

Escalation in major projects: Lessons from the Channel Fixed Link

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Abstract

Why do major projects escalate on schedule and budget? Research from an engineering management perspective has focused the technical failings in project management, but little has been achieved in improving performance. We therefore contribute to theory by posing the question “can a more comprehensive perspective on the escalation phenomenon drawing on organisation theory be developed?” We turn to three contributions to research on major projects which treat project escalation as an organisational process rather than an engineering problem. We suggest each of these contributions – future-perfect strategising, strategic misrepresentation, and escalation of commitment – makes only a partial contribution, but also they can complement each other as elements in a more comprehensive perspective on the escalation phenomenon. The resultant analytic model is applied to the case of the Channel Fixed Link using a hindsight approach to explore the dynamics of escalation using history for generating theory in project management research.

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1. Introduction

The aim of this paper is to advance theory in project management research by developing a broader, organisational perspective on the escalation of schedule and budget to provide a more comprehensive understanding of why major projects so frequently escalate on schedule and budget. We focus on escalation in schedule and budget because of the notoriety of major projects on these performance criteria. Pioneering work in the 1980s on major projects by the RAND Corporation (Merrow, 1988; Merrow et al., 1981) and by Morris and Hough (1987) started to identify some of the research issues on major projects such as chronic budget and schedule overruns, lack of clear definition of objectives and hence dynamic scope creep, and the extraordinary management challenges that such projects posed. This tradition has continued through Miller and Lessard (2000) to recent contributions (e.g. Merrow, 2011; Priemus et al., 2008). However, this work remains largely within an engineering management perspective

and does not connect strongly with theoretical developments in organisation theory (Orr et al., 2011). The engineering perspective suggests that major project escalation is mainly caused by technical errors in estimating, and that by correcting these errors, we can mitigate project escalation. For instance, HM Treasury has recently attempted to mitigate budget underestimation (HM Treasury, 2004) by implementing a mechanistic optimism bias mitigation procedure. These initiatives have yet to demonstrate an improvement in major project performance.

These observations prompt the research question of whether we can develop a broader perspective on the escalation phenomenon by drawing on social and organisation theory. Our review of the literature, guided by Söderlund (2011), identified three distinctive perspectives on major projects which have *both* conducted empirical research on major projects *and* which clearly draw on social and organisation theory — future-perfect strategising, strategic misrepresentation, and escalation of commitment. While a large number of different perspectives from organisation theory could yield insights into the escalation phenomenon on major projects, very few have actually been applied in such a research context. In order to provide a sound basis for theory development in this paper, we have only included in our review those contributions which meet these two criteria.

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Our paper starts by reviewing each of the three perspectives identified. We then indicate their limitations and suggest ways in which they might complement each other by providing insights in areas where the others are relatively weak and suggest an analytic model showing how they might complement each other. In order to establish whether they do actually complement each other, we explore the empirical case of the Channel Fixed Link (CFL) through each of the perspectives. Our research method is historical — we take a *hindsight approach* to a single project case where the longer-term outcomes are known. This is one way to move beyond the problem inherent in major project research of taking a time-frozen cross-section of a process that unfolds over many years. We conclude that for the CFL case, the perspectives do indeed complement each other as suggested by the analytic model. We then discuss the implications for theory and further research of this conclusion.

2. Organisation theory perspectives on escalation on major projects

2.1. Future perfect strategising on major projects

Much of the literature on major projects is positivist in methodology, yet a constructivist perspective can lead to significant insights such as the Sydney Waste Water project (Clegg et al., 2002; Pitsis et al., 2003; van Marrewijk et al., 2008). The case is one of the projects associated with the Sydney Olympics, and therefore had an immovable deadline with a relatively flexible budget organised as an experiment in project alliancing on an open book basis between three contractors and the client. It was delivered on schedule and slightly over the target budget. Ethnographic fieldwork yielded rich data which were analysed through distinctive conceptual frames:

- *Endgaming* (Clegg et al., 2006; Pitsis et al., 2003) was explicitly deployed by the project leadership through “end games” which specified what was expected to happen, when, by setting milestones and targets for future achievement.
- *Governmentality* (Clegg et al., 2002) is the condition of reflexive self-control where management normalises behaviours and does not have to deploy overt disciplinary formations.
- *Designer culture* (Clegg et al., 2002) stresses artefacts to create project culture. This culture was created through the co-located project team offices which were open-plan and displayed large banners articulating the nine alliance principles while a large, strategically placed, fish-tank symbolised the project mission — clean water in the Harbour.

2.2. Strategic misrepresentation on major projects

The strategic misrepresentation perspective is rooted in Flyvbjerg's (2001) espousal of a practical social science, drawing on Aristotle's concept of *phronensis*; little could be more practical than the perennial question of budget and schedule escalation. A desk review of the outturn performance of 258 transport projects found that the average budget escalation was 28% (Flyvbjerg et al., 2003). The research team also noted that there has been no

trend towards the improvement of budget estimating capability over the period studied, and concluded that the data cannot be explained by estimating error (i.e. incompetence) or by random effects which both ought to be evenly distributed around the budget estimates. Rather, they suggested, it is explained by strategic misrepresentation (i.e. lying) about the real size of budgets required for the investment. As well as the systematic underestimation of budget, Flyvbjerg et al. (2003) also identified systematic overestimation of the benefits of the completed facility measured by actual utilisation by travellers compared to forecast. They argue that these data also display evidence of systemic bias in forecasts by both consultant transport analysts and project promoters.

In the subsequent development of the strategic misrepresentation perspective, it has become confounded with the psychological problem of “optimism bias” (Weinstein, 1980) which is the condition where a prediction about the occurrence of a known risk in one's own case is more optimistic than inference from the base rate would imply. The concept has been most developed to help understand the psychology of health where individuals consistently underestimate their probability of ill-health given unhealthy behaviour such as smoking. It was applied to the project domain in work on the “planning fallacy” which identified experimentally the chronic inability of planners to accurately predict task durations (Buehler et al., 1994). Flyvbjerg et al. (2009) capture the differences between strategic misrepresentation and optimism bias in their distinction between “deception” and “delusion” respectively.

2.3. Escalation of commitment on major projects

The roots of the escalation commitment perspective lie in social psychology (Sleesman et al., 2012). Experimental work conducted with students in the early 1970s identified the tendency to reinforce commitment to a course of action in the face of adverse information about the results of that course of action (Staw, 1976). They argued that the psychological driver of this seemingly perverse – from a rational decision-making perspective – behaviour is self-justification. Reviewing later experimental work Staw (1981) concluded that escalation effects were reinforced by the attribution of negative outcomes to exogenous rather than endogenous factors, and social norms of leadership in which constancy of purpose and consistency in actions were seen as highly positive attributes. He goes on to argue that the experimental results suggest that decision-makers display a retrospective rationality, as opposed to the prospective rationality which is typically associated with formal investment appraisal models based on subjective expected utility (SEU) theory. Thus retrospective rationality violates the rationalist economic principle that by-gones are by-gones and should not affect current investment decisions due to the risk of throwing good money after bad.

As the escalation of commitment perspective developed, Staw realised the inherent limitations of experimental work for understanding managerial phenomena, and turned his attention to case studies of major projects and explored the ways in which organisational and contextual factors interacted with psychological

ones. Expo '86 in Vancouver (Ross and Staw, 1986) displayed serious nominal public budget escalation (435% in less than 5 years) coupled with diminishing scope and functionality. They concluded that escalation of commitment is a temporal process driven by the dynamic interplay of project-specific, psychological, social and structural determinants, with the psychological determinants tending to be stronger earlier in the project life-cycle, and the social and structural ones becoming stronger as more and more resources are committed, and the magnitude of the loss inevitably resulting from cancellation grows. This approach was further explored in the case of the Shoreham Nuclear Power plant on Long Island which escalated in nominal dollars from £75 m to £5000 m over 23 years and was then closed without ever operating (Ross and Staw, 1993).

2.4. Complementarities and differences

Fundamental to the process of modernisation is the belief in the rationality of decision-making in which the allocation of scarce resources to their most efficient use is axiomatic (Weber, 1947). The central difficulty in achieving these norms of rationality is that the results of allocations of resources to particular activities lie in the future while the allocations themselves have to be made in the present. If this is true of any economic activity, it is profoundly true of major projects where knowledge of the most efficient allocations can only be known with hindsight some 10 or 20 years later. The paradigmatic solution to this problem has been the combination of von Neumann and Morgenstern's (1953) concept of expected utility with Savage's (1954) concept of personal probability in subjective expected utility (SEU) theory as a norm for decision-making (Schoemaker, 1982) emphasising the formal aspects of Weber's concept of rationality. The implementation of SEU theory in major projects typically takes the form of cost-benefit analysis (Layard and Glaister, 1994) which also attempts to take into account non-traded costs (such as environmental impact) and benefits (such as lives saved) which cannot be directly assigned a monetary value.

The fundamental point of agreement between the strategic misrepresentation perspective and the escalation of commitment perspective is that the norms of rationality established by SEU theory are broken in decision making around the allocation of resources to major projects. In essence, the escalation of commitment perspective presumes that the original budget estimate is made in good faith in accordance with the norms of SEU theory and that the norms of good practice in investment appraisal are not violated at project inception. It is only when good money gets thrown after bad once escalation commences that these norms are violated and resources misallocated. The strategic misrepresentation perspective, on the other hand, argues that the initial investment appraisal is done in bad faith and that the norms of good practice are violated at that point leading to the misallocation of resources. It holds that the norms of rationality are broken through self-serving advocacy and downright deception and the cost-benefit analyses produced to justify the allocation of resources are mere fig-leaves to hide darker motives for decision-making.

We wish to propose that there are important complementarities between the two perspectives, and in particular that strategic misrepresentation relies upon escalation of commitment for its success. As Shapira and Berndt (1997) identify, the SEU model of resource allocation relies upon a "heroic" notion of decision-making where resources are rationally allocated and events then take their course. This heroic notion is apparently shared implicitly by the strategic misrepresentation perspective in that once the funder has swallowed the lie events take their course through to the inevitable budget escalation. However, as we will see in the case of the CFL, the financial resources required by major projects mean that they are only committed in stages, and often against interim performance targets. This means that, from a strategic misrepresentation perspective, the lie has to be repeated many times, and as evidence of escalation accumulates, that lie has to be repeated in the face of growing opposition from those who are providing the financial resources. We propose that escalation of commitment is the crucial process that allows the resources to continue to flow even in the face of growing scepticism of the merits of the original business case.

These considerations raise another puzzle – what is the motive for strategic misrepresentation? Leaving aside corruption for personal gain – which is not suggested as an important driver within the strategic misrepresentation perspective – the motives behind such misrepresentation remain unclear. Simply competing for scarce organisational resources for the sake of it would not appear to be an adequate motivator for taking on the enormous challenges of promoting a major project. We suggest that future-perfect strategising plays a crucial role here, and propose that it is the vision of the future benefits enabled by the completion of the major project that is an important motivator for strategic misrepresentation and helps to facilitate escalation of commitment. In the face of calls – typically from those providing the financial resources – to cancel the project, advocates of the future benefits can call on norms of visionary leadership to support their advocacy of continuation. Thus, in contrast to the arguments of van Marrewijk et al. (2008), we suggest that future perfect strategising and strategic representation are complementary in the insights they can offer into the project escalation phenomenon.

A ubiquitous feature of the organisation of major projects also provides an important enabler of strategic misrepresentation and escalation of commitment. The levels of human and material resources mobilised on major projects are way beyond the capabilities of project promoters and are only required temporarily during the definition and execution of the project. Effectiveness and efficiency oblige a buy rather than make approach on the part of the promoters and clients of major projects so they hire project-based firms which are usually called "contractors" to delivery the project. A useful feature of contractors from the strategic misrepresentation and escalation of commitment perspectives is that they provide a convenient scapegoat. If strategic misrepresentation has occurred, then the project is bound to escalate. However, if a contractor has agreed to deliver the facility at the unescalated price it can then be publicly blamed for incompetence and perfidy. Similarly, escalation of commitment is easier if the reasons for escalation can

be placed exogenously with the contractor rather than endogenously with the client's own decision-making processes (Staw, 1981). As Merrow cites one project director, “first we hire the scape-a-goats!” (2011: 131).

Drawing on these considerations, we propose the analytic model of budget and schedule escalation as an organisational process presented in Fig. 1. This shows how the three different perspectives might be used in a complementary manner to gain greater insight into the budget and schedule escalation phenomenon. Future perfect strategising motivates the advocacy that drives strategic misrepresentation as project promoters seek scarce funds; budget and schedule escalation inevitably follows once the project is launched. The project promoters then face the problem of ensuring the continuing commitment of those who have invested funds; project promoters themselves are not escalating commitment because they knew escalation would happen. Providers of financial resources are persuaded to invest further due to a combination of a reluctance to admit they were wrong initially, suasion by the leadership of the project manipulating the perceived project economics, and an internalisation of the future perfect state in what Clegg et al. (2002) call “governmentality”. Thus the project funders repeatedly cycle through phases 2 and 3 of Staw's summary model (1997) which is reinforced by further advocacy of the benefits of the investment by future perfect strategising by the promoter and the scapegoating of the contractor which diverts attention from the viability or otherwise of the original business case. The outcome of this recursive budget and schedule escalation process 5 or 10 years later is a “project failure”.

3. Research methodology

Empirical research into major projects as organisational phenomena presents serious difficulties, and stretches the ingenuity of researchers to their limits. A major problem, particularly if one is concerned with the relationships between managerial actions and organisational outcomes, is that the lag between key managerial decisions during the front-end definition of the project and actual outcomes at project completion may be 10 years or more. This has led most researchers in the field to focus their enquiries upon completed projects and to rely on documentary sources complemented by interviews with key players where possible

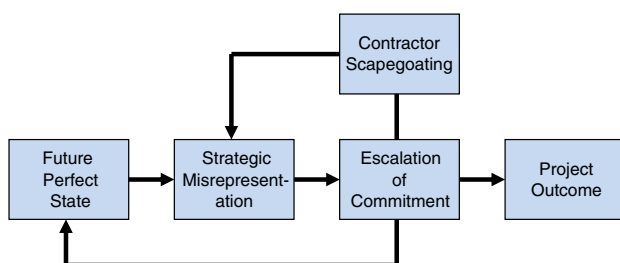


Fig. 1. An analytic model of project escalation.

(e.g. Koppenjan et al., 2011; Sahlin-Andersson, 1992) — we call this the *hindsight approach*. A second challenge is the idiosyncratic embeddedness of major project organisations — there is no “typical” major project because phenomena on major projects are both multi-dimensional and contextually specific (Ross and Staw, 1986; Shapira and Berndt, 1997). In terms of both the project mission (what the project is trying to achieve) and the socio-economic context in which that mission is being delivered all major projects are different on dimensions as varied as the political stability of the country where the project is being executed; the intensity of stakeholder action in relation to the project; and the infrastructure already available at the project location.

In order to address these issues, we have chosen to borrow our method from political science. Sagan (1993) explored the issue of nuclear weapons safety. He wanted to understand why there had been no accidental detonation of a nuclear weapon. He compared and contrasted two theories of organisational safety — normal accidents and high reliability organisations — using them as perspectives to interpret the historical record revealed from military sources and interviews. Hindsight is essential here, because any judgement of the safety of a system is inherently dependent upon whether an accident has occurred or not — all systems can be claimed to be safe until they fail. Political scientists are also very experienced at drawing more general inference from the idiosyncratic embeddedness of particular aspects of the state such as the military. We follow this example by using future-perfect strategising, strategic misrepresentation and escalation of commitment as different perspectives to examine the case of the Channel Fixed Link project.

In deploying the hindsight approach we are proposing history as a method *for* project management research, rather than a history *of* project management research. We fully support calls for more attention to the history of the field (Lenfle and Loch, 2010). However, our aim here is rather different and draws on a long standing tradition in strategic management research of historical case analysis (e.g. Daneels, 2010; O'Sullivan and Graham, 2010; Rosenbloom, 2000) as the basis for the generation of theory.

Why have we selected the CFL as our case study? It is unquestionably a major project, with an outturn construction budget of £9500m at 2004 prices, and because of both its symbolic nature and its scale it was well-reported at the time providing considerable documentary evidence from newspapers, journalistic accounts, and official reports. It is completed, and enough years have passed to allow a thorough assessment of the benefits side of the investment equation. Costs are usually available upon completion, but benefits typically take a decade or more to be fully proven. The passing of the years has also allowed the release of more honest reminiscences from those involved at the time in the form of speeches and memoirs — such data are particularly important for the identification of strategic misrepresentation which is, in its nature, covert. These documentary data — both contemporary and retrospective — provide the empirical basis for our analysis. We turn now to a brief history of the project which largely draws on Winch (1996).

4. The Channel Fixed Link story

A simplified project organigramme is offered in Fig. 2 showing the key actors on the project. The Intergovernmental Commission (IGC) established by the Treaty of Canterbury between France and the UK in February 1986 awarded a concession to operate the Channel Fixed Link to Eurotunnel in April 1986. A consortium of 10 construction companies dubbed Transmanche-Link (TML) was then awarded the construction contract by Eurotunnel in August 1986. Thus Eurotunnel is the promoter/client for the project as concessionaire, and TML is the contractor. TML chose to undertake the tunnelling work itself, while it let subcontracts for the supply of services related to fitting out the tunnels and the terminals. It also acted as an agent for Eurotunnel for the procurement of the locomotives and rolling stock to provide the car (now branded as Le Shuttle) and heavy goods (HGV) shuttles from the loose Euroshuttle consortium. Eurostar is a separate operation established by a consortium of Belgian, British and French railways to provide through passenger services and purchases an agreed proportion of the CFL capacity, as do rail freight operators.

Funding for the project was obtained from a number of sources and in a number of tranches. The fundamental premise of the funding was specified in the Treaty of Canterbury: article 1 specified that the construction and operation of the scheme “shall be financed without recourse to government funds or government guarantees of a financial or commercial nature”. This left equity and loan capital, both of which were pursued. The original capital of Eurotunnel was provided by the promoters — the founding banks, and the original 10 construction corporations with the latter in the majority. In September 1986 Eurotunnel was refinanced with £46m of equity from the original 5 lead banks - known as Equity 1 - which became the “*noyau dur*” and the members of TML became minority shareholders. Equity 2 went ahead in October 1986 through a private placing with financial institutions which, after some arm twisting by the Bank of England, raised £212m. Equity 3 took the form of an Initial Public Offer (IPO) which successfully raised £770m. Loans were arranged from banks around the world; for instance £1 billion was raised from the European Investment Bank and £5 billion from a consortium of 200 investment banks in 1987.

The construction contract specified that the completed facility would be handed over by TML to Eurotunnel in December 1992

for commissioning and open in May 1993. Although the tunnelling works were completed on schedule, there were significant delays in fitting them out. In 1990, it still looked as if the tunnel would be open in June 1993, but by 1992, it became apparent that this could not be achieved and a target of December 1993 was announced. The project was finally handed over on the 10th of December 1993, some 12 months late, a schedule escalation of 14.2%. The official opening by the respective Heads of State finally took place 12 months later than the original date in May 1994, but this was more dignified than efficient in that the full range of services (rail freight; HGV shuttle; Eurostar; tourist shuttle) was not available until December 1994.

Table 1 gives the construction budget in constant 1985 prices broken down by the main categories of work. As can be seen the budget escalated steadily. The overall budget escalation in constant prices is 69%, the largest proportional increase being the rolling stock. The benchmarks provided by the RAND Corporation survey (Merrow, 1988) of megaprojects (>\$500m at 1984 prices) demonstrate that this was not an egregious case of escalation because the megaprojects average is 88% compared to the 69% witnessed here. However, this does compare unfavourably to the mean figure of 45% overrun for rail projects and 34% for fixed links presented by Flyvbjerg et al. (2003).

Once the revenue-earning services were launched they failed to meet the revenue projections and further losses accumulated. While the company easily covered its operational costs, interest payments of £60m per month were swamping the revenues generated and the debt burden steadily mounted. Negotiations with the bank consortium to resolve this situation moved slowly and in September 1995 Eurotunnel announced that it was suspending payments on all debts, except the senior debt, for up to 18 months to allow the situation to be resolved. Following the brinkmanship that was by now commonplace for the project, an agreement was proposed in October 1996 that the banks should take an increased equity stake in Eurotunnel, raising their share to 45.5%. This directly reduced Eurotunnel’s debt by £2000m from £9100m, and lowered the interest payments on the rest. The deal was facilitated by the French and UK governments’ willingness to increase the discounted value of the asset by increasing the length of the concession by a further 34 years, subject to improved conditions for freight transport and the payment of 40% of the operating profits after 2052 to the governments.

So, on its 10th anniversary, the future of Eurotunnel as operator of the CFL was in the balance. The suspension of interest payments was only a breathing space. Since it opened, Eurotunnel

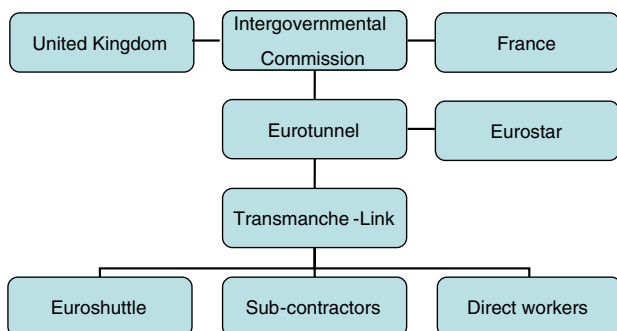


Fig. 2. Simplified organigramme of the channel fixed link project.

Table 1
Channel Fixed Link budget data.
Source: Eurotunnel Documentation

	1986 Budget	1990 Forecast	1994 Outturn	% Increase
Tunnels	1329	2009	2110	59
Terminals	448	491	553	23
Fixed equipment	688	814	1200	43
Rolling stock	245	583	705	188
Total	2710	3897	4568	69

has been profitable at the operational level, but has not been able to generate enough profit to make significant progress in paying back its loans. In February 2004, Eurotunnel finally admitted that the debt burden was far too high for the company to support. While in earlier crises it had advocated restructuring of the debt, this admission showed that Eurotunnel could never be profitable without some or all of the debt being written off. By then, it was servicing a debt of £6000m with annual interest charges of £318m from an annual operating profit of £170m and so this burden continued to grow.

To make matters worse, the minimum user fee agreement with the rail operators (freight and Eurostar), which provided 50% of its income of £232m in 2003, ceased in November 2006, further reducing income because the fee was based on an assumption of 10m passengers a year on Eurostar and 5m tonnes of rail freight which has never been achieved. Passenger numbers increased following the opening of High Speed 1 to London in November 2007 and achieved 9.5m in 2010 representing an 80% market share (www.eurostar.com accessed 30/01/12). Shuttle freight is the only market sector where out-turn performance has exceeded predictions, although Eurotunnel has yet to take 50% of the market from the ferries (Anguera, 2006: table 9).

A recent hindsight review of the performance of the CFL concluded “the cost benefit appraisal of the Channel Tunnel reveals that overall the British economy would have been better off if the Tunnel had never been constructed, as the total resource cost has been greater [than] the benefits generated” (Anguera, 2006: 314). Arguably, this is a rather restricted view of the situation for it does not take into account any positive externalities such as spending by the additional passenger traffic generated or any regeneration effects in France, but it also excludes additional investment by French and Belgian railways and the construction of High Speed 1 in the UK. Positive externalities are, however, unlikely to outweigh the calculated net present *negative* value of £10,006m in 2004 prices. How did this situation arise?

5. Budget and schedule escalation on the Channel Fixed Link

In order to answer this question, we deploy the perspectives reviewed above, looking for evidence of the processes involved. There is much evidence of *future perfect strategising*. Taking two aspects of it identified above, designer culture through the use of artefacts, and endgaming we will identify examples of both on the CFL project. For over 200 years, dreamers of various levels of practicality have proposed bridges, tunnels and “brunnels” across the Channel, and tunnel construction started twice before the successful attempt in 1986. The public imagination has been stimulated by articles in the popular and technical press; leading public figures have advocated its construction; and scale models have been used to seduce sceptics (Fetherston, 1997; Hunt, 1994; Lemoine, 1994).

An important feature of future perfect strategising is the use of artefacts as representations of the future-perfect state as part of “designer culture”, and these were extensively used on the CFL. Eurotunnel established a visitor centre in Folkestone to stimulate public support, but the more important uses were in

raising finance. Models of the new facility played an important part in raising finance. For many years in the 1960s, a scale model graced the offices of the House of Morgan in New York (Fetherston, 1997), while fund-raising during the 1980s was enlivened by a scale model that was the centrepiece of fund raising dinners in the City of London (Freud, 2006).

Endgaming was also very important; indeed it is arguably almost inherent in expected utility calculations based on net present value due to the importance of time in the calculus. Endgaming was an important element in the negotiations between the banks and TML around the construction contract. In essence, the banks stated that the construction period proposed by the contractors of 7 years and 6 months was too long to allow acceptable rates of return, and that a period of 7 years was required. TML held that this meant that there would not be enough time for commissioning the facility; the banks were adamant, so TML agreed (Winch, 1996).

Endgaming was crucial as symbolic milestones were reached in the construction schedule. The finalisation of raising £1800m in additional loans in 1990 was closely linked to the emotional moment when the first two tunnels “broke through” to join each other under the Channel on December 1st which was carefully managed for media purposes (Fetherston, 1997). As the project neared completion more games were played around completion dates. The target completion date had been extended by one month in 1989, and 1990, it still looked as if the tunnel would be open in June 1993. By 1992, it became apparent that this could not be achieved and a target of December 1993 was announced. The tunnelling had been completed on schedule, but there were significant delays in the fixed equipment works in particular. The original commissioning period planned was 6 months from December 1993 to May 1994, but, effectively, it doubled to 12 months — reclaiming the 6 months that had been lopped off the schedule at the behest of the banks in 1986. The handover of the CFL from TML to Eurotunnel took place as agreed on 10th December 2003, although commissioning was not actually complete in apparent breach of the construction contract (Fetherston, 1997). The official opening with the two Heads of State finally took place on May 6th 1994, 12 months later than the original date in the contract, but even this was gamed as no services were actually able to run at this time.

As well as evidence of future-perfect strategising, we can also see indications which suggest *strategic misrepresentation* of the progress against schedule in support of the second rights issue. There was certainly optimism bias on the CFL — as one of the co-directors of TML put it:

Optimists and enthusiasts... they will always look on the bright side, minimize the risk and concerns and go on, because that's what makes the world go round (cited Fetherston, 1997: 92).

The more stringent test of the strategic misrepresentation perspective is whether we can find other evidence of the deliberate distortion of the costs and benefits of the project in order to move it forwards.

More detail on how Equity 3 was sold has been provided by Freud (2006). Project finance, where the finance is directly secured

on the asset being created, was a new and exciting market opportunity in the City of London in the mid 1980s. Warburg's were appointed brokers to Eurotunnel, but did not have much faith in the prospects of the project until they reanalysed the projections for how the share price would perform as risk reduced through the project life-cycle and concluded for themselves on no apparent analytic basis that the traffic forecasts provided by the transport analysts were conservative. What drove them was the opportunity to expand their position in the market for private finance deals, particularly using equity rather than loan capital. Whether this amounts to strategic misrepresentation is moot – Freud backed his own analysis with significant purchases of shares so he obviously believed the analysis – but certainly a large number of investors were misled by the manipulation of the press by Freud and his team to put a positive spin on the prospects of the shares. Freud later concluded that “as the marketer of the issue, I had successfully sold the market a pup” (2006: 357).

There is also direct evidence of strategic misrepresentation in order to push the project forwards. A senior executive of Taylor Woodrow, one of the TML member firms, argued that

The project price... was put together to convince the governments, it was a viable price, a promoter's price. What it was not was a contract price. We should never have undertaken to do the work for anything like the sums that were in the submission to the governments (cited Byrd, 1994: 27).

In other words, the member firms of TML did not believe that the project could be built for the initial estimates; so far as they were concerned, the estimates were simply to ensure that the investment appraisal calculation stacked up. One detailed piece of evidence here is that the £150m budget line for cooling in the tunnel was removed during the same negotiations with the banks that reduced the overall length of the project in the full knowledge that it would have to be put back in (Fetherston, 1997). We submit that this budget and schedule manipulation is strong evidence of strategic misrepresentation.

Simultaneously, the revenue estimates were being consciously inflated. Whether the motivation for Warburg's rejection of the “conservative” estimates of Eurotunnel income overall was deliberate misrepresentation or not, it is clear that presentation of the passenger traffic estimates for Eurostar did involve strategic misrepresentation. The then Chair of the Eurostar group, who worked at the head office of SNCF (French railways) in 1986, took the opportunity of the opening of the first phase of the Channel Tunnel Rail Link in September 2003, to reveal that SNCF never believed the forecasts it gave for the number of travellers using Eurostar of 17m passengers a year at the time of project appraisal during the 1980s but had announced them so as to ensure that the business case was viable without public support (*Financial Times* 29/09/03). This manipulation of the revenue forecasts apparently continued through the life of the project — as costs rose, benefits mysteriously rose as well “without any clear evidence or justification” (Anguera, 2006: 303).

Psychological evidence of *escalation of commitment* is, in its nature, not available from the kinds of sources used for

this study. We can, however suggest various factors which facilitated escalation in the context of strategic misrepresentation of the original business case. The first mechanism is founded in the different cultures of the banks and the contractors during 1986 — two cultures founded on mutual suspicion (Fetherston, 1997; Tabouis, 1988). Stannard, a former Managing Director of Eurotunnel (1990: 53), argues that:

Only the contractors could supply an estimate for the Channel Tunnel. The banks did not want an estimate, they wanted a final figure: realizing they could not have a final figure the banks worked on the basis that the estimate was high. The contractors worked on the basis that the estimate had to be low enough to win the concession. In banking you bid high and then trim your margin: in contracting you bid low and then get your profits on the variations.

The underwriting banks' suspicions were reinforced by the findings of a technical report they commissioned from consulting engineers which concluded that the TML figures were high (Fetherston, 1997). The result was that a formal process of “optimisation” was implemented which – at least in the opinion of TML – over-engineered the specification: “the project was not properly designed in advance by Eurotunnel, and they developed a habit in the early days of asking for the best of everything, whether or not it was needed” (*Financial Times* 09/01/90). Eurotunnel believed that these additional costs would be borne by TML; TML believed otherwise and serious arguments ran throughout the life of the project around optimisation. As Fetherston (1997: 206) explained:

Optimization demanded exquisite calculation and balance, because each change provoked a chain reaction that disrupted calculations and forced other changes, which in turn cascaded through the project, down to the bedrock assumptions upon which the Channel Tunnel idea stood.

Political support was crucial at various stages of the project. This was much more important in the UK, because there was no history of opposition to the construction of a CFL in France, and many of the key financial institutions were owned by the state. Henderson (1987) reports that he does not know why Mrs Thatcher committed so enthusiastically to the CFL given her notorious antipathy to both trains and the European Union, but that commitment swept away considerable opposition to the principle of the CFL in political circles. However, convincing the financial institutions that would have to invest was another thing. During Equity 2 this lack of conviction became manifest so the Bank of England (the UK central bank) became involved to cajole reluctant investors (Freud, 2006). Similarly, during the search for additional loans in 1990, the Japanese syndicate banks, reeling from their own stock market crash and constrained by new banking regulations were reluctant and were only persuaded by a direct appeal by Mrs Thatcher to the Japanese prime minister, who in turn cajoled these banks (Fetherston, 1997).

Despite these political pressures it remains a puzzle as to why banks from around the world agreed to invest and keep investing thereby escalating their commitment. In [Stannard's opinion \(1990: 53\)](#):

In normal circumstance the lending consortium would merely have walked away, but fortunately there were mitigating factors:

- The project was of the highest political visibility and the banks knew that their names had been used in the proposal to the governments;
- There very few, if any, alternative project financings available to lenders; and,
- The cash flow of the project was still extremely robust, there was very little doubt that it could be built, and thus the risk to the banks was one of delay in repayment rather than loss.

Thus the strategic misrepresentation around the traffic forecasts was critical in the escalation of commitment by the underwriting and participating banks. This was reinforced by a market perception that infrastructure project finance was an exciting new market in the 1980s ([Freud, 2006](#)) generating a herd instinct towards investment by bankers. Within Eurotunnel, the necessity to keep raising the traffic forecasts as construction costs rose was enshrined in the “cover ratio”. As one banker explained to [Fetherston \(1997: 257\)](#):

A cover ratio is a present-value relationship between a flow of income and a flow of costs. If the flow of income is greater than the flow of cost, you have a positive cover ratio... The revenue forecasts were reported on and updated every six months or so months and [so were] the costs. So every six months, effectively you got a new series of project economics. You fed them into the computer and you came out with a different number and you kept your fingers crossed.

If the cover ratio fell below 1.2 Eurotunnel could not draw down its loans; if it fell below parity Eurotunnel would default on its loans. The temptation to misrepresent traffic forecasts in the face of escalating costs was apparently overwhelming.

The escalation of commitment by the funding banks was facilitated by the implementation of an explicit strategy of scapegoating the contractor. The nub of the problem was that the construction contract was signed prior to Equity 1, and so the constituent firms of TML were the majority shareholders of the client with which they were signing the contract. So as one agent banker put it:

les nouveaux actionnaires soupçonnant des entreprises d'avoir signé avec elles-mêmes lorsqu'elles étaient majoritaires un contrat léonin et les entreprises estimant être en bon foi et avoir pris les risques et des engagements précis dès le début, notamment auprès des gouvernements (cited [Tabouis, 1988: 62](#)). [The new shareholders suspected the contractors of having signed a compromised contract with themselves when

they were in the majority while the contractors believed that they had acted in good faith and had taken significant risks prior to project launch, particularly in relationship to the governments.]

Therefore in the run-up to Equity 3, Eurotunnel was concerned to demonstrate its firmness towards TML. A letter from Eurotunnel to TML was leaked to press which showed its “no-nonsense” attitude towards the contractor, and the Chairman of Eurotunnel became increasingly associated with public displays of toughness. During 1988, it became clear that costs would significantly overrun the original budget, and there were also fears about the programme. A war of nerves developed between Eurotunnel and TML. Early progress on tunnelling was painfully slow. In August of 1988, a Eurotunnel Co-chair publicly criticised the corporate members of TML for its lack of attention to the management of the project, and in the October forthrightly declared that “we don't have a tunnelling problem. We have an equipment and management problem. Bad ground is not to blame for the delays” (cited [Hunt, 1994: 216](#)).

As the project moved into the fitting out phase, similar tactics were employed in the face of mounting costs. At a press conference in October 1992, Morton stated that “it's hard to believe that TML could lose six months in fitting out, but they did” (cited [Fetherston, 1997: 362](#)). The principal result of the consistently sour relationship between client and contractor which witnessed continual reference to the terms of the construction contract was that joint problem-solving was impossible. For instance, as costs started to escalate, TML wanted to establish joint teams in a search for savings, but Eurotunnel refused ([Fetherston, 1997](#)). Similarly, during commissioning, the two parties did not work together but chose an arbitrary point at which to hand over from one to another the partially commissioned facility. One knowledgeable estimate from the Chief Executive of TML is that these disputes cost as much as £1000m and caused the job to be 9 months late ([Anderson and Roskrow, 1994:199](#)) — an unintended consequence of scapegoating strategy.

Experienced project managers, we suggest, understand this dynamic, and sometimes use it to their advantage. For instance, the project manager of another major project – the Storebælt fixed link in Denmark – stated that he “had to have the concrete on the table in a hurry” (cited [Bonke, 1998:10](#)). In other words, generating sunk costs fast is a key to successfully managing an escalating project, or rather to preventing its de-escalation through cancellation. The same sense of urgency was found on the CFL. Wary of an incoming Labour government cancelling, for a third time, the project in 1987 TML and Eurotunnel pressed on with digging the tunnels before design work was complete. As a banker reported to [Fetherston \(1997: 205\)](#) on attempts in 1987 to stop the project and reassess the business case and contractual arrangement with Eurotunnel during Equity 3:

The ball had started rolling and there was no way it could be stopped. And if you were the guy saying, no, don't do this, you must stop, think about it — you were simply pushed aside.

6. Implications and further work

Escalation in budget and schedule and underestimation of benefits is not inevitable on major projects – the Dartford and Severn Bridge crossings in the UK are testament to that – but it is common. We have used the CFL case to explore some recent perspectives from organisation theory on the management of major projects and to suggest how they can be combined to provide deeper insight into the escalation process. There are, however a number of issues that the argument has not addressed which suggest lines for further enquiry.

Two are suggested by the work of [Shapira and Berndt \(1997\)](#). They develop a cognitive model of decision-making on major projects drawing on the Carnegie school of decision-making, emphasising the importance of uncertainty at the point of decision, and perceptions of post-decisional control. Uncertainty is pervasive on projects, rendering the purported rationality of cost–benefit analysis nugatory; while it undoubtedly has value as a structured form of sensemaking providing a common language for talking about the future, cost–benefit analysis in this view cannot of itself form the basis of decision-making. In the face of uncertainty, advocacy motivated by future-perfect strategising is, perhaps, inevitable. Arguably, the issues revolve around openness and critique in advocacy rather than its replacement with “rational” forms of decision-making. In this perspective, strategic misrepresentation is a result of a lack of openness, rather than lying about the future. Indeed, in the absence of evidence that the advocate is wrong – that evidence can only be obtained in the future – strategic misrepresentation cannot be defined as “lying” in the strict definition of the word, merely as self-serving.

The argument here touches on some established critiques of the escalation of commitment perspective. Its basic presumption is that escalation – throwing good money after bad – is irrational in that psychological or behavioural reinforcement dynamics pervert managerial rationality according to the norms of SEU theory. Some commentators have, however, suggested that the escalation phenomenon is not as clear-cut as that. [Bowen \(1987\)](#) argues that in practice, feedback on performance is often equivocal in that its implications for action are difficult to discern due to difficulties of unambiguously comparing what appears to be the case with what ought to be the case. Thus escalation may be the product of “decision dilemmas” rather than decision errors. Along similar lines, [Drummond \(1998\)](#) has argued that escalation is a function of a rationality that does not take into account paradox where means can become ends and the focus on delivering the project closes off continuing consideration of the rationale for the project. CFL managers on our evidence became locked into a delivery mentality remarkably early on in the project which pervaded the entire project coalition from bankers to construction managers which is another form of endgaming.

Perception of capability for post-decision control is the second issue raised by [Shapira and Berndt \(1997\)](#). The managerial claim of control is supported by the claims of the project management discipline – associated with organisations such as the Project Management Institute – to have mastery of the success factors for project delivery. These claims have been widely questioned

(e.g. [Hodgson and Cicmil, 2006](#); [Merrow et al., 1981](#)), yet they provide the crucial legitimacy for the claims of the promoters of major projects to be able to deliver on the costs side of the business case. Further research – preferably of an ethnographic nature – is required into the “dynamics involved in the planning of large-scale projects” ([Shapira and Berndt, 1997: 352](#)).

A third issue is identified in [Genus’ \(1997\)](#) analysis of the CFL which argues that under high levels of uncertainty, the most appropriate strategy for the creation of large technical systems is an incremental approach that allows the adjustment of the development process as learning is obtained. However, he also points out that major projects are typically characterised by non-incremental decisions that are irreversible — half a tunnel is simply a hole in the ground. Recent work by [Gil \(2009\)](#) has identified the potential role of options thinking on major projects as a possible alternative to incrementalism and further work along these lines would yield much insight.

Finally, and perhaps most importantly, what is to be done? Investors in projects do not like project escalation and they are more likely to invest in the infrastructure society needs if they can have confidence that the business case will be realised as proposed within a fairly narrow margin. Can we say more than that every project promoter needs access to “deep pockets” ([Miller and Lessard, 2000](#))? There are various current approaches to research on this issue from an engineering management perspective aimed at proactively avoiding escalation. The first is a focus on decision-making which has been explored within the Concept research programme ([Williams et al., 2009](#)) and elsewhere ([Priemus et al., 2008](#)). The second is to focus on procedural issues associated with project assurance ([NAO, 2010](#)), typically through stage-gate processes ([Williams et al., 2010](#)), and the “three lines of defence” ([Hone et al., 2011](#)). A third approach focuses on the organisation of the early phases of the project, particularly on “shaping” and “front-end loading” ([Merrow, 2011](#); [Miller and Lessard, 2000](#)) while watching for the “early warning signs” ([Williams et al., 2012](#)).

These engineering management approaches have considerable merit, and we suggest that one way of developing their complements with the organisation theory perspective presented here could be to develop the information processing under uncertainty perspective that underlies both the work of [Shapira and Berndt \(1997\)](#) to articulate a perspective on project organisations as information processing systems through time ([Winch, 2010](#)). This would allow the development of distinct but complementary levels of analysis articulating the psychological, organisational and contextual aspects of project escalation. A further complement is that all the research reviewed in this paper from both an engineering management and an organisation theory perspective focuses on what clients do to promote the project, as opposed to what the supply side does to deliver the project. This suggests that we need to give more research attention to the distinctive roles of clients on projects in contrast and complement to the roles of the project-based firms which deliver the project. It has been argued in the case of the CFL ([Loch et al., 2006](#)) and more widely ([Winch, 2010](#)) that contract design issues are crucial for mitigating escalation. However, the important point here is that contract design can do little to address the dynamics driving

escalation identified here — they are internal to the client body rather than a function of relationships between clients and their contractors.

7. Conclusions

We posed the question of whether research drawing on organisation theory could contribute to the development of a more comprehensive perspective on budget and schedule escalation on major projects than is presently provided from an engineering management perspective. We have contributed to theory in project management by answering this question positively and developing the analytic model of budget and schedule escalation on major projects shown in Fig. 1. We then deployed this model in a hindsight analysis of the Channel Fixed Link case which suggests that it captures well the mutually reinforcing dynamic of future-perfect strategising, strategic misrepresentation, and escalation of commitment on major projects. Advocacy of the benefits of major projects motivated by future-perfect strategising tempts project promoters into the strategic misrepresentation of the business case which seduces financiers – whether from the public or private sectors – into making the investment. As awareness of the inevitable escalation grows, contractors are scapegoated for budget and schedule escalation while advocacy of the potential benefits of the facility by the promoters becomes more strident. Reassured by these claims, but also aware that there is no chance of getting a return on their investment unless the project is completed and revenues start flowing, investors escalate their commitment encouraged by political interventions. The outcome is yet another major project “failure”.

Simultaneously monuments to both the genius and the hubris of their promoters, major projects have shaped the modern world and have provided the infrastructure that enables the social and economic processes that underpin our welfare to exist. Researching major projects poses considerable methodological difficulty, yet the theoretical issues they raise about the basis of rational economic decision-making in the face of uncertainty are profound and the challenges of managing multinational organisations that are both very large and temporary are immense but little understood (Orr et al., 2011). In our view, neither of these challenges has been adequately addressed by existing research in project management from an engineering management perspective and so we developed and deployed the analytic model shown in Fig. 1 of project escalation as an organisational process through time. We also proposed the hindsight approach as one method of using history for the development of project management theory and as a way of looking forward while looking backward (O’Sullivan and Graham, 2010) on major projects. We hope that his paper has stimulated greater interest in research on major projects using a hindsight approach as one contribution to project history.

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