

Constructing the accurate forecast: an actor-network theory approach

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Abstract

Purpose – This paper empirically demonstrates the major organizational events of a rolling forecasting process and the roles of controllers therein. In particular, this study aims to investigate how the understanding of a “realistic forecast” is translated and questioned by various mediators in the rolling forecasting process and how it affects the quality of planning as the ultimate accuracy of forecasts is seen as important.

Design/methodology/approach – This study follows an actor-network theory (ANT) approach and maps the key points of translation in the rolling forecasting process by inspecting the roles of mediators. This qualitative case study is based on interviews with controllers and managers involved in the forecasting process in a single manufacturing company.

Findings – The paper identified two episodes of translation in the forecasting process, in which the forecast partially stabilized to create room for managerial discussion and debate. The abilities of controllers to infiltrate various functional groups and calculative practices appeared to be one way to control the accuracy of forecasting, although this was built on a façade of neutrality.

Originality/value – Prior literature identifies the aims of interactive planning processes as being to improve the quality of planning. The authors apply ANT to better understand the nature of mediators in constructing an entity called a “realistic rolling forecast”.

Keywords Translation, Planning, Mediator, Actor-network-theory, Controller, Rolling forecasting

Paper type Research paper

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1. Introduction

Arguably, rolling forecasts are one of the key tools in organizational planning, in which the accounting function is often seen as a neutral information intermediary (Bourmistrov and Kaarbøe, 2013; Goretzki and Messner, 2016). According to actor-network theory (ANT), an intermediary “transports meaning or force without transformation” (Latour, 2005, p. 39). However, ANT suggests that scholars should view most associations as mediators. Mediators, unlike intermediaries, “transform, translate, distort, and modify the meaning or the elements they are supposed to carry” (Latour, 2005, p. 39). This means that even though accountants may have an interest in representing both themselves and accounting technologies as neutral, we view them as active participants, that is, mediators that influence the outcome of the forecasting process, having a performative effect on the world the forecast intends to describe (Callon, 1998; MacKenzie, 2006; Revellino and Mouritsen, 2015).

Through continuous planning, organizations strive to improve their decision-making by keeping up with how current trends in markets and the internal production capabilities of firms influence future profit-generating potential (Lorain, 2010). This means a combined understanding regarding the behaviour of financial and operational sales forecast figures (Huikka *et al.*, 2017), as well as the costs of resources (Bourmistrov and Kaarbøe, 2013). Rolling forecasts strive to achieve many qualities at once – accuracy (Jordan and Messner, 2020), proactiveness (Henttu-Aho, 2018) and adjusting/reformulating targets (Bourmistrov and Kaarbøe, 2013; Goretzki and Messner, 2016; Palermo, 2018). Accounting research has recently been focused on organizational aims of delivering realistic numbers around the planning process (Østergren and Stensaker, 2011; Henttu-Aho and Järvinen, 2013; Jordan and Messner, 2020) and hence improving the quality of planning. However, the way forecasts are constructed, and the influence of management accounting experts and their calculations on the outcome of this process, are not presented in detail in prior literature (Sandalgaard and Bukh, 2014). Some beyond budgeting (BB) studies suggest that the role of controllers in regard to the quality of planning may be ambivalent (Østergren and Stensaker, 2011). On the one hand, controllers use their managerial relations, statistics and trends to compose more realistic forecasts and targets. On the other hand, they are found to be strongly affiliated with sub-divisional management in helping them to “sell” their viewpoints to upper management.

Forecasting typically emphasizes impartiality and forecast accuracy (Jordan and Messner, 2020). This implies that controllers may depict themselves as neutral experts (Miller, 1992), claiming the role of intermediaries who would ideally carry the meaning invested in numbers without transformation. However, this study draws on ANT and views controllers as a “web of mediators” (Latour, 2005), that is, they are included in a network of actors that includes both human actors and non-human actants, who in their own ways influence the outcome of the forecast. In addition to human actors, accounting inscriptions, technology and money are also seen as mediators that translate the meaning of information (Lowe, 2001; Hyvönen *et al.*, 2008; Robson and Bottausci, 2018).

To investigate the influence of these mediators in the forecasting process, we draw on a qualitative case study in a single manufacturing organization. Like most ANT studies, we use Bruno Latour’s works (Latour, 1987, 2005), where various technologies and inscriptions are used to establish facts and to organize social knowledge. This means the actor-network is not defined a priori; rather, it emerges from the complex, open set of relations between other actants, both human and non-human, through interaction and performativity. Thus, the relational nature of the network and the heterogeneity of its actors are at the heart of ANT (Law, 1992; Callon and Law, 1997). Prior research discusses how accounting systems

never seem to stabilize completely in order to fully achieve “black box” status; instead, they continue to be contested and develop over time (Quattrone and Hopper, 2006). In fact, rolling forecasts can be seen as fluid objects that become “immutable mobiles” (Latour, 1987) that maintain their form and are able to foster a centre of calculation that allows control at a distance (Robson, 1992). It is precisely the nature of the accounting inscriptions as immutable mobiles that allows centres of calculation to know what takes place in local peripheries.

Drawing on the concepts outlined previously, we present an interpretive qualitative case study and demonstrate through empirical evidence how the rolling forecast emerges in an actor-network comprised of various mediators. The broad purpose of this paper is to mobilize ANT concepts of mediators and intermediaries to understand the varying degrees of translation in the forecasting process. Our research question is why actors in a global paper company challenge and question the assumptions of a “realistic forecast”, while at the same time, they strive for forecast accuracy. Our results indicate how not only managers (Goretzki and Messner, 2016) but also company controllers take part in transforming assumptions about the future into meaningful forecasts, while still maintaining notions of objectivity, claiming the status of neutral intermediaries. By this, our study intends to contribute to studies that emphasize the role of controllers in establishing reliable accounting inscriptions by discussing how the reliability of an accounting inscription is achieved (Lowe and Koh, 2007) and how accounting information (partially) stabilizes as a result of their actions (Andon *et al.*, 2007; Hyvönen *et al.*, 2008). Second, we expand the literature on the quality of planning (Goretzki and Messner, 2016; Jordan and Messner, 2020) and interactive planning processes (Østergren and Stensaker, 2011; Bourmistrov and Kaarbøe, 2013) by highlighting management accounting’s mediating role inherent in forecasting.

The remainder of the paper is organized as follows. First, in Section 2, we provide a literature review on planning and various aspects of rolling forecasting. Section 3 explains the principles of ANT (Latour, 1987, 2005), which we aim to follow in understanding how the “rolling forecast” entity is constructed. Section 4 describes the research design. Section 5 demonstrates how rolling forecasts are constructed within the cross-functional forecasting process and contemplates the professional aims of controllers. In Section 6, we present a thorough discussion of the empirical findings and previous literature and conclude the paper.

2. Rolling forecasting and accuracy

Rolling forecasting is a planning process, where a forecast is updated monthly or quarterly by adding an extra month or quarter to the period of forecasting (Henttu-Aho and Järvinen, 2013). Thus, there can be several forecast versions prepared during the year, all of which consist of different calendar periods and figures. The advantages of rolling forecasting are related in particular to timeliness and the ability to update plans (Lorain, 2010; Henttu-Aho, 2018). Bøgsnes (2009) and Sandalgaard and Bukh (2014) note that rolling forecasts seem to differ from budgets in the sense that they do not have to be officially approved by the board of directors. There seems to exist a consensus in BB literature that there is usually no penalty for poor accuracy of estimated figures in a forecast. Such a view seems to differ from Jordan and Messner (2020), who demonstrate how forecast accuracy can be used as a results control mechanism for managers to improve the quality of planning, thus being part of the assemblage of performance metrics. Therefore, the main idea in forecasting is to observe the key changes in the business environment and estimate their monetary effects on profit, as well as to assess how the figures indicate the feasibility of achieving organizational targets (Bourmistrov and Kaarbøe, 2013).

In empirical studies, sales forecasts have been found to be a crucial starting point for company revenue and cost planning and for the alignment of demand and supply (Goretzki and Messner, 2016; Huikku *et al.*, 2017; Jordan and Messner, 2020). Therefore, the accuracy of sales forecasts, seen as an important element of planning quality, has been of special interest to organizations. From the perspective of costs, forecasting has been improved by the organized delivery of various cost factors and cost information collected by information systems (Bourmistrov and Kaarbøe, 2013; Henttu-Aho and Järvinen, 2013).

In fact, prior empirical studies demonstrate various ways to improve the quality of planning numbers. First, the growing importance of sales forecasting in uncertain business environments has led to the development of quantitative modelling tools (Huikku *et al.*, 2017). Second, there have been aims to incentivize more accurate sales forecasting by using accuracy measures (Jordan and Messner, 2020). In addition, empirical studies on BB indicate that interactive (“dynamic”) forms of planning process may provide ways to improve the quality of planning (Bourmistrov and Kaarbøe, 2013).

Importantly, the aim of accurate forecast figures may conflict with the need to set ambitious targets. For instance, literature on BB argues that while organizations typically set their target figures at an ambitious level, the same figures cannot be used for unbiased forecasting (Bøgsnes, 2009). Ambition in constructing forecast figures may create a “polluted forecast” (Østergren and Stensaker, 2011). Thus, one important aspect of rolling forecasting is the reconciliation of different and potentially conflicting goals, which calls for increased organizational interaction (Østergren and Stensaker, 2011).

3. Actor-network theory and accounting

ANT has been part of scholarly discussions in accounting for decades (Robson and Bottausci, 2018). In *Reassembling the Social*, Latour (2005) discusses mediators and intermediaries in the process of translation. Of these, intermediaries carry forward meanings without transforming them and as such cannot influence other actors. However, empirical interest in ANT is concerned with mediators, which can influence other actors as well as having the power to reconfigure actor-networks; thus, mediators translate meanings and form actor-networks between human and non-human actors.

The process of translation consists of four stages: *problematization*, *interessement*, *enrolment and mobilization* of allies (Callon, 1986). Problematization refers to focal actors that actively appeal to other actors with their conceptions of issues and indicate having solutions to these problems through explicit practices. Interessement is defining and locking the roles of other actors by the focal actor in accordance with their plans to solve the problem. Enrolment refers to successful interessement and the creation of alliance networks in order to build agreement regarding their interests. The enrolling agency thus stabilizes and cements links to other agencies. Finally, mobilization refers to a mechanism that monitors the stability of various interests. The process of translation ultimately has the capability to produce “facts” and even stabilize fully to become a “black box”. According to (Latour, 1987, p. 131), a “black box” can be considered as a taken-for-granted system where many elements act as one. Importantly, prior research discusses how accounting systems never seem to stabilize completely to fully achieve black box status; instead, they continue to develop over time (Quattrone and Hopper, 2001, 2006). Likewise, managers will most likely understand that financial forecasts are not unquestionable facts where controllers act as neutral and impartial intermediaries; rather, forecasted numbers are constantly in motion, reconfigured by various mediators.

Law (1991) and Latour (1999) provide examples of different kinds of mediators. Inscriptions materialized into forecasted accounting numbers (Busco and Quattrone, 2018; Robson and Bottausci, 2018) are one such important category but are often in themselves

incomplete and never fully stabilize (Quattrone and Hopper, 2006). Many accounting studies focus on the capability of various accounting-related technologies, particularly information systems, to reconfigure actor-networks (Lowe, 2001; Quattrone and Hopper, 2006; Hyvönen *et al.*, 2008). Finally, and not surprisingly, people, particularly controllers, carry forward meanings and are an integral part of actor-network configuration.

Other relevant ANT concepts include, for example, “centre of calculation”, “action at a distance”, “trials of strength” and “obligatory passage point”, which illustrate how representations emerge in actor-networks. A centre of calculation refers to a point in an actor-network in which the data from distant places and spaces are brought in, which are then combined and calculated into information bringing a more comprehensive picture of things happening faraway in time and space and therefore outside the centre (Latour, 1987, p. 232). From the centre, action at a distance becomes possible due to the translation process of information, which generates knowledge accumulation of these distant spaces and events. Such knowledge production, which generates new types of “truths”, is not fully stabilized, that is black-boxed, but rather creates contestable “facts” which can be challenged and, if necessary, modified according to the “better” knowledge or “truth” of the given situation being contested. Therefore, trials of strength are events where actors contest the existing knowledge or so-called “truth” by bringing in possibly better knowledge or “truth” of a given situation. An obligatory passage point relates to the previously mentioned problematization stage of translation, where the negotiation space is under the control of a focal actor (Callon, 1986).

This paper presents a case study of a chain of events related to the forecasting process and controller involvement in the creation of accurate forecast numbers. The case study approach will be elaborated further in the section that follows.

4. Research design

This empirical study portrays a global paper company (hereafter Paperco) setting, where budgeting and planning were undergoing significant changes. This presented a good opportunity for conducting a qualitative field study to understand the abandonment of the annual budgeting process. Even though our preliminary theoretical approach was the budgeting change, from the very first interviews, we recognized that when our informants talked about recent developments in the budgetary process, they were often referring to rolling forecasting. Moreover, while the previous annual budgeting process was mainly focused on manager–subordinate relations, the interviewees seemed to be much more concerned with certain cross-functional events being central to the novel rolling forecasting process.

At the time of the study, Paperco represents the traditional core of heavy industry, with 70 production sites in 20 different countries. According to Paperco’s financial report, the company places great emphasis on protecting its production assets and avoiding any unplanned production stoppages. A major part of its sales takes place in Europe. Sales are operated through Paperco’s own distribution centres and global sales offices. Products such as pulp are sold through the company’s own distribution centres. At Paperco, each business area has its own sales organization and personnel. Business areas are responsible for their profit and for achieving their strategic targets.

The dataset for the study consists mainly of interviews, but some secondary data sources were also used, such as organization charts and annual reports. As the empirical phenomenon of a study, rolling forecasting, is typically found to become a central activity in organizations that have abandoned traditional budget control (Østergren and Stensaker, 2011), we felt it important to conduct interviews with various organizational functions. Our interview data consists of 26 interviews with 19 different people in sales, production plants (mills), business areas, support

functions (energy and wood supply) and group (see [Appendix](#)). We interviewed various people who were involved in the rolling forecasting process. Each interviewee was also asked to nominate other persons whose working tasks were closely related to forecasting. Finally, we interviewed accounting personnel, managers and support function personnel to establish an adequate illustration of the network constructing the forecast ([Lowe, 2001](#)). We interviewed the chief financial officer (CFO), group controllers, business controllers, sales controllers, mill controllers and support-function controllers, as well as various function managers, such as operational, business and support-function managers.

Interviews were carried out in several waves, in 2009, 2011 and 2014. The field work started in 2009, soon after the company had started to prepare monthly forecasts on a rolling basis. First, we conducted semi-structured interviews with controllers to get an overall understanding of the rolling forecasting as part of the management control system in the company. These interviews revealed that the new practice of rolling forecasting required frequent interaction with various organizational actors. The second round of interviews, in 2011, enabled us to get a deeper understanding regarding organizational interaction around the forecasting process by extending the interviews to managers and sales controllers, the latter of which appeared to be a recently established position in the company. The last round of interviews, in 2014, focused more on the forecasting process of production sites (paper mills) and the roles of support functions.

Several interview questions were prepared for each theme, but not all of them were applicable to all interviewees due to their different positions in the organization. The first round of interviews, in 2009 with controllers at various organizational levels, focused on four themes: new developments in budgeting, the role of technology in budgeting, new development projects, and the changing role of the controller. Then the second and third rounds of interviews, carried out in 2011 and 2014, were more like open-ended interviews with a few clarifying questions. In 2011 the focus was mainly on new rolling forecasting practices and the ways planning and control were carried out in the organization by controllers and managers. Finally, the interviews carried out in 2014 sought to bring deeper understanding about the main aims of the forecasting process and controlling. For example, we were interested in issues such as, what is the main purpose of the forecasting process and whether the aims of accuracy or realism of forecasting figures, or organizational motivation, can be supported by controlling.

As organizational theorists often emphasize difficulties in crossing inter-occupational boundaries of humans with respect to building shared meaning, we found it important not to focus on ties between actors but rather to investigate the actions and events where the meaning of accounting information was contested and translated by various human and non-human actors ([Latour, 2005](#)). For this purpose, we used ANT as our method theory to study the functioning of the rolling forecasting process and the role of mediators for the quality of planning, both of which were in our focus from the domain-theoretical perspective ([Lukka and Vinnari, 2014](#)).

5. Two episodes of translation in the rolling forecasting process

This section describes the construction of a rolling forecast in Paperco as a web of mediators by employing the elements of “sociology of translation” ([Latour, 1987, 2005](#)). We map the key points of translation in the rolling forecasting process (problematization, interestment, enrolment and mobilization) ([Callon, 1986](#)) and inspect the roles of various mediators, such as inscriptions, technical artefacts, human actors (especially controllers) and the money therein. In assessing the key points of translation, we identified two episodes. The first episode demonstrates how the initial sales prospects provided by the firm’s field offices were

questioned, analysed and finally altered by sales controllers and other actors in the company business area. The second episode shows how the sales forecast was not taken for granted at the production site but carefully inspected and even resisted by mill controllers and other actors. Finally, our findings also reveal how monetary incentives acted as a mediator in constructing accurate forecasts.

5.1 Episode 1: *problematizing the sales forecast*

Paperco was operating in a volatile business environment, and predicting customer demand was seen as a challenging task. The company had field sales offices around the world, where sales office personnel were continuously assessing the sales demand prospects among current and potential customers. These first stage sales prospects were related to demand and sales volume estimates for the next 12–15 months. However, sales controllers and product segment representatives were setting initial sales targets twice a year, which guided the level of sales for the next six months:

In our organization, the sales (function) doesn't set their own targets, but it is especially me and my team's task to be involved in the target setting. [. . .] We aim to tell a story of how we see that the demand and sales price will develop in the future, what type of outside indicators and parameters we have taken into account (in calculations), and how we see the competition will be in different areas. [. . .] This can be seen as a sort of sparring and helping – providing a direction to them. (Sales controller, 2 July 2014)

Field sales office people updated their first-hand estimates of demand straight into the sales information system. As the sales offices were usually located far from actual business area management and paper factories, these *inscriptions* uploaded to the system were the only available outlook of future demand. At Paperco, the importance of this sales prospect information as a *mediator* became evident as it immediately started to mobilize various actors in business area sales.

First, the sales volume figures of field sales offices were uploaded into the system, stimulating lively discussion in the business organization. In particular, controllers were *problematizing* the accuracy of these sales figures. One interviewee, an experienced sales controller, stated that: “the information considering the first three months is fairly accurate, but the accuracy of later months can be seen declining strongly”. The sales controller challenged the assumed truthfulness of the given sales prospects by arguing that salespeople at field offices usually painted too optimistic a picture of sales possibilities.

Next, controllers, in conjunction with organizational salespeople, started to inspect these given sales prospects within the various product segment teams. At Paperco, business area sales organization was divided into product segments, and each product segment had its own team. Furthermore, each product segment team consisted of managers and one sales controller. The interaction within these product segment teams was daily and informal (Østergren and Stensaker, 2011). Teams started to assess the feasibility of given sales prospect figures as soon as they were available. They simulated the given figures and calculated profitability at various price levels with the assistance of an analysis tool. The forecasting period for the business area was 12 months plus three months, for which the top-line price for each product segment and corresponding sales volumes were forecasted. Product segment team members, including the sales controller, became important mediators in questioning and altering the prospective demand figures given by remote sales offices. The important skill of sales controllers was related to product and customer profitability calculations, as well as the verification of sales prospect data in cooperation with product segment managers. One sales controller explained how, by conducting historical data

analysis (Bourmistrov and Kaarbøe, 2013), they were able to compare the sales prospect numbers (provided by field offices) with the company's historical sales trends:

And, well [...] we don't quite trust those sales prospects as such, but we make some analysis of them using our historical data. We build confidence (on the sales data) with the help of this data analysis. There we can see how the price and volume will develop in the future. We provide some data points to these segment teams to be able to construct a rolling forecast. [...] And then we have quite good forecast patterns, which we believe in, especially from the perspective of price and volume development. (Sales controller, 20 June 2011)

This sales forecasting tool was an important *technical artefact* in the forecasting process as it acted in concert with controllers to adjust the initial sales estimates in a direction that had more credibility with other actors. The tool proved to be a critical mediator for the acceptance of sales forecasting information in the organization. There were knowledgeable experts in each product segment team, who had the opportunity and skills to contest the information given by their colleagues at the field offices. However, the data analysis tool, combined with the competence of the sales controllers, formed an *interessement device*, through which the segment teams were enrolled in the business area sales alliance (Munro, 1999) to craft "realistic sales information". This analysis tool scaled the field's sales prospect figures by the historical sales trends and thus represented the initial sales prospects in a different light across the whole organization.

Finally, it was not unusual for the questioning of field offices' sales prospects to *mobilize* sales controllers and business controllers to visit customers directly to track the origins of numbers and to get more information on the actual market situation:

It is not simply that some sales guy says that this is what all the others do, and we should follow them if we want to be in this business. That's a common slogan for salesmen. But now we try to find the facts that these slogans are based on. (Sales controller, 20 June 2011)

The validation of sales forecast figures, usually seen as a managerial task, appeared to be an important part of the work of sales and business controllers (Bourmistrov and Kaarbøe, 2013). This strengthened "the system of alliances" around "realistic" sales forecasts. However, the final acceptance of modified sales figures was given by the sales manager, who reviewed the trend of figures and made the decision from the business area viewpoint.

These three examples show the scepticism towards the sales volume estimates. At first, sales controllers and their calculations were problematizing the initial sales prospects of field offices and building a network of allies to support the conversion of sales figures. Then, sales controllers acted as important *mediators* in shaping the figures to be more realistic and trusted within the business area. The historical analysis tool represented a *technical artefact* that was used to shape the "realistic forecast figures". By using historical sales data, the controllers aimed to show the acceptable range of trends for the prospective figures, whilst also building allies, which appeared to have a strong altering and stabilizing effect for the rolling forecast. During the first episode, the sales forecast became "partially stabilized" sufficient to be communicated, which in our case means that, on the one hand, it was trusted that it could be *mobilized* further, but on the other hand, the actors knew that it was just a forecast that could still be contested. Thus, in the sales organization, the sales forecast could still not be considered as a black box or an unquestionable fact at that stage of the forecasting process. There was to be a subsequent test when the sales forecast was presented to the production site.

5.2 Episode 2: *problematizing the operative forecast*

After the sales forecast was sufficiently stabilized to allow for its use in planning, it was the sales organization's (of which the sales controller was a member) responsibility to carry out further profitability calculations and data analysis. The aim of this was to determine how to

divide the sales volumes between production sites and factories. Thus, the sales forecast had the utmost importance for the mills, as the sales allocation plan practically determined the level of capacity usage at the mill and might, at worst, have severe implications for mills in the form of employee layoffs and shutdowns of production lines. The following quotation indicates that the interviewed mill director saw the sales forecast as a credible set of numbers but was still worried about the origins of the presented figures:

Apparently, there is a lot of information which is known only by the financial function and which has already been processed. Then, when we [mill management] participate in the RF [rolling forecasting] meeting, where people from production and sales are also present, the future outlook is only the tip of the iceberg. We actually don't know the whole process behind those figures. (Mill director, 11 April 2014)

This quote signifies that the forecast had at least partially stabilized (Quattrone and Hopper, 2006), stable enough to achieve mobilization and to be acted upon, whilst remaining an inscription that could be challenged and questioned in the process of being continuously made and updated. Therefore, actors at the mill wanted to *problematize* the allocated sales figures, especially when all the details of the sales plan were not transparent to all actors. In addition to the mill director, the mill-specific sales forecast involved various actors at the production sites in the process of *interessement*, such as the mill controller, production managers, logistics manager and purchasing staff. Sometimes, the suggested sales forecast gave rise to debate, and the effects of the forecast were discussed in detail. In particular, large-scale under-utilization of production capacity was not easily accepted at the mill. Actors at the mill could resist the plans of the sales organization, and sometimes they led to significant changes at the mill:

For example, we [in the sales organization] had planned under-utilization, as we saw that there is not enough demand for that type of business [. . .]. Right away, we got input from them [at the mill] that in that case they have capacity to sell pulp instead. Then we discovered that there is demand for pulp in the markets, so we increased the sales of pulp at that mill, even though the sales of paper were decreasing. So, it is not top-down, but it is rather iteration. (Sales controller, 20 June 2011)

For the paper mill, it was important to see whether the new forecast created changes in utilization rates and affected the stock and working capital goals. Thus, the sales forecast was a strong mediator for the various actors at the mill. The mill controller explained how both sales and production volumes, along with stock levels and prices, were jointly discussed in a monthly estimate meeting:

At the mill, we have an estimate [RF] meeting at the end of each month. Then I sit down with the mill director, sales manager, production manager and logistics director. We review how our next forecast looks and what kind of forecast we are going to send to the business area next month, and what kind of changes we have. (Mill controller, 9 August 2011)

The sales manager started the meeting by presenting the near-term outlook and the anticipated sales volume figures for the mill. When the sales figures had been introduced, the mill management wanted to know what implications this would have for production site, the production plan and the product mix. In the background of the meeting, the mill controller was updating the income statement calculation in their spreadsheet computation. The cost side of calculation was partially based on monthly information, which was collected from various organizational support functions and contained information such as raw material prices, energy prices and exchange rates. The interviewed mill controller

explained how they combined these key cost figures with the sales forecast information in their own calculation during the monthly estimate meeting:

During that estimate meeting, the controller at each mill usually has their own formulated template in an Excel worksheet, where they update those estimate calculations [...], and as the discussion goes on, we update those estimate figures in the worksheet and are then able to see how it affects our profit and cash flow. (Mill controller, 9 August 2011)

The delivery of cost information was well organized and collated in electronic form on SharePoint, a team collaboration software tool connected to the company's enterprise resource planning system. The persons responsible for delivering the cost factor information appeared to be called controllers (e.g. wood supply, logistics and energy supply). Mill controllers often contacted their colleagues in these support functions, which helped the mill controllers in knowledge accumulation, as well as in building an alliance network, as these colleagues understood the functioning of the calculations and the importance of providing truthful information.

This calculation could be seen an "intersement device", which divided people into those who understood its functioning and those who needed the output of the calculations to justify their operational existence. However, and importantly, forecasting is a recurring exercise that is to a great extent (but not perfectly) stabilized. The intersement was more linked to aspects of being a professional who possesses knowledge about the accounting inscription and who has the capacity to challenge numbers (Ezzamel, 1994; Alcouffe *et al.*, 2008).

The monthly RF meeting at the mill was a culmination point for the entire rolling forecasting process. The meeting brought together various actors, each of them having the possibility to affect the direction of the final forecast. In particular, the income statement and related accounting calculations were important *technical artefacts* in translating the information into a form that visualized the implications of the sales allocations for the mill operations and created a new "truth". The spreadsheet tool controlled the discussion and *enrolled* the interests of various stakeholders into the larger common interests that were in play (Munro, 1999). After the representatives of sales, production and accounting had achieved a shared understanding and agreement on the mill forecast, and once the other mills had prepared their own, all the mill forecasts were uploaded into the company's Hyperion consolidation tool. Finally, the business controllers gathered the forecasting information and prepared an overall outlook for the whole business to be discussed by the business management and the CFO.

5.3 Promoting quality and accuracy of planning

In Paperco, the accuracy of the forecasting was monitored on a regular basis. At the beginning of each month, the variances between actual and forecasted figures were analysed. From the business controller's point of view, if the forecast was compiled well, it should be fairly accurate. Accuracy and dedication were seen as the main characteristics of good quality in rolling forecasting. The group controller of the company used the word "mechanism", which indicated that the issue of quality was related to the whole process of forecasting:

I trust that our production sites work so that they try to generate a realistic forecast. So, I sort of trust this (process), if I dare to use the term 'mechanism'. In our firm, people want to do things right, and they also understand what is right. And I know that individual controllers' performance bonuses can be tied to the accuracy of forecasting; the issue that one has considered the right things [...] [...] what may happen in the future and what things have an effect. [...] Therefore, I'm satisfied with the way this process works, even though I know that the psychological effect might drive towards goal-orientation. (Group controller, 7 June 2011)

As the quotation indicates, one way of confirming the controllers' dedication to the forecasting accuracy issue was that their monetary rewards were tied to the *ex post* accuracy measures of the forecasts. Thus, *money* was also an important mediator guiding controllers' focus on the accuracy of forecasts. However, controllers seemed to keep a low profile regarding their aspirations to control the process:

This is not a process led by controllers anymore [as in annual budgeting]; also, the whole business organization works in it, having ownership of the process. We just support and participate in that process. We sort of coordinate the process. (Business controller, 6 June 2011)

Even though controllers argued that they only coordinated the process, it became evident that they were also active mediators. It was important for them that the forecast would mobilize the planned actions so that they would finally achieve their accuracy-related incentive targets and meet their professional expectations. A mill controller illustrates the situation:

However, the forecast may bring about different sorts of issues that might need further investigating [...] [...] [...] we need to start thinking of actions by which we perhaps could do something to remedy such issues. [...] The forecast may also bring about individual more nuanced subjects of interest that might not be added to the official list of action plans. [...] In our case, the business area monitors each month how well we were able to estimate. Did we hit it right? It has a direct influence on our bonuses. (Mill controller, 9 August 2011)

In conclusion, we have described two episodes in the rolling forecasting process which show how a "realistic forecast" is continuously questioned during the forecasting process and how the controllers at various points of the process perform conscious manoeuvres as a part of the "forecasting mechanism". Therefore, controllers' ability to infiltrate various parts of the organization and calculative practices seemed to be one way of ensuring that the realized figures would be fairly close to those that were jointly forecasted. Also, the point that controllers' bonuses were tied to the accuracy of forecasting (measured *ex post*) may lead to some element of risk aversion in the controllers' work and in the level of the forecasted figures.

6. Concluding discussion

In this study, we draw on ANT to demonstrate how rolling forecasts emerge in an actor-network. We show how the "partial stabilization" of the elements of forecasting provided simultaneous means to challenge the "conceptions of realistic forecast" while still aiming to control the hypothetical accuracy of the forecast (Latour, 2005; Quattrone and Hopper, 2006). Our paper empirically documents two episodes of rolling forecasting, where "the understanding about what is a realistic figure" was repeatedly translated and challenged to build the outcome of an accurate forecast. Both episodes indicate that various mediators, such as inscriptions, technical artefacts, human actors and money, played important roles in the process of translation.

Our case study indicates how the expected accuracy of the forecast was an important issue in a large capital-intensive manufacturing firm operating in fluctuating markets. The accuracy of the monthly version of the forecast is usually measured by comparing the previously compiled forecast to actual figures *ex post* (Jordan and Messner, 2020), and therefore the perceived accuracy of the forecast can be seen as hypothetical at the time of preparing a forecast. However, this more anticipatory nature of the concept of "forecast accuracy" became evident in our case study through numerous courses of action that various actors were carrying out (Latour, 2005) to improve the quality of the planning.

In the previous section, we presented two forecasting episodes representing the key points of translation, where the strength of the situational "conception of a realistic forecast"

was contested and the hypothetical accuracy of the forecast estimated. Our findings suggest that the “partial stabilization” of some elements of rolling forecasting was important so that the forecast, which was collated from numerous and heterogeneous remote inscriptions in association with many organizational actors, could be discussed and challenged at the very centre of events. [Lowe and Koh \(2007\)](#) point out that seemingly trivial elements in the network may be critical for the credibility of the inscription. We argue that the partial stabilization of the sales forecast, where some parts of the process could be challenged and some could not, enabled building trust in an otherwise heterogeneous system, referring to a system in which various mediators, such as inscriptions, technical artefacts, human actors and money, associate in the process ([Callon and Law, 1997](#)).

Prior research discusses how accounting systems never seem to stabilize completely to fully achieve black box status, rather continuing to develop over time ([Quattrone and Hopper, 2001, 2006](#); [Busco and Quattrone, 2018](#)). In our case, we were able to identify two forecasting episodes where the constructed accounting inscriptions partially stabilized as “facts”, mobilizing various actors to discuss and challenge the set of numbers. The first episode was in the sales organization and showed how the use of a technical artefact (sales analysis tool) played an important role in shaping the idea of realistic sales figures. Ideals, such as being “realistic”, are typically abstract entities unless they are operationalized and enacted ([Quattrone and Hopper, 2006](#)). In particular, the historical analysis tool of the sales team was a powerful mediator in bringing “the absent very much present”, namely, historic trends ([Justesen and Mouritsen, 2011](#)). By modifying the sales figures to comply with the criteria of historical trends, actors were able to translate the organizational understanding of what is meant by a “realistic sales figure”. Thus, actors were able to bring the past and the future into the present ([Palermo, 2018](#)) by viewing the current understanding of trends. This way, figures presented in the historical scale became more valid “facts” and could be agreed on in sales and the whole business area organization. This way, the sales forecast appeared to achieve a partial, limited-time black box status (stabilization for now) in the forecasting process. Nevertheless, we can speculate that the range of possible outcomes of sales volumes and price might be wide in uncertain environments. This indicates that a forecast becomes constructed by various types of constellations and shifting connections, which may cause relational drift ([Andon *et al.*, 2007](#)). Thus, the systems cannot be seen to stabilize completely, as the ways in which the forecast mobilizes other actors change constantly ([Quattrone and Hopper, 2001, 2006](#)). Therefore, the controller, even while being capable of inventing practical solutions to confirm the quality of information, cannot completely control the outcome of the process ([Lowe, 2001](#); [Andon *et al.*, 2007](#)).

The second episode of stabilization took place in the production site’s forecast meeting and focused on the concerns of production-side personnel regarding the under-utilization of production capacity. While the sales organization and controllers had the authority to orchestrate the allocation of sales volumes between the production sites, their sales forecast was a powerful inscription, as it mobilized production personnel and controllers at the mill. One starting point for the second stage of stabilization was the technological platform that gathered all available information regarding the operations of the mill for the use of controllers, enhancing the knowledge accumulation cycle ([Latour, 1987](#)). The platform as an inscription device enabled mill controllers to become a “centre of calculation” in the forecast meeting and objectively represent the operations of a company in a form of simplified Excel sheet by bringing the “outside in” ([Law, 1992](#); [Robson, 1992](#)). As experts in financial calculations, mill controllers sketched the paper mill’s future, visible to others in the form of profit and loss, using these calculations as truthful representations of the future ([Lowe, 2001](#)). However, the validity of the truth (forecast accuracy measure) could only be assessed

afterwards (Lambert and Pezet, 2010). From the quality of planning point of view, our study indicates that the “partial stabilization” of rolling forecasting was a controlled action, where company controllers, through their calculative apparatus, defined those elements that were open to challenge and those that were not. Our findings demonstrate the perceived strength of accounting’s functional network and their inscriptions over the other functional actors (Lowe and Koh, 2007).

Our findings extend previous studies on interactive forms to improve planning quality (Østergren and Stensaker, 2011; Bourmistrov and Kaarbøe, 2013), and our paper is, as far as we know, the first to give a more detailed demonstration of the rolling forecasting process and the role of a varied group of controllers therein (cf. Goretzki and Messner, 2016). Controllers were in the centre of the calculation, and there was a strikingly wide group of controllers working in various support functions (paper mill, wood supply, energy supply, logistics, etc.). The strength of the accounting network in the forecasting process was its ability to use “obligatory passage points” (Callon, 1986; Latour, 1987), such as the historical tool of sales trends and the profit calculation, which combined the concerns of all (the networks of sales, production and accounting) (Lowe and Koh, 2007). While Bourmistrov and Kaarbøe (2013) point out that rolling forecasting provides many possibilities for discussion and debate, we specify that the obligatory passage points in rolling forecasting (in relation to the key problematization stages of forecasting) were in fact important fabrications in funnelling the flexibility in forecasting and creating a controlled space for interaction. In line with Østergren and Stensaker (2011), controllers’ calculative practices created room for managers to assess the feasibility of figures as the decision-making situations were continuously changing. Therefore, the forecasting can rather be seen as the “interaction of heterogeneous elements that are shaped and assimilated into an open-ended network” (Law, 1991). This means that the forecast was mediated through relational attempts to define what it “really” represented (Andon *et al.*, 2007).

Our findings show that the controllers were rhetorically willing to claim their neutrality in the rolling forecasting, even though they seemed to be strong mediators in the process. For example, controllers could initiate investigations for remedial actions in a proactive manner, if forecasted figures started to indicate deviation from targeted levels. Moreover, controllers were incentivized by *money* to promote the accuracy of the forecasts. Monetary incentives may inhibit controllers from advancing managerial interests in the organization, which can be a risk with more interactive planning processes in general (Østergren and Stensaker, 2011). In fact, strong authority of controller function is found to foster risk aversion (Lambert and Sponem, 2012), which was also evident in our case, as controllers were reluctant to take risks with excessively anomalous forecast numbers. It rather seems that attempts were made to construct a “façade of neutrality”, for acting like an intermediary that delivers impartial information to managers. This finding contributes to Hyvönen *et al.* (2008) by indicating how controllers acted in concert with other mediators (accounting inscriptions, technology, money/resources) to mobilize action.

One explanation for controllers’ claims of neutrality might relate to their willingness to promote the trust in figures. Accounting inscriptions are typically seen to represent neutrality but also to build trust in figures; therefore, the controllers may aim to keep the neutral illusion of their intervention. Thus, the powerful role of controllers is not given or “invisible” background information but rather becomes evident as an outcome of the actor-network. Our study points out that when the focus is on measuring the forecast accuracy, this guides the attention to the issues that are typically important for the accounting function, that is, how well all the available information has been integrated to compile the

forecast and how well the forecast is finally enacted in the organization (Jordan and Messner, 2020).

Finally, this was a single case study illustrating a construction of numbers in a firm's forecasting process and the role of controllers therein. This is one interpretation of controllers' aims of keeping a neutral illusion of their intervention, while being a powerful mediator in the process. Therefore, we propose more research in other management accounting settings to shed further light on the role of controllers in cross-organizational planning processes.

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Interviewee	Location	Date	Duration
Mill controller No. 1	Production site	29 Sept. 2009	1 h 20 min
Group controller	Group headquarters	02 Oct. 2009	1 h
Business controller No. 1	Group headquarters	02 Oct. 2009	1 h 30 min
Business controller No. 2	Group headquarters	26 Oct. 2009	1 h
Business controller No. 3	Group headquarters	26 Oct. 2009	1 h 15 min
Mill controller No. 2	Production site	17 Nov. 2009	1 h 10 min
Business controller No. 2	Group headquarters	06 Jun. 2011	1 h 15 min
Business controller No. 1	Group headquarters	06 Jun. 2011	1 h 10 min
Business controller No. 3	Group headquarters	07 Jun. 2011	1 h 10 min
Business area controller No. 1	Group headquarters	21 Jun. 2011	50 min
Mill controller No. 2	Production site	09 Aug. 2011	1 h
Group controller (new)	Group headquarters	07 Jun. 2011	1 h 20 min
Sales controller No. 1	Group headquarters	20 Jun. 2011	45 min
Business area controller No. 2	Group headquarters	20 Jun. 2011	45 min
Sales controller No. 2	Group headquarters	20 Jun. 2011	1 h
Sales support manager	Group headquarters	21 Jun. 2011	1 h 5 min
Business controller No. 4	Group headquarters	21 Jun. 2011	1 h
IT manager	Group headquarters	22 Jun. 2011	50 min
Business manager	Group headquarters	08 Nov. 2011	50 min
BI manager	Group headquarters	08 Nov. 2011	50 min
Mill controller No. 2	Production site	11 Apr. 2014	40 min
Mill director, production manager and financial manager	Production site, Group interview	11 Apr. 2014	45 min
Business manager	Group headquarters	26 May 2014	1 h
Business Controller, Wood supply	By phone	09 Jul. 2014	40 min
Business Controller, Energy supply	By phone	11 Jul. 2014	45 min
Sales controller No. 3	By phone	02 Jul. 2014	50 min
Interviews 26			21 h 45 min

Table A1.
The interviews

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