

Large Infrastructure Projects in Germany Between Ambition and Realities

Working Paper 3

Public Infrastructure Project Planning in Germany: The Case of the BER Airport in Berlin-Brandenburg

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1. Introduction

“The one who can successfully operate airports is not necessarily the one who can build them too. ... There was an overconfidence to achieve what better would have been left to professionals to do.”

Hartmut Mehdorn, CEO FBB since 2013²

1.1 High-profile failure in large infrastructure projects

‘Infrastructure’ is a term used for physical assets that “enable, sustain or enhance societal living conditions”³. With regulatory power, technical expertise, delivery capacity and financing ability dispersed among a multitude of state and non-state actors, infrastructure is a case in point of co-production of statehood that relies on coordination and effective governance. This is exacerbated in cases where the infrastructure is complex, costly and attracts a high level of public attention or political interest – large-scale infrastructure projects or megaprojects.

When such projects fail, the damage to the Governments in charge, the private sector service providers, the financiers, public or private, and the users can be enormous. Berlin Brandenburg Airport (“**BER**” or the “**Airport Project**”) currently under construction in Schoenefeld, Brandenburg, is such a high profile failure being more than 4 years behind schedule and at least 70% above budget. The official opening date of BER has been moved four times, from originally October 2011 to dates in mid 2012, early and then late 2013. Since the last cancellation of a firm opening date in January 2013, the developer of the Airport Project, Flughafen Berlin Brandenburg GmbH (“**FBB**”)⁴, has not been able to name a new opening date given the complexity of the ongoing technical issues faced until December 2014. Only then the lost quarter of 2017 as a time band for the opening date was announced.

² Der Spiegel, Spiegel-Gespraech mit Hartmut Mehdorn, “Kann Deutschland keine Grossprojekte mehr stemmen?”, live at Beuth Hochschule fuer Technik, Berlin, 15 January 2014.

³ Jeffrey E. Fulmer, “What in the world is infrastructure?”, Infrastructure Investor, July/August 2009, pp. 30-32, refer to p. 32.

⁴ The airport company underwent a number of name changes before becoming FBB. In this thesis ‘FBB’ is used throughout where possible.

Cost overruns and schedule delays are the quintessence of failure, as succinctly formulated by Holgeid and Thompson:⁵

“Project Success: The project is completed on-time and on-budget, delivering the expected value; Project Failure: The project is either terminated or not completed on-time, or not on budget, or not providing the value aimed for.”

The failure of the Airport Project has led to several parliamentary hearings and full-scale investigations. Documents and minutes made available by these ongoing investigations point to serious flaws in the governance structure as being at the heart of the disaster. Innumerable change requests by FBB, deficiencies and mistakes in general planning, and failures in construction and interface management are clearly documented and not in dispute. These issues lead inevitably to questions about steering of and by FBB, ranging from the suitability of planning processes, over project organization to the contractual allocation of construction risks.

This study analyzes BER’s governance failures having regard to issues identified by research studies of other large-scale infrastructure projects and attempts to draw lessons. Intriguingly, the BER disaster is neither unique in its failings nor therefore unexpected. The poor experience globally of providing publicly funded megaprojects in infrastructure on time and budget should have heightened the caution of the decision makers responsible for the Airport Project. But more importantly, if BER’s mistakes follow a global pattern, they not only could have been avoidable, but also can be the basis for lessons for future projects.

BER is a high-profile failure that did and continues to damage severely the reputation of all actors involved, from architects and planners to engineers, managers, politicians and Germany as a whole. But whilst failure was not totally unexpected, it was not predestined either, as large airport passenger terminals can be developed and delivered successfully. Recent examples for successful developments are Munich Airport’s Terminal 2 or Hamburg Airport’s Terminal 1.

Three broad reasons of why the BER failure is worth exploring are as follows:

⁵ Kjetil Holgeid and Mark Thompson, “A Reflection on Why Large Public Projects Fail”, in: Andrea Roemmele and Henrik Schober (Eds.), *The Governance of Large-Scale Projects: Linking Citizens and the State*, 2013, Nomos Verlagsgesellschaft, pp. 219-243, p. 221.

- (a) Whereas a body of international research exists that explains common mistakes in planning and executing large infrastructure projects, BER and other current projects still have been executed with faulty governance structures. This exacerbates the public outcry and highlights the need for clear and founded lessons such that ‘this never happens again’;
- (b) Whilst benefiting from the information made available by the several parliamentary hearings and investigative committees, the study aims at a different outcome. The committees are likely to focus on identifying fault and political responsibility instead of drawing general lessons. Their conclusions will also be influenced by party political considerations; and
- (c) There is ongoing innovation in the field of governing large-scale infrastructure projects, in particular in the United Kingdom. Assurance and management concepts and contractual arrangements developed for or used by public projects in the UK are available for the analysis.

1.2 Research Question and Limitations

The definition of the research question is based on the understanding that governance is at the heart of success or failure of undertaking a megaproject. This logic also applies to BER that shows the full list of symptoms of ineffective project governance, as developed by Greiman.⁶

- Owner and sponsor conflicts;
- Cost overruns and schedule delays;
- Quality control and assurance issues;
- Increased project incidents; and
- Escalating claims and risk problems.

In order to formulate improvements to the governance of megaprojects based on the specific experiences of designing and constructing Berlin Brandenburg Airport the following **research question** needs to be answered:

⁶ Virginia A. Greiman, *Megaproject Management: Lessons on Risk and Project Management from the Big Dig*, 2013, Wiley Publishers, page 138.

What were the major mistakes made in the governance of the Airport Project that contributed to the significant time delays and cost increases, and what lessons can be drawn from the BER experience to strengthen the governance of publicly provided megaprojects?

Answering this question will have regard to a number of studies undertaken by scholars and practitioners on the different factors for success and failure. Also, new developments in the interplay between public and private sectors that are being applied to mitigate time delays and cost increases in large-scale infrastructure projects will be considered.

In order to contain the scope of this study a number of **limitations**, time-wise and as regards to the subject matter, were chosen:

The analysis focuses on the time between the decision to deliver the Airport Project as a public project and the last cancellation of a firm opening date, i.e. a period stretching from 2003 to 2013. It focuses further on the delivery of the passenger terminal building. The ancillary buildings or the runway system were excluded since here only few cost and financial issues occurred.

As a consequence the study does neither touch on the questions of why the privatization process in the late nineties and early 2000's failed, nor the possibility of a future privatization of BER. Also excluded are the political decisions to build BER, to locate the airport in Schoenefeld and decisions relating to the current airport system in Berlin. On the back end, the analysis focuses on the 'original' delivery process and its governance, not the current remedial actions since the arrival of Hartmut Mehdorn as CEO in 2013 that 'try to put humpty back together again'.

Further, the thesis side-steps the much debated question of comparing public and private ownership and operation of infrastructure assets on the criteria of efficiency or equity, but rather draws lessons in order to increase the likelihood of success of projects that for one reason or the other are decided to be undertaken by public entities.

1.3 Hypothesis

As mentioned above, the basic understanding of this study is that the significant time delays and cost increases in the construction of the Airport Project are attributable first and foremost to mistakes in designing the governance of the multi-billion-Euro project. Specific problems like the insolvency of designers, design changes due to new EU guidelines, project interface issues and significant quality problems are mere symptoms of such mistakes.

The problems at BER are, therefore, not based on unique or unprecedented problems or incidences, but rather on aspects of governance of megaprojects that have been the subject of research for at least two decades and have been identified and outlined in a number of publications.

Building on that basic understanding and recognizing total disregard for best practice by the owners and sponsors of BER, the hypothesis of this thesis is composed of the following parts:

- The literature on megaprojects contains several potentially significant ideas and concepts that have direct relevance for BER;
- Based on a literature review a set of relevant success criteria can be elaborated which can guide through the vast amount of case specific information;
- Mistakes were made at BER on both, the design and set up of the governance structure as well as the undertaking of key processes within that structure. Two key issues warrant mention at this point, first, that the megaproject was ‘squeezed’ into an existing corporate governance framework designed for a going concern. Second, that ongoing changes to size and layout are less a valid explanation for the cost increases (as argued by Hartmut Mehdorn), but rather a cause of the many problems; and
- It is believed that, built on the foundation laid by the foregoing points, lessons can be drawn to be applied to other large-scale infrastructure projects.

1.4 Methods of Inquiry and Sources

The research strategy applied is the case study approach, which is supported by a literature review. The literature review is utilized to build a framework for the case study by crystalizing governance factors important for the success of such undertakings as developed by research. These factors then guide and organize the build up of the case study, validate the assessment and inform the drawing of lessons.

A case study is an approach that focuses on “understanding the dynamics present within single settings” and can include the analysis of multiple cases or various levels within one case.⁷ The case study of BER is based on a combination of primary and secondary sources. Some of the primary sources relate to parliamentary investigative committee hearings, like written minutes of selected hearings about BER or written Questions & Answers as part of such investigations, or have been made public in connection with such investigations. In particular the leaders of the Piraten Partei in the State Parliament of Berlin, the party that chairs that parliament’s investigations into BER, have proven to be promoters of transparency by making a large number of primary sources public. Such sources include internal documents and reports by FBB and by their expert advisers, as well as project-internal correspondence.

These sources have been supplemented with other public primary sources including reports by audit offices, media releases by FBB, media interviews of key actors, and the project’s architect even published his own book.

Secondary sources for the case study include a wide range of media reports (newspapers and television), some accounts of statements made during the hearings and other outsider critiques, and non-academic descriptions in book or report form.

Interviews were not conducted. The reasons for this are threefold. First, there is sufficient inside evidence accessible, including accounts and explanations by key actors, to draw a good picture of what happened. Second, the accessibility of key actors is restricted given that the project is still ongoing, is considered a big failure,

⁷ Kathleen M. Eisenhardt, “Building Theories form Case Study Research”, *Academy of Management Review*, October 1989, Vol. 14, No. 4., pp. 532-550, p. 534.

is politically charged, and parliamentary investigations are current. Third, a clear pattern of 'blaming someone else' has emerged that does not much enlighten the issue. The Federal Republic blames the other shareholders, the State of Berlin blames the architects, the architects blame the FBB management, and so on.

The literature review accessed research by scholars and practitioners into success and failure of megaprojects. This research ranged from broad and well-known academic research of Flyvbjerg or Miller and Lessard, over published reviews of specific projects, to a popular account of practitioners backed by Deloitte.

2. Megaprojects and their Inherent Problems

2.1 Large-scale Infrastructure Projects – an Introduction

Megaprojects are simply ‘very large’ projects, beyond that the term is open to interpretation and definition.

Large-scale infrastructure projects are characterized by high levels of complexity, which can be explained “as a set of problems that consist of many parts with a multitude of possible interrelations and most of them being of high consequence in the decision making process that brings about the final result”⁸. Brockmann highlights that this complexity does not only encompass task complexity, but also social and cultural complexity, based on the number of individuals and organizations involved and their different historical experiences.⁹

Underscoring the multidisciplinary complexity, Hassan et al. put the following attributes on megaprojects:¹⁰

- ‘High’ capital costs;
- Long duration but programme urgency;
- Technologically and logistically demanding;
- Requires multi-disciplinary inputs from many organizations; and
- Leads to ‘virtual enterprise’ for the execution of the project.

2.2 Empirical Performance of Large-scale Infrastructure Projects

Over the last 10 to 15 years the general performance and the underlying performance drivers of megaprojects have been the subject of academic research. However, the continuing troubles with megaprojects can be seen as sign that to date the lessons from the past have been mostly lost and an accessible way to share acquired insights with key actors has still to be found.¹¹

⁸ Christian Brockmann, “Mega-Projects: Getting the Job done, Proceedings”, LEAD 2009 Conference, page 3.

⁹ Brockmann, “Mega-Projects”, pp. 3-4.

¹⁰ Tarek M. Hassan, Ron Mccaffer, Tony Thorpe, “Emerging clients’ needs for Large Scale Engineering projects”, Engineering, Construction and Architectural Management, Vol. 6 Iss: 1, 1999, pp.21 - 29,p. 21.

¹¹ Compare with concern of Haynes, in: Wendy Haynes, “Infrastructure Megaproject Leadership, Management, Innovation, and Accountability”, Public Works Management & Policy 2011 16(3), pp. 193-198, p. 197.

2.3 Drivers of Project Performance

This section summarises the reasoning of several studies of the root causes and the solutions proposed. It also outlines relevant and applicable lessons drawn from a 'lessons learned' study of the 2012 London Olympic Games as well as a popular book on 'getting big things done in Government'.

2.3.1 National Research Council (US Department of Energy)

Given the bad performance of the US Department of Energy in undertaking its complex, very expensive and sophisticated projects, the National Research Council provided in its report a number of recommendations aimed at lifting the department's performance to the standards of better performing agencies and the private sector.¹²

On governance, the council found that there was a lack of comprehensive project organization that covered all parties involved and set out the roles and responsibilities of these parties. In particular, no single authority was responsible, with lines of authority unclear. On risk assessment and mitigation, the report recommended setting contingency levels for each project having regard to the risk appetite, degree of uncertainty and confidence levels. On project reviews, the report found that independent project reviews were essential and recommended the formalization of procedures for independent reviews that are continuing and non-advocate. Finally, on the field of contracting methods, the report pointed to the need for the development of guidelines for structuring and managing performance-based contract, in particular with the view of an appropriate allocation of risks.¹³

¹² National Research Council, *Improving project management*, pp. 3-9.

¹³ National Research Council, *Improving project management*, pp. 3-9.

2.3.2 Miller and Lessard (IMEC Study)

Based on the IMEC Research Program, Miller and Lessard see large-scale infrastructure projects primarily as managerial challenges of coping with unforeseen turbulence. According to the authors turbulence is triggered by events, exogenous or endogenous, that had not been foreseen and is negatively linked to project performance. Given the long lead times and extended development time spans applying to megaprojects turbulences are likely to happen.¹⁴

The authors differentiate three types of management approaches used for megaprojects, rational planning, adaptiveness and shaping, the latter being the preferred one. Rational planning or hyperrationality assumes that the future can be forecast. The media which often cites better planning as the key solution to megaproject delivery performance is a supporter of that approach. However, uncertainty is an inherent fact of large-scale infrastructure projects, and therefore “their management can never be tidy”¹⁵. In contrast, supporters of the adaptiveness approach argue that megaprojects are unmanageable and a successful outcome is a matter of luck. In the eyes of Miller and Lessard this is also an inadequate approach. They prefer an approach that includes both, deliberate, planned action and responses to events – what they call ‘shaping’.¹⁶

Miller and Lessard’s focus is on the sponsors of the projects that both, lead and coordinate. They state that “successful projects are not selected but shaped” and that “[t]he seeds of success or failure are thus planted and nurtured as choices are made”¹⁷. Successful sponsors create ‘governability’, the capacity of project participants, which on one hand are autonomous players and on the other are linked to each other through interdependencies, to get through turbulences.¹⁸

Tools proposed to achieve ‘governability’ are numerous, covering relationships with all project stakeholders. For this thesis the devices proposed for relationships with contractors are of special interest. They include turnkey contracts, incentives in target price contracts, functional specifications and contractors being involved in

¹⁴ Miller, *Strategic Management of Large Engineering Projects*, pp. 20-23, 25.

¹⁵ Miller, *Strategic Management of Large Engineering Projects*, p. 14.

¹⁶ Miller, *Strategic Management of Large Engineering Projects*, pp. 93-112.

¹⁷ Miller, *Strategic Management of Large Engineering Projects*, p. 93.

¹⁸ Miller, *Strategic Management of Large Engineering Projects*, pp. 131, 135.

ownership.¹⁹ In the authors' words, looking at the track record, "collaboration between owners and contractors-suppliers and design-build contracting have led to substantial cost and time reductions"²⁰.

In a re-examination of the results of the research program Miller and Hobbs highlight 'intense scrutiny' as another key theme of performing projects. Again, strong and performing sponsors are important to ensure and manage the scrutiny of projects. To achieve this, a framework needs to be created where stakeholders with different and conflicting interests and perspectives have the ability and the incentive to dissect, comment and ask for or demand changes. The authors mention evaluations by financiers and also public consultation as examples.²¹

2.3.3 Flyvbjerg et al

As mentioned above, Flyvbjerg sees the causes for the widespread performance issues at megaprojects in two phenomena, optimism bias (delusion) and strategic misrepresentation (deception). He dismisses the often-stated technical explanations, including inadequate data, honest mistakes and imperfect techniques, as not consistent with his large sample. In particular, that there is no improvement in accuracy over time and that costs are constantly underestimated, whereas benefits are overestimated, are cited as the reasons that technical explanations do not fit the data.²²

A growing body of social science research concludes that many decisions humans make do not follow rationality and good reasoning, but are influenced by irrationality and cognitive biases. "Humans predictably err" according to Thaler and Sunstein.²³ Overoptimism can be linked to these cognitive biases. Another term used in the literature is planning fallacy, specifically used to describe the propensity to underestimate completion times and costs of tasks.²⁴ Nonetheless Flyvbjerg does not see optimism bias as the primary cause of planning mistakes.

¹⁹ Miller, *Strategic Management of Large Engineering Projects*, pp. 137-140.

²⁰ Miller, *Strategic Management of Large Engineering Projects*, p. 27.

²¹ Miller, "Governance", pp. 42-50.

²² Flyvbjerg, "Policy and planning", pp. 8-10.

²³ Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness*, 2008, p. 8.

²⁴ Bent Flyvbjerg, Massimo Garbuio, Dan Lovallo, "Delusion and Deception in Large Infrastructure Projects: Two Models for Explaining and Preventing Executive Disaster", *California Management Review*, vol 51., No.2, Winter 2009, pp. 7-8.

Learning processes would have decreased the mistakes that result from the biases over time, but this has not happened according to Flyvbjerg's database.²⁵

Instead Flyvbjerg comes to the conclusion that planners and backers deliberately lie and strategically misrepresent costs and benefits driven by political pressure to secure political approval and financing for the project. This conclusion is backed by a series of interviews of individuals involved in large infrastructure projects conducted in the UK in 2004. Another study by Wachs of transit planning cases in the US came to a similar conclusion.²⁶ The essence of the quote of a consultant given 1990 is basically identical to a quote by Meinhard von Gerkan, architect of the BER Terminal, when interviewed about the Airport Project.

“success in the consulting business requires the forecaster to adjust results to conform with the wishes of the client”

Consultant, US transit planning, 1990²⁷

“The full truth does not get you further in this business. The Sydney Opera House would have never been approved, had it been known from the start what it would cost. It only works with a lie at the start”

Meinhard von Gerkan, architect, 2013²⁸

Flyvbjerg explains the occurrence of strategic deception with the principal-agent theory. Agency theory deals with situations where one party (the principal) assigns a task to another party (the agent) and describes the relationship between the two parties with the tool of a contract. The contracting problems focus in particular on moral hazard and different attitudes toward risk.²⁹ Based on this theory, Flyvbjerg highlights the necessary conditions that encourage deception:³⁰

1. Existence of differences in the actors' self-interest
2. Presence of asymmetric information
3. Actors have different risk preferences
4. Actors have different time horizons
5. Diffuse or asymmetric accountability

²⁵ Flyvbjerg, “Policy and planning”, p. 11.

²⁶ Flyvbjerg, “Policy and planning”, pp. 12-15.

²⁷ Flyvbjerg, “Policy and planning”, p. 15.

²⁸ Der Spiegel, Spiegel-Gespraech, “‘Versaute Verhältnisse’ - Gipfeltreffen der geplagten Architekten: Pierre de Meuron, Meinhard von Gerkan und Christoph Ingenhoven verantworten die größten und schwierigsten Bauprojekte des Landes”, 24/2013, pp. 118-124, page 124.

²⁹ Eisenhardt, “Agency Theory”, pp. 58-59.

³⁰ Flyvbjerg, “Delusion and Deception”, pp. 10-16.

Having identified deception as the primary cause of planning mistakes, Flyvbjerg amends his views in subsequent publications and calls delusion and deception “complementary rather than alternative explanations of failure of large infrastructure projects due to cost underestimation and benefit overestimation”³¹. He recognizes that learning from one’s one mistakes has only a limited influence, as “[a]lthough large infrastructure projects occur frequently across the globe, any individual project is often a once in a career decision for a public or private executive”³².

Flyvbjerg goes on to propose a cure each for the identified causes for planning mistakes. Delusion can best be confronted by a better forecasting technique, reference class forecasting. Reference class forecasting applies actual experiences on comparable projects by aggregating those in statistically meaningful reference classes. The project is then placed in a statistical distribution of results from the relevant class of projects.³³ In order to prevent bias when predicting where the project falls along the historical distribution, the methodology includes mechanisms to correct intuitive estimates.³⁴

Deception can best be tackled through accountability and transparency, or – in keeping with the principal-agent theory – through an optimal contract between the principal and the agent. Such a contract would be either behavior-oriented (e.g. salaries, hierarchical governance) or outcome-oriented (e.g. transfer of property rights, market governance).³⁵ The practices recommended by Flyvbjerg aim at improved control structures via ‘contracted’ changes to the incentive structure. The first practice is for proposing and approving authorities to share financial responsibility. This is relevant for projects where local authorities are proposing and where a minimum contribution by these same authorities may decrease the incentive for deception. More convincing and with a broader application is the second practice to include private financiers in the financing of the project, who put their own capital at risk. This proposal unquestionably would improve control structures, including through in-depth project finance lender due diligence. A third proposal aims at implementing independent peer reviews for consultants and

³¹ Flyvbjerg, “Delusion and Deception”, p. 16.

³² Flyvbjerg, “Delusion and Deception”, p. 30.

³³ Flyvbjerg, “Policy and planning”, pp. 17-18.

³⁴ For more detail, refer to Flyvbjerg, “Delusion and Deception”, pp. 24-28.

³⁵ Eisenhardt, “Agency Theory”, pp. 58-61.

advisers. A further proposal recommends placing financial risk with contractors for delays and scope increases.³⁶ In addition, strong governance frameworks with professional and criminal penalties, and clear accountability including director liability are cited as mechanisms to deter lying.³⁷

Flyvbjerg et al are more structured when they propose to achieve accountability in megaproject decision making through four specific 'basic instruments':³⁸

- i. Transparency; as this is the main mechanism to achieve accountability in the public sector. All documents to be available for public scrutiny. Also active stakeholder engagement is advised.
- ii. Performance specifications; these would "derive from policy objectives and public interest requirements to be met by the project" for a "goal-driven appraisal and decision-making process"³⁹.
- iii. Explicit formulation of the regulatory regime.
- iv. The involvement of risk capital; importantly "no total sovereign guarantee should be given to the lenders"⁴⁰. Private risk capital "will ensure a higher degree of involvement by the lenders during the final design, construction and operation of the project, and more efficient monitoring"⁴¹.

2.3.4 Mott MacDonald

In its study for the UK Treasury Mott MacDonald made the premise that optimism bias was the reason for the recorded timetable and cost overruns. The study found high levels of optimism in forecasting costs and delivery times, as well as project benefits.⁴² The authors saw in turn the main cause for optimism bias in failed risk identification and management. Whereas the authors did not see a correlation between project size and optimism bias, there was a strong correlation between the project size and the number of project specific risks.⁴³

³⁶ Flyvbjerg, "Delusion and Deception", pp. 19-24.

³⁷ Flyvbjerg, "Policy and planning", pp. 22-27.

³⁸ Bent Flyvbjerg, Nils Bruzelius, and Werner Rothengatter, *Megaprojects and Risk: An Anatomy of Ambition*, Cambridge, UK: Cambridge University Press, 2003, pp. 107-123.

³⁹ Flyvbjerg, *Megaprojects and Risk*, pp. 123-124.

⁴⁰ Flyvbjerg, *Megaprojects and Risk*, p. 109.

⁴¹ Flyvbjerg, *Megaprojects and Risk*, p. 121.

⁴² Mott MacDonald, *Review of large public procurement in the UK*, pp. S-1, 4.

⁴³ Mott MacDonald, *Review of large public procurement in the UK*, p. 19.

In comparing traditionally procured projects with PFI projects, Mott MacDonald came to the conclusion that the latter showed less optimism bias. Two explanations were given for this finding. First, the negotiated risk transfer of PFI projects passed on the risks to the party best placed to manage the risk, second, PFI projects showed higher levels of due diligence.

Interestingly and in contrast to Flyvbjerg et al., Mott MacDonald have identified a trend of reducing levels of optimism bias, which the authors have contributed to the use of, among others, the following improved project management tools:⁴⁴

- Improved risk allocation, through focus on output (instead of input) specified requirements, as well as risk allocation through new contracting techniques including PFI;
- Greater diligence at the project definition stage, resulting in more robust business cases;
- Partnering; in the authors' definition a structured management approach to facilitate team working across contractual boundaries through formalised mutual objectives, and agreed problem resolution methods; and
- More controlled cost monitoring.

2.3.5 Institute for Government / 2012 London Olympics

Commissioned by the Government Olympic Executive (“GOE”) and the Department for Culture, Media and Sport (“DCMS”), the lead Government entities coordinating the 2012 London Olympic Games, the Institute for Government undertook a ‘lessons learned’ exercise of the Games⁴⁵ that have been widely seen as a great success and exceeding expectations. Whereas the study is particularly relevant for the staging of large-scale, high-profile events touching all aspects of government, many of the building blocks discussed and lessons to be learned are very much applicable to stand-alone large-scale infrastructure projects.

The study’s take-aways relevant for this paper are outlined below, organized in the five building blocks (i) institutional design and governance, (ii) people and skills, (iii) budget, (iv) programme and project management, and (v) risk and scrutiny.

⁴⁴ Mott MacDonald, *Review of large public procurement in the UK*, pp. S-3, 21-31.

⁴⁵ Institute for Government, *Making the Games: What Government can learn from London 2012*, 2013.

Institutional Design and Governance

(a) Necessary powers to implement project to be provided

The Games' governance built on an established model in the UK and Australia, where a statutory body was created to deliver the infrastructure. The Olympic Delivery Authority ("**ODA**") was given clear powers through legislation to see through the delivery of the infrastructure. This included planning powers, avoiding that several local government entities acted as planning bodies.⁴⁶

(b) Binding all important players into decisions

The governance structure of the Games was complex, with the London Organising Committee of the Olympic and Paralympic Games ("**LOCOG**"), ODA and GOE being the core actors. On top of the governance structure were two cross-programme decision-making bodies, the Olympic Board a Cabinet sub-committee. Whilst these bodies seldom made formal decisions, the Institute highlights these bodies' role in "binding all the important players into decisions".⁴⁷

People and skills

(c) Attract best people with track record of success

The Games followed the strategy of hiring the best-in-class, which meant that established leaders in their respective fields were targeted across the full spectrum of the structure. This resulted in the need to pay relatively high salaries. In exchange, ODA and GOE had access to exceptional talent from the construction, operations, communications and financial worlds. To run LOCOG as CEO, for example, the then COO of Goldman Sachs Europe was hired.⁴⁸

Budget

(d) Include a sizeable contingency into the budget

The Games' public sector funding budget of GBP 9.3 billion as of March 2007 included a contingency of 30%. This contingency resulted in the broad understanding that the envelope was fixed. Whereas significant unforeseen or unexpected funding requirements surfaced in the next 5 years, the overall budget

⁴⁶ Institute for Government, *Making the Games*, p.34.

⁴⁷ Institute for Government, *Making the Games*, p.37.

⁴⁸ Institute for Government, *Making the Games*, p.39-40.

stayed at GBP 9.3 billion – a fact that contributed significantly to the overall view that the Games were a great success.⁴⁹

Programme and project management

(e) Set a robust design and engineering scope and discourage change According to the study, strict change control was identified as crucial to ensure project delivery in time and within budget. This required on one hand time and effort to get the scope right upfront, and on the other to limit subsequent changes to this scope. To make changes was made very difficult by creating a Change Board that needed to be convinced of the merits of any change.⁵⁰

(f) Limit innovation

Tried and tested methods have a clear advantage when dealing with high profile projects and hard deadlines. For the Olympics this meant working with tried methods and processes and scale them to the required size or capacity.⁵¹

Risk and Scrutiny

(g) Seek for scrutiny by external bodies

The Institute for Government attributed high value to Games from the scrutiny of external bodies, in particular the IOC's Coordination Commission and the Commission for Sustainable London 2012.⁵²

2.3.6 Eggers and O'Leary (If We Can Put A Man On The Moon)

Eggers and O'Leary's book sets itself apart from the academic studies and research papers outlined in this chapter. In content and style it is not targeted as much at academics or practitioners, but rather the discerning reader in the mass market. Nevertheless, its case study-based outline of traps for and problems in the delivery of large policy programs and public projects contains some interesting findings that are relevant for this thesis.

The book's findings are based on the analysis of seventy-five large public initiatives of the US Government, ranging from wars in the Middle East to the war

⁴⁹ Institute for Government, *Making the Games*, p.44-48.

⁵⁰ Institute for Government, *Making the Games*, p.51-52.

⁵¹ Institute for Government, *Making the Games*, p.69.

⁵² Institute for Government, *Making the Games*, p.64.

on poverty, and from environmental programs to large infrastructure projects.⁹⁶

The findings are summarized in common and recurring ‘pitfalls’, of which the ones relevant for this thesis are outlined below:

1. *Confirmation Bias*

Only facts that confirm the leadership’s view of the issues and the world are sought and acknowledged. Information and evidence that does not fit into that worldview is ignored.⁵⁴

2. *Overconfidence Trap*

“Those who fall into the Overconfidence Trap dismiss those who advise caution, consider only the best-case scenario, and plan with unrealistic budgets and impossible time lines. The best way to avoid the Overconfidence Trap is to take the possibility of failure seriously – and take precautions to avoid it”⁵⁵.

A way of embracing the risk of failure is through scenario planning and risk mapping.

3. *The Complacency Trap*

There is a tendency to become complacent when things are going well. This can lead to risks not being recognized or appreciated.⁵⁶

2.4 Analytical Framework for Review of BER Project

Each one of the research projects outlined above is a comprehensive and multi-faceted work of analysis revealing some important insights of what makes large-scale infrastructure projects succeed or fail. With the aim of applying the key findings to the research question of this paper, the vast body of findings is distilled into ten criteria to assess the governance of BER, as shown in Table 2 below.

Five of the criteria focus on the fundamental set-up of the project. Governance as rules that set the framework for the delivery of the infrastructure project. The other five criteria focus on processes, more specifically on decisions when shaping and undertaking processes.

⁵³ William Eggers and John O’Leary, *If We Can Put a Man on the Moon ... Getting Big Things Done in Government*, Harvard Business Press, 2009, Kindle edition, Loc. 336.

⁵⁴ Eggers, *Man on the Moon*, Loc. 806, 880.

⁵⁵ Eggers, *Man on the Moon*, Loc. 451.

⁵⁶ Eggers, *Man on the Moon*, Loc. 3528, 3550.

Table 2: Assessment Criteria

	National Research Council	Miller and Lessard (IMEC)	Flyvbjerg et al	Mott MacDonald	Institute for Government	Eggers & O'Leary
Governance as rules – fundamental decisions about project set-up						
Comprehensive control and steering structure with: (i) clear responsibilities and lines of authority, as well as (ii) decision- making structures that channel expertise and bind all key stakeholders	X	X	X	X	X	X
Transparency and public control to enforce accountability in the public sector	X		X		X	
Expertise on all levels – hiring of best-in-class people and purchase of outside expertise (consultants and advisers)		X			X	
Involvement of risk capital – effective scrutiny by financiers / lenders that put own capital at risk		X	X	X		
Procurement contracting allocating construction and interface risks to contractors and also using incentives / penalties constructs	X	X	X	X	X	
Governance as processes – key decisions when shaping and undertaking processes						
Diligence at project definition stage and robust design at the outset	X	X	X	X	X	
Taking the possibility of failure seriously – Inclusion of significant contingencies in cost & time estimates to account for optimism bias	X		X	X	X	X
Discouraging of change requests after design has been agreed					X	
Confront information that makes you uncomfortable, include people with different combinations of knowledge and experience, and test ideas with skeptics						X
Undertaking of scrutiny processes, e.g. independent reviews or peer reviews by external bodies	X	X	X	X	X	

3. The BER Project

“The full truth does not get you further in this business. The Sydney Opera House would have never been approved, had it been known from the start what it would cost. It only works with a lie at the start.”

Meinhard von Gerkan, architect of BER⁵⁷

3.1 Background: The Long Road Towards a New Airport in Berlin

With growing air traffic to and from West-Berlin hitting constraints in the walled city by the late 1980's, plans to build a new airport for Berlin emerge immediately with the Fall of the Wall. A few months before German Re-Unification in October 1990 a working group comprising West and East German Government representatives commences work on finding a location for a new capital city airport. In early 1991 three of the 53 reviewed potential locations are shortlisted; Schoenefeld-Sued, Genshagener Heide and Sperenberg.⁵⁸ A final decision was not taken until mid 1996, when the Federal Republic of Germany and the States of Berlin and Brandenburg executed the 'consensus decision' (*Konsensbeschluss*) to develop Schoenefeld to the 'single' airport in Berlin and thereby close Tempelhof and Tegel Airports in the old west of the city. The decision also included a new runway in addition to the existing system at Schoenefeld that had served as East-Germany's central airport. Further, the Governments decided to privatize the airport holding, then called Berlin Brandenburg Flughafenholding GmbH ("**BBF**"), and have the new airport developed, built, owned and operated by the private sector.⁵⁹

1999 a consortium led by HOCHTIEF, a German construction group with a nascent airport operations business, was selected the preferred tenderer in the bidding process. But underbidder IVG, a German real estate company, objected the process and results, ultimately leading to a cancellation of the privatization attempt due to procedural errors.⁶⁰ A new attempt to privatize BBF also failed. In

⁵⁷ Der Spiegel, "Versaute Verhältnisse", p. 124.

⁵⁸ Rainer W. Düring, *Lachnummer BER: Das Debakel um den Hauptstadtflughafen – Eine Chronik*, Rotbuch, 2013, Kindle edition, section 1.

⁵⁹ Berlin Brandenburg Flughafenholding GmbH, "Konsensbeschluss", Anlage zum Beschluss der Gesellschafterversammlung von 20.Juni 1996.

⁶⁰ Handelsblatt, "Sieben Todsunden machten BER zum Desaster", dated 08.06.2012, updated on 13.08.2012.

2003 the three involved Governments announced that the discussions with HOCHTIEF and IVG, now working together, were cancelled and the entire privatization process terminated. The airport would be built, but under public sponsorship. Berlin's Governing Mayor, Klaus Wowereit, stated that "now we have to tackle it ourselves"⁶¹. Flughafen Berlin Schoenefeld GmbH ("FBS"), since 2012 called FBB, was created by merging BBF with two subsidiaries tasked with the new airport development.⁶²

In August 2004 the Planning Authority of the State of Brandenburg, on which territory Schoenefeld is located, confirmed the plans for the expansion of Schoenefeld Airport (*Planfeststellungsbeschluss*).⁶³ The go-ahead for the project was confirmed in 2006, when the Federal Administrative Court in Leipzig dismissed lawsuits by residents against the planning approvals driven by noise concerns.⁶⁴

3.2 BER Governance and Project Set-up

3.2.1 Against better knowledge: failure to appoint a general contractor and consequences for risk allocation

When the three Governments decided to change plans and undertake the development of the new Berlin Brandenburg Airport as a public project in 2003, the decision makers were aware of the pitfalls of megaprojects. In order to avoid "sloppiness and cost blow outs" of other large public infrastructure projects Wowereit said they would hire an experienced project manager from the private sector.⁶⁵ He did this by poaching Thomas Weyer who led HOCHTIEF's efforts during the privatization processes. Starting on 1 January 2004 Weyer became General Manager Berlin Brandenburg International and Technology and in this capacity the project leader responsible for the technical and financial aspects of

⁶¹ Frankfurter Allgemeine Zeitung, "Privatisierung der Berliner Flughäfen entgültig gescheitert", 22.05.2003.

⁶² During, *Lachnummer BER*.

⁶³ Ministerium fuer Stadtentwicklung, Wohnen und Verkehr des Landes Brandenburg, "Planfeststellungsbeschluss Ausbau Verkehrsflughafen Berlin-Schoenefeld", 13 August 2004.

⁶⁴ Berlin gegen Fluglaerm, "BER / BBI – Urteile zum Flughafen Berlin Brandenburg International", accessed under: <http://berlin-gegen-fluglaerm.de/ber-bbi-urteile-flughafen-berlin-brandenburg-international-schoenefeld/> (last accessed 14.07.2014).

⁶⁵ Frankfurter Allgemeine Zeitung, "Privatisierung der Berliner Flughäfen entgültig gescheitert".

the Project.⁷⁰ Weyer reported to the CEO / spokesman of the FBB management board, which was comprised of both them plus a general manager human resources.

Weyer set up the initial project organization to have a single general contractor take on the responsibility of detailed design, construction planning and construction work of the BER passenger terminal.⁷¹ As part of that project organization FBB engaged Planungsgemeinschaft Berlin-Brandenburg International (“**pg bbi**”) as general planner in January 2005. Pg bbi was a joint venture including architects Gerkan, Marg und Partner and JSK Architekten. The scope of the general planner was to undertake the design stages required to lodge the necessary building permits and prepare the design and programme documents for the general contractor tender (i.e. initial design or design planning). Further part of the project organization was the review and supervision of the general contractor’s detailed design and ongoing construction performance by an expert on behalf of FBB. Mid 2007 FBB selected also pg bbi to undertake this role.

Whereas the initial project organization was modelled on FBB being a ‘traditional’ client with a general contractor in charge of the passenger terminal, FBB did not appoint a general contractor. This turned the entire project organisation on its head and lay the foundation for future problems. On 9 October 2007 the FBB supervisory board approved the proposal of FBB management to annul the tender for the BER passenger terminal because the four offers obtained were perceived as uneconomical. Instead, the works would (likely) be tendered out in seven lots. According to FBB the re-tender would not impact the completion date, targeted for 31 October 2011.⁷²

A challenge by HOCHTIEF, one of the bidders in the terminal tender, was dismissed by the procurement chamber (*Vergabekammer*) of Brandenburg. The court concurred with FBB’s argument that the offers were uneconomical, as all four bidders exceeded the expected lump sum of Euro 630 million by around Euro

⁷⁰ Flughafen Berlin Brandenburg, media release, “Aufsichtsrat der Flughafen Berlin Schoenefeld GmbH konstituiert sich neu und beruft Geschaefstsfuehrer“, 5.12.2003.

⁷¹ Ernst & Young, “Sachverhaltsdarstellung zu Stoerungen des Projektablaufes und deren Auswirkungen, Report an Planungsgemeinschaft Flughafen Berlin-Brandenburg International (pg bbi)”, Berlin, 27 April 2012.

⁷² Flughafen Berlin Brandenburg, media release, “Vergabeverfahren aufgehoben: Bau des BBI-Terminals wird neu ausgeschrieben“, 09.10.2007.

400 million.⁷³ The tricky contention of the day was whether Euro 630 million or Euro 1.0 billion was the right construction price for the passenger terminal. FBB and its advisers, buoyed by rumours and allegations of price collusion by the tenderers voiced by small and medium sized contractors⁷⁴, rejected the calculations of the tenderers, that without doubt included sizeable contingencies, and discarded the talk of the increased risk of time delays and cost blow outs. A without question biased and upset comment by a HOCHTIEF representative at the time was that breaking the project up into lots would make it more complex, and result in a completion date much later than originally planned.⁷⁵ A statement that time proved correct, as HOCHTIEF's external legal counsel reiterated in May 2012 saying that the 'adventurous' assessment of the day that by undertaking the detailed design themselves and breaking the project into smaller components would save Euro 350 million and time had been proven as completely wrong.⁷⁶

An immediate consequence of the refusal to appoint a general contractor was that FBB would now take on responsibility for the detailed design and construction planning. The detailed design of the passenger terminal was therefore tendered, with pg bbi securing the role which was agreed in early 2008. The scope was increased to also cover the piers north and south in addition to the main terminal building. Further, pg bbi was to prepare and to be involved in the tender of the seven lots. The targeted completion date remained the 31 October 2011.⁷⁷

The challenging situation for FBB was not helped by the sudden departure of key man Thomas Weyer, who moved on to become general manager at Munich Airport. He resigned in March 2008, during the tendering phase, and had left FBB by August 2008. Weyer was replaced by Dr. Manfred A, Körtgen.⁷⁸

⁷³ Flughafen Berlin Brandenburg, media release, "Aufhebung der Terminalausschreibung rechtens: Vergabekammer bestätigt Berliner Flughäfen", 18.12.2007.

⁷⁴ Der Tagespiegel, "Flughafen BBI: Gerüchte über Preisabsprache", 29.11.2007.

⁷⁵ Berliner Zeitung, "Es wird noch nicht gebaut aber schon geklagt – Vergabekammer weist Beschwerde gegen die Aufhebung der Terminal-Ausschreibung zurueck. Hochtief will vor Gericht ziehen", 19.12.2007.

⁷⁶ Leinemann Partner Rechtsanwälte, media release, "BER: Mehrkosten und Verzögerung seit 2007 absehbar", 22.05.2012.

⁷⁷ Ernst & Young, "Sachverhaltsdarstellung", page 7.

⁷⁸ Flughafen Berlin Brandenburg, media release, "Geschäftsführer BBI/Technik verlässt zum Jahresende das Unternehmen", 20.03.2008; Flughafen Berlin Brandenburg, media release, "Manfred Körtgen wird Geschäftsführer Technik/BBI", 11.07.2008.

To bolster FBB's skill set through external know how, in 2008 FBB outsourced project management and controlling, i.e. the construction manager role, first to Drees & Sommer, and after their departure in early 2009 to WSP/CBP.⁷⁹ Press reports of the time stated that Drees & Sommer were terminated because they reported in November 2008 that it would be illusory to believe that the terminal could open at the envisaged date at the estimated costs – either the costs needed to increase or the opening date pushed back.⁸⁰ Years later WSP/CBP said that they never reported directly to the supervisory board with their cost and timing estimates, but only via FBB management.⁸¹

The press reports on Drees & Sommer's advice were corroborated when a confidential letter⁸² from the construction manager to FBB's Manfred Koertgen, Weyer's replacement, from November 2008 was published in early 2014. However, whereas Drees & Sommer introduced their analysis by highlighting that the practice of undertaking the different tenders before the detailed design was completed resulted in significant follow-on cost risks, their advice on what to do would ultimately lead to further problems.

Drees & Sommer's analysis was undertaken because the tenders of the seven lots returned significantly higher costings than anticipated. With the exception of the baggage handling system the costs were 55% to 175% higher than estimated. According to the construction managers the reasons were that the lots of Euro 50 million and more were too large for a strong competition to form and the inherent interface risks within these work packages plus the lack of completed detailed design resulted in high contingencies.⁸³ Based on the tender results the construction costs of the passenger terminal would increase to approximately Euro 1.1 billion.⁸⁴ Drees & Sommer then analysed three alternatives. The first alternative was to progress with the seven lots and accept the higher costs. Even then the targeted opening date would be "significantly threatened and only

⁷⁹ BZ Berlin, "Blackbox BER: Eine Serie von Pannen", 09. September 2012.

⁸⁰ Die Zeit, "Blindflug in Berlin", 21.06.2012, Nr. 26.

⁸¹ Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, "Wortprotokoll Ausschuss fuer Bauen, Wohnen und Verkehr, 21. Sitzung 23. Januar 2013, 17. Wahlperiode", page 52.

⁸² Drees & Sommer, "Projektstrategie – Kosten und Termine, Stand 07.11.2008", letter to Flughafen Berlin-Schoenefeld GmbH, Planung und Bau BBI, Herrn Manfred Koertgen et al, 18.11.2008.

⁸³ Drees & Sommer, "Projektstrategie", p. 5.

⁸⁴ Drees & Sommer, "Projektstrategie", p. 8.

achievable through fast-tracking measures”⁸⁵. The second alternative saw the cancellation of most of the tenders and negotiated awards with the chance of some cost reductions (approx. Euro 12 million). A delay of at least 6 months would result. The third alternative had the seven lots broken up into many smaller lots. This would result in a delay of 12 to 18 months and savings versus the first alternative of Euro 56 million. The risk of achieving the cost targets and the (revised) time targets was seen as lowest for alternative three.⁸⁶ Also it was advised to change the contracts from fixed time, fixed price contracts to fixed unit rates contracts without penalties, in order to decrease the contractors’ contingencies and achieve the envisaged cost savings.

Intriguingly, FBB took the advice to break up the passenger terminal construction into around 35 lots with as much tenders – a decision that with the benefit of hindsight can be seen very negatively and as key contributor to the experienced delays.⁸⁷ However, FBB did neither take the advice to amend the completion date by 12 to 18 months as clearly outlined in Drees & Sommer’s analysis, nor rectified the inherent problem that tenders were undertaken and construction commenced prior to have the detailed design and planning phase concluded.

Through the change in the award structure FBB turned from principal and client to ultimately something resembling a general contractor. Subsequently it became apparent, however, that FBB had bitten off more than it could chew. Ernst & Young concluded years later that FBB did not revise its structure and internal processes accordingly.⁸⁸ A key example is the double role of pg bbi as mentioned above. When pg bbi’s scope as general planner increased to take over the detailed design, after it had already won the separate tender for the role to review and supervise the (general contractor’s) detailed design and the ongoing construction performance, pg bbi did in effect supervise itself.⁸⁹ Interestingly, this apparent conflict of interest was discussed at the FBB supervisory board but not rectified. Key argument was that pg bbi was legally entitled to participate in both tenders and won both based on the bid criteria.⁹⁰

⁸⁵ Drees & Sommer, “Projektstrategie”, translated from German, p. 10.

⁸⁶ Drees & Sommer, “Projektstrategie”, p. 12-20.

⁸⁷ Ernst & Young, “Sachverhaltsdarstellung”, p. 12.

⁸⁸ Ernst & Young, “Sachverhaltsdarstellung”, p. 10.

⁸⁹ Der Tagesspiegel, “Flughafendesaster: Bauplaner überwachten sich selbst”, 24.05.2012.

⁹⁰ Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, “Wortprotokoll Ausschuss fuer Bauen,

The revision of the award structure for the passenger terminal building had significant consequences for the risk allocation. The responsibility for the detailed design would remain with FBB – without a chance to allocate it in its entirety to other parties. Instead of only overseeing one general contractor that would also be charged with the detailed design, FBB was now in charge of the detailed design and the interface with around 35 contractors. These many interfaces made it impossible to effectively contract out the risk that the works of the many contractors would function as part of a whole state-of-the-art passenger terminal.

3.2.2 Project Supervision and Control: deficiencies in structure and expertise levels

The Project was managed by FBB Management, supported by its advisers and consultants, which in turn reported to the FBB supervisory board, a board of non-executive directors tasked by the German corporation law (*Aktiengesetz*) to supervise management.⁹¹ This board is a statutory body applying to all German corporations and its governance takes no special consideration of the requirements of a megaproject. In this particular case the board was tasked with both, supervising the management of three operating airports (until Tempelhof's closure) and supervising the development and construction of a new airport.

The supervisory board of FBB met four to five times a year⁹² and was comprised of representatives of the three shareholders, who made up two thirds of the members, and representatives of the company's employees, who made up the remaining one third.⁹³ As of December 2013, eight of the ten supervisory board members sent by the shareholders were politicians on premier/cabinet minister or state secretary level. The remaining two were a hotels and gastronomy consultant,

Wohnen und Verkehr, 10. Sitzung 18. Mai 2012, 17. Wahlperiode", p. 33.

⁹¹ Refer to Aktiengesetz, § 111 Aufgaben und Rechte des Aufsichtsrats, accessed under: <http://dejure.org/gesetze/AktG/111.html> (last accessed on 10.03.2014).

⁹² Abgeordnetenhaus Berlin, "Antwort des Regierenden Buergermeisters Klaus Wowereit auf die Kleine Anfrage des Abgeordneten Martin Delius (Piraten): BER-Debakel V: Wie arbeitet der Aufsichtsrat?", 26.06.2012, 17. Wahlperiode", Drucksache 17/10682; in the period from 2003 to 2011 only in 2007 there were more than five meetings p.a. (there were eight).

⁹³ rbb Rundfunk Berlin-Brandenburg, "Wer kontrolliert was im Flughafen-Aufsichtsrat?", dated as of 11.12.2013.

and the manager of the chamber of industry and commerce of Cottbus, a small city in Brandenburg with around 100,000 inhabitants.⁹⁴

When the symptoms of ineffective project governance started to pile up, members and ex-members of the board started to voice criticism about the lack in relevant expertise. Harald Wolf, Minister of Economics in Berlin's previous Government and during his tenure member of the FBB supervisory board, stated to the investigative committee that the airport company had too little know how of construction issues to manage such a complex project and that he only realized that fact in hindsight. Purchasing the missing skills externally was counterproductive as it further increased complexity and contributed to the disaster.⁹⁵ Engelbert Luetke Daldrup, a former state secretary in the Federal Ministry of Transport, Construction and Urban Affairs and supervisory board member from 2006 to 2009, concurred with the expertise point. Interviewed by the investigative committee of the State Parliament Berlin, he said that experts were missing on the board. He would have wished for more expert knowledge on construction issues.⁹⁶ Instead of focusing on the important matters the board spent its time on minor issues and details. Daldrup also stated that his proposal to nominate a FBB finance director was implemented only five years later.⁹⁷ Asked by the Berlin State parliament on the issue of expertise, Klaus Wowereit, chairman of the supervisory board, was quite clear when he said that there is no proven expert with construction competences, no one that had been chosen with those requirements in mind, on the board.⁹⁸

Another point of ex-post criticism is that the board may have been seen as unapproachable, given its political whiff and the fact that it was chaired by two top politicians, the Governing Mayor of Berlin and the Premier of Brandenburg. pg bbi reportedly indicated later, after they got dismissed, that they were repeatedly told by FBB management, "we solve the problems here among professionals. They are politics. We keep them out of it".⁹⁹

⁹⁴ rbb Rundfunk Berlin-Brandenburg, "Wer kontrolliert was im Flughafen-Aufsichtsrat?", dated as of 11.12.2013.

⁹⁵ rbb Rundfunk Berlin-Brandenburg, "Der Aufsichtsrat hat seine Pflicht getan", dated as of 15.11.2013.

⁹⁶ rbb Rundfunk Berlin-Brandenburg, "Ex-Aufsichtsrat beklagt Mangel an Sachverstand am BER", dated as of 18.10.2013.

⁹⁷ Piraten Fraktion Berlin, media release, "BER: Finanzen seit 2008 nicht im Griff", 18.10.2013.

⁹⁸ Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, "Wortprotokoll Ausschuss fuer Bauen, Wohnen und Verkehr, 10. Sitzung 18. Mai 2012, 17. Wahlperiode", p. 7.

⁹⁹ Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, "Wortprotokoll Ausschuss fuer Bauen,

Harald Wolf's statement to the investigative committee that "there were substantial deficiencies in the flow of information" backs that argument.¹⁰⁰ But it also points into the direction of inaccuracy of information. Whether the supervisory board was lied at is a contentious issue – it's one's word against another's. Serious allegations have been made by disgruntled architect Meinhard von Gerkan against FBB management. With management falsifying internal conclusions, minutes and timetables, "[t]he reporting to the supervisory board, [...], corresponded therefore not always to the truth, to say the least".¹⁰¹ Supported are these allegations by the statement to the investigative committee of Michael Zehden, the hotelier on the supervisory board, that he believed controlling reports provided to the supervisory board had been altered.¹⁰²

In any case, the need for a tight control of the airport company should not have been news to the responsible politicians. Mismanagement and sloppy business practices were an issue before, when the company spent 400 million Deutsche Mark including 19 million in fees to its own advisers for 118 hectare of overpriced agricultural land assumed to be required for the airport expansion, but then written off because the plans changed.¹⁰³ The supervisory board of the time did not undertake its control function effectively as clearly stated by the Bundesrechnungshof, which wrote in its report that "the federal Government should strongly advise its representatives on the supervisory board to comply with their control obligations and ensure that the BBF-Holding keeps house properly".¹⁰⁴

3.2.3 Financing and the Role of Banks

FBB's shareholders provided a 100% guarantee in regard to the entire debt amount of Euro 2.4 billion.¹⁰⁵ The guarantee, including waiving rights to contest,

Wohnen und Verkehr, 21. Sitzung 23. Januar 2013, 17. Wahlperiode", p. 47.

¹⁰⁰ rbb Rundfunk Berlin-Brandenburg, "Der Aufsichtsrat hat seine Pflicht getan", dated as of 15.11.2013.

¹⁰¹ Meinhard von Gerkan, *Black Box BER. Vom Flughafen Berlin Brandenburg und anderen Grossbaustellen. Wie Deutschland seine Zukunft verbaut*, Quadriga Verlag, 2013, Kindle edition, location 914 of 1389.

¹⁰² Piraten Fraktion Berlin, media release, "Verletzte Aufsichtspflicht? – Pressemitteilung von Martin Delius", 20.09.2013.

¹⁰³ Der Spiegel, "Geschlampt und Geschoent", 7/1995, dated 13.02.1995.

¹⁰⁴ Deutscher Bundestag, "Plenarprotokoll 13/35, 11.05.1995", page 2774.

¹⁰⁵ Landesrechnungshof Brandenburg, "Auszug aus dem Jahresbericht 2011, Bürgencontrolling anlässlich der Bürgschaft für die Kredite zur Finanzierung des Flughafens BER", p. 226.

offset or pursue any other remedies¹⁰⁶, was provided to the airport company on 24 June 2009.¹⁰⁷ Given the nature of the guarantors the loans are virtually risk-free for the lenders, a fact that is underlined by the exemption to provide equity capital under the banking regulations.¹⁰⁸ As a result, the feasibility of the project, the design of a robust project delivery governance including customary checks, and the typical contractual requirements of lenders that aim to avoid cost and time overruns were of no economic interest to the lenders.¹⁰⁹ Taking the ‘corrective’ lenders out of the equation, however, can lead to a significant deficit of expert knowledge in the overall design of the project, ranging from the contractual relationships of parties, over input of lenders’ independent experts, to oversight. In order to offset the loss of banks as actors, the guarantors set up a guarantors controlling by engaging PriceWaterhouseCoopers, an accounting firm, to undertake certain services.¹⁴⁹ The extent of the guarantors controlling was the topic of two court of auditors reports, one on federal level, the *Bundesrechnungshof*,¹¹¹ and one on State level, the *Landesrechnungshof Brandenburg*¹²¹, both of which critiqued that the controlling did not follow the processes and methodologies applied by banks for arms-length commercial loans.

The Landesrechnungshof Brandenburg provided the following concise summary:

“According to the Ministry of Finance its guarantors controlling is, in its core, composed of the auditing firm receiving information from the airport operating company, the auditing firm evaluating this information and then providing this information plus analysis to the ministry. In the view of the Landesrechnungshof is such a guarantor controlling not adequate to properly compensate for the loss of the bank monitoring of the guaranteed loan commitment.”¹¹³

¹⁰⁶ Landesrechnungshof Brandenburg, “Bürgencontrolling”, p. 226.

¹⁰⁷ Bundesrechnungshof, “Mitteilung an das Bundesministerium für Verkehr, Bau und Stadtentwicklung und an das Bundesministerium der Finanzen über die Prüfung der Betätigung des Bundes bei der Flughafen Berlin-Schönefeld GmbH hinsichtlich der Einrichtung eines Bürgencontrollings, GZ: III 4 - 2010 – 0877”, 12. September 2011, p. 10.

¹⁰⁸ Landesrechnungshof Brandenburg, “Bürgencontrolling”, p. 226.

¹⁰⁹ Landesrechnungshof Brandenburg, “Bürgencontrolling”, p. 226.

¹¹⁰ Bundesrechnungshof, “Prüfung der Betätigung des Bundes”, p. 9.

¹¹¹ Bundesrechnungshof, “Prüfung der Betätigung des Bundes”, p. 10.

¹¹² Landesrechnungshof Brandenburg, “Bürgencontrolling”.

¹¹³ Landesrechnungshof Brandenburg, “Bürgencontrolling”, p. 235.

3.2.4 The Design Process and Change Requests

Despite revising the award structure in late 2007 FBB was focused on keeping the targeted completion date of 31 October 2011 unchanged, as outlined above. In order to keep with that timetable, the different tenders were undertaken before the detailed design was completed. In several cases the tenders were undertaken with designs that were subsequently changed significantly. That meant that detailed design and construction were often undertaken in parallel, resulting in both, additional claims by the contractors and interruptions in the construction (stop-and-go).¹¹⁴ Whereas construction on the BER passenger terminal started on 11 July 2008¹¹⁵, the changes to the design were so substantial that new building permits were sought on 30 March 2009.¹¹⁶ According to pg bbi additional new building permits were sought during their time of involvement, including in February 2012, three months before the planned opening date.¹¹⁷

The parallel designing and constructing resulted in a considerable complexity that made the project overly vulnerable to mistakes in design documentation (by pg bbi) as well as change requests (by FBB). Following the fourth postponement of the opening date Horst Amman, then COO of FBB, summarized as follows:

*We had to endure a whole range of changes in planning and use, [] and therefore had to undergo constant changes in the design of these facilities. Unfortunately, we also have in many places a lack of planning quality, a very late delivery of design documents, and therefore time delays and the need to increase the pressure of time massively, all of which has ultimately resulted in the problems.*¹¹⁸

Ongoing design changes were at the heart of the complex problems with the fire safety services that have not been solved to date. The fire safety services including the smoke extraction services were originally designed in a much smaller scale and were upsized as the building envelope grew over the design and construction period.¹¹⁹ According to a representative of one of the many

¹¹⁴ Ernst & Young, "Sachverhaltsdarstellung", pp. 8, 11.

¹¹⁵ Flughafen Berlin Brandenburg, Sachstandsinformation zur 87. Sitzung des Hauptausschusses des Abgeordnetenhauses Berlin am 16.06.2010, p. 7.

¹¹⁶ Ernst & Young, "Sachverhaltsdarstellung", p. 12.

¹¹⁷ rbb Rundfunk Berlin-Brandenburg, "Zu kompliziert zum Funktionieren", as at 16.05.2014.

¹¹⁸ Abgeordnetenhaus Berlin, Plenar- und Ausschusssdienst, "Wortprotokoll Ausschuss fuer Bauen, Wohnen und Verkehr, 21. Sitzung 23. Januar 2013, 17. Wahlperiode", p. 5.

¹¹⁹ Abgeordnetenhaus Berlin, Plenar- und Ausschusssdienst, "Wortprotokoll Ausschuss fuer Bauen,

contractors responsible for components of the smoke extraction services, Robert Bosch GmbH, the many change requests by FBB resulted in requirements to re-design and re-test the service installations. During the project there were very many change requests, for Bosch more than 300.¹²⁰

The aggregate number of change requests alters by time frame and definition. Wowereit confirmed that FBB requested around 150 changes in the time from January 2008 and December 2012. In any case, he put emphasis on the point that each one of such requests was examined by pg bbi before implementation as of cost and time implications.¹²¹ According to Meinhard von Gerkan pg bbi did include 286 change requests and 201 orders, i.e. a total of 487 changes requested by FBB, into its design of the passenger terminal, until it got dismissed in early 2012.¹²²

On 29 January 2010 FBB management ordered a stop to any more change requests, however without success, as shown in Appendix III.¹²³

Only weeks before the second delay and pg bbi's dismissal as general planner, Ernst & Young, on behalf of pg bbi, detailed a number of change requests, including six major disruptions, that in their opinion resulted in significant interferences and ultimately mistakes and delays. One of those was the re-design of the passenger boarding bridges (see case study below).¹²⁴

Case Study: Re-design of Passenger Boarding Bridges

In pg bbi's initial design of 2007, agreed by FBB and used as basis for the contractors tenders, international passengers had to use stairs or elevators before accessing the passenger boarding bridges. During the use by international passengers the stairways were not available for domestic / Schengen passengers.

Wohnen und Verkehr, 10. Sitzung 18. Mai 2012, 17. Wahlperiode", pp. 51-52.

¹²⁰ Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, "Wortprotokoll Ausschuss fuer Bauen, Wohnen und Verkehr, 21. Sitzung 23. Januar 2013, 17. Wahlperiode", p. 15.

¹²¹ Abgeordnetenhaus Berlin, "Antwort des Regierenden Buergermeisters Klaus Wowereit auf die Kleine Anfrage des Abgeordneten Oliver Hoefinghoff (Piraten): BER-Debakel XXXVI: Bauverzoegerungen durch Aenderungsanordnungen der Flughafengesellschaft?", 21.01.2013, 17. Wahlperiode, Drucksache 17/11357.

¹²² Gerkan, *Black Box BER*, location 36 of 1389.

¹²³ Gerkan, *Black Box BER*, location 586 of 1389.

¹²⁴ Ernst & Young, "Sachverhaltsdarstellung", pp. 15-16.

As a result, there were only 25 gates available for international passengers. Change request no.68 provided for a fundamental re-design of the boarding process by including double-storey boarding bridges that resulted in a more comfortable boarding experience for international passengers and increased the number of gates available for international flights to 39. After taking into account pg bbi's review of impact on time and costs, FBB directed on 10 July 2008 that change request no.68 be implemented.

By the time change no.68 needed to be implemented, the detailed design, based on the original 2007 initial design, was already progressed. But not only initial design and detailed design needed to be re-done to take into account the new structural realities, but also a new building approval application lodged, which was finalized on 30 March 2009. The partial restart of the detailed design of the passenger terminal structure and the resulting procedure of designing and constructing in parallel ultimately led to several construction stops and an increase in proneness to error.¹²⁵

3.3 Anatomy of a Missed Timetable

According to Greiman, the symptoms of ineffective project governance are manifold, including cost overruns, timetable delays, and quality control issues.¹²⁶ The following chronicle of the four delays and their explanations is full of those symptoms. Based on that logic it is important to see the explanations given by FBB and others not as root causes, but more as a signal that the governance was not right.

3.3.1 First postponement – from 31.10.2011 to 03.06.2012

On 25 June 2010 the FBB supervisory board agreed to delay the opening date from 31 October 2011 to 03 June 2012, a delay of approximately 7 months. The reason cited by FBB in its media release was the need to expand the airport security screening area following EU directive 297/2010. It also referred to the insolvency of one of the joint venture partners in pg bbi, IGK-IGR

¹²⁵ Ernst & Young, "Sachverhaltsdarstellung", pp. 15-16.

¹²⁶ Greiman, *Megaproject Management*, p. 138.

Ingenieurgesellschaft Kruck mbH, which was responsible for the design of the technical building services / installations / equipment.¹²⁷

This delay followed an internal tussle of at least a few months. According to the parliamentary committee investigating this first delay, the FBB supervisory board discussed, at its meeting on 26 March 2010, the two issues in-depth and, following a report by construction manager WSP/CBP, came to the conclusion that the completion date 31 October 2011 was not in jeopardy.¹²⁸ According to FBB the remaining pg bbi partners confirmed verbally and in writing to be able to keep to the envisaged time table.¹²⁹ Interestingly, a letter by pg bbi to FBB CEO Rainer Schwarz dated 26 February 2010 clearly documents doubt that the completion date can be realized. The general planner refers to the time lost because of the change in contracting strategy in 2007 and design mistakes resulting from the time pressure that meant designing and constructing in parallel.¹³⁰ On 19 May 2010 WSP/CBP changed its estimates and issued a letter to FBB advising that the construction end date was in danger due to insolvency-related delays. Then, on 25 May the German Federal Police, the agency in charge of screening passengers, advised FBB that it was of the view that a doubling of the space allocated for screening was required due to the new EU directive on liquids, aerosols and gels.¹³¹ In the end, the FBB supervisory board agreed to the (first) delay, of which Matthias Platzeck, Prime Minister of the State of Brandenburg, said: "The decision we took today is a decision driven by reason".¹³² It is interesting, though, that WSP/CBP's letter, which reasoning for the delay fit into the 'official story', was made public by FBB at the time, not so pg bbi's that addressed more fundamental problems.

The repercussions of EU directive 297/2010 show how rushed, thoughtless and un-monitored the detailed design process must have been, for FBB and its

¹²⁷ Flughafen Berlin Brandenburg, media release, "Neuer Flughafen wird größer – erster Fliegertartet am 3. Juni 2012", 25.06.2010.

¹²⁸ Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, "Wortprotokoll Hauptausschuss, 87. Sitzung 16. Juni 2010, 16. Wahlperiode", p. 3.

¹²⁹ Flughafen Berlin Brandenburg, "Sachstandsinformation zur 87. Sitzung des Hauptausschusses des Abgeordnetenhauses Berlin am 16.06.2010", pp. 4-5.

¹³⁰ Planungsgemeinschaft Flughafen Berlin Brandenburg International, letter to Rainer Schwarz, CEO FBB, dated 26.02.2010.

¹³¹ Flughafen Berlin Brandenburg, "Sachstandsinformation zur 87. Sitzung des Hauptausschusses des Abgeordnetenhauses Berlin am 16.06.2010", p. 5.

¹³² Flughafen Berlin Brandenburg, media release, "Neuer Flughafen wird größer – erster Flieger startet am 3. Juni 2012".

consultants being startled by a meeting with the federal police. Rainer Schwarz, CEO of FBB at the time, himself summarized the path the EU took in its directives regarding liquids, aerosols and gels.¹³³ EU directive 300/2008 from 11 March 2008 provided for specific security standards to be agreed in the future. Directive 272/2009 from 2 April 2009 then advised a deadline of 29 April 2010 for announcing technology and process standards in regard to liquids, aerosols and gels. This then occurred with directive 297/2010 that went into force on 29.04.2010 and prescribed new screening technology from April 2013.¹³⁴ That this directive was developed with at least some influence by the aviation industry can be construed by two letters by the Airports Council International Europe, the second one in conjunction with the Association of European Airlines, from 17 June¹³⁵ and 14 September 2009¹³⁶, where the lobbyists set out their concerns to the European Commission about the state of the available technology and the required investment by more than 400 airports.

In the end, even by 2014 the ban on carrying liquids, aerosols and gels had not been lifted after a concerted effort by aviation industry and EU member states arguing the lack of adequate equipment.¹³⁷ According to the European Commission, the ban will not be lifted before 2016, at the earliest, giving technology providers plenty of time to develop 'skinnier' machines.¹³⁸ That the aviation industry is involved in the process and does not need to be 'surprised' is further documented in the Airport Council International Europe's position paper on the EU's Aviation Security Technology Roadmap from April 2013:¹³⁹

¹³³ Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, "Wortprotokoll Hauptausschuss, 87. Sitzung 16. Juni 2010, 16. Wahlperiode", pp. 10-11.

¹³⁴ Flughafen Berlin Brandenburg, "Sachstandsinformation zur 87. Sitzung des Hauptausschusses des Abgeordnetenhauses Berlin am 16.06.2010", pp. 13-14.

¹³⁵ Airports Council International Europe, letter from Mr. Yiannis Parachis, President ACI Europe, to Mr. Antonio Tajani, Vice-President of the European Commission, dated 17 June 2009.

¹³⁶ Airports Council International Europe and Association of European Airlines, letter to Mr. Antonio Tajani, Vice-President of the European Commission, Joint ACI Europe/AEA Submission to the European Commission on the European Commission's Proposal to replace the current restrictions of the carriage of Liquids, Aerosols and Gels, dated 14 September 2009.

¹³⁷ Airportfocusinternational.com, "EU aviation security: drowning in red tape", dated November 2012, pp. 11-12, accessed under: <http://airportfocusinternational.com/eu-aviation-security-drowning-in-red-tape-extended-version> (last accessed on 21.01.2014).

¹³⁸ European Commission, Mobility and Transport website, "Air, Liquids Aerosols and Gels", accessed under: http://ec.europa.eu/transport/modes/air/security/aviation-security-policy/lags_en.htm (last accessed on 20.01. 2014).

¹³⁹ Airport Council International Europe, "Position on Aviation Security Technology Roadmap", 09 April 2013.

The European Commission has established a Technology Roadmap Group, involving different Commission services, industry stakeholders and EU Member States and observers. The aim of the group will be: to develop a consensus vision of what technology will be needed and be available for aviation security at different points in the future; to develop a strategy and concrete actions regarding research funding and pre-commercial procurement; and to monitor and support the European Commission Security Equipment Industrial Policy.

3.3.2 Second postponement – from 03.06.2012 to 17.03.2013

The construction work has progressed on schedule. Passenger terminal, aerobridges, connections to the road network as well as plant buildings are to a large extent ready. “The opening date of 3. June 2012 is firm. Until then the works on BER will run at full speed”, so Dr. Manfred A. Körtgen.

FBB media release, dated 14.12.2011¹⁴⁰

On 8. May 2012, 27 days before the planned opening of the BER passenger terminal, FBB hit the brakes. Completion, acceptance testing and approvals of the fire safety services, in particular the smoke extraction services, could not be achieved for the planned completion date.¹⁴¹

As at 20 April 2012, the day of the supervisory board meeting, FBB management and its consultants were still of the view that the opening date could be achieved. However, this view was based on the feasibility of a fall back mechanism in regard to the smoke extraction services. Instead of operating a fully automated smoke extraction including computer-guided fire doors, FBB was planning since December 2011 to implement a ‘human-maschine interface’ with up to 200 people per shift operating fire doors. After building code officials outlined their doubts about that interim solution it was finally shelved. Subsequently, on 7 May, the chairman of the FBB supervisory board, Klaus Wowereit, was advised of the need for a postponement.¹⁴²

¹⁴⁰ Flughafen Berlin Brandenburg, media release, “Endspurt für BER-Inbetriebnahme”, 14.12.2011.

¹⁴¹ Flughafen Berlin Brandenburg, media release, “Sicherheit hat Priorität: Technische Probleme bei der Brandschutztechnik machen Verschiebung des Eröffnungstermins für den BER unumgänglich“, 08.05.2012.

¹⁴² Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, “Wortprotokoll Ausschuss fuer Bauen, Wohnen und Verkehr, 10. Sitzung 18. Mai 2012, 17. Wahlperiode”, pp. 3-5, 23.

The chair of the supervisory board as well as FBB management confirmed at the parliamentary committee session discussing this second delay that problems to get the different components of the fire safety services / smoke extraction services, provided by five different firms, to inter-operate on time were the sole reason for the postponement. Large problems on site were the complex collision and interface checks between the deliverables of the different providers.¹⁴³

Following the FBB supervisory meeting on 17 May 2012 FBB announced a new completion date, the 17 March 2013. As reaction to the second postponement FBB fired pg bbi, the general planner and construction supervisor. It also dismissed Manfred A. Körtgen, General Manager Berlin Brandenburg International and Technology responsible for the technical aspects of the project.¹⁴⁴ Körtgen was replaced by Horst Amann from Fraport, who commenced as Chief Operating Officer at FBB on 1 August 2012.¹⁴⁵

Interestingly, the target date of 17 May 2013 was based on a timetable developed by pg bbi in the week before their dismissal as general planner and construction supervisor.¹⁴⁶

3.3.3 Third postponement – from 17.03.2013 to 27.10.2013

Following his appointment and start at FBB, Amann undertook a detailed review of the construction timing for the BER Terminal.¹⁴⁷ The conclusions of the review, made public on 7 September 2012, were drastic: The opening date was postponed to 27 October 2013 and an additional capital requirement of Euro 1.2 billion was identified.¹⁴⁸ In a media release Amann highlighted crucial issues concerning the

¹⁴³ Abgeordnetenhaus Berlin, Plenar- und Ausschussdienst, "Wortprotokoll Ausschuss fuer Bauen, Wohnen und Verkehr, 10. Sitzung 18. Mai 2012, 17. Wahlperiode", pp. 21-22, 37, 45.

¹⁴⁴ Flughafen Berlin Brandenburg, media release, "Nach der Aufsichtsratssitzung: Neuer Eröffnungstermin 17. März 2013, Technikgeschäftsführer Körtgen verlässt das Unternehmen, Vertrag mit Generalplaner pg bbi wird beendet", 17.05.2012.

¹⁴⁵ Flughafen Berlin Brandenburg, media release, "Horst Amann neuer technischer Geschäftsführer", 22.06.2012.

¹⁴⁶ Flughafen Berlin Brandenburg, "Projektstatus BER 04.01.2013", appended to letter from Jan Muecke, State Secretary at the Federal Minister of Transportation, Building and Urban Affairs, to Dr. Anton Hofreiter, chair of the federal parliamentary committee on transport, building and urban affairs dated 01.02.2013 and received 05.02.2013, no consistent page numbering.

¹⁴⁷ Flughafen Berlin Brandenburg, media release, "Nach der Aufsichtsratssitzung: Überprüfung des Eröffnungstermins läuft / Richtungsentscheidung beim Schallschutz", 16.08.2012.

¹⁴⁸ Flughafen Berlin Brandenburg, media release, "Flughafen eröffnet am 27.10.2013, Kapitalbedarf bei 1,2 Mrd. Euro", 07.09.2012.

fire safety installations as reasons for the delay. He stated, “We are still lacking plans for a coherent, integrated planning process. Further work is needed in this area to ensure that the construction companies have a reliable basis to work from for the remainder of the project.”¹⁴⁹

In a report to the FBB supervisory board months later, Amann admitted that an act that aimed at solving the maladministration totally backfired and resulted in months of construction stop commencing in May 2012:¹⁵⁰

“In particular, the core of the project was destroyed through the dismissal of pg bbi as general planner and construction supervisor and not properly replaced. Even the approach to recruit previous subcontractors and have them managed by FBB has failed. The result was a construction stop of several months”.

The additional capital requirement of Euro 1.2 billion was broken down as follows:¹⁵¹

- Additional construction cost so far: 276m €;
- Additional construction cost due to delayed opening: 67m €;
- Additional operational cost due to delayed opening: 230m €;
- Risk provision for other cost and loss of revenue: 322m €; and
- Additional cost due to noise abatement measures: 305m €.

Subsequently, an additional Euro 250 million were re-allocated to construction costs, without altering the total sum.¹⁵²

3.3.4 Fourth postponement – from 27.10.2013 to no firm date yet

First official indication that the opening may not be realised in October 2013 was given by FBB in November 2012. Amann was quoted in a media release as follows:¹⁵³

¹⁴⁹ Flughafen Berlin Brandenburg, media release, “Flughafen eröffnet am 27.10.2013, Kapitalbedarf bei 1,2 Mrd. Euro“, 07.09.2012.

¹⁵⁰ Flughafen Berlin Brandenburg, “Projektstatus BER 04.01.2013“, pp. 1-2.

¹⁵¹ Flughafen Berlin Brandenburg, media release, “Flughafen eröffnet am 27.10.2013, Kapitalbedarf bei 1,2 Mrd. Euro“, 07.09.2012.

¹⁵² Flughafen Berlin Brandenburg, media release, “BER Supervisory Board meeting: €250 million more for construction, additional capital requirement remains at €1.2 billion“, 7.12.2012.

¹⁵³ Flughafen Berlin Brandenburg, media release, “Zur heutigen Berichterstattung der BILD“, 10.11.2012.

"In their letter, [fire safety experts] hhp admit to deviations between the fire safety concept, planning permission and actual construction of the airport. An analysis of hhp's statement in the last few days has shown that acceptable solutions have not been found for all unresolved issues. We are currently working intensively with planners and experts on finding solutions to any outstanding problems. Further consultations over the next few days will bring clarity."

Clarity of some sort was provided on 7 January 2013 when FBB announced, "that the proposed opening date of 27 October 2013 is no longer viable". "This further delay is the result of problems with the fire protection system, in particular the fresh air supply in the case of a fire and the complexity of the system as a whole". A new opening date was not provided.¹⁵⁴

In an internal report to the supervisory board Amann is more sanguine of what happened. In setting the opening date to 27 October 2013, FBB had deliberately taken the risk of getting necessary construction sign-offs despite actual construction differing from the building approvals received. In the end, though, comprehensive re-planning and re-programming of services were required given feedback from the building authorities. Even more disturbing, a number of extreme building defects were unearthed.¹⁵⁵

As a result of the further delay the FBB supervisory board dismissed Rainer Schwarz, FBB CEO and Commercial Director since 2006, with immediate effect.¹⁵⁶ On 8 March 2013 the chairman of the supervisory board presented veteran troubleshooter Hartmut Mehdorn as new FBB CEO.¹⁵⁷ Following a public power struggle between Mehdorn and Amann, the latter was relieved from his role as COO.¹⁵⁸

Also in the aftermath of the fourth delay, Klaus Wowereit, Governing Mayor of Berlin, was taken out of the firing line by swapping the role of chairman of the FBB supervisory board with Matthias Platzeck, Prime Minister of the State of

¹⁵⁴ Flughafen Berlin Brandenburg, media release, "Re Berlin Brandenburg Airport", 07.01.2013.

¹⁵⁵ Flughafen Berlin Brandenburg, "Projektstatus BER 04.01.2013", pp. 1-2.

¹⁵⁶ Flughafen Berlin Brandenburg, media release, "Platzeck New Head of Supervisory Board and Management Reshuffle", 16.01.2013.

¹⁵⁷ Flughafen Berlin Brandenburg, media release, "Hartmut Mehdorn appointed CEO of Berlin Brandenburg Airport", 8.03.2013.

¹⁵⁸ Flughafen Berlin Brandenburg, media release, "Berlin Brandenburg Airport: Further planning and construction works initiated; Executive Committee changes", 23.10.2013.

Brandenburg, until then deputy chair.¹⁵⁹ Wowereit, who was chairman from 2001, was reinstated as chairman on 13 December 2013.¹⁶⁰

In February 2014 Mehdorn hinted that the airport may not open before 2016, five years after the first target opening date.¹⁶¹

3.3.5 The long road to final completion

It turned out, that in the month preceding the intended opening date in June 2012 a chaotic rush to completion had taken place. For most of 2012 and 2013 the FBB primarily concentrated on analyzing the multiple deficiencies of the terminal building. Hundreds of issues for repair were lined up, but the most serious deficiencies had to do with the building services technology, in particular the legally required higher standards of fire protection, i.e. the design and steering of the smoke extraction device. As it later turned out, the repair of the effects of this rush to completion would ultimately take years.

On the one hand, the whole concept including its automation and control was deficient and a new one had to be designed. On the other hand, the cable channels had been overcharged with a disorganized number of different cables. This long period of analyzing the deficiencies was handicapped by the fact that the architects and general planner as well as key staff people from FBB had been dismissed in the aftermath of the failed opening. Altogether, this resulted in a long period of stand still with no visible progress.¹⁶²

After Mehdorn had taken over as CEO in mid 2013, he had tried several ways to speed up the completion and finish with the standstill which he attributed to Amanns long lasting analyses. But Mehdorn was not successful with the person replacing Mr. Amann who had been charged with re-designing the fire protection facilities. This person had to be dismissed because of legal procedures opened against him regarding presumed conflicts of interest and corruption.

Another approach of Mehdorn was his “SPRINT” programme and the attempt to prepare a partial opening of the North Pier for air traffic in order to offset the total

¹⁵⁹ Flughafen Berlin Brandenburg, media release, “Platzeck New Head of Supervisory Board and Management Reshuffle”, 16.01.2013.

¹⁶⁰ Flughafen Berlin Brandenburg, media release, “Wowereit again Chairman / Bretschneider becomes Deputy Chairman”, 13.12.2013.

¹⁶¹ Berliner Morgenpost, “Mehdorn befuerchtet BER-Eroeffnung erst im Jahr 2016”, 25.02.2014.

¹⁶² Tagesspiegel vom 07.12.2014, Interview Mehdorn und Marks

standstill. But both did not result in the intended progress. It was not before Mehdorn had been successful to recruit Jörg Marks as the new Technical Director of FBB that things finally started to move forward in a technically and professionally successful way. Marks had been Manager for Siemens for years and in this role also deeply knowledgeable in the intricacies and deficiencies of the fire protection and smoke extraction devices installed in the terminal building.¹⁶³ Since Marks has taken over finally an apparently feasible system for fire protection and smoke extraction was decided upon. It is based on splitting the previous system into three parts. Its official approval by Brandenburg's building authority is expected for summer 2015. Moreover, Marks started a time consuming room by room restoration of the chaotically assembled cable channels. Since 3.600 cable kilometers are involved, this will altogether last until mid 2016. Then the official acceptance of the construction work, especially of the smoke extraction system will follow. Afterwards a larger period of test runs for the terminal building and the facilities at large will follow.

In December 2014 Mehdorn stepped down. Shortly afterwards the supervisory board decided that the official opening of BER should take place in the last quarter of 2017.

3.4 Budget blowout at BER

Throughout the project the cost situation at BER has lacked transparency. Once the delays started only high-level figures about new equity injections, one in 2012 and the other in 2014, have been made public. For over 12 months after Mehdorn had taken the reigns neither the supervisory board with its representatives of the three shareholding Governments, nor the parliaments have been provided with a financing plan for the completion of the Airport Project, as confirmed by the State of Brandenburg's finance minister and member of the supervisory board.¹⁶⁴ An updated plan was finally discussed and agreed at the BER supervisory board meeting on 30 June 2014.¹⁶⁵ All along, all the requests of the opposition parties in

¹⁶³ Siemens had been awarded only a limited part of this larger system his company responsible only for the automation and control system. Therefore Siemens was not able to solve the deficiencies alone.

¹⁶⁴ Maerkische Allgemeine Zeitung, "Christian Goerke ueber den Problem-BER", 03.06.2014.

¹⁶⁵ Der Tagesspiegel, "Mehdorn bekommt naechste Milliarde", 1 July 2014, p. 1.

the Berlin State Parliament (Grüne, Linke and Piraten) for a full disclosure of the costs for BER had been defeated by the governing 'grand coalition'.¹⁶⁶

It has become clear, though, that FBB management follows a strategy to 'discuss away' that the inevitable further cost increases are the result of planning errors and construction faults. On television¹⁶⁷, in print media¹⁶⁸ and through public rebukes of supervisory board members via media release¹⁶⁹ FBB's current CEO Harmut Mehdorn takes refuge in three key messages. First, that "more airport costs more money"¹⁷⁰ referring to the increase in planned capacity of the passenger terminal since construction commenced from 17 million to 27 million. Second, that new noise abatement regulation increased the cost of noise insulation of resident homes'.¹⁷¹ And third, that a final cost of "a bit over 5" billion Euro¹⁷² would still be "good value".¹⁷³

Mehdorn's core statement that the terminal's space 'nearly doubled' can be refuted by referring to the airports own media release archive. In 2006 the media release introducing the new airport said: "Once the airport opens at the start of the 2011/2012 winter timetable with a capacity to handle 22 – 25 million passengers per annum"¹⁷⁴, and not 17 million as now publicly claimed by Mehdorn. But even if the capacity increased through change requests and other decisions, this would have only been the case until the first completion date in 2011 and before an additional Euro 1.2 billion of capital was called by FBB in 2012. After that, the building shell was finalized and therefore large-scale capacity increases could not have been possible.

¹⁶⁶ Abgeordnetenhaus Berlin, 17. Wahlperiode, "Drucksache 17/1026", 30.05.2013; for a detailed description of the activities of the Piraten refer to: Martin Delius and Benedict Ugarte Chacon, *Unten Bleiben – Zwischenbericht der Piratenfraktion zum Untersuchungsausschuss BER*, pp. 81-86.

¹⁶⁷ rbb Rundfunk Berlin-Brandenburg, "Der BER-Chef im Gespräch", TV Interview, 11.03.2014.

¹⁶⁸ Der Tagesspiegel, "Für Mehdorn sind 5,4 Milliarden preiswert", 22.06.2014.

¹⁶⁹ Flughafen Berlin Brandenburg, media release, "Mehdorn contradicts Minister Goerke", 09.05.2014.

¹⁷⁰ Flughafen Berlin Brandenburg, media release, "Mehdorn contradicts Minister Goerke", 09.05.2014.

¹⁷¹ Flughafen Berlin Brandenburg, media release, "Mehdorn contradicts Minister Goerke", 09.05.2014.

¹⁷² Frankfurter Rundschau, "BER wird noch teurer", 28.02.2014.

¹⁷³ Der Tagesspiegel, "Für Mehdorn sind 5,4 Milliarden preiswert", 22.06.2014; and rbb Rundfunk Berlin-Brandenburg, "Der BER-Chef im Gespräch", TV Interview, 11.03.2014.

¹⁷⁴ Flughafen Berlin Brandenburg, media release, "BBI – The Airport of the Future", 15.05.2006.

The lack of information is exacerbated by legislation that does not allow the parliamentary investigative committees to inquire about the costs to complete the airport whilst the airport is still under construction. The parliamentarians have only the right to ask about actions or events laying in the past, 'preventive control' through investigative committees is not allowed.¹⁷⁵

Nevertheless, the pillars of the financing are known, as well as some large-scale increases to the aggregate costs. The capital requirements quoted refer to the construction of the passenger terminal building, the expansion of the existing runway and the construction of a second runway, the construction of access road and other related investments.¹⁷⁶

On initial sources of funds the following is known:

- In 1996 when the Federal Republic of Germany and the States of Berlin and Brandenburg agreed to develop Schoenefeld to the 'single' airport in Berlin, the three shareholders contributed together a shareholder loan of Euro 224.5 million to the airport company to partially pre-fund the development.¹⁷⁷
- In 2005 the shareholders agreed to swap the shareholder loan into equity and inject a further Euro 430 million of equity. In 2007 the State of Brandenburg agreed to finance the access road to the airport with Euro 74 million.
- The total debt amount of Euro 2.4 billion was arranged in 2009, with the European Investment Bank's share of Euro 1.0 billion already agreed in 2007 and available since late 2008.¹⁷⁸ As outlined in more detail in section 4.2.3 above, the three shareholders agreed to a 100% guarantee of the loan, turning the lenders from stakeholders to by-standers.

These total initial sources of funds add to Euro 3.1 billion, compared to the widely quoted initial estimated construction costs of Euro 2.4 billion¹⁷⁹.

¹⁷⁵ Berliner Morgenpost, "Untersuchungsausschuss zum BER Debakel wird ausgeweitet", 14.06.2014.

¹⁷⁶ Europaeische Kommission, "Staatliche Beihilfe Nr. NN 25/2009 (ex N 167/2009) – Deutschland Finanzierung des Flughafens Berlin Brandenburg International", 13.05.2009, pp. 4-5.

¹⁷⁷ Europaeische Kommission, "Staatliche Beihilfe Nr. NN 25/2009 (ex N 167/2009)", p. 2.

¹⁷⁸ Europaeische Kommission, "Staatliche Beihilfe Nr. NN 25/2009 (ex N 167/2009)", p. 5.

¹⁷⁹ Flughafen Berlin Brandenburg, media release, "Mehdorn contradicts Minister Goerke", 09.05.2014.

As discussed in section 4.3.3 above, after the third postponement in 2012 the shareholders agreed to contribute an additional Euro 1.2 billion. This sum included Euro 305 million to fund increased noise protection costs that arose due to a court decision in June 2012 to significantly improve the noise protection for residents.¹⁸⁰ This increased the total sources to Euro 4.3 billion.

A week before the BER supervisory board meeting on 30 June 2014 media reported of an additional capital requirement of Euro 1.049 billion needed to complete the construction of BER. This sum was made up of Euro 340 million for the passenger terminal, Euro 168 million for other construction and planning services, Euro 286 million for additional noise insulation for local residents, and Euro 255 million as contingency.¹⁸¹ The limited information released post the meeting confirmed the aggregate of Euro 1.1 billion, but did not provide a breakdown.¹⁸²

Including the Euro 1.049 billion the total sources of funds contributed by the shareholders and the lenders would have increased to Euro 5.4 billion.

Comparing this figure to the originally quoted construction estimate of Euro 2.4 billion and the original sources of funds results in increases of 125% and 74%, respectively, including the increased requirements for noise abatement.

3.5 Key Issues Identified at BER

Looking back with the benefit of hindsight it is surprising that such a large and high profile project was not embedded in a comprehensive project governance framework designed to ensure expertise on all levels and a degree of assurance commensurate with the public moneys spent. Instead, the project of developing and building BER was squeezed into corporate governance framework of a going concern, furthermore one specialized in operating and maintaining airports, not undertaking billion Euro greenfield projects.

¹⁸⁰ European Commission, "State Aid SA.35378 (2012/N) – Germany Financing of Berlin Brandenburg Airport", 19.12.2012, p. 2.

¹⁸¹ Der Tagesspiegel, "Fuer Mehdorn sind 5,4 Milliarden preiswert", 22.06.2014.

¹⁸² Der Tagesspiegel, "Mehdorn bekommt naechste Milliarde", 1 July 2014, p. 1.

Consequently, there was no project board or project steering group empowered to hire, fire and monitor the management team responsible for the project.¹⁸³ These are tested mechanisms that ensure that the sponsors, through their dedicated representatives or experienced nominees with relevant industry skills, have an ongoing and close engagement through regular meetings.¹⁸⁴

In addition to the lack of dedicated decision making structures, there was an absence of independent assurance and transparency. The supervisory board was toothless and no other function outside the project challenged the management on progress, cost development and other key risks. There was no transparency, with parliaments and the public kept uninformed for most of the project.

The architects, some of the contractors, and even some project managers may have been best-in-class, but without expert steering and expert supervision they could not reach their potential. Therefore, the lack of expertise on sponsor level weights heavily. Heavily also weights missing the expertise of lenders in regard to the key risk issues, given that a full government guarantee was provided. The continuous change requests, both a symptom of governance breakdown and a root cause for the failure of the project, could not have occurred to such an extent in a structure where banks put their own capital at risk and/or sponsors understood the subject matter.

All in all, ignorance and unfounded optimism of sponsors and FBB management trumped thoughtfulness and appreciation of risk. The possibility of failure was not taken seriously and the extent of the problems that eventually surfaced were inconceivable. Adequate time and cost contingencies were not included, resulting in cost-driven decision making that put the entire project on a slippery slope. Also, unwelcome information, that was provided by consultants like Drees & Sommer for example, was neither confronted nor passed on.

Table 3 below summarizes the key issues identified at BER by applying the analytical framework developed in chapter 2 above.

¹⁸³ Greiman, *Megaproject Management*, p. 124.

¹⁸⁴ Ross Garland, *Project Governance: A Practical Guide to Effective Project Decision Making*, London and Philadelphia, Kogan Page, 2009, p. 35.

Table 3: Assessment Criteria applied to BER

	Very poor / Non existent	Poor	Satisfactory	Good	Very Good
Governance as rules – fundamental decisions about project set-up					
Comprehensive control and steering structure with: (i) clear responsibilities and lines of authority, as well as (ii) decision-making structures that channel expertise and bind all key stakeholders		X			
Transparency and public control to enforce accountability in the public sector	X				
Expertise on all levels – hiring of best-in-class people and purchase of outside expertise (consultants and advisers)		X			
Involvement of risk capital – effective scrutiny by financiers / lenders that put own capital at risk	X				
Procurement contracting allocating construction and interface risks to contractors and also using incentives / penalties constructs		X			
Governance as processes – key decisions when shaping and undertaking processes					
Diligence at project definition stage and robust design at the outset		X			
Taking the possibility of failure seriously – Inclusion of significant contingencies in cost & time estimates to account for optimism bias	X				
Discouraging of change requests after design has been agreed	X				
Confront information that makes you uncomfortable, include people with different combinations of knowledge and experience, and test ideas with skeptics		X			
Undertaking of scrutiny processes, e.g. independent reviews or peer reviews by external bodies	X				

4. Recommendations / Lessons Learned

The lessons seek to re-interpret the specific case study findings and insights into new developments into five succinct conclusions serving decision makers of large-scale infrastructure projects for the public by the public.

Lesson 1

Governance structures need to be filled with expertise on all levels to be effective; experienced and skilled people on all project levels need to be supported by effective governance to reach their potential.

Elaborate governance structures and processes are mandatory to support the experienced and skilled people leading and/or executing the project and its elements. Gerkan, Marg and Partners are celebrated architects with high profile projects all over the globe, but these skilled experts failed in an environment without robust processes regarding change requests, without a skilled up client, without a comprehensive control and steering structure.

At the same time, tested and established bodies like the statutory supervisory board are inadequate if they do not have or do not seek sufficient levels of expertise and skill to understand issues thoroughly and make informed decisions. They are also inadequate if they do not properly assess that the level of supervision and guidance they can provide is not enough for the complexities of a large-scale process and a project specific governance structure with a dedicated project board or steering committee is required instead.

Lesson 2

Engaging a general contractor – usually advisable but necessitates a public side which is professionally well equipped

If the governance set up is insufficient as in the BER case, then it is highly risky and almost fatal to execute the project without a general contractor who would take over the technical and financial risks of the execution process and of handling the subcontractors in an adequate way. In the BER case all risks remained with FBB and its stakeholders, i.e. the public budgets.

The execution of the terminal building and its sophisticated building technology for fire protection primarily broke down because FBB management could not handle the interface and coordination of altogether 50 contractors which all had separate pieces of the project to work at. Insolvency or dismissal of the contractors to do this job only aggravated these deficiencies.

The BER case is a sad example of the disastrous consequences in terms of time and money spent to repair the consequences of the subsequent rush to completion.

Engaging a general contractor still puts high demands on the public sponsor. Only if detailed pre-planning and the quality of contract are well done, floods of costly change requests can be avoided. The Elbphilharmonie case is a good example for this.

Lesson 3

Sufficient time for planning in detail before contracts as well as during execution

In the case of BER, it proved disastrous that when it was decided to go for altogether 50 tendering processes and awarded contracts sufficient time necessary was not allocated. This should have been accompanied by postponing the completion and opening date of the airport. If sufficient time is not allocated either by detailed pre-planning or by postponing the intended completion date, the process results in parallel planning and execution – a source of many coordination flaws.

Lesson 4

Assurance, Assurance, Assurance

FBB management lost control over what was happening on site early on. The sponsoring governments, through their supervisory board members, got filtered and possibly altered information by FBB management. The parliaments had no access to accurate and up-to-date information whilst the problems accumulated and only were allowed to investigate ex-post. In short, there was

no functioning assurance, no visibility of project performance that could have supported the decision makers. And nothing was done about it.

The UK examples show that assurance needs to be undertaken on various levels, to be effective: (i) on the level of line managers, (ii) as a centralized cross-project function, (iii) on the sponsor level, (iii) and as an independent function for the political sphere and the public.

An independent assurance with a mandate to review the project is indispensable, especially if the governance of a project does not provide for sufficient overseeing and management bodies with adequate expertise. It is not understandable why the Federal level holding a 27% share of FBB – represented by the Ministry for Building and Transport – did not mobilize a quality of expertise which the two state governments were not able to contribute. This could at least have prevented some of the initial flaws of the governance set up, especially the switch from a general contractor model to splitting up contracts in such a vast way.

In the long run, a national body with competencies and expertise as established in the UK with the major project authority MDA would be advisable also in the federally decentralized Germany.¹⁸⁵ Such an independent institution would be helpful for advising the governance set up and monitoring the progress of projects. In Germany an institution like this could only be established by an agreement between federal and federal state governments – which normally would be hard and time consuming to arrive at.

Lesson 5

Client to be given all resources, internal and external, to be a “smart client”

The public entity responsible for the delivery of the project needs to be skilled up to select, negotiate with, and control the private sector companies ultimately undertaking the design and construction work. The demands this brings with it are very often underestimated.

This applies to the entire range of large-scale projects, the ones where the public entity is a ‘traditional’ client relying on a turnkey contract as well as projects

¹⁸⁵ Cabinet Office. „Major Projects Authority Annual Report 2013-2014. Accessed on 15.07.2014

where the public entity takes on more risk – by, for example, engaging several private companies to provide specific parts of the project and retaining the interface risk. Both, adversarial and non-adversarial contracts require a smart client. The first in order to counterbalance the information asymmetry that contractors may want to exploit, the latter as the collaborative management of risks is at the forefront.

FBB chose a contractual arrangement that gave them a ‘dumb’ project manager. Simple compliance with the demands and expectations of FBB had priority (in particular after the first project manager got fired), not a partnership at eye level. Further, FBB’s architects were incentivized not to push back on change requests, that increased their billings, instead pushing back focusing on the overall project deliverables.

London 2012 Olympics’ ODA has set an example of how to be a smart client. ODA attracted best in class board members and managers, and selected a delivery partner that provided it with manpower and know how. Importantly, the delivery partner was incentivized to meet cost and time targets.¹⁸⁶

¹⁸⁶ Kintrea, Kenna and Jason Millett. “Delivery Presentation – Lessons Learned from delivering the Olympics” Cumbria Event 21 February 2013. Published on Mar 13, 2013. Accessed on 15.07.2014. <https://www.youtube.com/watch?v=2h0Rh855I8>.

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Appendix I: Table of Abbreviations

Airport Project	Berlin Brandenburg Airport
BBF	Berlin Brandenburg Flughafenholding GmbH
BER	Berlin Brandenburg Airport
DCMS	Department for Culture, Media and Sport
DP	Delivery Partner
FBB	Flughafen Berlin Brandenburg GmbH
FBS	Flughafen Berlin Schoenefeld GmbH
GOE	Government Olympic Executive
IMEC	International Research Program on the Management of Large Engineering and Construction Projects
LOCOG	London Organising Committee of the Olympic and Paralympic Games
MPA	Major Projects Authority
MPLA	Major Projects Leadership Academy
NEC3	National Engineering Contract 3
ODA	Olympic Delivery Authority
PFI	Private Finance Initiative
pg bbi	Planungsgemeinschaft Berlin-Brandenburg International

Appendix II: BER Timeline

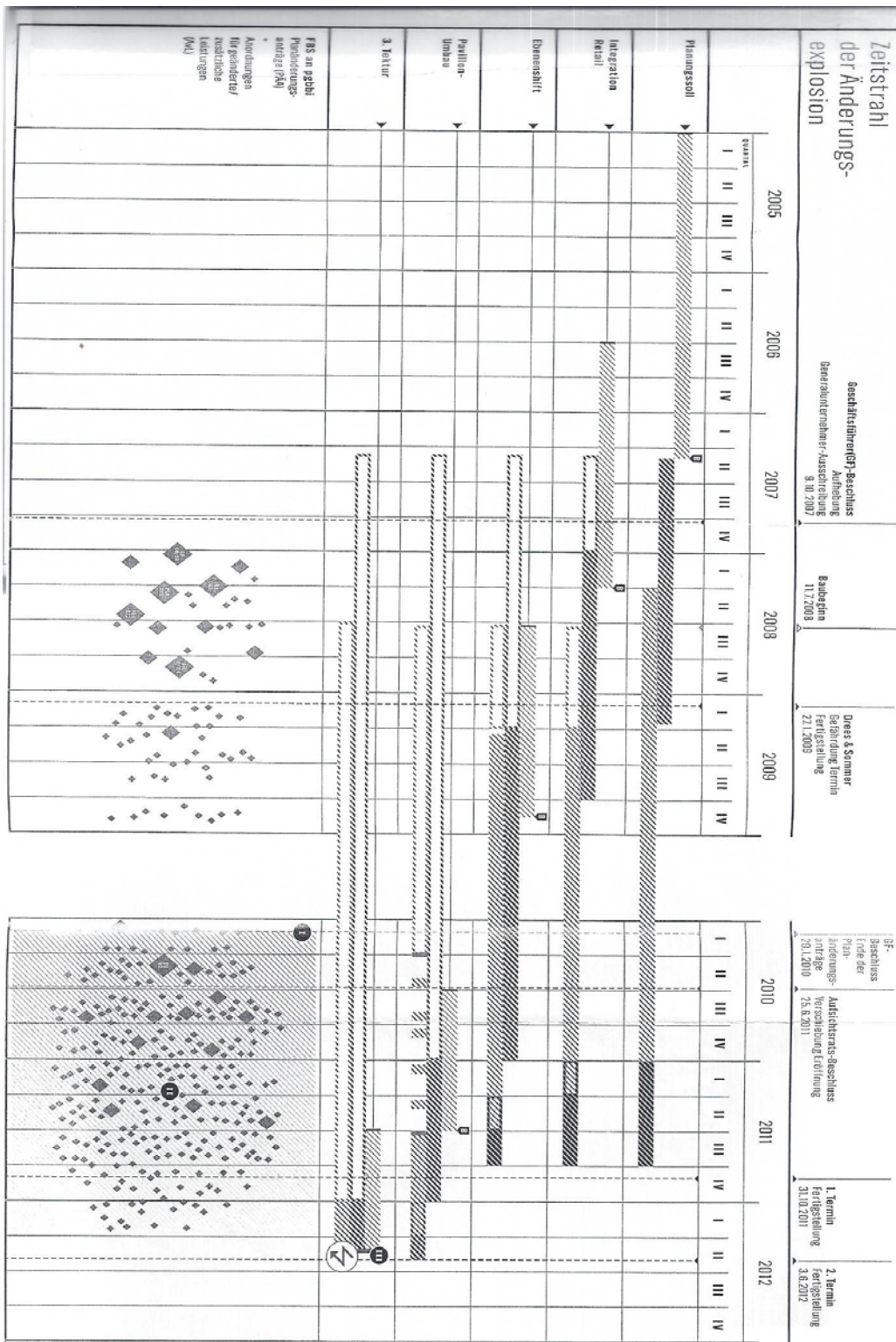
Date	Event / Decision / Announcement
June 1996	Consensus decision (<i>Konsensbeschluss</i>) to develop Schoenefeld Airport to the 'single' airport in Berlin.
March 1999	First privatization attempt; Opening targeted for 2007.
August 2002	Second privatization attempt; Opening targeted for H2 2007.
May 2003	Entire privatization process terminated; Decision to build airport under public sponsorship.
October 2003	Berlin Brandenburg Flughafen Holding (BBF) is merged with two subsidiaries tasked with the new airport development resulting in a new head entity, Flughafen Berlin Schoenefeld GmbH (FBS).
January 2004	Thomas Weyer becomes project leader as General Manager Berlin Brandenburg International and Technology; Opening targeted for October 2010.
August 2004	Responsible planning authority confirms the plans for the expansion of Schoenefeld Airport (<i>Planfeststellungsbeschluss</i>), including passenger terminal with underground train station, new runway and the extension of an existing runway.
January 2005	pg bbi engaged as general planner.
December 2005	Dr. Rainer Schwarz announced as new CEO replacing Dieter Johannsen-Roth. Starts on 1 June 2006.
March 2006	Federal Administrative Court in Leipzig dismisses lawsuits by residents against the planning approvals driven by noise concerns, but imposition of night curfew and other limitations due to aircraft noise. Opening date targeted for 30 October 2011.
June 2006	Bridge financing of Euro 350 million in place, provided by banking consortium incl. Commerzbank, Helaba, KfW IPEX.
5 September 2006	Ground-breaking ceremony.
November 2006	First tender for terminal building fails as only one bidder qualifies (HOCHTIEF).
Mid 2007	pg bbi selected to review and supervise the general contractor's detailed design and ongoing construction performance.
9 October 2007	Second tender for terminal building fails. All 4 bidders provide bids that are within a very narrow range, and around 400m Euro in excess of the estimated 620m Euro.

	Decision not to have a general contractor for the terminal building.
	Opening targeted for 30 October 2011, “ambitious but achievable”.
December 2007	A challenge by HOCHTIEF against the termination of the tender for the terminal building was dismissed by the procurement chamber (<i>Vergabekammer</i>) of Brandenburg.
Early 2008	Following refusal to appoint a general contractor, detailed design of the passenger terminal to be undertaken by pg bbi. Scope also included piers North and South in addition to the main terminal building.
20 March 2008	Thomas Weyer announces that he will leave FBS.
March 2008	Drees & Sommer selected as construction manager for BBI.
Juni 2008	Award of construction contracts for structural works of BBI terminal.
11 July 2008	Construction of the passenger terminal commences.
1 September 2008	Manfred Koertgen succeeds Thomas Weyer.
30 Oktober 2008	City-Airport Tempelhof closes.
November 2008	Drees & Sommer analysis of cost and schedule situation after the tenders of the seven lots were received; Drees & Sommer terminated as Construction Manager.
Early 2009	Passenger terminal construction broken up into around 35 lots.
March 2009	New building permit sought.
13 May 2009	European Commission agrees to 100% guarantee for debt package.
24 June 2009	100% guarantee in regard to the entire debt package by FBS’s shareholders.
30 June 2009	Financing package agreed with a banking group.
December 2009	FBS supervisory board decides to use the abbreviation ‘BER’, ‘BBI’ is discontinued. Airport named after ‘Willy Brandt’.
29 January 2010	FBS management ordered stop to any more change requests – unsuccessfully.
8 February 2010	IGK-IGR Ingenieurgesellschaft Kruck insolvent.
26 February 2010	Letter from pg bbi to FBS stating doubts about meeting target opening date.
7 May 2010	‘Topping out ceremony’ (<i>Richtfest</i>) of the new passenger terminal.
19 May 2010	Letter from WSP CBP to FBS stating that opening date is in jeopardy.

25 May 2010	German Federal Police advised of its view that a doubling of the screening space was required due to a new EU directive on liquids, aerosols and gels.
25 June 2010	First Postponement Supervisory board agrees to delay of opening date from 30 October 2011 to 3 June 2012.
8 June 2011	BER branding introduced.
January 2012	Flughafen Berlin Schoenefeld GmbH changes its name to Flughafen Berlin Brandenburg GmbH (FBB).
February 2012	Start of 4-months long live testing of terminal.
8 May 2012	Second Postponement Announcement that opening date of 3 June 2012 cannot be achieved.
17 May 2012	New opening date of 17 March 2013 announced; pg bbi and Manfred Koertgen dismissed.
From May 2012	Construction stop for several months post dismissal of pg bbi.
June 2012	Horst Amann announced as new FBB COO and head of the Airport Project, commences on 1 August 2012.
7 September 2012	Third Postponement New opening date 27 October 2013 announced; Additional capital requirement of Euro 1.2 billion identified.
30 October 2012	Fire safety experts hhp highlight deviations between the fire safety concept, planning permission and actual construction.
December 2012	EU Commission agrees to capital injection of Euro 1.2bn by BER's owners.
7 January 2013	Fourth Postponement Announcement that target opening date cannot be achieved. No new date.
16 January 2013	Schwarz dismissed as CEO; Klaus Wowereit relinquishes role as FBB chairman and becomes deputy chair.
March 2013	Hartmut Mehdorn announced as new CEO.
October 2013	Ammann relieved from his role as COO.
December 2013	Klaus Wowereit reinstated as FBB chairman.
June 2014	Mehdorn provides 'planning assumption' of opening in late 2015 or early 2016 reiterating that this was not a firm date.
30 June 2014	FBB management presents supervisory board an updated financing plan; Additional capital requirement of Euro 1.1 billion.

Appendix III: Timeline of Change Requests

The shaded area in 2010 and 2011 shows all change requests after FBB management ordered to stop any more change requests on 29 January 2010.



Source: von Gerkan, Meinhard. *Black Box BER: Vom Flughafen Berlin Brandenburg und anderen Grossbaustellen - Wie Deutschland seine Zukunft verbaut*. Quadriga Verlag. 2013.