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Budgeting – Taking into Account and Ranking: Assembling a Budget in the Construction Industry*

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Abstract
This paper analyses budgeting practices in the construction industry. It explains budget making as a process which tests knowledge and ranks functionalities under conditions of uncertainty. Firstly, the budget is one document in a network of documents that not reducible to each other. Secondly, it is developed in tensions between financial resources, concerns for reputation and pressures for time-management. Thirdly, the budget sums up propositions developed by multiple, dispersed calculating actors and adds resources to the collective rather than integrates all aspects of the knowledge of these actors. The budget sums up aspects of various inscriptions such as drawings, tender documents and dispersed calculations but it does not copy or take over the properties of their dimensions. There is a difference between the budget and the thing to be budgeted which accounts for its degree of fragility.

Introduction
There is no shortage of research on the antecedents to and effects of budgets, but there is an unfortunate shortage of research on the process of budgeting. Our aim is to analyse the details of budgeting practices and develop an account of how actors convince themselves about the size, functions and purposes of a budget. This inquiry offers three new propositions. Firstly, the budget is one document in a network of documents reflecting technical, legal, (inter-)organisational and economic concerns, decisions, responsibilities, projections and hopes that are not reducible to each other. Secondly, it is developed in tensions between financial resources, concerns for reputation and pressures for time-management where each of these elements influences the relations between the two other elements. Thirdly, the budget sums up propositions developed by multiple, dispersed calculating actors and adds resources to the collective rather than integrates all aspects of the knowledge of these actors.
These conclusions are the outcome of our study of design and budgeting practices in the construction industry (Boland and Caloppy, 2004). Specifically we were allowed to observe critical project meetings and conduct interviews with participants when they developed the budget for Animal House (pseudonym) in a European Animal Park (pseudonym for a comprehensive Zoo). When budgeting commenced, the building was still only a couple of sketches that suggested its overall signature. This was important because the building was expected to be a symbol – one whose architecture would contribute towards the reputation of Animal Park (Smith et al., 2000).

Given the severity of economic consequences in a construction setting, budgeting is serious (c.f. Thum, 2005). Yet, there are reports of significant budget-overruns and budgeting is often presented as unrewarding in the construction industry (e.g. Akintoye, 1988, Freire and Alarcon, 2002, Froud et al., 2007, Hall and Tomkins, 2001, Lam et al. 2001, Nicolini et al., 2000). This has been explained by the planning fallacy by which the future looks brighter than the past (Buehler et al., 2002, Lavello and Kahneman, 2003). People think they have learnt from the past and can thus dispense with certain previously experienced risks; they then become optimistic. It has also been explained by deception (Flyvbjerg, 2005, Flyvberg et al., 2003) so that project approval depends on insincere presentation of cost and benefits, and the politics of budgeting compels people to cheat.¹ Both optimism and deception are likely in budgeting for construction projects, but how would optimism or deception be possible all the time and everywhere when everybody knows that they happen? There must be more to budgeting processes than overt cheating and naïve optimism.

We therefore analyse the process of assembling the budget and ask not whether people are optimistic or lie, but we ask what actors know and how they know it in order to be satisfied that it is reasonable to go on with the project of building the house. How it is possible to be claim that the proposed budget is reasonable, good, realistic, or appropriate. How do participants convince themselves that something is desirable and possible and that other things have to be rejected as less interesting and irrelevant? With inspiration from Latour (2004), this process can be understood as the intertwinement of two elements: (1) how does budgeting draw the boundaries around the relevant entities that justify an eventual budget – or, how many do we take into account?, and (2) how does budgeting distinguish between propositions that are solidified in the budget and those that are marginalised and expelled – or, how do we rank?

¹ Flyvbjerg and colleagues have been interested in mega projects and not only in construction of buildings e.g. also transportation projects (Flyvbjerg et al, 2002). There may be a difference between construction generally and construction of buildings even if there are examples of construction of buildings also in Flyvbjerg’s sample (e.g. Flyvbjerg, 2005)
The paper is organised as follows. First, we discuss how budgeting is an issue in the literature and find that the process of budgeting is wanting in budgeting research. Then we develop our research strategy which draws on certain elements of actor-network-theory. We proceed by analysing the empirical material, discuss the findings, and we then provide conclusions.

**Budgets and budgeting**

In their review of the budgeting literature, Covaleski et al (2003) show how research to a high degree of detail has analysed the antecedents to and consequences of budgeting. They analyse how research has developed economic, psychological and sociological budgeting theories. Economics based research is interested in the ‘economic value of budgeting practices for owners and employees’ (p. 8). It analyses ‘budget-based contracts, participative budgeting, capital budgeting and variance investigation’ (p. 9) Psychological research is interested in ‘the effects of budgeting practices on individuals’ mental state, behaviour, and individual performance’ (p. 8), and it analyses ‘participative budgeting, budget difficulty, budget emphasis in performance evaluation, budget-based compensation’ (p. 9). Sociological research is concerned with budgeting’s influence on ‘decision-making and bargaining processes among a plurality of interests pertaining to planning and control of social and organisational resources’ (p. 8). It focuses on ‘participative budgeting, budget-based performance evaluation, budget importance, using operating budgets for management control … (and) … budgeting processes’ (p. 9). But budgeting processes are rare. Most of this research sees budgeting as a black box and looks at it primarily as a mechanism that can be either an input to managerial behaviour or an effect of certain contingencies.

To Colvaleski et al. (2003) only some budgeting research is concerned with processes and this ‘provides a model to more explicitly address the volitional role of the plurality of interests pertaining to the planning, control, and bargaining processes such as budgeting around social and organisational resources’ (ibid., p. 33). This perspective analyses how actors negotiate the categories of a budgeting system (Covaleski and Dirsmith, 1988a, 1988b), how budgeting moves between rational and natural justifications and arguments (Boland and Pondy, 1983. 1986, Covaleski and Dirsmith, 1986), how budgeting is a boundedly rational social and political process (Covaleski and Dirsmith, 1983, Jönsson, 1982, Peters, 2001), how budgeting may be part of a process of conversation and sense making (Charniawska-Joerges and Jacobisson, 1989, Samuelson,
1986), how budgeting is part of a process of resistance (Berry et al., 1985, Christiansen and Skærbæk, 1997, Ezzamel, 1994). and how the fabrication of budgeting procedures is a socio-political accomplishment taking much time and effort (Ezzamel et al., 1995, 1996, Pinch et al., 1989, Preston et al., 1992). These studies illustrate how the budget is stabilised through political processes. They show the ambiguities of participation due to the uncertainties of interests and their management; they illustrate complexities and multiplicity of budgeting activities. They focus on the production of a budgeting system but they pay but little attention to the construction of the entities in the budget and how actors create a sense of certainty about these entities. This perspective is concerned primarily to describe the complex processes around the budget more than the development of the budget.

There are political processes in writing up the budget but how does politics act in the budget? To some extent it is assumed that budgeters already know what they strive for and a good deal about effects of their actions. This is why strategies of de-coupling, strategies of deception and misrepresentation, strategies of bringing new logics into a setting, and strategies of playing the game of budgeting may make sense (Covaleski & Dirsmith, 1986, March & Olsen, 1989, Meyer & Rowan, 1977). These strategies are primarily about the distribution of effects of actions more than about the knowledge that would translate actions into effects and about the development of interests that are involved in the games.

Clearly there political – and also technological, environmental, and behavioural (see Covaleski et al., 2003) – elements related to budgeting as much research says, but these are typically seen as conditions for the budget rather than elements to be handled in the process of budgeting. A remaining concern is to analyse how politics operates when assembling the budget. This is a process of developing and organising different kinds of materials (projections, assumptions, projects, ideas, possibilities etc.) in relation to each other. This parallels Preston et al.’s (1992) analysis of fabrication of budgeting systems. They analyse how fabrication stabilises the accounting entity in institutionalised form and their history of accounting reform in the public sector accounts for the black boxing of a budgeting system into one durable format (see also Ezzamel et al., 1995, 1996). However, looking at the process of assembling we do not assume black boxing but only that the budget can be proposed as relevant and therefore attention has to be paid to how the budget is considered interesting, relevant, useful or adequate.
Approach and research strategy

The budget may be considered to relate to all activities that have to be performed to construct the building. It translates these activities and inscribes them in a document in monetary form. Therefore, it is useful to adopt an approach that seeks to find the translations between all manner of decisions in design and engineering and their possible financial effects. Studying this as *circulating reference* (Latour, 1999) we assume that the matters under consideration – such as design, engineering and economics – are not only related but also that they gain identities by the way they are interrelated. Phenomena travel far or short depending on how they claim other entities’ cooperation; and this cooperation is genuine when the phenomena intermingle and thus change identity. Latour (1999, p. 71) says that:

“phenomena are what circulates all along the reversible chain of transformations, at each stop loosing some properties to gain others that render them compatible with already established centres of calculation”

Circulation describes phenomena interacting with other phenomena. When references circulate they are interacting – the drawing of the building is interacted with drawings of piping and electrical installations, for example, which may (as we shall see) transform what the appropriate system of ventilation may become. And this interaction may at a certain point in time be inserted into the budget as possible centre of calculation that relates architecture, engineering and economics to each other. But this reference does not remain stable at all times because not only economics but also architecture and engineering can be re-opened and reassessed.

This approach compels the researcher to follow the chains of transformation – to follow the phenomena and look for their interactions with other phenomena and to mind how they are related to centres of calculation. The materiality of such centres of calculation is often found in the form of documents that present phenomena as ‘two-dimensional, superimposable, combinable inscriptions’ and ‘materialized into a sign, an archive, a document, a piece of paper, a trace’ (Latour, 1999., p. 29). This approach allows us to follow translations (transformations) between architectural sketches and financial numbers through engineering sketches and tender documents, all of which are propositions about the future building.

Participants were experts in various fields of construction such as architects, construction engineers, quantity surveyors, and structural engineers all involved in making the
building real. Each may not understand the others’ knowledge and expertise but the budgeting process may link them to each other through the budget. Together, as a collective, they designed a construction. This is a construction, not only the concrete sense of a building but also as a metaphor of a constructivist research strategy (Latour, 2005, p. 89):

“… to say that something is constructed has always been associated with an appreciation of its robustness, quality, style, durability, worth etc. so much so that no one would bother to say that a skyscraper, a nuclear plant, a sculpture, an automobile is ‘constructed’. This is too obvious to be pointed out. The great questions are rather: How well designed is it? How solidly constructed is it? How durable or reliable is it? How costly is the material. Everywhere in engineering, architecture, and art, construction is so much a synonym for the real that the question shifts immediately to the next and really interesting one: Is it well or badly constructed?”

A construction is real and exists; but this reality or existence is the effect of a series of transformations of existences that have been proposed over time under the auspices of the question how well it can be designed. The design process proposes possible functionalities that are added to or detracted form the building through the course of budgeting. At least, understanding the budgeting process in the light of how well or badly the design is developed pays attention to the fate of functionalities proposed by various types of materials such as architectural drawings, technical drawings, tender documents, budgets and risk reports. To ask questions about the quality of the design is similar to asking questions about the process that leads to the design and about the mechanisms used to invite functionalities to and exclude functionalities from the design. Latour (2004, p.110) asks two questions about the formation of a collective:

“How many new propositions must we take into account in order to articulate a single common world in a coherent way? … What order must be found for the common world formed by the set of new and old propositions?”

There are two questions: How many entities do we account for and how do we rank? These lead to a collective proposition about the design. They require firstly, a procedure to be ‘capable of verifying the importance and qualifications of the new entities … (which is) the constraint of the requirement of relevance’ (ibid.). Secondly, they require ‘an explicit work of hierarchization through compromise and consultation … (which is) the requirement of publicity in the ranking of entities’ (ibid.). The dual concern of taking into account and raking provides a strategy for organising our empirical. It helps to understand both how far away elements to be taken into
account in budgeting are from the budget; and it helps to understand how these elements are accorded relevance or not in the budget. This dual concern helps to find the various entities that go into the budget and those that are expelled. This teaches us how a construction becomes bad or good.

In order to investigate how well a construction has to be designed, we use the case of designing and budgeting for Animal House. This building had been in process for about three years when the research commenced and the detailed budgeting started. Previously, the building had been represented by an oversight sketch that was used to raise the funds to finance it. This took three years because it turned out to be an expensive building – the most expensive building ever built in Animal Park. Our involvement with Animal House began when participants started to recognise that the initial budget was highly constraining, and actually, if all suggested requirements should be incorporated in the building the budget-overrun would be about 40%. This was not acceptable and therefore re-design had to be made.

We participated in project meetings where propositions to change the building were aired and considered. Following this process allowed us to study relations between propositions of architects, of structural engineers, of construction engineers, of quantity surveyors and of the client including his advisors. They problematised, discussed, proposed changes to and reflected on drawings (hanging on the wall), and budget and risk reports (lying on the table). This provided insight into interactions, conversations, and translations between drawings in various forms and cost and risk reports.

The observations of the meetings were explored further through analytical interviews with all participants of the project-group. This type of interview focuses not only on describing the situation according to each informant like an ethnographic interview. It is also an attempt to develop a reflection about the conditions under which the informant would change perspective on the affairs of the team’s activities and his or her role in it (Kreiner and Mouritsen, 2005). So, we were not only interested in learning e.g. that a quantity surveyor seeks to find the best possible budget for the whole project, but also interesting in learning what dilemmas a quantity surveyor attempts to manage in the process. The idea is that the descriptive account should be followed up by a question about the tensions related to the descriptive account in order to highlight the issues involved in decisions about whether an entry in the budget should be increased or decreased.

The interviews lasted from one-and-a-half to four hours and they were conducted in the participants’ companies. We had interviews with architects designing the house, architects
designing the landscape, construction engineers designing the technical requirements and managing
the tender documents, structural engineers who advised on the design of the roof, advisors to the
client, and quantity surveyors who developed and consolidated the budget. The interviews were
designed to obtain an understanding of the different roles of the participants and to understand the
challenges faced by the participants in the budgeting process. All interviews were tape recorded and
transcribed.

Budgeting practices in construction

The project meeting was to start at 9 am. The engineers had arrived and a few minutes before time
in came architects armed with drawings that were hung on the wall. They presented the building in
many different angles and with very different scales (Yaneva, 2005). It seemed possible to point to
the building with any degree of generality and specificity. The building was already there. It was
visible and touchable (Robbins, 1997).

The meeting was serious. Not only was the budget tight. This had been known for
some time because there was a budget-overrun of 40%, even if when the meeting started this
overrun had been reduced to about 15%. The meeting was also serious because there were delays.
The drawings were not finished which influenced the engineers’ work to develop tender documents;
the deadline to produce the tender documents was approaching quickly – 2 months. The theme of
the meeting was to develop the budget. This required other documents: the various drawings of the
house, the drawing of the landscape, the drawing of the piping etc. and eventually a tender
document for contracting purposes.

Our field notes from the meeting provide a brief illustration of the layout of its sequence and
content:\(^2\)

1. Updates on previous meetings
   a. Tender packages for demolition and steel sheet pilling discussed, and the engineers hope
      these packages can be confirmed and closed with a decision because then they can finalise
      tender documents. No final decision made, though. [Hope that an item in the budget can be
      settled]
   b. There is still uncertainty about earthwork which has turned out to be unpredictable and there
      is no contingency for this in the budget. [Stress of uncertainty]

2. Cost updates

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\(^2\) Notes in […] are our comments to the process.
a. Costs are still uncertain because the final drawings of the building have not been delivered: ‘It is not satisfactory that we cannot say precisely how the cost will work because drawings are late’. [Architectural work is defined as bottleneck]

b. Quantity Surveyor says that to solve the problem of costing, ‘we need at complete picture of the house, and currently we only have sketches which is not enough’. [Accountability about state of drawings.]

c. Engineer adds that ‘we have been put in an awkward position. We were told that the drawing was to be finished (2½ months ago), and we cannot take the burden of the delay, but we appear to have to take the blame’. The engineer explains that tendering requires a finished set of drawings and that he has to change tender documents when the drawings change. [Accountability and presentation of extra work].

d. The client is more categorical: ‘the reason we do not have the cost update is that the drawings are very late. This is not acceptable and we are not confident that things will go according to the time plan’. [Accountability]

e. The architect responds saying that ‘the design is difficult because we want a green environment and we also want things to be solid. This is a conflict in the design and we try to find a mediating point and this is difficult because there are aesthetic requirements. The sacred cows are the number of square meters, the amount of green, and the amount of concrete. This is very complex and some things have to be done’. [Explanation and justification]

f. Client: ‘We accept the explanations, but the problem is time. You could have told us before that we could not have the drawings and we then would not need this meeting’ [Accountability about design process]

g. Architect: ‘The problem is not the budget but the design’. [Design choices have to be made first; sequence of decision making. Explanation and justification]

h. Client: ‘I would prefer to know whether the solutions we make are over or under budget’. [Projection of effects of design choices]

i. Architect: ‘The solution is more radical, namely to reduce the whole landscaping’. [Radical design solution]

j. Quantity Surveyor: ‘We need to understand the technical decisions that have arisen and we need to rethink …’ [Concern with projection of effects of design choices]

k. Debate about relations between redesign and cost
   i. Long spaces of glass too expensive
   ii. Precast panels reduce need for weight in the structure
   iii. Open tendering again to non specialists and see if we can include cheaper subcontractors
   iv. The roof area can be changed
   v. The number of ventilation points necessary
   vi. Perhaps Danish subcontractors are cheaper than English ones?
   vii. ‘We also need subcontractors with design capacity’ [Relations between design choice, the organisation of the construction activity and the budget. Division of labour between the participants and relations between price and quality]

l. Client: ‘We want you (architect and engineer) to make estimates separately… and I want to see all the figures because comparing the figures is important. The point is to make things comparable. We want this extra security’ [Assumptions about the budget]

m. Quantity Surveyor: ‘We will do separate costing. But is it better if we talk together; this will facilitate the process’. [Knowledge in costing]

n. Client: ‘I would actually like to participate in a meeting about the differences. This will not delay the process’. [Cost calculation depends on actors]
This excerpt from the field notes illustrates that the budget had links to many design choices in
many fields such as architecture, engineering, animal welfare, and visitors’ possible interests; there
are relations to the various expressive dimensions of the building and its surrounding landscaping;
there are relations to subcontractors, deadlines, and drawings; and there are relations to
accountability, coordination and presentation of the economics of the building. The budget engaged
concern. It developed preoccupations and it installed attentions and influenced the development of
priorities. The budget organised other actors in relation to each other but it did not take over the
properties of the other actors. Even if it made expected economic effects visible, it did not develop
the calculations that it incorporated. Multiple actors developed calculations and the dialogue
specified how this was a concern because different calculations arrived at different results.
Therefore, the budget was not the end even if it presented aspects of the collective ambition, namely
to perform according to a proposed budget-sum.

In addition to budgets the dialogue also mobilised drawings, risk-reports, tender
documents. In the dialogue explanations went well beyond individual budgets, drawings and reports
because their relations were highlighted: translation from drawings into tender documents, from
budget to a possible redesign of a new division between house and landscape, from a new idea of
wall-work and various possible recalculations of costs, from deadlines to tender documents to
architectural drawings. These relations were propositions – offers to explain the multiple ways in
which it were possible to develop suggestions and means of intervention that would make the
building accord to principles of architecture, engineering and economics simultaneously.

To make these propositions, participants went to the wall, pointed to drawings and
showed a movement of elements in the drawing and argued about financial and architectural effects.
This movement proposed causality since it added a movement in the relations between design
choices and financial effects. Design choices about walls and types of concrete had consequences
for landscaping, for plumbing and ventilation which were important because they were required by
tender documents soon; and they also had to pass the budget in time.

The budget had its own space (Figure 1). On its vertical dimension it had three main
categories: (i) concept design estimate, (ii) value management target adjustment, and (iii) extended
design change. Each of these categories contained design elements – a value chain of design:
enabling work, the building, paddocks and external works, figures/ furniture/equipment, overheads,
and contingencies. The horizontal axis also had three main categories: (I) budget, (II) extended
design, (III) responsibility. This dimension coupled the original budget, changes to the budget and
responsibilities together. As such the budget was connected to somebody responsible and it allowed re-design to happen if it could be approved. The budget was thus an intersection between choice making and responsibility. It visualised how changes could happen. This was perhaps why discussing the financial affairs of the building there was only a small leap from cost estimates and seriousness. An estimate was the responsibility of someone. It was typically discussed as a relation between a proposal and a person.

--- Insert figure 1 about here ---

The budget’s format existed before the project of Animal House as it was a standard format brought in by the Quantity Surveyor. It had already established a version of the building as a set of choices about the value chain of a building and of the ways in which the budget incorporated various types of variances and attached responsibilities. It already had mobilised some of the entities that the project had to incorporate, and it already proposed that certain kinds of responsibilities had to be designed. In advance, it proposed there to be separations and identifications of elements of a value chain and it proposed a distinction relevant to concerns about the responsibility for the budget and its eventual re-constitution.

The risk register also had a standard format produced by the Quantity Surveyor but its content was more localised to the situation. As shown in figure 2, it reported (i) description of risk, (ii) consequence, (iii) likelihood, (iv) impact, (v) rating, (vi) owner, (vii) actions, (viii) date, (ix) comment. For example, the design schedule not coordinated (i), whose consequence would be break-down of team spirit (ii). The Likelihood (iii) was rated as high, medium, low, and then a calculation of possible costs was produced. The risk register was a separate point on the agenda of the project meeting. Together the agenda item and the risk register encouraged participants to develop narratives of risk that were then mapped according to the structure of the risk register and documented by Quantity Surveyor. All could chip into this discussion about possible conditions and situations that could hamper the design of the building. The dialogue concerned the risks of the process of arriving at the budget and pertained to decisions to be made by the project group.

--- Insert Figure 2 about here ---
The risk register was able to present completely different mechanisms of risk at the same time: design risks, risks about legal rules, risks about the behaviour of sub-contractors, risks about delays, risks about intervention from other buildings, risk about pollution, risk about market conditions and risk about structural mathematics of structural design. The heterogeneity of risk was considerable and it drew the building into a whole series of hypothetical situations. It could all be proposed as various management objects but these would not all emerge as problems in the future. They were points to monitor – a multidimensional monitoring system – that were hoped never to guide any serious action.

Like the budget, the risk register insisted on participants’ time, effort and engagement. Like the budget, the risk register was part of the design choices. The two documents influenced the course of project activities.

*It is not a church!*

The signature sketch of the building identifying the architectural ambitions of the building developed the first budget. The sketch motivated donors to finance its projected costs. This was the budget-sum; the budget target. But the sketch was not a drawing and “one of the problems was that people were expecting the original design to be more advanced, more fixed, than it actually probably was. Because at that stage my interpretation is that there is a design concept we really haven’t thought back at the thing.” (Engineer). It motivated the building to financers but did not convince project participants about the boundaries of the project. ‘Lots of exceptions not incorporated in the budget’ haunted the design process because the budget-sum provided a strong voice of restraint and urges to reconsider

“There was a lot of exceptions not taken into consideration [in the beginning]; all of these things should have been part of the budget. Then the budget would have been around [+ 40 %] Money, or so. Then they [the client] would have set their minds after that amount instead. We would have had an easier task then. For the client it was all about how much money they needed to get financed, and now they had set their minds on the amount of [- 40%] Money. For that amount they though they could get a house, with concrete, glass roof, and they had calculated how the park around would be fine. At that time they were not aware of the cost of all the things they didn’t incorporate in the budget, and that has given the difference in their picture of what they though was possible to get, and what is reasonable to believe they would achieve today.”

(Engineer)
Soil, technical facilities and ventilation systems were proposed as elements not recognised in the sketch but yet strongly present in the design process and in the drawing when it translated into other increasingly voluminous documents.

The budget proposed an overrun and motivated a re-evaluation of the construction which was a ‘unique rather than a standard building’ and shared traits with ‘a special church’ that produced risk:

“The 20% [contingency fund] is universal. But then it depends on what it is you are building, if it is something well known, office buildings or apartments, you can have a smaller margin. But if you see a church that you are working on then it is the most difficult, because it is so special. Animal House goes into the same category.”
(Architect)

This risk proposed addition of cost. Animal House was not a church but the church delivered a difference which justified that costs could press themselves forward.

The unique building was risky in multiple dimensions. When the budget pressed attention to overruns forward detail mattered more and more and with detail, combinations of things pushed complexity forward. When detailed changes arose they created new, and unique, sets of combinations of engineering and architecture where ‘there are different ways of making the steel structure’:

“[We] give an overview of the structure that you build into the concrete, it is just a back up to the architectural report saying we considered how to found it and how the walls would stand up for the roof we made. At that time we did quite a lot of studying to do the actual roof construction because that was going to be a key feature. If the designer just reports an architectural dream it is a building that possibly can’t be built. [Architects] don’t know what the thickness of the concrete would be. These standards are things that are in a report like that.

Has there been major changes regarding the structural part of building?
Yes, it has gone through certain stages and not come back to [the starting point] but it has gone further away from it. … This original roof was less expensive than the one we have now, but the one we have now has much more steel around the axes. So it produces more thrust into it. Also, it used to have another complexity and it had cables running across. We have taken this out to simplify the construction, to simplify maintenance, and for visual reasons.” (Engineer)

Intertwined with architectural design there was co-construction through structural engineering and concerns for economics. Here, numbers were ‘very rough’ because there was ‘no time’ to develop what may be thought of as smooth numbers:
“When the things are changed, then you should draw and measure all the suggestions and calculate them. But there is no time for that. … So a common feeling about the way we move is created. It is something about 40% more grass, is about […] Money or more, there are two ports less, of […] Money each. On these decisions there are very rough numbers.” (Engineer)

Calculation was uncertain and as design developed it many propositions, although not all, were based on ‘common feeling’. As the design became more detailed it also changed its object: When ‘early knowledge was translated into the different sectors of the building’ the uncertainties of the cost-estimate changed.

“There is one type of knowledge when you are in the beginning phase where you know nothing, and the client doesn’t know a lot. This is getting the feeling of the house. Then you transform that knowledge into different sectors, there is a different mode when you start to contact the architect, the engineers and suddenly the type of knowledge needed is different and that comes from not only a database but also personal experience in the sense that you have been doing it in time and space. In terms of how labour cost works, how material costs works. Which is a different mode, it is more situational.” (Engineer)

First, participants learned from the church and developed a margin for surprises. Second, the building was dispersed and divided into elements that could be allocated to participants which involved a movement from an overall cost per m2 into cost per functional areas such as the house and the surrounding landscape. Third, these were then again translated again into costs of the roof, costs of the walls, costs of the ventilation system, costs of movement of dirt, and costs of stabilising the house on the ground. This process produced the power of the budget format (see figure 1) which inscribed the translation of cost in terms of elements and responsibilities.

Rough numbers challenged the quantity surveyors to recalculate costs drawing on experience form yet other buildings of which ‘we have built thousands across the World’ the Quantity Surveyor assured. Other buildings substituted Animal House circumventing complex cost calculation as far as possible – calculating something else made the case for the cost of Animal House stronger. Even if, in principle, it would be possible to calculate complex architectural-engineering-landscaping propositions, dead-lines objected. The more propositions, the more time to calculate had to be found. As complex propositions produced links between many different elements in the building, the calculations were to handle more and more unexpected relations, and this hampered the calculating ability due to deadlines. A change of walls, for example, influenced
the design of the structure of the roof due to change in stability and strength of the construction. Calculating this took time. In effect, even if calculability was possible, calculation was not because of deadlines. The concern was therefore how much should be known before the process of designing the building could go on?

Time ran out and to some degree calculation had to be guesswork and oversight. Participants responded to the constraints of time by ‘adding much more of their own time than required’, as one Architect said, and for ‘strategic reasons’.

“It costs time and money to do things not one but 2, 5 or 6 times. This impacts our financial result. When we started it was a sensible business since we got a fair profit. We still hope but it is no good business right now. … We fight to try to recover some costs for unforeseen work, but this is not the most important thing now. Strategically it is important that we get this project done. …. Then we may have to make profits from other projects.” (Engineer)

The time involved in developing the design concerned both the constraints imposed by deadlines and the use of additional time proposed by participants to make the construction strong even if this was not contractually stipulated. But even adding time was not enough to transforms the design in view of budgetary constraints; the budget pressed for more radical changes.

Value management

The budget-sum challenged architecture, engineering and landscaping and motivated the quantity surveyor to organise a value management exercise to decide priorities in the design. 3 It developed a prioritised list of functionalities that designed the building vis-à-vis the budget-sum. It ‘allowed them to value engineer out all the stuff that was not a need’ and focus on what ‘you really want’ as pointed out by an Architect. This prioritised list of functionalities developed a new set of possible decisions because it combined animal welfare, architecture, engineering and landscape and weighed them against each other. This weighing was performed vis-à-vis ideas of value for the client, the user, the animals and other actors and to each option a budget amount was proposed:

What value has been kept as a central value in the project and which ones were not so important?

“The key has been the animals; to be sure that every thing you need for the animals are there. A lot of the strip down has been to cut down all the finish so there is a basic

3 See e.g. Ashwoth and Hogg (2002) and Kelly and Male (2000) for presentations of value management as technique.
but simple environment to put people through. So the value is about the animal … Obviously the architects have visual requirements and this is why [Architect] was chosen for the job. But I mean it is an animal house that invites people in. The key element is animal welfare but it is also in an environment that can be used as a flagship for Animal Park and this is where [Architect] comes in.” (Engineer)

It considered possibilities for managing cost by doing things differently and it developed ‘the essence of the building’ as an Architect claimed. And the client was happy:

“I have never before seen something as constructive as this. We got a project which was even better than the one we started with in spite of the budget being reduced by 25 %. The process created a huge move with a concentrated and goal-oriented effort.” (Client)

Value management reorganised the participants since it allowed them to propose changes ‘even in others’ area of expertise and balance expectations’ (…) which did create tensions both between the participants and about the signature of the building:

“Doubtlessly, the architect has suffered because of that [value management], since they are responsible for the creative part of the process. Every idea they have proposed and each drawing has been measured in monetary terms right away. Of course you need to do so, but they likely wouldn’t like all suggestions being met by other parties every time – bang: Its not 168 but 188. They [the architect] must be thinking, “What have we done? Now we need to go back again.” (Engineer)

Value Management developed the functionalities of the building but the collective budget-sum hindered overt conflict. It insisted on redesign as a response to surprises arising from the detailed knowledge which developed more items of elements not inscribed in the budget. There was a ‘lot of exceptions’ and it was full of holes. Perhaps some of these holes ‘should have been calculated’ because knowledge hereof was available but not considered. For example, knowledge of soil issues was available with the participating engineering firms but the engineer knowing about it was not in the calculating team until late in the process.

The budget-sum induced dialogue about the curved walls requiring in-situ shaping of concrete that could be substituted by prefabricated concrete elements which would reduce cost and risk of quality since ‘not many have that expertise’ including Danish building workers, an Architect proposed. Walls made from prefabricated concrete elements would also challenge ‘architectural intentions’:
“Now the architects must take the economic into consideration and you can say they are probably not the right people to do so because architects have clear intentions about houses they build having to be unique. This is what they base their business on. That is what they should do. But that consequence was not thought of in the beginning. It may be that we have not been good enough to shoot it down each time the architect suggested this and that requirement. And we might not have said each time, this cost extra, we need a place to save money. But it is very difficult to do so in an early phase. Because you don’t know exactly how the surface should be like, how the construction will be, you are not that detailed in the pre-phase… you can say that it was not what they meant back then.” (Engineer)

This concern with scarce resources made the walls ‘even if looking fantastic totally out of reach’.

“But it is aesthetic, if you could make it, it would look incredibly great, doubtlessly. Now the house is curved with the use of earth instead. It is far more rational. The other solution was not possible; it was totally out of reach.” (Engineer)

There was a concern to oppose aesthetic and economics considerations. Along with the curved walls, that had to be re-designed, the glass roof was a premier signifier of the building. But also the roof was under pressure from the budget because during design processes, the building had increased in size to accommodate 50% more animals. The glass roof thus increased in size and the strength of its foundation was proposed as inadequate. The simple answer was to ‘make the roof self-supportive’ but the extra steel and glass ‘turned out to be much more expensive than expected after talks with suppliers’ and it was also realised that ‘this was impossible due to consequences for the concrete below’; therefore it was ‘impossible both for economic and for geometrical reasons’ as a structural engineer pointed out. The roof was separated from the concrete walls and cost reduction was expected but uncertain because ‘the technical solution was not yet ready’. The architecture became a bit more ‘thingy’:

“How we were going to support the roof without imposing elements into the concrete? How were we restraining the roof now we couldn’t impose load on the concrete? We haven’t got the main geometry. We spend a lot of time working with the preliminary details to get those visually correct because we are not thrusting into the concrete. Getting that to work without making it look very ‘thingy’ is quite a bit. It is one of the key details.” (Engineer)
Not only did this move change the view of the building; it also developed ‘more condensation because of the size of the new glass dome’; this concern was, however, postponed into the future to ‘the next phase’:

“The problem is that you have a big glass dome developing condensation since it is affected by sun and snow. It moves about 1 meter in diameter. Even there are those movements it should not affect a hole in the house. It is not solved yet. There are some sketches that show one or the other thing. It is clearly one of the things to be solved in the next phase.” (Engineer)

Some problems could be developed but whether they would actually become important problems could not be known, and sometimes rather than solving the issue quickly, it was decided to postpone the decision and test whether actually condensation would develop when the roof would be in place.

Value management not only considered the signature of the building; it also considered the user (visitor) and the landscape. This cut across the original division between house and landscape and developed priorities between elements of the house and elements of visitors and landscape. The café area created a link between the house and the landscape as ‘it presented a view over the riverbed so that it was possible to sit relaxed and enjoy the animals’ life’ which originally was planned for as a particularly noteworthy item but it was taken out of the building. The visitors’ pathway allowed visitors to see the animals from three perspectives. This landscaping proposition ‘was an impressive idea so one could see how the scenario of animals opens’ where a tunnel under an old big tree would symbolize the entry to animals:

“When one is walking down the ramp and step into Animal House, one has a magnificent view on the dry “riverbed”, where the animals are, and the park in the background. A part of the room will function as a café with tea and snacks from [the home country of the animals]. From the café there is free view over the site, where one can sit relaxed, quiet and enjoy the animals’ life. Especially this is a nice spot when the weather is unpredictable during the spring and autumn season.” (Architect)

“Some functionality has been taken out of the building. Animal Park had other expectations. They wanted a cafeteria and a shop, and there should have been other things as well. I would not say that the client gets more, in fact they get less.” (Engineer)

“Then you should have entered through the tunnel, it was a very impressing idea from the landscape architect that you walk through and see the whole scenario opens with
the animals. But it was also an expensive element. We also agreed that there would be people who didn’t think it would be pleasant to walk through such a narrow passage. You could not see the light at the end of the tunnel.” (Architect)

These were significant reductions in the construction. And the abandonment of multi plateaus to see the animals ‘gave a simpler experience to the visitors’ and the outside facilities were made less spacious. The tunnel was substituted by a one-way route through the facility which was suggested to ease visitor management but also make the visitor’s experience more predictable.

The design process mobilised concerns for ‘animals’, for ‘animal keepers’, and for ‘visitors’ and new items were added to the budget which then recognised more clearly that there was a tension between the building and its location because the budget could not accommodate all:

“[Architect] did the sketches. You can see the style. With the Client he went around looking at the animals and they went to see [another building] where they saw the roof. They were sure the animals would love it.” (Architect)

"Animal Park really did know all the things they wanted. Later on they knew a little bit more. I think at that time the humans were still in the same area, the keepers and the animals were in the same space. Not anymore; too many keepers have died. So the new house does not have the keepers and that has been the biggest change in the design". (Architect)

“One of the demands to the architects has been that Animal Park’s visitors should be able to see the animals indoor in a spacious lay-out where the animals’ social structure can function 24 hours a day, and that the surroundings seen through Animal Park visitor’s eyes are light and attractive to the animals. And there were demands regarding a visual unity between the inside of the house and the surrounding park, so the experience is so to say pulled indoor. (Engineer)

The challenge was that the building and surrounding park were both proposed as high expectations to quality of expression. The budget made participants economise and prioritise this quality of expression – they engaged to develop and prioritise the signature of the whole construction.

Surprises

The relations between house, visitor and landscape prioritised the house. The signature of the house came first and value management developed a more pointed set of priorities of the construction. It did this by finding functionalities that could be omitted. But value management also experienced challenges and also had to realise that the budget was not able to hold all entities in a strong grip.
Surprises pushed themselves forward such as unexpected conditions in the soil because of increased knowledge about the required space and due to new legal requirements not present when the first design proposition was made.

The hill proposed soil quality as a problem when ‘erosion had to be taken into consideration’ and ‘other houses in the vicinity of Animal House’ were obstacles:

“If you build on a hill you have to take certain things into consideration. In [two years previously] the engineers assumed that it would be possible to build directly into the hill. They had not considered the consequences of digging into the hill. If you dig you can’t leave the ground horizontal which also happens if you dig a hole in the garden. The ground is floating. Worst thing is if you are on the beach and you dig in the sand, then it lies in a very low angle, so when we dig out we influence the whole ground to get down to a certain level. This is also possible if you are in a field, but you can’t do it if you already have another animal house standing next to it because you erode it. Therefore if you look at close hand to place a plug, that is why you place those big steel profiles. Those are positioned 4 meters lower than the level you are going to dig into. Either you let them stand in the open or you drill an anchor under it and seal it underneath. It’s a piece that is lying there, and you use the ground to hold it. It is a science in it self. But each plug costs [lots of] Money.” (Engineer)

Nature challenged the first estimates constructed two years previously where soil was not the central concern and problem. In drawings, Animal House was alone, but in Animal Park there were other animal houses that had to be minded. As drawings increasingly had to accommodate more and more challenges when detailed and when translated into other documents including engineering drawings and tender documents, they had to pass more tests. Soil pressed itself on through the preparation of the tender documents and suddenly erosion was a new problematic entity. The soil proposed investments in big steel plugs to hold back erosion, ‘but each plug costs [lots of] Money’. The plugs pushed the construction.

Also, as tender documents pressed themselves on, ground water proposed a problem. Strangely, ‘a ground water reservoir was placed on the highest site in town’ which ‘if floating could undermine the neighbouring buildings.’ (Engineer) The translation between architectural drawings and engineering documents developed new propositions about the construction and added concerns. Engineering’s propositions influenced architecture taking advantage of certain bits of engineering knowledge that was not the property of participants in the project group but of actors that arrived later. Thus, the translation between architecture and tender documents drew in more engineering knowledge from participating firms that mobilised the budget to develop re-design of architecture.
Likewise, when architecture translated into engineering drawings, legal rules and regulations barred some of its ambitions. Hot air proposed a challenge to the construction since ‘Danish legislation does not allow us to let out hot air for environmental reasons’ and therefore legislation pressed for inclusion:

“The English engineers made the first budget of ventilation cost in [two years previously]. But this did not mirror our reality. It was far too cheap compared with its functionality. We don’t base it on a central ventilation system; we base it on a lot of smaller exhalations placed in various positions. The problem with hot air is that you have to change the air, so you blow it out, and let in new air, but this is not allowed according to Danish legislation, and you can’t just let out hot air. If you let out hot air you need to take out the maximum energy of the air, its called heat conversion, pull out the heat and place it in liquid form. This has enormous impact on the design, because you suddenly have to place a lot of big tubes, going forth and back. You have to have a central ventilation system which requires a lot of space and that was not incorporated [then].” (Engineer)

The ventilation system was under attack but the alternative ‘decentralised ventilation system more space for tubes’ in the cellars of the construction and suddenly, indoor design had to be moderated. The interrelationships between architecture, engineering and legislation developed new entities to be accommodated but they had to pass the budget to be accorded a place in the construction. When the process of detailing happened, engineering and legislation achieved more and more of a say and this helped to reconstruct the interests of the visitors. Engineering and legislation influenced architecture mediated by the budget and legitimated by imputing new interests to visitors.

The future

Relations between architecture, engineering, legislation and the budget were plentiful. Every time a new relation was proposed, a new element of the construction emerged. Through detailing, more and more elements appeared in the constellation and more and more entities had to be taken into account and accorded performance and causality.

Starting from the sketch a first budget helped to raise money to finance the building. The first budget required ‘some standard procedures based on price books’ which are standard prices developed by the [national] statistical office or developed by the association of engineers. These proposed unit costs of various types of activities related e.g. to number of yards, or number of m2. If ‘quantities of activities could be specified, the price book could suggest expected cost’ and this produced a projection when there was only a sketch or a minimal drawing of the building.
The price book required knowledge about quantities of the items to be calculated. Since there was ambiguity about design of the walls, there would also be uncertainty about the cost of concrete. There was a design choice between in-situ shaping of concrete and prefabricated elements, and therefore the amount of concrete to be predicted was fluid at time of the projection. And then, the cost stipulated in the price book incorporated a particular point in time far removed from the time when the concrete was to be purchased. Would the ‘market price’ differ in the future?

"[The price book] defines a price level for e.g. February 2000. If you then need a new calculation for June 2002, then you address the Building Index and use this for the forecast. We always first calculate the cost for the current time, and then if we want to forecast it ½ years then we use the index … What you do not get are heated markets and trends in building techniques, and we are very interested in knowing what this means for Animal House because the market is heated.” (Engineer).

The budget projection was fragile and other means of inscribing the building were therefore also drawn in. Other projects produced their ‘cost per m2’ or ‘cost of a door’ based on ‘databases and personal experience’. Information collected by a ‘global team in a knowledge sharing effort’ substituted the work of sorting out the specifics of the sketch or drawing by short-cutting the process.

“Our global network revolves around database management and knowledge sharing really. It is one of the most difficult things really. It is very important to keep knowledge available in this office. There is a team in the global organization who try to make those cross referrals, clients we worked for, projects we worked on some of the issues that kind of come out of that. Knowledge sharing is out of the trust of the relationship, its been in individual offices, and again it gave some independence of the group. But trails have made that available its not perfect but yet having people around the world that are committed to share that information, it makes it that much better than it would have been without. …We have something called research development group, and their job is to collect data from all our projects. Their job is to analyze those and then make the results available.” (Quantity Surveyor)

The building would then be a simulation of other actual buildings and their calculated historical cost would then reduce time for sketching, drawing, planning and costing. Knowledge from ‘previous projects had to be related to expectations about the future’ and the future consisted of corrections added to the past and made it a conditional future.

A conditional future ‘made it difficult to save money because participants were not aware of the surprises that could happen’ (Engineer) as the list of surprises could not be predicted
even if the future existence of surprise could. Any future was a proposition that required cooperation of others, including the cooperation not only of participants but also of soil, water, legislation, concrete, holes in the ground, and visitors.

The progression of design changed the object of the design. In the first phase, ‘cost estimation was a global technique which later became more detailed’ (Quantity Surveyor). The start was number of m2 and some correction for type of construction (unique, yet not a church). Then the design was about the functionalities of the construction with the correction of the expressive interests attributed to the building. Then the design included soil conditions, relations to other houses in the area, visitors’ experience of the surroundings with the correction for buildability. The object of the budget transformed itself along with the progression of the design, and the costs to be calculated straddled between the past and the future, and between internal knowledge (experience, other buildings, internal databases) and external knowledge (price books etc.) and about the flexibility of cost. This was less in the overall budget figure than in the boundaries created in the design, which ‘was difficult to manage because it was mostly structural and very little surface’ (Engineer) because it was a house for animals; they would destroy ornaments.

It was a house for animals that developed uses which were different from those of the visitors. While visitors would mobilise the view and the panorama, the animals ‘would create a lot of dust which has to be removed by water on the roof and walls and things would get steamy. Organic material would then sediment and condensation develop’ (Engineer). This proposition was ‘needed to be considered’ but was postponed the ‘the next phase’ (Engineer). Since the list of details was endless and even if it was possible to conceive of condensation and possibly even find a probable solution, it would also be possible to oversee it and hope that it could turn out not to be an issue testing it when the roof were in place rather than by interpreting a drawing. Maybe condensation would not really be a problem? Or one could hope that ‘you can do it more cheaply’:

“When they question the number? Well, you compromise, or you just hope you can do it more cheaply – you can bet on it being cheaper” (Architect).

Omissions from drawings, tender documents and budgets were considerable and a good dose of hope was mobilised to believe in the budget. But the budget was defensible, even if uncertain, and this allowed the process to go on.
Assembling the budget

The research on budgeting is concerned more with the conditions and effects of budgets than with the development of the items in a budget. It includes technological, environmental, behavioural and political conditions for and effects of the budget. In the analysis of Animal House these elements are not seen as conditions or effects. They are elements handled in the process of budgeting. Budgeting is a process where propositions are transformed and assembled in new configurations some of which have not been seen before and which survive a test of adequacy: is this relevant enough?

The description of the construction of the budget for Animal House shows that budgeting is a fragile affair, where engineering, architecture, politics, nature and economics are intertwined (Robbins, 1997). None of these entities effectively determines the others and the eventual design – the question of ‘how well or badly the construction is designed’ (Latour, 2005, p. 89) – moves in all four directions at the same time. To become solid, the design has responded to queries about the (physical) stability of the building, the (artful) aesthetics of the building, the (several) interests being served by the building and the (economic) costliness of the building. Problematisation appears sequentially gradually developing candidates for barring the process to go on. It is a multiverse of elements and propositions that together justify the construction and which could retract or expand in many dimensions (cf. Callon et al., 2002). The two main research questions are relevant here to understand the process of assembling the budget: (1) How do we rank? and (2) Whom do we take into account?

How do we rank?
The elements of budgeting. Budgeting proposes decisions that shape the object being budgeted. In casu, budgeting provides functionalities to the building and motivates the search for new purposes. But budgeting does not only propose a building, it also proposes competencies for actors participating in the process; the object of budgeting is both the building and the participants who gain or lose reputation by the affair.

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4 The case of Animal House is most likely exceptional. To Animal Park the building was a capital investment, while to the other participants it was an operational activity. Animal House was part of a construction industry whose qualities amongst other things are that the production space is hardly constructed as a laboratory or a factory where important uncertainties are designed away. Nature speaks loudly in the construction industry: soils, wind, sun, leaking water and stubborn hills all play a role. The construction industry may be special making budgeting different from situations where the conditions may have been stabilised more by design such as in factories (Miller and O’Leary, 1994) or in laboratories (Latour, 1987).
Specifically, budgeting negotiates tensions between the budget-sum, time-management and reputation. This triangle represents a practice where it is impossible to find one final criterion for making decisions. Rather, design choices have to pass at least three trials because the budget-sum, time and reputation all have a say in these decisions. Figure 3 illustrates the plot.

-- Insert Figure 3 about here --

Figure three illustrates budgeting as a triangle consisting of three nodes and three lines. Firstly, as a triangle, budgets are assembled of heterogeneous concerns and interests which interact. Budgeting proposes formulation of purposes and ends and induces formulation of interests when budget-sums are related to design choices. But budgeting is more than the budget-sum because decision making is also influenced by time-entities such as deadlines and participants’ own time budgets, and concern for reputation to make the building a symbol or to make behaviour agreeable to others with a view to future cooperation. The triangle thus illustrates budgeting as a multiplicity of performances all of which help to frame the collective.

Secondly, the nodes of the triangle develop each their problematisation of the challenges of the collective. The budget-sum presents what the client proposes to pay but also, it develops a variance through a projection which is an input to design and re-design processes. It tells the collective when common problems emerge and when it is necessary to engage a reformulation of purposes and ends. The budget-sum intervenes when there is a budget-variance. Another node in Figure 3 is reputation which frames and develops the interests of participants. It develops aspirations by eliciting priorities and makes design choices relevant to the collective. Insisting on presenting values of the building, reputation continually asks participants what purposes and ends should be made serious in the situation at hand. Design choices engage questions of values and competencies. The third node in Figure 3 is time-entities that propose decision-making to proceed. Deadlines arrive as the calendar makes itself felt, and time can be added by resources mobilised by participants but not counted by the budget-sum. Thus, time can make deadlines count; or time can

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5 Reputation is most likely an element that is highly intertwined with the construction industry because of the brand capital associated with grand architecture. There are star-architects and when constructing signature buildings reputation is at stake for the architect and also for client because of the expressiveness of the building. Engineers and constructors also have reputation but for other things than architects and designers. To generalise, reputation may be an example of accountability since it concerns itself with the performance of activities and it claims attention to the development of justification and/ or excuses of (potential) time and budget overruns. To build reputation is a piece of accountability where reputation is one justification of the performed activities. Accountability is a common event in organisations and often it is attached to accounting systems (Roberts and Scapens, 1985, Munro and Mouritsen, 1996).
be added so that deadlines are less troublesome e.g. when architects and engineers invest more time or when the client accepts to move deadlines even if this can incur opportunity costs in the form of unrealised income from a season forgone. So, the budget-sum concerns the distribution of funds between functionalities. Time-entities concern deadlines, investment in preparation (resources), and time to calculate. Reputation concerns documentation and expression of competencies.

Thirdly, the relations between the nodes in Figure 3 define three types of tensions. The tension between budget and reputation is that the budget sum is necessary to develop reputation, and reputation is economised when the project is re-designed. Between the budget and time-entities the tension is that time is participants’ time and not counted in the budget-sum of Animal House. Between time-entities and reputation the tension is that using more time will most likely develop reputation but also be expensive. The existence of three simultaneous tensions makes their resolution complex. In principle, it involves sorting out three kinds of challenges at the same time, and therefore it may is cumbersome to arrive at a stable decision on the budget.

How are these tensions resolved? Visually, observing Figure 3, they stop by the intervention of the item not in the direct relation. When the tension between the budget and reputation cannot be stopped by argument about the preferred functionalities within budget, deadlines tell when a solution is good enough. More specifically, the concern in the relationship between reputation and the budget is value management. This is a process of hierarchical ordering of functionalities and their subtraction from the project. It attempts to reject functionalities with only little or no loss of items that can develop reputation. The key question is here how much functionality can be abandoned without the signature of the building getting lost?

There is tension between the budget and the time spent by participants. The building’s budget is one element, but the participants’ own time budget is another budget. The central question is how much time the participant will invest to uphold or develop the project. Reputation intervenes here because it projects the fate of the participants in other future projects as it problematises the competencies of trustworthy participants. Time develops intangible assets and is an investment for future application. Last, when there are tensions between time and reputation, the budget-sum intervenes and proposes that changes in design are not necessary any more because the variance has been effaced. The budget intervenes here as it defuses the charge levelled against the collective when the re-design is in line with financial resources.

The three tensions move decision making criteria around. No criteria will be stable to discipline all decisions because all the tensions can only be relieved to a degree and all the tensions...
can develop as consequence of activities performed in other relations. For example, when value management happens, the budget may be satisfied through additional investment in time, but then reputation may install new concerns such as queries about architectural ambitions. Concerns develop over time and are actualised by the character of other concerns. Budgeting does not stop just because the best solution has been found and a stable equilibrium has been established. It stops because other criteria are mobilised which inform or force decisions. The budget is therefore less a balancing of the affairs related to the project and more a settlement that may work for a while.

**Developing the budget.** Budgeting develops a set of drawings, sketches, illustrations, models and tables that are related to each other though new inscriptions such as the budget and the risk report. This process builds several buildings – e.g. it proposes the building as small/large; as separated form the concrete or integrated with it; as a path for customer-observation or as a place to work for animal care-takers; as integrated with neighbouring buildings or as a stand-alone entity.

The budgeting process develops propositions which claim stabilisation of the project but this is effective only until somebody questions appropriateness and usefulness of the inscription. Any element can be divided. Concrete can be divided into in-situ concrete and prefabricated concrete. Trees in the landscape can be divided into large trees and small trees. Walls can be divided into curved walls and straight walls. Division is possible and detail can be added. Detail is a pragmatic concern with the possibilities of acting on the budget. Detail is less a property of the world as it is a property of how the world is problematised during budgeting.6

The budget hardly stabilises all the elements of the building not only for the obvious reason that there are omissions and uncertainties as discussed above. The inscription developed in the budget does not copy and substitute all the dimensions of the drawings, sketches, tendering documents etc. The budget is not the world of drawings because they still exist. It is not the world of the building because it is not yet there. It is not the whole of the financial arrangements because there is allocation of time and resources which are outside the budget under discussion. Neither is it

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6 More dramatically, the more items there are in the budget the more optimistic it may be because any of the items goes through purification with a view to eliminating the reserve or contingency fund. Through such a procedure the reserve vanishes from the budget which, however, may not make it more precise. When, for example, there is disagreement about the cost of an item, the rule is to lean on the less expensive proposition of the ones developed by various actors and therefore the proposition is rarely the statistical expectation of the outcome, it is more optimistic than the average proposition. When detail is added to the budget each of which does not have average expected costs, but optimistic costs, it is possible that risk is added to the budget when it is detailed more. Hope is also added.
about the world of the client because operating costs and revenues are added in the client’s budget. So, is it nobody’s?

The budget defines boundaries around concerns. It is good enough when actors are satisfied that it makes no sense to contemplate more; when actors are satisfied that it is defendable to go on in the process even if there are still risks and uncertainties. Anomalies will appear, but the size, timing and form of anomalies cannot be projected. The hope is that they will be manageable in the future situation. Paralleling Hacking’s (1983) discussion of representation, the budget is adequate when nobody proposes additions to it. The budget is only a problem when there is competition between different calculations. The disagreement is not primarily with the external world whose dimensions are countless; the disagreement is with other inscriptions. In a sense all inscriptions are true – all budget-formats are true – until alternatives are proposed and disagreements are aired about the adequacy of a particular inscription for the purposes at hand.

Competing inscriptions are frequent when budgeting produces detail so that any budget and drawing at a certain time will be transformed at a later stage. Neither budget nor drawings can claim incorporation of all conceivable elements, and it is impossible to propose e.g. that the budget subsumes the drawings. Together they engage in the circulation of propositions about the building with new detail. The drawing added propositions e.g. about wall, roof, landscape, and ventilation and the budget added financial propositions about additions in the drawing. There is an explosion of detail, which has to be incorporated as it is disciplined but not taken over by the budget-sum. The budget deficit develops new detail but it does not guarantee that the re-design is financially feasible. It requires hope. Budgeting stops because of the budget-sum, time and/or reputation and not because all is known and all is settled.

Whom do we take into account?

Hope is present, but how strong is it? Participants possess more knowledge than they carry. Their networks are important because they mobilise experiences developed elsewhere. As persons these actors are not very powerful but they rely on others who are absent. How many are we? As many as are necessary to mobilise experiences developed from afar (see figure four).

-- Insert Figure 4 about here --
Figure four illustrates that the construction of the budget extends well beyond the place of the project group. The budget is not only the work of a set group of actors allocated to the project. They reach out and gain resources from their firms’ databases, from legal entities, from standardisation authorities and from pre-calculations and knowledge of financial effects that are developed institutionally in price books etc. There are also macro-economic analyses of the conditions of the industry developed by quantity surveyors and by institutions. And then Animal House’s budget is only one among other and others’ budgets.\(^7\)

The project extends in space and time and making Animal House a punctuation in a much wider process. The assembled budget is based on knowledge about varied items such as e.g. purified (or idealised) experience of other buildings, the traditions of DK construction market, macro economic analyses of price-projections in the market place, rules of thumb about allocation of fees, Danish engineering standards, hopes that outsourcing of certain design jobs will make the design less costly, and propositions that during construction it is possible to make the design cheaper. These all suggest that the budget is based on assumptions that are not the building but idealised other buildings. The building is assembled along experiences of other buildings and composed through jig-saw pieces of other already finished buildings.

Such propositions from the past build hope but only rarely optimism, as Buehler et al. (2002) and Lavello and Kahneman (2003) claim, since there is also significant uncertainty and uneasiness. Optimism is difficult because the knowledge developed from history is known to be fragile. It not only expands insight and capability. It also suggests that there will be anomalies but that the list of anomalies cannot be drawn up. It is expected that some things unexpected will turn up; it is just impossible to know which things will be unexpected. It is also clear that many of the unexpected things are calculable but they are not calculated. So many things can be calculated that if they were calculated, it would be impossible to move towards the collective building. Time would not allow it.

The budget is a budget among budgets and based on multiple sets of dispersed financial calculations, drawings etc. representing other spaces and times and yet they are inputs to

\(^7\) To a certain degree this has also been noted by Ahrens and Chapman (2004), Boland & Pondy (1983, 1986) and others when they suggest that calculations can be used in various ways being moved by individual managers. However, they tend to assume that the realm of knowledge on which to base judgments is the accounting report and the interpretations made by the human mind to make local repair and global integration possible. While this is important, we wish to add that the types of knowledge that inspire the development of insight are located in many other places than the human mind; that the development of what constitutes a concern for repair and a concern for the global is related to more than the individual human mind. The very need for local repair and global integration has to be added to the complex of the budget. This addition has to pass the passage of a collective concern that first has to be pointed out through a laborious process of assembling the budget.
the realisation of Animal House. The budget organises knowledge that is separated from the project in time and space. The budget is thus larger than the assembly of people designated to the task to plan for Animal House. It inscribes entities from afar. This inter-organisational space substitutes the simple dichotomy between one organisation and other organisations (e.g. see Håkansson and Lind, 2004, Thrane and Hald, 2006, Tomkins, 2001) for many more heterogeneous entities such as databases, experience, macro analyses, institutionalised rules, legal prescriptions, customer preferences, and other buildings. The inter-organisational space is limitless, and its practical expression or delimitation is the budget which organises and distributes actors by summing up aspects of their activities for the collective (cf. also Mouritsen and Thrane, 2006). Calculation is dispersed (cf. also Czarniawska, 2004, p. 777) but summing up is centralised.

Budgeting mediates hopes and ambition (cf. also Boland and Pondy, 1984). It is poorly described, however, as a battle turf of omniscient actors and more fruitfully analysed as a common world actors strive to identify and where opportunities are rarely pre-established but require to be defined. Surely, the budget does embrace politics of deception in the sense that actors attempt to present their ambitions selectively (cf. Covaleski and Dirsmith, 1983, 1986, 1988, Flyvbjerg, 2005). For example, to gain advantages for themselves, engineers did organise themselves according to their deadlines and produced proposals for tender documents in time; but they also knew that the design drawings were not finished so the tender documents had to be re-written – but on time paid for separately. This type of politics assumes that the collective is finite and that actors just have to carve out their part of it.

However, an additional notion of politics is also in place. Any political ambition has to be able to engage with the situation at hand and attach itself to some of the concerns, discourses and inscriptions that rule in the setting (Hindness, 1986, Robson, 1993). Actors invite changes to the setting by proposing additions to the design, to the usefulness of the building, to engage new possible objectives and present new knowledge about the conditions for realising the building. Interests are not only entities that separate the actors. They also have to be related to the collective means for articulating ambition. These means are found in the drawings hanging on the wall, or in the budgets lying on the table.

These inscriptions are obligatory passages and make propositions public. Even if the means for articulation are uncertain they engage a public (the project group) and require a justification. Interests have to be articulated within the design and thus attached to propositions about visitors, animals, financial donors and animal caretakers; propositions about walls,
landscaping, roof and holes in the ground; propositions about water, soil, hot air; and propositions about condensation, dust and organic material; and about engineering, legislation, economics and architecture. Politics exists through these propositions and interests are formed by the intervention of these propositions all of which can increase investment, decrease investment or remain oblivious to the charge.

Propositions face trials by the actors of the project. Others’ interests are imputed and this influences the strategies that can be made relevant e.g. in a value management exercise. Value management does not mirror pre-defined interests already in place but develops decision opportunities and ranks functionalities. This will not appeal equally to all, but it does appeal towards to common concern to make a collective of the project that will survive as a building.

Since the building is not input to the design but its effect, the collective is not a-priory. The process tests what can be assembled in the collective. Therefore, the building is proposed through a series of articulations that are tested and therefore the political act is not in the dark; it has to be articulated stand the test of opposition including the oppositions proposed by multiple calculating agencies. Otherwise it will not enter the budget.

The budget sums up propositions that have survived tests. It produces a public and a self-presentation to the collective and makes it reflexive. Continuously, it meekly asks about possible ends and purposes that can be considered as time goes. Budgeting compels actors to take part; to force their propositions forward; to articulate the building. It helps to develop interest. But it hardly guarantees that its propositions are true in all future.

**Budgeting as process**

The case of Animal House focuses on budgeting as process in a way that adds to other process theories of budgeting. This case shares with budgeting theories which emphasise budgeting as a local and embedded accomplishment that budgeting is an institutional, social and organisational activity, it is also different.

This budgeting literature is concerned with political activities involved in using budgets to advocate an organisational entity upwards in an organisational hierarchy and influence budget allocation (Covaleski & Dirmsith, 1983, 1988b, Wildawsky, 1975), with legitimation (Covaleksi & Dirmsith, 1986, March & Olsen, 1989, Meyer & Rowan, 1977), and with the role of conformity to social value (Covaleski & Dirmith, 1988a, Meyer, 1986). It is also concerned with cognitive dimensions of budgeting activities describes ad tensions between rational and natural
criteria (Boland & Pondy, 1983), and between type of decision model and mode of analysis (Boland & Pondy, 1986). Here budgeting is made up of frame shifting between arguments in a budgeting process.

This research is concerned with process, but it is possible to extend it because the process envisaged here is predicated on a game played out among roles and interests defined primarily in and connected to a structure in an organisational hierarchy. There is a struggle about resources and autonomy organised around the budgeting process. Yet, often in this research the content of the budget assumes a retired position and the deliberations that move things into and out of the budget are marginalised. Extending this research, Animal House shows the formation of practical, rather than structural, interest and its obligation to connect to propositions that have to pass the budget and thus be relevant to the collective. Animal House illustrates how stakes are formed and transformed in relation to the budget. The referent of the budget concerns the materialities that the political process is about.

The case of Animal House adds some elements to understanding process. It is concerned with what budgeting is made of (see also Preston et al., 1992). There is politics here, but it is not a priori; it is more a development of interest that can attach itself to the budget. The process treats interest as endogenous (March & Olsen, 1989) and formulated so that it can make a difference to the constitution of a collective action. This is why interest is more than an appendix to a position in an organisational structure. It is also a negotiation of the entities that will be influenced by the interests that can maintain attachment to the project. Here, the budget is an obligatory passage (Skærbæk, 2005) that compels all interested participants to propose items that can be fitted to the context of budgets. They summarise aspects of decisions and show financial expectations of these propositions. Interest acts not alone but through changes to drawings and budgets and therefore interest is not only the property of position but of the means mobilised to engage in the collective and to create its dimensions.

This adds to research on budgeting processes; it does not assume that interest is given, nor does it presuppose that participants know all their interests in advance. They are not only abstract interests; they are more typically means of changing the budget by propositions and calculations that are developed locally but have to pass the publicity of the budget to be accepted. The case of Animal House illustrates what the process of negotiation is about. It is about the development of many different materials that do not quite fit because they are not similar to each
other. There is a loss of strength when they are translated to each other because in each translation there is also a reformulation of the matter of interest.

Negotiation is about matters material and matters of interest and they cannot be separated. In addition to the forces of individualisation and separation of roles and responsibilities this process also develops the collective. The collective is not there a priori which makes its division into entities via pre-established interests cumbersome. So while it is easily possible to understand how budgeting individualises, which is also the case in Animal House, there is another movement at least as profound. This is the construction of the collective – the construction of the building – which is conditioned on more than degree of implementation of pre-established plans and objectives. It is significantly constituted by the search for the building which requires the services of various kinds of competencies and capabilities where the end-design is not settled. The boundaries and interdependencies between architecture, economics, and engineering are found out during budgeting; the ends and purposes of the building are found out during budgeting; the reputation and capabilities of participants are constructed through budgeting; they all have to be accommodated in the budget. Therefore, interests are formed; they are endogenous not only to budgeting but to the budget as such.

**Conclusion**

The case of Animal House corroborates much received budgeting literature. Target setting involves questions of coordination and motivation or of collective integration and individualised responsibility thorough incentives. It is also clear that budgets are constructed in the expectation of a later process of accountability and therefore budgeting does connect between the past and the future. It is also clear from the case of Animal House that there is politics at stake and that actors direct attention to their own goals in budgeting processes.

But the case of Animal House is also sceptical about these conclusions. Yes, there is target setting, but targets are involved in the redesign of the matters that targets are set for, and therefore targets are both inputs and outputs. Yes, there is coordination and delegation, but the gradual composition of the collective does not make these distinctions a priori. Coordination and delegation are probably important but hardly separated concerns because they would falsely separate the entities during the process and they would falsely assume that the collective is
entangled at the beginning. Yes, there is accountability, but the entities that enter accountability settings have variable interests and may in some cases justify expansion of financial resources and in other cases the reduction hereof. And yes, there is politics but not only in the sense that actors know their interests and the means to reach them, but rather in the sense that actors engage the setting to explore how interests can develop and be attached to the collective.

The case of Animal House proposes that the budgeting process takes entities into account and ranks them by relations between budget, reputation and time. They mediate each other and handle concerns or tensions between them. These concerns are about optimisation (the list of functionalities to be excluded from the building) about time-budgets and deadlines (intersection of different firms’ time budgets; the project’s deadlines), and about reputation (ascribed competencies appreciated by participants). These tensions are interrelated, and typically they are ‘resolved’ only because some boundary becomes too strong: the boundary of the budget-sum, the boundary of reputation and the boundary of time.

This proposition extends existing budgeting literature by three additions. Firstly, it shows how knowledge used to justify a budget is developed; actors hardly already know the relations to be budgeted via private information or more detailed insight just because they are closer to production. Even when people know, their knowledge is also simultaneously old and potential rather than actual because it has to be fitted to new situations that fall outside the knowledge of the past. Knowledge of the past is experience but experience has to be mediated to inform the future. Experience is a problem because it is contextual; what is needed is ‘pure’ experience where all things ‘not normal’ are subtracted. Uncertainties will emerge, but it is not possible to predict these uncertainties because they are local. Private information is not certain information.

Secondly, the budget sums up decisions and projections but is no substitute for the rest of the documents, such as sketches, tender documents, drawings and risk registers. There are still drawings of various versions of Animal House, piping, electricity, plumbing, tender documents that each develops certain aspects of the building. The building is not there in its entirety and the budget does not hold all relations to all other documents. These are not substituted by the budget. It sums up other calculations that are produced in all manner of spaces. Calculation is dispersed; summing up is the task of the budget.

Thirdly, the budget is a combination of decisions, accountabilities and motivations. They act together. Decisions and coordination are inside the budget just as much as accountability and motivation are inside the budget. It is a passage of various types of purposes that intersect.
There is no particular distinction between decision making, motivation, coordination and other purposes taken into account in the budget. They are all inscribed into the budget document itself as it portrays both a ‘value chain’ of construction activities, a specification of decisions, a projection of their consequences, and a relation to responsibility.

The budget does many things at the same time and an a-priory separation into functional task is near to impossible. They will be ways in which to mobilise the budget and to allocate variances, but beforehand which of the purposes will be most important cannot be known. There are many possible links between budgetary numbers and action, some of which probably depend on the message carried by the budget numbers themselves – do they present a space to expand functionalities or will they require them to be reduced?

References


Lowe & Shaw


Figure 1: The space of the budget
<table>
<thead>
<tr>
<th>Id no</th>
<th>Description of risk</th>
<th>Consequence</th>
<th>Likelihood (HL, L, FL, U, VU)</th>
<th>Impact (D, S, L, M or N)</th>
<th>Rating (Calculate by Quantity Surveyor)</th>
<th>Owner</th>
<th>Action</th>
<th>Date by or Closed by</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>Failure to incorporate value management during extended Design Phase and Failure to recognise and deal with Advanced warnings</td>
<td>Delay to Commencement and re-design</td>
<td>HL</td>
<td>D</td>
<td>XX</td>
<td>Architect</td>
<td>Client and Designers to actively be involved in remaining within Revised Budgets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>The Authorities do not accept escape ways from the building and demand an escape tunnel</td>
<td>Design amended delays to programme</td>
<td>L</td>
<td>D</td>
<td>XX</td>
<td>Architect</td>
<td>Agree acceptable strategy within Authorities</td>
<td>Fire strategy approved in principle with Authorities – now accepted</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Contractors Believe our Architects project will be difficult/expensive</td>
<td>Budget extended or limited response from local contractors</td>
<td>L</td>
<td>S</td>
<td>XX</td>
<td>Client</td>
<td>Marketing/promotion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Delay of construction starts due to authorities</td>
<td>Design revisions/delayed completion</td>
<td>VU</td>
<td>S</td>
<td>XX</td>
<td>Client</td>
<td>Keep involved/informed e.g Fire strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Building too close to existing animal house</td>
<td>Re-locate new boundary lines</td>
<td>L</td>
<td>L</td>
<td>XX</td>
<td>Construction Advisor</td>
<td>Reduce vibration-monitor</td>
<td>Site Boundary to be clearly marked on drawings</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>More contamination discovered on site than is currently predicted</td>
<td>Draw on Contingency – more excavation</td>
<td>U</td>
<td>L</td>
<td>XX</td>
<td>Construction Advisor</td>
<td>More test during Demos</td>
<td>See internal memo</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Building industry is busy. Price level go up. Tender come in over budget</td>
<td>Inflation Adjustment Insufficient</td>
<td>L</td>
<td>L</td>
<td>XX</td>
<td>Quantity Surveyor</td>
<td>Monitor Inflation trends</td>
<td>Monitor construction activity-speak to contractors</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Façade design System not designed for structural</td>
<td>Failure of dome structure</td>
<td>U</td>
<td>L</td>
<td>XX</td>
<td>Architect/Construction</td>
<td>Progress façade design</td>
<td></td>
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<td>movements</td>
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<td>on engineer</td>
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Figure 2: Risk register (examples of entries)
Figure 3: Components in Budgeting
Figure 4: Actors constructing the budget and the design