



The triple visual

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Translations between photographs, 3-D visualizations and calculations

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Abstract

Purpose – The purpose of this paper is to analyze relations among different kinds of visualization in annual reports and to trace their interaction with activities in marketing and sales, in design and planning, and in operations. For this purpose it is intended to produce insight into the referents that make up a particular image found in the annual report: the 3-D visualization.

Design/methodology/approach – It is a case study of a firm that uses different kinds of visualization in many parts of its activities. The case study is based on different kinds of empirical data, such as annual reports, interviews and field observations. This allows a better understanding of relations and translation between visualization and organizational practices. The paper draws on theoretical work on photography and 3-D visualizations and is inspired by the actor-network theory approach in its analysis of how various kinds of visualizations interact.

Findings – It is suggested that visualization is important in all aspects of the firm's activities such as accounting, communication, selling, planning and operations. It is shown how the visualizations interact with one another and are superimposed on one another to develop even stronger modes of reporting in the annual report and stronger coordination towards the market, production and operations. Visualizations in annual reports are not merely window dressing but also their traces and referents have to be found elsewhere than in the financial reporting system.

Research limitations/implications – This is a single case study, and more cases need to be analyzed to understand the complexities of interactions between visualizations.

Originality/value – The paper produces insight into the referents that make up a particular image found in the annual report: the 3-D visualization.

Keywords Visual media, Photographs, Annual reports

Paper type Research paper

Introduction

A common theme running through most discussions of the visual in annual reports is the attempt by the firm to convince an audience about the firm's capabilities and futures. Annual reports are often seen as rhetorical devices that are used for "impression management" purposes (Aerts and Cormier, 2008; Neu *et al.*, 1998; Skærbæk, 2005). We add to this research by showing that, rather than being merely rhetorical, visualizations can have the capacity to strengthen the link between the annual report and events that happen inside the firm and towards its market. Visualization can strengthen the annual report because it translates and performs (Latour, 1986a, 1987, 1999) combinations of cost accounting, marketing, design and planning activities. The annual report is thus not only full of empty signifiers; some visualizations are powerful because they are extended by events that govern selling, production and design.

This argument is based on a study of a property developer firm in the Danish construction industry (DF, a pseudonym). DF develops and sells construction projects but subcontracts out all construction work and a large part of the design work to



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external companies. Over the last 8 years DF has developed a sizeable annual report whose number of pages exceeds the number of employees. We analyzed these reports, we interviewed managers, we observed meetings and did field work on a construction site. It turned out that visual images were present everywhere and played a notable role in all the different locations. In a discussion about the annual report and the visual, DF is a particularly interesting case because its annual report not only includes photographs but also visualizations created by new 3-D technologies (Boland *et al.*, 2007).

The distinction between photos and images created by 3-D technologies is interesting because whereas photos may appear “realist” (Sontag, 1977), the latter images are often simulations of things not yet materialized. How can simulations work in annual reports which are supposedly accounts of past transactions? The 3-D visualization turns out to be strong because it is solidified by appearing, not only in the annual report, but also in other situations. The 3-D visualization is in marketing materials where it is a basis used by customers to decide to buy an apartment, house or a building. It also plays a role in designing, planning and realising the particular construction projects. Through all these links the 3-D visualization has created strength. It is a mediator (Latour, 2005) that connects different entities and activities.

The paper proceeds in the following way. First, we outline the general approach and theoretical underpinnings that inform our study. Then we relate our research to previous studies on accounting and the visual. After that we turn to the empirically based case study of visualizations “in action” where we analyze how the visual acts in different ways when it travels from one context to another. We end our paper with a theoretical discussion of the powers of visualization related to the findings of our case study. This is followed by a short conclusion.

Approach and conceptual background

Actor-network theory

Our analysis is informed by actor-network theory (Latour, 1987, 1999, 2005). Consequently, we view both annual reports and visualizations as actors. According to Latour “any thing that does modify a state of affairs by making a difference is an actor – or, if it has no figuration yet, an actant” (Latour, 2005, p. 71). However, no actor acts alone and when the visual acts, such action is always part of a larger “collective” that acts together with it, hence the notion of the “actor-network”. Actors are always “made to act by many others” (Latour, 2005, p. 46). Translation is a key concept that is used “to mean displacement, drift, invention, mediation, *the creation of a link that did not exist before...*” (Latour, 1999, p. 179, our emphasis).

Actor-network theory focuses explicitly on the actions of visualizations. With a pun, typical of his style, Latour says that visual aids make “present absent things” (Latour, 1986b, p. 8). Latour focuses particularly on 2-dimensional graphical materials which are generally referred to as “inscriptions”, characterized by materiality, combinability and mobility that makes new translations possible (Latour, 1987, 1999). An inscription can be moved from one context to another (spatial and/or temporal), making it possible to “act at distance” (Latour, 1987). A classical example is the map that makes it possible to act in relation to a distant place that one may never have set foot on (Latour, 1986b, 1987). Other examples of inscriptions, related specifically to accounting, are accounting numbers in general (Robson, 1992) or intellectual capital statements (Mouritsen *et al.*, 2001a).

DF's annual report consists of many different kinds of inscriptions, such as numbers, text, diagrams, maps and different kinds of pictures, of which some are photographs and some are visualizations created by 3-D technologies. The sales material is another set of inscriptions which uses 3-D visualizations, and they are used also in design and planning activities in the firm. We trace the movements of these visualizations to see how they interact in relation to the annual report.

Photographs and 3-D representations

Although actor-network theory discusses inscriptions there is little focus on photographs and 3-D visualizations as specific kinds of inscriptions. Therefore, we draw on Susan Sontag's work on photography (1977) and Boland *et al.*'s (2007) discussion of representations generated by 3-D technologies. Sontag's work is different from actor-network theory, but, like Latour, Sontag is critical of the kind of correspondence theory that views representations as "mirrors of reality" (Rorty, 1980). On the basis of this epistemological consistency, we use Sontag's work to the specific purpose of this paper.

In Sontag's well-known essay on photography she claims that "[p]hotographed images do not seem to be statements about the world so much as pieces of it, miniatures of reality that anyone can make or acquire" (Sontag, 1977, p. 4). The photograph's realist pretensions have also been noted by accounting researchers (Preston *et al.*, 1996). Sontag notes that "[t]he picture may distort; but there is always a presumption that something exists, or did exist, which is like what's in the picture. [...] a photograph any photograph – seems to have a more innocent, and therefore more accurate, relation to visible reality than do other mimetic objects" (Sontag, 1977, p. 6). Sontag's argument is not that photographs actually have such a transparency but that they appear to have it and appeal to it.

In many ways, a 3-D visualization is similar to photography. It often looks like a photograph and could even be seen as an imitation of the photography. But Sontag's statement that pictures presume the material existence in either past or present of the object they depict is today contradicted by the presence of the 3-D visualizations, a technology that did not exist when Sontag wrote her essay. Here, the visualization often points towards something that strictly speaking does not exist, but may exist in the future. There is nothing inherent in the technology that necessarily makes it future-oriented. It is, of course, just as possible to make a 3-D visualization of an already materialized object. However, in practice 3-D technologies are often used to represent virtual objects. Boland *et al.* (2007) discuss how 3-D representations are used for innovation purposes in the construction industry. To them, 3-D tools are different from traditional 2-D images because they "allow for a full visualization of design in actual scale [...]. When fully developed, a digital 3-D representation is a complete digital prototype that *acts like the actual building*" (Boland *et al.*, 2007, p. 636, our emphasis). Thus, if the photograph has "realist ambitions" Boland *et al.* apparently view the 3-D representation as "super-real". Representation and object are conflated. While the photograph points backwards in time towards the physical existence of the photographed object, the 3-D representation refers to a virtual object that may materialize in the future.

When we analyze 3-D generated visualizations in this paper, the representations referred to are often translated into a 2-D representation. While the 3-D visualization can

be presented on a computer monitor in a way that makes it possible to move the represented object and view it from different angles, these possibilities no longer exist when the 3-D image is frozen and copied into an annual report or a printed sales prospectus. The temporality of the referent in this 2-D version, however, is still the future.

The visual in annual reports

It is possible to compose an annual report without the use of visual aids, but today[1] this rarely happens for larger companies. Visual images are part of accounting representations and “annual reports commonly comprise quantitative information, narratives, photographs and graphs” (Stanton and Stanton, 2002, p. 479). Even if inclusion of pictures in annual reports has been dated back as far as to the 1930s (Preston *et al.*, 1996, p. 113), only few studies discuss the relationship between accounting and the visual. This underrepresentation in accounting research, noted by Hopwood (1996) more than a decade ago, still seems to be true although there are now notable exceptions (Davison, 2002, 2007, 2008; Preston *et al.*, 1996; Graves *et al.*, 1996; McKinstry, 1996; Preston and Young, 2000; Mouritsen, 2000; Mouritsen *et al.*, 2001a, 2001b; Quattrone, 2009).

Firms spend a considerable amount of money designing such documents (Preston *et al.*, 1996, p. 115) and larger companies typically outsource the design task to an external design agency (Stanton and Stanton, 2002, p. 479). Inspired by a post-modern perspective, Preston *et al.* (1996) argue that annual reports not only represent, but also help constitute the firm. They analyze how pictures play a role in this context. Graves *et al.* (1996) show that the inclusion of pictures in annual report coincides with the rise of what they call a “television regime”. They argue that, at least in the USA, the television media function as a supra-discourse setting the agenda for representation in several other domains, including accounting. In order to persuade audiences, it is a good idea to imitate the way television communicates which is primarily by entertaining through images. Both Graves *et al.* and Preston *et al.* discuss the role of annual report images at a general level. They make no explicit theoretical distinction between different kinds of pictures. However, the examples in their articles are mainly photography, although Preston *et al.* also discuss how reproductions of artwork may be imported into annual reports.

Davison (2007) focuses explicitly on the photography as a distinct genre in her analysis of NGO accounts and accountability. She analyzes the front cover photograph of a NGO annual report, showing how this picture may be read as “a statement of the multiple nature of the non-governmental organizations’ operations and advocacy” (Davison, 2007, p. 154). Mouritsen *et al.* (2001a, 2001b) trace the use of visualizing aids in intellectual capital statements. They suggest that visualizations and narratives add to financial numbers and propose to account for the mechanisms of value creation. This communication is directed not merely to the external audience but also to internal audiences to persuade them about their (new) roles and obligations in the firm, and how they (should) contribute to value creation. While photographs are common, 3-D generated visualizations are rare in annual reports and, to our knowledge, the role of such images has not been discussed in the accounting literature.

Visualization in action: the case of DF

Our case analysis is a qualitative study, based on different kinds of empirical evidence related to DF. We combine document reading, interviewing and observation studies

(Silverman, 1993). We analyze eight annual reports (1999-2006) but focus primarily on the 2006 report, and we include the firm's sales material, which is both in print and online. Second, we draw on qualitative, semi-structured interviews (Kvale, 1996) conducted in the firm. All interviews were tape recorded and transcribed at full length. Third, we undertook a week's field work in a construction site and use field notes taken during meetings and other observation activities in the field.

DF, the case firm, is a property developer firm. It is a quite small organization with less than 100 employees. However, in terms of revenues and profitability it is one of the big actors in the Danish construction market. DF's main activity is development of ideas on the basis of land acquisitions that are seen as potential sites for new building projects. The projects are typically houses or apartments sold to private customers. DF is organized in two main units called, "project development" and "building departments". Typically, product developers have a background as estate agents. A few are engineers, but there are no architects. Project developers are primarily involved in the early phases of the projects where they develop ideas for new construction projects to be sold, and then built. The firm's rule of thumb is that 50 percent of a project must be sold before the actual construction is initiated. As we show later, development and marketing are therefore integrated and overlapping activities in this department. Later in the process, the project is handed over to a manager from one of the building departments. Project managers all have a technical background, such as engineers or constructors, and in addition to this, they have experience with project management, typically from other contracting firms. However, construction activities are all outsourced to external contractors and the role of the firm can be described as that of a highly professional client who supervises the outsourced work closely.

Thus, DF is in the construction business but is not a typical contractor because all parts of the construction work are outsourced. Property developers, in general, are firms that add yet another layer to the already distributed practice that characterizes the construction industry (Boland *et al.*, 2007). DF's tasks are property development, marketing and sales. In order to manage these activities DF supervises the activities of the contractor who, in turn, is responsible for the activities on the construction site. DF is a typical network company that "uses other firms' complementary resources in its operations" (Mouritsen and Thrane, 2006, pp. 241-242). It has a small core but, through its network, its scope is large.

DF's annual reports – changing appearances

Table I illustrates how DF's annual reports have changed significantly from 1999 to 2006. The length of each report is listed and this column shows significant variation at this point. The category "other visualizations" refers to the firm logo, diagrams, maps, etc.

	1999	2000	2001	2002	2003	2004	2005	2006
Photos	0	0	37	22	36	60	32	18
3-D visualizations	0	0	0	19	28	38	20	14
Other visualizations	0	0	7	4	4	12	11	8
Use of colour	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Length of report (number of pages)	24	38	41	47	84	116	88	97

Table I.
Count of the visual in
DF's annual reports

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22,6

978

The table shows how the design of the annual report changed dramatically in 2001. The number of visualizations increased from literally none to occupying almost all pages apart from those presenting the financial statement. In 1999 the firm's annual report consisted of 24 pages. On the first page a headline proclaims that the year has ended with a "record result" for the firm. However, while there is no modesty in claims about the success of the firm, the visual design is modest and dull in a way that would appear striking in the decade to come. There is no flashy front page, no colours, no pictures and no other visualizations. The report consists of words and numbers only, all printed in black on a white background

In 2006[2] the annual report looked completely different. This text is printed in colours and there is at least one picture on almost every page of the first 55 pages of the 97 pages long document. The words and the numbers are still there, but they are accompanied by a multitude of different visualizations. The front page shows a picture of a building. Above the photo is the company name printed in white next to the company logo, also in white. Below the company name, it says "annual report, 2006", "25th fiscal year". All text appears on a blue background.

The first page of the report is completely covered by yet another picture of a building, somehow resembling the one on the front page. The buildings, both shown from the façade, are dominated by the colour brown and both have large windows. In both pictures, a clear blue sky above the houses is visible. However, while this picture shows a building that has been built, the image on the front page is a visualization that shows a building to be build in the near future. Even though the two pictures are strikingly similar, the text tells that the first is a visualization, whereas the second is a photo. The latter refers back in time whereas the former points forward towards a virtual referent. In terms of content, composition and style, the resemblance between the photos and the 3-D visualizations in the report is striking (see Figures 1-4).



Figure 1.
3-D generated
visualization

Source: Developer Firm's database of pictures and visualizations



Source: Developer Firm’s database of pictures and visualizations

Figure 2.
Photograph

A difference between the two kinds of images is a difference in time orientation. In DF’s annual reports the photographs and the 3-D visualizations often refer to particular buildings, but whereas the former refers to existing buildings, built in the past, the 3-D visualization refers to something that is in process of becoming because more than 50 percent of the building has been sold and promised to buyers. However, its referent does not exist *yet*, or at least it does not exist in the straightforward, common sense of the term “exist”. Its referent is located somewhere in the future. Thus, there is a temporal difference.

Time is implicitly invoked as a structuring principle throughout the report that oscillates between referring to past, present and future events and activities[3]. A considerable part of the report describes in words how the firm has performed during the year in question, referring to the past. Quantitative financial numbers are then added to the qualitative account. For example the report presents key ratios for the firm, comparing the last five years financial performance in three different tables and when the numbers are read in the chronological order it shows a line of progress measured on (almost) every indicator. The performance of each year is improved compared to the previous year, culminating in the year 2006.

The accounts of the past in words and numbers are supplemented by photographs, the majority of which (a total of 11) show buildings that have been developed and built



Figure 3.
Photograph

Source: Developer Firm's database of pictures and visualizations

by the firm; seven of the 11 photographs of completed projects are full page pictures. Each photograph has a short text attached stating the name and the location of the project and also stating that the picture is a photo. No further comments are added to the photos in this report. The photographs of buildings are stories of past performance. The firm has developed, built and, perhaps most importantly, sold the buildings in the pictures. The pictures represent value created by the firm in the past year. However, since this value is already represented by words and numbers in the report, what do the photographs add to the account of past performance?

According to Sontag, photographs are very convincing evidence of the real:

Such images are indeed able to usurp reality because first of all a photograph is not only an image (as a painting is an image), an interpretation of the real; it is also a trace, something directly stencilled off the real, like a footprint or a death mask (Sontag, 1977, p. 154).



Source: Developer Firm's database of pictures and visualizations

Figure 4.
3-D generated
visualization

That is, photographs have a special convincing potential because they seem not only to illustrate past performance but actually bring proof of this performance into the report. They appear as a physical sample or a trace of reality rather than a mere representation. In a sense, the building solidly constructed at a precise place in the world seems to be transported into the annual report through the medium of the photography. However, as Latour (1987, 2005) reminds us there is no such thing as a “pure”, frictionless transportation. Movement means displacement, translation and the forging of new links. Therefore, when the building is made present in the report by the photograph as mediator (Latour, 2005) it partakes in new actions by being linked to accounting numbers and text and then it becomes an accountability device.

Whereas the photographs of the report refer to the past, the 3-D visualizations refer to the future. They show something that will exist in the near future due to the

activities of the firm. They promise a materialization of the images shown. In that sense the movement is opposite. It is not “real” buildings that are brought into the report, but rather images of buildings that are to be translated to and transformed into reality. Hence, both the past and the future are brought into the annual report through different kinds of inscriptions.

The present is also represented in the text through numbers, words and pictures. However, while pictures of buildings are used to illustrate value of past and future activities, the present is represented through photographs of the firm’s “knowledge resources”: people working in the firm[4]. The pictures of people illustrate that the constellation of knowledge resources ranges widely from “ties” to “hard hats” and that activities are diverse in this company. The photographs show existing resources that are the means to realise and materialize the promised future projects. The photographed people, engaged in a variety of activities, are the ones who will translate images into real buildings of bricks and stones.

In spite of the differences in terms of temporal reference, all the images in the report are idealizations. The photograph, even if obviously about a real thing, edits this real thing by giving it occasion: it is nice weather, the building is clean, and there are only a few, if any, people to disturb the aesthetics of the building which performs iconoclastically.

The space between the photos and the 3-D visualizations is filled with text and numbers. There are statements about employees, competencies, customers and partners and the more the visual gets mobilized in photos and 3-D visualization, the more the text develops descriptions of the firm’s practices, the report becomes a noticeable body of pages and adds colour and composition. Together the text, the numbers and the visual develop a version of the firm which:

- requires important knowledge resources;
- is a network organization which needs to have a network of partners to help execute strategies; and
- invites customers to take part in the realization of the future.

The annual report assumes a place as a centre of calculation (Latour, 1987) which assembles different threads about the past, the present and the future focusing on buildings, employees, managers, and customers. Assigning roles to all these entities the annual report weaves together an account of organizational competency, or of DF’s intellectual capital.

Creating visualizations of the future: designing and selling new projects

When presented in the annual reports, 3-D generated visualizations of future buildings can be seen as promises to actual and potential shareholders and stakeholders. However, the same images can also be seen as promises in another context. DF always prepares sales material at the beginning of a project and 3-D generated visualizations are central parts of this material. When DF develops and plans future buildings, numbers, words and visualizations are intermingled in these processes as they are in the accounting representations.

Typically, the development of a new project begins with the acquisition of land that is seen as having “potential”:

You find a piece of land that has good potential for a construction project. And this drives the process. Because the buyers will only be there when you have *illustrated* what you want to build and what it will cost and what the *visions* are” (project developer, our emphasis).

Developers talk in visual terms from the very beginning of a project. The project developer emphasizes the importance of “illustrating” the building project in terms of both visions and costs. Visualization is a precondition for selling the project. Another interviewee also refers to visualization in the very early part of the process, but he does so in more concrete terms by connecting the visualization to the making of a concrete sales material:

As soon as we have a district plan it’s a starting signal in this firm saying that we now have to sell. And then the project developers start making a sales prospectus (project manager).

The “sales prospectus” is the visualization of the emerging construction project, but before this material can be finalized, the firm interacts with external architects, hired for the particular project. The project developers and the architects discuss various options in order to create a particular vision of the future project:

Then we cooperate with the architects, discussing how to develop the site in the best way, extracting the greatest amenity values from the area. This varies quite a lot. [...] We look at the site and ask ‘could we create something that hasn’t been seen before . . . get something out of the site that we can transform into a future amenity value?’ (project developer).

The notion of “amenity value” is important here as a piece of land may hold different potentials. The project developers’ job is to extract maximum amenity value. However, the aesthetics of the project is not the only aspect to be considered. While the aesthetic concept of “amenity value” and the visual appearance is one parameter, the quantitative concept of “the square meter” is seen as equally important. The unit of the square meter is included in the calculations of both assumed costs and assumed revenues and this measure is essential to the development of a profitable project:

Typically, they [the architects] make different suggestions [...] and then we try to figure out which advantages and disadvantages are related to one building rather than the other [...]. Again, it is a question of the number of square meters we want to build. And, then, after 2-3 workshops [with the architects] we end up with something that we think is saleable (project developer).

Calculations of space are not detached from reflections on “amenity value”, because the price of the square meter – both in terms of costs and revenues – varies with it. This is clearly illustrated by the following quote from the CEO:

Of course, they [the architects] draw the houses, but the point is to draw something you can sell; optimized and trimmed buildings. That’s part of it. If you can make an apartment that is 4 square meters smaller, but still has the same functions and gives the same impression of a 3-4 room apartment, then that is the trick.

Visualizations are connected to calculations in this part of the planning process and the focus on optimizing assigns roles to architects with less autonomy than they may be used to.

When it is decided to go ahead with a project, the firm approaches the market very quickly by preparing sales material before beginning the actual construction process. Therefore, detailed visions of the projected building are important at an early stage.

The initial drawings are sent to an external design and advertising agency that has specialized in designing 3-D visualizations to the property development industry and this agency creates images of the projected houses, which is to function as part of the sales material. This is the same material that eventually may appear in the annual reports to come. The sales material is presented in both a printed and a website version and the potential customers' buying of houses is based on this material.

Also in the context of marketing, images are supplemented by both text and numbers and by other kinds of visualization such as photographs of landscape, maps and drawings. The text is in many ways similar to the typical real-estate discourse, but compared to "regular" real estate ads this text is much more elaborated, containing detailed information about the architecture, etc. The numbers are primarily related to prices, which are again roughly correlated with the number of square meters of a certain apartment or house.

3-D generated visualizations are thus used in project planning activities and they are strong inducements of accountability because they promise potential buyers a specified product. These images are real in the sense that they have certain framing implications since people buy their future homes based on them. This is a precondition for the realization of a building project. So even if the visualization is true in negotiating with the individual customer, it is not 'really true' before it has attached itself to the market (50 percent sold). Again, we see how visualizations translate since the "same" image performs differently here compared with in the annual report. Visualizations are actors (Latour, 2005) in the sense that they do something. They promise and help selling a not-yet realized product. This is possible because they are connected to other entities, such as developers, advertising text, calculations, real estate agents and customers. Here the visualization may be particularly potent because of the realist pretensions (Sontag, 1977) it adopts by imitating the photography. Boland *et al.* (2007) accentuate this arguing that the 3-D representations "act like the real thing". However, while this may be true in terms of promising, persuading and selling there is a considerable amount of work still to be undertaken before the referent is constructed. As the following section illustrates, when the visualizations travel into the field – into the construction site – they change once again because they are now connected to new entities and ends.

Translating 3-D visualization in the building process: constructing the materiality

When the critical percentage of a project is sold, the actual construction process begins. The formal role of DF is now that of a professional client who participates very actively as a project manager on the construction site.

During our field study we observed the project manager's everyday activities and our observations made us aware how visualizations, such as photographs and the 3-D generated images also play a role in this context. For instance, we noticed how the project manager took pictures with his digital camera when walking around the site. One such picture was taken of a hydrant "which should have been removed by the contractor", he told. He explained that the pictures are sent to the contractor, documenting things that the contractor should react to. It is also used to document if the contractor is behind schedule. The project manager creates a project file, which is organized as a project log book. In this file, the progress – or lack thereof – is noted day by day, using both words and pictures as documentation. These visuals are used at

meetings with the contractor, holding the latter accountable in relation to the time schedule etc.

In two different meetings between DF's project manager and managers from the contractor firm, we observed how the visualizations, printed in the sales material, were mobilized. In the first meeting, an issue on the agenda concerned the placing of kitchen cupboards. During this discussion it was interesting to see how the sales material was referred to by the project manager who literally pointed to the 3-D generated visualizations of the kitchens in the sales material, arguing that the contractor should solve the problem by building in accordance with the visualizations in this material. The contractor, however, argued that he was supposed to build according to the architect drawings – and not sales material or customer preferences. The architectural drawings were then also placed on the table, and it turned out that consistency did lack between the two sets of representations. The architect was told to consult the sales material in order to make sure that the revised drawings would fit it.

In another meeting the project manager and the contractor consulted the sales material several times when discussing choices of materials and other options in the building process. Although there are opportunities to optimize the choice of material it is required that the chosen material looks like the one in the virtual image of the sales catalogue.

The sales material is important because it makes a promise to the buyer. In a sense, the customers have bought a virtual product, trusting that the firm will realize what their pictures, words and numbers promise. The CEO of the firm reflects on this in the following quote:

[...] It means that you have to be very precise very, very early in the process. Because those pictures are so vivid that you can actually see if the floor material is oak, beech or ash tree, right. In the past we only had a drawing and a description. It was almost not until you moved in that you could see what it looked like. So there are now some very strong restraints which means that we must make some decisions very early in the process because you are caught. *It is so vivid that you think it is a photo*". (CEO, our emphasis).

The quote shows how the sales material partakes in the construction of the building in the sense that the representation restrains the process in important ways. If the floor looks like oak in the material it *must* be oak in the actual building. In that sense, the sign or the inscription is prior to the referent.

Again, the "realist" (Sontag, 1977) or even "super-realist" (Boland *et al.*, 2007) genre of certain images have a number of implications and can be seen as actors that make a significant difference (Latour, 2005) and actively partake in the actual work of constructing a new building. The process is neither smooth nor linear. It is not a question of transporting the image into reality, realizing an already existing potentiality. Instead, our analysis has shown how the translation process involves hard work and negotiations to position different actors *vis-a-vis* each other via visualization

The powers of visualizing: the performativity of pictures and calculations *The circulation of visualization*

The case of DF enhances our understanding of how different kinds of visualization act and how they act together. Tracing the visual through annual reports and sales materials as well as in planning meetings and on the construction site, it is noteworthy how it is part of many of the firm's activities. The 3-D generated visualizations occur

and play a central role in both annual reports, planning of new project and the coordination of work at the construction site. Like others (Preston *et al.*, 1996; Graves *et al.*, 1996; Davison, 2007), our study shows that visualization is a strategy through which the firm attempts to manage and persuade its audience. However, we add to this literature an account of how the images in an annual report are strengthened by visualizations. The visualizations become “super-real” in the annual reports because they enrol many actors in the market place, in design and in the firm whose ambitions and activities are organized by the visualization. It is strong because it organizes so many others and therefore it has a form of referent that is not merely decoupled window-dressing. As Latour (1986a, 2005) says, the visualization is a centre that organizes other actors and which gain reality by the combined work of all these actors.

Therefore, our addition to this literature is to show how different kinds of actors interact, travel and are translated via the visualization. The visualization found in the annual report also has a place in other settings and influence decision-making in many parts of the firm. This visualization travels between the annual report, design, marketing and sales, and construction. This travel makes it strong and solid.

Generally, the visualization does not stand alone. In the annual report photographs exist alongside 3-D generated visualizations and text about intangibles and financial numbers. In the design meeting, images exist alongside cost calculations and calculations about market demand; the calculations help develop the building. On the construction site, photos are juxtaposed with the calendar to expose accountability, just like, in the field, 3-D visualizations and architectural drawings compete for recognition leading to allocation of blame and accountability when they are drawn on differently by the various parties. The interplay between visualization of different kinds is facilitated by their materiality and mobility (Latour, 1986b). They can all, literally, be carried from meeting room to meeting room; from design room to sales room and from the sales room to the customer’s homes or computers; from planning rooms to temporary offices on the construction site. Second, the visual in the annual report connects the past, the present and the future. The past and the future are connected, because it is shown how the future is going to resemble the past in terms of finished building projects that appear as successful. The visualizations representing the future can be seen as borrowing legitimacy from the photo that is conventionally read as realist (Sontag, 1977). Only, the 3-D visualizations show the reality as it will be in the future. It presents a promise. It is a representation that has a virtual referent, but this does not mean that there is no referent or that the image is a mere illusion. The image is not detached from the material reality, but helps to enact this reality. In forthcoming annual reports pictures of the visualized building may appear again. The motive and composition may be almost the same. Only this time, the picture will be a photograph of a physical rather than a virtual thing. It will tell a story of something that has, literally, taken place rather than something that is going to take place.

Where others have related visualization in annual reports to a post-modern idea of a lost referent (Macintosh *et al.*, 2000) – or at least a much-weakened relation to such a referent (Preston *et al.*, 1996, p. 113) – our analysis suggests that the relation is instead strengthened through the use of visualizations. The relationship between representation and referent is, however, in no way a simple and uncomplicated mirroring of an external reality. In terms of the photograph the picture is always a carefully edited and idealized image that “furnishes evidence” (Sontag, 1977) of past

performance. In terms of the 3-D generated visualizations, this is also an idealization but it is also a promise that obligates and restrains future actions in a way that cannot be understood if such images are read as a mere “play with signifiers”. It is not cost free to make such promises. Fulfilling them to an acceptable degree requires a lot of work and numerous translations. Even so, there will never be an exact match between representation and referent, but the job of DF is to construct a building that looks like a match – a match to be photographed and put in a forthcoming annual report. The future is conditional, we learn from the planning meetings, since the building first has to be designed and then sold before it is possible to contemplate its construction. These additional conditions in marketing and production are mediated by the same types of visualizations as the ones we see in the annual report.

All the visualizations share a certain optical consistency (Latour, 1986b) that makes it possible to present them on a 2-dimensional surface. The photograph, the 3-D generated visualization, numbers about markets and cost and the timetable can, in that sense, be placed on the same level. They can all be related in compositions in the annual report, in the sales material, in the design of the building and in the management of contraction in the field. Each visualization is an amplification (Latour, 1999) where the tedious detail of disparate and singular events is gradually omitted – the photograph purifies the past life of the building; the 3-D visualization purifies the future; the cost and market calculations is a set of normalized rules of thumb based on past experience. But together the visualizations produce a new space which gains strength the more visualizations and calculations are put on top of each other. Together, they produce more reality than any of them can do alone and together. The (idealized) future of 3-D is contextualized by (idealized) past of the photographs; the layout and allocation of space in the building intertwines the 3-D visualization with the economic inscriptions; the organization of the field of construction requires a time table in addition to the visualization and its translation into architectural drawings.

Conclusion

In this paper, we show that neither the visual nor accounting should be seen as isolated phenomena. Visual aids act as mediators that cross and blur boundaries between accounting, selling and production activities; between external and internal communication; and between the past and the future. The visual links these different activities and establishes referents within the firm. This is what makes the visualization more than a mere simulation without referent. This may be how images in annual reports become more than decoupled signifiers.

The paper illustrates important relations between various kinds of visualization. They interact and are superimposed on each other. So, when a visualization of a house is in process, superimposing it with cost calculations and estimates of demand influences the composition of the building on the 3-D visualization. The various types of visualization work together and produce more than each of them can muster. This is important because it becomes clear that even if some visualizations are inscriptions at the end of a procedure or organizing traces, then it is not the single inscription that is powerful. It is its combination with other inscriptions that have been rendered on a form which allows interaction to appear. This can be the two dimensional form which inscribes entities so that they can be next to each other. Being next to each other is the power that visualization offers. Visualization redefines scales so that all things have

the “same size” and can be related. This is where the financial market, the customer, the planner, the designer, and the quality control person meet. They all require visualization which allows them to take their knowledge to the table and connect it to other knowledge and then proceed to develop new visualization through superimposition and combination.

We have shown how visualizations, such as photos and 3-D images interact, circulate and are superimposed on each other to develop strong modes of reporting and strong coordination towards the market, production and operations. The circulation of visualizations is not empty window dressing but devices that help enact the firm’s activities in different ways. We link the visualizations in the firm’s annual report to events that happen both inside the firm and towards its market. In this way we trace a set of translations (Latour, 1987, 1999) which displaces the visual image from one situation or context to another. In these translations we also find new visualizations which are often omitted in the analysis of the visual, namely economic visualization through representation of market and cost effects of design and operational decisions.

The surprising effect is that suddenly it is possible to conceive of the visual not merely as empty window dressing in annual reports. The visual may in some situations stand for a long network of actors, commitments and accountabilities that strengthen it in the annual report. The longer the network organized by the visual the stronger it is. The stronger is the referent thus being cultivated.

Notes

1. For an account of the historical development of annual report design, see McKinstry (1996).
2. Visualizations peaked in 2004, measured quantitatively. However, we have chosen to focus our analysis on the most recent annual report and at the time we initiated our research that was the 2006 report.
3. There is an extensive discussion of time and organizing in Jones *et al.* (2004). However, it is beyond the scope of this paper to relate to this more sophisticated conceptualization of time.
4. Although highly interesting, we do not follow up on the gender issue in this paper. For a discussion of representation of women in annual reports, see Benschop and Meihuizen (2002) and Tinker and Neimark (1987).

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