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# The construction of persuasiveness of self-assessment-based post-completion auditing reports

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In this study, we investigate how persuasiveness of self-assessment-based post-completion auditing (PCA) reports on capital investment is constructed. We examine what makes companies consider that information in these reports rises to an acceptable quality level. The investigation was motivated by extant agency theory (AT) informed literature suggesting that self-auditing will entail obvious risks for the quality of PCA reports in terms of data manipulation. We employed actor-network theory as our method theory. The empirical evidence of our case study came from 24 semi-structured interviews and the analysis of the construction of 22 PCA reports of strategic investments in one of the major European forest companies. We add to the capital budgeting literature by identifying and discussing the role of various conditions affecting the construction of persuasiveness of PCA reports. We maintain that the existence of three conditions (i.e. an appropriate collective process, alignment with relevant external/internal reference points, and following of formal guidance) can play a major role in facilitating the production of a persuasive PCA report. Additionally, the paper is able to make sense of the complex process of fabricating the persuasiveness of PCA reports, which would remain a black box when examined from the AT viewpoint only.

**Keywords:** post-completion auditing; capital investment; capital budgeting; data manipulation; case study; actor-network theory

## 1. Introduction

The post-completion auditing (PCA) of capital investments involves a formal review of a commissioned investment project, focusing on a comparison between the pre-investment estimates and the achievements after completion (Chenhall and Morris 1993, Huikku 2007). It appears that most large companies in Anglo-Saxon countries conduct PCA and many companies in other countries have also adopted that practice.<sup>1</sup> Prior research suggests that one of the major objectives for companies to implement PCA is the enhancement of organisational learning

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(OL) for future capital investments (Neale 1989, 1994, Azzone and Maccarrone 2001, Huikku 2011). PCA information is perceived to have the potential to help a company avoid previous mistakes and to systematically identify successful processes that can be repeated in future investment projects (Shapiro 2005, Northcott and Alkaraan 2007). In addition to contributing to OL, accountability-related issues such as measuring performance of an investment project, and enhancing the integrity of investment appraisals, have also been reported as some of the major objectives of PCA (Neale 1991a,b, 1994, Pierce and Tsay 1992, Huikku 2008). In fact, performance measurement (evaluating the success of a completed investment) can be viewed as the core function of PCA, forming a prerequisite for the other potential uses of PCA reports to emerge (Huikku 2008). From the agency theory (AT) perspective, PCA (and specifically its performance measurement function) can be considered a particular type of monitoring (and feedback) mechanism in principal–agent relationships assuring that agents honour contractual conditions (e.g. Eisenhardt 1989).

Interestingly, the literature tells us that the most common PCA practice in companies is to allow staff to review their own investment projects, that is, to conduct a so-called self-assessment-based PCA (Kennedy and Mills 1993, Morgan and Tang 1993, Segelod 1997, Huikku 2011). Even though PCA is typically not tied to financial rewards (e.g. Huikku 2008), it may still have important non-financial impacts on managers involved in the investment project. Hence, from the AT viewpoint, for instance, it would be plausible to assume that the self-auditors of PCA have both an opportunity and a motive for manipulation and be keen on gameplaying. It could be anticipated that the persons involved in the investment project have an incentive to show that the project has achieved the set targets and that they likely do not release potential negative private information. In line with this, Lumijärvi (1990; case study), Cheng et al. (2009; laboratory experiment study), as well as many contributions in normative literature (e.g. Gulliver 1987, Holmes et al. 1991), suggest that self-assessment-based PCA entails great risks in terms of information manipulation.

In spite of the significant role that PCA conductor choice potentially has for the perceived quality of PCA reports, our knowledge about this important relationship is still in its infancy. While Lumijärvi (1990) has to some extent covered these aspects in his case study, and Cheng et al. (2009) have studied the relationship in a laboratory setting, to date the relationship between PCA conductor and PCA reports has not been a primary focus of any case (or field) study. One plausible reason for the scarcity of research on this question is the difficulty in gaining access to sensitive data potentially revealing embarrassing issues about ‘irrational’ looking behaviour within a company. Moreover, while AT has been the typical broad framework for studies dealing with PCAs and their conductors (e.g. Lumijärvi 1990, Cheng et al. 2009), it is worth noting that, for that method theory (cf. Lukka and Vinnari 2014), self-assessment-based PCA remains a black box. So, how is it that we actually have them and even so widely, given that the obvious gameplaying possibility makes them look quite suspicious from the principal–agent monitoring point of view?

Prior literature suggests that PCA reports play a major role in communicating the results of PCA in an organisation (e.g. Neale and Holmes 1991), and hence in facilitating and supporting PCA’s primary purposes: OL and accountability functions (Kennedy and Mills 1993, Azzone and Maccarrone 2001, Huikku 2011). PCA reports are, however, already commonly conducted much before the end of the life-cycle of an investment, when the final outcome of a project is still unclear (Neale 1994), and their preparation takes place under a condition of various kinds of uncertainties of notable degree. In order to enable comparisons between *ex ante* and *ex post* investment calculations (e.g. net present value (NPV), internal rate of return (IRR), and payback period), PCA reports include not only actual figures (past), but also forecasted figures (future) (Huikku 2008).<sup>2</sup> Similarly, narratives in reports are related to both past and future

issues. Inherently, future-related figures and narratives can be considered as softer, less verifiable information than actual figures (and narratives). As demonstrated by Rowe et al. (2012), it is plausible to suggest that soft accounting information is not necessarily persuasive straight away without hardening. They maintain that the users have to consider information having risen to an acceptable quality level before they agree to accept and use it for their various purposes. Following this reasoning, the PCA reports would need to persuade the readers that they do not contain intentional distortions or unintentional errors before they will be viewed as having become usable. The PCA reports can be considered persuasive when they are stabilised and no more amendments are expected; they are deemed finalised. Nevertheless, before the PCA process becomes closed, potential hardening of soft elements in reports may need to take place, various controversies regarding the draft reports may need to be settled and, accordingly, modifications made.

Based on the potentially controversial setting outlined above, largely overlooked in the prior literature frequently informed by AT, the aim of this study is to shed light on the process of building persuasiveness into self-assessment-based PCA reports. This is (potentially) a setting where subjective PCA conductors construct reports that are heavily based on subjective evaluations and judgements both about the past and future. Consequently, our research question is ‘How is persuasiveness of the self-assessment-based post-completion auditing reports on capital investments constructed?’ In addressing this question, we first outline the scene based on AT, pointing to the black box that it leaves, and thereafter draw primarily on actor-network theory (ANT) (Latour 1986, 1987, 2005), which leads us to accentuate the importance of the collective, dynamic processes in hardening information, that is, in enhancing the persuasiveness of a PCA. The study uses elements of Latour’s thinking to explicate the processes, which accompany the construction of PCA reports and affect their persuasiveness. Drawing on ANT as our method theory (Lukka and Vinnari 2014), we follow the complex process of fabricating the persuasiveness of PCA reports. This is a process, in which numerous elements, both human and non-human, are actively combined in a dynamic interplay, as we will see typically leading to a stabilised outcome. The empirical evidence of this case study is primarily based on 24 interviews in one of the major forest industry corporations in Europe and an examination of its 22 recent PCA reports related to major strategic investment projects.

The paper adds to the capital budgeting literature on PCAs by extending our knowledge about the relationship between the persuasiveness of PCA reports and the PCA conductor. It contributes to the PCA literature by opening up the process through which self-assessment-based PCA drafts can be transformed to become sufficiently persuasive PCA reports, and consequently considered usable. Adding to the more structural view offered by AT, our paper outlines a picture of a collective process of PCA report construction, where the feature of self-assessment receives notable consideration by all actors participating in the process. Hence, our analysis also contributes to our understanding of the limits of AT and specifies how another method theory, in this case ANT, can be used to expand the analysis and open up the black box which would seem unavoidable if the phenomenon of self-assessed PCA were examined only through the theoretical lens of AT. Our findings indicate that three important elements likely function in the process of hardening the PCA draft, facilitating the construction of a stabilised, acceptable PCA report. These are, in particular, an appropriate collective process of constructing the reports, the mobilisation of relatively objectified external and internal reference points for various pieces of information, and sufficient following of the guidance and reporting instructions in this process.

The remainder of this paper is structured as follows. Section 2 presents the relevant domain and method theory literatures that form the basis for this study, and Section 3 describes the research method. The empirical findings are presented in Section 4. The findings are discussed in Section 5 and, finally, the conclusions are presented in Section 6.

## 2. Prior literature on PCA, AT and ANT

### 2.1. PCA report

The results of PCA are primarily communicated with the aid of PCA reports. A PCA report typically includes the following elements (see e.g. Neale and Holmes 1991, Azzone and Maccarrone 2001, Huikku 2001, 2011): (1) description of the investment project, (2) follow-up on the cost budget, scheduling, and technical specifications, to see whether they are progressing according to plan, (3) comparison of *ex ante* and *ex post* investment calculations, (4) comments on the achievement of objectives (actual and future). In addition, companies may include in their PCA reports proposals for action (such as suggestions, helpful hints, and lessons learned), comparison of non-monetary targets and actual outcome, and attachments including other material. Because PCA is typically conducted much before the end of the life-cycle of an investment (e.g. one year after commissioning), PCA calculations include uncertain forecasts about the future cash flows of investments (Neale and Holmes 1991, Huikku 2011). As a consequence, in order to ensure comparability between *ex ante* and *ex post* investment calculations (e.g. NPV, IRR, payback period), it is common that companies reconstruct their calculations in connection with PCA (Huikku 2008). Thus, in addition to taking into account actual figures, new updated forecasts are used for the remaining periods of useful life. PCA reports include both actual figures (past) and forecasted figures (future), and in addition they include textual parts regarding actual and forecasts.

The core procedure in PCA is to compare and analyse the *ex post* outcomes (including forecasted future figures) of an investment project with its *ex ante* objectives (Neale and Holmes 1991). It is common that strategic investments include both financial and non-financial objectives (see e.g. Abdel-Kader and Dugdale 1998, Alkaraan and Northcott 2006, Carr et al. 2010, Frezatti et al. 2013). Financial objectives are monetarily quantifiable and can be included in investment calculations (e.g. NPV, IRR), whereas non-financial aspects can be (non-monetarily) quantifiable or non-quantifiable (Slagmulder et al. 1995, Shank 1996, Abdel-Kader and Dugdale 1998). Non-financial quantifiable aspects may include, for example, enhanced quality of the products, reduced lead times, shortening manufacturing throughput times, and customer satisfaction. Non-financial non-quantifiable objectives can include, for example, benefits related to obtaining greater production flexibility, the ability to expand in the future, improved company image, and enhanced learning. *Ex post* measurability/verifiability of non-quantifiable objectives – expressed in a textual format – can be very demanding, if not impossible. Accordingly, the verifiability/measurability of different types of objectives both *ex ante* and *ex post* and the potential for their inclusion in investment calculations are fundamentally different (e.g. Birnberg et al. 1983).

In addition to the above-mentioned aspects (figures vs. text), temporal aspects (actual vs. future) affect the measurability/verifiability of objectives. The major challenge in compiling PCA reports is suggested to be the making of accurate cash flow estimates for the remaining useful life of an investment project beyond actual (e.g. Huikku 2008). The cash flows of these future periods typically have a great effect on the outcomes of NPV, IRR, and payback period in PCA calculations. In assessing the quality of future-oriented calculations, it can be difficult to distinguish between intentional misrepresentations (lies) and honest misestimates (Lev 2003, p. 32). Nevertheless, Power (1997, p. 87) maintains that in the context of financial accounting, future-oriented calculations can be made auditable if the auditor ensures that uncertainties are fully disclosed, the underlying assumptions are reasonable, and the auditee system for generating the disclosure is appropriate. It is plausible to consider actual figures to be harder than future figures, even though reporting actual figures in PCA can also be challenging and questioned, for example, due to disentanglement of cash flows between different projects.

## 2.2. PCA conductor and AT informed literature

Not surprisingly, the professional competence and objectivity of the person or team conducting the PCA and completing PCA reports have been suggested in normative literature to be heavily associated with the quality of PCA reports (e.g. Dillon and Caldwell 1981, Gulliver 1987; see also e.g. Eilifsen et al. 2010, p. 149 in the internal auditing context). The term objective is understood to mean existing outside of the mind, having a separate or independent existence. In more practical terms, in most contexts objectivity means fairness and impartiality; someone who is objective has not allowed prejudice or self-interest to distort judgement (Porter 1996). According to Merchant and Van der Stede (2012), low objectivity is likely if performance is self-reported. In a similar vein, objectivity and independence of PCA conductors are advocated as cornerstones for an appropriate PCA by CIMA (2005, p. 60) as can be seen in its current definition:

Post-completion auditing is an objective, independent assessment of the success of a capital project in relation to plan. Covers the whole life of the project and provides feedback to managers to aid the implementation and control of future projects.

Empirical evidence reported in prior studies with regard to the PCA conductor can be classified into two groups: (1) studies investigating who conducts PCA in companies, and (2) studies addressing the relationship between self-assessment-based PCA and data manipulation. As for the first question, the literature offers a picture in which typically companies allow the business units to conduct a self-audit (see e.g. Kennedy and Mills 1993, Morgan and Tang 1993, Segelod 1997, Huikku 2011). Segelod (1997), for example, reports that the unit responsible for the investment invariably performed PCA. In line with this, Farragher et al. (1999) found that only in about 25% of the companies was PCA performed by persons or teams with no prior involvement in the project.

To our knowledge, the only field evidence-based study addressing the relationship between PCA conductor and the quality of a PCA is Lumijärvi's (1990) extensive field study. Nevertheless, PCA aspects do not play a major role in his study.<sup>3</sup> Additionally, Cheng et al.'s (2009) experimental laboratory study is the only research with a primary focus on addressing the relationship between PCA conductors and the trustworthiness of PCA reports. Both of these studies draw on AT informed literature.<sup>4</sup> PCA can be regarded as a particular type of monitoring (and feedback) mechanism in a capital budgeting setting assuring that agents (subordinates) honour contractual conditions with principals (superiors) (e.g. Eisenhardt 1989). The existence of information asymmetry between agent and principal is the prerequisite for the potential to opportunistically manipulate information (e.g. Williamson et al. 1975).<sup>5</sup> The basic type of gameplaying in capital budgeting is overstatement (or less often understatement) of forecasted cash flows (see e.g. Bruggen 2011). As suggested by Pruitt and Gitman (1987) and Pohlman et al. (1988), investment project appraisals can include intentional biases upwards, because managers want to gain approval for their proposals (see also Turner and Guilding 2012).<sup>6</sup> Managers' desire to increase the likelihood of receiving the desired investment funds has been pinpointed as the major reason for gameplaying in capital budgeting (Bower 1970, Lumijärvi 1990). According to Bower (1970), managers play against each other to achieve organisational position and power, and build empires. In addition to personal empire-building motives (Jensen 1986, Hope and Thomas 2008), it has been suggested that gameplaying can be related to managers' motives to secure their careers (Narayanan 1985, Hirshleifer and Thakor 1992) and to maximise their compensation (e.g. Dechow and Sloan 1991).

According to Williamson et al. (1975), different tasks involve specific skills and individuals possessing these skills have an advantage over others in the form of job-specific information. They suggest that, as a consequence, individuals are able to manipulate information – they

can select or distort disclosure of information or give promises regarding the future that they might have no intention of fulfilling. Individuals may make attempts to use all (private) information at their disposal to affect results, especially if the results are used in their performance evaluation (see e.g. Hopwood 1976, Jaworski and Young 1992). Additionally, Jaworski and Young (1992) maintain that if the individual believes that his or her peers are increasingly attempting to game the system, he or she is also more likely to engage in gameplaying.<sup>7</sup>

Lumijärvi's (1990) study investigated gameplaying in capital budgeting in a large divisionalised Finnish corporation, and simultaneously covered, to some extent, PCA-related issues. In the company he studied, the persons involved with the investment appraisal (i.e. their *ex ante* proposers) also performed PCA. He found that information asymmetry enabled many types of gameplaying in capital budgeting, and suggested that conducting PCA was the only factor that could decrease information manipulation; especially, when a proposer of an investment project is aware of the coming review (see also Scapens and Sale 1981, Neale 1994). Nevertheless, he also found that when PCA is employed, a new game appeared: manipulation of PCA reports. He further suggests that by using information manipulation, an investing unit can make an attempt to indicate project success, regardless of the project's actual outcome. According to Lumijärvi (1990), covering up an underperforming investment project can be performed by preparing a calculation that shows the capital investment to be in accordance with the investment plan. Moreover, items that would cover gameplaying in the previous phases of capital budgeting process can be omitted from the PCA report (Lumijärvi 1990). In one case the manipulation of PCA reports was uncovered when a profit centre controller later analysed the previously compiled PCA report in more detail. In Lumijärvi's study, it appeared that the primary motivation of manipulation was to keep the likelihood of receiving future funds at as high a level as possible. Based on his findings in a self-assessment-based PCA setting, Lumijärvi (1990, p. 218) suggests that 'In fact, to a great extent an *ex post* report can be manipulated to show anything that is desired' and concludes that post-audits by outsiders reduce the likelihood of manipulation of PCA reports.

Cheng et al.'s (2009) experimental laboratory study focused on the relationship between PCA conductors and the trustworthiness of PCA reports. More specifically, the study investigates the factors that impact manager's willingness to share private information in the PCA phase if they self-audit the projects. These authors suggest that managers with higher personal responsibility for the initial project decision were significantly less willing to share information that is private and unfavourable to the manager. Accordingly, managers place less emphasis on, or even ignore, negative project feedback in their PCA reporting. Further, Cheng et al. (2009) suggest that if PCA is primarily used for accountability purposes (e.g. explicit performance evaluation and rewarding), rather than for OL purposes, managers involved in the investment project were significantly less willing to share unfavourable project information. The authors conclude that there are risks of biased information sharing in PCA if persons responsible for the project perform PCA and if it is conducted for accountability purposes. Hence, consistent with Lumijärvi, they emphasise that the choice of PCA conductor is critical for the trustworthiness of PCA, and question the appropriateness of self-assessment-based PCA.

Following AT reasoning, in PCA contexts self-auditors would be keener on gameplaying in PCA reporting if PCA is explicitly tied to the evaluation/reward systems. According to scholars, in practice only few companies use PCA in formal evaluation/rewarding of managers or consider it beneficial for it (Neale 1994, Smith 1994, Huikku 2008). Nevertheless, even though PCA is not typically tied to financial rewards, it may have important non-financial impacts on managers involved in the investment project. Namely, project reviews can provide useful information for top management to evaluate the competence of managers to plan, implement and/or run investment projects, and hence affect both their individual career prospects and

the potential for the investing unit to gain approval for their future investment appraisals (e.g. Cheng et al. 2009).

Taken together, from the AT viewpoint it would be plausible to assume that the self-auditors of PCA have both an opportunity and a motive for manipulation and be keen on gaming. It could be anticipated that the persons involved in the investment project have an incentive to show that the project has achieved the set targets and that they likely will not release potential negative private information. From the AT viewpoint, these observations make the entire exercise of investing resources into self-assessed PCAs highly suspicious, up to the point that their very emergence – and particularly their notable popularity – in organisations could be viewed as a conundrum. At the very least, how self-assessment-based PCAs earn their persuasiveness remains a black box for AT.

### 2.3. *Latourian approach – collective fact-building in heterogeneous networks*

Accounting literature – often informed by ANT – includes studies that employ concepts closely related to the process of increasing the persuasiveness of accounting information.<sup>8</sup> Following ANT notions (see e.g. Callon 1986, Latour 1987, 1993, 2005), some accounting studies follow the processes of ‘fabrication’ (Preston et al. 1992, Chua 1995), ‘fact-building’ (Chua 1995, Briers and Chua 2001), ‘purifying’ (Power 1996, Christensen and Skaerbaek 2010) and ‘translation’ (Mouritsen et al. 2009).<sup>9</sup> Outside the ANT domain, according to Rowe et al. (2012), soft accounting information is not necessarily persuasive without hardening. They accentuate the importance of comparability of accounting information in other spaces and times to make sense of the quality of data (see also Hopwood 1987, p. 216). In the PCA setting, hardening can potentially raise the nature and felt quality of information to an interpersonally acceptable level so that it is perceived to have become usable. PCA reports would need to persuade the readers that they do not contain intentional distortions or unintentional errors before they will be used. Hence, in this study, a PCA report is anticipated to be persuasive when the PCA process has become closed. Thereafter, amendments are no longer made and the report is deemed final; then it is felt that it can be used for various managerial purposes.

While the notion of hardening of accounting information plays an important role in the paper, it draws primarily on the notions and fundamental ideas of ANT (Latour 1987) to investigate the persuasiveness of PCA reports. According to Latour (1987), ‘facts’ are collectively stabilised from the midst of the controversies, and gradually start to become ‘true’. He describes the fact production process as a ‘translation’ of claims into facts.<sup>10</sup> During the translation, the claims go through ‘trials of strength’ by the dissenters, that is, the resistance of the ties that link the representatives to what they speak for is evaluated (Latour 1987). Rhetoric plays a central role in defending the truth claims against dissenters, but in addition to this, human actors may enrol allies consisting of both human and non-human actors in order to attach additional weight to their claims. Translation can also be characterised as a ‘negotiation’ where actors struggle and debate to construct common definitions and meanings. Ultimately, if the controversies can be settled, users and providers of information may accept a fact as a ‘black box’; something that can be taken-for-granted, that is, accepted without further modifications.

The role of always uncertain future estimates can play a major role in producing PCA reports. Contributions informed by ANT suggest that, in the construction process of facts, particularly the collective feature of the process can enhance the perceived ‘objectiveness’ of future numbers. Accordingly, referring to Latour (1986), Mouritsen (2011) suggests that collectively created and useful representation of financial reports seems to replace the traditional view of truth. Kalthoff (2005) suggests that negotiations are the social place where the interpretation of figures in a calculation can be stabilised, and shared meaning constructed between the



participants. He further emphasises the role of written (draft) documents as a ‘prosthesis’ of the oral in the negotiations. Moreover, outside the ANT domain, but in line with this perspective, Spee and Jarzabkowski (2011) suggest that a strategic plan is an outcome of a recursive process of integrating talk and text within an organisation; the plan becomes more authoritative over the successive, multiple cycles of negotiations and consequent textual amendments. Furthermore, Porter (1996) maintains that trust of numbers is more related to their impersonality than their ability to exactly copy the world. Power (1996, 2003) emphasises the role of auditing in producing collectively validated, generally accepted accounting reports simultaneously acknowledging that the reports are not necessarily either right or wrong.

The aim of this study is to unpack the process of building persuasiveness into self-assessment-based PCA reports; that is, reports based on the procedure entailing great risks of data manipulation, according to existing AT-informed literature. In an attempt to open up the black box that self-assessed PCA poses for AT, we analyse this phenomenon with the help of ANT (Latour 1986, 1987, 1996, 2005). In addressing the research question, ANT leads us to emphasise the importance of the collective, dynamic processes in hardening information, that is, in enhancing the persuasiveness of a PCA. The ANT view suggests that the only way to understand the strength and nature of the facts is to identify the various actors in the network and follow the traces they have left. In the coming pages we report how we followed the actors and traced relations between them to describe how the ‘facts’ of the PCA reports are collectively composed and eventually become accepted as such. In doing so, we specifically follow how the PCA report is gradually transformed from a draft to a final report when it passes various trials of strength (i.e. reviews at mill, business area (BA), and group level) (see Briers and Chua 2001, Revellino and Mouritsen 2009). In this paper, we are not investigating what happens with the final PCA reports after the process has become completed, but we are focusing on the process through which this completion of self-assessment-based PCA reports can happen, including exploring the conditions that need to be fulfilled therein.

### 3. Research method

One plausible reason for the scarcity of research addressing the relationship between the PCA conductor and the quality of the PCA report can be the sensitivity of the issue; it can be difficult to get access to honest data potentially revealing dysfunctional behaviour within a company (e.g. Hopwood 1972, Otley 1978, Merchant 1990<sup>11</sup>). Consequently, limited prior knowledge and the sensitivity of the research topic encourage adopting a deep-probing case study method, also enabling explorative approaches, rather than a survey method, for example (Vaivio 2008). The results do not attempt to offer statistical or constructive generalisation, but potentially can be generalised to similar contexts in the spirit of contextual generalisation (Lukka and Kasanen 1995, Modell 2005, Ahrens and Chapman 2006).

The ‘European forest corporation’ (Eufoco; the real name is disguised) is the empirical object of this study; the organisation was suitable and willing to participate in the study. It has about two decades of comprehensive experience in conducting self-assessment-based PCA. Globally, it is one of the major players in its industry, which is characterised by a high degree of capital-intensity; in recent years Eufoco’s annual capital expenditure budget has typically been several hundred million euros, and in some years over a billion. It has production facilities in many continents. The typical major investments are projects to expand production facilities (mills and production lines). From the organisational perspective, the Eufoco group has been divisionalised into several BAs, which manage their respective operational units (mills). The division of its businesses (i.e. BAs) has been developed according to the product portfolio. Large size, diversification of product lines and internationalisation are believed to increase the degree of

asymmetric information (see e.g. Gordon and Smith 1992); the prerequisite for gaming behaviour in capital budgeting. In order to acquire access to sensitive information, the research was linked to a commitment to provide feedback and recommendations to the management at the end of the data gathering phase. This link also appeared to commit and encourage the company to provide the very intimate information required.<sup>12</sup>

Theme interviews with knowledgeable persons at the different levels (group, BA, and mill) and an examination of the most recent PCA reports related to major strategic investments were the primary data sources. Altogether, 24 semi-structured interviews were conducted in 2010, amounting to 38 hours of recorded and transcribed material. All interviews were carried out face-to-face, except one, which was a telephone interview. The interviewees consisted of 22 different persons (hereafter H1–H22). At the group level, eight persons were interviewed: Senior Vice President (SVP) and manager of investments and capex, the CFO, director of group business controlling, SVP of group strategy, SVP of internal auditing, Manager of purchasing and investments, and Executive Vice President of group technology and strategy. At the BA level, eight interviews took place. They covered all the executives responsible for the investment activities in their respective BAs and other persons closely related to capital investment and PCA. At the mill level, six persons including two mill managers were interviewed. We were also provided with all the PCA material regarding the last 22 major strategic investments reviewed in the corporation.

In order to enhance the validity and reliability of the study, triangulation was mainly conducted through synchronic and diachronic primary data source triangulation (Pauwels and Matthyssens 2004) by interviewing two key persons at the group level more than once, and different persons on the same topics many times. Additionally, PCA reports provided an excellent base for triangulation purposes. Moreover, we used the capital investment manual, investor presentations, interim/annual reports, newspaper and magazine articles, and informal corridor and lunch discussions as secondary data sources.

After each interview, and without delay, the material was transcribed. Thereafter, the transcribed material, relevant PCA reports, and other material (e.g. capital investment and PCA instructions) were preliminarily analysed to obtain feedback for further upcoming interviews and deeper analysis. Accordingly, during the interview process the material was continuously read and re-read, findings contrasted to prior theory and theories relevant for this study. The theme interview structure was not totally closed at the beginning (see Appendix 1). It slightly evolved during the interview process as our understanding about the phenomenon increased, enabling us to focus more on the interesting topics that were raised (Atkinson and Shaffir 1998).

The analysis phase of the study was conducted, to some extent, in the abductive mode. Hence, the empirical findings were not only integrated together in the inductive mode, but they were also reflected against our prior knowledge on capital budgeting (see e.g. Dubois and Gadde 2002, Lukka and Modell 2010). Finally, after the whole interview process had been conducted, coding and analysing of data continued mainly based on the thematic approach. ANT was employed as our main method theory (Lukka and Vinnari 2014), even though the potential and eventually the limitations of AT were also examined.

As our ANT-based analysis was able to describe and analyse the specific ways in which a self-assessment-based PCA could become persuasive, it also was able to identify how the causally relevant conditions for the persuasiveness emerged. This meant the employment of some of the typical ideas/resources of causal analysis: thought experiments based on counterfactual conditionals (supported by empirics), contrastive thinking (giving focus to our analysis) as well as looking for the necessary conditions for persuasiveness to happen (cf. Lukka 2014).

## 4. Findings

### 4.1. PCA in Eufoco

In Eufoco, investments are divided into three categories according to their size: major (over €15 million), medium-sized (€5–15 million), and minor investments (under €5 million). In practice, major and medium-sized investments are called strategic investments and typically include projects related to expansion of production capacity or manufacturing new products. Minor investments consist of development and replacement investments. Strategic investments are funded from the group investment fund, whereas minor investments are funded from a BA's annual investment allocation (budget). The appraisals for the major capital investments are approved by the CEO and the Board of directors. The Board of directors requires that all the major investments have to meet financial targets for NPV, IRR, and payback period in order to receive approval. Investment planning and control is coordinated by the Group investment function consisting of two executives. In addition, the investment working group (IWG) plays a central role at the group level in evaluating and developing feasibility studies and investment appraisals, and reviewing PCA reports. The IWG consists of about 10 members representing BAs and group functions. In Eufoco, the investing units (mills) conduct their own PCA, present first the draft reports to BA staff, and then the final reports at the IWG meeting. Following Latour's (1987) terminology, the mills can be viewed to act as 'centres of calculation', that is, locations at which information is accumulated about other places, processes, entities, and activities that are distant (cf. Miller 1990).

According to Eufoco's written PCA instructions, all major capital investment projects are submitted for PCA. Additionally, PCA instructions define the objectives of PCA, its timing, the content of a PCA report, and the presentation forum of PCA reports. Enhancement of OL and accountability-related aspects (evaluation of the success of an investment project) are the primary objectives of PCA stated in Eufoco's PCA instructions. These two objectives for PCA were also constantly and simultaneously mentioned by the interviewees, even though some of them placed more emphasis on OL and some others more on accountability, as can be seen in the following quotes:

The current PCA process primarily gathers learning experiences about successes and failures. Its target is that those involved in the project learn for the next investment project and that this learning would also be disseminated to other mills. The controlling [accountability] function is not emphasised as such. (H1; group-level interviewee)

I think that the primary function of PCA is to make the teams who propose the investments responsible for their promises. You cannot promise whatever you want when you know that PCA will however take place later and you will be asked to report the success of the investment. (H8; BA)

There was a tendency that interviewees at the higher organisational level (group) considered enhancement of OL to be more important than did the mill personnel. This is understandable, because an individual mill does not frequently make major investments, and accordingly the potential for them to use prior lessons learned at that particular mill is limited. Formal personnel evaluation was not considered to be an explicit objective for or perceived benefit of PCA, and the incentive systems are not linked to PCA. However, some interviewees perceived that PCA is moderately used for informal personnel evaluation, as H12 (BA) explained:

Yes, we evaluate informally how chaps have managed the projects and it has an impact on the selection of project personnel for future projects.

Hence, in addition to accountability potentially affecting manager's future career and prestige, outcomes of evaluations can be used for learning about the capabilities of personnel.

In accordance with the PCA guidelines, a PCA is conducted roughly one year after the investment project has been completed; when it has reached a relatively settled state. The location of responsibility for the PCA system is centralised to the Group investment function, which has ownership of PCA activities and is in charge of tasks such as the development of the PCA system and its general functioning (e.g. providing policies, giving instructions, ensuring that mills/BAs adhere to them, and checking the reports before IWG presentation).

Typically, a PCA report in Eufoco consists of about 30 pages in PowerPoint format. Eufoco has instructions regarding how to compile it. According to the instructions, the report consists of the following main themes: (1) Executive summary, (2) Description of the scope of the investment project, (3) Review of the investment outlay and profitability, (4) Description of key operational impacts, (5) Evaluation of key profitability drivers, (6) Lessons learned, and (7) Site or division specific issues. Dissemination of PCA reports is relatively brief, covering people involved in the project and the IWG members. The company does not have a centralised database or archive for PCA reports, but some BAs have an investment-related site in their intranet, where PCA material is filed. In these BAs, one or two people from every mill have access to this material. In addition, annually, a one or two page summary of the PCA reports is presented and discussed at the Group board of managers' meeting. In this forum, the focus is clearly on accountability. The summary reports and compares the final results of *ex ante* and *ex post* investment calculations (NPV, IRR, and payback period) per project. The PCA reports, as such, are not communicated to the Board of managers and, for that matter, neither to the Board of directors.

The investing units (mills) prepare the PCA reports (including drafts and final versions) themselves; that is, they conduct self-auditing. It appears that there has never been explicit discussion and decision-making about the choice of a PCA conductor. The overriding reason for self-assessment-based PCA seems to be related to competence. Typically, the interviewees in this study advocated the self-assessment approach by emphasising the self-auditor's intimate knowledge and understanding of the project, as H2 (group) explained:

I would say that the project manager and his team have by far the best conception of what has been done and how one has succeeded in it.

Nevertheless, even though the managers at Eufoco were sufficiently satisfied with the persuasiveness of the produced PCAs and no fundamental changes for the process of preparing PCAs were planned, they frequently noted challenges of their PCA process. The variation of the PCA reports' quality appear to be wide in Eufoco, for example, as commented by H2 (group):

Again this year we have had about ten post-audits. One of them was, I would say, world-class, even though the project as such was a failure. Then we have had mediocre reports and one weak report. We can easily see that the scale, how the quality varies, is too broad.

H11 (group) continued in a similar vein:

I think that nowadays we take PCA much more seriously than earlier. The quality of [PCA] reports has improved. Nevertheless, they are not at a level where I would like them to be. Specifically, when the project has not achieved its targets we sometimes receive weird reports.

The latter quote also partly indicates the existing general-level scepticism related to self-auditing. This was also confirmed by many other interviewees such as H13 (group):

The degree of objectivity diminishes when you start to approach those parties that have been more involved with the investment project. It is a kind of baby of your own. You start to rationalise its excellence and fit to the strategy. The objectivity will vanish. It is inevitable.

Eufoco has an internal auditing function that could potentially conduct PCA. Nevertheless, as explained below, using ‘a commando group’ from internal auditing was perceived to have its disadvantages.

I do not think that a ‘commando’ type of group would be a good solution [for conducting PCA]. It could considerably diminish the motivation of mills towards the PCA process, because ‘commando’ would be regarded as a form of punishment or police. It would be a fringe in controlling. We would lose a lot of learning potential [i.e. use of prior lessons learned] within the units. (H1, group)

In addition to lack of project-specific knowledge of internal auditors and threat to motivation of mill staff, an internal auditing staff member highlighted threat to segregation of duties. He was concerned that it would be harmful if they themselves both conducted PCA and simultaneously audited the investment process in its entirety:

Internal auditing is expected to evaluate the functioning of internal processes in the corporation, such as the whole capital investment process. If we conducted PCA, we would in fact audit our own work. This should not be possible. (H13, group)

To sum up, even though managers acknowledge the inherent ‘independence and objectivity’ challenges related to self-auditing and there appear to be ‘better and worse’ reports, they used PCA reports for the intended purposes, which testifies to their sufficient persuasiveness. Ultimately their final outcome – comparisons between *ex ante* and *ex post* profitability calculations – seems to be presented at the Group board of managers meeting as ‘facts’ and these ‘facts’ may influence future resource allocation decisions within the corporation. In the next section, we will follow various human and non-human actors participating in constructing PCA reports in Eufoco, and try to understand how the reports are drafted and contested and how they gradually tend to gain their persuasiveness in collective processes.

## 4.2. *Trials of strength*

In this section, we focus on consecutive major forums where trials of strength (i.e. PCA draft reviews) to make PCA reports persuasive occur (at mill, BA, and group level). We follow the various actors in the networks, and illustrate how analysing, comparing, and debating the reports can gradually affect the persuasiveness of PCA drafts.

### 4.2.1. *Mill level: constructing the draft report*

Here we will first review the process through which a PCA report is constructed in Eufoco. Then, the generation and reporting of actual and future data will be presented, and a brief synthesis of the associations between different actors influencing the PCA report construction is provided.

4.2.1.1. *Policies and process of constructing a PCA report.* The instructions for PCA report format in Eufoco require certain themes to be covered in all PCAs (see Section 4.1). The PCA reports include both actual figures (past) and forecasted figures (future), and also textual parts regarding actual and forecasts; the PCA calculations do not only include historical (actual)

data but also uncertain future estimates. H10 (BA) describes the main aspects in constructing the calculations in a PCA report (see an example of Eufoco's PCA calculation in Appendix 2):

Then you reconstruct the profitability calculation. You first take actual figures, for example 1.5 years, then you estimate the coming periods and calculate.

In investment profitability calculations, the same capital budgeting techniques (payback period, NPV, and IRR), WACC, calculation principles and investment calculations software have to be used both *ex ante* and *ex post*, as H4 (mill) explained:

Then we use the same calculation template and principles as at the appraisal phase. So, it is comparable in that sense.

All these calculation related pre-defined procedures and principles are intended to increase comparability of *ex ante* and *ex post* results, minimise discussion related to them, and enhance the persuasiveness of the calculations.

In Eufoco the investing units (mills) are in charge of preparing the PCA drafts themselves. Within the mill, the project manager has a significant role in writing the narratives and compiling the PCA draft. S/he has typically an in-depth and comprehensive knowledge of the progress of an investment. Additionally, the mill controller is responsible for providing figures for the PCA calculations and presentation, and finding explanations for potential gaps. Controllers in Eufoco do not only report to mill managers but also in the matrix organisation to their functional superiors outside the investing unit.<sup>13</sup> They were considered to be neutral and objective resources enhancing the persuasiveness of PCA reports. H21 (mill manager) commented on their PCA calculations:

I rely totally on what our controller is calculating. I am sure that she is doing that in a very right way. Completely objectively.

Additionally, mill sales managers have an important role in determining what sales figures will be used for the future periods in *ex post* calculations. Many different persons provide information for the report, as stated by H13 (group):

We have a segregation of duties and this means in practice that there are several parties in generating the needed information.

Nevertheless, the ultimate responsibility for the project at the mill lies with the mill manager, as described by H12 (BA):

It is in fact more or less the project manager and the controller who compile the PCA [draft] report. However, the mill manager is responsible for the project and he has to present it [at the IWG meeting]. Hence, he has to know the project. Otherwise he will be caught out in no time.

Accordingly, although project managers are typically in charge of narratives and compiling the PCA draft consisting of different elements, it is an outcome of distributed, collective group work, as commented by the project manager (mill 1):

In fact one person compiles and finalises the [draft] report, in this case me, but it does not mean that it would be only my text there. We sit several times in a meeting room together with other members and review the different versions of drafts and make revisions. It is a result of teamwork.

Hence, the PCA draft production phase in fact already includes the first trial of strength. Internally at the mill, consensus is sought as long as everybody can feel comfortable with ‘the final draft’.

4.2.1.2. *Actual performance of an investment project in a PCA report.* Identifying and reporting actual performance of an investment *ex post* was not considered to be problematic in Eufoco. Controllers use existing accounting systems to find figures in the company’s accounting database; the same principles for defining the cash flows of an investment project are used *ex ante* and *ex post*. Hence, potential disentanglement problems of project cash flows are already agreed upon *ex ante*, at the planning phase.

PCA does not have, however, exclusivity in providing an impression of the actual success of an investment. In Eufoco’s strategic investments, the central and critical objective is sales. Total sales and factors influencing it – sales volumes and prices per units – are allocated to an investment and they are carefully followed up on a monthly basis. With regard to Eufoco’s strategic capital investments in machines, production lines, and mills, certain production volumes are used as core targets, which are typically derived from sales targets. In addition to production-volume-based targets, the investments include other targets for production, such as yield, productivity, and cost per unit. Targets for these key production figures (including production volumes) play a central role in investment calculations, and are followed up on a daily or weekly basis. Furthermore, a mill constitutes a profit centre that reports income statements, balance sheets, cash flows, and non-financial figures on a monthly basis to BA. The major investments tend to have a major impact on the performance of the mill, and hence, at least to some extent, the success of an investment can be seen in a report.

Furthermore, the success of an investment is heavily related to the control phase already taking place before commissioning, namely monitoring of investments during implementation. During the implementation phase, a project manager (and team) and a project steering group intimately and frequently follow up on the cost budget, scheduling, and technical specifications, to see that they are progressing according to plan. Hence, monitoring during the implementation phase is an essential part and a prerequisite for being able to conduct PCA.

BA and Group IWG members typically participate in the steering groups of major investments, and consequently continuously receive feedback about their progress. H2 (group) emphasised that control taking place in steering groups is a cornerstone for later PCA.

Steering groups continuously follow the project. How it proceeds and whether the plans are followed or not. And all the changes in scope have to be approved by the steering group. The project is followed in real time and the PCA report is in fact the final outcome in this process.

Additionally, a steering group can be considered to be a major tool in ensuring that PCA conductors will not later in their report be able to misrepresent the success of a project, as explained by H12 (BA):

We have in all major investment projects a steering group. It knows what has happened. Hence, if you want to forget something, you already have to withhold information from the steering group. Ok, you do not have to tell everything at the steering group meetings. But you can hide only minor issues. It is not information that would affect calculations or turn an unsuccessful project to a successful one.

Hence, the persuasiveness of actual figures in a PCA report tends to be high. They are closely linked to the accounting database of the company, and the management is able to verify these with a little effort. Additionally, the PCA reports have to be consistent with the business stories already presented earlier at the steering group meetings.

4.2.1.3. *Forecasts for future periods.* Generating figures for the future periods in PCA reports is inherently very demanding. Namely, in this industry, selling and raw material prices and exchange rates affecting them tend to be highly volatile. Nevertheless, for PCA purposes Eufoco uses future estimates that are primarily derived from the strategic plans of mills and BAs, and thus are not merely calculated for these purposes ad hoc. Accordingly, debates and controversies related to these figures have already taken place and been settled in another space and time and the figures can be taken almost for granted.

The future years are derived from the strategic figures of the mill. (H5, mill)

We have a process to update twice a year the main premises for the coming five years. Business areas are responsible for this. It is an estimate about selling prices, costs for raw material and energy. After five years we have to use the so-called fixed trend prices. We have to use these figures for the investment appraisal and PCA purposes. (H8, BA)

It appears that bodies of expertise located outside the company, such as economists in forecasting institutions and industrial consultants, have a central influence on determining core components in Eufoco's plans and strategies. These include, for example, general economic outlook, outlook for the industry, total demand forecasts for specific products, estimates for selling prices, and raw material prices and energy costs.

Nevertheless, the future figures are still uncertain estimates that cannot be verified. As a consequence, comparing actual figures with *ex ante* objectives for that particular period was commonly considered to be more important than the future figures; the former were considered to be harder than the latter. Even though mills were asked to provide recalculated NPV, IRR, and payback period in their PCA reports, the focus in reviewing the figures at mill, BA and IWG level was on actual figures (both financial and non-financial), as H7 (group) described:

The role of investment profitability calculations is rather . . . rather low. And I am actually quite ok with that. What is usually focused on, and is more important for people, are the short-term issues. So, if you promise cost decrease of x MEUR per year, then you certainly want to see two years later what is your cost decrease on an annual basis right now. But the NPV number with the 20 years' calculation has less relevance in those kinds of cases. Or have you promised to reduce your personnel by 30 people, then we would absolutely like to see what the reduction has been and so on. So those are short-term things. I think that they are as important in the PCA as NPV and IRR, because it is just a new projection two years later. Of course you have some more facts but you have, anyway, a lot of uncertainties about the future.

H17 (BA) continued, in a similar vein:

Actually I don't care so much about these profitability indicators in the PCA report, because, well, we conduct these PCAs usually one year after start-up. So, if we then compare for example NPV, IRR or payback, it is still only one year which is an actual number and then other, I don't know, 10 years or something, which is still estimated. So it is still quite much guessing I would say. What I actually think is important to see are these [actual] operational figures: have speed targets [e.g. for a paper machine] been achieved, is production progressing according to plan, are the savings promised there, and so on. Hence, we focus on comparing the actual figures with the promised ones. Everything that contains future estimations is then . . . [only] a kind of 'must' that has to be done.

However, at the final review level, that is, the Group board of managers meeting where the summaries of PCA reports are annually reported, the role of reconstructed profitability calculations seems to become more important than following-up the actual figures. There, the success of an



investment project is ultimately presented by comparing reconstructed NPVs, IRRs, and payback periods with the planned ones. Moreover, interestingly, in the summary reports, figures consisting of both actual and estimates are called just actual, and compared with planned figures. Consequently, in this forum actual and forecasted, uncertain figures are at least presented and perhaps also considered as equally hard.

Taken together, the process of constructing a PCA draft is, at the mill level, already a distributed activity. Even though the project manager is in charge of compiling the reports and writing the narratives, many other actors (controllers, sales directors, and mill managers) also provide information for it and are involved with shaping the final mill level (draft) report. This phase can be considered to be the first trial of strength; the team at the mill checks different versions of the report, modifies the report, and finally finds consensus about their shared ‘truth’. The report has to be consistent with the stories presented in a different space and at an earlier time: budget presentations, strategic plan presentations, steering group meetings, informal discussions with BA and group staff, and monthly mill reporting. Additionally, non-human actors such as strategic plans, reporting templates, instructions, and calculation models heavily guide the process of producing a PCA report. Specifically, future data – the softest element in the report – seem to be hardened by linking them to strategies already negotiated within the company and trend prices given initially by external bodies of expertise outside the company. Hence, to a great extent, future data appear to be black-boxed. Moreover, it appears that focusing on pieces of more measurable/verifiable information (actual figures) in PCA instead of the whole *ex post* investment calculation, including uncertain forecasted figures, can enhance the perceived persuasiveness of the reports. Nevertheless, in Eufoco *ex post* investment calculations (including future estimates) play a major role at the Group board of managers meeting (i.e. the final review level) when the success of a project is communicated.

#### 4.2.2. BA-level reviews: challenging the draft report

In Eufoco the draft PCA report has to go through many trials of strength and the self-auditors have to persuade many actors before it can be deemed ‘final’. In particular, self-auditors have to persuade persons at the BA, the Group investment function and the Group IWG. Simultaneously, it appears to be of utmost importance that the self-auditors all the time take into account that the story must be in line with the messages conveyed in a different space and at an earlier time (e.g. in steering group meetings).

Simply letting the mill conduct the PCA without control and then distribute the final PCA reports directly to the group would have been considered a major threat to their quality, as commented by H22 (group).

If you let the project team at the mill conduct the PCA merely by itself, it will be their self-portrait. And this self-portrait can be distorted. It will focus only on something [i.e. on positive aspects]. That’s why you need an external person to see the wholeness.

H17 (BA) added in line with this:

The quality of the PCA reports would be much lower if the reports were not discussed but delivered directly from the mill to the group. Some of the issues [e.g. inconsistency with budget and strategy] will be noticed only when they are discussed in a group.

The scepticism about the intrinsic objectivity of mills to conduct PCAs without BA’s guidance is specifically related to the underperforming projects, as explained by H8 (BA):

With regard to underperforming projects, we have some examples that the neutrality of the mill has come to an end. Hence, the BA has to bring it [to the PCA report].

Hence, the mills are not permitted to deliver their PCA reports directly to the group. The BAs want to ensure the appropriateness of the draft PCA reports by reviewing and challenging them within the BA. In practice, BA's investment task group, management group, or at least the persons responsible for investment activities within the BA review the draft PCA reports. BA Investment task group is a forum within a BA for coordination and evaluation of investments. H12 (BA) explains the presentation of draft PCA report at the BA Investment task group meeting:

Mills present their draft PCA reports at BA Investment task group meeting before they will be delivered to the group. They are presented by the mill manager. They get comments that this and that is still missing. Then the organization [mill] will finalise the report.

H16 (BA) added:

It is in our basic processes that we never deliver a PCA report directly from the mill to the group. That cannot happen. In a way, what is said about the investments has been discussed and treated by the BA.

Additionally, in one BA the director at BA investment staff checked all the PCA reports before they were delivered to the group as H8 (BA) explained:

All these [draft PCA] reports go through him. His duty is to check that calculations and everything has been done according to the instructions. He is a kind of filter who comments on the reports and asks mills to supplement if something is missing. If there are more challenging issues, we discuss them together [among other BA Investment task group members].

The director commented further on the PCA drafts delivered from the mill to the BA, pointing to the great variability of their quality:

Basically all kinds of things are missing every now and then. We have a guideline on how to conduct a PCA and accordingly, what we request should also be included. Basically, there could be anything missing, most recently the lessons learned part has been missing, but it can be that they do not even compare the figures that they have achieved to the promised figures in the investment card [investment proposal]. They may just show what is the actual performance or something like that.

Based on the BA reviews, the mills were asked to complement and revise their draft report, as described by the mill manager:

BA staff give us all kinds of comments about the report. They ask us to complete material, to specify things; they ask why we have done it like this here and presented that there in a way that it is not possible to understand, for example. Then afterwards we modify the report at the mill and send it to the group.

Even though figures approved for budgets/strategies seem to guide considerably the setting of future data, sometimes the link between these and the PCA report material can be ambiguous or even non-existent. This is more typical with regard to smaller strategic investments. In these cases, PCA conductors have to use estimates of their own and this may diminish the persuasiveness of reports, as H16 (BA) explains:

When you receive a PCA report you will see that the first two years have not been good [actual figures] but after that everything will change and you will get more than was originally promised. It is systematically like this. The start-up has been slow but then it will come. These are the first things we [BA staff] ask the mills to correct.

Accordingly, the BAs seem to have a major role in ensuring that the PCA reports have been compiled according to the instructions and, specifically, that data or comments are not missing or over-optimistic.

In addition to aspects related to objectivity, the perceived quality of PCA reports can suffer from self-auditors' inadequate competence to conduct PCA, as explained by H16 (BA):

The first version that we received from the investing unit was immediately thrown back. They did it in a prettified manner and tried to find all possible positive arguments to make it look fine and beautiful. They had clearly not understood how to conduct PCA; which figures to include and how to review it. And now the next version is already much more realistic, clearer and better. It is a kind of iteration process and a mill manager does it maybe once in a lifetime, if we think about the major investments.

H12 (BA) continued on the competence challenge in smaller mills:

The sizes of our mills vary tremendously. The big mills have conducted a lot of PCAs and they have human resources, whereas in a small mill one guy may wear three hats [have three positions]. Accordingly, it is natural that we have to support them more [from BA].

Hence, in these small mills, which seldom make large investments, the poor quality of draft PCA reports can be more related to incompetence of conducting PCA than to intentional misrepresentation.

To sum up, a BA review of draft PCA reports is not just a ritual. It is a phase when the draft reports are seriously challenged and thereafter often modified, and as an outcome, the persuasiveness of reports may be greatly enhanced. As illustrated above, often the first versions of PCA reports submitted to the BA were considered inadequate. The BA wants to ensure that the perceived quality of reports is sufficient. At this level, efforts are made to minimise unintentional errors and (potentially intentional) misrepresentations. Specifically, consistency between internal and external reference points for pieces of information is checked; are the figures and stories in line with the budgets and strategy, steering group and other discussions, and historical performance. In fact, ensuring consistency with the reference points can be considered a major condition that a draft PCA report has to meet before it can get stabilised (Latour 1987). In a similar vein, relating to a second condition, following of the guidance and reporting instructions for PCA report construction are at this phase of the process ensured, and missing aspects in the report are asked to be complemented.

#### 4.2.3. *Group-level reviews*

The PCA reports reviewed by the BAs are delivered from mills to Group investment function about two weeks before the Group IWG meetings (i.e. the group reviewing and approving the final PCA reports). The staff at Group investment function make a brief check in order to ensure that all the required materials have been enclosed and delivers the PCA reports to the members of Group IWG about one week before the meeting. This procedure can diminish asymmetry of information and enables IWG members to analyse the reports in advance and generate potential questions, as H2 (group) stated:

Everybody has an opportunity to read through the [PCA] material. This enhances the level of discussions in connection with the presentation because they have about one week to ponder what to ask there.

The PCA reports are presented at the Group IWG meeting by the mill manager and/or his staff member (typically the project manager). A typical duration of a PCA presentation is 45 minutes. Nevertheless, just before that, an IWG member of the BA habitually gives a five minutes introduction to the project. S/he presents the big picture of the project: why the investment was made, what was the strategy when the project was approved, and where it is now, for example. This indicates how the BA gradually becomes an ally of the self-auditors at the mill level. From now on, the BA staff are committed to the report; they speak for the PCA report. Using these spokespersons increases the persuasiveness of the reports in the eyes of the other Group IWG members. They understand that the report is no longer just compiled by mill staff, but it is a challenged version, which comforts the BA staff, too.

At the IWG meeting, discussion and reflection on the PCA reports takes place. The reports are debated and challenged. H1 (group) describes an IWG meeting about PCA:

There is a lot of discussion about the deviations [between the plan and the outcome]. For example about the actual investment outlay or about the development of the market forecast. It is not a rubber stamp. Often more explanations are required.

In addition to accountability-related issues, 'lessons learned' aspects are actively discussed at the meeting. If IWG finds deficiencies in the PCA report or requires more explanations or specifications for it, the mills provide information later to the Group investment function. It distributes the material to IWG members and sometimes the issues are re-discussed at the next meeting.

The interviewees commonly perceived that there is no major information asymmetry between PCA conductors and the members of the Group IWG. The Group IWG consists of knowledgeable persons who have considerable experience in various investment projects and some of them have even participated in the steering group relating to the particular project to be reviewed, as commented by H11(group) and H4 (mill):

The guys who sit there [Group IWG] know what it is all about. This is perhaps not that clear for everybody who writes a report. Some guys make fools of themselves with the report they have written. (H11, Group)

Yes, naturally they [IWG members] know less about the details, but I do not think it would harm a lot. (H4, mill)

Accordingly, at least the major problems in the reports are believed to be identified at the latest during these final reviews.

To synthesise, even though the centre of calculations is located at the mill, collectivity in constructing PCA reports very much characterises the PCA process in Eufoco. Many persons are already involved in providing information and drafting reports within the mill. Additionally, before the PCA reports can be deemed to be final the self-auditors have to persuade many other persons. The draft PCA report is questioned and challenged first within the mill. Then, PCA conductors have to persuade the BA staff and the investment staff of the Group. The final trials of strength take place at the Group IWG. Challenging discussions take place at all these levels and final reports are gradually produced. Additionally, the PCA story must be in congruence with earlier presented related stories in different places. The interviewees emphasise that 'the reports cannot be delivered directly from the mill to the group'; this would pose an overly great threat to their persuasiveness. It appears that the reports would not be deemed good

enough, and accordingly final, without these processes challenging them, suggesting modifications or at least comprehensively checking the reports. Hence, an appropriate collective process can be considered to be the third condition (in addition to reference points and following of the guidance) in ensuring the persuasiveness of a PCA report.

### 4.3. Controversies during the PCA process

We have shown above the process typically ending up with a stabilised, sufficiently persuasive PCA report. According to this illustration, even though contesting happens, it may still appear that to conduct a self-assessment-based PCA in Eufoco is a relatively straightforward and smooth process without serious complications. Nevertheless, this is not necessarily always the whole picture of the PCA process, as we will illustrate next. In addition to the most typical disagreements described above (e.g. about missing data and ‘over-optimistic’ future cash flow estimates) during the trials of strength, we will illuminate here in more detail the kind of concerns and controversies that can take place before the PCA reports become stabilised. First we will further elaborate typical data manipulation methods (filtering and focusing) appearing during the PCA processes. Then we will illustrate one variation of filtering in PCA reports that has caused particular disputes during the process: omitted *ex post* investment calculations.

#### 4.3.1. Typical data manipulation in PCA reports

The major concerns and hence triggers for controversies in Eufoco’s draft PCA reports seem to be related to lack of comprehensiveness. A comprehensive PCA report can be anticipated to include all information (descriptions and explanations) necessary to understand the phenomenon being depicted. As described above, draft PCA reports (especially drafts from the mills to BA) often lack relevant information; that is, units appear to filter negative information. ‘Forgetting’ to notify all relevant data in a PCA report was considered the number one way to distort PCA reports, as H7 (group) explains:

The easiest way to manipulate or to lie is of course not to tell everything.

H16 (BA) continued:

I think that if you let the project manager conduct the PCA you will get the positive side of the story and an effort will be made to show the negative aspects in a positive light or to forget them.

It appears that most forgetting occurs in reporting key production figures.

I think that our calculations endure daylight, they are transparent. But in this reporting ... one issue that they always try to smooth away is the lag in production forecast. If they fall behind in sales, it is reported. It is an external factor. But if they fall behind in production volumes, there is no project manager or production director who will voluntarily bring it out. (H10, BA)

The template required for PCA reporting is not very specific, that is, it does not contain exact instructions how to report the main themes required. Additionally, it appears that sometimes the PCA conductors simply modify the content (i.e. the headlines for the main themes) for their own opportunistic purposes and even leave something out. The comment made by H11 (group) represents a common opinion in the organisation advocating tighter guidelines for the PCA report:

I think that we give too much freedom for the PCA conductors with regard to the content of the PCA report. We should have tighter, more formal guidelines for the content.

In addition to forgetting, explaining away was regarded as one particular type of behaviour.

Especially when projects have not gone as expected, we sometimes get funny presentations; they are really funny. I would say sometimes I am upset; it is not funny anymore, it is almost insulting what you see then. Then somebody tries to manoeuvre and find a hundred thousand explanations why it is as bad as it is. This has happened a couple of times. (H11, group)

Furthermore, providing information overflow in order to blur the *ex ante* and *ex post* comparisons of key figures has appeared, as H1 stated:

In some projects you can see the make-up. They even try to some extent to cloud the report by providing unessential information or by calculating the key figures in multiple different ways. (H1, group)

The PCA reports include both figures and narratives. The interviewees considered the textual parts to be softer than figures. According to the managers interviewed, there is much more room for misrepresentation in the textual part of a PCA report than in pure figures, as H4 commented:

In calculations it is difficult to adjust the [actual] figures, or in fact it is stupid, because the facts are already there. But in the text part . . . There you can forget something.

Other interviewees added, in a similar vein:

In a text part, there you can have an influence over what and how to write, and which issues to highlight. It is human. This [PCA report] is not a cold analysis of what has happened. (H5, mill)

I don't believe that there is manipulation of figures, but there is a risk that a project team tries to show the project outcome in a more positive light. They have tendency to tell the better stories and forget the worse ones. But [actual] key figures you cannot change. It would be dangerous to present wrong figures. Nevertheless, in a text you can tell positive issues. (H14, BA)

Hence, in addition to filtering (forgetting) material the PCA conductors tend to manipulate reports by focusing on successful aspects of the project.

Occasionally, deficient documentation of *ex ante* investment project appraisal material has impeded compilation of the PCA reports in Eufoco. As explained below by H11 (group), it appears that in certain cases the verifiability of investment targets *ex post* and the premises behind them can be substantially jeopardised if the documentation of *ex ante* material is inadequate.

Of course the problem is that PCA will, in practice, be made 4–5 years after the approval and a lot of changes have taken place. You seldom meet people who really know what the thinking was at that time. So, it is a question about the documentation and who really knows what it is all about.

Consequently, if the investment appraisal material (or its documentation) is inadequate, managers have more room to interpret and present the original objectives in their own favour.

Taken together, filtering negative information and focusing on positive sides of the story occur in Eufoco's PCA reports to some extent. A lot of data manipulation is, however, already revealed

and corrected during the reviews with BA staff. It is commonly perceived that there is more room for misrepresentation in the textual part of the PCA report, whereas the figures (especially actuals) are considered ‘harder’. The figures in the report seem to set limits as for how much PCA conductors can filter and focus in order to embellish the picture. Consequently, an unsuccessful project cannot easily be converted into a successful one by a ‘clever’ writing of narratives as was also stated by H13 (group): ‘But of course, the figures speak for themselves [although the text would be manipulated]’.

#### 4.3.2. *Omitted ex post profitability calculations*

It seems that the final PCA reports always include comparisons between the actual and planned key components of the investment. Nevertheless, an interesting variety of ‘forgetting’ (filtering) was discovered in Eufoco. It appears that PCA conductors do not always want to present all profitability calculations (i.e. NPV, IRR and payback period calculations including forecasted elements) in the PCA report, but rather to omit them, as H1 (group) explained:

Sometimes the subjectivity appears in a regrettable way. The units may apply the guidelines so that they avoid calculating certain key figures [NPV, IRR or payback period]. They explain that due to this and that reason we cannot calculate them.

H11 (group) and H2 (group) added:

I would not say that the figures had been manipulated or that they had been over-optimistic. People just avoid showing bad figures. They are just missing [in the PCA report]. I think that this is human behaviour. If you do not succeed, you leave it out. This you can see in our reports. But I would not say that people intentionally show distorted figures. (H11)

... there have occasionally been clear deficiencies in these profitability calculations. They may explain with a poker face for example that because the targeted operation rate was 95% and now it is only 62%, it is impossible to calculate the profitability. For me, it means that the profitability is a red figure. You can calculate it but the figure is so horrible that one doesn’t want to show it. (H2)

Occasionally, the approach used in the Group investment function and IWG has been mixed as to whether to always require the calculations or not. Focusing on actual figures instead of the whole estimated life-cycle of an investment seems to play a major role in this ‘looking the other way’ approach.

I agree with NN that to understand how the premises have changed between the plan and outcome is more important than to make these technical profitability calculations. This is the reason why we have occasionally looked the other way when the calculations have not been made and we have let them explain why they have not presented the figures. But okay, it is for me perfectly clear that the main reason not to show the numbers is that they would be so bad. Nevertheless, they have not managed to escape scot-free because these issues have been covered in the [Group IWG] meeting. (H1, group)

With regard to this V3 project, the PCA was done without a calculation. PCA was presented at the Group IWG. The IWG stated that this is a nice PCA but where is the calculation. Then I don’t know whether somebody asked for that calculation or not, but it should have been calculated. (H10, BA)

One manager representing a unit with missing calculations commented on his reluctance to update the calculations with regard to new estimates:

We should pay attention to the selection of investments, not to technically update investment calculations with new guesses. (H15, BA)

Another manager defended himself as to why he does not always include all calculations:

A simple reason why the calculations were not made was that we knew in advance that there will not be any profitability. We can state it in one sentence: no profitability. (H10, BA)

Eufoco has not followed a totally strict policy with regard to whether to always require units to report the results of their *ex post* investment profitability calculations. Hence, negative or low project NPVs and IRRs can also be occasionally missing in the final PCA reports. In a similar vein, very long payback periods are not always reported. It appears that the lack of full consensus about the meaningfulness to update the *ex post* calculations with new forecasts is one reason for this. Nevertheless, it also seems that occasionally PCA conductors just do not want to show, and hence ‘document’, the weak performance of their underperforming projects.

Our findings indicate that information asymmetry diminishes during the PCA process when the PCA drafts are discussed and challenged. Accordingly, during the process, what is initially a relatively high level of information asymmetry tends to become notably smaller. Without the collective process it is plausible to think that superiors would not necessarily put great effort into checking the correctness of the PCA report even though they would have the ability to analyse the PCA drafts if they so desired (cf. Birnberg et al. 1983). Our data lends support to contend that in Eufoco the persuasiveness of PCA reports would be very questionable if the reports compiled by mill staff were deemed immediately final without the long reviewing processes by the other actors. The prior literature remains silent about the potential role of these processes in hardening self-assessment-based PCA, giving an impression that self-auditors would have authority to decide the final outcome of the report.

## 5. Discussion

It appears that self-assessment-based PCA reports can become persuasive. Our case study examined how the process of hardening can lead to an acceptable PCA report even though it is self-assessment based, revealing numerous features that can play a role therein. Nevertheless, three main categories can be delineated as standing out as facilitating conditions for a PCA report to become eventually persuasive. Importantly, as comprehensively illustrated in the empirical part of our paper, the first condition – *an appropriate collective process of constructing the PCA report* – seems to play the major role in the hardening process. Secondly, aspects related to the *existence of relatively objectified external and internal reference points for various pieces of information* also seem to be essential for persuasiveness. Thirdly, *sufficient following of the guidance and reporting instructions for the PCA construction and reporting* appears to be a prerequisite for a persuasive report as well. In fact, it seems that the simultaneous fulfilment of all three conditions may greatly facilitate the construction of a persuasive PCA report. It appears that reports would remain dubious and their persuasiveness questionable unless these three conditions are fulfilled.

With regard to the first and foremost condition, the collective process in producing a PCA report, it indeed clearly appears that the action is distributed; no single actor can alone decide the final outcome of the report (Latour 2005). Still, and to some extent ironically, the reports are called *self-assessment*-based PCAs. The faith of the PCA report is far from being simply the outcome of its original drafter, but to large extent is also in the hands of others. The draft report circulates in an organisation and contestations, modifications and clarifications take



place. Many trials of strength have to be faced and dissenters silenced. The perceived quality of reports increases continuously when the reports are subject to public scrutiny within a company and more actors can give their comments (Kalthoff 2005, Spee and Jarzabkowski 2011). This is closely congruent with the suggestion from Porter (1996) that the trust in numbers is more related to their impersonality than their ability to exactly copy the world. Hence, as in the case company, circulating and presenting the drafts of PCA reports widely in the organisation adds and shares accountability and responsibility for them. The reports become more impersonal and impartial, and consequently are perceived to be more objective (Mouritsen 2011). Collective comfort with the report appears to be more decisive in assessing its persuasiveness, with less emphasis being placed on how faithfully it represents reality (Pentland 1993, Power 1997, Kalthoff 2005), that is, the hardness of the report is to a great extent linked to consensual understanding among actors.

Even though the centre of calculation (the mill) draws things together, the report is not only governed from there. The self-auditors at the mill have to persuade many others (e.g. colleagues at the mill, BA staff, project steering group members, staff at group functions), try to mobilise support from their allies (e.g. BA staff after persuasion process), and finally obtain approval for the report (IWG at the group level). Even external humans such as prediction experts mediate the report by providing data for future estimates (see also Miller 1988, Power 1997, Christensen and Skaerbaek 2010). Nevertheless, the report is not only a stabilised consequence of negotiations and the effect of settled disputes between humans: non-humans also actively participate in this techno-social network to produce persuasive PCA reports by providing calculative devices (calculation model and PCA template), setting limits (budgets/strategies), and giving guidance (guidelines and instructions) on how to proceed (Callon 1998). It is worth comprehending, however, that the responsibility for the investment project *per se* remains at the mill, even though the responsibility for the PCA report can be perceived to be diluted.

As for the second condition, the existence of reference points for the PCA report is related to the coherence of the reported data with the existing data in the company's accounting databases and beyond. This reasoning is plausible, firstly, as it simply follows 'common sense' to typically prefer consistency over inconsistency in the world. This kind of reference points can also be closely related to the coherence theory of truth. According to Sosa (1991), coherence refers to the property of beliefs fitting together or agreeing with one another (see also e.g. Kirkham 1997, Stolowy et al. 2014). Accordingly, a 'true' statement is one that does cohere with the other statements about the same phenomenon (Arthur 2001, Macintosh and Baker 2002). Our argumentation is also consistent with Rowe et al.'s (2012) suggestions that comparing similarities between different data sources may greatly affect the perceived persuasiveness of accounting data (see also Hopwood 1987). In a similar vein, Etzion and Ferraro (2010) accentuate the role of analogy and conformity of arguments (in the context of sustainability reporting) in order to gain legitimacy for them.<sup>14</sup>

The third condition for a self-assessment-based draft of a PCA report to become persuasive, the following of the guidance and reporting instructions, can also be regarded as another well-known aspect in strengthening the plausibility of one's argumentation. The role of rules has also previously been pinpointed as an essential building block of management control mechanisms in organisations (e.g. Burns and Scapens 2000, Lukka 2001, 2007). Setting standards (or standard operating procedures) for activities is common in organisations (Brunsson and Jacobsson 2000, Brunsson et al. 2012). Hence, we suggest that sufficient – yet not necessarily total – compliance with set rules and guidance is an essential condition for a PCA report to become persuasive.

As also suggested by Lumijärvi (1990) and Cheng et al. (2009), the findings show that self-assessment-based PCA may involve risks for the perceived quality of PCA reports in terms of data

manipulation (e.g. filtering and focusing) (Birnberg et al. 1983). Specifically, this seems to be the case, if the reports compiled by the self-auditors are deemed immediately final without external reviews. It can, however, be an overly hasty conclusion to suggest, as does Lumijärvi (1990), that ‘to a great extent an ex post report can be manipulated to show anything that is desired’. We maintain that the phenomenon appears to be much more nuanced. Accordingly, there can be many human and non-human actors that narrow the potential for data manipulation, and hence affect the perceived quality of reports. The actors can be mutually reinforcing, adding up to a situation where in fact only limited room for data manipulation can exist. It appears that one can manipulate reports to some extent, but it is much more difficult to hide the ‘big picture’. One cannot easily convert a bad project to a good project simply by ‘prettifying’ the PCA report. Furthermore, it is notable how the various elements forming PCA reports (actual vs. future and figures vs. narratives) have a significantly differing original hardness (and room for manipulation). As a consequence, it can be a considerable challenge to enhance the persuasiveness of some elements of the report to an acceptable level.

In our case company, OL aspects were emphasised as an objective of the PCA. While performance evaluation of personnel and incentive systems were not formally linked to PCA, the outcomes of PCAs seemed to affect managers’ future career and prestige. Hence, managers can also have the motivation to engage in manipulation in this kind of setting, even though it is plausible to think that the motivation would be even higher if the evaluation/incentives and PCA were directly linked (e.g. Hopwood 1972, Merchant and Van der Stede 2012).

By using ANT we were able to make comprehensible a phenomenon that remains a black box from AT’s point of view. This stems from the fundamental differences between AT and ANT approaches. In particular, AT does not represent process analysis, as does ANT; AT does not deal with collectives, but most typically merely dyadic relations,<sup>15</sup> and AT is not inclined to examine the world as a constructed constellation, but as a set of given facts. Through ANT we could follow how the persuasiveness of PCA reports, even if they were self-assessment based, became constructed in collective processes and passed several trials of strength. Our ANT-based analysis also revealed which conditions tend to facilitate a PCA report in order to become persuasive.

## 6. Conclusions

The aim of this paper was to shed light on the persuasiveness of self-assessment-based PCA reports. We investigated what makes companies consider that information in these reports rises to an acceptable quality level and they agree to accept and use the reports for their certain purposes. The investigation was motivated by the extant AT-informed literature suggesting that self-auditing will entail obvious risks for the quality of PCA reports in terms of data manipulation (Lumijärvi 1990, Cheng et al. 2009), yet leaving the process of fabricating the persuasiveness of the self-assessment-based PCA reports a black box. Given that self-assessment-based PCA is nevertheless the most common way to conduct PCA procedures in companies, this phenomenon was in our view worth investigation. Accordingly, we addressed the research question ‘How is persuasiveness of the self-assessment-based post-completion auditing reports on capital investments constructed?’ In responding to this question, we employed ANT as our method theory (Lukka and Vinnari 2014), and accordingly followed human and non-human actors in the heterogeneous networks in producing the PCA report. The empirical evidence of our case study came from 24 semi-structured interviews and the analysis of the construction of 22 PCA reports of strategic investments in one of the major European forest companies. We tracked the various traces that were left in the construction of PCA reports, that is, showed how various actors participate in producing it and simultaneously

affect its persuasiveness (Latour 1987). Specifically, we examined the conditions and features functioning in the process of hardening the elements converging towards an acceptable PCA report.

The paper adds to the capital budgeting literature on PCA by extending the discussion about the relationship between the persuasiveness of PCA reports and the PCA conductor. The central contribution of the paper is to open up the process through which self-assessment-based PCA reports can be made persuasive. Specifically, we add to the literature by identifying and discussing the role of various conditions in this hardening process. We maintain that the existence of three conditions – an appropriate collective process, external/internal reference points, and following of the formal guidance – can play a major role in producing a persuasive PCA report. These mechanisms can clearly add to the strength of the actor-network, and in doing so, they can make the reports persuasive. It seems plausible to argue that these conditions are also likely to be relevant in other settings to that of our case company.

The second contribution of our study is related to the method theory used. Drawing on ANT, the paper is able to make sense of the complex process of fabricating the persuasiveness of the PCA reports, which would remain a black box when examined, for instance, from the AT viewpoint only. In this process numerous elements, both human and non-human, are actively combined in a dynamic interplay to form a collective, eventually accepting (or not accepting) the PCA report. By introducing the ANT approach to a new field, we add notably to the more structural view offered by AT, which has greatly informed the existing literature. Instead of drawing on AT's approach to focus on dyadic relations, and regarding the world as a set of given facts, our paper outlines and brings to the fore a picture of a dynamic, collective process of PCA report construction, where the feature of self-assessment receives notable consideration by all actors participating in the process. A self-assessment-based draft for a PCA report can achieve the quality of being persuasive, but not without considerable collective efforts and the passing of several trials of strength.

The inherent empirical limitations of this study suggest various fruitful avenues to further extend our understanding of the relationship between the PCA conductor and PCA reports. Further research, most likely case research, could investigate the persuasiveness of PCA reports in other settings. For instance, how persuasive are PCA reports if they are compiled by external persons or potentially with hybrid teams (internal and external conductors)? Furthermore, in our research both OL and accountability aspects were emphasised as PCA objectives. What happens to the perceived persuasiveness of reports, if accountability dominates as an object? Moreover, in this study, we focused on investigating a company primarily conducting only one PCA. Hence, as also suggested by Arnold and Schreiber (2013), we could investigate to what extent multiple PCAs influence the perceived quality of PCA reports.

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### Notes

1. The following adoption rates have been reported in different countries: (1) In UK, 74% (Harris et al. 2009), 98% (Arnold and Hatzopoulos 2000) and 79% (Neale 1991b); (2) In USA, 88% (Farragher et al. 1999), 76% (Gordon and Myers 1991) and 90% (Klammer and Walker 1984); (3) In Norway, 41% (Neale 1994); (4) In Italy, 71% (Azzone and Maccarrone 2001); and (5) In Finland, 67% (Huikku 2011).
2. Nevertheless, it appears that some companies focus on comparing only actual figures with their pre-investment estimates (Huikku 2011).
3. Lumijärvi investigates what kind of games people employ in a capital budgeting process. In addition to manipulation of PCA reports, he covers many other games, such as selling games (see Lumijärvi 1991), manipulation of *ex ante* profitability calculations, bypassing procedures, and external gameplaying.
4. AT addresses the cooperative relationship between principal (superior) and agent (subordinate) and assumes that the parties have at least partially conflicting goals and different attitudes towards risk (see e.g. Jensen and Meckling 1976). The agents are further assumed to be self-interested, risk-averse, and boundedly rational (Jensen and Meckling 1976). The focus of analysis in AT is on the contract governing the principal–agent relationships (Eisenhardt 1989). Additionally, there exists information asymmetry between the parties; that is, information is asymmetrically distributed if the agent has more knowledge than the principal about a relevant issue (e.g. Fama and Jensen 1983, Bourgeois and Brodwin 1984). Information asymmetry can lead to agency problems that can be delineated to two general classes: moral hazard, and adverse selection (Sprinkle 2003). Moral hazard (hidden action) is related to the problem that agents may have an incentive to engage in unobservable actions that are not in the interest of the principal, such as building empires, acting myopically, or working less (e.g. Bruggen 2011). An adverse selection problem arises when agents have private (hidden) information they can use to increase their welfare at the expense of the principal's welfare (Arrow 1985). With regard to capital allocation decisions (capital budgeting), Waterhouse and Tiessen (1978) suggest that the primary problem is that the necessary information is widely dispersed within the organisation, and this leads to dysfunctional behaviours. In other words, if the decision-maker does not possess complete information, as is typical in decentralised firms, gameplaying may occur at the lower levels (see e.g. Bourgeois and Brodwin 1984, Hertenstein 1986, Marsh et al. 1988).
5. See, for example, Haka's (2007) literature review about AT-based research and information asymmetry in capital budgeting context.
6. Typically companies use capital rationing, that is, not all NPV positive projects, for example, are accepted and funded in companies, only the most profitable ones (Mukherjee and Hingorani 1999). Internal competition for resources can induce self-interested misrepresenting of private information (e.g. overstating cash flow forecasts) (Bruggen and Luft 2011).
7. See, for example, Birnberg et al.'s (1983) data manipulation framework. It identified six methods used by subordinates to distort accounting information: biasing, focusing, filtering, smoothing, gaming, and 'illegal' acts. They suggest further that all these methods could be potential in capital budgeting process. For another comprehensive analysis of biasing in the accounting/budgeting context, see Lukka (1988).
8. In these studies, accounting information is commonly considered to have a 'persuasive power' (see Chua 1995).
9. Many of these contributions given as examples also use simultaneously, at least to some extent, other notions on this list. Specifically, translation is a basic concept in ANT referred by all these authors. See, for example, Justesen and Mouritsen (2011) about the effects of ANT in accounting research.
10. Latour (2004, 2005) further makes a distinction between matters of facts and matters of concern. He presents matters of facts as finite objects (e.g. stones, rugs, mugs, and hammers), and matters of

- concern as highly uncertain and loudly disputed interesting agencies (Latour 2005, pp. 114–15). Accordingly, matters of facts may remain silent, whereas matters of concern are not taken as objects but rather as gatherings of agents related to the concern in question (ibid.).
11. The challenge in data gathering is also clearly illustrated by Merchant (1990, p. 303) where he comments that the other major form of data manipulation (another was smoothing) to be addressed in his study – falsifying data – was considered too provocative in the case company, and accordingly omitted.
  12. In this sense, the paper has an element of interventionist research, yet only on a small scale (cf. Jönsson and Lukka 2007).
  13. As another dimension in the organisation, there are BA-level teams for several functions, such as for controllers, marketing/sales personnel, and operations headed by BA-level directors.
  14. Our theorising related to the two first conditions could also have been alternatively linked to the discussion of framing (see Callon 1998 and in the accounting context, Skaerbaek and Tryggestad 2010, Vinnari and Skaerbaek 2014). According to Callon (1998, p. 249), ‘The frame establishes a boundary within which interactions – the significance and content of which are self-evident to the protagonists – take place more or less independently of their surrounding context.’
  15. While AT literature also includes discussion of the need of, and examples of attempts to, examine multi-period and multi-person settings, the high preference of AT to design exact models and apply mathematical analysis (e.g. Haka 2007, Lambert 2007) has, so far, made these attempts far from capable of exploring settings as complex as the phenomenon of the hardening of self-assessment-based PCA reports.

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## Appendix 1. An interview structure

### General:

- Description of the person to be interviewed (education, career, main tasks, and current responsibilities).
- How the person has participated in PCA? How often?
- In recent years, what have been the biggest investments in the BA 2 business area (over 5 MEUR)?
  - (a) Have you conducted PCA for all of these investments?
- Does ‘BA 2’ business area have own written investment policy and instructions?
- How business areas (business units, mills) compete with each other for the same restricted investment funds?

### BA 2 Post-completion auditing:

- Which are the conducted PCA’s in the BA 2 during the last years?
- How the PCA reports are reviewed in the business area?
- How the PCA reports have been reviewed in the investment working group of BA?
- To whom PCA reports are distributed?

**PCA of capital investments:** (= control or evaluation of the investment after start-up)

- What is the motive for conducting PCA?
  - (a) Tool for learning vs. emphasising accountability?
  - (b) Has PCA enhanced the reliability of investment proposals? If yes, how?
  - (c) The role of PCA as a tool for evaluating (informally) personnel involved in the investment project?
- What concrete benefits have been achieved by conducting PCA and what kinds of actions PCA information have triggered in the company?
  - (a) How is PCA and information generated by PCA exploited in the company?
- What are the main challenges in preparing PCA report?
- Is it already known when investment plan is being accepted that investment will be post audited?
- What is the motive of mills to conduct PCA?
- What are the benefits to mills from conducting PCA?

**PCA conductor:**

- Who conducts PCA and prepares the PCA report?
  - (a) How do you justify investing unit as a PCA conductor? Why investing unit conducts PCA?
  - (b) What kind of effect the PCA motive has on who conducts the PCA?
  - (c) Are you satisfied with the choice of present PCA conductor?
- How would you see some other party as a PCA conductor?
- What positive features you see as an investing unit conducting PCA?
  - (a) What negative features?
- What positive features you see as an outside person or team conducting PCA??
  - (a) What negative features?
- Do you feel that outside PCA conductors would be more objective and would question things more and maybe put on more comments and improvement proposals in PCA phase, when compared with investing unit?
- In your opinion, who would be the most suitable person to conduct PCA? Why?
- What kind of role the controller has on the preparation of PCA report?
- What kind of role do personnel in other business areas/units/mills play in PCA?
- What is the line-up for investment working group in business area and what role does that group play in PCA?
- Have you ever felt that lack of qualified personnel would have been a constraint in conducting PCA?
- How do you see the PCA conductor's superior's effect on conducting PCA?
  - (a) Do you see it problematic in conducting PCA?
  - (b) Advantages and disadvantages?
- How do you see the information asymmetry between PCA conductors and other people in the company, when people involved in the investment are conducting the PCA and preparing the PCA report?

**Review, distribution and database of PCA reports:**

- Does somebody review these draft reports before final reports are being reviewed in the IWG?
  - (a) What kind of role does BA play in reviewing these draft PCA reports?
  - (b) Do you feel these reviewers have enough knowledge and information on the investment being post audited, so they are able to review these reports critically?
- In what (formal) forums and how draft reports are reviewed before final PCA reports?
- Do you receive PCA reports before the actual IWG meeting?
  - (a) Do you review the PCA report before IWG meeting?
  - (b) In what kind of matters do you pay attention to when reviewing the report?
  - (c) Have there been any kinds of modifications to PCA reports at this stage?
- In what way the PCA reports are reviewed in the IWG meeting?
- To whom are the final PCA reports distributed?
  - (a) Is there some database for PCA reports?

- Do you receive PCA reports from other business areas?
- In what way 'lessons learned' are distributed in the business area?
- In practice, are improvement proposals presented in the PCA report executed in the company?

#### Content of PCA reports:

- With regard to PCA reports, what is potential information, that can be subject to
  - (a) Forgetting to tell
  - (b) Biased/misrepresenting
  - (c) Window dressing
  - (d) Explaining away?
- What kind of role do profitability calculations (NPV, IRR, Payback period) play in PCA report?
  - (a) In your opinion, are profitability measures, their realisation and reasons for deviations discussed in the PCA report sufficiently?
  - (b) Does it become evident from the PCA report how calculations have been made?
- What do you think about the reliability (objectivity/accuracy/realism) of PCA reports?
  - (a) Do you feel that PCA reports are sometimes manipulated or calculations are maybe too over-optimistic? Could you give an example?
  - (b) Do you feel that PCA conductors have 'forgotten' to tell something
  - (c) Do you feel that PCA reports have included information that can be subject to:
    - (i) Biased/misrepresenting
    - (ii) Window dressing
    - (iii) Explaining away?
- How is the reliability of PCA reports and calculations ensured?
- In your opinion, what is the benefit from information manipulation/biasing included in PCA report?
- How could the reliability of PCA reports be improved?
- How do you think PCA affects on the evaluation of personnel involved in the capital investment process?
  - (a) Does it have a different effect if there is collective responsibility vs. project has well-defined leader who has the responsibility?
- What is your personal opinion about PCA?
  - (a) Do you see it as an important part of investment process?
  - (b) Problems related to it?
  - (c) Benefits related to it?

**Appendix 2. Example of a PCA calculation (PCA conducted in the beginning of the year 2007; figures disguised)**

USD in mill	2004 Actual	2005 Actual	2006 Actual	2007 Est.	2008 Est.	2009 Est.	2010 Est.	2011 Est.	2012 Est.	2013 Est.	2014 Est.	2015 Est.
Sales, gross	0.0	0.0	7.0	10.2	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0
Sales costs	0.0	0.0	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Transport	0.0	0.0	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.6	-0.7
<b>Mill net sales</b>	<b>0.0</b>	<b>0.0</b>	<b>6.4</b>	<b>9.5</b>	<b>10.8</b>	<b>11.3</b>	<b>11.8</b>	<b>12.3</b>	<b>12.8</b>	<b>13.3</b>	<b>13.7</b>	<b>14.1</b>
Raw material	0.0	-2.8	-3.5	-3.8	-4.3	-4.5	-4.7	-4.9	-5.1	-5.3	-5.4	-5.5
Filler/chemicals	0.0	-0.3	-0.4	-0.4	-0.5	-0.5	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7
Energy	-0.1	-0.4	-0.7	-1.2	-1.3	-1.4	-1.5	-1.6	-1.7	-1.8	-1.9	-2.0
Other variable	0.0	-0.1	-0.2	-0.3	-0.4	-0.4	-0.5	-0.6	-0.6	-0.6	-0.6	-0.7
Personnel	-0.1	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.4
Other fixed	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Production costs	-0.3	-3.9	-5.2	-6.1	-7.0	-7.3	-7.8	-8.2	-8.6	-9.0	-9.2	-9.5
<b>EBITDA</b>	<b>-0.3</b>	<b>-3.9</b>	<b>1.2</b>	<b>3.4</b>	<b>3.8</b>	<b>4.0</b>	<b>4.0</b>	<b>4.1</b>	<b>4.2</b>	<b>4.3</b>	<b>4.5</b>	<b>4.6</b>
Investment/Capex	-0.5	-8.5	-4.0	-0.3	0.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0
WC Change	-0.5	-1.2	-2.0	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	3.1
Taxes	0.0	0.0	0.0	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
<b>CASH FLOW</b>	<b>-1.3</b>	<b>-13.6</b>	<b>-4.8</b>	<b>2.6</b>	<b>3.4</b>	<b>3.5</b>	<b>3.5</b>	<b>2.6</b>	<b>3.7</b>	<b>3.8</b>	<b>4.0</b>	<b>7.3</b>
Discount factor (7.7%)	1.000	0.929	0.863	0.801	0.744	0.691	0.642	0.597	0.554	0.515	0.478	0.444
DCF flow	-1.3	-12.6	-4.1	2.1	2.5	2.4	2.2	1.6	2.0	2.0	1.9	3.2
<b>DCF, cum. (NPV)</b>	<b>-1.3</b>	<b>-13.9</b>	<b>-18.1</b>	<b>-16.0</b>	<b>-13.5</b>	<b>-11.0</b>	<b>-8.8</b>	<b>-7.2</b>	<b>-5.2</b>	<b>-3.2</b>	<b>-1.3</b>	<b>1.9</b>