another, more detailed estimate. As a solution, the management accountants could find quite a stable relationship between purchasing investments and development costs in today's architectures and they applied, in cooperation with the project team leader, the same proportionality on estimated development costs in order to consider purchasing investments. The management accountants believed these new estimates were of better quality and incorporated these in their calculation for top management, shown in Figure 8.

Insert Figure 8 around here.

Refocusing contribution margins

Differences of sales volumes and variable costs were another key element of the calculation. The project team had agreed on specific BEVs and combustion models as the basis for the analysis, and the management accountants asked the sales manager in the project team to provide sales volumes. He argued that only the integrated architecture would enable offering each model both as a conventional car and as a BEV. He claimed that sales volumes would be too low for doing the same with separate architectures and therefore assumed that only a few models would be offered both as a conventional car and as a BEV. He made some further assumptions about sales mix and substitution, and as a result, showed sales numbers that were 10% lower for separate architectures.

The management accountants did not like how these estimates disadvantaged the concept of separate architectures. They used the data, but changed the comparisons by creating four options. This is shown in Figure 9. Options 2a and 2b are separate architectures and Options 3a and 3b concern integrated architectures. Instead of comparing the integrated architecture including the higher sales volume (Option 3a) with the separate architectures based on the lower sales volume (Option 2b) as the sales manager had suggested, they created two comparisons, each time on the basis of the same sales volume.

Insert Figure 9 around here.

Contribution margins of conventional cars and BEVs (nine years into the future) were derived from the contribution margins of the same models of the current vehicles. The management accountants adapted these contribution margins with combustion- and BEV-specific changes which cost experts are AutoCompany expected for the future product generation. A chart explaining this proceeding for one particular car model was also presented to the strategic management committee.

Furthermore, the comparison of variable costs included a quantification of specific technical differences that would be caused by these technical concepts. The integrated architecture necessitated cars to be a bit higher and heavier, which increased production costs and CO2 emissions and also required using wheels with a larger diameter. The management accountants had collected data on these differences and when presenting these in the project team, the project leader expressed his doubts: “That is too much for me – certainly, there will remain probably only 10 to 15 kilograms.” The management accountants protested and refused to change the numbers, arguing there was no need for speculation, and insisted to accept these estimates, because they been provided by concept engineers.

In the following weeks, the management accountants quantified the technical differences together with cost experts, and also presented and discussed these with the project team several times. They relied on cost information of today’s cars. For example, if the body of a current car project weighed 300 kg, and caused material costs of $1200 in total, the management accountants calculated with a variable cost value of $4 per kg, which they multiplied with the additional weight per car. In addition, they evaluated CO2 emissions with $95 per gram, which is the fine car companies will have to pay per gram from 2021 in the EU if they fail their emission goals. And lastly, they considered the additional complexity costs by multiplying material costs of a comparable current car project with 3%, without justifying this any further. This was a reasonable but also quite arbitrary assumption about higher material costs because of the complexity of the integrated architecture—as a concept engineer said: “Somehow, they

will be there. I just cannot tell you in detail today which parts will be affected." Presenting and discussing these calculations with the project team several times led to a few changes and, in the end, the management accountants evaluated a significant additional material costs for combustion cars for the integrated design of roughly $ 800–1000 per car. However, not everyone was convinced and the sales manager in the project team stated that "those $1000, I still do not believe them to this day."

What happened?

The slide shown in Figure 10 summarized the management accountants' calculation and was presented to the top management committee and the executive board. The presentation contained many more slides with more detailed calculations for the various numbers, and the management accountant provided further explanations during the presentation. For example, he explained in detail the various elements of the variable cost difference per unit between the integrated and separate architectures.

These slides also showed the *sales estimates* and *investment estimates* and it was indicated that the input data had been provided by various departments, which had their representatives in the project team. It was signaled that "their own people" in sales, development and production had provided these numbers. The management accountants had contested the earlier estimates for investments and negotiated lower investment estimates. The management accountants had also reframed the comparisons for sales numbers. That all took place earlier with other members of the project team and the management committee. They had had their changes, those battles had been fought, and now the numbers were "fixed."

Insert Figure 10 around here.

The formal decision at the end of this episode was to develop two separate architectures, and not just for the specific car models the calculation covered, but also for all other sedan and station wagon models in related size segments. Top management believed that having a mix of integrated and separate architectures in closely related segments made no sense. Subsequently, calculations for the two remaining SUV segments were made. The researchers were not involved in this, but could observe from the slides that these calculations were done similarly, with some aspects being more detailed. In particular, variable cost increases because of an integrated architecture were examined at a much more granular level. The result of approximately $1000 additional costs remained quite stable, though, and after two additional strategic management committees, AutoCompany's executive board made the final decision to develop separated architectures for all BEVs and combustion-engine cars.

5 Discussion

We described the calculations that management accountants had produced in the context of product development at a car company. First we will discuss that they had an agenda which motivated several assumptions they made and which also influenced how they accepted or fought information they received from others. Then we will discuss how they provided justification for their calculations through internal consistency and creating other comparisons; by showing assumptions and reversing the burden of proof; and by closing the window of opportunity for challenging calculations.

Preferences that influence calculations

The management accountants in our case study had their own preferences. The management accountant in the first episode expressed that he wanted to go to a common architecture in Segment 5 and this did not have to be AutoCompany's architecture. In the second episode, the management accountant wanted to achieve the disadvantages of the integrated design and the advantages of the split design with two separate modular architectures got more attention.

The case provides several examples of how these preferences influenced the calculations, in particular the assumptions that the management accountants made. As described in the case, assumptions about future costs and revenues were quite uncertain and typically, other assumptions could have been made and defended equally well. Especially differences of assumptions between the calculations for Segments 3 and 5 provide indications for the deliberate use of assumptions to support particular outcomes. While the method and logic underlying the calculations was similar, subtle differences concerned the classification of axles as either a relevant cost difference (in Segment 3) or as an irrelevant cost different (in Segment 5); the substitution effect if a powerful engine could not be offered anymore was estimated at 100% in Segment 3 and less than 100% in Segment 5; scale effects that were not quantified in Segment 3, but these had a significant cost impact in Segment 5. Furthermore, within the calculation for Segment 5, a business case included assumptions that favored the scenario that AutoCompany canceled its own platform but at the same time discouraged that Enterprise would cancel its own platform. Also remarkable within the calculation for Segment 5 was the classification of the transmission initially as a relevant cost difference but subsequently as an irrelevant cost difference. All these assumptions helped to get to the outcomes shown in Figures 5 and 6, which made one conclusion inevitable: AutoCompany should cancel its own platform and adopt CarEnterprise's architecture. In other words, these assumptions influenced the

outcomes of the calculations in the first episode in such a way, that these supported the management accountant's preferences.

Their preferences were also consistent with how the management accountants sometimes reacted when they received information and started accepting it or fighting it. In Episode 2, they refused to accept investment estimates from the production, development and purchasing departments, arguing that these were too large and too uncertain, yet they accepted in Episode 1 estimates of contribution margin losses that were arguably comparably large and uncertain. Both actions were consistent with the agendas of the management accountants in both episodes. Also in Episode 2, the management accountants had received information about technical differences between cars as the basis for a calculation of variable cost differences. When other actors raised doubts, the management accountants defended this information. They needed that information for their calculation that showed cost disadvantages, which they wanted to show for their agenda. As another example in Episode 2, the management accountants could not avoid taking particular numbers on expected sales volumes from the sales department, but then they created four scenarios instead the previous two, which changed the comparisons that were being presented and took away the effect that the sales numbers were too disadvantageous for the scenario they preferred. Instead of focusing on lower sales for a particular scenario, the calculation now focused on cost differences given comparable assumptions about sales volumes.

Thus, the case provides evidence that the management accountants had specific preferences and choose particular detailed aspects of their calculations in such ways that these supported particular recommendations that were in line with their preferences. This contributes to the literature on the work of management accountants. The literature has identified several ways in which accountants behaved not objectively according to the preferred image of the profession (Davis et al., 2006; Maas & Matějka, 2009). Yet, these studies explain such behavior as reactions to pressures and expectations from managers and other actors., in particular to deal with the duality of the management accountant's role. Our research extends that work by showing that management accountants may also have their own preferences. Having these does not necessarily imply unethical behavior, because they may not be based on narrow self-interest. Management accountants may very well believe—before completely having conducted particular calculations—that particular decisions would be the best thing to do for the organization (Mahlendorf et al., 2018). Having such preferences and promoting those can still be in line with guidelines of the profession, but it nuances the profession's idea of what it means to be "objective". That notion implicitly suggests that an impartial and impersonal analysis

should provide the answer. Preferences apart from what the analysis tells are not neutral but represent personal biases. But maybe objective can also mean a judgment that is based on tacit knowledge, whether we call this experience, gut feel, or intuition, in combination with a genuine belief that it is in the best interest of the organization—not self-interest at the expense of the organization. However, this distinction is certainly up for further investigation, looking at questions such as what is driving those preferences, why are they there, how do management accountants and managers consider such preferences? This finding also leads to the next question as to how management could enhance the justification of their recommendations and supporting calculations that promoted their preferences.

Providing justification

The management accountants tried to enhance justifiability for their calculations in several ways. We will discuss how justification may increase by creating comparisons, showing scrutiny, reversing the burden of proof, and closing the window of opportunity for challenging calculations.

Creating comparisons

One way of enhancing the justifiability of these calculations was by showing comparisons. Comparisons can help to make calculations more justifiable (Goretzki & Messner, 2016). "Comparable accounting information enables people to identify similarities and differences that help them to reduce ambiguity about the information" (Rowe et al., 2012, p. 262). Another study found that cross-checking was central becoming more comfortable with calculations, as managers and management accountants "relied heavily on what Housing Interviewee 2 described as "due diligence"—the constant checking of numbers calculated in different ways and cross-referencing between different datasets" (Andon, Baxter, & Chua, 2018, p. 29).

By showing in the case study how the calculations in Episode 1 started from the basis of the actual material costs for current cars, information receivers were provided with a comparison to information they would already consider hard. Furthermore, by providing a breakdown of total cost differences into different topics (see Figures 1, 2 and 3), the different parts of the calculation could be connected and compared, showing internal consistency. As other examples, it was explicated (in Figures 1 and 3) how particular rounded numbers for the material cost differences per car were used for the calculations of the overall financial impact, which enabled connecting and comparing the detailed calculations shown in Figures 1 and 3 with the overall calculations shown in Figures 4, 5 and 6. These overall calculations again included connections between numbers, not only by adding up the numbers for different topics,

but also by showing the parameters for getting to a particular total number. The business case calculation shown in Figure 5 was an example. Not only did the details provided in this example demonstrate internal consistency, but these also helped to build a comparison to hard numbers (the parameters were identical to the current situation for the other brand) and to a broader context of business practices (AutoCompany would offer this option in way that was quite common for most brands in this car segment). Furthermore, the similarity of the calculations the two car segments in Episode 1 was emphasized, so providing comparisons between calculation methods. The exhibits looked identical in terms of structure and colors, it was emphasized orally that the methods were similar, and it was pointed out that the relevant variable cost differences were in the same order of magnitude ($400 and $350).

These comparisons for enhancing justifiability have in common that they show how the calculation is related to other information or reference points that are important for receivers of the information (Rowe et al., 2012). Comparisons between *various parts of the calculation* demonstrate internal consistency. Receivers of the information can see how numbers are aggregated and disaggregated, so how numbers add up, and how input data and several calculation steps lead to aggregate information. Such relationships between different elements of the calculation provide receivers of the information with comparisons and consistency checks, helping to justify the information and make it more persuasive. Justifiability may also be enhanced by showing comparisons to *numbers and sources* that are already hard. It helps if the calculation starts with actual (ex-post) numbers that people would not question and the calculation is derived from that starting point. It also helps to show that particular people whose opinions matter to receivers of the information (for example, because of their expertise or hierarchical position) have provided particular inputs. Justification can furthermore be based on comparing the current calculation to *calculation methods* that are important to information receivers. Examples could be calculations for internal calculations that followed the same method, legislation, technical standards, or accounting standards. Finally, we propose that justifiability may be enhanced by making comparisons to the *broader context* of the calculation. For example, particular assumptions may become more persuasive by comparing these to business practices in other parts of the same organization or in similar other organizations, by connecting these to the strategy of the organization, or by showing how these are consistent with broader societal trends.

Those details and explanations of the calculation that may enhance justifiability can be communicated in several ways. Such information may be shown *in writing*, such as on presentation slides or on other documents. The information can be more or less salient, for

example because some slides are presented and other slides are available in the slide deck but not shown during a meeting, or because some information is in the management summary of a report and other information is in a footnote of an appendix. Information may also be provided *orally* when a calculation is discussed, not only information that is also available in writing and pointed out, but also additional information that is not in writing. The provision of additional information may be triggered by the discussion or explicit questions, but the information provider may also have had the intention to provide particular information, but only orally. Providing information such information may happing during meetings, but also, some elements of the calculation that are very technical or sensitive could be discussed with particular information receivers *before* a meeting (Goretzki et al., 2017) or *after* a meeting when this triggered following-up some elements with particular information receivers.

Showing scrutiny

Another way of enhancing the justifiability of calculations was by showing these have undergone scrutiny, in the form of activities such as debating, challenging, checking, correcting, and elaborating the calculation. In the case study, management accountants included explicit references to experts who had provided particular information. Management accountants also explained how some very detailed costs had been included and some very specific issues had been considered, which implied that the numbers had been discussed with experts to be able to come up with such detailed calculations. Information receivers may find a calculation more persuasive and become more willing to the act on it, if they believe it has undergone scrutiny by representatives from various parts of the organization (Rowe et al., 2012). Rowe et al. (2012) used the term "practical arguments games" in which the information is hardened through inclusive debates and majority rule. Practical arguments become increasingly persuasive when they survive public challenges during debates, meet required burdens of proof, and beat rival interpretations (Rowe et al., 2012). That study showed how members of cross-functional teams "have many debates about the validity of the accounting information and they exert considerable effort in many meetings to elaborate on this information by identifying and correcting unintentional errors and intentional distortions and thereby reconciling the information to make it more comparable and therefore hard" (p. 275). Information became harder because people understood that the players had been "analyzing, evaluating, and potentially changing the information" (p. 261). This scrutiny was public (within the company), documented, and communicated in a language that was understandable for non-specialists.[4]

[4] In other contexts, information may become influential because of the belief that properly implemented accounting techniques can create good enough information, or because powerful managers use their authority make sure

Thus, our research suggests that management accountants may try to enhance justifiability by showing *explicitly* to what extent the calculation has been scrutinized, for example, by explaining checks that have been conducted, indicating names or positions of experts who have provided estimates, approved particular assumptions, or sanctioned the calculation method, or by referring to earlier meetings in which the calculation has already been shown and discussed. Management accountants may also express *implicitly* that the calculation has been scrutinized. The fact that the management accountant is able to show detailed information about numbers, information sources, calculation methods etc. suggest that they must have been in contact with experts, consulted several data sources, and conducted specific analyses. The level of detail and explanation provided implies that scrutiny has been applied to be able to come up with that kind of information.

Furthermore, providing particular details and explanations can be done to help *information receivers* to scrutinize the information. Additional explanations and details without too much technical language, for example, can help making the accounting information more understandable for information receivers who may have limited accounting knowledge. This could enable them not only to verify whether the overall implications of the calculation are making sense to them and are consistent with their broader experience and "gut feeling," but it also helps them to evaluate if particular parts of the calculation they have received are credible in relation to specific non-accounting knowledge information receivers have.

Reversing and focusing the burden of proof

When management accountants presented their calculations (to the project team, management committee, the top management committee, and the executive board) they repeatedly made the point that if others would have better information, they would be like to hear it. Of course, "better" would need to be supported, while for now, their reasonable but unsupported assumptions remained standing. For example, in Episode 2, the accountants explained that particular supporting calculations were based on the assumption of a 3% cost increase.

Our research suggests that providing explicit information on assumptions may have the effect of reversing the burden of proof. We suggest that the notion of "grey zone" is important. Preferences may influence the management accountants' assumptions, but within boundaries (Goretzki et al., 2017). While some extreme assumptions will be considered as being unrealistic by almost everyone, there is likely a "grey zone" of reasonable assumptions. In the grey zone,

particular numbers get used for decision-making, or through the use of statistical analyses by accountants and other specialists (Rowe et al., 2012).

nobody really knows and one assumption is as believable and also uncertain as another. Thus, if other people have doubts and disagree with assumptions the accountants propose, they will have difficulties convincing the management accountants or managers of alternative inputs and assumptions. For example, suppose someone would like to change the assumption of a 3% cost increase because of complexity to 2%. Both assumptions would be in the grey zone and be equally reasonable and uncertain. Why would 2% be any better? Why would we change it?

Thus, management accountants, just as others, could propose inputs and assumptions that are in the grey zone and fit their agenda, and they could readily accept inputs and assumptions from other that are in the grey zone and fit their agenda. By making these assumptions explicit, the accountants can make the first move. In the grey zone, not much evidence is needed if you are the first stating an assumption that is "reasonable" (as well as arbitrary). Others who question that assumption would be expected to provide much more evidence for an alternative assumption that would overturn the initial assumption. Stating an assumption is like staking your claim.

Apart from reversing the burden of proof, providing explicit information about assumptions may have the effect of focusing the burden of proof. Particular details and explanations draw attention to specific aspects of the calculation and suggests that these are the aspects to talk about. It makes those aspects more salient and puts those up for discussion and challenge. Management accountants might mention particular details and explanations to focus the discussion to distract from other assumptions and elements of the calculation. This also makes it harder to challenge the accountants' assumptions that are not detailed and explained. Others need to understand the calculation well enough to be able to challenge it and explain the issues they want to address. However, fewer details and explanations are provided. And so, the management accountants can cleverly influence which assumptions and other aspects they would prefer to be "on the stand" and which aspects they would like to keep silent.

Closing the window of opportunity for challenging the calculation

Management accountants were also providing details and explanations that opened and closed the window of opportunity for disagreement with their calculations. When presenting the calculation to the top management committee and the executive board in Episode 2, they explained that estimates of investment differences had been provided by their own departments in development, purchasing and production. They also made it clear to the top managers from these departments that their representatives in the project team had had their chances to influence the calculation and they signaled that it would be too late to disagree now. For example, the sales manager in the project team mentioned to the management accountants at

the end of Episode 2 that he still did not believe the number on the variable cost differences. However, this had been presented to the top management committee and the executive board and the possibility for changing this number through discussions in the project team had passed.

Our research suggests that management accountants, by providing details and explanations, first opens the possibilities for challenging the calculation, but then also *closes that window of opportunity for challenging the calculation*. Providing details and explanations suggests openness, neutrality, and seems to invite others to challenge the calculation. However, the fact that details and explanations have been provided also limits future possibilities for disagreeing. Disagreeing positions others took during earlier discussions with management accountants but which they could not successfully defend are difficult to propose later in discussions with more senior information receivers. Management accountants can make it clear to senior information receivers that a lot of details about how they have produced their calculation have been shown before to lower-level managers, thereby suggesting that everybody has had their chances, and so what is now presented to senior information receivers must be the hardest information possible about an uncertain future. That message is not only directed at those senior information receivers to indicate implicitly that the information has been scrutinized (something we already mentioned above) but the message is also intended to silence the lower-level managers. They got all the details and explanations, they have had their changes to challenge the calculation, but now it is to late to fight what they could not change earlier.

6 Conclusion

This study contributes to the literature on management accountants and justification. Management accountants provide recommendations to managers and support these with calculations of the financial consequences of future courses of action (AICPA, 2017; IMA, 2019). Management accountants would like to enhance the justifiability of their recommendations and supporting calculations, because managers are likely to critically review these, similar to, for example, auditors who are providing justification for their recommendations that will reviewed by other auditors and client managers (Kadous, Leiby, & Peecher, 2013; Kennedy, Kleinmuntz, & Peecher, 1997; Koonce, Anderson, & Marchant, 1995; Shankar & Tan, 2006). Whereas the accounting literature has investigated many settings in information preparers try to persuade information receivers and increase justifiability, little is known about management accountants and justification. We investigated the agenda of management accountants and how they use details and explanations to enhance the justifiability of their recommendations and supporting calculations.

This study contributes to the literature on management accountants of people of flesh and blood (Davis et al., 2006; Fauré & Rouleau, 2011; Maas & Matějka, 2009). Prior literature has mainly shown how management accountants act in particular ways different from "neutral information providers" in response to expectations from other organizational actors. We add to this literature by showing that management accountants may also have their own preferences, which may motivate assumptions they make and how they respond to information they receive from others.

This study also contributes to the literature on justifiability of recommendations that management accountants provide. Prior research has mostly investigated justifications in the contexts of auditing tasks (Kennedy et al., 1997; Shankar & Tan, 2006; Trotman et al., 2015). Some of results may also hold for management accountants and decision-supporting calculations they provide to managers. For example, justifiability may likely increase if the supporting information recognizes trade-offs, includes benchmarks, and provides evidence of extensive effort searching information and developing the advice (Kadous et al., 2013). However, we simply know little about management accountants' work in the context of justification and persuasion, apart from notable exceptions (Goretzki et al., 2017, 2016; Goretzki & Messner, 2019). This exploratory research sought to better understand how management accountants enhance the justifiability of their recommendations and supporting calculations by providing details and explanations. We know from prior research that management accounting information can become more persuasive if the information has been scrutinized through checking, validating and such activities, and if that the information includes many comparisons (Huikku & Lukka, 2016; Rowe et al., 2012). Building on this, we find that management accountants can provide justifications by showing how different parts of the calculation are internally consistent, by showing connections to numbers or sources that information receivers already find persuasive, by showing how the calculation resembles calculation methods that information that matter to receivers, and by connecting the calculation to a broader context. Overall, providing comparisons and showing scrutiny may lead to managers finding the calculations more useful for making decisions. This may enhance the credibility of the information, even if managers would believe management accountants are also trying to influence them (Isaac & Grayson, 2016).

We also find that management accountants can provide details and explanations for reversing and focusing the burden of proof and for opening and closing the window of opportunity for challenging the calculation. The notion of a "grey zone" provides a more nuanced understanding of the role of uncertainty. We proposed that as long as particular

information is not so extreme that most information receivers would consider it as simply unrealistic, the information can be in a grey zone of uncertainty. Different assumptions in that zone are equally plausible or implausible and there is little convincing proof that justifies one assumption more than another assumption in the grey zone. We proposed and provided evidence that management accountants use numbers in the grey zone that fitted their agenda and that by being explicit on these assumptions, they could also reverse the burden of proof. On this basis, and also by focusing the discussion through the details and explanations they provided, management accountants first invited discussion of the calculation. But later, because of first providing the opportunity for challenging the calculation, they also closed the window for challenging the calculation. In other words, they stake their claims, point to issues to discuss, ask for "better ideas" but later make it clear that "everyone has had their chances."

A limitation of this study is that, despite fantastic access in the case company, there is always more data to wish for. For an even better understanding of the calculations in these two episodes, we would have liked to witness more of the discussions that have been taking place in the top management committee and the executive board. Furthermore, this is a longitudinal study, but the story goes on. Further calculations, provision of details and explanations, and decisions are happening that have not been included and could have further informed our understanding.

The study suggests several questions for future research. If accountants have their own preferences and provide details and explanations to enhance justifiability of their recommendations and supporting calculations, which is what our study suggests, how do information receivers react in the longer run? Management accountants want to be seen as competent and truthful actors to be effective in their role (Goretzki et al., 2017). Providing details and explanations may strengthen the impression of competence. But if other actors would start to see such information as a lever that accountants using to further their own preferences, would this backfire and hurt their image and identity as producers of truthful knowledge (Goretzki et al., 2017)? Other actors may see details and explanations as a tactic that management accountants use for persuading them, and this suspicion may increase if they realize that the management accountants have considerable discretion for providing details and explanations, which may increase suspicion of persuasion attempts (Friestad & Wright, 1994). However, details and explanations may also help managers using the calculations for making decisions. This may enhance the credibility of the information, even if managers would believe management accountants are also using persuasion tactics (Isaac & Grayson, 2016).

Furthermore, why do management accountants have preferences? How are this related to their experience, to incentives, self-interest, or what they believe to be the interests of the organization or of particular stakeholders? Developing further ideas about the role of details and explanations for enhancing justifiability may also lead to using experiments for testing hypotheses. Finally, future research could address the role of details and explanations when accountants have less discretion, because the similar accounting information is regularly produced. Information receivers would expect particular details and explanations every time and the management accountants would not have much flexibility for how they would use it to increase the persuasiveness of the information they provide. How is the provision of details and explanations used in such situations?

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Figures and tables

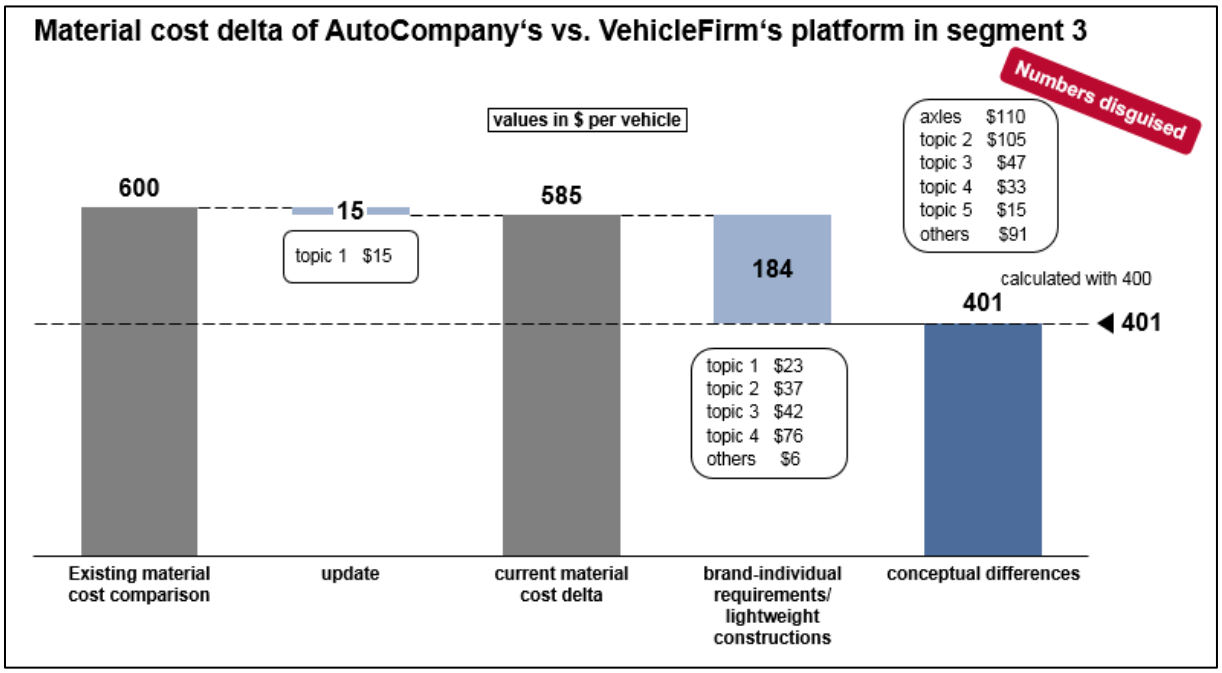

Figure 1. Comparison of material costs. This closely resembles the figure used in the company, but with modified numbers and disguised details.

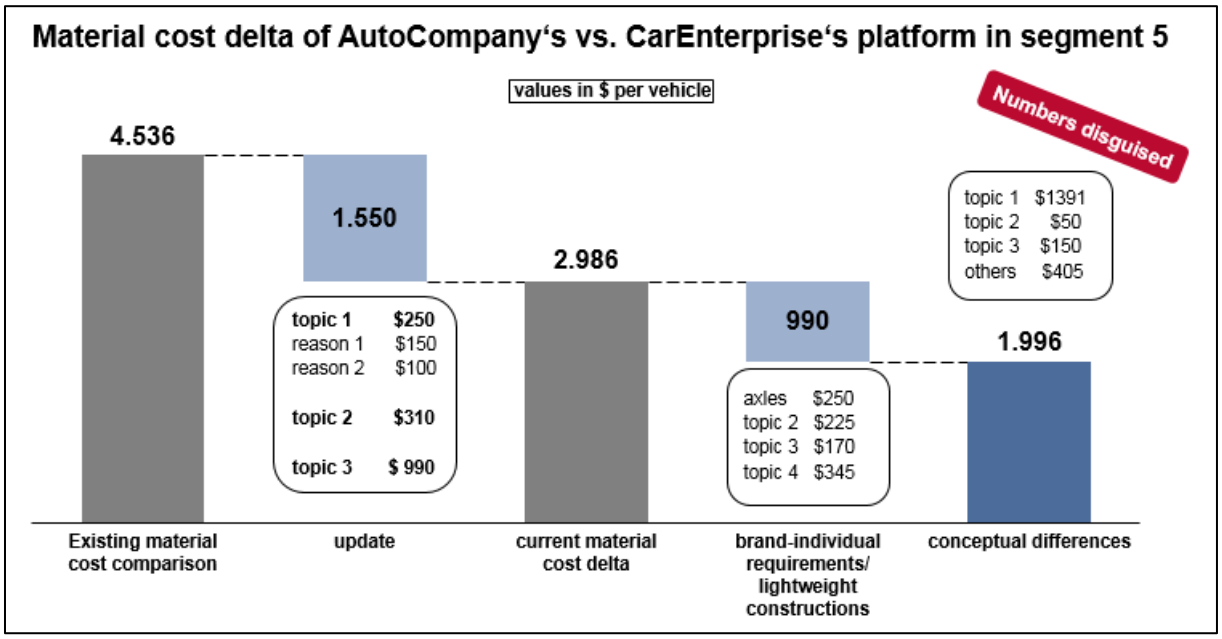

Figure 2. First version of material cost calculation

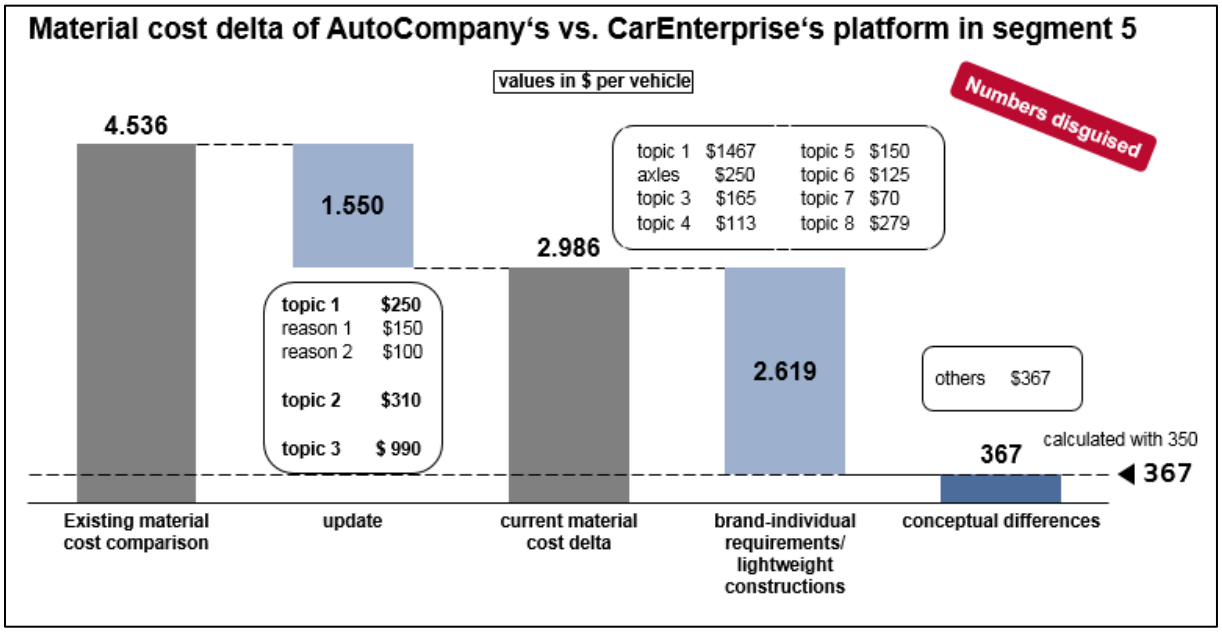

Figure 3. Final version of material cost calculation

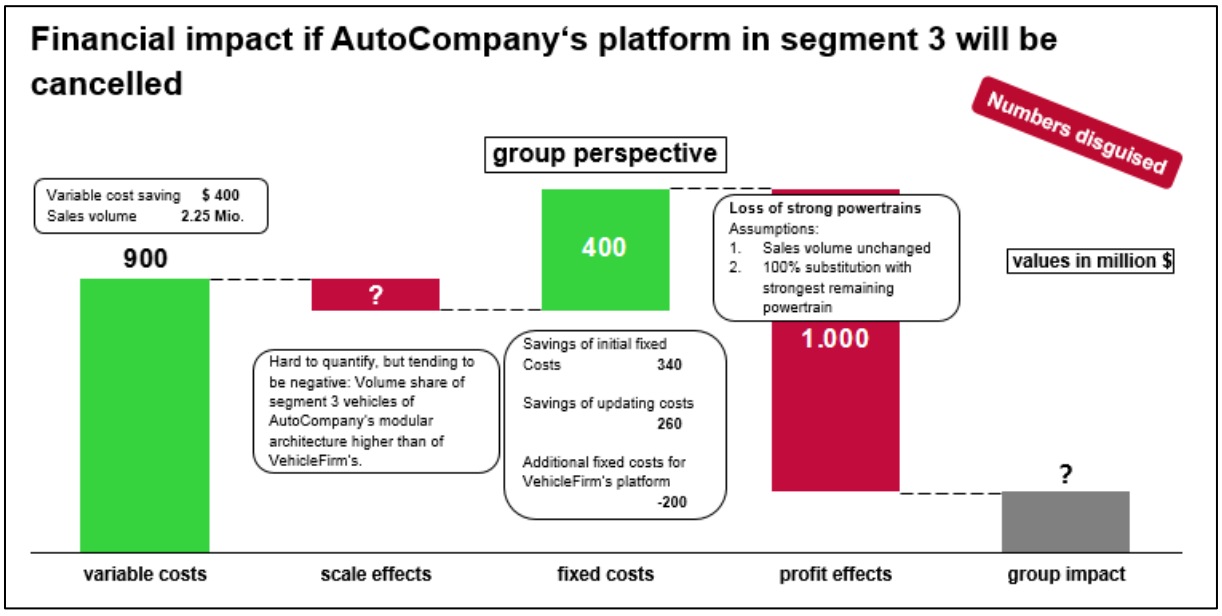

Figure 4. Financial comparison. This closely resembles the figure used in the company, but with modified numbers and disguised details.

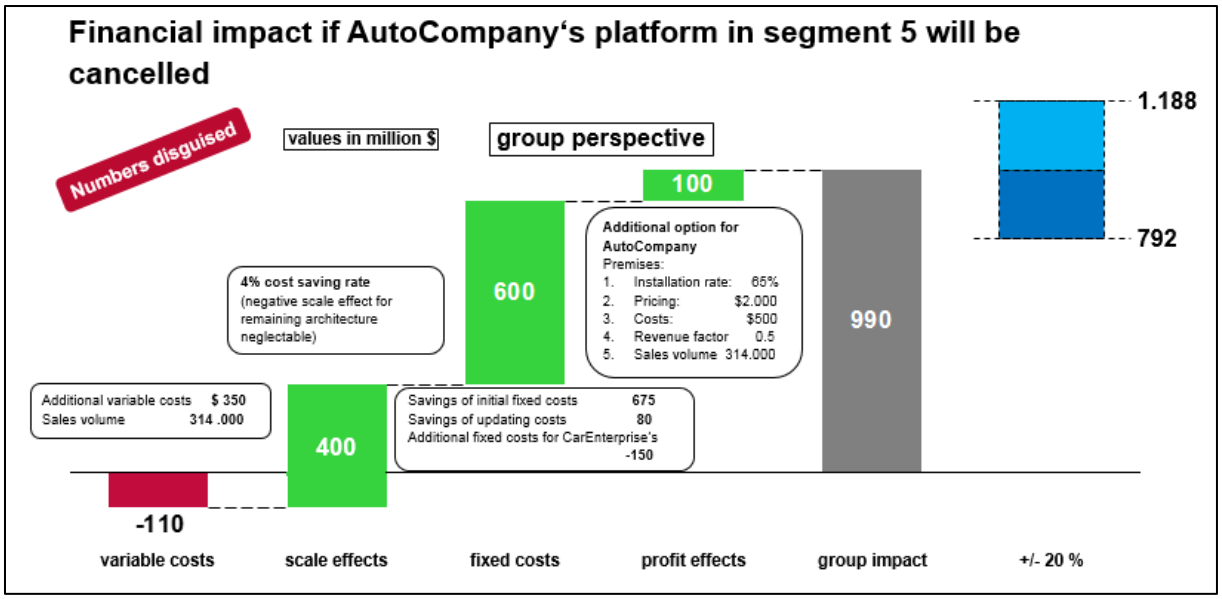

Figure 5. Calculation of financial impact if AutoCompany’s own platform is cancelled

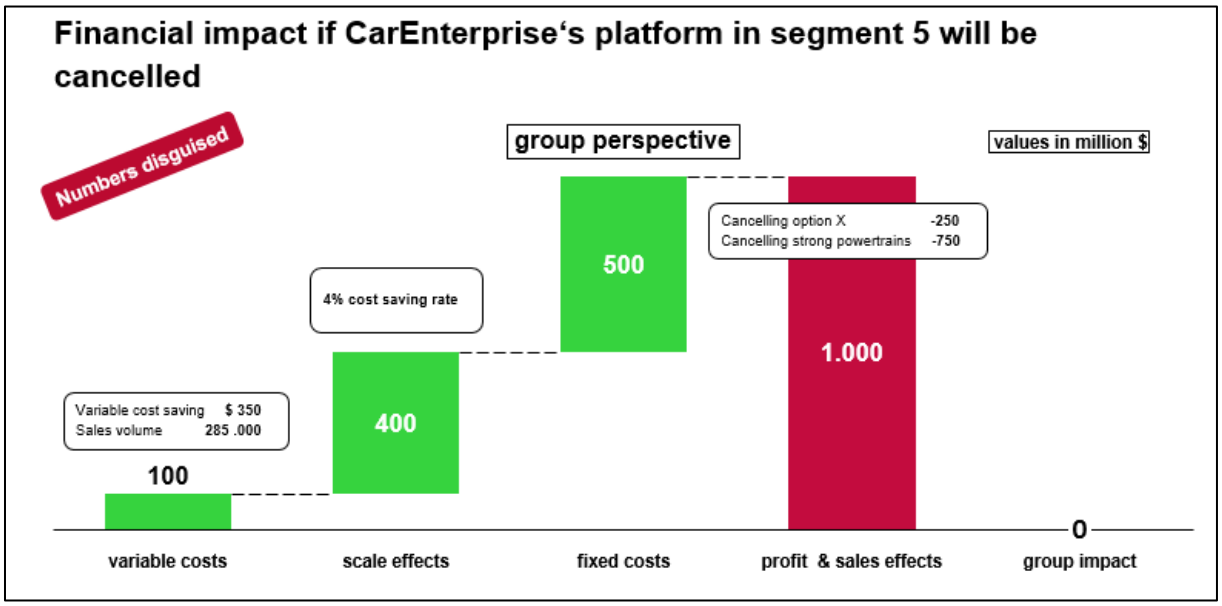

Figure 6. Calculation of financial impact if CarEnterprise’s own platform is cancelled

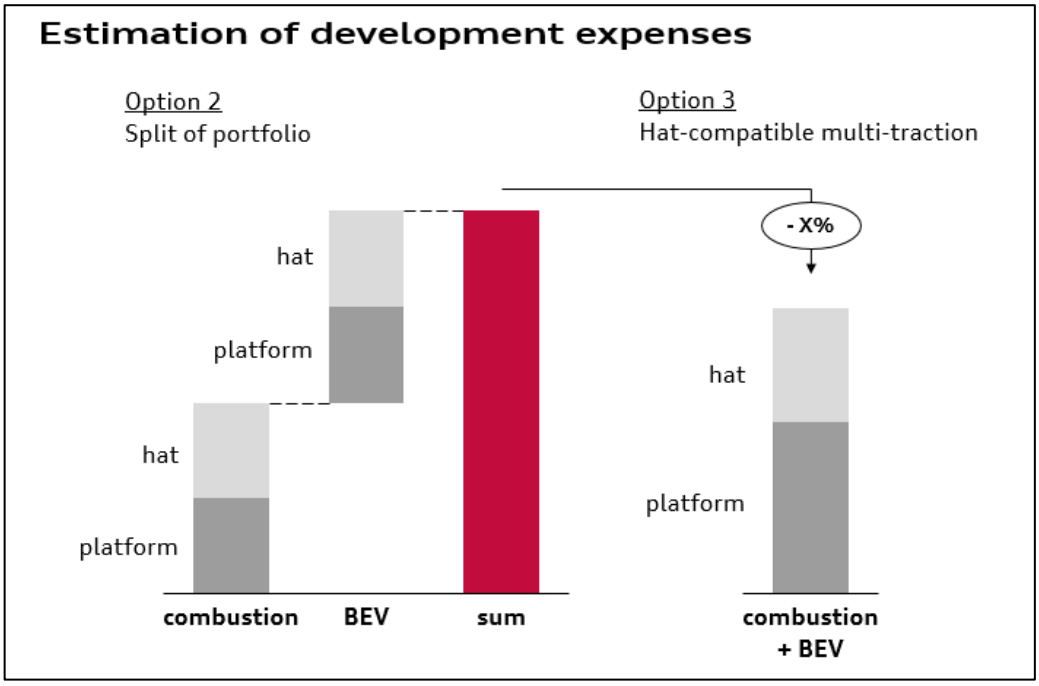

Figure 7. Initial qualitative comparison of investments.

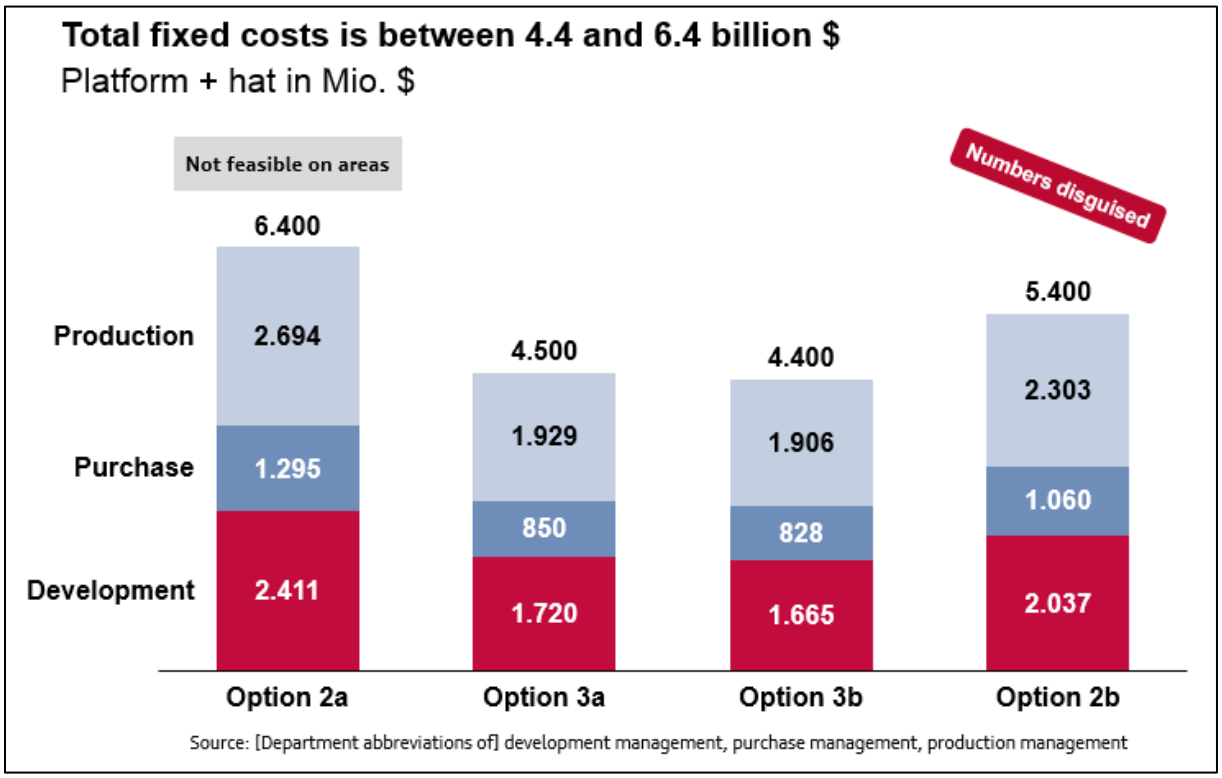

Figure 8. Later estimates of investments. Two variations of the separate architectures are shown (called Option 2a and 2b) as well as two variations of the integrated architecture (Option 3a and 3b)

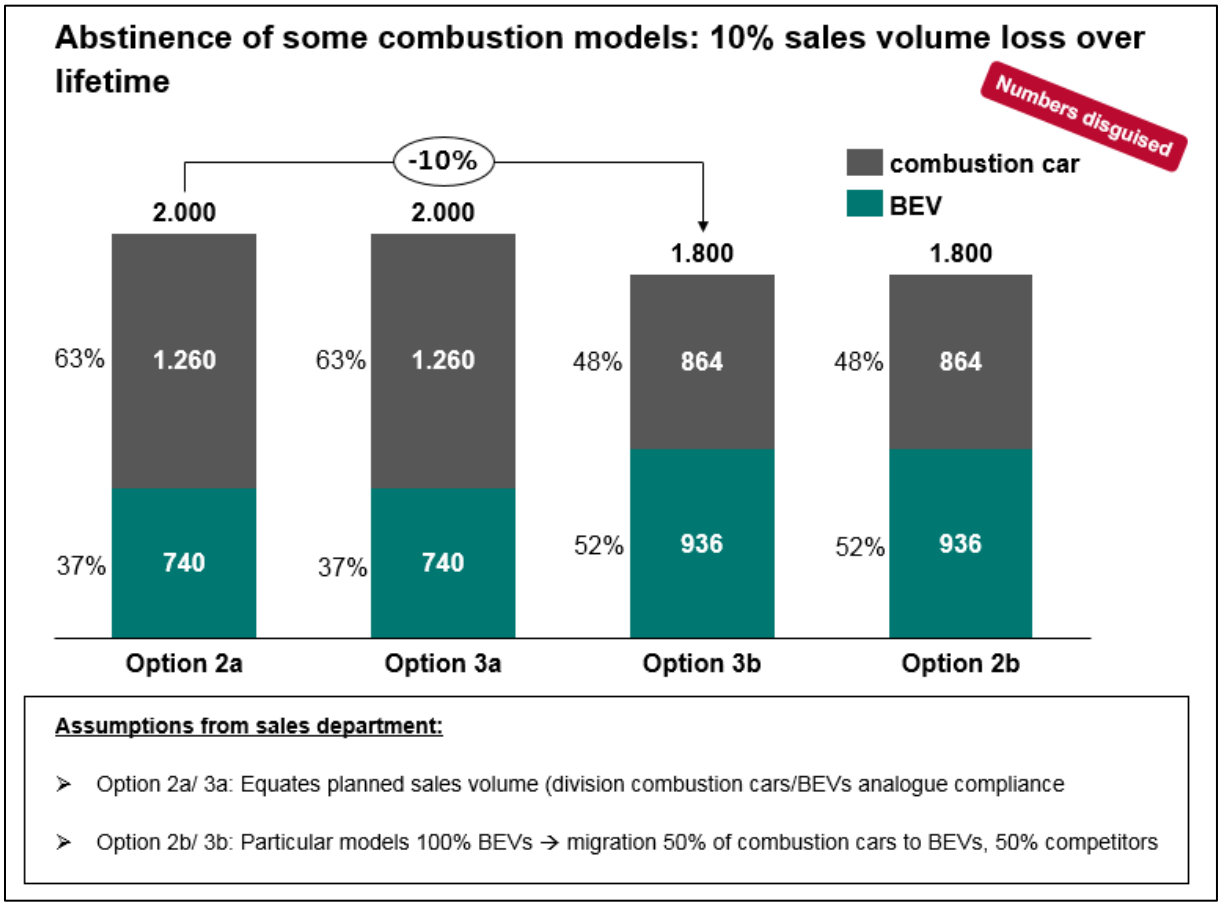

Figure 9. Changing the comparisons of sales volumes

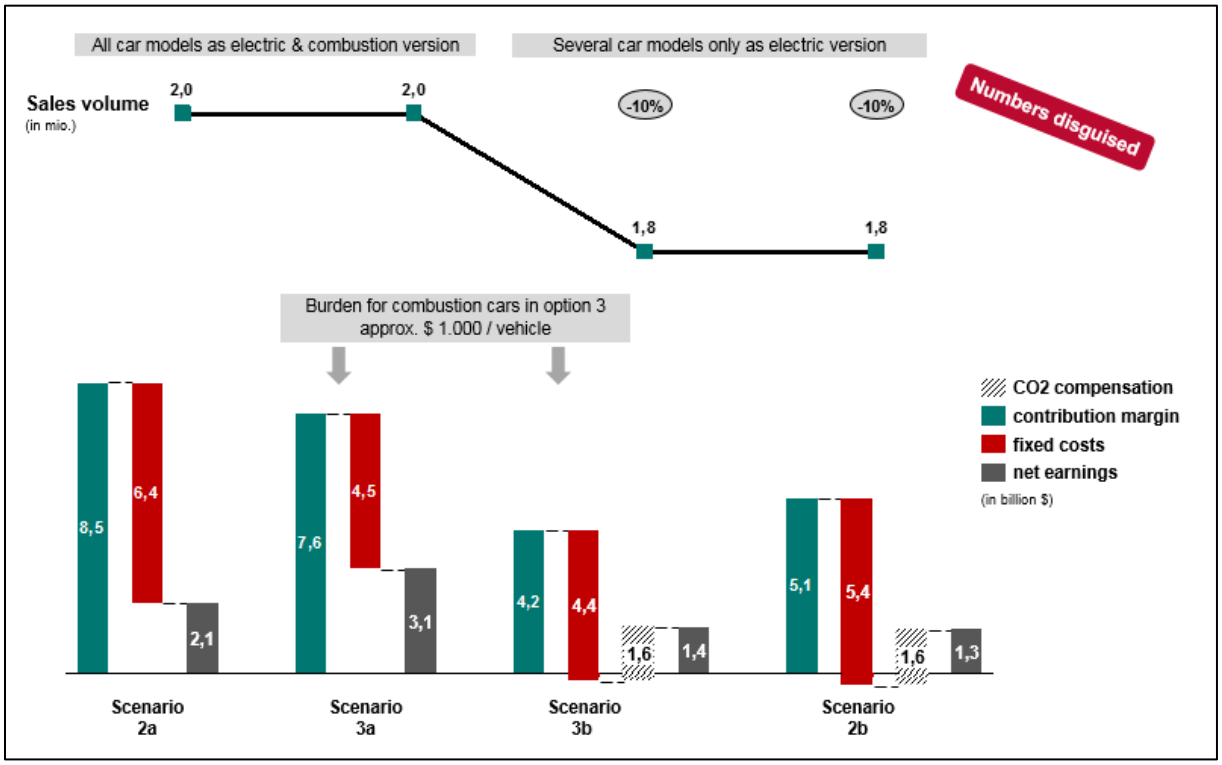

Figure 10. Summary of the calculation of the four scenarios