

# Case study

## Berlin Brandenburg Airport

ACE225 - Project Management in Construction

### **Group 2**

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## 1 Introduction

In 1982 the Federal Government of Germany announced a program to privatise airports due to its background in budget restrictions, resulting in the first planned privatisation project in May 1996, the Berlin Brandenburg Airport (BER Airport). The airport represented high hopes for Berlin and Germany's leaders as it would help establish Germany as a new world center, introduce long-distance connections and provide higher passenger capacity.

In September 1997 the privatization process started but was fully terminated in 2003 due to a private investor pulling out of the deal. The construction of BER airport was now fully to be built under public sponsorship and the state-owned Flughafen Berlin Brandenburg GmbH (FBB), operator of Berlin Tegel Airport and Berlin Schönefeld Airport, took the responsibility upon themselves.

Even though the project organisation was initially set up as a main contract by the appointed General Manager, the FBB did not appoint a general contractor. This introduced a line of problems throughout the project, causing a major delay and price overrun.

One of the main goals of this project was for the Berlin Brandenburg Airport to become the busiest airport in Germany, with a projected 45 million passengers annually. The demand for air traffic has increased dramatically since 2012, and the increase is still going on, because Berlin is a very attractive City, and the town and its environment are growing each year.

This case analysis aims to dig deeper into the issues and problems related to project management that occurred during the project planning, control and execution of the BER airport. Furthermore, to elaborate on possible solutions of what could have been done differently.

### ***Project information and Project set-up***

**Name of Project:** Berlin Brandenburg Airport, also called BER Airport

**Construction start:** 2006

**Estimated hand-over:** Initially October 2011, delayed to 2012, 2014, 2016 and 2020

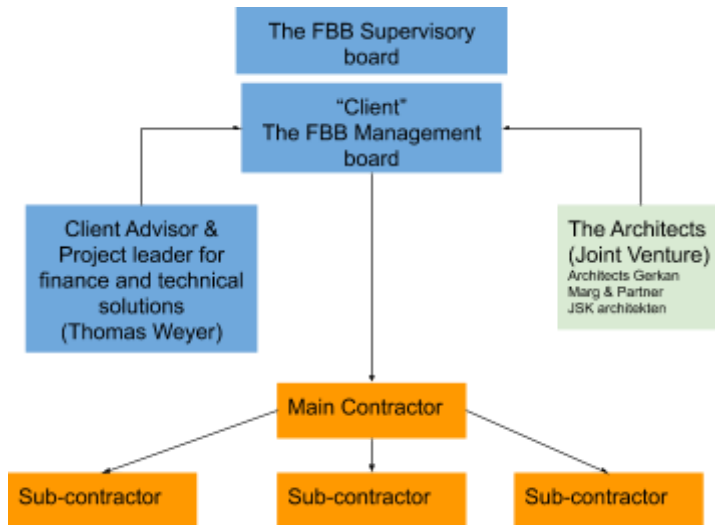
**Estimated Price:** 2.83 billion Euro

**Current Price:** 7.3 billion Euro (Lopez,J. 2019)



### ***Initial Project Set-up***

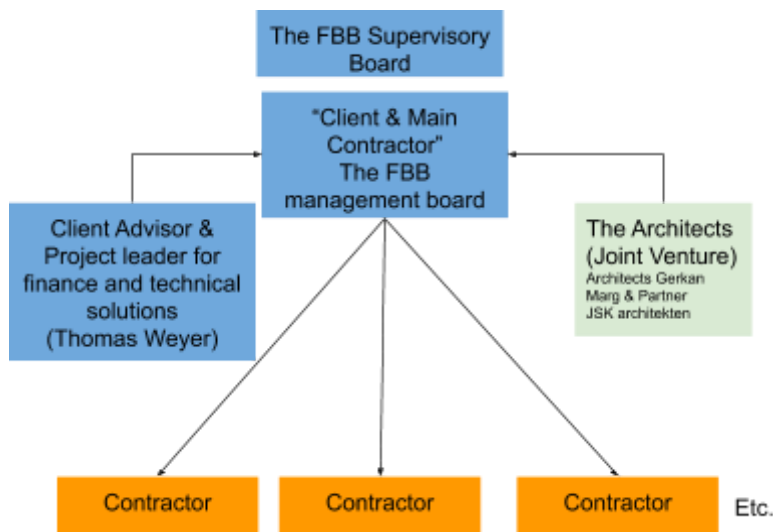
The formal set up of the project was made by Thomas Weyer, project manager for the technical solutions and finance. The project set-up were symbolising a main contract as shown in figure 1. The Client (The FBB) was represented by the FBB Management Board and the FBB supervisory board. The FBB Management Board was in charge of the operation of three other airports in Germany and reported directly to the FBB supervisory board, which by majority was represented by politicians but also a hotel and gastronomy consultant (Fiedler and Wendler, 2015).



*Fig.1 Initial project set-up organised by Thomas Weyer*

### ***How the set-up developed***

The FBB failed to appoint a general contractor due to the offers received from tender were perceived as uneconomical. In an attempt for cost-savings, the FBB decided to proceed by dividing the tender in approximately 35 lots, with equal amounts of contractors bidding. By choosing this approach, the FBB went from client to also resemble a general contractor.



*Fig.2 The initial project organisation developed from a main contract to a set-up where the clients were now also representing a general contractor.*

## **2 Mapping of Project Management Issues**

There were a large amount of problems and issues with the project, which covered almost all the project management areas. These issues are summarized as below:

<b>Project Management Knowledge Area</b>	<b>Identified Issue / Problem</b>
Stakeholder management	<ul style="list-style-type: none"> <li>• Changing ownership, bankrupted contractor, etc.</li> <li>• Lack of identifying stakeholders' and their roles and responsibilities</li> </ul>
Scope management	<ul style="list-style-type: none"> <li>• Changing requirements and lack of identifying requirements e.g. noise control, added luggage belts, failure in identifying technical requirements</li> </ul>

	<p>for e.g. fire alarm system and escalator sizes</p> <ul style="list-style-type: none"> <li>• Lack of scope statement identified as requirements documentation seem to be missing e.g. design codes, building regulations and standards</li> <li>• Lack of detailed WBS, resulting in large work packages with inherit cost risks in the tender process</li> </ul>
Resource management	<ul style="list-style-type: none"> <li>• Unqualified fire system designer, etc.</li> </ul>
Quality management	<ul style="list-style-type: none"> <li>• failed fire system since beginning until late verification, wiring problem, etc. 550,000 problems to fix (Bowlby, 2019).</li> <li>• Not enough monitoring of quality related to the cost management processes or reporting of cost to ministry</li> </ul>
Cost management	<ul style="list-style-type: none"> <li>• Overrun of budget</li> </ul>
Schedule management	<ul style="list-style-type: none"> <li>• Unbelievable delay</li> </ul>
Integration management	<ul style="list-style-type: none"> <li>• Charter not working well, general plan not mature, lose of change control</li> </ul>
Risk management	<p>Not enough preparation for risks</p> <ul style="list-style-type: none"> <li>• The client did not rectify the risks identified and analysed by hired consultants</li> <li>• Lacking involvement of stakeholders planning for potential risk</li> <li>• No tolerance criterias for how to handle schedule and cost overrun</li> </ul>
Communication management	<ul style="list-style-type: none"> <li>• Lack of enough communication with some of the stakeholders, like the Deutsche Bahn</li> <li>• Communication channels and reporting to stakeholders not established e.g. FBB supervisory board were regarded as politicians and unapproachable</li> </ul>
Procurement management	<ul style="list-style-type: none"> <li>• The architects responsible for the design documents also won the separate tender for supervision, meaning they supervised themselves.</li> </ul>

The table above summarizes the problems in the project of Brandenburg Airport. The problems covered almost all the ten project management knowledge areas. Since beginning, the initiation was not performed well because the charter creation was not clear, and stakeholders not identified sufficiently. Subsequently, all planning processes were not well carried on, e.g.: Incomplete stakeholder management and communication management led to bad scope baseline formation, which endangers schedule management and cost management in the future. Risk and resources were also not planned well, resulting in potential disruptions in project execution problems, especially the problems related to quality management with the fire system failure as the most prominent one. These problems also came back to disrupt scope, schedule, and cost baselines. During these project management processes, there also lacked the change control function within the integration area. In the next section, these problems will be analyzed in detail according to different knowledge management areas.

### **3 Analysis of the Case**

For the detailed analysis of the project problems on the long list, we could begin with the project integration management area. During the initiating stage, a project charter should have been developed, which clarifies the project purpose, target, success criteria, high-level needs, main deliverables, overall risks, complete milestone plan, approved budget, key stakeholders, acceptance requirement, project manager, and sponsors (PMBOK 2017). However, the ownership and project team have been in chaos since the beginning. The states of Berlin, Brandenburg, and the Federal Republic of Germany formed an operation company BBF to initiate the project via privatisation step first, considering if the project might go wrong if it is run by three governmental parties. After a dispute on justice during the bidding period between two main bidders Hochtief and IVG, BBF aborted the privatisation (Neumann, 2003). Later, the name of BBF changed into FBB, and the authority decided to grant permission for FBB to develop, own, and operate the airport (Brandenburg, 2004). The project target was also under-estimating the needs. The fast growing travellers volume has already brought up the need for the airport size soon, and the customer considered there should be another two side-wings to the main building, and enlarged space in the terminals, but firstly, extra luggage belts were approved with fund (TheLocal, 2014). The risks are not sufficiently examined either. When the project came to execution, the monitoring function was not working efficiently. Many problems were not detected in time, and got exposed just several days before audit or during audit. The change control function seemed not working either, with the typical example as the changed need on the airport size. For the closing stage, sadly the project has not finished yet until today, with October 30th

2011 as the original planned opening day (FBB, 2008). From the view of overall integration management, the project should be planned and prepared much more sufficiently, with a clearly-defined charter, stating clear high-level needs, main deliverables, and carefully examined risks. During project execution and monitoring stages, project changes need to be strictly controlled, especially for project scope and requirements.

The stakeholder management also had potential risks since the beginning. As mentioned above, the project ownership was insatiable before the project initiation. The main bidding contractors had disputes and questioned each other. The supervisory board also experienced complicated and dazzling personnel changes, including chairman, CEO, and contractor executives (Spiegel, 2013). Some of them from both customers and contractors were also involved in bribery lawsuits (Spiegel, 2015). One of the main contractors IGK-IGR even went bankrupt in 2010, taking the project team's blame for the delay of progress (Fülling, 2010). The project plan also ignored some external stakeholders, such as the citizens living near the airport. These citizens complained that the noise caused by the airport must be taken care of, and obviously the project plan had not considered this need with these citizens as stakeholders (Wedekind, 2016). The lack of sufficient stakeholder consideration is also one reason causing immature scope planning. The stakeholder management is also partly associated with the communication management. The engagement and sufficient communication with some of the stakeholders were not secured well. For example, Deutsche Bahn has completed railway to the airport many years ago, and Air Berlin was also well-prepared to move to the new airport based on the planned opening date (Spiegel, 2012), but they were notified not early enough about the delaying status of the project, and Deutsche Bahn even filed lawsuit to the project for the loss of investment on the unused railway for so many years (Bild, 2015). The dilemma indicates that the project should carefully check all potential stakeholders, consider their needs, secure their engagement and keep good communication with every party during project execution and monitoring stages.

The scope management was one of the areas having heavy problems. Scope management begins with planning and collecting requirements. Obviously, requirements were not collected thoroughly. As mentioned above, the requirement from customers was not fully investigated among stakeholders, and the size of the airport had to be enlarged during the project execution. The changed major scope caused quite a large expense and it could be reduced remarkably if it was planned in the beginning. Namely, the noise control in the citizen houses nearby should also be put in project scope, then it might save several months for lawsuits and extra work. All the deficient planning work resulted in imperfect scope definition and then incomplete WBS. During the monitoring and controlling stage, the scope was changed again and again due to stakeholder requirement changes and project

quality problems, with the fire system as the largest problem. Unbelievably extra work was done to cover up the original fire system failure and it was accepted by the certification authority TÜV as late as in April 2019, and officially completed the scope validation process for this system (Fabricius, 2019). The scope management in Brandenburg Airport aspect stipulates a good example for all projects that stakeholder needs must be collected carefully in the beginning, and project scope and WBS must be clearly and thoroughly defined. The baseline should also be strictly controlled during project execution and monitoring with mature change control function in the organization. For the size of this project, it would have been advisable to divide the WBS in sub-projects in order to make the scope more manageable.

Due to the bad project scope management, the schedule management was also in bad status. The project schedule management relies on the output of WBS from scope management to define activities needed to complete the project. Naturally, the schedule would not work since the WBS was not reflecting adequate stakeholders' needs at first, no mention of the disruptive and frequent change requirements leading to scope change. The stakeholders' changes, quality problems, budget outruns, and many other disturbances were contributing to the delay of the project. The construction began in 2006 and was expected to finish in 2011. However, just around one year before the planned opening date, FBB said they cannot meet the schedule, and blamed the delay on the bankruptcy of IGK-IGR. The new opening date was planned on June 3rd 2012 (Füllung, 2010). However, even worse than the last delay, FBB announced the delay again on May 8th 2012, with the background that the other two airports Tegel and Schönefeld were to close on June 2nd, highways were planned to close, and first flights were scheduled. The announcement was just made 26 days before the opening date, making it greatly unpleasant to key stakeholders and being a bad example of stakeholder management and communication management (Spiegel I. , 2012). Just before 2013, there were already four times of delays announced (Spiegel, Berlin Airport Opening Delayed Yet Again, 2013). As emphasized, the fire system was the fatal problem threatening the project, obsessed the project in the years afterwards, and caused the schedule to be delayed until now. It was delayed so badly and even the display screens installed in 2012 for the inauguration already went out of life in 2018 (TheLocal, Monitors at Berlin airport to be replaced for €500,000 before ever being used, 2018). According to the latest information, the planned opening time is in November 2020 (Rooks, 2020). The series of delays painted the dishonorable timeline of the project. Eventually, it is not easy to secure the project schedule management under the circumstance that so many problems existed in the project, from scope, to cost, to quality, to stakeholder, to communication, to resource, and so on. The continued delays were just consequences of the overall problems. To secure the schedule management, the project team needs to perform better in all the aspects of the management areas.



The cost management has also attracted attention. When costs are firstly estimated, it needs input from the scope management to know what to deliver, and also input from schedule management to know what work to do. It also needs input from human resources to know how much and how expensive human resources are costing. Unfortunately under the same circumstance as the schedule management, the cost estimation was receiving inaccurate WBS and scope baseline in the beginning, and then endured continued requirement change, scope change, quality disaster, and other problems. The schedule was seriously delayed once and once again, and amplified the consequence on the cost overrun, since any delay in the schedule leads to further extra costs. The original budget was 2.83 billion euros in 2009, and the final cost might be around 7.3 billion euros (Lopez, 2019). Similar to schedule management, securing the cost management needs the project team to enhance the management performance on all the relevant aspects, especially scope, quality, and risk schedule management.

The quality management plan was lacking for both the project and the product. As the project failed to establish a proper scope and procurement process due to constant change in design, the needs of the project could not be established nor measured. The lack of quality management could be seen as early as in the tendering, where the architects had already won the tender for producing the design documents, but then later on also won the tender for supervision - meaning they supervised themselves, creating issues in quality control. A quality management plan for the project cost, time, risk and integration were identified missing. This could be seen related to the finances of the BER airport. The nature of the loan made it risk free for the FBB to make mistakes, and did not make it feasible for the FBB to put in governance or quality management methods in the initial planning phase. The Ministry of Finance identified the monitoring of cost as insufficient, being only one auditing firm analysing the information received from the airport operator (FBB management board) before it reached the ministry. Besides having to revise the conditions of the loan, a thorough control of change requests would have been necessary to identify corrective or preventive measures. However, even though if such a process existed, the constant change of design and therefore change in requirements made it difficult to perform or measure quality.

When planning for a risk management plan the involvement of all stakeholders is important, especially in large public projects having a fixed date and being sensitive to changes. The attitude towards the FBB supervisory board, the Deutsche Bahn and the neighbours around the airport suggests that a risk management plan was missing as they were not included in meetings preparing for risk, nor in the reporting of project status. In 2008 the FBB outsourced project management and controlling as the second round of tendering for seven lots was once again regarded

uneconomical. The consultants produced an analysis with options for how the FBB could move forward and minimize cost in the tender. All options involved a delay in schedule, however the FBB decided to move forward without adhering to the advice and revise the date of completion. Furthermore, the consultants highlighted the inherent problem of tenders without having the detailed design in place, resulting in high contingencies in the bids and major time delay while re-applying for building permits. The approach resulted in claims and interruptions for the contractors, as the construction work was being conducted in parallel with the detail design work. The development of the project charter stating the high level risks were failing from the start, together with failing to identify the roles and responsibilities in the ever changing project organisation. The above issues identified suggests that the project risk management plan missed an overall risk breakdown structure (RBS) taking the technical, external, project, and organisational risk into consideration. The RBS could have helped in managing different risks, involving the right stakeholders and agreeing in the risk tolerances for the different objectives. This way, more rational decisions could have been decided and discussed between the involved parties.

The project resource management is planning, developing and following up the teams, materials and supplies that is necessary for the project. In this big of a project there will be a huge amount of different areas where they all will need their own unique resources to complete their task. (Project Management Institute, Inc. 2017). A problem with the resources in the Brandenburg airport was that they hired a lot of different subcontractors. Where they might have had the resources in forms of teams this also means a lot of time to manage, lead and follow up all the different groups that were working on the project. The part of controlling the resources also gets more complicated since they were needed to plan for all the different work teams. One of the postponements were also due to the missing of opponents, much because they were using a number of different firms for the different part components which made it harder to synchronize and also created collisions when delivering. (Fiedler, J. and Wendler, A., 2015). This shows how the planning of resources can have been too scattered, where the resources existed but created problems when managing and controlling the work of so many different resources. Another option could have been to use less different firms and instead have a more compact group of resources which would have been easier to manage. This could be a question of costs, where reaching out for resources from different firms can be a way of saving, but in this case instead it created more expenditures due to all the problems and delays that were created.

#### **4 Reflections**

The Berlin Brandenburg Airport is an example of a failure of planning. All negative examples to be avoided according to the PM book have been committed.

FBB's board lacked the knowledge to lead the projects. In order to avoid misjudgements, professional knowledge was needed. The flexibility of the projects required a board with several representatives from different areas. Factual knowledge with such a large and significant investment can't be avoided.

The BER Airport was no exception to the investigation of 258 projects, being initially estimated to cost 2.83 billion Euros, now exceeding 7.3 billion Euros. The project was highly political and part of a political strategy, making Berlin more accessible and establishing the city as a new world center (Lopez, 2019). The privatization of the airport failed, leaving the FBB Management Board, an airport operator, and the FBB supervisory Board, a group of politicians in charge of the project. The competence regarding construction and construction cost can be questioned, and the first tender was rejected as it was considered uneconomic (Fiedler and Wendler, 2015). The question is if the initial estimated cost of 2.83 billion euros took contingencies into consideration, or if it was a part of a political power struggle to get the project started. FBB management board furthermore chose to ignore the advice of hired consultants; to increase the cost or push the opening date. The architects placed serious allegations towards the FBB Management Board, reporting that the supervisory board received falsified minutes of meetings, internal conclusions and timetables. It can be discussed if the advice from consultants and information from the involved stakeholders ever reached the FBB Supervisory Board, and if there was an economic self-interest for the FBB management board to not report the truth to the Supervisory Board. The deficiencies and inaccuracy in the flow of information was backed up by Harald Wolf, Minister of Economics and a previous member of the supervisory board. The amount of change request and constant change of scope are considered to be a top contributor for the cost overrun. The lack of construction expertise in the FBB, could also have been misused by the 35 subcontractors who realised their power over the client and the overall lack of traceability in the project.

“Cities compete fiercely for approval and for scarce national funds for such projects, and pressures are strong to present projects as favourably as possible, that is, with low costs and high benefits, in order to beat the competition.” (Flyvbjerg 2006) One problem with the resources at Brandenburg Airport was that they hired many different subcontractors. In this case, the subcontractors underestimated their costs to be more competitive. A research conducted covering 258 transportation infrastructure projects deduced that 9 out of 10 projects is underestimated in cost. The study investigated the technical, economical, psychological and political aspects of the projects and its possible impact on cost overrun. The most significant findings were related to the economical political aspects of the project. The economical factor suggests that public projects are actively underestimated in order to keep the costs low from start, and therefore save the taxpayer's money (also called the “noble lie”). In terms of self-interest from the consultants or contractors, cost might deliberately

be underestimated in order to ensure the future and their involvement in the project. The political factor indicates that there might be a misleading forecast of cost in order to attract investors and get the project started. The project itself might influence the reputation of the city or be pushed in order to take part of the yearly budget, and therefore become a question of political power. Both the economical and the political factors indicate that deception and lying are used tactics in power struggles, aiming at getting projects started and making profit (Flyvbjerg, 2002).

The Berlin Brandenburg Airport was a good example of planning and decision making under uncertainty. Princeton psychologist Daniel Kahneman the Nobel prize in economics in 2002 (Kahneman & Tversky, 1979a, 1979b; Kahneman, 1994) argued that people under uncertainty underestimate the costs, completion times, and risks of planned actions, whereas they overestimate the benefits of the same actions. "This would later be known as "the planning fallacy" "that this fallacy stems from actors taking an "inside view" focusing on the constituents of the specific planned action rather than on the outcomes of similar actions already completed" (Flyvbjerg 2006) In the case described here, the uncertainty played a major role. There was a constant change in the cost, the management of the stakeholders. The scope of the project changed with new challenges. WBS cannot be done without a clear scope. Environmental aspects and social aspects were negligent which increased uncertainty in the success of the project and led to delay.

It was a strict hierarchical relation among stakeholders in contradiction to scientific research. "Further, it stated that the traditional hierarchical coordination between the different actors in construction projects, being based on contractually defined duties and responsibilities, generates misunderstandings and promotes sub-optimization and adversarial behaviour." (Gottlieb, Jensen 2012)

The FFB projects have made all sorts of mistakes with stakeholders. No trust in each other. Poor communication, hierarchical structure and even bribery lawsuits. All of these factors undermine the success of a project. As there was no trust between the stakeholders in the project, there was also a lack of stability. The institutional influences affecting the BER airport project was highly related to the social structure and behaviour in the project set-up from the beginning. The traditional project set-up involving a general contractor was ignored and the architects got the responsibility for both the design and supervision, meaning that the legal requirements between the parties (the normal norms and rules) and within the project were suddenly not existing, which likely caused confusion in how to engage between the involved parties.

## References

- Bild. (2015, 10 31). *Bahn will 70 Mio. Euro vom Pannen-Flughafen*. From Bild: <https://www.bild.de/geld/wirtschaft/deutsche-bahn/will-schadenersatz-von-flughafen-ber-43223364.bild.html>
- Bowlby, C. (2019, 6 29). *Berlin Brandenburg: The airport with half a million faults*. From BBC: <https://www.bbc.com/news/world-48527308>
- Brandenburg, L. (2004, 8 13). *Planfeststellungsbeschluss des Landes Brandenburg für den Ausbau des Flughafens Berlin-Brandenburg International*. From Brandenburg Land - Ministerium für Infrastruktur und Raumordnung (MIR): [https://web.archive.org/web/20090427204618/http://www.mir.brandenburg.de/cms/detail.php?id=173010&\\_siteid=45](https://web.archive.org/web/20090427204618/http://www.mir.brandenburg.de/cms/detail.php?id=173010&_siteid=45)
- Fabricius, M. (2019, 4 17). *Das Monster vom BER ist gezähmt*. From Welt: <https://www.welt.de/wirtschaft/article192033569/Flughafen-BER-Das-Monster-Entrauchungsanlage-ist-vom-TUEV-abgenommen.html>
- FBB, F. (2008, 9 4). *Two years of construction work on the new Capital Airport BBI: "We are right on schedule"*. From Flughafen Berlin Brandenburg: <https://www.berlin-airport.de/en/press/press-releases/2008/2008-09-04-bbi-construction-work/index.php>
- Fiedler, J. and Wendler, A., 2015. *Public Infrastructure Project Planning in Germany: The Case of the BER Airport in Berlin-Brandenburg. Large Infrastructure Projects in Germany – Between Ambition and Realities, pp.1-65*.
- Füllung, T. (2010, 6 25). *BBF-Start um mehr als ein halbes Jahr verschoben*. From Berliner Morgenpost: <https://www.morgenpost.de/berlin-aktuell/article104269853/BBF-Start-um-mehr-als-ein-halbes-Jahr-verschoben.html>
- Flyvbjerg B.(2009) *Curbing Optimism Bias and Strategic Misrepresentation in Planning: Reference Class Forecasting in Practice*, European Planning Studies Vol. 16, No. 1, January 2008 <https://doi.org/10.1080/01944360208976273>
- Flyvbjerg, B., Holm, M. and Buhl, S., 2002. *Underestimating Costs In Public Works Projects: Error Or Lie?*. [online] Taylor & Francis. Available at: <http://www.tandfonline.com/doi/abs/10.1080/01944360208976273> [Accessed 4 August 2020].

Gottlieb, Jensen (2012) Making sense of partnering, The Engineering Project Organization

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<http://www.tandfonline.com>  
<http://dx.doi.org/10.1080/21573727.2012.695732>

Lopez, J. (2019, 12 5). *Berlin's 'cursed' Brandenburg Airport finally nears completion*. From CNN:  
<https://edition.cnn.com/travel/article/berlin-brandenburg-airport-opening-date/index.html>

Neumann, P. (2003, 5 20). *Warum die Flughafen-Privatisierung 1999 scheiterte: Der Untersuchungsausschuss berät heute über den Abschlussbericht: Pleiten, Pech und Pannen in Schönefeld*. From Berliner-Zeitung:  
<https://www.berliner-zeitung.de/warum-die-flughafen-privatisierung-1999-scheiterte-der-untersuchungsausschuss-beraet-heute-ueber-den-abschlussbericht-pleiten-pech-und-pannen-in-schoenefeld-li.6292>

Project Management Institute, Inc. (2017) *Guide to the Project Management Body of Knowledge (PMBOK® Guide) (6th Edition)*

Rooks, T. (2020, 6 3). *Berlin's new airport is finally set to open, its future is up in the air*. From DW:  
<https://www.dw.com/en/berlins-new-airport-is-finally-set-to-open-its-future-is-up-in-the-air/a-53672964>

Spiegel. (2012, 11 12). *Berlin Airport Faces Further Possible Delays*. From Spiegel International:  
<https://www.spiegel.de/international/germany/further-delays-possible-for-new-berlin-airport-a-866691.html>

Spiegel. (2013, 1 7). *Berlin Airport Opening Delayed Yet Again*. From Spiegel International:  
<https://www.spiegel.de/international/germany/opening-of-berlin-airport-delayed-again-due-to-technical-problems-a-876103.html>

Spiegel. (2013, 3 8). *Mehdorn wird Chef des Berliner Flughafens*. From Spiegel:  
<https://www.spiegel.de/wirtschaft/unternehmen/hartmut-mehdorn-wird-berliner-flughafenchef-a-887585.html>

Spiegel. (2015, 5 28). *Richter steckt früheren BER-Manager in U-Haft*. From Spiegel:  
<https://www.spiegel.de/wirtschaft/soziales/hauptstadtflughafen-ber-manager-in-untersuchungshaft-a-1036079.html>

Spiegel, I. (2012, 5 17). *New Berlin Airport Won't Open until March 2013*. From Spiegel International:  
<https://www.spiegel.de/international/germany/new-berlin-airport-won-t-open-until-march-17-2003-a-833692.html>

TheLocal, G. (2014, 5 2). *Berlin's new airport is already too small*. From The Local:  
<https://www.thelocal.de/20140502/berlins-new-airport-too-small>

TheLocal, G. (2018, 3 16). *Monitors at Berlin airport to be replaced for €500,000 before ever being used*. From The Local:  
<https://www.thelocal.de/20180316/monitors-at-berlin-airport-to-be-replaced-for-half-a-million-euros-before-ever-being-used>

Wedekind, O. (2016, 5 4). *Lärmschutz am BER kostet bis zu 50 Mio. Euro mehr*. From Bild:  
<https://www.bild.de/regional/berlin/flughafen-berlin-brandenburg/laermschutz-am-airport-kostet-noch-mal-mehr-45641834.bild.html>

# Evaluation of project management models and practices

ACE225 - Project Management in Construction

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## **Project management model by PMBOK**

In the course of ACE225 Project Management in Construction, the PMBOK (A Guide to the Project Management Body of Knowledge) was used as the main material for studying project management, and the PMBOK itself is one of the most popular project management models.

In the model presented by PMBOK, a map consisting of ten knowledge areas and forty-nine project management processes was pictured. It categorizes the overall work of project management in an universal project into these ten areas of management: integration, scope, schedule, cost, quality, resource, communication, risk, procurement, and stakeholders. For each of the knowledge areas, there are some working processes belonging to them, for example, the scope management area includes processes of: planning scope management, collecting requirements, defining scope, creating WBS, validating scope, and controlling scope. In the meantime, PMBOK adopts the method that divides all the working processes into five process groups: groups of initiating, planning, executing, monitoring & controlling, and closing. Each of the forty-nine working processes could be classified into a working process group, in the meantime, the work in a management area could be allocated in several working process groups in the form of its working processes. For example, inside the scope management area in a project, the scope management work must begin with making a scope management plan, and then collect stakeholders' needs which are the basis for forming project scope. After completing the collection of stakeholders' needs, the scope could be defined, but this is not the end for scope creation. The scope must be split into systematic work breaking structure, which confines all the work in the scope into different levels of work with the fundamental work package specified. The WBS could be regarded as the scope baseline and the project will be executed according to the WBS. All the work is classified into the working group of planning. In the group of monitoring & controlling, the scope baseline will be referred to control the working scope, and then the deliverables will also be validated according to the scope baseline. From the view of the scope management area, its working processes are mainly in two groups: planning and monitoring & controlling. For other management areas, they might be existing in more working groups, like the integration management which exists in all the five working groups.

A prominent characteristic of the PMBOK model it formalized all the working processes into standardized forms. Each process includes three components: input, tool & techniques, and outputs. For example, for the process of validating scope, it needs several inputs: scope management plan, requirements management plan, scope baseline, lessons learnt register, quality reports, requirements documentation, requirements traceability matrix, verified deliverables, and work performance data.

The scope validation is mainly checking if the verified deliverables match the scope baseline, thus the scope baseline and verified deliverables naturally become the most important inputs for the scope validation work, and other contents and documents like quality reports would also be needed to validate the overall work. The tools & techniques are the methods needed for performing the validation work. Here the technique of inspection and decision making are employed. After the completion of the validation work with tools & techniques, there will be outputs where verified deliverables turn into accepted deliverables. If there are variations between deliverables and scope baseline, then there might be change requests generated to modify the scope. The example of the validation scope illustrates how the three components of a process works.

## **Reflection on the PMBOK model: Strength and limitation**

### **Strengths**

The largest strength of the PMBOK model is the map or the structure it builds up with the knowledge areas and processes, and the inputs and outputs contained in each process. These areas and processes are like horizontal and vertical bones establishing the whole sketch of project management work, and clearly present the parts of work needed to be done in each stage. More importantly, the inputs and outputs are channeling different working processes and making the processes in different areas vividly linked with a logical way and demonstrating the casual relationships of work in different parts. As mentioned, verified deliverables are output from the quality control process, but become the input for scope validation. Similarly, scope baseline is the output from WBS creation, but becomes input for defining activities in schedule management. This brings deeper understanding on the whole model and on the practical project management work.

Furthermore, the PMBOK model points out the importance of integration management by setting it as an individual management area, and furthermore stresses the change control function. PMBOK gives clear indication that the scope needs to be respected as a baseline. Project managers should preserve the intact baseline with the principle that no extra work will be done, and no piece of work will be missed. It does not mean that the scope cannot change at all once the baseline is formed. Most projects have changes, but the changes need to be carefully and thoroughly examined through change control function in the integration area. This principle helps project managers to avoid frequent project changes and frustrations.

One item to notice in the project management model in PMBOK is the emphasis on the pyramid of three elements in project management systems, which is composed of scope, schedule, and cost. These three elements are fundamental factors for all

projects, but three is the quality management amid them as the prioritized criteria. Each project needs to balance between them. The scope management decides how much work needs to be done, and the work amount dominates how much time it needs to complete the work in the schedule management. The duration of the work schedule subsequently influences how much budget is needed in the cost management. If the project manager decides to save cost by reducing resources, then the schedule might be crushed into an even longer timeline; if the project manager decides to save cost by reducing some work, the scope baseline might be broken with deliverables missing, and endanger the quality further. Similarly, if the project manager wants to use schedule compression, the quality might be damaged and threaten the scope baseline further. If the project manager wants to perform more work to enhance the quality or secure the scope baseline, more resources and more time will be needed, and the baselines of schedule and cost will be threatened too. This pyramid illustrates clearly what criteria and balancing relationships a project manager needs to bear in mind.

## **Limitations**

Having a well-defined scope is important for everyone involved in the project. Making clear what the project requires and creating baseline and WBS takes time and extra cost. The same thing goes for risk management, one of the most important areas to address and plan for in the start of a project. Risk management processes involve many unquantified tools and techniques and can often be considered as non-vital, time- and cost consuming, resulting in a poor or non-existent risk management plan. The PMBOK does not take the human factors or behaviour of the key stakeholders into consideration. Project team members or key stakeholders being defiant towards planning areas that require time or do not have an immediate quantified output can be difficult for the project manager to argue the value of.

One of the limitations of the PMBOK is related to the institutional approach or theory which is composed of three pillars; rules, norms and value/culture. The PMBOK presents valuable tools and techniques in how to perform best practice in project management, however it does not take the three pillars into consideration, which might have an impact on how effectively the project management tools will be utilised.

Defining the scope of large and constantly varying projects that have uncertain factors and an ongoing transformation is a difficult challenge. Since the PMBOK uses methods where all the factors are known and from there the scope is produced it can sometimes be hard to translate to real constructions projects. Often many challenges and changes come up on the way, and planning and designing may be ongoing while the project has already started which is making it possible for the

scope to change. This can make the way of coming up with the scope presented in the PMBOK a bit to unflexibel for some projects.

The well-defined efforts form the basis for the scope of the project. Although the initial definition is not well described but the shareholders have confidence in the managers, having a good relationship and trust can make it possible to overcome the uncertainty in the definition of the scope. Although the PI book allows the correction in scope it is difficult to make changes without agreeing with stakeholders. To create a new base line and create the new WBS dictionary cost money and time which increase the cost of the project.

## **Reflection on Project Management - Our own learning process**

Project management requires complex knowledge, it does not only count on technical and financial knowledge, but it requires leadership to understand human behaviour has a crucial role in terms of project success.

Throughout this course the ten knowledge areas have been presented and explained in tools and techniques with the desirable outcome. The in-depth studies in these areas has given a broad understanding for why many projects have failed throughout time, and what was missing in order to have a successful project. This understanding was particularly exercised through the process of assignment 2b, where other layers to the problem, such as power and authority and governance of projects could be discussed. The learning outcomes of this course has already proven helpful when working in current organisations, projects and processes, where it is now easier to establish what is needed in order to improve the outcome, or why something is not working the way it should work. It is however apparent that true change comes from top management in larger projects and organisations, making it essential to have skilled people there who understand construction projects. Furthermore, It was interesting to see how large complex projects can behave and how the uncertainty should be planned in.

It has given the understanding of why different management areas are needed and how they are used. Also that a project can be divided into many different sub categories that all need to be managed and controlled to be able to move the project as a whole forward. But it has also shown that all projects are different and there will always be unique features, if it's in the building itself or the people working on the projects. This makes it important to remember that everything isn't black and white and it is needed to use other personal opinions, experiences and so on to navigate through a project process. So be able to use the tools the PMBOK gives you as long as it fits but also be able to analyze when you may need to stray away from it a bit to help solve problems that may be more complex. There can also be social and

communication problems within projects. Since there will be a lot of different groups, subcontractors and stakeholders that are involved in projects there can always be the collisions between people, misses in communication and different experiences. This makes the human factors important and a good leader and problem solver can go a long way.

In addition, analysing the projects from a distance without personal involvement in the project helped give a much wider perspective of the project management tools. But it's also important to keep in mind that every project can be different and come with different challenges, so knowing that the methods used can change depending on the project and analysing more and different cases could give an even wider base of knowledge.

## Reference

Project Management Institute, Inc. (2017) *Guide to the Project Management Body of Knowledge (PMBOK® Guide) (6th Edition)*