DO WE REALLY NEED THE F IN DB(F)MO?
AN EMPIRICAL STUDY INTO THE SUBSTITUTES OF THE F COMPONENT IN DUTCH DBMO BUILDING PROJECTS AND THE EFFECTS ON ADDED VALUE.

S.C.E. van den Assem
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DO WE REALLY NEED THE F IN DB(F)MO?

An empirical study into the substitutes of the F component in Dutch DBMO building projects and the effects on added value.

BY
S.C.E. VAN DEN ASSEM

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PERSONAL INFORMATION

NAME: S.C.E. VAN DEN ASSEM
ADRESS: TORENSTRAAT 8, 2513BS DEN HAAG
EMAIL: STEPHANIEVASSEM@HOTMAIL.COM

STUDY RELATED INFORMATION

UNIVERSITY: DELFT UNIVERSITY OF TECHNOLOGY
FACULTY: CIVIL ENGINEERING AND GEO SCIENCES
MASTER: CONSTRUCTION MANAGEMENT & ENGINEERING
STUDENT NO: 1364812

GRADUATION COMMITTEE

PROF. MR. DR. M.A.B. CHAO-DUIVIS
PROF. DR. IR. J.W.F. WAMELINK
DR. W.M. DE JONG

GRADUATION COMPANY

COMPANY: BRINK GROEP
ADRESS: OVERGOO 5, 2266 JZ LEIDSCHENDAM
SUPERVISORS: IR. S. AALBERS
             IR. I. GOTINK
This thesis is written as part of my graduation project for the Delft University of Technology and with it, I finish my master Construction Management & Engineering at the faculty of Civil Engineering. On my way to becoming an engineer, many interesting subjects and matters have passed by. Among them were project management practices, process management strategies, but also financial engineering and feasibility studies. I often read papers on large-scale infrastructure and real estate projects, which were going into depth on these topics. I noticed that whenever construction projects were discussed, the financial aspect took my attention in particular. In view of that, I decided to use my graduation project to enrich myself on the subject of financing of PPPs in Dutch construction.

In my search for a graduation company, I found Brink Groep, a management and consulting firm that focusses on construction, real estate and housing topics, that wanted to have a closer look at the role of the F component in Dutch DBFMO building projects and how the role could be rebuilt without the actual use of project financing in DBMO. With the help of Brink Groep, I succeeded in conducting research on this matter. A special thanks goes out to my colleagues at Brink Groep, who were always willing to help me and provide me with insights in the current state of affairs. And especially to Sjoerd Aalbers and Inge Gotink, who could always find me, even in the turbulent time of change for Brink Groep. I would also like to express my gratitude towards the experts who were kind to speak with me about their experiences in the projects that were subject of this research. I would also like to thank my graduation committee for their guidance, and especially Monika Chao-Duivis for her daily counselling.

And last but not least, I would like to thank all those beloved people, who helped me cope with the stress and uncertainty of graduation.

Enjoy reading!

Stephanie van den Assem

10th, August 2014
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An empirical study into the substitutes of the F component in Dutch DBMO building projects and the effects on added value

DBFMO contract structure
In Dutch construction, numerous new variants of integrated contracts have been developed over the last couple of years, where not only design and build but also other stages of the building life cycle are combined into a single contract. The traditional UAC 2012 (former 1989) model and DBFMO are two extremes on both sides of the horizontal axis and in between various types of combinations are possible. The abbreviation DBFMO stands for the different stages in a project: Design (D), Build (B), Finance (F), Maintain (M) and Operate (O). In the DBFMO contract, the design and execution along with the maintenance and exploitation and, most importantly, the financing of a building project are combined. Characteristic of DBFMO contracts is that the financing of the project to be realised is laid upon the DBFMO contractor. In exchange, the contractor will receive a periodic fee from the client during the entire term of the contract. As the contractor is not paid for the delivery of work but receives a monthly fee for the availability of the work during the term of the contract, the contractor plays a role in prefinancing the activities to perform the work. To facilitate the prefinancing of the activities, capital is attracted by issuing shares to shareholders. However, the equity providers are unable to provide funding alone and therefore, the contractor will conclude financial agreements with external financers, who will take care of the largest part of the funding. In reality, a substantial part up to 92 per cent of the investment sum is financed using debt. The term of the DBFMO contract is typically around 20 to 30 years. Once the term of the contract is ended, the contractor is obliged to hand back the project to the client in the agreed upon state. The role of the client has been pushed back in this model. The client does not steer the contractor on the base of a set of specific requirements, but limits itself by formulating the boundary conditions of the services to be produced, including the boundary conditions of the building to be realised. Therefore, the client only steers on the base of broadly formulated functional criteria (output specifications). As these criteria are specifically directed at realising a desired result and not how the contractor is to realise this result, the process is driven on output rather than input.

Added value potential
DBFMO is an important instrument for public investments to realise more quality for less money with regard to large public building projects. The main reason that DBFMO is applied by the Government Building Agency is because it is assumed to deliver added value. It is expected that Dutch DBFMO contracts can generate added value in terms of time, money and quality compared to other contract forms. DBFMO is considered not to be an end, but a means to generate added value to the taxpayer. In literature, DBFMO has been praised for its added value as compared to traditional contracts. DBFMO projects are assumed to result in better performance, lower costs, and more innovative solutions compared to the traditional way. Other value added factors mentioned by various authors in literature are: lower project costs; shorter construction times; possibility of initiating projects that might otherwise not be realized; higher overall quality of the final work and benefits resulting from allowing the private sector to be innovative in its solutions.
The F component
Specialists often recall that the success of DBFMO can be partly attributed to the special role of the F component in DBFMO. In contrast to other forms of integrated contracts that are gradually evolved over time based on the traditional UAC 2012 (1989) contract, the DBFMO standard is explicitly built on the principles of project finance. Rather different from all other forms of integrated contracts is that with DBFMO the private party rather than the public authority organises the financing of the work. As the financial component is in the heart of the DBFMO contract, a rather different contract structure appears that has its own characteristics accordingly. Besides the obvious function of the F component to fund a project in a particular manner, there seems to be more functions attached to the F. For instance, it has been suggested that the F is also used to produce strong performance incentives at the side of the contractor. Yet, even with the finance component contributing to the success of DBFMO, there is a flipside to the coin. In practice, it has been noted that the F component has its own weaknesses and that these weaknesses have increasingly led to exclusion of the F component, specifically for projects of smaller scale.

New movements in Dutch practice
Due to the difficulties around the F component, it recently appears that more attention has been paid to exploring the alternatives of bank financing. New forms of integrated contracts are gradually being developed that are funded by public resources, but are directed at producing comparable incentives as produced by the F component. In addition, practice shows that additional measures are built in DBM(O) agreements producing comparable incentives, while simultaneously avoiding the complications of private financing. While new practical experiences have shown that the F component is more often excluded from the contract and that supplementary arrangements are built in the DBMO agreement, it has been noticed that the theoretical knowledge is way behind.

The research
In view of these new practical movements, this research is aimed at a better understanding of the mechanisms underlying the role of the F component in DBFMO as well as how the role of the F component can be rebuilt in DBMO without the actual use of private financing. Moreover, as the prevailing view seems to be that DBFMO projects provide real incentives that express themselves in added value, this research will also go deeper into the question whether the same level of added value as under a DBFMO structure can be generated, once the F component is removed from the contract. Therefore, the main question of this research is formulated as: “What measures can be taken to overcome the loss of the F component out of the Dutch DBFMO building contract and; which implications does this have for the added value of a project?”

I ROLE OF THE F COMPONENT

Principles of project finance
DBFMO projects typically make use of project finance. Project finance is a technique commonly used to raise funds for major projects, such as infrastructure, power stations and other property developments. Project finance is defined by Yescombe (2014) as a method of raising long-term debt financing for major projects through ‘financial engineering’ based on lending against the cash flow generated by the project alone. Characteristic of project finance arrangements is that they make use of high levels of debt, where lenders receive no guarantees beyond the right to be paid from the cash flows originated from the project. The project is usually carried out through a special purpose vehicle (SPV), whose only business is
Another essential feature of project financing is that the financing is highly dependent on the revenues generated from the project’s operations in the form of a fee that only becomes available after the completion of the work. The contractor needs to recover its investment during the exploitation after the object is to be realised. Therefore, the revenue stream that is generated from the exploitation of the object lies at the heart of the project financing.

Due diligence & monitoring
As lenders receive little to no guarantees beyond the right to be paid from the revenue stream from the project’s operations, one can assume that lenders will have a particular interest in whether the project really works and that ultimately sufficient cash flows are generated. A SPV, unlike a corporate borrower, has no business record to serve as a base for the lending decision. Yet, lenders have to be confident that they will be repaid, especially taking account of the additional risk from the high level of debt inherent in project finance transactions. Therefore, lenders require adequate due diligence regarding the technical, financial and juridical aspects of the project and they also continue monitoring during operation.

Financing and the DBFMO Agreement
Although, a DBFMO contract structure suggests that the financing is integrated in the contract, it does not imply that the DBFMO contract actually is a financial agreement. The financing itself is further arranged by separate contracts to be concluded between the SPV and its lenders. Yet it is precisely the financing element that makes the relationship between the parties in a DBFMO contract in some respects significantly different from the relationships in other types of construction and maintenance contracts. Because the financing is directly dependent on the revenue stream to be generated by the project, the lenders will have their own vision on virtually all contract components. As the contractual arrangements are rather complex due to the involvement of lenders in the DBFMO contract, a standardized tailor made DBFMO contract is developed in the Netherlands. The standard DBFMO model covers all arrangements and provisions that stem from the integration of project financing in the DBFMO contract.

Presence of project finance in the preparation phase
Already in the preparation phase the presence of project finance can be detected. During the project development process, various external advisors are used by the contractor and the contracting authority as well as the lenders. Advisors can play a valuable role in the development of the project. The entire structure of the project must meet the project finance requirements, so the financial advisor must anticipate all issues that might occur during the lenders’ due diligence process, ensuring that they are properly addressed in the contracts. During the tender procedure, bidders are required to include the financial model in their proposal, which demonstrates how they have arrived at their final bid proposal. Immediately after the winning bid is appointed, the preferred bidder will be requested to provide a (Financial Close) bank guarantee, that can be called upon when the Financial Close is not reached in time. Once the lenders, the contractor, and the contracting authority agree that the financial model’s structure and the calculations reflect the projects and its contracts correctly, the Financial Close can be concluded.

Presence of project finance in the realisation phase
The project does not stand still after Financial Close, and lenders continue to review their exposure during the realisation of the object. As most problems that might affect the
successful completion project are likely to occur during construction, lenders are eager to ensure that no problems occur during construction that will jeopardize the repayment of their debt services. Therefore, the lenders’ technical advisor is required to provide regular information on the progress by the construction contractor, once the project construction is under way. The technical advisor also keeps monitoring the construction and provides reports about the (financial) performance on a regular base. Also, a performance bond is requested from the contractor in this phase. The performance bond protects the client against the possibility of default by the contractor in the early stages of the construction when the project is worth nothing.

**Presence of project finance in the exploitation phase**

During the exploitation phase, the financing will be fully repaid through an availability fee. The availability fee is a monthly fee for the availability of the object during the term of the contract. The contracting authority only makes the payment when the agreed performance has been delivered. The fee is reduced for any periods of non-availability, and if the services provided are not the required standard. Also, the lenders’ advisors continue to monitor and report on operating performance and maintenance. This is because lenders have a great interest in the contractor keeping up to the performance level agreed by the contracting authority. This is because poor performances may lead to penalties and discounts on the availability fee and thus, may jeopardize the repayments of the debt services. The contractor may also be requested to provide a transfer guarantee at the end of this phase. The transfer guarantee is designed to protect the client against the possibility of default by the contractor just before the expiry date. This is because just before the end of the term the largest part of the availability fee is already paid and thus, little incentives are left for the contractor to carry out the last maintenance and replacement activities.

**Three functions of the F component**

Based on the analyses of the presence of project finance in the DBFMO life cycle phases, the role of the F component in DBFMO is translated into three interconnected core functions:

- **Financial means** Project finance in DBFMO implicates that one overall budget is used for the entire project. The combination of one single budget, the interchangeability of CAPEX and OPEX funds and broadly formulated output specifications together make that there is a considerable amount of freedom for the contractor to decide how to allocate the budget among construction and exploitation activities. By providing scope to the contractor to allocate the budget wisely and use his own ingenuity, the F component becomes a treasured instrument to finance projects.

- **Securities for the client** The securities for the client are closely related to the active involvement of lenders in the project’s operations. This is because the interests of the client and the lenders in a DBFMO project are to a certain extent equated. Not only the lenders, but also the client will benefit from the due diligence and monitoring activities performed by the lenders’ advisors. These activities, along with one fixed overall budget, the issued bank guarantees, risk transfer and typical project finance structure, provide strong guarantees towards the client as regards the proper functioning of the object.

- **Incentives for the contractor** The availability fee connects the contractor’s performance to the payment made by the client. The payment mechanism in DBFMO projects offers room for penalties and discounts in case of non-performance or non-availability. Therefore, the client is allowed to pay a discounted fee in case of non-compliance. In view of that, it can be said that the payment mechanism works as a financial incentive for the contractor to do what is agreed upon in the contracts.
This set of functions is used as an underpinning for the empirical research to explore how these functions are fulfilled in DBMO projects that do not make use of project finance.

II SUBSTITUTES IN DBMO PRACTICE

The DBMO contract structure
The DBMO structure is relatively new in the Netherlands and therefore, there has been little experience with this type of contract structure yet. The abbreviation DBMO stands for Design, Build, Maintain and Operate. Under a DBMO contract, the DBMO contractor is not only responsible for the design and construction as is the case with Design & Build contracts, but also takes the responsibility for the maintenance (M) and the operation (O) after the object is realized. Unlike DBFMOs that have their own standard contract, DBMOs do not possess their own tailor-made contract. Usually a set of general terms and conditions applies to DBMO projects called the UAC-GC 2005 conditions. However, it is not by definition that the UAC-GC conditions are to be used; other contract forms are also applicable. Under the UAC-GC 2005 conditions, the contractor is assumed to be responsible for the entire design, execution and operation process, whereas the client is obliged to pay the contractor such an amount as stated in the contract. Yet, the UAC-GC conditions are also applicable to Design & Build and DBM structures and so, these conditions are not explicitly designed for DBMO projects. As the UAC-GC conditions provide ample scope for additional measures, it has been noticed that extra arrangements are often settled in the DBMO contract.

Fulfilling the function as financial means
Two DBMO cases were selected for the case study research to analyse how the role of the F was fulfilled in DBMO. Typically of DBFMO projects is that there is only one single budget for CAPEX and OPEX. Due to the fact there is only one budget, there is a considerable amount of freedom to decide how to divide the budget among construction and exploitation activities. This is called interchangeability of budgets. Interchangeability implies that the budget for construction and the budget for maintenance and services are convertible. This means that there are no separate budgets for construction and exploitation. The interchangeability of budgets has advantages over the use of separate budgets. This is because the candidates in the tender are forced to take account of all costs accruing throughout the entire term of the contract, when proposing a bid. As a result of the integrated approach, life cycle optimisations may occur. Both DBMO cases (the Integral Child Centre Zeeburgereiland and the Community School Joure) had separated budgets for CAPEX and OPEX. The separation of budgets was due to the fact that the cash flows for realisation, maintenance and operation of school related projects in the Netherlands stem from different sources. As a result, there was hardly any interchangeability of budgets in the Community School Joure project, as well as the Integral Child Centre Zeeburgereiland project.

Fulfilling the function as security for the client
Just as in DBFMO projects, the risks are mainly transferred to the private sector in both DBMO cases. Characteristic of both cases is that the risk of cost overruns rests with the contractor. The client makes a certain budget available and the contractor is responsible for realising the project within that budget. No official due diligence is performed in both DBMO cases. Yet, there are some practices that have to a very limited extent similar effects as due diligence carried out by lenders’ advisors in DBFMO projects. Since there are no financers involved in DBMO, there are no monitoring activities by advisors of lenders either. In both cases, the contractor has to perform quality tests on behalf of the client and submit them to the client.
for acknowledgement. In this respect, the system of output specifications combined with the performance measurement system is the same as in DBFMO. As to the issued guarantees, both cases use bank guarantees to protect the client against default by the contractor. In the Integral Child Centre Zeeburgereiland, the conversion of a bank guarantee into a concern guarantee during exploitation is an efficient way to reduce costs at the side of the consortium. In the Community School Joure project, the withholding of payments is a powerful instrument to provide securities towards the client.

**Fulfilling the function as incentive for the contractor**

In both the Integral Child Centre Zeeburgereiland and the Community School Joure, the capital expenditures are paid in instalments according to the payment schedule drawn up by the contractor. For the Integral Child Centre Zeeburgereiland, the disbursements are based on real expenses for DBM in accordance with the payment schedule. The Community School Joure project also makes use of deferred payments to stimulate the contractor to perform well during exploitation. The deferred payments are then spread out over the exploitation phase. For operational expenses, both consortia receive an availability fee over the term of the contract. However, these cases only use the availability fee to cover the OPEX. As the fee only covers the operational expenses, the availability fee in the DBMO cases is much smaller than the availability fee generally used in DBFMO projects. As the size of the availability fee gives the opportunity to impose penalties, a smaller fee simultaneously implies that the threat of penalties will be less severe in the two DBMO cases. In view of that, it can be assumed that the performance incentives provoked by the penalty system in DBMO are less powerful compared to those in DBFMO.

**Measures proposed**

Based on the analysis of the two DBMO cases, nine measures are proposed to overcome the absence of the F component in DBMO projects. The first measure is to bring budgets closer together (1). A common problem with DBMO projects is that the budgets for CAPEX and OPEX originate from different sources. In order to enable interchangeability of budgets, the government should appoint one single institution that is allowed to make small changes in the CAPEX and OPEX budgets. Second, as the exploitation phase typically takes twenty to thirty years, non-compliance with the performance requirements can have major consequences. In order to make sure that the client gets what he wants, important elements of the building can be prescribed rather than formulated in outline (2). As there is no monitoring on behalf of lenders in DBMO projects, the client should fulfill this function himself or appoint an external party. Therefore, it is recommended that the client should conduct tests during the design process and on the date of completion (3). In DBMO a fixed availability fee typically poses a risk on the client. This is because under a fixed annual availability fee the replacement investments are paid well in advance. This risk can be reduced by demanding that payments are made after the actual work has been carried out (4). The fifth measure, contributing to the security level of the client, is the issuance of bank guarantees and/or concern guarantees (5). Sixth, by withholding payments and requesting equity (6) of the contractor financial incentives are created for the contractor to deliver the building in the adequate condition and to ensure availability. Seven, imposing a system of penalties and bonuses (7) will motivate the contractor to perform well. Eight, by connecting multiple projects with the same concept to one single tender, savings can be made in tender costs. Moreover, as there is only one tender procedure for multiple projects (8), the candidates in the tender will be encouraged to submit their very best offer, as winning the tender implies jobs and income over the longer term. And last, the fulfilment of contractually agreed upon performance can be legally enforced by establishing an uniform DBMO standard agreement (9).
III IMPLICATIONS ON ADDED VALUE

Added value in Dutch construction
As the F component is not only a financial means but simultaneously a security towards the client as well as an incentive for the contractor to perform well, one might infer that the integration of the F component adds value to a project. Added value is an expression frequently used in multiple disciplines across the economy. In this thesis, added value in the broadest sense is defined as the net effect of adding features to a basic line or model from which the performance of actions increases the total value of the goods of services produced, taking into account the various value perceptions of the stakeholders involved. However, the Government Building Agency uses the term added value to express difference between the traditional contract model and the bid by the private consortium.

Criteria selected
Technically, the effects that ultimately result in added value can be measured by means of a set of criteria. There are many different criteria available to assess the effects that result in added value. Since the Government Building Agency believes that DBFMO can generate added value in terms of cost, time and quality compared to other contract forms, this thesis uses the cost time quality tripartite division as an underpinning for the selection of the added value criteria. On the basis of the cost time quality tripartite division, twelve criteria have been selected that in a way are related to F component in DBFMO. The twelve criteria are then used to assess the effects of two real-life DBFMO and two DBMO cases in order to find what the implications for the level of added value are if the F component were to be removed.

Effects on cost criteria
By comparing the effects of the DBFMO cases with the DBMO cases, it has been found that DBFMO projects have significantly higher transaction cost (1) than DBMO projects. As regards the cost of funding (2), the weighed cost of capital (WACC) of both DBFMO cases was higher than the interest rate, whereupon the municipality borrows, in the DBMO cases. The case studies also revealed that more life cycle optimisations with respect to the realisation and exploitation cost (3) occurred in DBFMO cases. With respect to price certainty (4), the DBFMO as well as the DBMO cases scored high on price certainty. The experts indicated that there were no budget overruns with respect to the cases selected.

Effects on time criteria
As regards the lead time preparation (5), the case study comparison shows that it is hard to compare the lead times of the preparation. This is particularly because there are other factors involved that influence the preparation as well. For instance, political concerns in the Community School Joure project had slowed down the preparation of the project considerably. But also complexity and level of detail of the output specifications affect the lead time of the tender. As regards construction time (6), the majority of the interviewees indicated that the lead time of the construction was shorter in both DBFMO and DBMO cases than if the project had been procured using the traditional model. Also, all interviewees said that time overruns (7) hardly occur in DBFMO and DBMO. However, the case study proves that small time overruns are still possible under DBMO and therefore, it is assumed that the probability of time overruns is slightly higher under DBMO as compared to DBFMO.

Effects on quality criteria
For the quality of the object (8) as well as for the quality of the process (9), both DBFMO and DBMO cases scored high. This is different to the service quality (10), which actually scored
As regards innovative solutions, a distinction can be made between technological innovations and process innovations. Technological innovations can, in turn, be split up into unproven and proven innovations. The interviewees declare that unproven technological innovations hardly occur in the DBFMO and DBMO cases, whereas proven technological innovations do occur. As to process innovations, DBFMO as well as DBMO are praised for the level of process innovations introduced. One of the interviewees even calls these innovations smart thinking innovations, whereas another one talks about creativity in the process. However, innovative thinking (11) is also highly dependent on the award criteria.

As regards the flexibility of the contract (12), the opinions of the interviewees varied widely and so, it was not possible to draw conclusions on the sole basis of the case study research.

Implications of excluding the F

Based on the analysis, there are five implications of excluding the F component found.

- **Transaction cost savings** The research shows that DBFMO projects have higher transaction costs as compared to DBMO projects. Transaction costs rise when lenders get involved in the project. By leaving the F component out of the building contract, significant savings can be made in transaction costs.

- **Financial cost savings** Project finance rates are higher than interest rates on government debt. This is because under project financing the risks are explicitly accounted for in the price of capital, while this is not the case under public financing. It is in this respect that the higher financial costs under DBFMO reflect a reward for the private sector carrying those risks. The cost of capital is also higher in DBFMO because project financing is on a non or limited recourse basis, which implies that lenders are only entitled to repayment from the cash flows originating from the project and not from other assets of the borrower. As a result, a risk premium is required enhancing the cost of capital.

- **Loss of life cycle optimisations** The research shows that more life cycle optimisations are induced in DBFMO projects than in DBMO projects. There are several reasons why more life cycle optimisations are induced under DBFMO contracting. First, it seems that more life cycle optimisations are induced if the contractor is free to spend the budget between CAPEX and OPEX. Given that DBMO projects often have separate budgets whereas DBFMO projects apply one budget, it is expected that the use of one budget positively affects the scale of the life cycle optimisations induced. Furthermore, it is discovered that the extent to which life cycle optimizations are induced also depends on the proficiency of the contractor, the competition in the market, and the nature of the award criteria.

- **Increased probability of time overruns** Although time overruns hardly occur under both DBFMO and DBMO contracting, the research shows that the probability of time overruns is still slightly higher under DBMO. This is because the incentives to deliver the project on time are less stringent under DBMO contracting. Since the availability fee is larger in DBFMO projects, the threat deriving from the penalty system is assumed to be more severe under DBFMO.

- **Improved service quality** The case studies demonstrate that the level of service quality is higher under DBMO than under DBFMO. There is a reasonable explanation why the service level scores lower under DBFMO. This has to do with the presence of lenders in the project’s operations. As the primary focus of lenders is to recover their loan, it seems logical to understand that lenders make sure that the required service quality is met, but also no more than that. This is in contrast to DBMO projects, where the contractor himself decides whether he will exceed the quality level stated in the minimum requirements or not. A DBMO contractor might decide to provide a higher service level, for instance to show his capability to the outside world, hoping to get subsequent projects.
Public Private Partnerships

Public private partnership (PPP) projects have received increasing attention over the last decade. Much is being claimed in the public debate as to the inherent benefits of PPP (Grimsey & Lewis, 2005; Leiringer, 2006). PPP is a term that is frequently used in practice to refer to different construction projects albeit no clear definition exists. According to the HM Treasury (2000), PPP in the simplest sense of the word can be seen as a type of arrangement that brings public and private sector together in a long-term partnership for mutual benefit. However, a definition alike, leaves much room for interpretation. Particularly, the notion ‘mutual benefits’ is highly contentious and the term partnership is rather ambiguous. Proponents of these kinds of arrangements often predicate their arguments on the belief that both sectors have an unique set of characteristics and skills providing them with leads in undertaking certain tasks and that blending these skills would therefore be advantageous (Leiringer, 2006).

Leiringer (2006) notices that ensuing the wide definition given to partnerships, the diversity and multitude of project arrangements that are ascribed as PPPs are immense. This statement corresponds with the findings of Kappeler and Nemoz (2010). While the term PPP has been in use since the 1990s, they found that there is no single European model of a PPP. The European PPP Report (2009) states that “the range of structures used for PPPs varies widely: in some countries, the concept of a PPP equates only to a concession, where the services provided under the concession are paid for by the public. In others, PPPs can include every type of outsourcing and joint venture between the public and private sectors” (DLA PIPER, 2009). Since PPP covers so many different models and collaboration forms, the term PPP has slowly been transformed into an ‘umbrella term’ for various types of projects (Välilä, 2005). According to Grimsey and Lewis (2005) depending on the country concerned, the term can cover a range of transactions where the private sector is given the right to operate a service that traditionally is the responsibility of the public sector alone. This so-called right is given for an extended period, ranging from relatively short term management contracts through concession contracts, to joint ventures where there is a sharing of ownership between the private and public sector (Grimsey & Lewis, 2005). Therefore, PPPs can fill up the space between traditionally procured government projects and full privatisation.

PPP in the Dutch building sector

In the Netherlands, PPPs are often linked to chain integration. According to the Dutch Government Building Agency (2009), chain integration is needed in Dutch construction as it is aimed at achieving synergy between the cooperating parties with the intention of facilitating a better project at lower cost. There are various ways possible to combine different activities within succeeding phases of the construction and facility management process. The Dutch
Government Building Agency (2009) believes that by incorporating design, build, finance, maintain and/or operate into a single contract, the different parties involved are forced to collaborate from the early start of the process. The agency assumes that by doing so, private parties are given the opportunity to come with innovative ideas and at the same time it will put an end to self-interest by stimulating parties to do the best they can for the common purpose of the project. The last decennia, numerous new variants of integrated contracts have been developed, where not only design and build but also other stages of the building life cycle are combined into a single contract. The traditional UAC 2012 (former 1989) model and DBFMO are two extremes on both sides of the horizontal axis and in between various types of combinations are possible, such as Design & Build (DB); Design, Build & Maintain and; Design Build, Maintain & Operate (DBMO).

**DBFMO and its added value**
The DBFMO contract is the most advanced integrated contract in Dutch construction. The abbreviation DBFMO stands for the different stages in a project: Design, Build, Finance, Maintain and Operate. A DBFMO contract covers all stages of a project through a single contract with a single procuring authority. The Government Building Agency (2009) sees DBFMO as an important instrument for public investments to realise more quality for less money with regard to large public building projects. “The main reason that DBFMO is applied by the Government Building Agency is because it delivers added value” (Government Building Agency, 2009, p. 14). The added value argument is also supported by the Ministry of Finance. According to the Ministry of Finance (2012), DBFMO is not an end, but a means to generate added value to the taxpayer. In the progress report of the Ministry of Finance (2012), it is explicitly stated that DBFMO can deliver added value compared to other contract forms in terms of time, cost and quality. The Dutch Court of Audit alludes to the financial added value potential of DBFMO, by saying: “An integrated DBFMO contract has advantages over the conclusion of separate contracts for each stage of a project. One of the advantages is financial added value (Netherlands Court of Audit, 2013, p. 5)”.

In literature, DBFMO has been praised for its added value as compared to traditional contracts. Straub, Prins, and Hansen (2012) note that integrated building contacts in the Netherlands are assumed to result in better performance, lower costs, and more innovative solutions compared to the traditional way. Grimsey and Lewis (2005) allude to the term value for money with respect to added value of DBFMO. Other authors refer to value added factors such as: lower project costs; shorter construction times; possibility of initiating projects that might otherwise not be realized; competitive advantage; higher overall quality of the final work and benefits resulting from allowing the private sector to be innovative in its solutions (Bing, Akintoye, Edwards, & Hardcastle, 2005; Grimsey & Lewis, 2005).

In the Netherlands, the Ministry of Finance has been encouraging the use of DBFMO since 1998. Up until the end of 2012, thirty DBFMO projects were undertaken in the Netherlands; six buildings projects and twenty-four infrastructural projects. The total value of these DBFMO contracts exceeded 6 billion euros and the financial added value was estimated around 800 million euros (Ministry of Finance, 2012). Based on these figures, the Ministry of Finance expects that DBFMO projects will generate approximately 10 to 15 per cent more value as compared to the traditional way of procurement. The number of proposed DBFMO building projects are growing rapidly over the years. Approximately 20 projects are currently in the tendering or preparation phase (PPS Netwerk, 2013). Practice shows that DBFMO has mainly been used for large scale projects. However, it appears that today more and more often
local authorities and regional organisations are interested in the application of DBFMO for schools, hospitals and other local utility projects as well (PPS Netwerk, 2013).

**The role of the F component**

In academic circles the success of DBFMO is to a large extent credited to the special role of the F component in DBFMO (Engel, Fischer, & Galetovic, 2010; Straub et al., 2012). Rather different from all other forms of integrated contracts is that with DBFMO the private party rather than the public authority organises the financing of the work. Practice shows that the private party usually does not have sufficient liquidity in house at the beginning to pre-finance the initial investment and hence, the private party has to rely on the lending facilities of financial institutions and banks. The mobilisation of private finance to fund public projects was originally inspired by the Private Finance Initiative (PFI) that began life in the UK in the early 1990s. Much of the motivation for the PFI in the UK arose from concerns regarding the ability of the public sector to provide an adequate level of project investments from a financial perspective (Grout, 1997). In the Netherlands, the DBFMO standard has also been established on financial grounds. In an interview, Meesters (2014) mentions that in contrast to other forms of integrated contracts that are gradually evolved over time based on the traditional UAC 2012 (1989) contract, the DBFMO standard is explicitly built on the principles of project finance. As the financial component is in the heart of the DBFMO contract, a rather different contract structure appears that has its own characteristics accordingly. Besides the obvious function of the F component to fund a project in a particular manner, there seems to be a second function derived from practice. It has been suggested that the private finance component (F) is used to produce strong performance incentives at the side of the contractor (Grout, 1997; Leiringer, 2006). Accordingly, it is assumed that a kind of incentive regime is created. This so-called incentive regime is intended to make sure that the contractor is actually doing what he promised and that the client receives what he asked for. Perhaps this second function is a coincidence of the model, but it is a recurrent phenomenon both in literature and practice.

Various sources in literature point to the presence of an incentive mechanism that is supposed to be brought into force by the mobilisation of private finance. The Dutch Court of Audit (2013) refers to the incentives present in DBFMO. “An integrated DBFMO contract is an incentive for private parties to anticipate technical practicability and the consequences of management and maintenance in the design” (p. 3). Moreover, the Dutch Court of Audit (2013) stresses the importance of the presence of the incentives in the DBFMO contract. “We think the government should strictly adhere to the principles of DBFMO and ensure that appropriate financial incentives are in place throughout the term of the contract” (Netherlands Court of Audit, 2013, p. 26). Leiringer (2006) refers to the report of the Statskontoret, Stockholm (1998) in which the dominant view appears to be that these kind of projects provide real incentives and create business environments that encourage innovation and improved practices in the construction phase. Also, in the DBFMO progress report of 2012 allusions has been made towards the alleged disciplinary effect of private financing. In this respect, the Ministry of Finance (2012) alludes to the special role of the financiers in DBFMO and claims that the private financer acts as a watchdog to control the performance of the contractor.

**Drawbacks of the F**

However, despite the supposition that the private finance component produces strong performance incentives that express themselves in added value and the use of the F to raise money, there is the other side of the coin. In practice, it has been noted that the F...
component has its own drawbacks. It is assumed that the preparation of the DBFMO contract involves high costs. A term often mentioned in relation to these costs is the term ‘transaction costs’. In literature, several sources confirm that transaction costs are high for DBFMO (Janssen, Orobio de Castro, & De Groot, 2010). Väiliä (2005) mentions that “PPPs are prone to higher transaction costs than traditional public procurement” (p. 109). Moreover, he acknowledges that the size of the transaction cost might cause problems for the involved public and private parties, by saying: “Indeed, the high transaction costs are perhaps the worst, and least studied, drawback of PPPs. The need to find the right private sector partner, and to negotiate, monitor and renegotiate a long-term contract giving him the right incentives to strive for service quality while containing costs makes a PPP dearer to set up and follow up than in-house public sector service production and provision” (Väiliä, 2005, p. 115).

In the PPP-annex of MediaPlanet (2012) by Het Financieel Dagblad, Deiman even claims that the transaction costs can be of such a magnitude that smaller companies are hardly able to join the PPP market. Moreover, he argues that these ‘unreasonable costs’ are already made in the early phases of the tender well before anything has been built, and therefore, they may impede fair competition (Schonewille, 2012).

In academic circles it has been claimed that particularly for projects of smaller scope, the costs of private financing do not outweigh the benefits (Grimsey & Lewis, 2005). Moreover, it is assumed that the size of the transaction costs has increasingly led to exclusion of the F component in practice. The impression is given that DBFMO is only applicable to projects of a large scale. Most of the works that are procured today as DBFMO have, indeed, net present values of at least 40 to 50 million euros (PPS Netwerk, 2013). Also, the literature suggests that DBFMO is only feasible for large scale projects (Heiligers, 2012). Aalbers (2013) believes that due to the magnitude of the transaction costs there must be a kind of tipping point in project size, from which it becomes feasible to select private finance over public financing alternatives and therefore, he assumes that it is not often a free choice between public and private finance structures. Moreover, as the mobilisation of private finance explicitly relies on the situation of the financial market, from time to time it may become problematic to attract sufficient private financiers and convince them to invest in the project. Especially, in the current depressed financial situation it has become more difficult for private parties to attract bank funding. Interest rates has been growing over the last couple of years due to the increased risk premiums, whilst simultaneously the term of the bank loans were shortened. According to the progress report of the Ministry of Finance (2012), banks are less and less willing to provide bank loans for terms as long as thirty years. These issues together make the F component a less interesting option.

**Alternatives for project finance**

Due to the difficulties of high transaction costs involved and the mobilisation of private financing, it recently appears that more attention has been paid to exploring the alternatives of bank financing. The DBFM(O) progress report of 2012 clearly stated that alternative sources of funding, such as institutional investors and alternative capital structures, may also have potential for the government to create value for money for their taxpayers. Also at the firm level, there are signs that more emphasis has been put on alternative ways of financing large public projects. At Brink Groep, a Dutch management and consulting firm that focusses on construction, real estate and housing, it has been noticed that the F component has increasingly been held outside the contract. “New forms of integrated contracts are currently being developed that are funded by public resources, but are directed at producing comparable incentives as produced by the F component” (Aalbers, 2013). In practice it
appears that more often additional measures are built in DBM(O) agreements producing comparable incentives, while simultaneously avoiding the complications of private financing. For example, the project ‘New Schools’ procured by Amsterdam City District East in 2012 is a pilot study that was designed in a way to replicate the same incentives as with private finance, while leaving the F component behind. Similar movements have been seen with Brede School Joure Zuid (2012, DBMO), Westluidense Poort Tiel (2013, DBMO) and; Kunstijsbaan Twente (2008, DBMO). While new practical experiences have shown that the F component is more often excluded from the contract and that supplementary arrangements are built in the DBMO agreement, it has been noticed that the theoretical knowledge is way behind. Since these practices are recently discovered, next to nothing has been written about how the role of the F component is replaced in DBMO projects. It also remains disputed whether the same level of added value can be generated without the presence of the F component in the building contract. Clearly there is a gap in knowledge concerning these issues.

The F component in Dutch DBFMO building projects is the object of this study. Yet, until fairly recently, comparatively little work has been conducted within the field of private financing in DBFMO. It is particularly difficult to find research that has been undertaken regarding the role of the F component. Furthermore, since it is found that due to complications concerning the F component, the F is increasingly left out of the building contract, the goal of this study is to find ways to overcome the loss of the F component. In view of that, this research aims at a better understanding of the mechanisms underlying the role of the F component in DBFMO as well as how the role of the F component can be rebuilt in DBMO without the actual use of private financing. Moreover, as the prevailing view seems to be that DBFMO projects provide real incentives that express themselves in added value, this research will also go deeper into the question whether the same level of added value as under a DBFMO structure can be generated, once the F component is removed from the contract.
In this section, an outline is provided of the research design. The chapter starts with the exploration of the problem, which is the subject of this study. The research objective and the problem questions will follow from the problem analysis. Subsequently, the definitions, scope and research object will be discussed. The research methodology can be found in section 2.4 and will provide a detailed description of the research approach and data collection. This chapter ends with the outline of the thesis.

2.1 Research problem

At the heart of the research, is the research problem. According to the online dictionary of the USC Libraries, a research problem can be defined as: “a statement about an area of concern, a condition to be improved, a difficulty to be eliminated, or a troubling question that exists in scholarly literature, in theory, or in practice that points to the need for meaningful understanding and deliberate investigation” (USC Libraries, 2014). Below the research problem of this thesis is outlined and summarised.

2.1.1 Problem definition

The Government Building Agency sees DBFMO as an important instrument for public investments to realise more quality for less money with regard to large public building projects (Government Building Agency, 2009). The Dutch Court of Audit (2013) pronounces that: “in principle, the government will opt for a DBFMO contract if it can generate financial added value” (p. 6). Studies by the Ministry of Finance (2012) have shown that DBFM(O) projects produce 10% to 15% more value as compared to traditional projects. In academia, DBFMO has been acknowledged for its added value potential (Bing et al., 2005; Grout, 1997). In the literature, it has frequently been cited that the integrated way of contracting results in better value for the project in terms of time, money and quality (Straub et al., 2012). Specialists often recall that the success of DBFMO can be partly attributed to the special role of the F component in DBFMO (Grimsey & Lewis, 2005). It has been suggested that the private finance component (F) produces strong performance incentives that express themselves in added value (Grout, 1997; Leiringer, 2006). Moreover, it is assumed that due to the presence of the F component a kind of incentive regime is placed down with the contractor. This so-called incentive regime is designed to make sure that the contractor is actually doing what he promised to the client and that the client receives its actual value.

However, even with the finance component producing strong performance incentives resulting in added value and the use of the F to raise money, there is a flipside to the coin. In
practice, it has been noted that the F component has its own weaknesses. Scholars have claimed that particularly for projects of smaller scope, the costs of private financing do not outweigh the benefits (Favié, Beelen, & Maas, 2009; Grimsey & Lewis, 2005). In view of that, it has been noted that the drawbacks of DBFMO have increasingly led to exclusion of the F component, specifically for projects of smaller scale.

2.1.2  **Summary of the problem statement**
As can be seen, the research problem involves a dilemma. It is supposed that a DBFMO contract structure delivers added value and that this added value is partly driven by the special role of the F component. However, in practice it has been noted that the F component has weaknesses and that these weaknesses, in turn, call for exclusion of the F component particularly for projects of smaller scale.

There are two opposing ways to deal with this problem. The choice between the two ways is whether to include the F component and find solutions to eliminate the weaknesses of the F component or to exclude the F component and find solutions to retain the same incentives and added value as with the F component. Heiligers (2012) already did research using the first method by investigating the size of the costs of DBFMO and exploring innovative solutions to reduce the size. Other researchers, as Favié et al. (2009), examined how transaction costs arise and how in theory transaction costs can be reduced. As the former approach has already been investigated by various researchers, the latter is a relatively new field to explore. Therefore, the latter method will be subject of this research.

2.1.3  **Gap in knowledge**
While various studies are directed at the magnitude of the (transaction) costs of DBFMO projects (Favié et al., 2009; Heiligers, 2012; Ruding, 2008), hardly any empirical data is available on the special role of the private finance component in DBFMO and its effects. In particular, it is difficult to find research that has been focussed on the alleged incentive mechanism induced by the private finance component. While the Ministry of Finance has been encouraging the use of DBFMO since the 90s, recently procured projects as the pilot study ‘New Schools’ procured by Amsterdam City District East and the House of Province of Gelderland show that in practice the F component has increasingly been left out and that additional measures are currently built in the DBMO agreement to evoke comparable incentives as when the F component is present. As these experiences demonstrate a new development in the Dutch construction industry, it has been noticed that the theoretical knowledge is way behind. Similarly, little to none has been written about whether the exclusion of the F component has implications for the level of added value. Clearly there is a gap in knowledge concerning these matters.

2.2  **Research objectives and research questions**
This research will provide a theoretical contribution to the scientific field of financing in Dutch building contracts. Given the central role of finance within DBFMO projects, it seems particularly interesting to obtain a deeper understanding of the mechanisms underlying the role of the F component in DBFMO. Since there is hardly any empirical data on the role of the private finance component in DBFMO available today, it will be a valuable contribution to the existing body of knowledge to investigate this topic. Furthermore, since it is found that due to complications concerning the F component, the F is increasingly left out of the building contract, the goal of this study is to find innovative ways to overcome the loss of the F component. In view of that, this research aims at a better understanding of the role of the F component in DBFMO as well as how this role can be fulfilled without the actual use of
private financing in DBMO. Therefore, this research will provide insights into what measures can be taken under DBMO agreements to overcome the loss of the F component out of the Dutch building contract. Moreover, since the prevailing view seems to be that DBFMO projects provide real incentives that express themselves in added value, this research will also go deeper into the question whether the same level of added value as under a DBFMO structure can be generated, once the F component is removed from the contract.

Therefore, the goal of this research is summarised as follows:

“To contribute to the theoretical knowledge of financing in Dutch building projects by providing insights into the mechanisms underlying the role of private financing in DBFMO and; exploring ways to fulfil this role without the actual use of private finance in DBMO projects.”

To be able to fulfil the research objective, it is essential to precisely formulate the research question. This question will be at the core of the conducted research and will be answered by means of the research. The main question will be supported by sub questions, to solidify the answer.

The main question will be formulated as follows1:

“What measures can be taken to overcome the loss of the F component out of the Dutch DBFMO building contract and; which implications does this have for the added value of a project?”

The sub questions that will be supportive in answering the main question are:

1. What is DBFMO?
2. What is added value?
3. What is the role of the F component in DBFMO?
4. What are the effects of excluding the F component?
5. How can the role of the F component be substituted in DBMO?
6. What are the implications of excluding the F component for the added value of a project?

2.3 Definitions, scope and boundaries

Stating definitions of the key concepts used in the problem statement, the research goal and the research question will help to delineate and structure the research project. This will be done for the key concepts: DBFMO; F component and; added value. Furthermore, the scope and boundaries of the research will be defined.

For the purpose of this research project DBFMO is understood as: “a form of public-private partnership in which the various stages of a project are outsourced to a single consortium of private parties by means of an integrated contract (Netherlands Court of Audit, 2013, p. 2). According the National Court of Audit (2013), DBFMO contracts usually have a long term of about 15 to 30 years, whereby the risks of the project are optimal allocated between the public and the private sector and are borne by the party that can best manage them. Another element that is inseparably linked to DBFMO is that the private consortium is

1 Dutch translation: “Op welke wijze kan het wegvallen van de F component bij DBFMO projecten ondervangen worden en welk effect heeft dit op de meerwaarde?”
responsible for project financing. Grimsey and Lewis (2005) say: “The private sector partner is paid for the delivery of the services to specified levels and must provide all the managerial, financial and technical resources needed to achieve the required standards” (p. 346). In this phrase, Grimsey and Lewis suggest that the private sector partner is assigned to provide all financial resources. This latter element is denoted by the character F in DBFMO. The character F is explicitly stated in the DBFM(O) progress report of the Ministry of Finance: “The consortium carrying out the DBFMO project is funded by private money (the F), partly equity and partly debt!” (2012, p. 8). As to this research, the F component is understood as the provision of financing by the private sector partner. The term added value is used in multiple disciplines across the economy. The online Cambridge dictionary describes added value in the broadest sense of the word as: “an improvement or addition to something that makes it worth more” (Online Cambridge Dictionary, 2014). In Dutch construction the term added value is often used to refer to synergy benefits (Government Building Agency, 2009). The Government Building Agency (2009) defines added value as: “constructing the same building, as under traditional procurement, at lower costs or realising a better building at same costs” (p. 13). With respect to this definition, the Government Building Agency believes that a combination of both is also qualified as added value. The three concepts will be further elaborated on in chapter 3.

The scope of a project can be described as “the extent of the area or subject matter that something deals with or to which it is relevant” (Oxford University Press, 2013). Asserting the scope involves setting boundaries to a project. It shows where the focus is on and what will be left out of the project. Setting all project boundaries together will give insights into the domain of the research. Since different countries have different procedures and legal setups, it is decided to delimit the research to the geographical boundaries of the Netherlands. Regardless of the fact that PPPs are applied to both infrastructure and public building projects, the research will solely focus on public building projects. Moreover, this research will explore the mechanisms underlining the role of the F component by exclusively concentrating on DBFMO and DBMO contract structures. This implies that other forms of integrated contracts, such as DB and DBM, are just beyond the scope of the research. The last boundary is related to the actuality of the studied objects. In order to contribute to the state-of-the-art knowledge, only the most recent projects are subject to this research.

The research will be conducted within the following boundaries:

- The geographical boundaries of the project are the Netherlands
- The research is focussed on public building projects. Infrastructural projects are excluded from this research.
- The research will only be concentrated on DBFMO and DBMO projects
- The cases selected for this research range between projects that were delivered five years ago up until projects that are still in the realisation phase.

Figure 1 Research boundaries
2.4 Research methodology

This paragraph will elaborate on how the research will be conducted. First, the research approach will be introduced, which will demonstrate how the various theories will be used within the research. Then, the data collection will be discussed.

2.4.1 Research approach

Typically, the nature of the research is directly linked to the research objective, the research questions and prerequisites such as time, money and available support (Christiaans, Fraaij, Graaff, & Hendriks, 2004). “Research can be considered to be a ‘voyage of discovery’, whether anything is discovered or not” (Fellows & Liu, 2003, p. 4). There are various ways possible to conduct research. Though, the outcome of the research generally depends on the selected techniques, searching methods, and the analyses carried out (Fellows & Liu, 2003). This research will make use of a qualitative approach. Qualitative approaches seek to gain insights and to understand people’s perception of the world (Fellows & Liu, 2003, p. 28). “The object is to gain understanding and collect information such that theories will emerge” (Fellows & Liu, 2003, p. 10). Although qualitative research can take various forms, they typically have a number of important features in common (Groat & Wang, 2002). N. K. Denzin and Lincoln (2008) provide the following ‘generic’ definition: “Qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. Qualitative research involves studied use and collection of a variety of empirical materials” (N. K. Denzin & Lincoln, 2008, p. 3).

As to the type of qualitative research, this thesis will contain elements of descriptive, exploratory and explanatory research respectively. Descriptive research is carried out to systematically identify and record all the elements of a phenomenon, process or system (Fellows & Liu, 2003). The phenomenon that is subject to this research is the role of the F component in Dutch DBFMO building projects. After the descriptive research is carried out, exploratory research will be conducted to test and/or explore the aspects of theory. Based on the findings of the descriptive research, the exploratory research will focus on real-life situations through case study work. Explanatory research is applied at the end to answer a particular question or explain a specific issue or phenomenon. It is a follow-on from exploratory research and it is carried out to discovery causations and explanations. By matching the results of case study work (exploratory research) with the existing literature (descriptive research), the main question can be answered.

![Figure 2 Research approach](image)

The steps of this research are shown in Figure 2. To be able to formulate the research problem, some qualitative research is conducted first during the exploratory phase. In this phase, the research objectives, the research questions and the research methodology are also designed. After the exploratory phase, literature study is conducted to provide inputs for a conceptual framework. Subsequently, data will be collected by means of case study work.
and expert interviews to be able to explore the aspects of theory. The following step is to analyse the empirical findings from the case studies and compare them with the theoretical findings. The last step is to draw conclusions, introduce a discussion and provide recommendations.

2.4.2 Data collection

Theories and literature
An essential early stage of virtually all research is to search for and to examine potentially relevant theories and literature. Groat and Wang (2002) state that theory in general sense is directly related to research methodology. They say: “Theory in general seeks to describe, explain, and predict. Research methodologies, on the other hand, may be viewed as prescribed ways to test those descriptions, explanations, or predictions” (Groat & Wang, 2002, p. 74). Literature is defined by Groat and Wang (2002) as “a body of information, existing in a wide variety of stored formats, that has conceptual relevance for a particular topic of inquiry” (p. 46). In this respect, literature review is the totality of activities the researcher undertakes to use the existing body of information in such a way that a topic of inquiry can be completely defined and addressed. In view of that, it can be said that literature and theories are the results of previous research projects. In Research Methods for Construction, Fellows and Liu (2003) point towards the relationship between the terms theory and literature. According the them, theories are the established principles and laws, whereas literature concerns findings from research which have not attained the status of theory, yet it often represents the findings from research into particular applications of theory (Fellows & Liu, 2003, pp. 61-62). Together, theories and literature review provide the theoretical framework for the research project.

Case studies
Case studies encourage in-depth investigation of particular instances within the research subject. In a case study the case is the particular occurrence of the topic of research. The nature of the in-depth data collection may limit the number of cases selected, when research is subject to resource constraints (Fellows & Liu, 2003). Often, case studies make use of a variety of data collection techniques. For this research, two DBFMO and two DBMO cases are investigated by means of exploratory, descriptive and explanatory study. The case studies contain interviews with key actors in the subject of study; such interview data are coupled with documentary data. Descriptive case study is directed at systematically identifying and recording the objects of study. By means of exploratory case study, it is tried to gain more in-depth knowledge pertaining the existing theories and to find new theoretical interpretations. Explanatory study is aimed at testing of theories which usually has a causal character allowing conclusions to be logically inferred.

Expert interviews
As part of the case studies, expert interviews are held with key players in the field of expertise. Descriptive interviews are coupled with theoretical data to set up the conceptual framework. Then, exploratory interviews will be held with key players to collect relevant data about the cases that are missing in the documentary data. The interviews will have a combination of semi-structured and unstructured questions. The unstructured questions are needed to pursue new and interesting aspects, whereas the semi-structured questions are required to get specific responses. Unstructured questions are particularly useful to find answers to the third and fourth sub questions; i.e. how the role of the F component can be rebuilt in DBMO without the actual use of project finance and; to what extent the proposed measures work.
Semi-structured questions, on the other hand, are quite convenient for answering the last subquestion as regards the added value of a project. Accompanied by a multi-criteria framework, the semi-structured questions will help effectively mapping the effects on the level of added value of the DBMO and DBFMO cases.

**Important remarks**

For this research, a qualitative methodology is selected. However, it should be noted that the objectivity of qualitative data is sometimes questioned, particularly by people with a background in quantitative research (Fellows & Liu, 2003). Qualitative research deals in the interpretation of contemporary situations. “It places particular emphasis upon the role of the research as a vital part of the research outcome” (Groat & Wang, 2002, p. 88). In view of that, it is way different from, for instance, correlational and experimental research, both of which assume an ‘objective eye’ on the part of the researcher. Fellows and Liu (2003, p. 28) argue that analyses of such data tend to be considerably more difficult than with quantitative data. This is because qualitative approaches often require a lot of filtering, sorting and other manipulations to make them suitable for analytic techniques. Other factors that are likely to impede the objectivity of the research are the large variety of external environmental variables present and the inputs of the researcher, as the questions asked will influence the responses obtained (K. N. Denzin & Lincoln, 2009). Yet, there is also recognition of the value and relevance of qualitative studies (Oakley, 1994). According to Oakley (1994), it is the acknowledgement of the abilities of such methodologies to go beneath the surfaces of problems and issues which are subject of quantitative studies, and thereby, to enable understanding for basic causes, behaviours and principles. Similarly, Fellow and Liu say: “Qualitative data may be unstructured, at least in their raw form, but will tend to be detailed and hence rich in content and scope” (Fellows & Liu, 2003, p. 28).

**2.5 Outline of the thesis**

Theory shows that DBFMO contract structures deliver added value as compared to other structures and that the added value is partly driven by the special role of the F component. However, since it is apparent that the F component has drawbacks and that these drawbacks call for exclusion of the F component particularly for projects of smaller scale, a problem is created that requires further investigation. The outline of the thesis is presented in Figure 3.

The first stage of the thesis is setting the theoretical context and conceptual design. Chapter 3, 4 and 5 cover the theory behind this research. This stage deals with the first three subquestions. In this stage the distinct role of the F component will be investigated by exploring the literature on DBFMO and project finance. Based on the literature study, the mechanisms underlying the role of the F component can be discerned. The mechanisms underlying the role of the F component can be translated into a set of functions that, if fulfilled, embody the role of F component. The set of functions will then form the theoretical framework and will serve as input for the ensuing steps.

The next stage of the thesis is the translation of the research into practice. Chapter 6 involves an in-depth investigation into the practical experiences with DBMO contracting in Dutch building practices. In this step, two real-life DBMO cases are investigated in order to explore how and to what extent these cases have dealt with the set of conditions formulated in the preceding step. Based on this research, the fourth and fifth sub question can be answered. Chapter 7 includes an investigation into the implications of the exclusion of the F component.
on the added value of a project. Based on a set of predetermined criteria, the effects of the substitutes of the F component in DBMO will be explored by comparing the selected DBMO cases with two practical DBFMO cases. A multi-criteria framework will be used to map the effects per criteria. By comparing the effects of the selected DBMO cases with the effects of the DBFMO cases, insights will be provided into the implications of extracting the F component on the level of added value of a project. Based on this research, the sixth subquestion can be answered.

The final steps are to analyse the data collected from the case studies, draw conclusions, introduce a discussion and answer the research question (Chapter 8). In Chapter 9, recommendations are given that provide inputs for future researchers and for future decision makers regarding the application of DBFMO and DBMO contract structures in Dutch construction practices. Supporting figures and tables to this research can be found at the end, containing all the appendices.
Figure 3 Outline of the thesis
3

THE DBFMO BUILDING CONTRACT

In the first part of the thesis, the core concepts will be discussed that will serve as input for the ensuing research and that together give substance to the theoretical framework. Before going into detail about the finance component of DBFMO, this chapter will focus on the DBFMO building contract itself. Before the DBFMO contract model is introduced, the various Dutch building contracts that corresponding to their level of integration stand between the traditional and DBFMO contract are discussed first. Subsequently, this chapter elaborates on the DBFMO contract structure, the DBFMO process, the application in the Netherlands, and the relation between DBFMO and the term added value. At the end of this chapter, the pros and cons of a DBFMO contract are enumerated.

3.1 Types of building contracts

The last decennia, numerous new variants of building models are developed, in which not only design and build but also other stages of the building life cycle are combined into a single contract. There are various ways possible to combine different stages of the construction process. Likewise, numerous articles are devoted to the experience with public private partnerships all around the world (Greve, 2003; Hodge, Greve, & Boardman, 2010; Osborne, 2002). From an international perspective, the most well-known forms are the various BOOT, BOT and BOO models (Hodge et al., 2010). These models represent all kinds of concessions in which a public authority enters into a contract with a private company to Build, Own, and Operate a specific piece of an infrastructure or asset (BOO), and possible later Transfer it back into public ownership. In turn, the contracting company expects to recover expenditures from charges to customers or to the public authority. Another form of PPP used by Scandinavian countries since the early 1990s is where a government sells an asset, a school building, for instance, and then leases it back from the private company with which the government is cooperating (Greve, 2003, p. 59). The duration of these sale-and-lease back contracts can last up to 20 to 30 years. Although most of these models look like new organisational forms, Greve (2003) considers most of them as just financial arrangements that embrace both public and private sector. Since there are so many different PPP forms all over the world and as the focus of this research is on the role of the F component in Dutch construction, no attention will be paid in the remainder of this thesis on how these different PPP forms work. For more information about these other forms, it is recommended to read International Handbook on Public-Private Partnership (2010) of Hodge, Greve and Boardman.
As this research is purely focused on DBMO and DBFMO contract models in the Netherlands, the emphasis in the remainder of this section is on how these models are established in Dutch construction. In order to explain how DBMO and DBFMO are constructed in the Netherlands, the other building contract structures existing in Dutch construction need to be considered first. In Dutch building practice, the most integrated way of contracting is DBFMO. The traditional model and DBFMO are two extremes on both sides of the horizontal axis and in between various types of combinations are possible. Characteristic of each type of contract is the contractual relationship between client and contractor. Contract types can be distinguished from one another based on the level of client’s involvement and the corresponding responsibilities (Chao-Duivis et al., 2013). In this paragraph, the traditional building contract, the Design & Build contract, and the Design-Build-Maintain-(Operate) contract are described. Based on the descriptions of these types of building contracts, the most integrated form of them, the DBFMO standard, is explained.

3.1.1 Traditional contract model
In the traditional contract, the responsibility for the design rests with the client. The client first enters into a contract with the architect for the design (the Design) based under The New Rules (DNR 2011). Once the design is completed, the client will enter into another contract with the contractor for the execution (the Build) of that particular design based on the Uniform Administrative Conditions for the Execution of Work and Technical Installation Works (UAC 2012). The contractor, in turn, is free to subcontract parts of the execution (see Figure 4). The building contract only covers the contractual relationship between the client and the contractor. So, there is no direct contractual relationship between the architect and the contractor, only a functional relationship (Chao-Duivis et al., 2013).

3.1.2 The D&B contract model
The Design & Build contract is a contractual form in which the design and execution are in the hands of a single party. This is referred to as an integrated contract governed by the UAC-GC 2005 terms and conditions. The party who takes the responsibility of the design and execution of the project may be the contractor, but also the architect, advisor or consulting engineer may fulfill this role. As opposed to the traditional model, the client has a limited role in the construction project. This is particular the case with regard to the client’s involvement in the execution of the works by the contractor. The responsibility of the client involves at least
the conceptual design (Chao-Duivis et al., 2013). Based on the conceptual design, the Design & Build contractor will do both finalizing of the design and execution of the work (see Figure 5). It seems explicable that the contractor does not have all expertise in-house to do both design and construction of the building. Therefore, the contractor can subcontract parts of the design and/or execution. As the responsibility of the design and construction are in the hands of one single party, this contract model provides opportunities to take account of the financial impacts of specific design decisions on the construction, already in the design phase.

3.1.3 The DBM(O) contract model

The DBFM(O) contract model is another form of an integrated contract. The abbreviation DBM(O) stands for Design, Build, Maintain and (Operate). Under a DBM(O) contract, the DBM(O) contractor of the construction project is not only responsible for the design and construction as is the case with Design & Build contracts, but also takes the responsibility for the maintenance (M) and in some cases the operation (O) after the object is realized (see Figure 6). The operational and maintenance obligations imply that the DBM(O) contractor also has the responsibility to maintain the building project and keep it available for the intended use by the client during the term of the contract. DBM(O) contracts usually cover long terms of 20 to 30 years. This is because the terms are often linked to the economic life of the object realized (Chao-Duivis et al., 2013). Decisions about the design and execution will have impact on the maintenance and operation in the phases thereafter. This creates opportunities during the design phase to take account of the impacts of particular design decisions on the construction, maintenance and operational cost later on.

![Figure 6 DBM(O) contract model](image)

The DBM(O) contractor of the project may be the contractor, but also the architect or another party. There is no standard contract for DBMO projects available. Just as with Design & Build projects, the 2005 Uniform Administrative Conditions for integrated contracts can be applied to DBMO projects. The use of the UAC-GC 2005 conditions enables the relationship between the client and the contractor to proceed smoothly (Chao-Duivis et al., 2013). Under the UAC-GC 2005 conditions, the contractor is assumed to be responsible for the entire design, execution and operation process. However, this does not mean that the client is not involved in the work in any way. The client is allowed to avail himself the opportunity offered by the test and acknowledgement plans stipulated in the UAC-GC 2005 conditions to monitor
the contractor’s activities (Chao-Duivis et al., 2013, p. 115). In addition, the client may also demand modifications or variations to be carried out by the contractor under certain circumstances. However, since active intervention in the works by the client is not keeping with this contract model, Clause 14 of the UAC-GC 2005 conditions is established which explicitly states that the client should exercise due caution in this respect. Furthermore, the client is obliged to pay the contractor such an amount as stated in the contract. However, the UAC-GC 2005 conditions do not specify the exact sum, they only allude to certain elements of the agreement between the client and the contractor in regard to payment. Although the UAC-GC conditions are regularly used as a foundation for DBMO projects, it should be noted that the use of the UAC-GC 2005 conditions is not compulsory. Other contract forms are also allowed to be used for DBMOS.

3.1.4 The DBFMO contract model

The most advanced integrated contract is the DBFMO contract. The abbreviation DBFMO stands for the different stages in a project: Design, Build, Finance, Maintain and Operate. In the DBFMO contract, the design and execution along with the maintenance and exploitation and, most importantly, the financing of a building project are combined. Together these elements are integrated by the client into one contract commissioned to one contractor. The DBFMO contractor will typically split the DB and MO activities and respectively, will enter into a contract with a DB contractor and a MO contractor. Characteristic of DBFMO contracts is that the financing of the project to be realized is laid upon the DBFMO contractor (see Figure 7). In exchange, the contractor will receive a periodic fee during the entire term of the contract. Therefore, the contractor is not paid for the delivery of work, but receives a monthly fee for the availability of the work during the term of the contract.

The term of the DBFMO contract is typically around 20 to 25 years. Once the term of the contract is ended, the contractor is obliged to hand back the project to the client in the agreed upon state. The role of the client has been pushed back even further in this model than in the UAC-GC 2005 model. The client does not steer the contractor on the base of a set of specific requirements, but limits itself by formulating the boundary conditions of the services to be produced, including the boundary conditions of the building to be realized. Therefore, the client only steers on the basis of broadly formulated functional criteria (output

![Figure 7 DBFMO contract model as in: Chao-Duivis et al. (2013)](image-url)
specifications). These criteria are specifically directed at realising a desired result and not how the contractor is to realise this result. Therefore, the process is driven on output rather than input and as a result, the contractor is given a considerable amount of freedom (Chao-Duivis et al., 2013).

3.2 The DBFMO contract structure

In this paragraph, the DBFMO contract structure will be described by zooming in on the stakeholders involved. By unfolding the roles of the key players, insights are provided into the structure of DBFMO.

3.2.1 Client

Characteristic of DBFMO projects is that the client is a public authority (Chao-Duivis et al., 2013). In the procurement and management of the real estate portfolio of the Dutch government, the Government Building Agency fulfils the role of professional public client on behalf of the State. The client will generally enter into a DBFMO agreement with the contracting party. The DBFMO agreement will specify the subject of the project, the output specifications which are required to be met and the description of the services to be produced after realisation of the building project. The role of the client in DBFMO is rather limited as compared to the traditional and UAC-GC models. There is no contract supervision on the side of the client nor is active involvement of the client in the contractor’s operations allowed (Chao-Duivis et al., 2013). For the client, the main instrument to exert influence on the work carried out is the payment structure of DBFMO. In DBFMO projects, the client no longer pays for the delivery of the building but pays for the availability of the building during the term of the contract. The availability fee is a monthly fee that is paid by the client for the availability of the asset during the term of the contract. The client makes the payment only when the agreed performance has been delivered. If the contractor fails, he will experience the consequences financially in the form of penalties and discounts on the fee (Chao-Duivis et al., 2013). Therefore, the availability fee connects the contractor’s performance to the payment made by the client. Since the client only pays for an agreed level of service, the payment mechanism is a tool of the client to steer the contractor to perform well. For that reason, these types of contracts are also referred to as performance-based contracts (Engel et al., 2010).

3.2.2 Private consortium

Rather different from the traditional building contract is the idea that the entire supply chain is contracted out at once. The client will enter into a DBFMO agreement with only one single contracting party. Based on the output specifications, the contracting party will design and construct the building project, will take care of the financing and will be responsible for the maintenance and operation during the entire term of the contract. In the end, the contracting party is obliged to hand back the project to the client in the agreed upon condition. Noteworthy is the fact that the supervision and control, as traditionally conducted under the UAC 1989, is not incorporated in DBFMO contracts. It is key to DBFMO contracts, that the contracting party organise this themselves. If the work does not meet the requirements of the client, the contracting party will notice this in his availability fee (Chao-Duivis et al., 2013, p. 176). The obligation of the contracting party and its right to payment are stipulated in Article 2.1 of the DBFMO Agreement. These obligations are further elaborated on in paragraph 4.3.3.

Due to the broad scope of activities and the long term nature of the DBFMO contract, a consortium of companies will usually act as the contracting party. The consortium is
established to carry out the work and is made up of different private parties such as contractors, architects, installation engineers and consultants. Together, the private parties in the consortium make up a collaborative arrangement in the form of a private company with limited liability. This is often referred to as a ‘Special Purpose Vehicle (SPV)’. The SPV is a newly formed entity, usually with limited liability, whose activities are purely focused on the particular project. The SPV has limited liability and therefore, acts independently under its own name and takes part in judicial matters through its various organs (Chao-Duivis et al., 2013). During the term of the contract, the SPV is responsible for both the assembly of the consortium and the financing of the project. What is more, the SPV participates on behalf of the consortium in the tender phase and is the contractual partner of the client.

3.2.3 Financers

A fundamental element of DBFMO is the financing. Different from the traditional building contract is the fact that with DBFMO the SPV is responsible for the financing of the project. As the consortium is not paid for the delivery of work but receives a monthly fee for the availability of the work during the term of the contract, the consortium plays a role in prefinancing the activities to perform the work. To facilitate the prefinancing of the activities, capital is attracted by issuing shares to shareholders. Usually one or a few participants of the SPV will act as equity providers and by doing so, take care of a part of the financing through shareholding (Engel et al., 2010). However, the equity providers are unable to provide funding alone and therefore, the consortium will conclude agreements with external financers, who will take care of the largest part of the funding. In reality, a substantial part up to 92 per cent of the investment is financed using debt (Meesters, 2014). Given the size of the required debt, loans are often provided by several banks and/or financial institutions together. Banks want to split the investment sum with other banks in order to diversify the chance that a project will default. This has become more common since 2008 as a result of pressures on bank balance sheets and the persistent decline in the aggregate financial market (Ruding, 2008). In most cases one or more banks will act as ‘lead arrangers’, which will ultimately underwrite the debt, and take care of the further division of the loan among the participating financial institutions (Engel et al., 2010).

The financers play an important role in DBFMO agreements. As the external financers have significant capital at risk, they will only provide funding if enough safeguards are established to ensure full recovering of their loans. For the recovering of their loans, the external financers are dependent on the payments made by the client to the SPV. In return for the provision of finance, the external financers are entitled to the income flow of the availability fees paid by the client to the SPV (Chao-Duivis et al., 2013). In view of that, the external financers have a great interest in the consortium keeping up to the output specifications agreed by the client. After all, poor performances may lead to penalties and discounts on the availability fee. The financer is typically the one who acts as a supervisor of the consortium. The financer will make sure that poor performance of the consortium is prevented. Before a consortium is submitting a final tender, the financers would have the tender extensively checked by independent parties in order to eliminate weak and risky points. This procedure is also called ‘due diligence’ and will elaborately discussed in the next chapter. The financers also secure their possibilities to intervene in the contractor’s business operations if these seriously fail thus possible endangering the recovering of their loans. In this respect, financers are entitled to ‘step-in rights’ (Chao-Duivis et al., 2013). These so-called ‘step-in rights’ are included in the Direct Agreement between the client, financer and the contractor. Additionally, financers stipulate traditional securities in the form of mortgage rights and pledges to secure their interests. Mortgage rights rest on the physical buildings that are realised, whereas pledges rest
on the availability fees and the shares of the participating parties in the consortium (Chao-Duivis et al., 2013).

Figure 8 DBFMO contract structure as in: Yescombe 2013

3.3 The DBFMO process

The DBFMO contract is a long-term contract. Characteristic of DBFMO is that the contract is signed up for approximately 20 to 25 years. The contract term is often linked to the economic life of the object to be realized. From the initiation till the end of the contract, the DBFMO building project will go through multiple phases. This paragraph will reflect on the phasing of DBFMO. Special attention is paid to the way the client enters into a contract with the contractor. This is because DBFMO requires special rules regarding the procurement.

3.3.1 Phasing

Building management of housing projects can be delineated by the housing cycle. The housing cycle used by the faculty of Real Estate & Housing of Delft University of Technology includes four main phases (Wamelink, 2007). These phases respectively are: the initiation phase; the preparation phase; the realisation phase; and; the exploitation phase (see Figure 9). The initiation phase is the start of the building life cycle as in this phase the client decides to build. In this phase, the decision is made by which contract structure the project is put out to tender. Once the decision is made to realise the project through a DBFMO contract, the preparation phase commences. The preparation phase is all about finding the right private party partner and to negotiate a long-term contract (Väiliä, 2005). During the preparation phase, the tender procedure is prepared which will ultimately result in the nomination of the most economically advantageous tender (MEAT) (Nagelkerke et al., 2009). Based on the award criteria, the candidate that offers the most economically advantageous tender, that is the best price-quality ratio, will be selected and will enter into an agreement with the client. After the contract is signed, the winning candidate continues finalising the design and subsequently, takes care of the construction of the project. The winning candidate will also take care of the maintenance and services of the building project once the construction of
the project is completed. After the term of the contract, the project will be handed back to the client.

Figure 9 Phasing of DBFMO

3.3.2 Procurement of DBFMO

With respect to DBFMO contracts, the procuring authority typically is a government body. As opposed to individuals that are free to enter into a contract with whomever they please, government bodies do not possess the freedom to choose any contract partner they like. Procurement law is applied to the contractual relation between government bodies and tendering parties. Government bodies are obliged to invite tenders for a contract. A tender is a procedure whereby the client is putting out a call for tender by inviting providers to submit quotations (Chao-Duivis et al., 2013). As public projects typically involve large amounts of public funding, one can assume that these projects do not lead to distorted competition. In order to prevent distorted competition and encourage transparency, the European Court of Justice have ruled that assignments above the European threshold value (for works: €5,186,000; see Directive 2004/18/EC) must be put to the European market. As Dutch DBFMO building projects usually have net present values of at least 40 to 50 million euros, the European procurement rules are applied (PPS Netwerk, 2013).

3.3.3 Procurement by means of the competitive dialogue

Since 2006, the contracting authorities have the opportunity to put a project out to tender by means of the competitive dialogue (Verboom, 2008). “The competitive dialogue is a process primarily focussed on the achievement of an optimum harmonisation of the request and offer” (Nagelkerke et al., 2009). The competitive dialogue is particularly designed for complex public contracts. The competitive dialogue can only be used when it is not able to define the technical, financial or legal aspects of the project beforehand (Chao-Duivis et al., 2013). Only in dialogue with the candidates, the specifications of the project can be determined. The output specifications will serve as a perfect point of departure for a dialogue in which the client’s request and the solutions proposed by the candidates can be optimised to achieve the maximum benefit for both parties (Nagelkerke et al., 2009). The dialogue may take place in successive rounds. In these rounds, consultations between the contracting authority and the candidates may lead to innovative solutions and creative input for the project. In this way, the contracting authority can formulate the most suitable solution (Verboom, 2008). The steps taken during the competitive dialogue are shown in Figure 10.

After the dialogue rounds, at least three candidates are invited to submit a final tender. The bid of the candidate that is the most advantageous in economic sense will win the tender. After the winning bid is appointed by the contracting authority, the Contract Close and Financial Close are prepared. The Contract Close relates to the determination of the obligations on the basis of the tender documents and the bid from the most economically advantageous tenderer. These obligations are laid down in the final agreement to be signed by both parties. The Financial Close relates to the determination of the definitive availability payments to be laid down in the DBFMO agreement. These payments are dependent of the interest rate level on the date of the Financial Close and the selected financial model. The Direct Agreement is concluded with the financiers. Since the financiers need to receive the
signed DBFMO agreement before they are prepared to make a final decision regarding the provision of funding, the Financial Close will be concluded several months after the Contract Close (Nagelkerke et al., 2009).


### 3.4 DBFMO in the Netherlands

#### 3.4.1 The first experiences

DBFMO contracts are relatively new in The Netherlands. The first DBFMO projects were carried out in The Netherlands at the end of the 90s. In the beginning, promoters of the DBFMO structure leaned heavily on the experiences with the English version, the Private Finance Initiative (PFI), in the United Kingdom (Koster & Hoge, 2008). Much of the inspiration for the PFI in the UK arose from concerns regarding the ability of the public sector to provide an adequate level of project investments from a financial perspective. The perception of low and falling levels of public funding along with concerns regarding the size of the budget deficit and the level of public debt along with arguments that the government would be unable to borrow further, led to a focus away from public financing towards privately financed solutions (Grout, 1997). The development of the DBFMO contract in The Netherlands had similar motives.

At the end of the 90s, the Dutch government had difficulties providing large amount of funding for major infrastructural investments. In order to realise these projects without an increase in the budget deficit, it was decided to develop these projects through public private partnerships. PPPs allow governments that have to deal with budget constraints and debt issues to ensure the execution of public project that would otherwise never materialise (Engel et al., 2010). Through PPPs, the Dutch government succeeded in delegating parts of the provision of infrastructure to the private sector. Private parties were involved as they were able to provide large amounts of financial resources to fund these investments. The
participation of the private sector on a cooperation-basis allowed the construction and operation of a public work to be organised more economically than traditional public sector provision (Grout, 1997). The leading principle was to maximise synergy between the cooperating parties with the intention of achieving a better end product at lower cost (Ministry of Finance, 2012). The High Speed Rail Line in 2001 and the N31 road in 2002 were the first DBFMO infrastructure projects in the Netherlands. A few years later, in 2006, the first DBFMO contract for a building was initiated for the renovation of the Ministry of Finance in The Hague. To make sure that the knowledge gained would not be lost, the Ministry of Finance established a PPP Knowledge Centre. The main purpose of the PPP Knowledge Centre was to ensure that DBFMO would become an accepted tool for the realisation of large public projects.

3.4.2 Current status
The Minister of Finance is responsible for the coordination of DBFMO projects, their relevant policies and application in Dutch construction (Netherlands Court of Audit, 2013). The Minister of Finance has encouraged the use of DBFMO from the early start. This is because the Ministry of Finance sees DBFMO as an important instrument for public investments to realise more quality for less money with regard to both infrastructural projects and building projects and wants to maximise the benefits provided by this form of contract by using it on as many projects as possible (Netherlands Court of Audit, 2013). The approval of the DBFMO model in practice is evident from the fact that several projects are currently being developed using the DBFMO contract. Figure 11 shows the building-related projects currently being carried out in The Netherlands and the projects that are still in preparation (Netherlands Court of Audit, 2013). As this study explicitly focusses on the DBFMO contracts for buildings, only attention is paid on the DBFMO building-related projects.

<table>
<thead>
<tr>
<th>BUILDINGS</th>
<th>TERM (years)</th>
<th>FINAL YEAR</th>
<th>INDICATIVE FINANCIAL COST (€ million)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Being implemented</strong></td>
<td><strong>TERM</strong></td>
<td><strong>FINAL</strong></td>
<td><strong>FINANCIAL COST</strong></td>
</tr>
<tr>
<td>Ministry of Finance</td>
<td>25</td>
<td>2033</td>
<td>147.1</td>
</tr>
<tr>
<td>Rotterdam Detention Centre</td>
<td>25</td>
<td>2035</td>
<td>80.8</td>
</tr>
<tr>
<td>Doetinchem Tax Office</td>
<td>15</td>
<td>2025</td>
<td>47</td>
</tr>
<tr>
<td>Duo Tax and Custom Administration, Groningen</td>
<td>20</td>
<td>2031</td>
<td>136.7</td>
</tr>
<tr>
<td>Construction of Schiphol custodial complex</td>
<td>25</td>
<td>2037</td>
<td>336</td>
</tr>
<tr>
<td>Kromhout Barracks</td>
<td>25</td>
<td>2035</td>
<td>450</td>
</tr>
<tr>
<td>National Military Museum, Soesterberg</td>
<td>25</td>
<td>2039</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>In preparation</strong></td>
<td><strong>TERM</strong></td>
<td><strong>FINAL</strong></td>
<td><strong>FINANCIAL COST</strong></td>
</tr>
<tr>
<td>• Construction of the Supreme Court, The Hague</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Renovation of Rijnstraat, The Hague</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Zaanstad Detention Centre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Bezuidenhoutseweg 30, The Hague</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• National Institute for Public Health and the Environment/ Ministry of Health, Welfare and Sport, Utrecht</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Flushing naval barracks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ministry of Defence surveillance and security system</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The annual report of the Ministry of the Interior and Kingdom Relations discloses these amounts as ‘off balance sheet assets and liabilities’. No further explanation is given (Minister of BZK, 2012: 214).

Figure 11 Overview of the currently being developed DBFMO projects in The Netherlands as in: Netherlands Court of Audit (2013)
As can be seen in Figure 11, there are no DBFMO projects for schools in the Netherlands. The main reason is that the budget for construction and the budget for maintenance and operation are managed by separate institutions. Also, there are no DBFMO projects for healthcare. According to Straub et al. (2012), this is mainly due to the lack of knowledge and expertise given the complexities financing the care system. However, since DBFMO is a relatively new type of building contract, the practice of DBFMO is still in its infancy. The more DBFMO is used in practice, the more experiences and knowledge will be gained. And so, in the future it might become attractive to use DBFMO for schools, hospitals and other utility buildings as well.

3.5 Added value of DBFMO

3.5.1 Synergy effects

The leading principle of integrated contracts is to achieve synergy between cooperating parties, with the intention of facilitating a better project at lower cost (Government Building Agency, 2009). It is expected that the integrated way of procuring the different stages of a building project produces synergy effects between the design, construction, maintenance and facility services. Since all elements of the construction and exploitation are in hands of a single contractor, it becomes possible for the contractor to optimally match these elements. In view of that, it is expected that the optimal integration of the successive phases into a single contact results in life cycle optimisations. Since the maintenance and operational costs are included in the tender of the project, the entire life cycle of the building is taken into account even before the project is started. By considering these costs at the very start of the project, the total life cycle costs of the project can be kept at a minimum. This is because the contractor is already making all kinds of trade-offs during the development of the design and preparation of the work. For instance, suppose that material Y is less expensive than material X, but material X has a longer life time and therefore doesn’t need to be replaced during the term of the contract while material Y does. Then, the contractor will probably select material X over material Y; given the assumption that the replacement costs of material Y will make material Y a more expensive option. Such trade-offs hardly occur in traditional building projects as these projects rely on separate contracts for construction and maintenance activities. An additional advantage of the integrated approach is that from the early start of the project all disciplines get together around the table. This implies that technical issues are solved from an integral perspective, which can yield additional benefits in both financial and qualitative terms.

3.5.2 Added value

The terminology used by the Government Building Agency and the Ministry of Finance to express the synergy effects of DBFMO over other contract structures is added value. Added value is defined as: “the difference between the public alternative and the bid by the private consortium” (Ministry of Finance, 2012). For the Government Building Agency (2009), creating added value implies that a building similar to traditional buildings can be achieved at a lower price or a better building at same price. Evidently, a better building for a lower price is also qualified as added value. Therefore, the term added value contains two components: a financial component and a qualitative component.

It is expected that Dutch DBFMO contracts can generate added value in terms of time, money and quality compared to other contract forms (Netherlands Court of Audit, 2013). Studies by the Ministry of Finance show that DBFMO projects produce 10 to 15 per cent more value as compared to projects procured through the traditional way of contracting (Ministry
of Finance, 2012). In principle, the government will opt for a DBFMO contract if it is proved that it can produce added value. The selection of DBFMO over more traditional ways of contracting from the public sector’s point of view is not one of whether the arrangement is on or off the balance sheet but whether it embodies good value for money for the taxpayers (Ministry of Finance, 2012). Value for money (VFM) is defined as: “the optimum combination of whole life cost and quality (of fitness for purpose) to meet the user’s requirement (Office of Government Commence, 2002, p. 6). In this respect, DBFMO is not an end, but a means to create value for money.

Since the Government Building Agency (2009) believes that DBFMO can lead to higher quality for the same money or the same quality for less money, it has decided to check each housing project that exceeds 25 million euros whether it can generate added value by using DBFMO. The threshold value of 25 million euros is chosen for building projects since potential projects must be financially significant. This is because the costs of the preparatory stage are high and DBFMO is not cost-effective on a small project (Netherlands Court of Audit, 2013). The suitability of a DBFMO contract for a particular project is determined at an early stage. Even before the preparation phase, it will be made clear whether a DBFMO contract structure will provide added value. This is done through a comparison between the expected costs of the traditional contract model and DBFMO (Ministry of Finance, 2012).

3.6 Pros and Cons of DBFMO

3.6.1 Benefits of DBFMO

Various sources in literature refer to the added value potential of DBFMO by reciting the benefits accruing from this type of contracting. In the empirical part of this research, the literary statements are tested against practical findings. The most often cited benefits in literature are presented below:

- **Life Cycle optimisations** The integration of the design, build, finance, maintain and operate stages into a single contract can produce whole life cycle optimisations. By taking account of all stages of a project’s entire life, the overall cost may ultimately be lower (Netherlands Court of Audit, 2013).
- **Price certainty** Under DBFMO, there is a high degree of ‘price certainty’. The client knows how the expenditure pattern is going to look like in the long run. Also, for the contractor the security of work and income over the longer time are appealing (Netherlands Court of Audit, 2013).
- **Time savings** Due to the linkage between design and construction, time savings can be made in the construction phase. This is because in the design phase, the contractor may already start preparing the construction (Knibbe & Bloemert, 2003).
- **Higher overall quality** From the early start of the building project all disciplines get together around the table. By sharing knowledge and expertise at this stadium, the quality of the building and services may improve significantly (Canoy, Janssen, & Vollaard, 2001).
- **More innovative solutions** The successful transfer of knowledge between the consortium members in the early stage may result in more innovative and sustainable solutions (Straub et al., 2012).
- **Better risk management** By efficiently distributing tasks and responsibilities, the risks can be allocated to the parties’ best able to manage them. Successful transfer of risks may result in lower risks for private parties and lower risks for the client as compared to the traditional variant (Grimsey & Lewis, 2005).
• **Successful collaboration** For DBFMO contracts holds that the contractor has an equal stake in the success of a project as the client does. No performance means no money for the consortium. This increases the chance of a successful collaboration between client and contractor (Ministry of Finance, 2012).

• **In time & budget** Due to the performance-related payments, contractors are triggered to deliver projects in budget and within time. This is in contrast to the traditional approach, where delays and overruns are most common (Government Building Agency, 2009).

• **Relaxation of the government’s burden** The client only has to manage one single contract. In this respect, DBFMO unburdens the government from certain responsibilities, so that the government can focus again on its core businesses (Verboom, 2008).

### 3.6.2 Drawbacks of DBFMO

Although DBFMO has many benefits, there are also factors that hamper the use of DBFMO and reduce the potential added value. The most frequently cited drawbacks of DBFMO are summarised below.

• **Long preparation time** This type of contract requires a relatively long preparation time. This is because the complexities inherent the Special Purpose Vehicle, as the many financial contingencies that have to be included in the contractual relationship combined with the long time frame of the contract, are translated into a lengthy preparation phase. The preparations for the tendering already take 7 to 12 months. The competitive dialogue itself can even take 36 months from the moment the candidates are selected up until the Financial Close (Nagelkerke et al., 2009). In the preparation phase, the client has to think through the entire project including the exploitation after the building is to be realized. In most cases the client does not have the required knowledge in-house and therefore, advisers are consulted. This will slow down the process (Verboom, 2008).

• **High complexity** The tender procedure is far more complex than the procurement under the traditional approach. The urge to find the best private sector partner, and to bargain, monitor and renegotiate a long-term contract and simultaneously provoke the right incentives as to strive for service quality, while restraining costs, makes DBFMO a far more complex and delicate structure compared to in-house public provision (Engel et al., 2010).

• **High transaction cost** Due to the longer preparation times, complexity issues and agency costs, the costs of preparing a DBFMO contract are reasonably high. The term to express these costs is ‘transaction costs’. Transaction costs are all costs that occur at the side of both the contractor and the client for preparing, entering, executing and controlling the contract (Heiligers, 2012). Transaction costs of DBFMO contract structures are seen as a major downside of DBFMO.

• **Unknown future** DBFMO is a service-based contract. This implies that the payments by the client are related to the performance of the services delivered by the contractor. The problem with service-based contract is that the required level of services needs to be specified well in advance, whereas it is hardly possible to get a good impression of the reasonable standard for quality 30 years from now (Engel et al., 2010). For that matter, it is disputed to what extent the client is able to establish the level of services for the next 25-30 years.

• **Flexibility issue** Another concern is that service-based contracts have to cover an extremely long timeframe and this reduces the flexibility considerably. Since the level of services is fixed in advance, a part of the flexibility of the client disappears during the term of the contract. And so, the contractor and client are stuck with each other for a very long time. If the project is continuously delivering bad performance, the client and
contractor cannot simply break up. Moreover, the flexibility of the client to ‘play’ with penalties and discounts declines over the longer term in the case that continuously bad performance is being delivered (Engel et al., 2010).

- **Sensitivity to financial market** Another concern is the sensitivity to fluctuations on the financial market. Fluctuations in the economic climate may interfere the use of private finance in DBFMO. As DBFMO structures rely on external financers for funding, fluctuations in interest rate levels and loan terms will affect the applicability of DBFMO. This is because the interest rate level and loan term are set by the banks based on the financial market (Ministry of Finance, 2012).

### 3.7 Conclusion

The last decennia, DBFMO contracts are increasingly applied to building projects in Dutch construction. This is partly because DBFMOs are a perfect vehicle for the government to get capital expenditures off the balance sheet, while getting the public work and the associated service provided. Besides these fiscal policy considerations, there is the leading argument that DBFMOs provide real benefits in terms of productive efficiency at the project level. DBFMO is seen as an important instrument for public investments to realise more quality for less money with regard to both infrastructural and building projects. This latter argument is decisive in the choice for the government to select DBFMO. In principle, the government will opt for a DBFMO contract if it can generate added value. It is expected that Dutch DBFMO contracts can generate added value in terms of time, money and quality as compared to other contract forms. However, there are factors that hamper the creation of added value. Long preparation times, high complexity, high transaction cost, unknown future, inflexibility of the contract and the sensitivity to the financial market are all drawbacks of DBFMO. By looking at the benefits and drawbacks, it seems that the drawbacks are more short term oriented, whereas most of the benefits express themselves in the long run. In view of that, it can be said the DBFMO contract has quite some disadvantages upfront, but that the benefits prevail over time. A second comment is that one of the advantages of DBFMO contracting is that the risks are borne by the party who is best able to manage them and hence, it is expected that there is better risk management, whereas a disadvantage of this contract structure is that there is increased risks due to the unknown future and the fact that certain aspects are well specified in advance. In view of that, it can be said that some of the pros and cons contradict each other and therefore, some might cancel each other out. However, to what extent they cancel each other out depends on various factors. Besides, many of the drawbacks mentioned seem to be related to the complexity and cost of financing. Therefore, it seems interesting to see what happens when the financing is excluded from the contract. Since surprisingly little has been written about DBMO in the Netherlands, empirical research is needed to find out what remains of the pros and cons enumerated in paragraph 3.6. Is DBMO an promising alternative? In order to find out, the mechanisms underlying the role of the F component are examined first in the next chapter.
THE ROLE OF THE F COMPONENT

A distinctive element of a DBFMO contract is the F-component. The central feature of the integration of financing in a DBFMO contract is that the investment cost of the government are allocated to the private sector partner. The government will not be paying for the completion of the work, but will be paying for the availability of the work during the term of the contract. For that reason, the private sector party has to attract commercial financing besides its own capital, mostly in the form of project finance. This chapter focusses on the role of financing in DBFMO. First, the principles of project finance will be discussed. Then, there will be elaborated on how project finance is applied in Dutch DBFMO projects. This will be done by examining the influence of the presence of project finance in the DBFMO standard as well as in the different life cycle phases. Based on description of project finance in each of the life cycle phases, the role of F component is defined. This chapter ends with the formulation of the specifications that give substance to the role of the F in DBFMO.

4.1 Principles of project finance

The evolution and spread of PPPs around the world is closely linked to the development of project finance, a financial technique based on lending against the cash flow of a project that is legally and economically self-reliant (Yescombe, 2014). Project finance is a technique commonly used to raise funds for major projects, such as infrastructure, power stations and other property developments. Project finance is defined as:

“A method of raising long-term debt financing for major projects through ‘financial engineering’ based on lending against the cash flow generated by the project alone; it depends on a detailed evaluation of a project’s construction, operating and revenue risk, and their allocation between investors, lenders and other parties through contractual and other arrangements” (Yescombe, 2014, p. 1).

It should be noted that ‘project finance’ is not the same as ‘financing projects’. This is because projects can be financed in many different ways. Traditionally large scale public sector projects were funded by public sector debt, whereas private sector projects were financed by large corporations raising corporate loans (Engel et al., 2010). All these approaches have changed as privatisation, deregulation and the introduction of private finance through PPPs have changed the way to finance investments in large public projects, transferring a significant share of the financial burden to the private sector.
4.1.1 Features of project finance

The definition stated by Yescombe (2014) highlights one of the most important features of project finance, which is that lenders primarily rely on the cash flows of a single project as the source of the loan repayments. Project finance arrangements make use of high levels of debt, where lenders receive no guarantees beyond the right to be paid from the cash flows originated from the project. Yet, there are differences in project finance structures between various industry sectors and from deal to deal. This is because each project has its own unique features. However, there are certain principles that are common to many project finance transactions. The basic principles of project finance are described by Yescombe (2014) and summarised below:

- **Long-term financing** The project typically relates to major public works with a long construction period as well as a long operating life. In view of that, the financing must also be for a long term.

- **Ring-fenced** The project is usually carried out through a special purpose entity (so-called ‘Special Purpose Vehicle’) whose only business is the project. This is because lenders purely rely on the future cash flow generating ability of the project itself rather than the assets and financial position of the parties involved to repay their debt. For that reason, the project must be ring-fenced, which means that the project is legally and economically self-contained. This is in contrast to projects carried out inside a company, where cash flows produced by the project in the operational phase can be subject to costly agency problems of the company itself, which may then prevent the revenues from repaying the debt (Engel et al., 2010). If the project is ring-fenced, on the other hand, the possibility of diverting resources from lenders is rather limited. That is why the project’s cash flow can be credibly guaranteed to lenders.

- **High leverage** There is a high debt to equity ratio. This is called leverage. The highly leveraged financing structure characteristic for project financed projects will be explained in detail in §4.1.2.

- **Non-recourse finance** There are no guarantees from the equity providers for the project finance debt. This means that lenders are only entitled to repayment from the cash flows originating from the project and not from other assets from the borrower. This is called non-recourse finance and will be explained in §4.1.3. If there are limited guarantees, then this is called limited-recourse finance.

- **Cash flow dependent** An essential feature of project financing is that the financing is highly dependent on the revenues generated from the project’s operations in the form of a fee that only becomes available after the completion of the work. The contractor needs to recover its investment during the exploitation after the object is to be realised. By the end of the project’s life, the project finance debt must be fully repaid (see §4.1.4).

- **Due diligence and monitoring** Lenders require adequate due diligence regarding the technical, financial and juridical aspects of the project and they also continue monitoring during realisation and exploitation (see §4.1.5).

- **Stringent contractual agreements** The physical assets of the project are likely to be worth much less than the debt if they are sold off after a default on the financing. Engel et al. (2010) state that the assets of the project are usually asset specific and therefore, they are assumed illiquid and of no use once the project is a failure. Even more, in cases of projects involving public infrastructure they cannot be sold anyway. So, the main security for lenders comprises contractual agreements, assurances and other step-in rights. Through these contracts lenders carry out a detailed analysis of the project’s risks, and how these are allocated between the various parties (Bing et al., 2005) (see §4.2 for contractual agreements as regards DBFMO projects).
4.1.2 Financing structure

Project finance practices abstain from the use of classic low-cost public finance. Instead of the public party, the private sector party is responsible for attracting the financing of the project. The public sector party generally is a Special Purpose Vehicle, that is established as a private company with limited liability. The structure of project financing usually has two elements (Yescombe, 2014):

- Equity provided by investors in the project and;
- Project finance-based debt, provided by one or more groups of lenders.

**Equity**

Private equity involves raising finance by issuing shares that are not publicly traded. Generally, one or a few contractual partners will act as sponsors of the SPV and by doing so, take care of a part of the financing through shareholding (Engel et al., 2010). That is why the shareholders of the SPV are also referred to as the sponsors of the project. A typical private company structure is presented in Figure 12. As regards most large-scale projects, an assured level of equity is often requested to attract debt. The presence of equity capital is essential for both the client and the lenders (Koster & Hoge, 2008). The presence of equity capital shows that the sponsors have confidence in the project and demonstrate commitment towards the feasibility of the project. Factors that have influence of the level of equity provision and the debt to equity ratio are:

- **Market perception** The higher the market risk, the greater is the proportion of the equity capital in the total financial needs (Koster & Hoge, 2008, p. 57).
- **Cost of private capital** In general, sponsors demand a higher return on investment than debt holders. This is because the project finance debt has first call on the project’s net operating cash flow (Peirson, Brown, Easton, P., & S., 2011). Therefore, the sponsors’ return in more dependent on the success of the project. As sponsors take the higher risk, they expect a higher return on their investment and the opposite is true for the lenders. As a result of this, a higher proportion of equity capital will automatically lead to an increase in the total project costs. Furthermore, it is noticed that the rate of return on equity is affected by a set of factors. For instance, the required rate of return of private parties depends on the sector, corporation and project involved. Also, the rate of return is time-bound and subject to general economic conditions. Due to these variations, it is impossible to set an uniform rate of return on equity for private parties (Koster & Hoge, 2008, pp. 57-58).
- **Requirements of the lenders** As to the calculation of the financial sustainability of the project, lenders will set out certain financial conditions with respect to the amount of equity provision required (Koster & Hoge, 2008, p. 58).
- **Influence of the client** The client has a particular interest in ensuring that a minimum amount of equity is made available by the sponsors in order to secure the commitment of sponsors in the successful execution of the project (Koster & Hoge, 2008, p. 58).
- **Considerations of the sponsors** Due to liquidity issues, solvency matters and reliability concerns, the sponsors will probably try to limit the provision of equity capital as much as possible (Koster & Hoge, 2008, p. 58).

Although there are no fixed rules about the level of equity or debt to equity ratio, studies into project financed structures show that on average the ratio 90 per cent debt and 10 per cent equity is applied to large-scale projects (Yescombe, 2014). Therefore, it can be inferred that the largest part of the financing is provided by project financed based debt.
Project finance debt has generally been provided by two sources: commercial banks and bonds. Commercial banks provide long-term loans to the SPV, while bondholders purchase long-term bonds issued by the SPV (Yescombe, 2014, p. 61). Bondholders typically are financial institutions such as life-insurance companies and pension funds, which need long-term cash flows. Recently, non-bank lenders have also started to provide direct loans to projects, and take part in debt funds. Although, the financial and legal structures and procedures are different, the criteria under which debt is raised in each of these markets are much the same. Therefore, the term lender can apply to either a bank lender, bondholder, debt fund or a non-bank lender. Up until now, commercial banks are the largest providers of project finance. In 2012, nearly 90 per cent of the private sector finance debt was raised by commercial banks (Yescombe, 2014, p. 62).

One of the key reasons why project finance is frequently used for large scale public utilities and infrastructure projects is that the investments required have a long term profile, but do not offer an inherently high return. Peirson et al. (2011) argue that project finance can be viable in cases where the operating cash flows are relatively predictable so that the low risk profile of the project allows a high proportion of debt used. In this context, (Peirson et al., 2011) refer to large scale projects, such as infrastructure, power stations and other property developments. The use of large amounts of debt for these types of projects may have beneficial effects on the return on equity (ROE). By using debt, the SPV is able to increase the rate of return earned by its shareholders. The more the SPV borrows, the less equity is needed, so any gains or losses are divided among a smaller number of shareholders and are proportionally larger as a result. In this regard, using debt can be seen as a technique to multiply profits and losses for the shareholders. This effect is called financial leverage or gearing and can be expressed by different ratios such as the debt to equity ratio. High financial leverage will gear the rate of return on equity to a reasonable level, while the non-recourse nature of project finance debt enables the risk exposure of equity providers to be minimised. That is why most large scale building projects have highly leveraged structure with 70 up to 92 per cent of the investment financed by debt mainly through bank loans.

4.1.3 Non-recourse finance
Project finance can be described as obtaining financing on a non-recourse or limited recourse basis for the realisation of an object, by which, once realised, the required revenues are generated (Koster & Hoge, 2008). It is financing based on a revenue stream, which in comparison to other types of financing requires a relatively small margin of equity capital.
Once the object is realised, the project will generate revenues, which will be used to repay the financing. There are certain conditions attached to non-recourse financing. First, the performance must be directly related to the cash flows generated by the project and thus, it does not involve any guarantees from the shareholders of the SPV towards the client. And second, the liability of the SPV must be minimized in such way that there are no unlimited risks, or any other uninsurable or unmanageable risks present at the side of the SPV (Koster & Hoge, 2008). Therefore, financing on a non-recourse basis implies that there are no indefinite risks at the side of the SPV. In a situation where there are still some indefinite risks left which cannot be transferred to certain parties, additional guarantees have to be provided so that the financing gets a limited recourse structure.

Yet, by definition both non-recourse and limited recourse financing imply that entitlement to the assets of the shareholders, in case of failure, is not or only to a very limited extent possible (Engel et al., 2010). This means that lenders are solely entitled to repayment from the cash flows originating from the project’s operations. Still, lenders often demand additional guarantees from sponsors to take away some of the financial uncertainties (Koster & Hoge, 2008). For instance, lenders will request certain step-in rights, pledges, mortgage right or other guarantees from sponsors (Chao-Duivis et al., 2013). These guarantees may lead to a shift in the character of project finance towards a more corporate finance structure. The basic principle of corporate finance is that the financing is purely based on the equity position of the sponsors involved, usually supplemented with all kinds of financial collateral arrangements (Peirson et al., 2011). Since it is possible to use project finance in combination with limited guarantees of sponsors to arrange the financing of a project, the distinction between project finance and corporate finance is often blurred. However, it should be clear that it is theoretically possible to arrange an economic feasible project by means of pure project financing, irrespective of the fact that lenders have a tendency to claim additional guarantees because of their naturally preserving character. As lenders are solely dependent on the cash flows originated from the project’s operations to cover their debt service under pure project financing, they will have a particular interest in the project delivering the required level of service.

4.1.4 Cash flow dependent

An essential feature of project financing is that the financing is highly dependent on the revenues generated from the project’s operations in the form of a fee that only becomes available after the completion of the work. The contractor needs to recover its investment during the exploitation after the object is to be realised. The revenue stream that is generated from the exploitation of the object lies at the heart of project financing. The revenue stream needs to be predictable and solid, because only in the best case scenario – under limited recourse financing - lenders have possibilities of redress against the contractor. Moreover, a project that is not capable of generating sufficient revenues to cover the costs and expenses, will not yield profits and dividends to the shareholders. Therefore, a predictable and stable cash flow is utmost important for shareholders as well as lenders. The willingness of lenders to fund large projects on a project-finance base purely lies in the expectation that the project will generate sufficient revenues to cover all design, construction, maintenance and operation costs as well as all interest and principal payments, financing costs, taxes, advisory fees, insurance charges and unforeseen risks (Koster & Hoge, 2008).

The compensation that the client is required to pay for the performance of the contractor, can be separated into two main types. One main type holds that the fee is related to the extent to which the object is available, that is irrespective of the actual use of the object
In this case, the actual users of the object are not required to pay any fee to the contractor. The other main type, however, entails that the fee to the contractor does in fact depend on the actual use of the object (Koster & Hoge, 2008, p. 38). In this case, the size of the fee to be paid by the client is determined by the actual use and not by the level of availability as is the case under the former type. As to both types, the client desires to build incentives for the contractor to perform well (Yescombe, 2014). Since only the former type is present in Dutch construction, the focus will solely be on availability based fees. In practice, the incentives that the client builds in a system of availability payments are often in the form of financial penalties (Ruding, 2008). If the service level is below standard then the client will impose fines or apply discounts. In that case, the contractor will earn less from the exploitation of the object than it would have been the case if the service level was consistent with the agreed quality standards. Incentives could also work the other way around. The contractor might just as well receive a bonus if the service level is above the agreed upon quality. However, up to now little experiences have been obtained with bonuses in Dutch practice (Ruding, 2008).

### 4.1.5 Due diligence and monitoring

As lenders receive little to no guarantees beyond the right to be paid from the cash flows from the project’s operations, one can assume that lenders will have a particular interest in whether the project really works and that ultimately sufficient cash flows are generated. A SPV, unlike a corporate borrower, has no business record to serve as a base for the lending decision. Yet, lenders have to be confident that they will be repaid, especially taking account of the additional risk from the high level of debt inherent in project finance transactions (Yescombe, 2014). This implies that the lenders need to have a high degree of confidence that the project can be realised in time and within budget, is technically capable of operating as intended and that there are sufficient cash flows generated from the project’s operations to cover their debt services adequately. The financial setting of the project also needs to be solid enough to cover any contingencies or temporary problems that may occur during the project. Therefore, lenders need to evaluate the contracts insofar as these contracts provide a basis for the construction costs and operating cash flows. They need to ensure that project risks are allocated to appropriate parties other than the SPV or mitigated if possible. This procedure is referred to as ‘due diligence’.

Lenders require adequate due diligence regarding the technical, financial and juridical aspects of the project and they also continue monitoring during realisation and exploitation (Engel et al., 2010). The due diligence process often slows down the start of the project as lenders inevitably tend to get involved in the negotiation of the project contracts (Verboom, 2008). However, due diligence by lenders is an indispensable aspect of raising project finance debt. Lenders also need to continue to monitor and control the activities of the SPV after the contracts are signed to make sure that the basis on which they assessed the risks is not diluted. Besides financial monitoring, lenders will monitor the realisation of the construction and management of the project. And after the project is finished, lenders keep supervising the further provision of services and the exploitation of the project. This is typically done by external experts or advisors, who are responsible for the provision of interim reports. Based on the interim reports, lenders shall try to steer the project when necessary (Koster & Hoge, 2008). As this will ultimately benefit the quality of the project, one can assume that the active stance of lenders in the project has advantages for the client as well.
4.2 Financing and the Dutch DBFMO contract

The principles of project finance are applied to Dutch DBFMO projects. The integration of project financing in contracts for large public works have started to emerge in the United Kingdom and the United States. The Anglo-Saxon contracts have mainly been the role model for the first Dutch DBFMO contracts. The first few Dutch privately-financed building contracts had the structure and scale of an Anglo-Saxon contract, but instead of English or American law, Dutch law was applied. In subsequent DBFMO projects attempts have been made to customize the DBFMO contracts more to the Dutch standards. As the main focus of this research is not on the legal aspects of the DBFMO contract, this thesis will not go into detail about the provisions and regulations under the DBFMO Agreement. Only reference is made to the project finance related articles in the DBFMO Agreement.²

4.2.1 The DBFMO standard

Even though a DBFMO contract structure suggests that the financing is integrated in the contract, it does not imply that the DBFMO contract actually is a financial agreement (Koster & Hoge, 2008). The financing itself is further arranged by separate contracts to be concluded between the SPV and its lenders. Yet it is precisely the financing element that makes the relationship between the parties in a DBFMO contract in some respects significantly different from the relationships in other types of construction and maintenance contracts (Koster & Hoge, 2008). Because the financing is directly dependent on the revenue stream to be generated by the project, the lenders will have their own vision on virtually all contract components. The requirements of the lenders make that the contractor and the contracting authority are facing each other significantly different than in non-privately funded projects (Nagelkerke, 2013). As the contractual arrangements are rather complex due to the involvement of lenders in the DBFMO contract, a standardized tailor made DBFMO contract is developed in the Netherlands. The standard DBFMO model covers all arrangements and provisions that stem from the integration of project financing in the DBFMO contract.

Two DBFMO model standards are currently deployed in Dutch construction. One DBFMO model agreement is used by the Rijkswaterstaat (RWS) for infrastructure works, whereas the second DBFMO model is used by the Government Building Agency for building projects. Although the two models are to a great extent equated, we will only be referring to the DBFMO model³ of the Government Building Agency as this report explicitly focusses on public buildings rather than infrastructure projects.

4.2.2 Financing and the DBFMO Agreement

The DBFMO Agreement does not enclose a financial agreement with the lenders. It only refers to the obligation to use project finance. In Article 3.1 of the DBFMO Agreement, it says that the contractor must finance the work based on project financing. Article 3.2 and 3.3 stipulate the provisions regarding the obligation to reach Financial Close⁴. These are without further ado the most explicit elements of project finance that can be found in the DBFMO Agreement. Yet, there are many provisions in the DBFMO Agreement that point towards the presence of lenders. However, the term lenders or financers is hardly used in the DBFMO Agreement. This is because the philosophy of the government is based on the thought that

² For more information about the legal aspects of the DBFMO Agreement, see: Nagelkerke, M.C.J. (2013), het effect van financiering. Tijdschrift voor Bouwrecht, 177(12), 1156-1168.
³ DBFMO Agreement of the Government Building Agency is free to download from: http://www.ppsbijhetrijk.nl/Publicaties
⁴ Financial Close (see §4.3.6)
the financing is the responsibility of the contractor (Koster & Wieland, 2014). The contracting authority only has an one-to-one relationship with the contractor and the contractor has its own relationship with the lenders. Therefore, the contracting authority stands apart from the financing and hence, he will provide minimum requirements towards the financing. Of course, the contracting authority encourages the consortium in acquiring financing, but he will not become actively involved in it. Article 3 of the DBFMO Agreement stipulates the basic financial requirements the contractor is obliged to fulfil in order to comply with the DBFMO Agreement. These requirements, however, are explicitly directed at the contractor and not at the lenders. The contractor has to set up the project finance arrangements towards the lenders in another agreement, called the credit agreement. The credit agreement is distinct from the DBFMO Agreement (see Figure 8 in Chapter 3).

4.2.3 Lenders and the Direct Agreement
A specific arrangement closely related to project finance in the DBFMO Agreement is the Direct Agreement. The Direct Agreement originated from the desire on the part of the lenders to make arrangements through a tripartite agreement between themselves, the contractor or SPV respectively, and the contracting authority about their ability to intervene in the operations of the contractor if it seriously fails, jeopardizing the repayment of the financing (Van Ee, 2014). The Direct Agreement protects the lenders as well as the contracting authority against the risk that the contractor fails to fulfill his obligations during the realisation of the project (Demirag, Khadaroo, Stapleton, & Stevenson, 2010). Paragraph (e) of Article 3.2 of the DBFMO Agreement states that on the date of Financial Close, the contracting authority and the contractor must enter into the Direct Agreement with the security agent. The security agent acts on behalf of the lenders. The Direct Agreement is the only direct link in the DBFMO Agreement between lenders, the contracting authority and the contractor. The Direct Agreement is enclosed in Annex 6 of the DBFMO Agreement.

Besides the obvious disadvantage for the contracting parties, termination of the DBFMO contract will also be highly undesirable from a social perspective (Koster & Hoge, 2008, p. 42). This is because these types of projects always have a public or social purpose. Therefore, the possibility to make use of so-called step-in rights is included in the Direct Agreement. The step-in rights are a means of the contracting authority to carry out a number of obligations by himself in the event of a disaster, as well as for the lenders to gain control over the project in case of failure of the contractor in order to secure the continuity. Since, the sponsors in the SPV typically have control over the contractor and thus, over the entire project, the step-in rights of the contracting authority and the lenders will only be used as a last resort (Nagelkerke, 2013). However, the advantage of the step-in right relationship is that the contractor and the lenders are directly involved in the progress of the contractor (Koster & Hoge, 2008). In conjunction with the step-in rights, lenders stipulate traditional securities in the form of mortgage rights and pledges to secure their interests. Mortgage rights rest on the physical buildings that are realised, whereas pledges rest on the availability fees and the shares of the participating parties in the consortium (Chao-Duivis et al., 2013).

4.2.4 Project finance as seamless web
Based on the abundance of provisions inherent in the DBFMO Agreement, one can assume that project finance is a seamless web that does not only affect the contractual arrangements but also all other aspects of the project’s development and process. Using project finance involves a systematic and well-organised approach to carry out a complex chain of interrelated tasks. The supplementary factor in project finance is that the sponsors must accept that external parties - lenders and their advisors – will get closely involved in
what the sponsors have been and are doing. This process will take additional time and work and hence, the financing can be a major critical-path item. Therefore, project finance cannot be dealt with in isolation. If a project uses project finance, not only the financial department and the lenders but also all those involved in the project need to have a basic understanding of how project finance works, and how their part of the project is related to and affected by the project finance structure. Moreover, since project finance affects all phases of a DBFMO project, it is valuable to analyse the influence of project finance in each of the DBFMO life cycle phases. An overview of a typical DBFMO project life can be found in Appendix A. In the next paragraphs, the presence of project finance is explored in the preparation phase (§4.3), the realisation phase (§4.4) and the exploitation phase (§4.5) respectively. Since, in the initiation phase the DBFMO structure is only opted and no further arrangements with respect to project finance are made, it is decided to skip the initiation phase.

4.3 Financing and the preparation phase

The preparation phase covers the time between the moment a DBFMO contract structure is opted and the date of Financial Close. The preparation phase is primarily dominated by the tender procedure. Already in the preparation phase the presence of project finance can be detected (see Figure 13). This paragraph describes the presence of project finance throughout the preparation phase. In particular, attention will be paid on how the various project finance related elements are entrenched in the DBFMO Agreement. An overview of the project finance related articles of the DBFMO Agreement is presented in Appendix B.

Figure 13 Role of the F component in preparation phase

4.3.1 Early support of lenders

After a DBFMO contract structure is opted, the preparation phase starts. The first step of the contracting authority is to advertise the project in official publications and the financial and trade press. Interested bidding groups are provided with the request for qualifications, which is an outline of the project and its requirements. Prospective bidding groups are then requested to set out their qualifications to undertake the project. These qualifications should demonstrate, amongst others: the financial capability to carry out the project and the letters
of support from prospective lenders (Yescombe, 2014). Commercial banks commonly provide letters of intent to sponsors early in the development of a project confirming the banks’ interest in getting involved in the project (Yescombe, 2014). Such letters should not be considered as legal commitment on the lenders’ part, since they would not have enough information at this point about the project to make such a commitment. Yescombe (2014) notes that serious lenders will only write such letters if they truly believe that the project has a reasonable prospect of being bankable. Then, a formal invitation to tender is sent out to the pre-qualified bidders. The initial bids based on the invitation to tender should include evidence of bank support, and a term sheet setting out their detailed terms. The financial advisors of the contracting authority should then evaluate these documents to confirm that there are no unduly onerous requirements which would affect the project’s financial viability. Nor the provision of the letter of intent, nor the evidence of bank support and term sheet are included in the directives of the DBFMO Agreement of the Government Building Agency. This is because these documents are part of the credit agreement between the SPV and its lenders.

4.3.2 Involvement of advisors
During the project development and financing process, various external advisors are used by the sponsors, the contracting authority and the lenders. Advisors can play a valuable role in the development of the project. This is particularly the case when the sponsor has not undertaken many of such projects in the past (Yescombe, 2014). Unless sponsors are experienced, issues resulting in negotiation of the contract agreement are likely to occur which are found to be unacceptable by the participating lenders. To handle such situations, sponsors without expertise need financial advice to ensure that they do the right task. In project finance, the financial advisor has a more wide-ranging role than would be the case in general corporate finance (Yescombe, 2014). The entire structure of the project must meet the project finance requirements, so the financial advisor must anticipate all issues that might occur during the lenders’ due diligence process, ensuring that they are addressed in the contracts.

Lenders, on the other hand, use their own set of external advisors, generally paralleling and reviewing the work done by the sponsors’ external advisors as part of their due diligence. Other advisors appointed by the lenders may include legal advisors, technical advisors, insurance advisors, model auditors and others. The lenders’ technical advisors are involved in multiple stages of the project. They carry out due diligence by reviewing and reporting to the lenders on matters such as: the project technology and design; experience and suitability of the construction contractor; and any particular technical issues or risks in operation of the project.

4.3.3 Due diligence
The due diligence performed by lenders’ advisors is intended to ensure that all necessary information about the project is available and that all project risks are identified in advance. The project finance risk assessment as part of the due diligence performed by lenders’ advisors includes the allocation of risks to appropriate parties through provisions in the contracts and the quantifying of the residual risks that remain with the SPV and thus, with the lenders. The theoretical principle of risk allocation in project finance is that risks should be borne by those who are best able to control and manage them, and to bear their financial consequences (Engel et al., 2010). In this respect, the risk of late completion and its financial consequences should be borne by the construction contractor, except if the late completion
was due to events outside the construction contractor’s control, in which situation insurance may step in to take such risks.

In the DBFMO Agreement the division of risks between the contractor and the contracting authority is strictly organised. Article 2.1 of the DBFMO Agreement stipulates the key obligations of the contractor. It holds a list of provisions regarding the obligations of the contractor. The rules under paragraph (a) of Article 2.1 stipulate that the contractor must carry out all work in accordance with the agreement. Paragraph (b) says that all cost that the contractor incurs in order to fulfil the aforementioned obligations will be borne by the contractor, except to the extent that the agreement specifically stipulates otherwise. Paragraph (c) of this article states that no matter what circumstances or events arise during the performance of this agreement, the contractor has:

i) No right to any payment from the Contracting Authority;

ii) No right to postponement or suspension of the performance of its obligations, and;

iii) No right towards the Contracting Authority in relation to a Contracting Authority default. (Article 2.1.c of the DBFMO Agreement)

By reviewing the paragraphs of this article, one can conclude that the obligations of the contractor are formulated in a very stringent way. Besides the obvious obligation of the contractor to carry out the work, the contractor is also obliged to incur all costs and has no rights to any payment or postponement, except in an event of a contracting authority default under provision iii of paragraph (c) of Article 2.1. Therefore, it can be said that the rights of the contractor are rather limited. Together, these obligations make sure that the risks are properly transferred to the parties other than the contracting authority. Since this articles stipulates that the contractor has to bear all costs that incur, except in a situation of default of the contracting authority, there are hardly any risks left at the side of the contracting authority. Article 2.2 of the DBFMO Agreement stipulates the key obligations of the contracting authority. This list of obligations of the contracting authority is much smaller. It only includes provisions regarding the commitment to pay the contractor in accordance with the payment schedule included in Annex 2 (Payment Mechanism) of the DBFMO Agreement.

4.3.4 The financial model

In the third and last round of the competitive dialogue, the bidders have to submit their indicative tender. Bidders are required to include the financial model in their proposal, which demonstrates how they have arrived at their final bid proposal. Information and assumptions are assembled to create inputs for the project’s financial model. The input assumptions for the financial model contain, amongst other: macro-economic assumptions; project costs and funding structure; operating revenues and associated costs; loan drawings and debt services, and; taxation and accounting (Yescombe, 2014, p. 345). The output of the financial model will confirm the viability of the project from the perspective of sponsors.

To calculate the sponsors’ return correctly the financial model should cover the entire period from the moment the initial development costs are incurred to the end of the project life. For the purpose of the lenders the model is only needed from the Financial Close. This is because the development costs up to the Financial Close are at the expense of the sponsors and therefore, stand apart from the investment budget. Ideally, the development of such model should be a joint operation between the sponsors and the lenders. Although the sponsors should have already developed their own model at an early stage of the project to assess its basic feasibility, it is usually better for there to be a single financial model for the project so all parties involved are working from the same base (Yescombe, 2014).
When the financial model is nearly complete, a model auditor is appointed to evaluate the model, including tax and accounting assumptions, and check if it properly reflects the contracts and financial documentation. The model auditor also performs a sensitive analysis and assesses the various scenarios. At this stage lenders should ideally confirm that their due diligence is almost completed, that the terms of their loan have been agreed and are embodied in an agreed loan agreement and that they have received the necessary credit and other approvals (Yescombe, 2014).

The DBFMO Agreement of the Government Building Agency does not hold an exclusive article about the financial model. Yet, the financial model is listed in the annexes of the DBFMO Agreement. Part 4 of Annex 7 (Models) of the DBFMO Agreement includes the fixation of the Weighted Average Cost of Capital (WACC), the expected rate of return on equity and the gross availability payment, which are all based on the financial model.

4.3.5 Contract Close

After the winning bid is appointed by the contracting authority, the Contract Close is prepared and the legal and insurance advisors come into play (Nagelkerke et al., 2009). The Contract Close relates to the stipulation of the obligations and responsibilities on the basis of the tender documents and the most economically advantageous tender. The key obligations of the contractor and the contracting authority are laid down in Article 2.1 and 2.2 of the DBFMO Agreement to be signed by both the contracting authority and the contractor. The lender’s legal advisors carry out due diligence on the contracts. The insurance advisors evaluate and report on the adequacy of insurance provisions in the contracts, the proposed insurance package for the construction phase of the project, and renewals of insurance during operation. If accusations and claims are made on the address of the project during the project, the insurance advisor will handle these. Article 14 of the Direct Agreement covers the provisions about the insurances that are required by the contracting authority. The insurances are utmost important as they insure the contractor and thus, the contracting authority against risks that arise from unfavourable circumstances.

4.3.6 Financial Close

The lenders’ legal advisors also assist lenders in negotiating the financing documentation between the Contract Close and the Financial Close (Yescombe, 2014). Financial Close is the date on which the conditions precedent in the financial agreements are satisfied or waived, documents executed, and draw-downs become permissible. The Financial Close relates to the determination of the Weighted Average Cost of Capital and the definitive size of the gross availability payments to be laid down in the DBFMO Direct Agreement. Both the WACC and the gross availability payments are dependent of the interest rate level on the date of the Financial Close and the final version of the financial model. The final calculations usually takes place on or just before Financial Close, to enable lenders to check whether - using entirely up-to-date assumptions and the final versions of the contract - the project still provides them with adequate coverage for their loan (Yescombe, 2014). Once the lenders, the sponsors, the model auditor (if any) and the contracting authority agree that the financial model’s structure and the calculations reflect the projects and its contracts correctly, the basic input assumptions are settled and the financial structure and terms are agreed to and also incorporated in the model, the Financial Close can be concluded. This normally happens several months after the Contract Close (Nagelkerke et al., 2009).

The provisions regarding the Financial Close are stated in Article 3.2 of the DBFMO Agreement. In paragraph (a) of Article 3.2, it is said that the Financial Close must take place
within a pre-determined number of months following the final submission date. If the Financial Close cannot take place in this period as a result of a supervening event, then under paragraph (b) of Article 3.2 the period for attaining Financial Close shall be extended until the day that falls one month after the day on which the interrupting event no longer inhibits the attainment of Financial Close. If the Financial Close cannot take place within under paragraph (c) of Article 3.2 determined number of months after the final submission date due to a supervening event, then both parties are entitled to terminate the agreement. The contractor is obliged to set the date of Financial Close in consultation with the contracting authority under paragraph (d) of Article 3.2. Paragraph (e) of Article 3.2 stipulates that on the date of Financial Close the contracting authority and the contractor must enter into the Direct Agreement with the lenders. The obligation to determine the WACC and the gross availability payments on the date of the Financial Close is embedded in paragraph (g) of the article.

4.3.7 Financial Close Guarantee
Immediately after the winning bid is appointed, the preferred bidder will be requested to provide a bank guarantee, that can be called upon when the Financial Close is not reached in time. The aim of this bank guarantee is to push the contractor in arranging the financing as quickly as possible and on the other hand, to cover the extra costs incurred by the contracting authority in case the Financial Close will not be reached. This bank guarantee is referred to as the Financial Close guarantee and is entrenched in Article 3.3 of the DBFMO Agreement.

4.4 Financing and the realisation phase
The project does not stand still after Financial Close, and lenders continue to review their exposure during the execution of the object. The question whether the project can be completed on time, on budget and to the required specifications mainly resolves around the risks inherent in the construction process (Yescombe, 2014, p. 203). Key construction risks include amongst others: site acquisition and access; risks relating to the construction contractor; cost overruns; delays in project completion and; inadequate performance on project completion. This paragraph describes the presence of project finance throughout the realisation phase (see Figure 14). There will also be reflected on how the various project finance related elements are entrenched in the DBFMO Agreement. An overview of the project finance related articles of the DBFMO Agreement can then be found in Appendix B.

![Figure 14 Role of the F component in realisation phase](image-url)
4.4.1 Monitoring
As most problems that might affect the successful completion of a project are likely to occur during construction, lenders are eager to ensure that no problems occur during construction that will jeopardize the repayment of their debt services. Therefore, the lenders’ technical advisor is required to provide regular information on the progress by the construction contractor, once the project construction is under way. The technical advisor makes available regular reports to the lenders, stressing any particular problems that might occur during construction. The technical advisor may also be required to confirm that claims for payment by the construction contractor have been properly made and that the required performance tests on project delivery have been passed. However, it is not the task of the technical advisor to supervise or control the construction process in any way as this remains the responsibility of the contractor.

There is no article in the DBFMO Agreement about the obligation of lenders to monitor the construction. This is because the presence of lenders in the DBFMO contract stands apart from the relationship between the contracting authority and the contractor. Moreover, it is in the best interest of the lenders to monitor the construction and so, there are no obligations or special arrangements necessary in the agreement.

4.4.2 Performance Bond
As already mentioned, non-recourse finance implies that there are no guarantees from the sponsors for the project finance debt. Yet, it should be noted that there are still some guarantees that are regularly incorporated in the DBFMO contract (Koster & Hoge, 2008). The guarantees related to the application of project finance in DBFMO are in the form of security rights. These security rights are primarily requested by lenders to take away some of the financial uncertainties that are present in the project. By requesting guarantees from the contractor, financial incentives are built in for the contractor. Especially at the start of the construction phase guarantees are often requested by the contracting authority. This is because there are certain risks at the early stage of the construction phase that cannot be transferred or mitigated. The guarantee often applied at the start of the construction is referred to as the performance bond. Article 3.4 of the DBFMO Agreement is related to the performance bond. Paragraph (a) states that on the date of Financial Close, the contractor must provide a bank guarantee as security for the fulfillment of its obligations pursuant to the DBFMO Agreement. The size of the performance bond depends on the content that the parties have agreed upon and is in accordance with the model supplied in Annex 7 (Models), part 1 of the DBFMO Agreement. The term of the validity of the performance bond is fixed under paragraph (b) of Article 3.4 to one month after the scheduled availability date.

However, in reality the performance bond expires when the value of the construction exceeds the size of the guarantee (see Figure 15). The performance bond only ensures that the construction contractor starts with the construction proceedings and that there are sufficient resources for the client for retendering in an event that the contract is prematurely terminated due to actions of the construction contractor (Meesters, 2014). For example, suppose that a construction pit was dug for the construction work and that due to default of the construction contractor the contract is already ended at this stage, then the contracting authority solely possesses a construction pit, which is worth nothing. In this case, the contracting authority has to find a replacement contractor to build the work for him. By setting a bank guarantee for the realization phase, the costs of the construction pit will be at the expense of the defaulted contractor as well as the incurred cost of closing the pit. As the construction progresses, there comes a moment that the construction will be worth more
than the performance bond, that is when the guarantee expires (see Figure 15). So, paragraph (b) of Article 3.4 only states that the contracting authority is entitled to the performance bond from the date of Financial Close to one month after the schedule availability date.

![Figure 15 Bank guarantees as in: Meesters and De Jongh (2013)](image)

4.4.3 Other bank guarantees
Beside the Financial Close guarantee and the performance bond, the construction contractor may be requested to provide other bank guarantees to make sure that the project is delivered in time and in the agreed upon condition. The regulations about the deployment of bank guarantees are stated in Article 3.6 of the DBFMO Agreement. A second bank guarantee can be perceived as an extra incentive for the construction contractor besides the incentives that are already originated from the fact that the construction contractor only gets paid from the moment the project is delivered (Koster & Hoge, 2008). Therefore, it has been argued that the double incentive for completion of the project is an overkill, which makes the project unnecessarily expensive due to the high costs of the additional bank guarantee plus the incorporation of the associated risks in the total costs of the project by the construction contractor (Koster & Hoge, 2008). Critics claim that the incentives for the contractor based on the payment mechanism are already significant (Nagelkerke, 2013). On the other hand, Koster and Hoge (2008) note that the contracting authority will already suffer considerable damage if it turns out that the construction of the intended object cannot be completed in time. On top of the damage caused by missed potential uses, additional charges might arise. For instance, these charges might be related to the need of the contracting authority to take temporary actions or even to re-tender the entire project. This is exactly the reason why additional bank guarantees are sometimes required by the contracting authority as a safeguard to such unpleasant risks (Koster & Hoge, 2008). However, the obligation to provide bank guarantee against such unpleasant risks is not customary in the DBFMO Agreement.

4.5 Financing and the exploitation phase
After the project is completed, the availability certificate and the completion certificate are issued demonstrating that all conditions are fulfilled. At this point, the exploitation phase starts. This paragraph describes the presence of project finance throughout the exploitation phase (see Figure 16). There will be reflected on how the various project finance related elements are entrenched in the DBFMO Agreement. An overview of the project finance related articles of the DBFMO Agreement can then be found in Appendix B.
4.5.1 Payment mechanism
Different from other contract structures is the fact that the contracting authority does not pay for the delivery of the object, but starts paying for the availability of the object from the moment the project is delivered. During the exploitation phase, the financing will be fully repaid through an availability fee. A typical cash flow regime of DBFMO projects can be seen in Appendix C. The availability fee is a monthly fee for the availability of the object during the term of the contract. The contracting authority makes the payment only when the agreed performance has been delivered. The fee is reduced for any periods of non-availability, and if the services provided are not the required standard. As the client only pays for the agreed upon level of services and availability, the payment mechanism is an incentive for the contractor to deliver good performance. Therefore, the availability fee is a steering tool of the contracting authority to ensure that the contractor is delivering good performance. As a result, the payment mechanism inherent in availability-based contracts makes sure that the interests of the contracting authority as well as the contractor are balanced and safeguarded (Government Building Agency, 2012). The regulations about the payment mechanism inherent in DBFMO projects are enclosed in Annex 2 (Payment Mechanism) of the DBFMO Agreement. Part 1 of Annex 2 (Payment Mechanism) specifies the calculations of the size of the availability payment. The regulations about the adjustments for non-availability and non-performance are enclosed in part 2 and 3 of Annex 2 (Payment Mechanism).

4.5.2 Quality assurance and monitoring
Availability is relatively easy to measure if a specific piece of equipment or service is being provided, but rather difficult to measure for public-service buildings. This is due to the fact that the share of loss of availability and thus, the penalty payable is very complex and project-specific, especially if parts of the building provided may still be available or partly usable for its required purposes, and if some parts of the building are more important than others (Yescombe, 2014, p. 118). Next to the basic availability requirements, there will also be requirements for a certain quality level of services. With the obligation to stipulate standards of performance in great detail, measurement of service performance may be highly complex. These specifications are often referred to as Key Performance Indicators (KPIs). The KPIs are typically monitored through a Performance Management System, under which the contractor has to report the contracting authority on performance against KPIs on a regular base. Also, the lenders’ technical advisor continues to monitor and report on operating
performance and maintenance. This is because lenders have a great interest in the contractor keeping up to the performance level agreed by the contracting authority. After all, poor performances may lead to penalties and discounts on the availability fee and thus, may jeopardize the repayments of the debt services.

As already pointed out in paragraph 4.4.1, there are no monitoring obligations of the lenders in the DBFMO Agreement. Yet, there are regulations about the monitoring obligations of the contractor. Under Article 5.2 of the DBFMO Agreement it is stipulated that the contractor must maintain the availability of the object in accordance with the output specifications and the regulations from the availability date up to and including the expiry date. The regulations about the obligation to monitor the availability and performance of the object by the contractor are stated in Article 8.1 of the DBFMO Agreement. This article stipulates that the contractor must draw up a monitoring plan and must undertake monitoring in conformity with this monitoring plan. The contractor must also consult the contracting authority on the result of the execution of the monitoring plan. The contractor is obliged to provide the contracting authority a monthly monitoring report on the results of the execution of the monitoring plan. Based on the results of the monitoring report, it is checked whether the agreed upon level of availability and/or quality is not been reached, the contractor is obliged under Article 8.8 to rectify the shortcomings within a reasonable period of time. If the requirements are still not met after the applicable rectification period, a discount on the fee can be held, accept if the deficiency is the result of an supervening event or the interruption of utility services insofar as the deficiency is not due to shortcomings of the contractor.

4.5.3 One-time payment option

In many Dutch DBFMO projects, the basic idea that the contractor must fully earn back his investment from the exploitation is alleviated. In this context, alleviation means that an one-time payment is done by the contracting authority to the contractor on the completion date of the object to be realized. Sponsors prefer frontloaded payments to recover their equity return faster (Engel et al., 2010). The advantage of such one-time payment is that the financing cost of the SPV will be reduced, since a part of the financing is already recovered at the completion date. Consequently, the contracting authority has to pay a lower availability fee during the term of the contract (see Figure 17).

By linking the one-time payment to the moment the object is realized, the financial incentive to deliver the object on time and in good condition stays as large as possible. The fact is that during the construction phase - which is usually regarded as the most risky project phase - the financial exposure of the contractor is at a maximum level. Once the object is realized, the financial exposure and thus, the project risks tend to drop allowing a more restricted financial incentive to be acceptable for the contracting authority (Koster & Hoge, 2008). However, the size of the one-time payment should be chosen in a way that even after the payment sufficient incentives remain for the contractor to perform adequately; i.e. the slope in Figure 17 representing the availability fee should be steep enough to retain the incentive regime inherent in the payment mechanism. If the one-time payment is too large and the slope becomes too gradual, the one-time payment becomes undesirable as it leaves the contracting authority potentially exposed to the sponsors having a much lower commitment to the operation of the project in the later years of the project agreement. In part 5 of Annex 2 (Payment Mechanism) of the DBFMO Agreement, the option to make an one-time payment is enclosed.
Figure 17 Structure one-time payment as in: Meesters and De Jongh (2013)

4.5.4 Transfer guarantee
Besides the Financial Close guarantee and the performance bond, the sponsors may also be requested to provide a third bank guarantee as a security that the project is in good condition at the end of the DBFMO contract. This guarantee is aimed at covering the risk of inadequate provision of maintenance services just before the expiry date of the contract. The guarantee should be of such magnitude that it provides a serious incentive to commit adequate maintenance, especially in the final years of the contract (Koster & Hoge, 2008). This is because the largest part of the financing is already recovered at the end of the term and hence, only a small fraction of the financing has to be repaid. As a result, the incentive for the contractor to deliver adequate maintenance is reduced and so, the risk of negligence by the contractor increases. For that reason, the contracting authority will request a guaranteed transfer of the object in an adequate condition at the end of the contract.

The obligation for the contractor to provide a transfer guarantee is covered in Article 7.3 of the DBFMO Agreement. Paragraph (a) of Article 7.3 stipulates that the contractor must provide a bank guarantee no later than a fixed number of months prior to the expiry date as security for the fulfilment of its obligations based on the DBFMO Agreement.

4.6 The role of the F component
Based on the analyses of the presence of project finance in each of the DBFMO life cycle phases, the role of the F component can be demarcated. The role of the F component can be divided into three core functions. First, the F component is a financial means to obtain funding for a project. Second, it provides securities for the client and third, it generates incentives for the contractor to perform well. Each of these core functions is extensively described below.

4.6.1 Financial means
The aim of the integration of the F component in the DBFMO contract is that it takes care of the financing of a project. In this respect, the F component is a financial means to organise the funding. Due to the integration of the F component in the DBFMO contract, the financing issue is delegated to the private sector. By means of project finance a rather different structure compared to publicly funded projects appears. Characteristic of project finance is the involvement of lenders in the project’s operations. Lenders mainly pre-finance the investment and are only able to recover their debt services during the exploitation phase (see Appendix C). As lenders provide the largest part of the financing on a non or limited
recourse base, they are particularly eager to ensure that the debt is adequately repaid during exploitation. In order to make sure that the size of the debt repayments over the entire term of the contract properly reflects the total investment sum, extensive calculations and projections are made during the preparation phase. Assumptions about interest rate levels, project costs, operating costs and financial costs all are incorporated in the calculations and included in the financial model. Based on the calculations in the financial model, one single budget is fixed for the entire project. This all-in-one budget takes account of all costs occurring in the construction phase as well as the maintenance and operational costs.

Since there is only one single budget for construction and exploitation, there is a considerable amount of freedom to decide how to divide the budget among construction and exploitation activities. It is up to the candidates in the tender to decide about the optimal allocation of the budget. This is referred to as interchangeability of budgets. Interchangeability implies that the budget for construction and the budget for maintenance and services are convertible. This means that there are no separate budgets for construction and exploitation. The interchangeability of budgets has advantages over the use of separate budgets. This is because the candidates in the tender are forced to take account of all costs accruing throughout the entire term of the contract, when proposing a bid. For example, the candidates should take notice of the replacement costs and maintenance expenses of the materials selected already in the budgeting of the bid. As a result of the integrated approach, life cycle optimisations may occur.

The combination of broadly formulated output specifications and the interchangeability of budgets may even enhance the possibility of life cycle optimisations to arise. As the output specifications are output driven, maximum scope is provided to the candidates to come with innovative solutions and to offer the best quality at the most competitive price. By formulating the output specifications in an open and abstract manner, they will serve as a perfect point of departure for a dialogue in which the client’s request and the solutions proposed by the candidates can be optimised to achieve the maximum benefit for both parties. The output specifications and the interchangeability of budgets together provide maximum room to candidates to develop innovative and sustainable solutions while keeping the life cycle costs in mind. In this way the output specifications combined with the interchangeability of budgets contribute to the integrated approach characteristic of DBFMO projects. By creating innovative solutions and allocating the budget efficiently between construction and exploitation, the F component becomes a valuable instrument to finance projects. Besides the fact that project finance is a means to arrange the financing by dint of one single budget, there are two other functions that come along with the integration of financing in the DBFMO contract.

4.6.2 Security for the client
The second role the F component fulfils is the provision of assurances or guarantees towards the client. Most securities under DBFMO contracts are the result of the active involvement of lenders in the project’s operations. Project finance goes hand in hand with the active involvement of lenders in the project’s operations. It can be said that the interests of the client and the lenders in a DBFMO project are to a certain extent equated (Koster & Hoge, 2008). The active involvement of lenders in the project’s operations is not only to the advantage of lenders, but also the client benefits from the active participation of lenders in the project. Since projects are financed for a large extent by loans of commercial banks, banks are very anxious to make sure that they will earn their money back. As lenders receive no guarantees beyond the right to be paid from the cash flows of the project, one can assume that they will
have a particular interest in whether the project really performs and that sufficient cash flows are generated. In order to safeguard sufficient cash flows, they need to ensure that the risks inherent to the project are allocated to appropriate parties other than the SPV or mitigated if possible. The SPV enters into back-to-back agreements with subcontractors to reduce the risk of the project as much as possible (Van Ee, 2014). By transferring the risks to the subcontractors, the financial consequences of reduced cash flows become the responsibility of parties outside the SPV (Nagelkerke, 2013) (see Figure 18). The allocation of risk to other parties than the SPV is beneficial for the client as it will minimize the risk for the client and hence, it enhances the assurance that the project will be completed on time and in the agreed upon condition. In exchange, private parties will require a risk premium reflecting the higher cost of capital for bearing the risk (Sawyer, 2005).

![Figure 18 Transference of risks to private parties other than the SPV](image)

Lenders do not only carry out extensive risk assessments as part of their due diligence, but they also carry out legal, financial and technical due diligence on the tender and ultimately on the contracts. Before the consortium is submitting its final tender, the lenders would have the tender extensively checked by their technical advisors in order to eliminate weak and risky points. Since the construction contractor plays a vital role in the project, the client is eager to know whether the construction contractor is adequately qualified for the job, with sufficient experiences personnel to undertake the tasks. Therefore, as part of the due diligence the lenders’ advisors also check the suitability of the management structure of the SPV and the capability of the personnel for construction and exploitation (Ruding, 2008). In this way, the due diligence organized by the lenders provides relevant information to the client and so, it enhances the client’s confidence level. After the Financial Close, lenders continue to ensure that poor performance of the consortium is prevented. They keep monitoring the construction and exploitation and provide reports about the financial performance on a regular base. The step-in rights enclosed in the Direct Agreement also
allow interventions in the contractor’s business operations if these seriously fail thus possible endangering the recovering of the debt services. Therefore, lenders safeguard the continuity of the project which is, in turn, utmost appreciated by the client.

Furthermore, the bank guarantees requested by lenders also ensure that securities are provided towards the client. The Financial Close guarantee is aimed at forcing the contractor to arrange the financing as quickly as possible and to cover the extra costs incurred by the client in case the Financial Close will not be reached. The performance bond protects the client against the possibility of default by the contractor in the early stages of the construction when the project is worth nothing. At this stage the project has not obtained any value (see Figure 15). Yet, it is most likely that already at this point costs are incurred, for instance for digging the construction pit. To prevent the client against the possibility of default by the contractor at this stage, a performance bond is requested from the contractor. Likewise, the transfer guarantee is designed to protect the client against the possibility of default by the contractor just before the expiry date. This is because just before the end of the term the largest part of the availability fee is already paid and thus, little incentives are left for the contractor to carry out the last maintenance and replacement activities. By requesting bank guarantees for all these threats, the client is relieved from any potential damages as a result of default by the contractor.

The final constituent that contributes to the confidence at the client’s level is the certainty arising from the fact that project finance only contains one single budget for the entire project. Due to the fact that the budget for the entire term of the contract is fixed in the preparation phase, the client obtains a considerably high degree of price certainty already in the early phases of the project. Moreover, the likelihood of budget overruns is minimalized as most risks that concern the project to be delivered in time, are allocated to parties other than the SPV. This enhances the guarantees to the client considerably. Altogether, it can be stated that project finance in DBFMO projects provides strong guarantees towards the client. These guarantees are closely related to the active participation of lenders in the project’s operations. Not only the lenders, but also the client will benefit from the due diligence and monitoring activities performed by the lenders’ advisors. These activities, along with the issued bank guarantees and typical project finance structure, provide strong guarantees towards the client as regards the proper functioning of the object.

4.6.3 Incentive for the contractor

The third function of the F component that comes to mind when analysing the DBFMO process is the incentive regime imposed on the contractor. This function has to do with the fact that the DBFMO contract is a performance-based contract. Under performance-based contracts, strategic performance standards are developed and payments are directly linked to performance against these standards (Hoffman, 2001). During the exploitation phase the debt services are repaid through an availability fee. The size of the availability fee is subject to adjustments in size in case of non-performance or non-availability. In case of non-performance or non-availability, the client is allowed to pay a discounted fee. In this respect, the payment mechanism in DBFMO projects offers room for penalties and discounts in case of non-performance or non-availability. Therefore, the availability fee connects the contractor’s performance to the payment made by the client. Since the client only pays for an agreed level of service, the payment mechanism is a tool of the client to steer the contractor to perform well (Nagelkerke, 2013). Therefore, the payment mechanism closely linked to project finance works as a financial incentive for the contractor to do what is agreed upon in the contracts. Only when the object delivers the agreed upon level of services, the contractor
can meet its obligations towards the lenders. As the risks of non-performance and non-availability are mainly transferred to the subcontractors of the SPV, they have to bear the financial consequences. In view of that, subcontractors are particularly anxious to deliver good performance.

The incentives for the contractor to deliver good performance are also secured in another way. Broadly formulated output specifications together with one fixed budget are a stimulus to come up with innovative ways to provide the best quality at the most competitive price. By taking account of the maintenance and replacement costs of the materials already in the decision making process, optimal decisions can be made that will eventually lower the overall costs of the project. The fact that there is one single budget, encourages the consortium to come up with cost-saving thoughts. This is because one fixed budget for the entire project works as a price cap; all cost savings made are gains for the consortium (Engel et al., 2010). However, one can assume that without a prescribed level of quality, the willpower to make such cost savings will eventually jeopardize the level of quality of the object. Therefore, in order to safeguard the quality level, output specifications are set under DBFMO procurement. Since output specifications indicate what is to be achieved and not how it is to be achieved, maximum scope is provided to come up with innovative cost saving ideas, while simultaneously guaranteeing the required level of quality. In this way, incentives are built-in to reduce costs, while keeping the required level of quality in mind. The construction contractor will not put the quality of the object at risk as this might result in financial implications in the form of penalties and discount on the fee. Penalties and discounts on the fee might jeopardize the contractor being able to meet its obligations towards the lenders. Therefore, the contractor is encouraged to deliver the required level of performance as agreed upon in the contracts.

4.7 Specifications of the F component

Table 1 shows that the role of the F component is made up of three core functions and that each function, in turn, is built up of multiple specifications. The specifications together embody the role of the F component. Based on the three core functions described in the previous paragraph, the specifications that together give substance to the role of the F component in DBFMO can be discerned. Each of the functions has its own set of specifications.

Table 1 The role of the F component

<table>
<thead>
<tr>
<th>THE ROLE OF THE F COMPONENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FINANCIAL MEANS</strong></td>
</tr>
<tr>
<td>• One single budget</td>
</tr>
<tr>
<td>• Interchangeability of budgets</td>
</tr>
<tr>
<td>• Availability fee</td>
</tr>
<tr>
<td>• Output Specifications</td>
</tr>
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<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

4.7.1 Specifications

The specifications that together embody the role of the F component are presented in Table 2. Each specification is assigned to the core function it belongs. Some of the specifications
are part of more than one function. Four specifications give substance to the role of the F component as financial means. The first specification is the availability of one single investment budget for the entire project. This all-in-one budget takes account of all costs occurring in the construction phase as well as the maintenance and operational costs. The second specification closely related to the first one is the interchangeability of budgets for realisation and exploitation. It implies that there are no strict budgets for capital expenditure (CAPEX) and operating expenditure (OPEX). The contractor is free to decide how to spend its budget on OPEX and CAPEX. During exploitation, the total sum of financing provided by lenders including interest must be recovered by means of the periodic availability fee (third specification). The use of output specifications is the last specification. Along with the all-in-one budget, the output specifications provide maximum scope to the contractor to spend the budget wisely over the different realisation and exploitation activities.

Six specifications are part of the role of the F component as security for the client (see Table 2). The first specification is the transference of risks to private parties other than the SPV. Lenders make sure that no significant risks stay at the SPV. Lenders carry out extensive risk assessments as part of their due diligence and make sure that the contracts reflect the allocation of risks to parties outside the SPV. The second specification is the due diligence performed by lenders. Lenders’ advisors perform due diligence on the contracts before signing the contract. After the contract is signed, lenders closely continue monitoring the construction (third specification) and exploitation (fourth specification) searching for problems that might affect the successful operation of the object. The issued bank guarantees under project finance are the fifth specification. Together, the Financial Close guarantee, the performance bond and the transfer guarantee keep the client from financial consequences as a result of the contractor’s default. Also, the use of one single budget for the entire project attributes to the level of assurance obtained by the client. Since the budget for the entire term of the contract is determined in the preparation phase, the client obtains a considerably high degree of price certainty already at an early stage of the project.

The role of the F component as incentive for the contractor entails four specifications (see Table 2). The first two specifications are the use of output specifications and the deployment of one single budget for the entire project. Broadly formulated output specifications combined with a fixed budget for the entire project are an stimulus for the contractor to come up with innovative ways to achieve the best quality at the most competitive price. This is because a fixed budget for the entire project works as a price cap so that all cost savings incurred contribute to the profitability of the contractor, whereas the use of broadly formulated output specifications provides maximum scope to the contractor to devise cost-savings ideas. The third specification is the availability payment. The availability fee connects the contractor’s performance to the payment made by the client. Since the client only pays for an agreed level of service, the payment mechanism is a tool of the client to steer the contractor to perform well (Nagelkerke, 2013). The availability fee is respectively high as amortisations and interest rates are included in the fee. Since the fee is significantly high, the contractor is encouraged to deliver the services in the agreed upon condition. This is because the client is allowed to pay a discounted fee in case of non-performance or non-availability. Therefore, the opportunity to use penalties and discounts in case of non-compliance is the fourth specification of the role of the F component as incentive for the contractor to perform well.
Table 2 Specifications and functions of the F component

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Financial Means</th>
<th>Security for the Client</th>
<th>Incentive for the Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>One budget</strong> for the entire project</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2. <strong>Interchangeability of budgets</strong> for realisation and exploitation purposes</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3. <strong>Risks are transferred</strong> to parties best able to manage them other than the SPV</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>4. During the procurement, lenders will test the quality of the consortium’s bid and the contracts (<strong>due diligence</strong>)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5. Lenders monitor the performance of the consortium during realisation</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6. Lenders monitor the performance of the consortium during exploitation</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>7. <strong>Bank guarantees</strong> against risk of contractor default</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8. Broadly formulated <strong>output specifications</strong></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>9. <strong>High availability fee</strong> (incl. interest rates and amortizations)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>10. Opportunities to impose <strong>discounts and penalties</strong></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Table 3 Checklist

<table>
<thead>
<tr>
<th>Questions:</th>
<th>Functions:</th>
<th>Specifications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How is the budget organised?</td>
<td>FM, SC, IC</td>
<td>One single budget</td>
</tr>
<tr>
<td>2. To what extent is the contractor free to spend the budget on CAPEX and OPEX?</td>
<td>FM</td>
<td>There is interchangeability of budgets between construction and exploitation</td>
</tr>
<tr>
<td>3. How are the risks mitigated?</td>
<td>SC</td>
<td>Mainly transferred to private parties other than the SPV</td>
</tr>
<tr>
<td>4. How is the investigation of the documents and stakeholders done prior to signing the contracts?</td>
<td>SC</td>
<td>Due diligence by lenders</td>
</tr>
<tr>
<td>5. How is the monitoring organised during the construction?</td>
<td>SC</td>
<td>Lenders’ advisors monitor construction</td>
</tr>
<tr>
<td>6. How is the monitoring organised during exploitation?</td>
<td>SC</td>
<td>Lenders’ advisors monitor exploitation</td>
</tr>
<tr>
<td>7. Are there bank guarantees issued?</td>
<td>SC</td>
<td>Yes, at least three: the Financial Close guarantee; the performance bond and; the transfer guarantee</td>
</tr>
<tr>
<td>8. How does the contracting authority steer the contractor?</td>
<td>IC</td>
<td>Output Specifications &amp; Payment Mechanism</td>
</tr>
<tr>
<td>9. How is the payment mechanism organised?</td>
<td>FM, IC</td>
<td>Availability Fee</td>
</tr>
<tr>
<td>10. How and to what extent are there bonuses and penalties included in the contracts?</td>
<td>IC</td>
<td>Yes, there are adjustments on the fee possible</td>
</tr>
</tbody>
</table>
4.7.2 Specifications and DBMO

Together, the specifications described above embody the role of the F component in DBFMO. The specifications will serve as an underpinning for further research on how the role of the F is substituted in DBMO projects. By using these specifications as a starting point, it can be explored how these specifications are settled in contracts that do not hold the F component. By investigating how the specifications are arranged in DBMO projects, a better understanding can be obtained of how the loss of the F component is overcome in DBMO projects. Table 3 can be used as a checklist to evaluate Dutch DBMO projects. As can be seen in Table 3, each question is ascribed to one of the three core functions. In fact, all three functions are closely related and hence, some of the questions should actually be allied to multiple functions. However, to keep the checklist organised, the questions are purely categorized on the basis of their most relevant function. The checklist is further used in the second part of this thesis to explore how Dutch DBMO projects take care of the specifications.

4.8 Conclusion

In this chapter, the role of the F component in Dutch DBFMO building projects is defined. Characteristic of DBFMO projects is that they make use of project finance. Project finance is defined as a method of raising long-term debt financing based on lending against cash flows generated by a project that is legally and economically self-reliant. As the contractual arrangements are rather complex due to the involvement of lenders in the DBFMO contract, a standardized tailor made DBFMO contract is developed in the Netherlands. The standard DBFMO model covers all arrangements and provisions that stem from the integration of project financing in the DBFMO contract. The presence of project finance is evident in all phases of a DBFMO project. Based on the analyses of the presence of project finance in each of the DBFMO life cycle phases, it has been found that the role of the F component in DBFMO is composed of three core functions:

i) it is a financial means to obtain funding for a project;
ii) it provides assurances or securities towards the client, and;
iii) it generates incentives for the contractor to perform well.

As the F component is not only a financial means but also a security for the client as well as an incentive for the contractor to perform well, one might infer that the integration of the F component adds value to a project. This presumption is in line with the philosophy of the Dutch government. The Dutch government has opted for DBFMO, precisely because it believes that added value can be realized by DBFMO as compared to contract structures that do not involve project finance. In one of the progress reports, the government explicitly states that DBFMO is a tool to achieve productive and allocative efficiency. As regards the main functions of the role of the F component described in this chapter, it is relevant to explore what the effects of the presence of the F component are on the added value of a project. Conversely, since DBFMO is not always feasible especially for projects of smaller scope, it is also valuable to explore whether the same level of added value can be achieved without the use of project finance through other arrangements in DBMO projects. In the next chapter, this research will focus on the term added value in theory.

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5 (“Publiek Private Samenwerking, samen werken aan meerwaarde,” 2007, p. 9)
The term added value is often put in relation to DBFMO projects. However, despite the fact that various sources in literature have highlighted the added value potential of DBFMO, an uniform description for the term ‘added value’ is lacking. Therefore, before we go into detail about the added value in relation to DBFMO and the F component in specific, an uniform definition is stated. Since it is made clear in chapter 4 that the F component is not only a financial means but also a security for the client as well as an incentive for the contractor to perform well, one might infer that the integration of the F component adds value to a project. In view of that, it is relevant to explore how the presence of the F component affects the level of added value of a project. Therefore, the criteria for assessing the added value of integrated projects that in some way are related to the presence of project finance in DBFMO, are defined in this chapter. For each of the criteria an assumption is made how the effects contribute to the level of added value of DBFMO. These assumptions are then tested in the practical part of the research.

5.1 Terminology ‘added value’
Value and value maximisation are commonly-used notions in the discipline of project management. “The fundamental idea is that a project should yield value: value to someone at some point in time” (Maylor, 2010, p. 87). A value-maximisation view is representative of the attitude of stakeholders in a project. A value-maximization view requires that a project is about delivering value rather than delivering the project itself. Such an approach is directed at maximisation of the overall value of the project.

5.1.1 Definitions in literature
Added value, value added and value creation are expressions frequently used in multiple disciplines across the economy. Added value as a noun has a broad range of perception and thus, can be used in multiple contexts. This makes it an umbrella term covering a wide range of aspects. As the term added value has a broad range of perception, it simultaneously contains a hidden danger. For instance, when two parties agree to one another on the subject of added value, it may be that both parties perceive the term added value in rather different ways. What could be considered beneficial for one may not be beneficial for the other (Reijniers, 1994, p. 137). For instance, for one party the added value is captured in a specific aspect, whereas from the other party’s perspective this aspect has no
contribution to his purported value at all. Yet this party approaches added value from a totally different angle. Consequently, it appears that both parties speak a different language. To avoid misconceptions, this chapter is directed at formulating an uniform definition for added value that can be used as a foundation to evaluate the added value of projects later on.

Added value is defined by various sources in literature. Below, four definitions of different dictionaries are stated.

1. The Online Business Dictionary defines added value in economic context as:

   “...an amount added to the value of a product or service, equal to the difference between its cost and the amount received when it is sold. Wages, taxes, etc. are deducted from the added value to give the profit” (Online Business Dictionary, 2014a).

2. The Online Cambridge Dictionary describes added value in the broadest sense of the word as:

   “...an improvement or addition to something that makes it worth more” (Online Cambridge Dictionary, 2014).

3. The Online Oxford Dictionary only provides a definition for the expression value added. This dictionary makes a distinction between value added in economic sense and value added as a modifier in a more general sense. The following description can be found in the Online Oxford Dictionary:

   i) “[mass noun] Economics
   the amount by which the value of an article is increased at each stage of its production, exclusive of initial costs:
   the proportions of both total output and value added fell
   ii) the addition of features to a basic line or model for which the buyer is prepared to pay extra:
   [as modifier]: value-added digital technology
   [as modifier] (of a company) offering specialized or extended services in a commercial area” (Online Oxford Dictionary, 2014).

4. The Online Business Dictionary also provides a definition for the term value creation. Value creation is defined as:

   “The performance of actions that increase the worth of goods, services or even a business. Many business operators now focus on value creation both in the context of creating better value for customers purchasing its products and services, as well as for shareholders in the business who want to see their stake appreciate in value” (Online Business Dictionary, 2014b).

In order to provide an uniform definition for the term added value, the various definitions of the dictionaries are examined searching for the most appropriate definition. As seen in the blue box, the first definition stated by the Online Business Dictionary is purely focussed on the differences between input and output prices of a good or service and so, there is hardly any space for qualitative factors in this definition. This is contrary to the second definition stated by the Online Cambridge Dictionary, which is far more open to qualitative factors. Yet, the expressions something and worth more in this definition make the description rather
ambiguous and therefore, this definition lacks precision. The third definition stated by the Online Oxford Dictionary, however, is far more explicit and is formulated in an ample way. Particularly, the second part of the definition holds a generally valid description. In this definition, added value originates from adding features to the basic model that makes people willing to pay extra. Since the wide-ranging character is representative of the term added value, this definition covers quite well the scope of added value. But still, the broad range of perspectives characteristic of the term added value cannot entirely be derived from this definition. Therefore, a fourth definition is presented. Value creation is an expression that is closely linked to the term added value. The definition of value creation presented by the Online Business Dictionary is more specific about the different perceptions of stakeholders. The definition of value creation covers the various perspectives of stakeholders: namely it clearly states that business operators can create value by taking into account the added value perceptions of customers as well as shareholders. If this definition is to be combined with the second description of the term value added stated in the online Oxford dictionary, a nearly complete definition can be formulated.

5.1.2 Positive and negative effects
A final aspect that is lacking in all definitions and belongs to the definition of added value is the balancing of the positive and negative effects. By valuing the contributions to various objectives in terms of benefits and the use of scarce resources in terms of opportunity costs, a kind of cost benefit analysis can be drawn up, showing which project has the highest net benefits for given development aims (Verhaeghe, 2009, p. 3 of Chapter 1). This is necessary as projects typically have positive and negative effects and the difference can be assigned as net benefit or added value (Maylor, 2010, p. 87).

5.1.3 Uniform definition of added value
By combining the value creation definition of the online business dictionary along with the second description of the online Oxford dictionary and the net effect of balancing the positive and negative effects, an uniform and fully covered definition for the term added value can be formulated. The definition of added value further used in this thesis is then formulated as:

“...the net effect of adding features to a basic line or model from which the performance of actions increases the total value of the goods of services produced, taking into account the various value perceptions of the stakeholders involved.”

5.2 Added value and DBFMO
The terminology added value is used by the Government Building Agency to express the net effect of DBFMO relative to the traditional way of procurement. In this context, added value is taken as: “the difference between the public alternative and the bid by the private consortium” (Ministry of Finance, 2012). For the Government Building Agency (2009), creating added value implies that a building similar to traditional buildings can be achieved at a lower price or a better building at same price. A combination of both a lower price and a better building is also qualified as added value. In The integrated way of contracting: an introduction (2009)^6, the Government Building Agency enumerates various value added factors of DBFMO. A sample of the most important value added factors mentioned by the

Government Building Agency are: a strong integrated approach; life cycle cost optimisations; risk control; lower construction and failure costs; incentives to the contractor to innovate; incentives to the contractor to perform well and; certainty about costs early on in the process. The Government Building Agency also stresses that DBFMO projects are consistently delivered on time and budget in contrast to the delays and overruns most common in the traditional approach. In view of that, it can be said that DBFMO contracts have the ability to generate added value in terms of time, money and quality compared to other contract forms.

However there are also factors that impede added value from being generated by the project. Frequently mentioned factors that may reduce the size of the added value to be achieved are high transaction costs, high financial costs and inflexibility of the contract (Government Building Agency, 2009). In consideration of these negative effects, the Government Building Agency has decided to check each building project above the threshold value of 25 million euros whether it has added value potential through DBFMO. The Government Building Agency has decided to use a threshold value of 25 million euros for building projects, since it believes that projects must be financially significant so that the negative effects are more than outweighed by the positive effects (Ministry of Finance, 2013).

As a matter of policy, the suitability of a DBFMO contract structure for a particular project is determined at an early stage, even before the preparation phase starts (Government Building Agency, 2009). For building projects above the threshold value of 25 million euros, the DBFMO contract form is considered based on the Public Private Comparator (PPC) and the Public Sector Comparator (PSC). The PPC and PSC are instruments to compare integrated contract forms with the public alternative over the required life of a project in order to select the most favourable option. These analyses demonstrate whether the project is suitable for public private collaboration or should remain in the hands of the government.

5.2.1 Public Private Comparator

In Dutch practice, value for money is explored before private parties are invited to tender, using a hypothetical public sector benchmark and a ‘shadow’ DBFMO bid. Value for money (VFM) is a term often used to refer to added value. Value for money alludes to the optimum combination of whole life cost and quality (of fitness for purpose) to meet the user’s requirement. The early indication of VFM is a prerequisite for approval of a DBFMO structure to proceed, and once the VFM has been shown theoretically possible, then the preparation of the procurement may start (see Figure 19). The instrument that is used to explore the initial potential for VFM is called the Public Private Comparator (PPC). The PPC evaluates the potential added – both qualitative and quantitative – value of projects relative to the traditional public alternative. It provides insights into the costs, gains and risks of integrated contract forms by which a large public project can be carried out. The PPC contains a step by step approach to calculate and argue about whether the proposed contract structure provides the best opportunities (Ministry of Finance, 2013). The calculation is based on life cycle costing. Life cycle costing not only includes the initial investment but also the expenditures of maintenance and operational activities during the term of the contract (Ministry of Finance, 2013). Since DBFMO is a complex contract structure whereby many assumptions about the near future are speculative, the PPC only shows a rough estimation.

7 The extended version of how the Public Private Comparator is used in Dutch construction can be found in: Ministry of Finance. (2013). Handleiding Publiek-Private Comparator. The Hague: Ministry of Finance.
The Government Building Agency together with the Ministry of Finance and the client will decide about the definitive contract form to be concluded. The final decision will be based on both financial and qualitative arguments (Ministry of Finance, 2013).

5.2.2 Public Sector Comparator

After the DBFMO contract structure is selected, the Governmental Building Agency carries out a second analysis, namely the Public Sector Comparator (PSC). The second analysis is necessary, because often initial estimates of VFM diverge widely from the real cost. This is particularly helpful in projects that involve new arrangements, changes in specifications and transfers of risks throughout the procurement (Netherlands Court of Audit, 2013). During the tender procedure, the PSC provides a more detailed calculation of the costs, revenues and risks over the life cycle of a project (see Figure 19). The PSC calculates the estimated cost of the traditional variant to determine whether it would be more cost effective to use a DBFMO contract or separate contracts. The PSC shows the total cost of the public variant during the project’s entire life. The PSC serves as a benchmark for the comparison with the private bids. The result of the comparison shows whether the private bids in the tender procedure may or may not be financially more advantageous than the public version (Netherlands Court of Audit, 2013, p. 35). Based on the PSC, the financial added value of DBFMO relative to the public alternative can be stated. If it turns out that all private bids exceed the amount of the PSC, the government is allowed to cancel the procurement and to retender the project in the traditional way (Government Building Agency, 2009, p. 51). In this way, the amount of the PSC will serve as a price ceiling or maximum price for the private bids in the tender.

Figure 19 Phasing tools as in: Government Building Agency, 2009 - Figure 9 p. 51

5.3 Criteria, project finance and DBFMO

Technically, the effects that ultimately result in added value can be measured by means of a set of criteria. There are many different criteria available to assess the effects that result in added value. Since the Government Building Agency believes that DBFMO can generate added value in terms of cost, time and quality compared to other contract forms, this thesis will use the cost time quality tripartite division as an underpinning for the selection of the added value criteria. On the basis of the cost time quality tripartite division, criteria will be selected that in a way are related to project finance in DBFMO.
5.3.1 Time, cost and quality (TCQ)
All projects face strategic choices. These choices concern a limited set of objectives. The basic considerations of the project’s objectives can be made in terms of time, cost and quality (TCQ) (Maylor, 2010, p. 84). The triangle - time, cost and quality - is so entrenched in the discipline of project management, that it is also reproduced in other disciplines. There is always a trade-off involved between these three key objectives and therefore, these objectives simultaneously pretend to be the constraints of a project (Maylor, 2010, p. 85). The time constraint refers to the amount of time available to complete a project. The cost constraint refers to the budgeted amount available for the project. The quality constraint relates to the standards by which the product as well as the output of the project and its process are judged. Generally, these three basic constraints are competing constraints: improved quality typically implies increased time and increased cost, a tight time constraint could lead to increased costs and reduced quality, and a tight budget could result in increased time and reduced quality. By dealing with these constraints efficiently, value can be created. Therefore, the time, cost and quality constraints are seen as the steering mechanisms of a project (Maylor, 2010). Maylor (2010) believes that in order to generate added value, projects must shift away from just achieving conformance and focus on the real performance of a project, while keeping the three basic criteria of time, cost and quality in mind. By doing so, the real performance of a project manifests itself in terms of:

i) the lowest cost;
ii) the shortest possible project duration; and;
iii) the highest level of quality that can be achieved (Maylor, 2010, p. 86).

5.3.2 Added value and project finance
In chapter 4, the role of the F component is explained by unravelling the three core functions of project financing in DBFMO. As the F component is not only a financial means but simultaneously a security towards the client as well as an incentive for the contractor to perform well, one might infer that the integration of the F component adds value to a project. With regard to these key functions, it is relevant to explore how the presence of the F component affects the level of added value of a project. The added value that is supposed to be contributed by the F component can be expressed through different criteria. Based on the cost time quality division, the criteria that are related to the presence of project finance in DBFMO are selected. These criteria and the associated effects are expounded in the remainder of this chapter. For this research, twelve criteria have been selected based on what has been written in literature.

The subsequent paragraphs go into detail about the cost criteria (§5.4), time criteria (§5.5) and quality criteria (§5.5) that are selected as they are assumed to be related to the presence of project finance in the DBFMO project. For each criterion, it is explained why the criterion is selected. Also, for each of the criteria an assumption is made how the effects of DBFMO relate to the effects accruing from projects under public provision. Public provision refers to the public alternative based on the traditional way of contracting. Since added value is defined as the difference between the public alternative and the bid of the private consortium, the traditional way of contracting is the benchmark for assessing the added value of DBFMO. Also, per criterion it is indicated whether the effect has a positive or negative impact on the level of added value.

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8 Explanation of the traditional way of contracting can be found in §3.1.1.
5.4 Cost criteria

Based on what has been written in literature, four cost criteria are selected that are by some means related to the presence of project finance in DBFMO. The four selected cost criteria are:

i) transaction cost (§5.4.1);
ii) cost of capital (§5.4.2);
iii) Life cycle optimisation with respect to construction and exploitation cost (§5.4.3), and;
iv) price certainty (§5.4.4).

5.4.1 Transaction cost

It is assumed that in DBFMO projects the contracting authority as well as the participating consortia make high costs. A term often mentioned in relation to these costs is the term ‘transaction costs’. Transaction costs are defined by Heiligers (2012, p. 13) as: “all costs that occur at the side of both the contractor and client for preparing, entering, executing and controlling the contracts”. Transaction costs in the broadest sense of the word, do not only cover the transactions in the initiation and preparation phase but also the overheads of the enactment and monitoring of the contracts during the construction and exploitation phase (Heiligers, 2012). The urge to find the best private sector partner, and to bargain, monitor and renegotiate a long-term contract and simultaneously provoke the right incentives as to strive for service quality, while restraining costs, makes a PPP a far more complex and delicate structure compared to in-house public provision (Janssen et al., 2010; Väälimä, 2005, p. 115).

In literature as well as in practice, transaction costs of DBFMO contract structures are seen as a major downside. Heiligers (2012) believes that the transaction costs in the contract management and preparation phase of a project will rise significantly as a result of the integration of project financing. Engel et al. (2010, p. 59) mention that the transaction costs resulting from the mobilisation of project finance could be so high that they wipe out the advantages of PPPs. Also, (Väälimä, 2005, p. 115) believes that the establishment of a PPP through project finance is accompanied with high transaction costs that undermine the productive and efficiency gains intrinsic to a PPP structure. According to (Väälimä, 2005, p. 109), the main sources of higher transaction costs in DBFMO are their long-time character, financial structure and risk-sharing features. For all these reasons the tendering, financing and monitoring processes become more resource consuming than in traditional short-term contracting (Väälimä, 2005, p. 109). Engel et al. (2010, pp. 59-60), believe that the higher transaction costs stem from complexity issues, longer lead times and high agency costs inherent in DBFMO. Heiligers (2012) researched the size of the transaction costs of DBFMO and found that the higher transaction costs in DBFMO projects primarily emanate from high design costs, complicated tender management and the active involvement of lenders.

An example of a simplified overview of the transaction costs of DBFMO up until the awarding of the MEAT is presented in Table 4. As can be seen, a significant part of the transaction costs is already incurred in the tender procedure, albeit it is unknown at this point who of the candidates will actually win the tender. At this stage, the transaction costs are primarily made up of due diligence costs, tender management fees, advisory fees and design costs. As the competitive dialogue prescribes that not only one but three candidates are required to submit their final tender, there will also be three elaborated designs and thus, the total costs up to the submission of the tender will be three times as high. Hence, there is significant cost at risk for the candidates in the tender procedure and so, each candidate will include an 1-
in-3 chance of winning a bid in the calculations of the transaction costs. With reference to the 1-in-3 chance of winning, Allen (2001) believes that the bidding costs to all potential contractors have reached as much as three per cent of the expected total project costs, regardless of project size, which is three times higher than under traditionally procured building projects.

Table 4 Simplified overview transaction costs (based on example provided by Brink Groep)

<table>
<thead>
<tr>
<th>TRANSACTION COST UP TO THE AWARDING OF THE MEAT</th>
<th>COSTS IN € (X 000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financing &amp; structuring</strong></td>
<td></td>
</tr>
<tr>
<td>Due diligence</td>
<td>225</td>
</tr>
<tr>
<td>• Technical</td>
<td>75</td>
</tr>
<tr>
<td>• Legal</td>
<td>75</td>
</tr>
<tr>
<td>• Insurance</td>
<td>25</td>
</tr>
<tr>
<td>• Financial</td>
<td>50</td>
</tr>
<tr>
<td>Tender management</td>
<td>250</td>
</tr>
<tr>
<td>Legal advice</td>
<td>150</td>
</tr>
<tr>
<td>Financial advice</td>
<td>135</td>
</tr>
<tr>
<td>Fiscal advice</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total costs structuring</strong></td>
<td><strong>800</strong></td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td></td>
</tr>
<tr>
<td>Design management</td>
<td>250</td>
</tr>
<tr>
<td>Architect</td>
<td>600</td>
</tr>
<tr>
<td>Consulting engineers</td>
<td>250</td>
</tr>
<tr>
<td>Facility advice</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total costs design</strong></td>
<td><strong>1250</strong></td>
</tr>
<tr>
<td><strong>Total costs structuring &amp; design</strong></td>
<td><strong>2050</strong></td>
</tr>
<tr>
<td>Compensation dialogue rounds</td>
<td>(700)</td>
</tr>
<tr>
<td><strong>Project costs at risk</strong></td>
<td><strong>1350</strong></td>
</tr>
<tr>
<td>Risk multiplier (x)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total costs incl. risk premium</strong></td>
<td><strong>4050</strong></td>
</tr>
</tbody>
</table>

Table 5 Transaction costs versus project size (based on example provided by Brink Groep)

<table>
<thead>
<tr>
<th>Project size in € (x 000)</th>
<th>Transaction costs at risk (x 000)</th>
<th>Transaction costs incl. risk premium (x 000)</th>
<th>Costs at risk vs. project size</th>
<th>Costs incl. risk premium vs. project size</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 000</td>
<td>1350</td>
<td>4050</td>
<td>6,8%</td>
<td>20,3%</td>
</tr>
<tr>
<td>40 000</td>
<td>1350</td>
<td>4050</td>
<td>3,4%</td>
<td>10,1%</td>
</tr>
<tr>
<td>60 000</td>
<td>1350</td>
<td>4050</td>
<td>2,2%</td>
<td>6,8%</td>
</tr>
<tr>
<td>80 000</td>
<td>1350</td>
<td>4050</td>
<td>1,7%</td>
<td>5,1%</td>
</tr>
<tr>
<td>100 000</td>
<td>1350</td>
<td>4050</td>
<td>1,4%</td>
<td>4,1%</td>
</tr>
</tbody>
</table>

However, transaction costs continue to increase after the awarding of the MEAT. Particularly, the lenders’ due diligence and control processes, and the advisers required for this purpose increase the costs significantly. Also, fees for financial and legal advice up to Financial Close contribute to the size of the transaction costs. Heiligers (2012) included the costs that incur after the awarding of the MEAT in the calculations of the transaction costs and found that the total transaction costs for the consortium have a bandwidth of 1 to 3 per cent of the DBFMO contract value. However, it is not clear whether Heiligers (2012) included the 1-in-3 chance of
winning in her calculations. Under the assumption that Heiligers (2012) only took account of the transaction costs at risk, the bandwidth including the risk premium would be much wider. Another comment is that design costs, expenses on due diligence and other transactions generally do not grow proportionally with the size of a project. In fact, transaction costs do not or to a limited extent scale with the size of a project. This means that the percentage of transaction costs relative to project size will be significantly higher for projects of smaller scope than for projects of large size (see Table 5). Because of this, it can readily be argued that the size of the transaction costs is a barrier for projects below a certain threshold value.

Overall, it can be stated that DBFMO projects involve high transaction costs and that these costs are partly related to the presence of project finance in the DBFMO contract. Because lenders are very concerned with the project generating sufficient cash flows, they become actively involved in the project’s operations. As a result of the active stance of lenders, the total transaction costs grow. Particularly, the lenders’ due diligence and monitoring processes of advisors during construction and exploitation contribute to the large scale of the transaction costs.

Therefore, it is assumed that:

“DBFMO contracting involves higher transaction costs than the traditional way of contracting.”

Moreover, since transaction costs enhance the overall cost of a project, it can be expected that the scale of the transaction costs of DBFMO has a negative effect on the added value of a project.

5.4.2 Cost of capital

Besides being lengthy, complex and resulting into high transaction costs, project finance is also an expensive method of financing. Various sources in literature have pointed towards the substantial financial costs under DBFMO. A recurrent criticism of project finance is that it costs more per dollar of financing than government debt (Riess, 2005). Engaging the private sector in funding major projects implies higher financing costs because the return required by lenders exceeds the costs of issuing public sector debt (Grimsey & Lewis, 2005, p. 351). Financial costs consist of all costs that are reflected in the applied interest rates including the financial fees. Arrangement fees, commitment fees, agent fees, swap margins, rate of return on debt and rate of return of equity all contribute to the magnitude of the financial costs. In general, project finance rates are higher than interest rates on government debt. Yescombe (2014, p. 20) notes that the lender’s margin over the financial costs can be two to three times that of public finance. In the Netherlands, the weighted average cost of capital under private financing is around 5% to 7%, whereas the cost of capital under public financing is around 2% to 3% (Aalbers, 2013).

The higher cost of capital stems from the fact that the incorporation of project finance in the DBFMO project imposes risk on the private party, and this is translated into a so-called PPP premium (Engel et al., 2010, p. 57). The PPP premium reflects the likelihood that the work may not be available at some point during the term of the contract and subsequently, no payments will be received to recover the debt. Due to the fact that lenders are very anxious to earn their money back and the potential of conflicts present under the SPV structure, various arrangements and guarantees have to be incorporated into the contractual agreement, which are directly reflected into the interest rates requested by lenders (Engel et
Engel et al. (2010, p. 60) enumerate the aspects that influence the size of the rates requested by lenders:

- the strength of the legal precedent;
- the economic situation;
- the reasonableness of performance tests;
- experience of the sponsor and operator in the industry or the country;
- the transparency of the tender agreements;
- the penalty mechanisms of the contract;
- the strength of the conflict resolution framework, and;
- the political support for PPPs.

Lenders will take account of all these aspects when setting the rates whereupon the financing is concluded.

However, it should be noted that project finance substitutes direct borrowing by government for indirect borrowing, and shifts from government being able to borrow at the lowest risk-free interest rate to the private sector borrowing through more expensive interest rates. The assumption that the cost of finance under project financing is higher is, however, to a certain extent countered by the fact that there is a transfer in risk involved and that the private sector is bearing the risk at a risk premium reflecting the higher cost of capital (Sawyer, 2005). In view of that, Grout (1997) argues that it does not make any difference for the citizens in terms of value or risk who finances, builds, and provides the service. The only difference between public and private provision is that the risk is explicitly accounted for in the private sector’s cost of capital, while this is not the case under public provision. So, while it appears that there has been an increase in cost of capital, it is only because the price of the risk of the project is made explicit in the private provision setting and is not priced in the public sector.

This in mind, it can still be said that DBFMO projects are concerned with higher interest rates and that the high interest rates partly stem from the presence of project finance in the DBFMO contract. The cost of private capital includes a risk premium and hence, it is higher than the risk-free interest rate whereupon governments can borrow.

Therefore, it is assumed that:

“The cost of capital is higher in DBFMO projects than in the traditional variant.”

Moreover, since it is expected that a higher cost of capital will make the project more expensive, it can be stated that this criterion has a negative effect on the added value of a project.

5.4.3 Life cycle optimisation with respect to construction and exploitation cost
It is expected that the provision of public services could become more efficient if it were transferred from the public to the private sector, with the public sector keeping the ultimate care of its availability and quality (Ministry of Finance, 2012). The involvement of the private sector would then allow the construction and operation of a public work to be organised more cheaply than traditional public sector provision (Grout, 1997). The argument that the involvement of the private sector in PPP provides real benefits in terms of productive and allocative efficiency has been decisive in the selection of private finance over public finance alternatives in the Netherlands (Ministry of Finance, 2012). Studies by the Ministry of Finance (2012) has shown that DBFMO building projects produce 10% to 15% more value compared to
traditional projects. Therefore, the Ministry of Finance encourages the use of project financing when it offers value for money to the taxpayers.

The Ministry of Finance (2012) also believes that bundling all expertise including the maintenance and operation procedures already in the building stage can induce life cycle cost optimisations. It is expected that the life cycle costs of a project can be reduced in situations where the investment and exploitation costs are brought in line with one another (Straub et al., 2012, p. 50). The concept behind this theory is that improved and economical buildings can be built if the long term consequences of a specific design are extensively explored already in the early stages of the development process (Grimsey & Lewis, 2005). Since the same party builds, operates and takes care of the finance under DBFMO, it has incentives to internalize life cycle cost considerations already in the preparation phase. By considering the costs of a project’s whole life at the start of the project, the overall cost may ultimately be lower. In view of that, it is expected that the integration of the design, build, finance, maintain and operate phases into one single contact produces whole life cycle optimisations.

Life cycle costing (LCC) normally includes all cost elements from the initiation up to the exposure of an asset. Life cycle costing is defined by the New South Wales Treasury (2004) as: “the total cost throughout its life including planning, design, acquisition and support costs, and any other costs directly attributable to owning or using an asset” (p. 1). Since, life cycle costing takes account of the planning, design and acquisition costs, there seems to be some overlap with the criterion transaction cost. In practice, it appears that the demarcation between transaction cost and life cycle cost is rather blurred. Often, part of the transaction cost is also ascribed to the life cycle cost of a project. To eliminate the overlap, life cycle costs should be split up into, on the one hand, planning, design and acquisition costs which are covered by transaction cost and, on the other hand, construction and exploitation costs. However, when considering the optimisations that are considered to be achieved through the life cycle approach, it has been found that most of the life cycle cost savings are the result of bringing the construction and exploitation costs in line with one another (Straub et al., 2012). Bogenstätter (2000) claims that life cycle cost savings are induced in the realisation and exploitation of the asset and not during preparation. Rather than saving money, it is presumed that the preparation of PPPs is even more expensive than that of the traditional variant (Favié et al., 2009). In view of that, it is supposed that life cycle optimisations do not occur in transaction cost. Even more, it is expected that transaction costs are so high that they even hamper life cycle cost optimisations to occur. Since transaction cost is already a criterion, the optimisations made in the realisation and exploitation of an asset should be considered separately by an independent criterion. The new criterion is called ‘life cycle optimisations with respect to construction and exploitation cost’. As life cycle optimisations are induced in the realisation and exploitation of an asset, it is decided for the convenience of the reader to abbreviate this criterion and to use the term ‘life cycle optimisations’ instead. Therefore, in the remainder of this research the term ‘life cycle optimisations’ exclusively refers to the optimisations made in realisation and exploitation cost and so, the transaction costs are not part of the definition further used in this research.

Whether and to what extent life cycle optimisations can be reached has also to do with the degrees of freedom of the contractor as regards the deployment of financial resources. For instance, if the contractor is allowed to distribute the budget among the different activities according to his own ingenuity, he may well be able to induce cost savings (Straub et al.,
Conversely, if the budget involves separate budgets for the realisation and exploitation phase, then the extent to which investment and exploitation cost savings are induced, is rather limited (Grout, 1997). This is because one single budget for the entire project works as a price cap and thus, it will encourage the contractor to carry out cost effective measures as all savings made will be incurred by the contractor. Grout (1997, p. 63) claims that without the possibility of shifting cost overruns to the contracting authority, the fixed budget provides even stronger incentives for the contractor to induce cost savings.

Overall, it can be stated that under DBFMO contracting life cycle optimisations are realised and that these savings are partly due to the presence of project finance in the DBFMO contract. Due to the interchangeability of budgets and the exploration of all life cycle costs at the start of the project, cost efficient measures are more often taken in DBFMO, reducing the size of the overall project cost.

Therefore, it is assumed that:

“Life cycle optimisations are to a greater extent induced under DBFMO than under the traditional way of contracting.”

Moreover, since cost savings reduce the total cost of a project, it can be expected that the life cycle optimisations made under DBFMO have a positive effect on the added value of a project.

### 5.4.4 Price certainty

Price certainty is related to the extent to which budget overruns occur and the degree of long-term certainty about prices. Therefore, price certainty enfolds two key elements:

i) the likelihood that projects are delivered within the agreed upon budget, and;

ii) the degree of long-term certainty about prices and rates.

As regards the first element (i), it is assumed that DBFMO projects are more often delivered within budget as compared to traditionally procured projects (Straub et al., 2012). This has to do with the fact that under DBFMO the risks of cost overruns are shifted to the private sector. Paragraph (b) of Article 2.1 of the DBFMO Agreement explicitly states that all cost that the contractor incurs in order to fulfil the aforementioned obligations will be borne by the contractor except to the extent that the agreement specifically stipulates otherwise. Under paragraph (c) of this article it is postulated that no matter what circumstances or events arise during the performance of the agreement, the contractor has no right to any payment from the contracting authority. Accordingly, the contractor is obliged to incur all cost and has no rights to any payment or postponement, except in an event of a contracting authority default. As this article requires that all cost overruns will be borne by the contractor, one can assume that the contractor will do his very best to realise the project within the prearranged budget.

The second element of price certainty is also dealt with in the DBFMO agreement. In Article 3.2 of the DBFMO Agreement, it is explicitly stated that on the date of Financial Close the Weighted Average Cost of Capital (WACC), the expected rate of return on equity and the gross availability payments for the project must be determined. The calculations of the WACC, the rate of return on investment and the availability fee are based on the financial model that is prepared by the lenders and the sponsors already in the preparation phase. As the WACC, the rate of return on investment and the availability fee are already fixed for the
entire term of the contract at the date of Financial Close, there is a considerable degree of price certainty under DBFMO. Particularly because in the DBFMO Agreement there are no rules that allow deviations or changes in prearranged prices and rates, except in a supervening event\(^9\). The only article that can be found in the DBFMO Agreement about price setting is Article 19 of the DBFMO Agreement. Still, this article only stipulates the provisions regarding the indexation of amounts and thus, says nothing about the possibility of allowing unforeseen adjustments on prices during the term of the contract.

Altogether, it can be said that there is a considerable degree of price certainty under DBFMO. The high level of price certainty of DBFMO is to a certain extent related to the use of project financing. As lenders of project financed debt demand that all risks are transferred to the party best able to manage them, the financial consequences of cost overruns become the responsibility of the contractor. As cost overruns will be borne by the contractor, he will be triggered to realise the project within the prearranged budget. The use of project finance also entails long-time certainty about prices and rates at the early stages of the project as all information about prices and costs throughout the entire project are already calculated and set on the date of Financial Close.

Therefore, it is assumed that:

“The degree of price certainty is higher under DBFMO than under the traditional variant.”

Moreover, since price certainty keeps the project from budget overruns, it can be expected that price certainty has a positive effect on the added value of a project.

### 5.5 Time criteria

Based on the literature review, three time criteria have been selected in this research that are in some way related to the presence of project finance in DBFMO. The three selected time criteria are:

i) lead time preparation (§5.5.1);

ii) lead time construction (§5.5.2), and;

iii) time overruns (§5.5.3).

#### 5.5.1 Lead time preparation

The lead time of the preparation is defined as the time between the moment the project is initiated and the start of the realisation phase. The typical preparation phase of a building project contains three ensuing periods:

i) The time between the initiation of the project and the start of the tendering;

ii) The time between the start of the tendering and the awarding of the winning bid, and;

iii) The time between the awarding of the winning bid and the start of the realisation phase.

Engel et al. (2010) note that DBFMO projects require a preparation lead time, which is usually longer than the lead time for public provision. “The complexities inherent to the SPV form, plus the many eventualities that have to be included in a contractual relationship that lasts for a very long time, explain the longer preparation periods” (Engel et al., 2010, p. 59). Also, the Government Building Agency (2009) acknowledges that DBFMO projects require longer preparation periods than traditionally procured building projects. According to the

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\(^9\) See Article 9 of the DBFMO Agreement about Supervening Events.
Government Building Agency (2009), the longer preparation phase stems from the fact that a DBFMO project is typically put out to tender for periods of 20 to 30 years. In view of the long duration of the contract, the contracting authority will be spending a lot of time working out the tender proposal prior to the tendering. This is because the tender proposal is not just for the actual construction of the building, but also for the required maintenance and services for the many years ahead. Therefore, setting up a project, preparing a tender procedure and specifying the functional requirements for such a long period demand great efforts of the contracting authority. As a result, it is expected that the preparation time preceding the tender phase (i) takes longer under DBFMO projects than under traditionally procured building projects.

It is also expected that the period between start of the tendering and the awarding of the winning bid (ii) is longer under DBFMO projects than under traditionally procured building projects. The longer lead time under DBFMO stems from the fact that all design solutions, requirements and cost implications over the entire term of the contract period have to be incorporated in the final bids of the selected candidates during the tendering. Moreover, as the winning party is not only responsible for the design and construction, but also for the maintenance and operation of the object for the years thereafter, the candidates in the tender phase will be encouraged to extensively explore all long term consequences of decisions made. This is particularly because miscalculations and bad decisions in the development process may have major financial consequences. For example, suppose that during the design process a particular material has been selected for the façade, which is expected to hold out the entire duration of the contract. If after five years of operation it appears that the material is obsolete and needs to be replaced, then the financial consequences over the entire term of the contract will be enormous. This is particularly because under DBFMO contracting, the budget for the entire project is already fixed before the start of the realization phase and all cost overruns that occur during the term have to be borne by the private sector. This is particularly why the candidates in the tendering will take the time they need to take account of all long-term consequences of decisions made.

In addition, Verboom (2008) mentions that the due diligence performed by the lenders’ advisors often slows down the start of the realization as lenders inevitable tend to get involved in the negotiation of the project contracts. It generally takes time to let the advisors perform the due diligence on the contracts. Another factor that contributes to the long preparation time under DBFMO is the fact that after the Contract Close the winning consortium cannot immediately start building. Before the realization phase may start, the financial documentation have to be settled on the date of Financial Close first. The time between the Contract Close and Financial Close is needed to agree upon the financial documentation. Usually it takes several months to settle the financial documentation. In paragraph (a) of Article 3.2 of the DBFMO Agreement, it is explicitly stated that the Financial Close must take place within a stipulated number of months following the final submission date. Since publicly financed projects do not make use of private funding and thus, do not need to reach Financial Close, it can be argued that the time between the awarding of the winning bid and the start of the realisation phase (iii) is longer under DBFMO than under publicly financed projects.

Overall, it can be stated that the preparation phase under DBFMO is rather time-consuming and that the lengthy preparation time is partly the consequence of the integration of project financing in the DBFMO contract. As project financing implicates one single budget for the entire project, the contractor will be eager to explore the long term consequences of each
design decision in the early stages of the development process as any cost overrun that might occur as a result of bad decisions is at the expense of the contractor. Furthermore, since project financing requires that a SPV structure is established, due diligence is performed and the financial documentations are ready on the date of Financial Close, it can readily be expected that the preparation of DBFMO will be lengthier than under public provision.

Therefore, it is assumed that:

“The lead time for preparations is longer under DBFMO than under the traditional variant.”

Moreover, as longer lead times slow down the process, it can be expected that the longer lead time for preparation under DBFMO has a negative effect on the added value of a project.

5.5.2 Lead time construction

The lead time of the construction is defined as the time between the moment the construction phase commences and the actual completion date. As the consortium readily takes account of the long-term consequences of design decisions in the development process, the consortium might well be able to implement some decisions that result in time savings during construction. Leiringer (2006) believes that shorter construction times can be realised through DBFMO contracting. Since the consortium is responsible for all tasks during the term of the contract, effective management in the early development process can lead to less mistakes and better time management during construction (Leiringer, 2006, p. 304). Knibbe and Bloemert (2003) also highlight the potential of time savings made in the construction phase of DBFMO. Yet, they consider the time savings as the result of the linkage between design and construction. Due to the fact that one single party is responsible for design and execution, the consortium can start preparing the construction already in the design phase (Knibbe & Bloemert, 2003, p. 29).

Another line of reasoning considers shorter construction times under DBFMO projects as a result of the payment mechanism used in DBFMO. The Netherlands Court of Audit (2013) explicitly refers to the payment mechanism as an incentive for the contractor for fast completion of the object. Since Dutch DBFMO projects use the availability fee, the contractor only gets paid from the moment the object is completed. This encourages the contractor to realize the building in a quick manner.

Overall, it can be stated that the shorter construction time under DBFMO is to a certain extent related to the use of project financing. Project finance in DBFMO requires a payment mechanism in which payments to the contractor are made after the building is realised. Since fast completion in DBFMO implies that the payments can be made earlier, the contractor will be encouraged to carry out the construction as fast as possible. Also, the integrated approach from the early start of the project along with the extensive preparation contribute to shorter construction times under DBFMO.

Therefore, it is assumed that:

“The construction time is shorter under DBFMO than under traditionally procured building projects.”

Moreover, as shorter lead times speed up the process, it can be expected that the shorter construction time positively affects the added value of a project.
5.5.3 **Time overruns**

Time overruns occur when projects are not completed by the time the project plan specifies. Engel et al. (2010, p. 59) state that against the longer lead times early on in the DBFMO process, it is more likely that a project will be completed on time than under public provision. Also, the Government Building Agency (2009) acknowledges that projects executed through DBFMO are more often delivered on time. In the Netherlands, all building-related projects that have been realised up to now through DBFMO were delivered on time (Ministry of Finance, 2012). Grimsey and Lewis (2005) note that there is a history of publicly procured contracts being delayed and that these delays do not occur under privately financed PPP structures. According to Grimsey and Lewis (2005), this is because the risk of delays and overruns are transferred to the private sector under privately financed PPP structures. “Transferring the risk of delays and overruns to the private sector and having it bear the cost of design and construction overruns is one way in which a PPP can potentially add value for money to a project” (Grimsey & Lewis, 2005, p. 246).

In view of the time value of money, a delayed completion will also be disadvantageous for the contractor as it implies a smaller net present value (NPV) of the project. This has to do with the fact that money spent today has a different value than the same amount of money spent next year. A delayed completion of the work means that the availability payments are made at a later point in time. Since money loses his value over time, the net present value of the project becomes smaller as spending is much further ahead into the future. Therefore, differences in completion date will have large impacts on the net present value. Since the construction contractor is the party best able to manage the risk of late completion, he will bear the consequences of delayed completion. In view of that, one can assume that he will do his best to complete the construction on time.

Altogether, it can be stated that time overruns hardly occur in DBFMO projects. The fact that time overruns hardly occur under DBFMO is to a certain extent related to the use of project financing. As the integration of project financing in DBFMO implicates that the construction contractor only gets paid from the moment the building is realized, he will be encouraged to deliver the work on time. This is particularly because the DBFMO Agreement explicitly states that the financial consequences of delayed completion must be borne by the party best able to manage this risk; i.e. the construction contractor in this case.

Therefore, it is assumed that:

> “Less or shorter time overruns occur under DBFMO than under traditionally procured building projects.”

As time overruns impede the successful progress of the project, it can be expected that a reduced probability of time overruns has a positive effect on the added value of a project.

5.6 **Quality criteria**

There are five quality criteria selected in this research that are in some way linked to project finance in DBFMO. The five quality criteria selected, are:

i) Flexibility of the contract (§5.6.1);
ii) Quality process (§5.6.2);
iii) Quality object (§5.6.3);
iv) Quality services (§5.6.4), and;
v) Innovative thinking (§5.6.5).
5.6.1 Flexibility of the contract

Typically, a long-term commitment requires flexibility. It is often assumed that DBFMO projects do not provide enough flexibility (Government Building Agency, 2009). In this context, flexibility is understood as the extent to which the contract provides room for contingencies, changes and alterations after the contract is closed. The prevalent picture is that projects awarded by DBFMO are less flexible than traditional projects, because they involve long-term contracting (Government Building Agency, 2009). Typically, a DBFMO contract is for a period of 20 to 30 years and specifies the services to be rendered over that period. Sawyer (2005) reasons that long term service contracts reduce flexibility and thus, impede direct responses to changing environments. He says: "Any contract drawn up for any significant period of time suffers from issues of flexibility in so far as the contract cannot possibly specify reactions to all changes in circumstances. Seeking to do so would entail extremely long contracts, and may not be possible in a world with some degree of uncertainty" (Sawyer, 2005, p. 238). Since the DBFMO Agreement has to cover an extremely long timeframe, it is expected that a lot of flexibility is given up compared to the traditional way of contracting. Yet, this does not imply that traditionally procured building projects are flexible by definition. The traditional public alternative also includes degrees of inflexibility. For instance, once a school is built, its use cannot readily be changed. But there still is some degree of flexibility: e.g. demographic changes may render the school excess capacity into requirements; its use may be changed, and; the associated maintenance arrangements can be alternated. Under a DBFMO Agreement, however, a compensation to the contractor would be required in these situations. Sawyer (2005) argues that by transforming management into a particular form of service delivery and locking one single contractor for a period of 20 to 30 years, the flexibility to respond to changed circumstances will be reduced rather than enhanced. As the DBFMO contract is a standardised contract, which is not only very detailed about the obligations of the contractor and the contracting authority, but also about the service level required, the bank guarantees requested, the availability payments etcetera, it can be readily argued that the degree of flexibility in the DBFMO contract is limited.

Overall, it can be stated that DBFMO contracts have a low degree of flexibility and that the low degree of flexibility partly stems from the integration of project financing in the DBFMO contract. Because lenders are very concerned about whether the project is generating sufficient cash flows, they request all types of arrangements and guarantees to be settled in the DBFMO Agreement. Lenders also require that no risks remain at the SPV as this may jeopardize the repayment of their loan. By requesting that all elements are explicitly recorded in the contracts, lenders protect themselves against uncertainties. At the same time this reduces flexibility as it inhibits direct responses to changing environments.

Therefore, it is assumed that:

"DBFMO contracts have a more limited degree of flexibility as compared to traditional contracts."

Because inflexibility of the contract hampers responses to changes, it can be expected that the inflexibility of the DBFMO contract negatively affects the added value of a project.

5.6.2 Quality process

The quality of the process refers to the value of the supporting activities of the project. It is about the smoothness of the progress from the moment the project is initiated up until the expiry date of the contract. Factors that affect process quality in construction are
transparency, cooperation and coordination between parties and activities (Arditi & Gunaydin, 1998). Transparency refers to the extent to which information about prices, cost and transactions are made visible in the process. Transparency depends on whether and to what extent information is shared, audits are held and prices are determined in advance (Arditi & Gunaydin, 1998).

As all prices and rates have to be agreed upon and fixed on the date of Financial Close, a considerable amount of information about financial matters is already available at an early stage of a DBFMO project. As the contractor is required to provide regular reports about the performance of the object and its services during realisation and exploitation and lenders do not only perform due diligence but also keep monitoring after the contracts are signed, it can be readily argued that there is a considerable degree of transparency under DBFMO.

Cooperation and coordination allude to the cooperative arrangement in which parties jointly work together towards a common goal (Klein, Feltovich, Bradshaw, & Woods, 2005). Mutual trust and conflict resolution are important ingredients of good cooperation. Like all other forms of integrated contracts, DBFMO requires cooperation between parties early on in the process. However, since DBFMO contracting holds a SPV that acts as one organ on behalf of all parties, the parties - more than in every other integrated contract - are forced to cooperate from the very start. Even more, the private parties are encouraged to act as a team as the DBFMO Agreement explicitly stipulates that all consequences of conflict issues must be borne by the private sector except in an event of the contracting authority default.

Overall, it can be stated that DBFMO contracting results in a high level of process quality and that the high level of process quality partly stems from the integration of project financing in the DBFMO contract. The SPV structure, the risk transfer, the monitoring activities of lenders’ advisors and the transparency of all costs at the early start are all features of project finance and together they enhance the process quality of DBFMO.

Therefore, it is assumed that:

“DBFMO contracting results in a higher level of process quality as compared to the traditional way of contracting”

Because a high level of process quality is beneficial for the course of the project, it can be expected that the process quality of DBFMO positively affects the added value of a project.

5.6.3 Quality object

Quality of the object can be defined as meeting the legal, aesthetic, and functional requirements of the project (Arditi & Gunaydin, 1997, p. 235). Straub et al. (2012) believe that better buildings can be developed when the consequences of a particular design are thoroughly examined in the early stages of the development process. In view of that, it is expected that DBFMO contracting results in higher overall quality of the end product (Leiringer, 2006). This has also to do with the fact that DBFMO contracts are built on the basis of functional specifications (Government Building Agency, 2009). The basic tenet is that the contracting authority formulates the required level of performance of the object, while the contractor proposes the solutions needed to realize the required level of performance. In this way the project is driven on output rather than on input. The performance specifications also form the basis of the payment structure of DBFMO. This is in contrast to traditional contracts.

10 See Article 2.1 of the DBFMO Agreement about the key obligations of the contractor.
where the contractor is directly paid on the basis of man-hours and the deployment of resources and materials. Under DBFMO, however, payments are delayed as they are dependent on the level of performance delivered in the exploitation phase. The availability of the building and the work stations is also considered as performance. As the contractor only gets paid for the agreed upon level of performance after the building is completed, one can assume that the contractor will deliver the object in good condition. Grout (1997, p. 63) reasons that if the same party builds and delivers the services and thus will only be compensated for successful supply of services, then there are no incentives to cut on quality. This is because savings on quality will lead to discounts on the fee. Since the contractor will earn his money gradually over the entire exploitation phase, he will not dare to cut on quality during construction. Besides, the contractor knows that savings on quality will immediately be noticed as performance tests are frequently undertaken and advisors of lenders are extensively monitoring the performance of the project during realization and exploitation.

Therefore, it can be stated that DBFMO contracting results in a high quality of the object and that the high level of quality partly stems from the integration of project financing in the DBFMO contract. The payment mechanism intrinsic to project finance in DBFMO together with the performance tests and monitoring activities of the lenders’ advisors during realisation and exploitation provide serious incentives for the contractor to deliver good quality.

Therefore, it is assumed that:

“DBFMO contracting results in a higher level of quality of the object as compared to the traditional way of contracting”

The higher quality of the object can be expected to have a positive effect on the added value of a project.

5.6.4 Service quality

Service quality refers to the performance of the services produced by the work during the exploitation phase. For the service quality, the same applies as written in §5.6.3 Quality object. Since the availability fee is stimulating the contractor to deliver the required level of services during exploitation, it is expected that the service provision has a high quality under DBFMO (Canoy et al., 2001). However, there is a danger here, namely at some point during exploitation the largest part of the payments is already incurred and so, the contractor is less triggered to carry out the last maintenance requirements. This is particularly so, when the maintenance services are more expensive than the remaining fee to be paid (Meesters, 2014). In order to ensure that also the last maintenance and services are properly carried out under DBFMO, a transfer guarantee is requested by the contracting authority. The transfer guarantee covers the risk of inadequate provision of maintenance and services just before the end of the contract and thus, ensures good service performance (Koster & Hoge, 2008).

Therefore, it is assumed that:

“The service provision has a higher quality under DBFMO than under the traditional way of contracting”

Moreover, the higher service quality can be taken as a positive effect on the added value of a project.
5.6.5 Innovative thinking

The term ‘innovation’ is defined by the Online Business Dictionary as: “the process of translating an idea or invention into a good or service that creates value or for which customers will pay.” From a construction perspective, PPPs are often credited as providing real incentives for the actors involved as well as creating a business environment that is conducive to innovation and improved practices (Leiringer, 2006, p. 301). Leiringer (2006) alludes to the benefits accruing from the private sector to be innovative in its solutions. Whereas traditional projects are based on detailed descriptions of buildings, within DBFMO performance specifications are being used. The contractor can therefore choose solutions that are able to deliver the performance in the most efficient manner (Sexton & Barrett, 2005). Correspondingly, it is claimed by the Dutch Regieraad Bouw (2005) that expressing the demand in performance specifications is a key stimulant for letting the private sector be innovative in choosing a solution. The output specifications together with the award criteria steer the architectural quality and the room for innovative thinking (Fokkema, 2009). Since the private sector has to come up with its own solutions, innovative thinking is stimulated. The party who has the expertise is then challenged to develop the best solutions given the performance specifications (Government Building Agency, 2009). Grout (1997) argues that when there is choice of technology and revenues are purely linked to the flow of suitable quality services from the asset, as is the case under DBFMO, then there are strong incentives to select the most technical type of asset. Straub et al. (2012) note that under DBFMO innovative solutions affecting maintenance and energy-use are of direct benefit for the contractor as he is the one that not only designs and builds but also takes care of the exploitation of the object and that therefore, innovations effecting maintenance and energy-use take place most frequently under DBFMO than under traditionally procured building projects.

Conversely, Hermans (2014) believes that contractors under DBFMO will stick to proven technology, since lenders are looking over their shoulders to make sure that no unnecessary risks are taken that might inhibit the recovering of their debt. Also, Leiringer (2006) suggests that due to the performance approach a contractor will likely choose a solution that suits best to the existing knowledge and available techniques, thus reducing project risk rather than choosing new or unique innovative solutions. Leiringer (2006) disputes whether a larger risk transfer to private parties will lead to innovative solutions. As the development of innovations entails additional project risk, it seems reasonable to presume that lenders prohibit technological innovations to take place. However, literature shows that the view that more innovations are introduced under DBFMO contracting than under the traditional way of contracting is still more prevalent (Straub et al., 2012). Therefore, this view is taken for now.

Hence, it is assumed that:

“Innovative thinking happens more often under DBFMO than under the traditional way of contracting”

Moreover, the assumption that DBFMO provides more room for innovative thinking can be taken as a positive effect on the added value of a project.

5.7 Conclusion

In this chapter, the term added value is highlighted. First, an uniform definition is formulated based on the definitions stated by various dictionaries. Then, the term added value in the
context of Dutch building-related DBFMO projects is addressed. The PPC and PSC are explained as these tools are used by the Government Building Agency to assess the added value of integrated contracts relative to the public alternative. Since it is expected that DBFMO can generate added value in terms of cost, time and quality compared to the public alternative, the cost time quality tripartite division is used as an underpinning for the selection of the added value criteria. In chapter 4, the role of the F component is already explicated by unravelling the three core functions of project financing in DBFMO. As the F component is not only a financial means but simultaneously a security for the client as well as an incentive for the contractor to perform well, one might infer that the integration of the F component adds value to a project. In view of that, this chapter was focussed on identifying the criteria that can be used to assess the added value of DBFMO, which are assumed to be related to the presence of project finance in the DBFMO contract. On the basis of the cost, time and quality division, twelve criteria have been identified. An overview of the criteria is presented in Table 6. For each single criterion an assumption has been made how DBFMO relates to the public alternative. Also, an indication has been made whether the effects per criterion contribute positively or negatively to the level of added value.

In chapter 7, the assumptions made in this chapter will be tested by way of real-life cases. It will, then, be examined whether the assumptions can be validated on the base of the practical findings. In order to discover to what extent the presence of the F component has influence on the level of added value of a project, it is also needed to investigate what the effects per criterion are for DBMO projects that make use of public finance arrangements as opposed to project finance. By comparing the effects of DBFMO with the effects of DBMO, it can be explored whether significant similarities and differences in value occur if the F component is explicitly left out of the contract. By doing so, the main research question can be answered.

Table 6 Overview assumed effect per criterion

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EFFECT RELATIVE TO THE TRADITIONAL VARIANT</th>
<th>EFFECT ON ADDED VALUE</th>
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<tbody>
<tr>
<td>COSTS</td>
<td></td>
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<tr>
<td>§5.4.1</td>
<td>Transaction Cost</td>
<td>Higher</td>
</tr>
<tr>
<td>§5.4.2</td>
<td>Cost of Capital</td>
<td>Higher</td>
</tr>
<tr>
<td>§5.4.3</td>
<td>Life cycle optimisation with respect to construction and exploitation cost</td>
<td>Higher</td>
</tr>
<tr>
<td>§5.4.4</td>
<td>Price Certainty</td>
<td>Higher</td>
</tr>
<tr>
<td>TIME</td>
<td></td>
<td></td>
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<tr>
<td>§5.5.1</td>
<td>Lead time preparation</td>
<td>Longer</td>
</tr>
<tr>
<td>§5.5.2</td>
<td>Lead time construction</td>
<td>Shorter</td>
</tr>
<tr>
<td>§5.5.3</td>
<td>Time Overruns</td>
<td>Shorter</td>
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<td>QUALITY</td>
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<tr>
<td>§5.6.1</td>
<td>Flexibility of the contract</td>
<td>Less</td>
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<tr>
<td>§5.6.2</td>
<td>Quality process</td>
<td>More</td>
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<tr>
<td>§5.6.3</td>
<td>Quality object</td>
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<td>§5.6.4</td>
<td>Service quality</td>
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<td>§5.6.5</td>
<td>Innovative thinking</td>
<td>More</td>
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</table>
This chapter presents the results of the empirical research conducted on how the role of the F component is substituted in Dutch DBMO projects. Two Dutch DBMO cases are selected and extensively studied with the aim of discovering the measures taken in the DBMO contract to overcome the absence of the F component. In this chapter, the research methodology is described first. Then, the two DBMO cases are shortly introduced. Since the role of the F component is already defined by means of three key functions in chapter 4, this chapter will focus on how and to what extent these functions are fulfilled in the two selected DBMO cases. The findings are then critically reviewed and based on the findings a set of measures is presented that can be used to replace the role of the F component in Dutch DBMO projects.

6.1 Research Methodology

6.1.1 Case study research

In order to explore how the role of the F component is fulfilled in Dutch DBMO projects, case study research is conducted. For the research, two practical DBMO cases are selected. These cases are:

- Integral Child Centre Zeeburgereiland, Amsterdam, and;
- Community School, Joure.

The DBMO structure is relatively new in the Netherlands and therefore, there has been little experience with this type of contract structure. In paragraph 3.1.3 the general principles of the DBM(O) contract structure are shortly described. Both selected cases make use of the UAC-GC 2005 general terms and conditions. The UAC-GC conditions are purely aimed at facilitating the relationship between the contracting authority and contractor (Chao-Duivis et al., 2013, p. 112). Yet, the UAC-GC conditions are also applicable to Design & Build and DBM structures and so, these conditions are not explicitly designed for DBMO projects. Along with the UAC-GC general terms and conditions, the UAC-GC contract used for DBMO projects includes a basic agreement with accompanying appendices, employer’s requirements plus other contract documents. In the basic agreement the contracting authority and the contractor jointly enter specific data and tick certain options (Chao-Duivis et al., 2013, p. 112). As each DBMO project has its own specifics, the basic agreement of DBMO projects may include very diverse subjects and for that matter, the structure of DBMO projects could diverge widely from one another. As these contracts provide ample scope for additional
measures, it has been noticed that more often extra arrangements are settled in the contracts to replace the role of the F component. This in mind, two DBMO cases are studied with the aim of exploring the measures that are taken to overcome the absence of the F component in the DBMO contract.

**Representativeness of the cases**

The two selected DBMO cases make use of the UAC-GC 2005 terms and conditions. However, the UAC-GC 2005 terms and conditions are not compulsory for DBMO projects. Other contract forms may also be used. As there is no specific standard for DBMO projects in the Netherlands available, DBMO contracts could diverge widely from each other. As the content of each DBMO contract is rather different, it can be expected that the measures included as well as the level of added value will differ among DBMO projects. In view of that, it can be questioned whether the two selected cases represent all Dutch DBMO cases. Another aspect that makes the representativeness of the cases contentious is the fact that until recently DBMO contract structures have occasionally been used in Dutch construction. Compared to DBFMO projects, a relatively small amount of DBMO cases have been executed over the last decennia. As a result, most of the DBMO projects executed are rather project specific. However, current practices show that the use of DBMO contracting particularly for school-related projects has been growing rapidly over the last couple of years (PPS Netwerk, 2013). As new movements show that DBMO structured have increasingly been used for school-related projects, the selection of two up-to-date school-related DBMO projects for the case study research can be validated. This is particularly so, as both DBMO cases serve as models for future DBMO projects. However, as these two DBMO cases represent housing projects for educational purposes, one should keep in mind that DBMO projects for other purposes may contain other features. Yet, since this thesis gives first insights into the measures that are recently included in DBMO contracts to overcome the absence of the F component, the two selected cases give a pretty good expression of the new movements in current DBMO practices.

### 6.1.2 Interviewees selected

The case studies contain interviews with project managers of the cases selected. The interview data are then supplemented with documentary data. As it is important to cover the entire story, interviews are held with project managers on the side of the consortium as well as on the side of the contracting authority. On the side of the consortium, interviews are held with the project managers of the lead companies. For Integral Child Centre Zeeburgereiland, the lead company is the construction contractor Verlaat Uden, whereas for Community School Joure it is the exploitation company Facilicom. The interviewees are:

- **ALBÈRT DUYST** DBMO Integral Child Centre Zeeburgereiland: Project manager City Council of Amsterdam East.
- **GERALD STERKENBURG** DBMO Integral Child Centre Zeeburgereiland: Project manager Verlaat Uden Bouwsystemen.
- **HELGA VAN DER MOLEN** DBMO Community School Joure: Project manager Municipality ‘De Friese Meren’.
- **BAS NIESE** DBMO Community School Joure: Project manager Facilicom Services Group.

The interviewees are questioned about how the financing is organised in the cases. The three key functions discerned in chapter 4 are used as a guideline for the questionnaire. The questionnaire of the interviews can be found in Appendix D.
Trustworthiness of the interviewees selected

A process-related concern is the validity of the statements made by the interviewees. Since the perceptions of the interviewees are used for data gathering, it is important that the interviewees have enough expertise and knowhow to be reliant. The trustworthiness of the statements made by the interviewees is crucial for the validity of the research. In order to verify if the interviewees selected are trustworthy, a small survey has been held among the interviewees (see Appendix I). The survey focuses on the expertise of the interviewees in the construction industry as well as their experience with integrated contracts. The survey shows that Duyst, Sterkenburg and Niese have worked in the construction industry for more than nine years. Only Van der Molen indicated that she has less than four years’ experience in the construction industry. As to the experience with DBMO contracting, Duyst indicated that he has 6 years’ experience, both Sterkenburg and Niese 5 years’ experience and Van der Molen 3 years’ experience. All four experts indicated that they have worked with other integrated contracts as well. Respectively, Duyst has 7-9 years’ experience with other forms of integrated contracts, both Sterkenburg and Niese 4-6 years’ experience and Van der Molen 0-3 years’ experience. Based on these figures, it can readily be expected that all four experts have sufficient knowledge in-house to provide substantiated answers and therefore, they all contribute to the validity of this research.

Table 7 Results survey trustworthiness interviewees

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Experience construction industry</th>
<th>Experience DBMO contracting</th>
<th>Experience other forms of integrated contracts</th>
<th>Experience with integrated contracts in general</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albèrt Duyst</td>
<td>&gt;9 years</td>
<td>6 years</td>
<td>DBM &amp; DBFMO</td>
<td>7-9 years</td>
</tr>
<tr>
<td>Gerald Sterkenburg</td>
<td>&gt;9 years</td>
<td>5 years</td>
<td>DBM</td>
<td>4-6 years</td>
</tr>
<tr>
<td>Helga van der Molen</td>
<td>0-3 years</td>
<td>3 years</td>
<td>D&amp;B</td>
<td>0-3 years</td>
</tr>
<tr>
<td>Bas Niese</td>
<td>&gt;9 years</td>
<td>5 years</td>
<td>DBFMO</td>
<td>4-6 years</td>
</tr>
</tbody>
</table>

6.1.3 Research approach

Since each function can be split up into a set of specifications, the specifications serve as a starting point to explore whether and to what extent these specifications are organised in DBMO. By investigating how these specifications are settled in Dutch DBMO projects, it can be explored how and to what extent the key functions of the F component are fulfilled under the absence of project finance. The checklist stated in Table 3 (see Chapter 4) is used as a tool to make sure that all essentials are covered. Subsequently, a SWOT analysis is drawn up for each case based on the results of the interviews and the completion of the checklist. The SWOT analysis will then show the finance-related strengths, weaknesses, opportunities and threats of each case. Based on the SWOT analyses, the cases are reviewed. By reviewing the two cases, it can be found how and to what extent the key functions are fulfilled and what kinds of measures are taken to fill up the absence of the F component. In the end, a list of measures is presented that can be used to replace the role of the F component in future DBMO projects.

6.2 Introduction DBMO cases

In this paragraph the two selected DBMO cases are introduced. Both cases are housing projects for educational purposes on regional level. These cases were selected as these projects were recently procured using the DBMO contract structure. Both projects were initiated in 2011. The Integral Child Centre Zeeburgerelend was delivered last summer, whereas the community school Joure will be completed this summer. Appendix E presents the
basic information about the two cases. As the financing is at the heart of this thesis, the main focus is on finance-related matters. After a short introduction of the cases the finance-related matters are evaluated in the upcoming paragraphs.

6.2.1 DBMO Integral Child Centre Zeelburgereiland

The Integral Child Centre Zeelburgereiland is a pilot project of the City Council of Amsterdam East. Based on the experiences from the erratic growth and development of IJburg, where expensive emergency services and relocations set the tone, the City Council has learned that housing for schools in redevelopment areas requires a different approach (Duyst, 2014). ‘New Schools, housing on demand’ is the name of the concept designed by the City Council of Amsterdam East to build schools in a better, faster and cheaper manner (City Council Amsterdam East, 2011). The project Integral Child Centre Zeelburgereiland is part of this innovative concept and is used as a pilot to test whether the new concept works. The aim of this pilot is to learn from the experience and finalize the concept, so that it can be copied to other projects.

The Integral Child Centre Zeelburgereiland is designed to serve as an anchor within the redevelopment area, accommodating a potentially-increasing number of families with school-age children, encouraged to take up residence in both existing and projected local housing units. The housing concept for the Integral Child Centre is concentrated around six main themes (City Council Amsterdam East, 2012, pp. 9-13). In short, the innovative concept for the Integral Child Centre Zeelburgereiland entails a healthy and sustainable building realised within six months that provides maximum flexibility in everyday use. The building anticipates future needs and is completely removable and reusable. The Integral Child Centre is a building for everyone, a social heart of the neighbourhood that meeting and collaboration encourages and facilitates. It has its own identity and it unburdens the users in a way that the market, the municipality as well as the users can focus on their core business. Furthermore, the project is developed and will be exploited within the available investment and operating budgets.

The market consultation of the pilot project Integral Child Centre Zeelburgereiland started in December 2011. In June 2012 the DBMO contract was signed by the winning consortium Verlaat Uden Bouwsystemen and the City Council of Amsterdam East for a duration of 30 years. Cleaning and minor repairs are included in the contract for a duration of 10 years. Part of the agreement was that if the pilot project turns out successful, the consortium is entitled to build two additional schools in Amsterdam. Therefore, the two subsequent assignments were also part of the tender. The Integral Child Centre Zeelburgereiland itself covers 3.376 square

11 Original Dutch translation: ‘Nieuwe scholen, huisvesten naar vraag’. 

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meter of gross floor area. This is including the future expansion. The building is organised in such way that the expansion of the school will take no longer than 6 weeks, so that it can be done during summer holiday.

6.2.2 DBMO Community School Joure

With the realization of a new community school in Joure, the Municipality ’De Friese Meren’ aims to provide a better and wider range of facilities for pupils and local residents. The purpose of the community school is to shelter the various facilities that contribute to the development of a pupil, under the same roof (Municipality De Friese Meren, 2014). The facilities that are included in the Community School Joure are: child care, two primary schools, a welfare organization and a Centre of Arts. The housing concept of the new community school comprises the following themes: multi-functionality & identity; collaboration & gathering; spatial & functional flexibility, and; sustainability with inclusion of the Fresh Schools Level B logo.

In June 2011 the municipal council gave its approval for tendering the Community School Joure using the innovative Design, Build, Maintain and Operate model. In January 2013, the contract was awarded to the consortium Facilicom Services Group. By signing the contract, the construction, management and maintenance of the Community School in Joure fall under the responsibility of the Facilicom Services Group for a duration of 25 years. The consortium Facilicom Services Group is a coalition of several parties. Next to Facilicom Services Group (exploitation), members of the consortium are Bureau Bos (design building), Pellikaan (construction), Breijer (management) and Kragten (exterior design). The Community School Joure covers 4.300 square meter of gross floor area.

6.3 From the case studies: Financial means

6.3.1 Dutch housing policy for schools

Both the Integral Child Centre Zeeburgereiland and the Community School Joure are housing projects for educational purposes. Housing for educational purposes has some specific laws and regulations in the Netherlands that directly affect the way the financing is organised. In the Netherlands, the cash flows for capital expenditures and operational expenditures for schools stem from different sources (Dutch Government, 2014). Municipalities are responsible for the housing including long-term maintenance of primary schools, secondary schools and special education, whereas the operation is paid by the State to the school boards (see Figure 22). In order to finance housing of schools, municipalities receive an annual contribution from the Municipal Bond Fund (Dutch Government, 2014). School boards of primary schools receive funding for personnel and material directly from the State, also called the lump sum (Dutch Government, 2014). The size of the lump sum is dependent on the numbers of students of the school. In view of that, it can be said that municipalities in the Netherlands hold the economic ownership of schools, while school boards keep the legal ownership. Recently, the Dutch Ministerial Council approved a legislative amendment by means of which the responsibility and budget for outside maintenance and adjustments to schools are reallocated from the municipalities to the school boards by January 1th of 2015 (Dutch Government, 2014). School boards are then fully responsible for the maintenance of the building (see Figure 23). It is thought that by placing the responsibility for the maintenance and operation in the hands of one single party, decisions can be made easier and the
administrative burden will be lessened (Dutch Government, 2014). Therefore, as of 2015, the municipality will only be responsible for the expansion and construction of new schools.

![Figure 22 Current housing policy for schools](image)

![Figure 23 Housing policy for schools as from January 1th, 2015](image)

6.3.2 Separated cash flows

Since the cash flows for housing and operation of schools are so different, it is quite difficult to merge the cash flows into one single budget. As integrated contracts require that all phases are combined, it becomes rather problematic to work with separated cash flows for different activities. The same goes for DBFMO contracting for school-related projects. Straub et al. (2012, p. 50) note that DBFMO projects for schools hardly exist in the Netherlands, “The main reason is that the budget for construction and the budget for maintenance and operation are managed by separate institutions” (Straub et al., 2012, p. 50). Allen (2001, p. 32) argues that in the UK there are considerable differences in value for money among privately financed PPP types, with road and prison projects showing high efficiency gains, whereas schools and hospitals achieving reasonably low efficiency gains. The lower efficiency gains have been associated with the use of separate budgets for construction, maintenance and operation. Niese (2014) believes that the use of separate budgets may jeopardize lifecycle optimizations to occur. In the interview, he says: “The power of PPP is that the components are working together. The danger of separate budgets is that parties within the consortium will not combine their forces for the common purpose and so, potential life cycle optimizations pass by.” Even more, it might result in unnecessarily high cost. This is made clear by the following example.

Suppose that a very cheap material was chosen for the floors. If this material is to be selected, the construction contractor can save huge costs. However, if the use of this cheaper material is expected to cause wide seams in the floor, then the cost savings might well be (more than) outweighed by the higher expenditures during operation. If it turns out that the wide seams call for additional care and instead of one hour cleaning, the floors need one and half hours of cleaning a day, then, over the contract period of 30 years the half hour extra cleaning a day will increase the operational costs significantly.

6.3.3 Limited interchangeability of budgets

The example shows that when cash flows originate from multiple sources, the extent to which life cycle optimisations occur, is narrowed. In order to stimulate life cycle optimisations to occur, attempts were made in the Integral Child Centre Zeeburgereiland project to combine the different cash flows into one single budget. To make this happen, the City Council of
Amsterdam East decided to take over the responsibility over all budgets. By taking responsibility over all budgets, the municipality endorsed itself to take care of the operational activities. As the operational activities normally are the responsibility of the school boards, the school board was asked to hand over all operational cash flows from the State. Despite the efforts, the City Council of Amsterdam East did not manage to create one budget. The budgets remained separated: one budget for CAPEX and one budget for OPEX. However, the City Council of Amsterdam East did succeed in creating a range in which the CAPEX budget and OPEX budget were allowed to vary. The CAPEX budget, for instance, was allowed to vary within the range of 5 per cent below and 10 per cent above target price. Within that range, the size of the CAPEX budget had direct implications for the size of the operating fee. In this way, limited interchangeability of budgets was managed.

In the Community School Joure project, the budget for CAPEX and the budget for OPEX are strictly separated. There is no interchangeability of budgets. The CAPEX budget is provided by the Municipal Council and therefore is released instantly, whereas the OPEX budget is based on the multiannual perspective of the State and therefore is a prognosis of the future spending pattern of the State. It is often believed that the separation of budgets for CAPEX and OPEX purposes hinders life cycle optimizations to occur. According to the project manager of Facilicom, Bas Niese (2014), a consortium would normally peck away part of the OPEX budget and use this for capital expenditure. “But then again, a consortium only spends part of the OPEX budget on CAPEX if it truly believes that the additional capital investment upfront will be recouped over the term of the contract” (Niese, 2014). Behind the scenes, the consortium Facilicom has also transferred part of the budget. Facilicom has invested more in building the school sustainable than the CAPEX budget enabled. According to Niese (2014), the small additional investment in sustainability upfront will be more than outweighed by the savings during exploitation. Niese believes that the small interchangeability of budgets will help to get most out of the potential life cycle optimizations of a project. While there are two distinct budgets on paper, in reality a small part of the OPEX budget is spend on CAPEX. Helga van der Molen, project manager of the municipality ‘De Friese Meren’ approves the use of separated budgets. She believes that if there’d only been one single budget instead of separated budgets, the consortium might do more advance payments by spending more of the OPEX budget on CAPEX. As the future is unknown, spending more on CAPEX than budgeted would impose risk on the consortium. Van der Molen clarifies: “No doubt, a magnificent building can be built in this way, but if the consortium subsequently goes bankrupt, then the municipality has received more than it has actually paid for” (Van der Molen, 2014). In view of that, Van der Molen thinks that the separation of budgets keeps the consortium from taking excessive risks by investing more in capital than budgeted.

6.3.4 To what extent

Both the Integral Child Centre Zeeburgereiland and the Community School Joure have separated budgets for CAPEX and OPEX. The separation of budgets emanates from the fact that the cash flows for realisation, maintenance and operation stem from different sources. As a result, it is hardly possible to bring the budgets together. Yet, a first step to bring the budgets closer has been taken in the Integral Child Centre Zeeburgereiland. By setting a range in which the CAPEX budget was allowed to vary, a certain amount of freedom was given to the consortium to allocate the total budget over CAPEX and OPEX. The Community School Joure did not allow any freedom to ‘play’ with the budget. Although the consortium secretly used a small part of the OPEX budget for CAPEX purposes, strictly speaking there were two separated budgets. If by January 1th of 2015 the proposed legislative amendment is implemented by means of which the responsibility and budget for maintenance are
reallocated from the municipalities to the school boards, then it may perhaps be easier to combine the budgets. But for now, it can be stated that there was no interchangeability of budgets in the Community School Joure project, whereas there was limited interchangeability of budgets in the Integral Child Centre Zeeburgereiland project.

6.4 From the case studies: Security for the client

6.4.1 Risk allocation
In the Integral Child Centre Zeeburgereiland as well as the Community School Joure, risks are mainly transferred to the private sector. This is in accordance with the UAC-GC terms and conditions. The UAC-GC terms and conditions stipulate the role of the client. The role of the client in integrated contracts is rather different from that in the traditional model, especially with regard to the client’s involvement in the execution of the works by the contractor. Under the UAC-GC conditions the contractor is assumed responsible for the entire design and execution process (Chao-Duivis et al., 2013, p. 115). Active intervention in the works of the contractor by the client is not keeping with this contract model. Yet, practice shows that the risk allocation is often subject to negotiation. In the competitive dialogue, negotiations are held with the consortium about the allocation of risks. Both cases show that the client took back some of the risks at the end of the negotiation process, that were assumed unreasonable to handle by the private sector.

Basically, the biggest risk of a project is that it will cost more than budgeted. The UAC-GC conditions explicitly stipulate that cost overruns are the responsibility of the contractor, except in a supervening event or default by the client. In the Integral Child Centre Zeeburgereiland project, the risk of cost overruns is imposed on the lead company Verlaat Uden. By requesting guarantees of its subcontractors, Verlaat Uden is able to mitigate the risk of cost overruns caused by subcontractors. Similarly, in the Community School Joure the lead company Facilicom is responsible for the risk of cost overruns. In turn, Facilicom demands guarantees from its subcontractors.

6.4.2 No due diligence
In both cases the reality of the bids is not tested by means of official due diligence. Sterkenburg (2014) believes that due diligence is not necessary for projects of this size. “Perhaps for larger scale the DBMO contract structure requires due diligence, but for a school project of only 3.300 square meter it is not that important” (Sterkenburg, 2014). Nonetheless, both cases show traces of techniques that have to a limited extent comparable effects as due diligence carried out by lenders’ advisors in DBFMO projects. For the Integral Child Centre Zeeburgereiland, the City Council of Amsterdam East engaged a consultancy firm to check on behalf of the municipality whether the candidates in the tender were capable and experienced enough to execute the project and what the consequences would be if the private party goes bankrupt.

In the tender procedure of the Community School Joure, the municipality imposed stringent financial requirements on the candidates. In the pre-selection, candidates were required to demonstrate that they met the financial and economic capacity requirements (Municipality Skarsterlân, 2011, p. 27). Moreover, during the tender procedure, the consortium Facilicom appointed an extern party to do shadow calculations in order to make sure that no mistakes were made in the calculations. According to Niese (2014), these shadow calculations were necessary to manage the risks at the consortium’s side.
6.4.3 Monitoring during realisation

As regards the monitoring activities performed by lenders’ advisors in DBFMO, no monitoring activities are conducted by other parties than those of the consortium in DBMO. The client can avail himself to the opportunity offered by the test and acknowledgement plan stipulated in the UAC-GC conditions to monitor the contractor’s activities (Chao-Duivis et al., 2013, p. 115). The subject of testing and acknowledgement by the client falls under the topic quality assurance. Quality assurance has a prominent position in the UAC-GC conditions\(^\text{12}\). This is not surprising, since the main idea of the integrated contract is to have the contractor display greater activity on monitoring and control, and to minimise the client’s role in this respect (Chao-Duivis et al., 2013, p. 139). In the first paragraph, of Clause 19 of the UAC-GC 2005 conditions the contractor is charged with the responsibility for both quality control of all work performed and the quality of the results of work and of documents. Paragraph 2 of Clause 19 stipulates that the contractor must submit a quality plan as well as any quality sub-plans to the client for acknowledgement. The quality plan affords insights into the contractor’s production processes and operation procedures. The client can include requirements regarding the payment schedule in the acknowledgement plan (Chao-Duivis et al., 2013, p. 120). For instance, payments can be allied to the completion of certain project stages, so-called milestone dates, whilst such milestone dates, in turn, can be linked to certain performance statements.

As monitoring by technical advisors’ of lenders is quite normal in DBFMO projects, in the two DBMO cases there are no other monitoring activities or quality controls during realisation than explicitly stated in the UAC-GC conditions. The quality tests stated in the UAC-GC conditions are carried out by the contractor and submitted to the client for acknowledgement. Then, the client checks the documents and gives his approval if the requirements have been satisfied. In addition to what is stipulated in the UAC-GC conditions, Facilicom appointed an installation advisor whose only task was to look over the shoulder of the installation advisor of the construction company Pellikaan during the realisation of the Community School Joure. With respect to monitoring during realisation, it is worth mentioning that Facilicom is the lead company of the consortium. Therefore, the responsibility for the quality of the work essentially rests with Facilicom. Since the Facilicom is a facility services provider, it has double incentives to monitor the construction closely. This is because mistakes made during construction will only show up during exploitation. If Pellikaan makes mistakes during construction, Facilicom will have to live with the consequences. Since the duration of the contract for the Community School Joure is 25 years, errors in construction could have major financial impacts for the exploitation firm. Therefore, in order to prevent mistakes being made during construction, Facilicom strictly monitors the activities of Pellikaan. Van der Molen (2014) believes that the reason that the consortium has worked so well in the Community School Joure project is because the lead company is a facility services provider instead of a construction company. Van der Molen (2014) even goes one step further by arguing that the positioning of a facility services provider as lead company might work better than the involvement of banks, whose only motive is to recover their loans and thus, hardly consider the quality and perception of users as important.

6.4.4 Monitoring during exploitation

Monitoring during exploitation is an important element in both DBMO cases. Monitoring during exploitation is an essential part of the output specifications. In the Integral Child Centre Zeeburgereiland as well as the Community School Joure, the client steers the contractor on

\(^{12}\) For the provisions governing quality assurance, check Chapter 9, Clauses 19 to 23 of the UAC-GC 2005.
the basis of a set of output specifications. The output specifications are aimed at realising the
desired result and not at how the contractor is to realise this result (Chao-Duivis et al., 2013, p.
174). Therefore, the process is steered on output rather than input. Since only the quality of
the building and the services to be rendered is agreed upon in the contract, a performance
measurement system is developed to test whether the quality stated in the output
specifications is actually met. The performance measurement system is linked to the payment
mechanism. In case of underperformance, penalties are imposed on the contractor. The
system of output specifications combined with a monitoring system works the same as in
DBFMO projects. Yet, in DBFMO projects lenders also appoint technical advisors to monitor
the actions of the contractor during exploitation. Since there are no financers involved in
DBMO projects, the monitoring activities of technical advisors of lenders is lacking in DBMO.

6.4.5 Guarantees and other securities
In both DBMO cases, additional guarantees have been requested by the municipality. These
guarantees are meant to cover any costs incurred at the side of the client if the contract is to
be terminated due to default of the contractor. For instance, if the contractor goes bankrupt,
the client needs extra money to retender the project. Since realisation has a higher risk profile
than exploitation, the guarantees requested in the realisation phase are higher than in the
exploitation phase. For the Integral Child Centre Zeeburgereiland, a bank guarantee was
requested of the lead company Verlaat Uden Bouwsystemen. Bank guarantees are, by
definition, quite expensive (STABU, 2014). Therefore, in order to reduce costs, an option is
included in the contract to turn the bank guarantee into a concern guarantee after one
year of operation, provided that the first user evaluation is positive. Different from a bank
guarantee, a concern guarantee does not contain the ‘pay first, then talk’ concept (STABU,
2014). Therefore, the option of converting the bank guarantee into a concern guarantee is
beneficial for Verlaat Uden Bouwsystemen. As the higher risk profile of the realisation phase is
still covered by the bank guarantee, the conversion does not impose additional risk on the
client either.

In the Community School Joure project, separated bank guarantees have been requested
for the realisation and exploitation phase. The bank guarantee issued for realisation is 10 per
cent of the realisation budget, whereas the bank guarantee issued for exploitation is only 5
present of the exploitation budget. The difference in size of the bank guarantees is the result
of the different risk profiles attached to the realisation and exploitation phase. After the
building is realised, the risk profile drops and thus, a lower bank guarantee is sufficient. Beside
bank guarantees, there are deferred payments13. In the realisation phase, payments are
linked to the completion of certain project stages, milestone dates. Approximately 75 per
cent of the total DBM budget is paid at the milestone dates. The remainder is spread over the
25 years that the consortium is responsible for exploitation of the school (Municipality
Skarsterlân, 2011, pp. 10-11). This infers that the consortium has to pre-finance a part of the
realisation. With this policy, the municipality aims at safeguarding its position by motivating
the consortium in realising a school that operates perfectly and is available in the agreed
upon condition.

6.4.6 To what extent
In both the Integral Child Centre Zeeburgereiland and the Community School Joure, the risks
are mainly transferred to the private sector. Characteristic of both cases is that the risk of cost

13 To read more about how deferred payments are applied in the Community School Joure project, see §6.5.2
Payment mechanism.
overruns rests with the consortium. The client makes a certain budget available and the consortium is responsible for realising the project within that budget. No official due diligence is performed in both DBMO cases. Yet, there are some practices that have to a very limited extent similar effects as due diligence carried out by lenders’ advisors in DBFMO projects. These practices include the employment of external advisors to check the competence of the candidates during the tender and the imposition of financial requirements in the pre-selection at the side of the client and shadow calculations taken by third parties at the consortium’s side. Since there are no financers involved in DBMO, there are no monitoring activities by technical advisors of lenders within the two cases. In both cases, the contractor has to perform quality tests on behalf of the client and submit them to the client for acknowledgement. In this respect, the system of output specifications combined with the performance measurement system is the same as in DBFMO. Noteworthy is the fact that in the Community School Joure project, Facilicom Services Group is the lead company of the consortium. As the facility services provider is the lead company, it has double incentives to monitor the construction closely. However, it remains disputed whether a facility services provider as lead company will have the same effect as monitoring by lenders’ advisors during realisation in DBFMO. As to the issued guarantees, both cases use bank guarantees to project the client against default by the contractor. In the Integral Child Centre Zeeburgereiland, the conversion of a bank guarantee into a concern guarantee during exploitation is an efficient way to reduce costs at the side of the consortium. In the Community School Joure project, the withholding of payments is a powerful instrument to provide securities towards the client.

6.5 From the case studies: Incentive for the contractor

6.5.1 Output specifications
In both projects, the client steers the contractor on the basis of criteria formulated in outline, which focus on realising the desired result and not on how the contractor is to realise this result. The process is therefore steered on output rather than input. For the Integral Child Centre Zeeburgereiland, the output specifications together with the six themes gave substance to the award criteria. As to the Community School Joure, the Municipal Council explicitly decided to put the school out to tender using the competitive dialogue combined with a set of output specifications. By means of innovative contracting, an attempt was made to let the market free in inventing its own solutions (Municipality De Friese Meren, 2014). The output specifications were laid down in a document of 400 pages in which absolutely everything was described. Not only what is to be achieved, but in some parts also how it is to be achieved was defined. According to Van der Molen (2014), the output specifications were sometimes so detailed that the building could just as well be designed solely on that basis. Van der Molen (2014) maintains: “Due to the comprehensiveness of the output specifications, the competitive dialogue became very heavy and juridical. There should have been far less detail in the output specifications. Rather than in the front, the detail should have been reflected in the realisation of the project.” In view of that, Van der Molen disputes whether the construction sector is yet ready to build without a blueprint.

Regarding the output specifications, the linkage between the level of interchangeability of budgets and the formulations of criteria in outline should be mentioned. In both cases, the limited interchangeability of budgets has impaire the utilization of the output specifications. This is because output specifications focus on realising the desired result and since separated budgets hamper the freedom of the consortium to make the most of the total budget, the limited interchangeability of budgets thwarts exploiting the output specifications. In view of that, the use of separated budgets and output specifications do not go well together.
6.5.2 Payment mechanism

Both cases use the payment structure for capital expenditure as set forth in Clause 33 of the UAC-GC 2005 conditions. Paragraph 1 of Clause 33 stipulates that the payment must be effected according to the payment schedule drawn up by the contractor. In the Integral Child Centre Zeeburgereiland project, the capital expenditures were paid in 8 to 9 instalments in accordance with the payment schedule (Sterkenburg, 2014). The instalments were linked to the completion of certain project stages, whilst such completion were linked in turn to a performance statement. According to Chao-Duivis et al. (2013, p. 120), the advantage of such method is that there will be no loose ends with respect to the question of whether a contractor is entitled to a performance statement. In this way, performance and payment are connected. As to the large-scale maintenance, a similar payment schedule has been drawn up. Based on the multiannual maintenance plan, there will be periodic payments at the end of each quarter over the exploitation phase. This implies that if in year x large replacements have to be undertaken, the payments will also be higher in that particular quarter. As regards the operational expenses, payments are made on the basis of occupation. Since the Integral Child Centre is located in a ‘VINEX’ location, the school will not be fully occupied from the beginning. However, when a building is underutilised, zones are used which are not supposed to be used. As a result, the building needs more cleaning than budgeted on the basis of the occupancy rate. For that reason a distinction has been made for the operational expenses between use-related and building-related activities. For the operational expenses, an availability fee is paid over the term of the contract. The payment profile of the Integral Child Centre Zeeburgereiland is presented in Figure 24.

For the Community School Joure, the municipality has released a DBM budget for design, realisation and long-term maintenance of the school within the confines of the ceiling price. Approximately 75 per cent of the DBM budget is paid in instalments allied to milestone dates during design and realisation (Municipality Skarsterlân, 2011, p. 10). The municipality uses a schedule of fixed period payments which are paid as soon as the performance obligations are fully complied with. The remainder of the DBM budget will be spread over the 25 years that the consortium is responsible for the long-term maintenance of the school (see Figure 25). As a result, a part of the costs associated with the design and the construction is not yet paid at the time of the completion of the work. This means that the consortium has to pre-finance part of the design and realizations activities. According to Van der Molen (2014), this would motivate the consortium in developing a community school that is optimally available and performs well after delivery. For the (mainly) operational part of the DBMO agreement an availability fee is paid over the term of the contract. Figure 25 shows the payment profile of the Community School Joure.

Figure 24 Payment profile Integral Child Centre Zeeburgereiland
6.5.3 Bonuses and penalties

Both penalties and bonuses are included in the DBMO agreement of the Integral Child Centre Zeeburgereiland. The penalty and bonus amounts set by the municipality in accordance with the consortium are specified in Article 14 of the Model Agreement of the UAC-GC contract. A penalty entails an amount deducted from the periodic payment, periodic payment. During realisation of the Integral Child Centre Zeeburgereiland, penalty amounts are attached to specific milestone dates. When the contractor fails to meet a specific milestone date, the penalty amount is deducted from the payment. During exploitation, penalties and bonuses are allied to a performance measurement system. The performance measurement system takes account of the building performance and the user satisfaction. Quality tests are conducted to check whether the right performance is being met. In the Integral Child Centre Zeeburgereiland project, attention is paid not only to the building performance but also to the evaluation of the users. In the interview, Sterkenburg (2014) gives the example of the user evaluation after one year of operation: “If the outcome of the user evaluation is positive, the consortium receives a bonus of € 2,500, however, if the result turns out negative a penalty of € 2,500 is imposed.” In view of that, it can be said that the bonus-malus system functions as a big stick.

Penalties are also applied in the Community School Joure project. Though, this project does not contain bonuses. In the realisation phase, penalty amounts are coupled to specific milestone dates. These milestone dates are then linked to a performance statement. If the performance statement cannot be given on a milestone date, a penalty is imposed. According to Van der Molen (2014), up until the completion of the work these penalties are only administrative fines, which means that on paper the consortium has a penalty, but that the penalty amount will not yet be deducted from the payment. If the work is still delivered on the agreed upon completion date, all administrative penalties will be deleted. As to the exploitation phase, a performance measurement system is set up to monitor the performance of the building. Penalties are imposed in case of underperformance.

6.5.4 Other incentives

In both projects, next to the inclusion of penalties and bonuses there are other incentives for the consortium to perform well. As to the Integral Child Centre Zeeburgereiland, one of the strongest incentives for the winning consortium has been the fact that the tender also included two subsequent assignments. In the tender procedure, three projects with the same concept were procured simultaneously. The pilot Zeeburgereiland has been the first project to be realised. On the basis of the principles and objectives set, the pilot will be evaluated objectively. If the pilot proves measurable success, the follow-up projects will be awarded to
the same party under a so-called ‘Further Assignment’ (City Council Amsterdam East, 2012). The two follow-up schools have programs similar to the pilot project. As there is only one tender procedure for three projects, the consortium can reduce transaction costs in the two follow-up projects. Even more, the consortium can learn from the mistakes made in the pilot and therefore, it might be capable of minimizing failure costs in the subsequent assignments. Therefore, the two potential projects are a true incentive for the consortium.

In the Community School Joure project, incentives are captured in the energy provision. With regard to the energy supply, a volume guarantee has been issued. A volume guarantee for energy implies that the client fixes the volume of the energy to be used. If more energy is used than stipulated in the contracts, the consortium has to pay the excess capacity. However, if less energy is used than stated in the contracts, the consortium is allowed to keep the profit. In view of the profit to be earned over the entire term of the contract, the consortium will definitely try to reduce the energy consumption by developing energy-friendly systems and encouraging users to use energy wisely. Therefore, the volume-guarantee stimulates the consortium to deliver the building in an optimal energy efficient condition.

6.5.5 To what extent
In both the Integral Child Centre Zeeburgereiland and the Community School Joure, the capital expenditures are paid in instalments according to the payment schedule drawn up by the contractor. For the Integral Child Centre Zeeburgereiland, the disbursements are based on real expenses for DBM in accordance with the payment schedule. The Community School Joure project also makes use of deferred payments to stimulate the contractor to perform well during exploitation. The deferred payments are then spread out over the exploitation phase. For operational expenses, both consortia receive an availability fee over the term of the contract. To motivate the contractor even more, penalties are imposed in both cases. The Integral Child Centre Zeeburgereiland also applies bonuses. In addition to the deferred payments and use of bonuses and penalties, the cases have other incentives as well. The follow-up assignments linked to the pilot Zeeburgereiland are a great incentive for the consortium to deliver good performance, whilst the volume guarantee for energy use motivates the consortium in the Community School Joure project to build more energy efficient.

Both Duyst and Sterkenburg consider the performance incentives to be strong enough in the pilot Zeeburgereiland. As to the Community School Joure, Van der Molen believes that the very detailed set of output specifications has repressed the freedom of the contractor. Yet, she considers the incentives originating from the penalty system to be strong enough. Niese (2014) says: "About the performance incentive, it is no different than with the F component in it, except that there are no banks looking over your shoulder. The main risks still rest with the private sector. Because the consortium has to pay in case of underperformance, there are already sufficient incentives by penalties alone. Niese concludes his statement by saying: "With the F in it, we’re not gonna run faster."

6.6 Reviewing the cases
Table 8 shows the extended version of the checklist made in chapter 4. In the extended version, the details about the Integral Child Centre Zeeburgereiland and the Community School Joure are filled in. Based on the extended checklist, a SWOT analysis is drawn up for each of the two DBMO cases. The SWOT analyses of the Integral Child Centre Zeeburgereiland and the Community School Joure are presented in Appendix F. In the SWOT analyses, the key points are made visible. On the basis of the two SWOT analyses, it becomes
apparent what measures have already been taken and in what areas there are still problems that require action.

Table 8 Checklist of the substitutes of the role of the F in DBMO

<table>
<thead>
<tr>
<th>Questions</th>
<th>Function</th>
<th>Specifications DBFMO</th>
<th>Specifications DBMO Integral Child Centre Zeeburgereiland</th>
<th>Specifications DBMO Community School Joure</th>
</tr>
</thead>
<tbody>
<tr>
<td>§6.3.2</td>
<td></td>
<td>FM, SC, IC</td>
<td>One single budget</td>
<td>Separated budgets</td>
</tr>
<tr>
<td>§6.3.3</td>
<td></td>
<td>FM</td>
<td>There is interchangeability of budgets between construction and exploitation</td>
<td>Limited interchangeability of budgets between construction and exploitation</td>
</tr>
<tr>
<td>§6.4.1</td>
<td></td>
<td>SC</td>
<td>Mainly transferred to private parties other than the SPV</td>
<td>Mainly transferred to the private sector</td>
</tr>
<tr>
<td>§6.4.2</td>
<td></td>
<td>SC</td>
<td>Due diligence by lenders</td>
<td>No due diligence on the contracts, only a check performed by a consultancy firm on behalf of the client</td>
</tr>
<tr>
<td>§6.4.3</td>
<td></td>
<td>SC</td>
<td>Lenders’ advisors monitor construction</td>
<td>No monitoring by parties other than the contractor</td>
</tr>
<tr>
<td>§6.4.4</td>
<td></td>
<td>SC</td>
<td>Lenders’ advisors monitor exploitation</td>
<td>No monitoring by parties other than the contractor</td>
</tr>
<tr>
<td>§6.4.5</td>
<td></td>
<td>SC</td>
<td>Yes, at least three: the Financial Close guarantee; the performance bond and; the transfer guarantee</td>
<td>Yes, there is a bank guarantee provided by Verlaat Uden (lead company), that can be turned into a concern guarantee after one year of exploitation</td>
</tr>
<tr>
<td>§6.5.1</td>
<td></td>
<td>IC</td>
<td>Output Specifications &amp; Payment Mechanism</td>
<td>Output Specifications &amp; Payment Mechanism</td>
</tr>
<tr>
<td>§6.5.2</td>
<td></td>
<td>FM, IC</td>
<td>Availability Fee</td>
<td>Disbursements are based on real expenses for DBM in accordance with the payment schedule and an availability fee for operation</td>
</tr>
<tr>
<td>§6.5.3</td>
<td></td>
<td>IC</td>
<td>Yes, there are adjustments on the fee</td>
<td>Yes, penalties are imposed during</td>
</tr>
</tbody>
</table>
bonuses and penalties included in the contracts? possible. realisation, whereas bonuses and penalties are imposed during exploitation during realisation which can only be turned into real penalties if the project is not delivered on time. During exploitation penalties are imposed

As opposed to DBFMO, there are four significant deficiencies found of DBMO with respect to the three core functions. These deficiencies are: (1) limited interchangeability of budgets; (2) absence of lenders; (3) weakened financial security, and; (4) reduced performance incentive.

6.6.1 Limited interchangeability of budgets
To begin with, both projects have separated budgets for capital expenditures and operational expenditures. As limited interchangeability of budgets bounds the contractor to invent solutions based on the formulated output specifications, it can be assumed that the separation of budgets is a weakness of both DBMO cases. Conversely, the separation of budgets can also be an advantage for the consortium as it keeps the consortium from excessive investments in capital. Suppose that the consortium is to spend part of the OPEX budget on CAPEX. If the consortium then goes bankrupt after realizing the building, it would mean that the consortium has invested more in the project than it has actually been paid for. In view of that, the separation of the budgets keeps the consortium from taking excessive risks by investing more in capital than budgeted.

6.6.2 Absence of lenders
The second point of attention is the absence of lenders in DBMO. In DBFMO projects, the interests of lenders and client are to a large extent equated (Koster & Hoge, 2008). In the tender procedure, lenders appoint advisors to perform due diligence on the bids and the contracts. After the contracts are signed, the lenders’ advisors continue monitoring the (financial) performance of the consortium during realisation and exploitation. Neither due diligence, nor monitoring by parties other than the consortium has been carried out in the two DBMO cases. In the Community School Joure, the consortium performed shadow calculations and in the pilot Zeeburgereiland, the municipality involved advisors to check on the competence of the candidates. Yet, these measures fall short against the due diligence and monitoring activities undertaken by lenders’ advisors in DBFMO.

6.6.3 Weakened financial security
The biggest risk in both DBMO cases is that the building does not comply with the output specifications and that the consortium cannot be held liable on the basis of the agreement or because of insolvency. This risk might lead to large adjustments costs on the side of the client. This risk will manifest itself in the exploitation phase, when the maintenance costs are higher than estimated, the energy performance is not met or the indoor climate does not comply with the output specifications. In both the Integral Child Centre Zeeburgereiland and the Community School Joure various measures are taken to mitigate this risk. For instance, in the Community School Joure, the output specifications not only specify performance but also prescribe some of the important requirements\(^\text{14}\). Also, the facility services company Facilicom is extra monitoring the proceedings during design and construction. This is because the facility services company is the lead company of the consortium and thus, will be at risk for the

\(^{14}\) See §6.7.2 Prescribing instead of appointing performance.
consequences of mistakes made during design and construction. As regards the Integral Child Centre Zeeburgereiland, disbursements based on real expenses on maintenance will keep the client from paying too much. Likewise, deferred payments in the Community School Joure project will provide safeguards to the client. The same goes for bank guarantees.

6.6.4 Reduced performance incentive

Generally, the size of the availability fee gives the opportunity to impose penalties in DBFMO projects. Only when it performs, the consortium is able to fulfill its obligation towards the lenders. The two DBMO cases also make use of the availability fee. However, these cases only use the fee to cover the OPEX. As the fee only covers the operational expenses, the availability fee in the DBMO cases is much smaller than the availability fee generally used in DBFMO projects. A smaller fee simultaneously implies that the threat of penalties will be less severe. In view of that, it can be assumed that the performance incentives provoked by the penalty system in DBMO are less powerful compared to those in DBFMO.

Another reason of reduced performance incentives under DBMO is that companies within the consortium are allowed to use the profits derived from other projects to compensate for the losses made in the project. Since the companies are allowed to divert resources from other projects to cover losses, the pressure to deliver good performance is to a certain extent reduced. This is in contrast to DBFMO projects, where the project is ring-fenced and financiers purely rely on the cash flow generating ability of the project itself rather than the financial position of the companies involved (Engel et al., 2010). Therefore, it can be expected that more pressure is put on the contractor in DBFMO projects than in DBMO projects.

6.7 Measures to overcome the loss of the F in DBMO

Based on the case study research, a set of measures has been set forth to eliminate the deficiencies resulting from the absence of the F component in DBMO. There are nine measures proposed that can help to remove the deficiencies and consequently, fulfill the role of the F component in the DBMO contract. As can be seen in Table 9, some of the deficiencies are already tackled by certain measures in the analysed cases. Beside the measures that are already taken, there are some new measures proposed.

Table 9 Overview of measures proposed

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>DEFICIENCIES DUE TO ABSENCE OF THE F</th>
<th>MEASURES PROPOSED</th>
<th>INTEGRAL CHILD CENTRE ZEEBURGEREILAND</th>
<th>COMMUNITY SCHOOL JOURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>Limited interchangeability of budgets</td>
<td>§6.7.1 Bringing budgets together</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SC</td>
<td>Absence of lenders</td>
<td>§6.7.2 Prescribing instead of appointing performance</td>
<td>-</td>
<td>V (Very detailed set of output specifications)</td>
</tr>
<tr>
<td>SC</td>
<td>Absence of lenders</td>
<td>§6.7.3 Testing during design and completion</td>
<td>-</td>
<td>V (Facility services company as lead company)</td>
</tr>
<tr>
<td>SC</td>
<td>Weakened financial security</td>
<td>§6.7.4 Disbursements based on real expenses</td>
<td>V (in line with the payment schedule)</td>
<td>-</td>
</tr>
<tr>
<td>SC</td>
<td>Weakened financial security</td>
<td>§6.7.5 Requesting bank guarantees and/or concern</td>
<td>V (bank guarantee that can be turned into a concern)</td>
<td>V (bank guarantee)</td>
</tr>
</tbody>
</table>
The first measure to improve DBMO as financial means, is to bring the budgets closer together. This is easier said than done. The main problem is that the budgets originate from different sources. In the Netherlands, the government policy for housing of schools prescribes that the funding of construction, maintenance and operation of schools are provided by different institutions. As this is a government policy, the problem can only be solved at state level. Figure 22 shows the current situation. As of January 1th of 2015, the maintenance also falls into the hands of the school boards (Figure 23). The Dutch government would do better by appointing one single institution that is responsible for all budgets and that is allowed to ‘play’ with the CAPEX and OPEX budgets. That institution can be the municipality as well as the school board. In order to make this happen, the government housing policy for schools should be reformed. The new school housing policy structures proposed are presented in Figure 26.
Yet, these new structures are purely focussed on school-related projects. As DBMO contract structures can also be used for other purposes, the policy around the other types should be investigated first.

6.7.2 Prescribing instead of appointing performance (SC)

The first measure, contributing to the security level of the client, is adding prescriptive requirements to the output specifications. Prescribing requirements can be particularly helpful for elements during exploitation, such as: indoor climate, maintenance level and energy performance. This is because the biggest risk of the client is that the building does not comply with the output specifications and that the consortium cannot be held liable on the basis of the agreement or due to insolvency. As the exploitation phase typically takes twenty to thirty years, non-compliance with the performance requirements can have major consequences. In order to make sure that the client gets what he wants, important elements of the building can be prescribed rather than formulated in outline.

Blyth and Worthington (2010) note that there should always be a mixture of prescriptive and performance requirements. They say:

“Clients which build regularly, such as large retail chains, will specify solutions that have worked well in the past. The brief will be largely prescriptive, focusing the project teams’ innovative abilities on the elements where performance can be improved and costs reduced. Clients who build infrequently or require to fulfil a specialised need, will tend to produce briefs with a higher proportion of performance specification. Briefs that are completely performance related, with no reference to past experience, can be risky. On the other hand, a brief which is totally prescriptive will stifle innovation. The best briefs have a mixture of innovation and past experience” (Blyth & Worthington, 2010, p. 64).

Therefore, as prescriptive requirements may stifle innovations, whereas performance requirements can result in loss of solid foundation, a balance of prescriptive and performance requirements would be best for DBMO projects (see Figure 27).

![Figure 27 Prescriptive versus performance requirements as in: Blyth and Worthington (2010) – Figure 5.7 p.65](image)

6.7.3 Testing during design and completion (SC)

The second measure, contributing to the security level of the client, is testing during the design process and on the date of completion. As there is no monitoring on behalf of lenders in DBMO projects, the client should fulfil this function himself. For instance, the client could
request that the contractor shows him the maintenance plan, the installation concept and the calculations on energy performance. The client could also perform technical due diligence on the bids and contracts. If necessary, the client can involve external advisors to check on the plans and proficiency of the candidates in the tender.

6.7.4 Disbursements based on real expenses (SC)
The third measure, contributing to the security level of the client, is imposing a payment schedule based on real expenses. In DBMO, a fixed availability fee typically poses a risk on the client. This is because under a fixed annual availability fee the replacement investments are paid in advance. This is made clear by the following example.

Suppose that a DBMO contract is signed for a school project for a duration of 30 years. An availability fee is applied for the maintenance and operational expenses (see Figure 28). In the multiannual maintenance plan, it is specified that the roof has to be replaced in year 17. If the contractor wishes to replace the roof by year 17, he will have to save up all fees paid over the 17 years. However, if the contractor goes bankrupt in year 16, the client will be left empty-handed. In that case, the fee paid over the 17 years for the replacement of the roof will be gone.

This examples shows again that the use of an availability fee in DBMO projects poses a risk on the client. This situation can be prevented by requesting that payments are made after the actual work has been carried out. This is presented in Figure 29. If the contractor goes bankrupt just before the replacement of the roof, then no advance payments have been done. In view of that, it can be concluded that disbursements based on real expenses during exploitation protect the client against unanticipated additional costs caused by insolvency by the contractor.

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**Figure 28** Replacement investments are paid in advance with a fixed annual availability fee

**Figure 29** Proposed situation: replacement investments are paid after the actual work has been carried out
6.7.5 Requesting bank guarantees and/or concern guarantees (SC)
The fourth measure, contributing to the security level of the client, is the issuance of bank guarantees and/or concern guarantees. The client is allowed to include a bank and/or concern guarantees in the DBMO contract. When the contractor does not comply with the performance statements, the bank and/or concern guarantee can be called upon. However, a concern guarantee provides limited assurance, especially in the event of bankruptcy (STABU, 2014). Bank guarantees, on the other hand, provide much greater certainty, but lead to stringent capital requirements and high costs for the contractor (STABU, 2014). Yet, these costs are significantly lower than when, for instance, the contractor is required to provide equity capital\textsuperscript{15} (Aalbers, 2013). High bank guarantees are also requested from the contractor in DBFMO, yet these bank guarantees are then just a supplement to the provision of equity capital.

6.7.6 Deferred payments / contribution of equity or corporate finance (SC/IC)
Deferred payments combined with the contribution of equity capital may improve the security level of the client as well as it may strengthen the performance incentives. A variant of PPS light is to pay approximately 80 per cent of the investment by way of one-time payments. The remaining 20 per cent of the investment sum is then withheld and should be pre-financed by the contractor by means of equity capital (Klijn, 2010). The contractor can recover the amount pre-financed through availability payments paid over the exploitation phase, similar to the way this is done in DBFMO (Klijn, 2010, p. 915). In this way, deferred payments create financial incentives for the contractor to deliver the building in the adequate condition and to ensure availability. If the retained investment costs that have to be funded by the contractor himself are limited in size, it is not necessary to use project financing. However, a contractor can reduce its financing cost significantly by borrowing money through corporate finance. By using corporate finance rather than project finance, there is no need to set up a SPV. The contract will be concluded directly with the consortium or the contractor (see Figure 30). Moreover, as the risk profiles are rather different, the interest rates of corporate debt are usually lower than the interest rates on project finance debt (Peirson et al., 2011).

\textsuperscript{15} See §6.7.6. Deferred payments/contribution of equity or corporate finance.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure30.png}
\caption{DBFMO contract structure versus PPS light structure with deferred payments and provision of equity capital}
\end{figure}
As seen in Figure 31 and 32, the payment structure that is used in accordance with deferred payments, is broadly the same as in DBFMO. Replacement investments can be incorporated in the periodic fee under the condition that the proportion of equity capital is sufficiently large. If the proportion of equity capital is too small, the performance incentive for the contractor will be weakened. In that case, a payment schedule based on real expenses should be preferred as is proposed in §6.7.4 (see Figure 29).

![Figure 31 Typical DBFMO payment structure](image)

![Figure 32 PPS light payment structure with deferred payments and provision of equity capital](image)

6.7.7 **Imposing penalties and bonuses (IC)**

Imposing a system of penalties and bonuses will motivate the contractor to perform well. Aalbers (2013) believes that even without interest and principal payments, the contractor receives significant amounts from the client for operational and maintenance activities over the term of the contract. Under the condition that the payments during exploitation are large enough, the bonus-malus system stipulated in the DBFMO Agreement can be equally applied to DBMO projects.

6.7.8 **Attaching multiple assignments to one tender (IC)**

Attaching multiple assignments to one tender can be a true incentive for the contractor. Since DBMO projects typically have smaller project sizes as compared to DBFMO projects, tender costs are proportionately high for DBMO projects. By connecting multiple projects with the same concept to one single tender, savings can be made in tender costs. As there is only one tender procedure for multiple projects, the candidates in the tender procedure will be encouraged to submit their very best offer, as winning the tender implies jobs and income over the longer term. By promising multiple projects to one consortium, the learning curve effect might come into force (Lam, Lee, & Hu, 2001). The learning curve effect implies that the consortium will learn from the mistakes made in the first project and as a result, it will be able to minimize the size of the failure costs in the subsequent assignments. However, it should
be noted that this measure can only be successful under the condition that the subsequent assignments have similar programs.

6.7.9 Establishing an uniform DBMO standard contract (FM/SC/IC)
The last measure is the creation of a DBMO standard agreement exclusively for DBMO projects. A standard model could accommodate all required measures that are currently added to the various contracts of DBMO projects. Elements that might be covered by the new standard model are:

i) an exit option for the client in the event of underperformance, including financial settlement;
ii) calling on the bank guarantee if penalties are higher than periodic payments, and;
iii) calling on the bank guarantee in case of underperformance.

The new DBMO standard model can be established on the basis of three current foundations. First, it can be built on the DBFMO Agreement minus the F component. Second, it can be founded on the UAC-GC conditions with expansion of the Maintain & Operate part or last, it can be built on the UAC-GC terms and conditions for the Design & Build part combined with a Service Level Agreement (SLAs) for the Maintain & Operate part. Beside the existing structures for the foundation of the standard, it is also possible to develop the DBMO standard from scratch.

6.8 Conclusion
In this chapter, two recently procured DBMO projects are discussed. The Integral Child Centre Zeeburgereiland and the Community School Joure are the cases selected for the case study research. The goal of the case study research was to explore by what sort of measures the absence of the F component is compensated in Dutch DBMO projects. The three key functions characteristic of the role of the F component have been used as a guidance for the case study research. Per function, the cases have been analysed. The four most important findings of the case study research are: (1) limited interchangeability of budgets; (2) absence of lenders; (3) weakened financial security, and; (4) reduced performance incentive. The case study research also gives insights into what measures have already been taken in the projects and in what areas there are still problems that require action. Based on the case study research, the following list of measures is proposed:

1. Bringing budgets together (FM)
2. Prescribing instead of appointing performance (SC)
3. Testing during design and completion (SC)
4. Disbursements based on real expenses (SC)
5. Requesting bank guarantees and/or concern guarantees (SC)
6. Deferred payments / contribution of equity or corporate finance (SC/IC)
7. Imposing penalties and/or bonuses (IC)
8. Attaching multiple assignments to one tender (IC)
9. Establishing an uniform DBMO standard contract (FM/SC/IC)

This list shows the measures already taken in one of the DBMO cases as well as the measures that should have been taken to overcome the absence of the F component. In view of these findings, it is valuable for the existing body of knowledge to explore what will happen to the level of added value if the F component is explicitly left out of the contract. In the next chapter, insights will be provided into this matter.
This chapter shows the results of the empirical research conducted into how DBMO contracting, as opposed to DBFMO contracting, affects the level of added value of a project. In chapter 5, twelve criteria for assessing the added value of DBFMO projects have been selected. For each of the criteria an assumption has been made as how DBFMO relates to the public alternative in terms of added value. In this chapter, these assumptions are tested by means of case study research. For the case study research, two recently procured Dutch DBFMO projects have been selected. Likewise, case study research is conducted into the level of added value of DBMO projects by evaluating the two Dutch DBMO cases already introduced in Chapter 6. Subsequently, the effects of the two DBFMO cases are compared with the effects of the two DBMO cases in order to find out what the implications are of the removal of the F component for the level of added value.

7.1 Research Methodology

7.1.1 Case study research

To explore what the effects of DBMO contracting are on the level of added value as opposed to DBFMO contracting, case study research is conducted. For the case study research, two DBMO cases and two DBFMO cases are selected. The two Dutch DBMO cases are:

- Integral Child Centre Zeeburgereiland, Amsterdam (§6.2.1), and;
- Community School, Joure (§6.2.2).

The two selected DBFMO cases are:

- Education Executive Agency & Regional Tax Office, Groningen, and;
- The Supreme Court, The Hague.

As the two selected DBMO cases are already introduced in paragraph 6.2, only the two Dutch DBFMO cases are introduced in this chapter.

Representativeness of the cases selected

Thus far, seven DBFMO building projects have been realised in the Netherlands and currently, around ten DBFMO projects are in their preparation/realisation phase. As the number of
DBFMO building projects implemented in the Netherlands is rather small, the sample size of two DBFMO cases is reasonable. Since both cases are built on the DBFMO standard model of the Government Building Agency, the representativeness of the two selected cases is not an issue. This is because the DBFMO standard agreement is the foundation whereon all current DBFMO building projects are established. As some older DBFMO projects have other contract structures and procurement procedures, it was deliberately chosen to select two up-to-date DBFMO cases which have been founded on the standard contract model. The Education Executive Agency & Regional Tax Office Groningen project is selected as the work is already in operation and therefore, it will provide great insights into the exploitation of the building, whereas the Supreme Court The Hague is one of the newest DBFMO projects and therefore, it will give information about the latest movements in DBFMO practices.

7.1.2 Interviewees selected
The case study research contains documentary data and interviews with project managers of the cases selected. Because the term ‘added value’ holds the perceptions of multiple actors, interviews are held with experts on both sides (client/contractor). As regards the two DBFMO cases, the interviewees are:

- **JACCO VAN DER VEGET** DBFMO Education Executive Agency & Regional Tax Office, Groningen: Project manager at the Government Building Agency.
- **KEES VAN OOSTEREN** DBFMO Education Executive Agency & Regional Tax Office, Groningen: Tender manager at Strukton.
- **PETER VAN LEEUWEN** DBFMO The Supreme Court, The Hague: Director Major Projects at BAM Utiliteitsbouw.

Based on the cost, time and quality criteria defined in chapter 5, the interviewees are questioned about the added value of the project. The questionnaire of the interviews can be found in Appendix D.

**Trustworthiness of the interviewees selected**
A process-related concern is the validity of the statements made by the interviewees. Since the perceptions of the interviewees are used for data gathering, it is important that the interviewees have enough expertise and knowhow to be reliant. The trustworthiness of the statements made by the interviewees is crucial for the validity of the research. In order to verify if the interviewees selected are trustworthy, a small survey has been held among the interviewees (see Appendix I). The survey focusses on the expertise of the interviewees in the construction industry as well as their experience with integrated contracts. The survey shows that Van der Vegte, Buijs and Van Leeuwen have worked in the construction industry for more than nine years. Van Oosteren has worked 7-9 years in the construction industry. As to the experience with DBFMO contracting, Buijs indicated that he has 10 years’ experience, both Van der Vegte and Van Oosteren 8 years’ experience and Van Leeuwen 5 years’ experience. Van der Vegte, Van Oosteren and Van Leeuwen said that they have been involved with other integrated contracts for more than nine years. Only Buijs indicated that he only has experience with DBFMO projects. Buijs actually is a financial expert at the Government Building Agency, specialised in financial aspects of DBFMO contracting. However, since he has experience with DBFMO for quite some time, it can readily be assumed that all four experts have sufficient knowledge regarding DBFMO projects to provide substantiated answers and therefore, they all contribute to the validity of this research.
Table 10 Results survey trustworthiness interviewees

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Experience construction industry</th>
<th>Experience DBFMO contracting</th>
<th>Experience other forms of integrated contracts</th>
<th>Experience with integrated contracts in general</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacco van der Vegte</td>
<td>&gt;9 years</td>
<td>8 years</td>
<td>DBMO</td>
<td>&gt;9 years</td>
</tr>
<tr>
<td>Kees van Oosteren</td>
<td>7-9 years</td>
<td>8 years</td>
<td>D&amp;B, DBM, DBMO</td>
<td>&gt;9 years</td>
</tr>
<tr>
<td>Jos Buijs</td>
<td>&gt;9 years</td>
<td>10 years</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Peter van Leeuwen</td>
<td>&gt;9 years</td>
<td>5 years</td>
<td>DBMO</td>
<td>&gt;9 years</td>
</tr>
</tbody>
</table>

7.1.3 Research approach

In this chapter, the assumptions formulated in chapter 5 are tested based on the opinions of the experts. Per criterion, the experts of the DBFMO cases are asked whether more or less value is generated as compared to the public alternative. The measuring scale used by the interviewees to allocate the size of the effects is presented in Figure 33. As the effects can have a positive as well as a negative impact on the level added value, the measuring scale includes a positive and negative pole. The value of the public alternative based on the traditional way of contracting\(^{16}\) signifies the origin of the scale. The ordinal measuring scale is selected to evaluate most of the criteria as it involves an intrinsic ranking. This is particularly convenient for the quality criteria as these criteria are often hard to quantify. Yet, it should be noted that most cost and time criteria could also be expressed in ratio measuring scales. Therefore, it is decided that whenever possible, real numbers are used to express the magnitude of the effects.

Figure 33 Ordinal measuring scale

After the assumptions are tested, the two DBMO cases will be assessed using the same measuring scale. Similar questions as to the level of added value are asked to the experts of the two DBMO cases. The findings are presented in paragraph 7.4. Based on the findings, an exploration is done into the relationship between the size of the effects and the measures taken as substitutes for the role of the F component\(^{17}\). After that, the two DBFMO cases are compared to the two DBMO cases in order to find significant differences and similarities in added value. Based on the comparison, the consequences of excluding the F component out of the building contract can be mapped (see Figure 34).

\(^{16}\) See §3.1.1 Traditional contract model

\(^{17}\) See Table 9 of Chapter 6 for the measures taken in the two DBMO cases.
7.2 Introduction DBFMO cases

In this paragraph, the two DBFMO cases selected for the case study research are introduced. Both cases are procured by the Government Building Agency. The Education Executive Agency & Regional Tax Office, Groningen was put out to tender in 2006 and was completed in 2011, whereas the Supreme Court, The Hague was put out to tender in the end of 2010 and is not yet delivered. The Supreme Court will be completed in November 2015. Appendix G contains an overview with the basic information concerning both cases.

7.2.1 DBFMO Education Executive Agency & Regional Tax Office, Groningen

The Education Executive Agency & Regional Tax Office Groningen is one of the very first DBFMO projects carried out in the Netherlands. Due to presence of political decision-making, there was a considerable time pressure on the project. Strong political interests were involved as the project was a merger between the Education Executive Agency located in Groningen and the Regional Tax Office located in Leeuwarden. The municipality of Groningen wanted the new accommodation to be located in Groningen as it would be good for employment (Van der Vegte, 2014). To make this happen, the municipality of Groningen eagerly cooperated from the beginning.

As to the new joint accommodation of the two institutions, the Government Building Agency, the employees and the municipality of Groningen intended to realise a sustainable and innovative office as an icon for the city of Groningen (Van Oosteren, 2014). The building had to unburden the users as well as it had to encourage collaboration. As regard the physical appearances, the building had to be in line with the profile of the city and parking had to be arranged out of sight.

The market consultation of the new joint accommodation of the Education Executive Agency and Regional Tax Office in Groningen started in December 2006. In March 2008, the project was awarded to DUO², a consortium of Strukton, Ballast Nedam, John Laing. By signing the contract, the consortium DUO² became responsible for the design, construction and finance of the new office for the Education Executive Agency and regional tax Office, including management and maintenance of the building and supplying general technical services over a period of 20 years. The Education Executive Agency & Regional Tax Office Groningen covers roughly 48,000 square meters of gross floor area. Additionally, there is 10,000 square meters available for parking and 9,000 square meters for the city garden that is to be completed in June 2014.
7.2.2 DBFMO The Supreme Court, The Hague

Due to growth in the activities of the Dutch Supreme Court and the corresponding number of employees, the former building of the Dutch Supreme Court suffered from a lack of space. Therefore, it was chosen to build a new accommodation for the Dutch Supreme Court. The main objective has been that the new Supreme Court can go forward for decennia on the new location. Representativeness is the leading principle of the new accommodation. The accommodation should not only function properly and inspire people for 5 years, but also for 50 years (Government Building Agency, 2014). Hence, flexibility is one of the most important preconditions. Flexibility is required to obtain a high level of adaptability for the building, its infrastructure and the supporting installations. Because the building symbolizes the institution that is called the Supreme Court and because of its prominent position in Dutch society, the building requires suitable architecture. The building should include a public as well as private part and should be functional. In addition, the building must provide a pleasant and safe working environment for all those who work at the Supreme Court as well as those who come to visit. Finally, the services must contribute positively to the functioning of the Supreme Court.

The market consultation of the new building of the Dutch Supreme Court started in December 2010. In November 2012, the Government Building Agency, commissioned by the Ministry of Security and Justice, awarded the contract for the new building of the Supreme Court to the consortium ‘Poort van Den Haag’. By signing the contract, the consortium ‘Poort van Den Haag’ became responsible for the design, construction and finance of the Dutch Supreme Court, including management and maintenance of the building and supplying general technical services over a period of 30 years. The consortium ‘Poort van Den Haag’ is a coalition of several parties. Members of the consortium are BAM PPP, PGGM, KAAN Architecten, BAM Utiliteitsbouw, BAM Techniek and ISS Integrated Facility Services. The new Dutch Supreme Court includes approximately 15,000 square meters of gross floor area, excluding the parking area.

7.3 DBFMO assumption testing

In chapter 5, assumptions have been made concerning the effects of DBFMO contracting on the level of added value on the basis of cost, time and quality criteria. The assumptions are based on what has been written in literature. In this paragraph, it is examined whether the practical findings correspond with the assumptions stated in chapter 5. An overview of the findings of the case study research conducted can be found in Appendix H.

7.3.1 From the case studies: Effects on the cost criteria

In paragraph 5.4, four assumptions are done on the basis of the selected cost criteria. The results of the verification of the assumptions are shown in Table 11.

Table 11 Verification of cost assumptions

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EFFECT RELATIVE TO THE TRADITIONAL VARIANT</th>
<th>VERIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COST</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction cost</td>
<td>assumption Higher</td>
<td>✓</td>
</tr>
<tr>
<td>Cost of capital</td>
<td>Higher</td>
<td>✓</td>
</tr>
<tr>
<td>Life cycle optimisation with respect to construction and exploitation cost</td>
<td>Higher</td>
<td>✓</td>
</tr>
<tr>
<td>Price certainty</td>
<td>Higher</td>
<td>✓</td>
</tr>
</tbody>
</table>
**Transaction cost**

The transaction costs on the side of the contractor are assumed to be higher as compared to the public alternative. This statement can be confirmed on the basis of the case study research. As to both the Supreme Court The Hague and the Education Executive Agency & Regional Tax Office Groningen, the experts of the consortia acknowledge that the transaction costs are much higher than if the project had been procured in the traditional way. Van Oosteren, tender manager at Strukton, estimates the transaction cost of the winning consortium for the Education Executive Agency & Regional Tax Office Groningen to be around € 5 million, all hours included. According to Van Oosteren, there was a great amount of legal costs incurred, particularly because at the time there was no DBFMO standard available. “This may at least differ € 500,000. At that time we had no idea how long the process was going to take. Strukton’s strategy was that we had to get involved in all PPP projects to get as much knowledge as possible” (Van Oosteren, 2014). As a result, all advisor’s fees were paid by the consortium. Nowadays, success fees are increasingly being deployed, so that advisers purely get paid based on their performance (Meesters, 2014). For the Education Executive Agency & Regional Tax Office Groningen the design costs were also extremely high. According to Van Oosteren, this is because the Government Building Agency found it very hard to steer the contractor on outline. As a result, a very detailed design was made, which took a lot of time and money. “Today, preliminary designs are far less specific in the dialogue rounds and designing is only done based on outline” (Van Oosteren, 2014). As for the Supreme Court The Hague, the winning consortium spend approximately € 4 million on transaction costs. According to Van Leeuwen, director of major projects at BAM Utilities, the size of the transaction costs is the twentyfold of the transaction costs under traditional contracts. Van der Vegte, project manager at the Government Building Agency, believes that due to standardization, the transaction costs of DBFMO and traditional contracts are coming closer together.

**Cost of capital**

The cost of capital in DBFMO projects is assumed to be higher than in the traditional variant. The case studies prove that this statement can be confirmed. Based on these numbers, it can be stated that the practical findings are in line with the assumption formulated in paragraph 5.4.

**Life cycle optimisation with respect to construction and exploitation cost**

More life cycle optimisations are assumed to be made under DBFMO contracting as compared to the traditional way of contracting. On the basis of the practical findings, this statement can be confirmed. The experts acknowledge that life cycle optimisations occur in the Supreme Court The Hague as well as the Education Executive Agency & Regional Tax Office Groningen. Van Oosteren estimates the life cycle optimisations induced in the realisation and exploitation of the Education Executive Agency & Regional Tax Office Groningen to be around 5%. “The life cycle optimisations induced are mainly the result of smart thinking. An example is the air handling unit. Instead of replacing the entire unit after x years, it was more cost-efficient to replace the components. In this way, considerable life cycle cost savings have been induced” (Van Oosteren, 2014). For the Supreme Court The Hague, the life cycle cost savings are much greater. Buijs, financial advisor of the Government Building Agency, states that the financial added value of the Supreme Court was 26.5%. After deduction of the transaction costs on the side of the client, a net financial added value of 21% remains. This number includes the savings due to life cycle optimisations, optimal risk division and the use of output specifications (Buijs, 2014). Buijs argues that if the
market is really tense that the figure representing the added value increases. According to Buijs, this can be the result of two things: or the Government Building Agency is not correcting the reference variant properly to the tense market, or the private sector is dropping its prices in order to stay competitive. Also, Van Leeuwen is certain that cost savings occur under DBFMO. He says: “DBFMO has a sort of efficiency. By linking the design to the other phases, huge cost savings can be realized” (Van Leeuwen, 2014).

**Price certainty**
The degree of certainty regarding costs and prices is assumed to be higher under DBFMO than under traditional contracts. Price certainty contains two elements: the extent to which budget overruns occur and the long-time certainty about prices and rates. As regards budget overruns, Van Oosteren as well as Van der Vegte confirm that there were no overruns in the Education Executive Agency & Regional Tax Office Groningen project. Even though the Supreme Court The Hague is not yet delivered, Buijs and Van Leeuwen expect that there will be no budget overruns either. “There will be no budget overruns under DBFMO as the DBFMO contract is a fixed price contract” (Buijs, 2014). In the interviews, the probability of cost overruns is frequently associated with the term additional work. It is often assumed that additional work leads to cost overruns. Yet, all interviewees believe that less changes and/or additional work are requested by the client in DBFMO contracts. According to Buijs, this is because the client is able to take notice of the entire life cycle cost of the additional work and then probably changes his mind when he sees the costs attached to the change. “As PPP enables a glimpse into the future, insight into the cost is simultaneously provided” (Buijs, 2014). Also, there is the argument that the tender is thought through more carefully by the client as it stretches over a longer timeframe (Van Leeuwen, 2014).

As regards price certainty, both cases score between the range of quite to extremely more. According to Van Oosteren, there will always be uncertainty about changes in requirements. “For example, suppose that after five years the user desires a completely different lamp. Then, these changes have to be calculated on top of the availability fee. And second, there is always the indexing-related risk on the side of the client, which impairs the long-term price certainty of the client” (Van Oosteren, 2014).

7.3.2 **From the case studies: Effects on the time criteria**

In paragraph 5.5, three assumptions are done on the basis of the selected time criteria. The results of the verification of the assumptions are shown in Table 12.

**Table 12 Verification of time assumptions**

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EFFECT RELATIVE TO THE TRADITIONAL VARIANT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TIME</strong></td>
<td>assumption</td>
</tr>
<tr>
<td>Lead time preparation</td>
<td>Longer</td>
</tr>
<tr>
<td>Lead time construction</td>
<td>Shorter</td>
</tr>
<tr>
<td>Time overruns</td>
<td>Shorter</td>
</tr>
</tbody>
</table>

**Lead time preparation**

It is assumed that the lead time for preparations is longer under DBFMO. This statement can be confirmed on the basis of the case study research. The preparation time can be divided into three ensuing periods. The first period is the time between the initiation of the project and the start of the tendering. The second period is the time between the start of the tendering and the awarding of the winning bid and the third period is the time between the awarding
of the winning bid and the start of the realisation phase. This separation is necessary as the preparation phase of DBFMO and the public alternative are rather different. Figure 37 shows the preparation phase under the traditional contract model and the DBFMO contract model. In the traditional contract model, the client first enters into a contract with the architect for the design of the work. The architect makes the first draft, then a preliminary design and lastly, a final design of the work. Once the architect has created the final design, the tendering procedure starts for the construction of the work. After the construction of the work is awarded to the winning bid, the permit procedure begins. Once the permits are obtained, the construction of the project may commence.

As can be seen in Figure 37, the initiation between DBFMO and the traditional contract model is quite similar. Yet, the problem comes next. The preparation of the procurement and particularly, the formulation of the output specifications require a lot of time in DBFMO, whereas in the traditional contract model there are no output specifications. In the traditional contract model the architect has to be selected first. Then, the architect has to make the design. According to Van Oosteren, the process of selecting the architect up to and including the completion of the final design can take up to two years. Therefore, Van Oosteren and Van Leeuwen believe that the preparation up to the start of the tender takes about as long in DBFMO as in the traditional contract model.

As regards the second period, the tender procedure is considered to be way longer under DBFMO as compared to the traditional contract model. All four interviewees acknowledge that the tender procedure is far longer under DBFMO. In the traditional contract model, the procurement of the construction of the work typically takes three to four months (Van der Vegte, 2014). In the Education Executive Agency & Regional Tax Office Groningen the procurement took 15 months, whereas the procurement of the Supreme Court The Hague took approximately 20 months. This is because the competitive dialogue includes several negotiation rounds and therefore, it usually takes longer than a standard public tender procedure (Buijs, 2014).

![Critical path preparation](image)

**Figure 37 Critical path preparation**

It is often assumed that DBFMO requires more time between the awarding of the winning bid and the start of the realisation, because the parties have to reach Financial Close first. According to Buijs, this is not true as the permit process runs parallel. The permit process is the critical path as it usually takes longer than reaching Financial Close. Three of the four interviewees believe that the period between the awarding of the winning bid and the start of the realisation phase is the same for DBFMO as for the traditional contract model. Only Van

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18 For the traditional contract model, see §3.1.1.
Leeuwen believes that the time between the awarding and the start of the realisation is shorter under DBFMO. He claims that this is due to the fact that there is more time pressure in DBFMO projects.

**Lead time construction**
The construction time is assumed to be shorter under DBFMO than under the public alternative. This statement can be confirmed on the basis of the case study research. Three of the four interviewees believe that the construction time is shorter than if the project had been executed based on the traditional contract model. Van Oosteren says: “The shorter construction time under DBFMO is the result of the huge financial incentive to speed up the construction process. This is because the availability fee is only paid after the building is completed. Therefore, every month the availability fee is paid earlier, the consortium saves money” (Van Oosteren, 2014).

**Time overruns**
It is assumed that less or shorter time overruns occur under DBFMO as compared to the public alternative. As to both the Supreme Court The Hague and the Education Executive Agency & Regional Tax Office Groningen, the experts acknowledge that shorter time overruns occur than if the project had been procured in the traditional way. Van Oosteren as well as Van der Vegte confirm that there were no time overruns in the Education Executive Agency & Regional Tax Office Groningen project. Even though the Supreme Court The Hague is not yet delivered, Bujs and Van Leeuwen expect that there will be no time overruns either. Van Leeuwen mentions that due to the fact that the contractor also makes the design, time management is much better organized in DBFMO. He says: “Because the contractor has its own information flow, the biggest bottleneck is cut out” (Van Leeuwen, 2014). Moreover, as penalties are imposed for late completion, Van Leeuwen suggests that there is even more time pressure under DBFMO. Van der Vegte reasons that because there are no banks looking over the shoulder of the contractor in the traditional contract model, it can be assumed that in the traditional contract model there is less pressure on the contractor to deliver the project on time.

7.3.3  *From the case studies: Effects on the quality criteria*
In paragraph 5.6, five assumptions are done on the basis of the selected quality criteria. The results of the verification of the assumptions are shown in Table 13.

**Table 13 Verification of quality assumptions**

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EFFECT RELATIVE TO THE TRADITIONAL VARIANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUALITY</td>
<td>assumption</td>
</tr>
<tr>
<td>Flexibility of the contract</td>
<td>Less</td>
</tr>
<tr>
<td>Quality process</td>
<td>More</td>
</tr>
<tr>
<td>Quality object</td>
<td>More</td>
</tr>
<tr>
<td>Service quality</td>
<td>More</td>
</tr>
<tr>
<td>Innovative thinking</td>
<td>More</td>
</tr>
<tr>
<td>Flexibility of the contract</td>
<td>Less</td>
</tr>
</tbody>
</table>

**Flexibility of the contract**
DBFMO contracts are assumed to have a more limited degree of flexibility as compared to the traditional UAC contract. Three of the four interviewees indicate that the DBFMO contract is just to quite less flexible as compared to the traditional contract model. Based on these figures, the assumption can be confirmed. Van Oosteren says that even with a clause in the
DBFMO contract to make changes, the flexibility is constrained by the long-term commitment. Also, Van Leeuwen points towards the long-term commitment as a factor that inhibits flexibility. Van Leeuwen argues that it is impossible to foretell the world in 30 years from now. “The client should therefore be careful with specifying the tasks” (Van Leeuwen, 2014). On the other hand, Van der Vegte believes that since there is a clause to make changes in the DBFMO contract, the flexibility is the same as with traditional contracts. Van der Vegte provides another example of the flexibility in the contract for the Education Executive Agency & Regional Tax Office Groningen by referring to the benchmark for facility services every five years, by which the client is entitled to enforce adjustments in case of great deviations relative to the market.

Quality of the process
DBFMO projects are assumed to have a higher level of process quality as compared to the traditional way of contracting. On the basis of the case study research, this statement can be confirmed. Three of the four interviewees acknowledge that there is a higher level of process quality in the DBFMO cases than if they had been executed on the basis of the traditional contract model. The process quality of the Education Executive Agency & Regional Tax Office Groningen scored much to extremely more. According to Van Oosteren, the high score is largely the result of the competitive dialogue, which had been very interactive. Van Oosteren also mentions the long-term commitment that encouraged cooperation between the parties as quality driver. Van der Vegte alludes to the transparency in the tendering process. “As the steps were known from the beginning, it became a well-organized and transparent process” (Van der Vegte, 2014). It is hard to assess the process quality of the Supreme Court The Hague as the project is still in the realization phase. Yet, Van Leeuwen believes that the process will be better, especially since DBFMO is a legally framed process-oriented contract.

Quality of the object
DBFMO project are assumed to have a higher level of object quality as compared to the traditional way of contracting. This assumption can be confirmed based on the interviews. Three of the four interviewees suggest that the project has a higher level of object quality than if the project had been executed on the basis of the traditional contract model. Only Van Oosteren believes that the quality of the object remains the same. Van Oosteren (2014) says: “Since the client steers the contractor on outline, the detailing may become pretty sober. In the traditional setting, the client more often interferes by saying that he wants something different. However, if the client wants something different in DBFMO, he must exactly specify what he wants. The problem, however, is that if the client specifies more, he simultaneously increases his risk level.” Therefore, Van Oosteren claims that there is more quality when it comes to life cycle choices, but less quality when it comes to detailing. Van der Vegte ascribes the higher quality in DBFMO to the great competition at the front of the process. “In the tender procedure, parties made every effort to win the tender. This is particularly due to the great deal of money that typically is involved with PPP” (Van der Vegte, 2014).

Moreover, the interviews shows that the quality level of the building is also dependent of the award criteria. In the Education Executive Agency & Regional Tax Office Groningen, the ratio quality versus financial award criteria was 2:1. This implies that the emphasis was on quality. Van der Vegte (2014) says: “Precisely because quality weighs more in DBFMO than in traditional way of contracting, there is more quality. In the traditional way of contracting, MEAT criteria are also used, yet practice shows that the price criteria are usually leading.”
Service quality

The service quality under DBFMO contracting is assumed to be higher as compared to the traditional way of contracting. Based on the interviews, this assumption cannot be confirmed. Three of the four interviewees consider the quality of the service level to be the same as for the public alternative. Van Oosteren believes that the quality is the same, but that the services are cheaper in DBFMO. “Because the service provider has been sitting at the table from day one, a building is developed which is well equipped for the service provision processes” (Van Oosteren, 2014). Van der Vegte states that it is more about the logistics of a building. “The project is able to provide more functional and pragmatic services” (Van der Vegte, 2014). In this respect, it can be said that the services are more efficient deployed than if the project had been procured in the traditional way. “The services will have the same quality, only less manpower is required, which results in lower operational costs” (Van der Vegte, 2014). According to Van Leeuwen, problems occur when changes need to be made. “Since the total cost of a requested change is calculated over the entire term of the contract, a small change in service level may lead to high additional costs” (Van Leeuwen, 2014). Therefore, fixing the service level for 30 years makes it rather difficult to make changes and adjustments at a later stage. In view of that, Van Leeuwen concludes that in traditional contracts there is more control on flexibility, but less on service quality, whereas in DBFMO contracts there is less control on flexibility, but more on quality of the services.

Innovative thinking

It is assumed that there is more innovative thinking under DBFMO than under traditional UAC contracts. Yet, the experts of the Supreme Court The Hague and the Education Executive Agency & Regional Tax Office Groningen found it very difficult to assess innovative thinking in both cases. Van der Vegte calls innovation an umbrella term. He believes that the term innovation should be split up into process innovation and technological innovation. As regards technological innovations, he says that mainly proven technology is used in the Education Executive Agency & Regional Tax Office Groningen. This is because lenders and private parties are not willing to use unproven technology due to the high risk. “With the traditional UAC contract, the contractor can sell the innovation with a great story to the client and if it turns out that the innovation does not work then the client has to pay anyway. However, in DBFMO the risks mainly rest with the consortium and therefore, the consortium does not dare to apply unproven technology” (Van der Vegte, 2014). As regards process innovations, the integrated approach and the total cost of ownership approach were considered to be innovative. “The primary focus on life cycle optimization was refreshing” (Van Oosteren, 2014). As for the Supreme Court The Hague, Buijs divides innovations into technological innovations and creativity. According to Buijs, there are slightly more technological innovations compared to the traditional way of contracting. This is because longer warranty periods are coupled to the installations in DBFMO projects and, therefore, better systems need to be developed. The incentive to build better installation is that huge penalties are imposed on the consortium if the installations do not hold out. As regards creativity, there are many creative solutions applied to the Supreme Court The Hague. Buijs gives the example of the involvement of Energy Service Companies. A contract has been signed up by Philips, by which Philips takes over the risk of light energy. As stated in the contract, Philips will replace all lamps after 15 years with the latest innovations.

7.4 What about DBMO?

After the effects per criterion are discussed of the DBFMO cases, the DBMO cases introduced in Chapter 6 are evaluated. In this paragraph, the practical findings of the case study
research are described. An overview of the findings of the case study research conducted can be found in Appendix H.

7.4.1  **From the case studies: Effects on the cost criteria**
In paragraph 5.4, four cost criteria for assessing the added value relative to the public alternative are distinguished. The effects of DBMO contracting on these criteria are shown in Table 14.

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EFFECT RELATIVE TO THE TRADITIONAL VARIANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction cost</td>
<td>Higher</td>
</tr>
<tr>
<td>Cost of capital</td>
<td>Same</td>
</tr>
<tr>
<td><em>Life cycle optimisation with respect to</em></td>
<td>Higher</td>
</tr>
<tr>
<td><em>construction and exploitation cost</em></td>
<td></td>
</tr>
<tr>
<td><em>Price certainty</em></td>
<td>Higher</td>
</tr>
</tbody>
</table>

**Transaction cost**

All four interviewees indicate that the transaction costs are higher than under the traditional way of contracting. Sterkenburg, director of Verlaat Uden Bouwsystemen, states that the transaction costs on the side of the consortium of the Integral Child Centre Zeeburgereiland are very low. Still, he thinks that the transaction costs would be lower if the project had been procured using the traditional way of contracting. According to Duyst, the transaction costs up until the submission date for the winning candidate were around €100,000, which is the quadrupling of the transaction costs under the traditional way of contracting. For the Community School Joure, Niese estimates the transaction costs on the side of the consortium to be around €250,000. According to Niese, the transaction costs of the Community School Joure are higher than if the project had been procured using the traditional way of contracting, but lower than if the project had been procured using DBFMO.

**Cost of capital**

As DBMO as well as the traditional way of contracting make use of public financing, the interest rate applied will be the same.

**Life cycle optimisation with regard to construction and exploitation cost**

Life cycle optimisations with respect to construction and exploitation are realised in the Integral Child Centre Zeeburgereiland as well as in the Community School Joure. Sterkenburg believes that by putting all disciplines together at an early stage, cost savings can be made. For the total Integral Child Centre Zeeburgereiland project, Sterkenburg estimates the life cycle cost savings made to be between the 5 and 10 per cent. Duyst (2014) says: “The budget for realization was €129,000 euro above the norm of the municipality, which meant that the operational activities were budgeted below the norm.” As regards the Community School Joure, Niese and Van der Molen note that the scale of the life cycle optimisations realised in the Community School Joure project was rather limited, because the quality criteria predominated the award criteria.
Price certainty

The degree of certainty about costs and prices is much higher under DBMO than under the traditional way of contracting. As regards budget overruns, Duyst as well as Sterkenburg confirm that there were no overruns in the Integral Child Centre Zeeburgereiland project. Sterkenburg, however, mentions that there is a difference between the cost price and the actual costs. According to Sterkenburg, the difference is partly the result of the complex assignment and partly because there are two subsequent assignments attached to the pilot project. The additional costs incurred are considered as process costs. Sterkenburg notifies that the consortium is not able to recover the additional process through the pilot Zeeburgereiland alone and therefore, has reserved part of the process costs for the subsequent projects. As to the Community School Joure, although the project is not yet delivered, Van der Molen and Niese expect that there will be no budget overruns. According to Niese, this is because all cost overruns that might occur, will be transferred to the construction company Pellikaan.

Furthermore, all interviewees indicate that there is much more price certainty in the DBMO cases as compared to the public alternative. As the budget is fixed from the beginning, there is a considerable degree of price certainty. However, Niese notes that there are still variables that may jeopardize the level of price certainty in the long run. He says: “Nobody knows how the world looks like in 20 years from now. Therefore, things could happen, that may affect the agreement” (Niese, 2014).

7.4.2 From the case studies: Effects on the time criteria

In paragraph 5.5, three time criteria for assessing the added value relative to the public alternative are distinguished. The effects of DBMO contracting on these criteria are shown in Table 15.

Table 15 Time effects of DBMO

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EFFECT RELATIVE TO THE TRADITIONAL VARIANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td>Case study research</td>
</tr>
<tr>
<td>Lead time preparation</td>
<td>-</td>
</tr>
<tr>
<td>Lead time construction</td>
<td>Shorter</td>
</tr>
<tr>
<td>Time overruns</td>
<td>Shorter</td>
</tr>
</tbody>
</table>

Lead time preparation

On the basis of the case study research, it is not possible to say whether the lead time for preparations is longer or shorter under DBMO. However, since the preparation time can be divided into three ensuing periods, it is possible to draw conclusion for some of the periods. The first period is the time between the initiation of the project and the start of the tendering. In the traditional contract model, the entire design process happens on the side of the client (see Figure 37). The client provides a kind of ready-made design, which enables a limited number of alternatives for the contractor. The selection of the architect and the developing of a final design generally take 18 to 24 months. The Integral Child Centre Zeeburgereiland had a very short preparation time before the start of the tender. In only four months, the project was initiated. In the interview, Duyst (2014) says: “In DBMO projects the procuring authority is allowed to continue developing the specifications during the tendering phase. However, in traditional projects the program of requirements have to be set before the tendering can commence.” As to the Community School Joure, the process took almost two years due to political concerns.
The second period is the time between the start of the tendering and the awarding of the winning bid. All four interviewees indicate that the tendering based on the competitive dialogue had taken longer than if the project had been procured in the traditional way. Causes of the longer tendering phase under DBMO mentioned by the interviewees are: the use of output specifications; the competitive dialogue method; the involvement of users in the dialogue rounds; the complexity of the assignment, and; the detailed nature of the design.

The third period is the time between the awarding of the winning bid and the start of the realisation phase. Three of the four interviewees believe that the period between the awarding of the winning bid and the start of the realisation phase is the same for DBMO as for the traditional contract model. The reason why this period is the same for DBMO and the traditional contract model is because the permit procedure is the critical path. Since the same permits are required for DBMO contracts as for traditional UAC contracts, the period is the same. Once the permits are obtained, the construction of the project may commence.

**Lead time construction**

The case studies prove that there is a shorter construction time under DBMO than under the traditional contract model. The challenge of the Integral Child Centre Zeeburgereiland was to realise the building within six months. The construction had suffered from bad weather and therefore, the overall construction time was slightly longer. However, Duyst as well as Sterkenburg believe that if the work had been procured using the traditional contract model, the construction would have taken at least 12 months. The construction of the Community School Joure is expected to take nine months. Van der Molen believes that the construction of a project such as the Community School Joure would take at least three more months if the traditional contract model had been used instead.

**Time overruns**

On the basis of the case study research, it can be stated that hardly any time overruns occur under DBMO contracting. Three of the four interviewees indicate that no/shorter time overruns occur than if the project had been procured by means of the traditional contract model. There was a slightly time overrun in the Integral Child Centre Zeeburgereiland project, which was mainly caused by the fact that since the project was located in a VINEX location, there was no connection with the energy grid at the date of completion. As to the Community School Joure, both experts expect that the project will be delivered on time. Niese thinks that this is because the penalty system is working extremely well and therefore, all milestone dates are properly met. According to Van der Molen, delays of three to six months are quite common for traditionally procured building projects that are about the same size as the Community School Joure.

### 7.4.3 From the case studies: Effects on the quality criteria

In paragraph 5.6, five quality criteria for assessing the added value relative to the public alternative are distinguished. The effects of DBMO contracting on these criteria are shown in Table 16.

**Table 16 Quality effects of DBMO**

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>EFFECT RELATIVE TO THE TRADITIONAL VARIANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUALITY</td>
<td>Case study research</td>
</tr>
<tr>
<td>Flexibility of the contract</td>
<td>-</td>
</tr>
</tbody>
</table>
**Quality process**

All four interviewees indicate that there is quite to much more process quality in the cases than there would have been if the projects had been procured using the traditional contract model. Duyst (2014) says: “The UAC-GC stands for trust. This is because the parties enter into a long-term relationship with each other.” Van der Molen as well as Niese refer to the integrated approach in which all parties are working together towards a common goal.

**Quality object**

All four interviewees suggest that the object has quite to much more quality than if the object had been procured using the traditional contract model. Sterkenburg says that the quality of the object is higher, particularly because the desires of the users are explicitly taken into account. “For example, choices as the colour of the floors and the walls prove that there the contractor has anticipated the perception of the user” (Sterkenburg, 2014). As a result, users highly appreciate the quality of the building. Likewise, Duyst ascribes the high quality of the object to the sharp focus on the user satisfaction. About the Community School Joure, Van der Molen (2014) says: “Particularly for the view, it is a tremendous added value.”

**Service quality**

The case studies prove that there is more service quality under DBMO than under the traditional contract model. All four interviewees indicate that there is more service quality than if the project had been procured via the traditional way of contracting. Duyst says that in traditional cleaning specifications, the quality of the services purely depends on the

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**Flexibility of the contract**

On the basis of the case study research, it is not possible to say whether the DBMO contact model is more or less flexible than the traditional contract model. The opinions of the interviewees are divergent. Duyst claims that the flexibility is the same. He argues that just like the UAC conditions, the UAC-GC conditions provide room for changes and amendments. Duyst also refers to the operational activities as cleaning, small repairs and waste management, which are included in the contract of the Integral Child Centre Zeeburgereiland for only 10 years instead of for the entire term of the contract, which is 30 years. After ten years, new arrangements have to be made regarding cleaning, small repairs and waste management. This provides some flexibility in the contract. On the other hand, Sterkenburg believes that the DBMO contract is quite more flexible as compared to the traditional contract model. According to Sterkenburg, the user consultation introduced in the pilot Zeeburgereiland enables some degree of flexibility in the contract. If the user consultation shows that user demand is changed, alterations can be made in the contract. In order to make that happen, the contract enables arrangements on user-related topics to be made at a later date, when more information about the behaviour of users is available. However, Sterkenburg acknowledges that the flexibility of the contract in the pilot Zeeburgereiland is also partly due to the professional project directorship of the municipality.

As regards the Community School Joure, Van der Molen and Niese contradict each other. According to Van der Molen, the DBMO contract is more flexible as there are more elements included in the contract, whereas Niese thinks that there is less flexibility due to the long contract period.
budget that is attached to the services. Sterkenburg believes that the quality of the services is better because if the consortium had used an inferior product, then this would have haunted the consortium for the rest of the contract period. This is because the penalties in case of underperformance are significant. Niese says that the higher quality of the services in DBMO is the result of the long term relation between the client and the service operator. Instead of for periods of three years, the term of the DBMO service contract typically is for periods of 20 to 30 years. “It is not about getting away with it for one year, but for the next twenty years. In view of that, it can readily be argued that more long-term choices are made in DBMO” (Niese, 2014). Niese continues: “Besides, the long-term contract encourages the service provider to deliver good performance as the long term nature of the contract implies work and income over the longer term.”

**Innovative thinking**

As regards innovative thinking, all four interviewees agree that more innovative solutions are introduced in both cases. The pilot Zeeburgereiland scored on innovative thinking much to extremely more, whereas the Community School Joures scored slightly to quite more. Inspired by the automotive industry, Verlaat Uden pursued maximum flexibility in the pilot Zeeburgereiland by developing a frame which can take different appearances. As to innovative solutions regarding the installations, a decentralized installation concept with streams through the facade instead of through the floors is used in the pilot Zeeburgereiland. Duyt mentions that the pilot scored even above the minimum requirements as stated in the award criteria, particularly regarding aspects of climate control. Sterkenburg (2014) concludes: “Due to the combination of things, the Integral Child Centre Zeeburgereiland has become a very innovative building.”

In the Community School Joure, there is less innovation thinking than in the Integral Child Centre Zeeburgereiland, but more as compared to traditionally procured building projects. Van der Molen (2014) explains the limited amount of innovations introduced: “Although innovative thinking has been encouraged, the men who are doing the job for years, are thinking with traditional logic.” Niese splits up the term innovation into technological innovations and smart thinking innovations. About the technological innovations, he finds it disappointing how many innovations are actually carried out. According to Niese, this is because technological innovations generally impose high risk on the contractor, particularly if the technology is unproven. “This is because if an innovation turns out differently and as a result, has to be replaced more quickly than expected, the contractor has to deal with the consequences.” (Niese, 2014). In view of that, a contractor will carefully examine the risks associated with every innovation. In traditional contracts, the client is responsible for this type of risk and so, the application of unproven technologies depends on the behaviour of the client. According to Niese, the reason why there is still more innovation in the Community School Joure project as compared to traditionally procured building projects is because DBMO contracts are usually that long, that better and more durable techniques are required for the installations. This is because penalties are imposed in the event of underperformance caused by defects in installations. About smart thinking, Niese believes that there is a lot of ingenuity in the Community School Joure project as a result of bringing all components together. “Due to the integration of all components, the bundling of expertise and the total cost of ownership approach, smart thinking is to a great extent present in the project” (Niese, 2014).
7.4.4 Causalities measures – effects

By analysing the measures taken in the two DBMO cases to overcome the absence of the F component\(^{19}\) and the effects on added value, causations and other relationships can be discovered. On the bases of the findings of the case study research conducted, three important relations are found. As the case study research is based on a limited sample, the findings merely provides early insights into the potential causalities between measures and effects. Further research is definitely needed to check whether the causation found in this research can be generalised.

I. The relation between the level of detail of the output specifications, size of the transaction costs and length of the tender procedure;
II. The relation between the level of detail of the output specifications and innovative thinking, and;
III. The relation between the use of a penalty clause and the probability of time overruns.

I. Detailed set of specifications affects transaction costs and tender procedure negatively

The first relation found is between the level of detail of the output specifications, size of transaction costs and length of the tender procedure. It is noticed that the transaction costs are much higher for the Community School Joure than for the Integral Child Centre Zeeburgereiland. Whereas the transaction costs of the Integral Child Centre Zeeburgereiland were only €100.000, the transaction cost for the Community School were around € 250.000. There are multiple reasons why the transaction costs are much higher for the Community School Joure than for the pilot Zeeburgereiland. One of the explanations is that the Community School is a much bigger project. It has a gross floor area of 4.300 square meters and a NPV of €12.1 million, while the pilot Zeeburgereiland only covers 3.376 square meters and has a NPV of €9.3 million. However, transaction costs do not grow proportionally with the size of a project. Therefore, the size of a project is not the only reason why the transaction costs are higher for the Community School Joure.

Remarkable is the fact that a very detailed set of output specifications was used for the Community School Joure. According to Van der Molen, the output specifications were laid down in a document of 400 pages in which absolutely everything was described. Not only what is to be achieved, but in some parts also how it is to be achieved was defined. According to Van der Molen, the output specifications were sometimes so detailed that the building could just as well be designed solely on that basis. Van der Molen (2014) continues: “Due to the comprehensiveness of the output specifications, the competitive dialogue became very heavy and juridical. There should have been far less detail in the output specifications.” Van der Molen also mentions that the candidates had to include a very detailed design in their final offer. This may explain the high transaction cost on the side of the contractor. Moreover, if we look at the lead time of the preparation, we see that the tendering phase had taken much longer for the Community School Joure than for the Integral Child Centre Zeeburgereiland. The procurement of the Community School Joure took almost 18 months, whereas only 5 months were needed for the procurement of the Integral Child Centre Zeeburgereiland. In view of that, it can be readily argued that the level of detail in the output specifications is related to the size of the transaction costs and the length of the tender procedure.

\(^{19}\) See Table 9 of Chapter 6 for the measures taken in the two DBMO cases.
II. Detailed set of specifications hampers innovative thinking

The second relation found is the linkage between the level of detail of the output specifications and innovative thinking. As seen in Appendix H, the Integral Child Centre Zeeburgereiland scored much higher on innovative thinking than the Community School Joure. Whereas the Community School Joure scored slightly to quite more on innovative thinking, the Integral Child Zeeburgereiland scored much to extremely more. There are various reasons why the projects scored differently on innovative thinking. First, innovative thinking highly depends on the proficiency of the contractor involved in the project. Second, it depends on the risk allocation. As in both cases the risks mainly rest with the contractor, the risk allocation is not the cause of the difference in value. However, there is another explanation, which is related to the prescriptive versus performance requirements paradigm. The prescriptive versus performance paradigm is explained in paragraph 6.7.2. It implies that too many prescriptive requirements stifle innovations, whereas too many performance requirements can result in a loss of foundation. As the output specifications of the Community School Joure were very detailed and comprehensive, they might have suppressed the level of innovation.

III. Use of penalty clause reduces probability of time overruns

The third relation found is the relationship between the penalty system and the probability that time overruns occur in the project. The Integral Child Centre Zeeburgereiland as well as the Community School Joure use a penalty clause. Payments are linked to the completion of certain project stages, whilst such completion is linked in turn to a performance statement. In both cases, multiple milestone dates are specified to which penalty amounts are attached. If the contractor fails to meet the performance statement at a milestone date, a penalty is imposed. In this respect, the penalty clause works as a big stick to ensure that the contractor delivers the work on time. It is generally accepted that delays occur in traditional projects (Flyvbjerg, Holm, & Buhl, 2002). According to Van der Molen (2014), delays of three to six months are quite common for traditionally procured building projects that are about the same size as the Community School Joure. As there were hardly any time overruns in the Integral Child Centre Zeeburgereiland and since it is expected that the Community School Joure project will be delivered on time, it can readily be argued that this has something to do with the penalty system used in both cases.

7.5 The comparison: DBFMO versus DBMO

In this paragraph, the two DBFMO cases are compared with the two DBMO cases in order to find significant differences and similarities in added value. First, the similarities are discussed, then the differences are defined. Based on the comparison, the consequences of excluding the F component out of the building contract will come forth.

7.5.1 Similarities

By comparing the findings of the two DBMO cases with the findings of the two DBFMO cases, interesting results arise. The comparison study shows that there are similarities in effects with respect to five criteria. These five criteria are:

1. Price certainty;
2. Lead time construction;
3. Quality process;
4. Quality object, and;
5. Innovative thinking.
As regards price certainty, the DBFMO cases as well as DBMO cases scored high. All eight interviewees indicate that there are no budget overruns. This is because the DBMO contract and the DBFM0 contract are fixed-price contracts. Naturally, there is always the indexation-related risk and the uncertainty regarding the future. But more important is the fact that for DBMO as well as for DBFMO the risk of cost overruns mainly rests with the contractor. Consequently, there will be no budget overruns caused by cost overruns. As the budget is fixed, any additional costs incurred will be the responsibility of the contractor.

In both DBFMO and DBMO cases, 75 per cent of the interviewees indicates that the lead time of the construction is shorter than if the project had been procured using the traditional contract model. As the project sizes of DBMO cases and DBFMO cases are rather different, it is impossible to say whether more time savings in construction are induced in DBMO or in DBFMO. Yet, since both DBFMO and DBMO have a high percentage of people saying that the construction time is shorter, the impression is given that the shorter construction time is the result of combining the components together rather than adding the F component to the contract.

In both DBFMO and DBMO, the quality of the process scored high. Seven of the eight interviewees believe that the quality of the process is higher in DBFMO and DBMO projects than in traditional projects. Because the quality of the process is assessed high for both DBFMO and DBMO, it can readily be argued that the process quality is distinct from the presence of the F component.

With respect to the quality of the object, both DBMO and DBMO cases scored high. As to the two DBMO cases, all four interviewees indicate that the quality of the object is quite to much higher as compared to the traditional variant. As regards the DBFMO cases, three of the four interviewees indicate that the quality of the object is quite to much higher for DBFMO as compared to the traditional variant. In this respect, it can readily be argued that with or without the F component the quality of the object remains the same.

As regards innovative solutions, a distinction can be made between technological innovations and process innovations. Technological innovations can be split up into unproven and proven innovations. The interviewees declare that unproven technological innovations hardly occur in the DBFMO and DBMO cases. In the DBFMO cases lenders keep the contractor from using unproven technologies, whereas in the DBMO cases the contractor is unwilling to apply unproven technologies due to the high risk involved. As regards proven technology, since both DBMO and DBFMO cases hold long-term contracts, better and more durable installations and techniques are applied. This is because in an event of underperformance caused by inferior techniques or defects in installations, large penalties are imposed on the contractor. As regards process innovations, DBFMO as well as DBMO are praised by the interviewees for the level of process innovations introduced. Niese alludes to the smart thinking innovations in the DBMO project Community School Joure, whereas Buiks talks about creativity in the process of the DBFMO project The Supreme Court The Hague. Still, it should be noted that innovative thinking is also dependent on the award criteria. For instance, the award criteria of the Integral Child Centre Zeeburgereiland provided ample room for innovative thinking and, as can be seen, this is reflected in the high score on innovative thinking.
7.5.2 Differences
By comparing the findings of the two DBMO cases with the findings of the two DBFMO cases, interesting results come forth. The comparison study shows that there are differences in effects with respect to five criteria. These five criteria are:

1. Transaction cost;
2. Cost of capital;
3. Life cycle optimisation with respect to construction and exploitation cost;
4. Time overruns, and;
5. Service quality

There are large differences in transaction costs between the selected DBFMO and DBMO cases. By setting the transaction costs of the Integral Child Centre Zeeburgereiland and the Community School Joure against the transaction costs of the Education Executive Agency & Regional Tax Office Groningen and the Supreme Court The Hague, it becomes apparent that the transaction costs of DBFMO projects are significantly higher. However, it should be noted that the project sizes of the DBMO cases are way smaller than the project sizes of the two DBFMO cases. Whereas the two DBMO schools have project sizes between the 3,000 and 5,000 square meters, the Supreme Court is 15,000 square meters and the Education Executive Agency & Regional Tax Office Groningen is even 48,000 square meters! Therefore, the project size also plays a role in the magnitude of the transaction costs. However, since it is assumed that the transaction costs do not grow proportionally with the size of the project, it can be readily argued that the transaction costs are higher in DBFMO projects.

Based on the case study research, it can be concluded that the cost of capital is higher for DBFMO projects than for DBMO projects. The weighted average cost of capital used in both DBFMO cases is higher than the interest rate used by the municipality for the Integral Child Centre Zeeburgereiland. Considering these figures, it can readily be argued that the interest rates used by lenders in DBFMO projects is higher than the interest rates used by governmental agencies.

There are differences in the magnitude of the life cycle optimisations induced between DBFMO and DBMO. It seems that smaller life cycle optimisations are induced under DBMO as compared to DBFMO. Given that the DBMO cases have separate budgets whereas the DBFMO cases use one budget, it is expected that the use of one budget positively affects the scale of the life cycle optimisations induced. Moreover, since the two DBMO cases have much smaller project sizes than the two DBFMO cases, it is also argued that there is a relationship between the project size and the extent to which life cycle optimisations are realised. Also, the experience level of the contractor is expected to influence the size of the life cycle optimisations. The Education Executive Agency & Regional Tax Office Groningen was one of the first DBFMO projects undertaken in the Netherlands. As this project was one of the first DBFMO projects, there was less experience and thus, the size of the life cycle optimisations was rather limited as compared to the life cycle optimisations induced in the Supreme Court The Hague. However, solely on the basis of the results of the case study research, it can be stated that more life cycle optimisations are induced in DBFMO than in DBMO.

With respect to time overruns, all eight interviewees indicate that time overruns are shorter as compared to the traditional variant. Even more, all four interviewees regarding the two...
DBFMO cases indicate that time overruns never occur in DBFMO projects. According to Buijs (2014), a time overrun under DBFMO only happened once in the past. However no banks were involved in the project concerned. Buijs suggests that due to presence of banks in DBFMO projects, the contractor is forced to deliver the project on time. If the contractor fails to deliver the project on time, huge penalties are imposed and as a result, banks will not be able to recover their loans. In order to ensure that their loans will be recovered, banks closely monitor the project. As to the two DBMO cases, three of the four interviewees suggest that time overruns are shorter in DBMO projects than in traditionally procured building projects. Only a slightly time overrun was noticed in the Integral Child Centre Zeeburgereiland project. Based on these findings, it is assumed that the probability of time overruns is slightly higher under DBMO as compared to DBFMO.

With respect to the service quality, the DBMO cases scored better than the DBFMO cases. All four interviewees regarding the two DBMO cases indicate that the level of service quality is higher than if the project had been procured using the traditional contract model. The arguments provided by the interviewees concerning the high service level of service quality under DBMO are: the long-term relationship between the client and the contractor; the long-term guarantee of work and income for the service provider, and; the threat of the penalty system. As to the two DBFMO cases, only one interviewee suggests that the level of service quality is higher, while three interviewees indicate that the service quality is the same as in traditionally procured building projects. Yet, the three interviewees expect that the services are more efficient deployed than if the project had been procured in the traditional way, but that the quality remains the same.

### 7.5.3 Further research needed

As regards the lead time of the preparation, it is difficult to make statements. This is particularly because there are other factors involved that influence the preparation as well. For instance, political concerns in the Community School Joure project had slowed down the preparation of the project considerably. But also complexity and level of detail of the output specifications affect the lead time of the tender. Then again, all eight interviewees acknowledge that the time between the start of the tendering and the awarding of the winning bid had taken longer than if the project had been procured in the traditional way. Yet, the lead times of the tenders differ significantly from each other. Therefore, on the basis of the case study research alone, it is not possible to say whether the preparation takes longer or shorter in DBFMO as compared to DBMO. For that reason, further research on this topic is required.

With respect to the flexibility of the contract, it is difficult to draw conclusions. At first side, it seems that the interviewees assess the flexibility of the DBMO contract more positively than the flexibility of the DBFMO contract. Two of the four interviewees believe that the DBMO contract is more flexible than the traditional UAC contract as against zero interviewees that consider the DBFMO contracts more flexible than traditional UAC contracts. Whereas three interviewees indicate that DBFMO contracts are less flexible as compared to traditional UAC contracts, only one interviewee considers the DBMO contract to be less flexible than the traditional UAC contract. Yet, for DBFMO as well as DBMO one out of four interviewees suggests that the flexibility is the same as with traditional contracts. Since the opinions of the interviewees with respect to DBMO diverge widely, it is not justified to draw generalised conclusions on the basis of the case study research. Therefore, it is not possible to compare the DBMO cases with the DBFMO cases. In view of that, further research on this topic is required.
7.6 Implications on added value of excluding the F component

Based on the comparison between DBFMO and DBMO, the effects of excluding the F component out of the building contract can be mapped. The exclusion of the F component has consequences for the level of added value with respect to five criteria. The implications for the level of added value are discussed below.

7.6.1 Transaction cost savings (+)

The first positive implication on the level of added value of the exclusion of the F component is the saving in transaction costs. The research shows that DBFMO projects have higher transaction costs as compared to DBMO projects. Transaction costs rise when lenders get involved in the project. By leaving the F component out of the building contract, significant savings can be made in transaction costs. This is because aspects such as due diligence and financial advice are omitted. However, Buijs (2014) mentions that the design costs are a large proportion of the transaction cost. As DBFMO projects typically are much larger than DBMO projects, it can be debated to what extent the design costs scale with the size of a project. Nevertheless, since the differences in transaction costs between DBFMO and DBMO are so great, it can be readily stated that regardless of the size of the project transaction cost savings are made by excluding the F component out of the building contract.

7.6.2 Financial cost savings (+)

The second positive implication of the exclusion of the F component is the saving in financial costs. Typically, the cost of capital can be calculated using the WACC formula. The WACC formula shows that when equity is involved in the project the cost of capital increases (see Example below). This is because the cost of equity typically is higher than the cost of debt. The reason of the higher cost of equity is that debt should be paid off first and thus, equity providers are only entitled to the remainder after the debt obligation is fulfilled (Brealey, 2012, p. 216). Therefore, equity providers require compensation for the higher risk that they have to bear.

**EXAMPLE - cost of capital -**

\[
V = D + E \\
WACC = r_D \frac{D}{V} + r_E \frac{E}{V} \\
D = \text{debt} \\
E = \text{equity} \\
V = \text{project value} \\

r_D = 0.06 \text{ (cost of project finance debt)} \\
r_E = 0.12 \text{ (cost of equity)} \\
r_f = 0.045 \text{ (government debt)} \\

\text{DBFMO (WACC)} = r_D \frac{D}{V} + r_E \frac{E}{V} = 0.06 \times 0.8 + 0.12 \times 0.2 = 0.068 \rightarrow 6.8\% \\
\text{DBMO (cost of capital)} = r_f = 0.045 \rightarrow 4.5\%
\]

Also, the financial costs of DBFMO are higher because the risks are explicitly accounted for in the price of capital in DBFMO, while in the case of public financing taxpayers underwrite the associate risk and the price reflects this fact (Grout, 1997). The private finance route explicitly
builds in the price of risk whereas the public provision route masks it. The public sector’s ability to tax and to diversify the risk among a large population, makes the public sector capable of raising seemingly cheaper financing without eliminating them. (Sawyer, 2005) Whereas many unsuccessful projects go unaccounted under public provision because taxpayers take on the costs of this risk, under private provision these risks are made explicit and priced, enhancing the financial costs of the project. It is in this respect that the higher financial costs under DBFMO reflect a reward for the private sector carrying those risks.

Moreover, it should be noted that financial institutions also require higher interest rates on project finance-related debt than on other forms of debt. This is because project financing normally is on a non or limited recourse basis, which implies that lenders are only entitled to the repayment from the cash flows originating from the project and not from other assets of the borrower (Yescombe, 2014). As a result, a premium is required which reflects the likelihood that the work may not be available at some point during the term of the contract and subsequently, no payments will be received to recover the debt. Another reason that the interest rates on project finance debt are higher than other forms of debt is because the interest rates on project finance debt include all kinds of fees on the side of financial institutions for arranging the project financing with respect to the DBFMO project. Therefore, it can be readily argued that by leaving the F component out of the building contract savings are made in financial cost.

7.6.3 Reduced size of life cycle optimisations (-)

The first negative implication of the exclusion of the F component is the reduced size of life cycle optimisations. The research shows that more life cycle optimisations are induced in DBFMO projects than in DBMO projects. There are multiple reasons why more life cycle optimisations are induced under DBFMO contracting. First, it seems that more life cycle optimisations are induced if the contractor is free to spend the budget among CAPEX and OPEX. From the case study research, it appears that DBMO projects can have separate budgets for CAPEX and OPEX purposes, whereas DBFMO projects generally involve one overall budget for CAPEX and OPEX. In view of that, it is suggested that the use of separate budgets may jeopardize lifecycle optimizations to occur. Niese disputes the use of separate budgets in PPPs. He says: “The power of PPP is that the components are working together. The danger of separate budgets is that parties within the consortium will not combine their forces for the common purpose and so, potential life cycle optimizations pass by” (Niese, 2014).

However, the extent to which life cycle optimizations are realized, also depends on the level of competence of the contractor and the competition in the market. Van der Vegte (2014) believes that the reason of the small size of life cycle optimizations in the first few DBFMO projects was that there was hardly any experience with DBFMO contracting. As regards the competition in the market, Buijs (2014) says that the percentage of life cycle optimisations induced increases if the market is really tense. According to Buijs, this is due to the fact that the Government Building Agency is not adjusting the reference variant properly to the tense market, or because the private sector is dropping its prices in order to stay competitive. Furthermore, it should be mentioned that the extent to which life cycle optimisations are induced, is also related to the award criteria. If the focus is on quality criteria rather than cost criteria, the life cycle optimisations will be rather small. In this respect, it can n be argued that because banks are looking over the shoulder of the contractor in DBFMO, the focus is more on cost control and hence, there is more pressure is on life cycle optimisations in DBFMO projects.
7.6.4 Enhanced probability of time overruns (-)
The second negative implication on the level of added value is the increased probability of time overruns under DBMO contracting. Although time overruns hardly occur under both DBFMO and DBMO contracting, the research shows that the probability of time overruns is still slightly higher under DBMO. This is because the incentives to deliver the project on time are more stringent under DBFMO contracting. Since the availability fee is larger in DBFMO projects, the threat deriving from the penalty system is also more severe. Additionally, the active involvement of lenders along with their step-in rights put even more pressure on the DBFMO contractor to deliver the project on time. Since the threat of penalties is smaller and there are no lenders present under DBMO, the incentives to deliver the project on time are less powerful and hence, the probability of time overruns is slightly higher.

7.6.5 Improved service quality (+)
The third positive implication of the exclusion of the F component is the improved service quality. The research shows that the quality of services does not benefit from the presence of the F component. The case studies demonstrate that the level of service quality is higher under DBMO than under DBFMO. Mainly because of the long-term relationship between the client and the contractor, it is expected that the quality of the services is higher than in traditionally procured building projects. Since DBMO contracts typically are commitments for periods of twenty to thirty years, the financial consequences of the use of inferior products can be substantial. If the consortium uses an inferior product, the consortium will have to live with the consequences for the duration of the contract. The threat of the penalty system makes sure that the services deliver good performance. Also, the guarantee of income and work over the long term is a motivation for the service provider to do his job properly. In DBFMO projects there is a similar long-term relationship and a comparable threat of the penalty system. In view of that, it seems rather strange why the quality of the services is lower than in DBMO projects. There must be another explanation why the service level scored lower under DBFMO. Perhaps, the lower service level is the result of the presence of lenders in the project’s operations. As the primary focus of lenders is to recover their loan, it seems logical to understand that lenders make sure that the required service quality is met, but also no more than that. This is in contrast to DBMO projects, where the contractor himself decides whether he will exceed the quality level stated in the minimum requirements or not. For instance, a DBMO contractor can decide to provide a higher service level to show his capability to the outside world, hoping to get subsequent projects. In this respect, it is argued that higher service levels are realised under DBMO.

7.7 Conclusion
In this chapter, the implications of the exclusion of the F component on the level of added value are explored. Based on the case study research conducted, it is discovered that leaving the F component out of the building contract has five significant implications for the level of added value. These implications are: (1) transaction cost savings; (2) financial cost savings; (3) reduced size of life cycle optimisations; (4) enhanced probability of time overruns, and; (5) improved service quality. Implication 1, 2 and 5 positively affect the level of added value, whereas implication 3 and 4 negatively affect the level of added value. However, it remains disputed whether the gains of transaction cost savings and financial cost savings more than offset the losses resulting from reduced investment and exploitation cost optimisations. Further research is needed to investigate the magnitude of these cost implications. The same goes for probability of time overruns and service quality level as these.

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20 See §6.6.4 Reduced performance incentive.
two implications are difficult to quantity. Furthermore, the case studies show that there are no significant differences with respect to: price certainty; lead time construction time; quality process; quality object, and; innovative thinking. As regards lead time preparation and flexibility of the contract, no statements can be made on the basis of the results of the case study research alone and thus, further research is required.
To complete the research, a conclusion is derived from the previous chapters regarding the main research question. A conclusion is drawn on the basis of the results of the research conducted. At the end of this chapter, there will be reflected on the question: “Do we really need the F in DB(F)MO?”, which is also the title of this thesis.

8.1 Research question
The F component in Dutch DBFMO building projects has been the object of this study. Until fairly recently, comparatively little work has been conducted within the field of project financing in DBFMO. It was particularly difficult to find research that has been undertaken regarding the role of the F component. Furthermore, since it was found that due to complications concerning the F component, the F is increasingly left out of the building contract, the goal of this study was to find ways to overcome the loss of the F component. In view of that, the thesis aimed at a better understanding of the mechanisms underlying the role of the F component in DBFMO as well as how the role of the F component can be rebuilt in DBMO without the actual use of project finance. Moreover, as the prevailing view seemed to be that DBFMO projects provide real incentives that express themselves in added value, this research was built around the question whether the same level of added value as under a DBFMO structure can be generated, once the F component is removed from the contract.

The central research question that is at the heart of this thesis, was formulated as:

“What measures can be taken to overcome the loss of the F component out of the Dutch DBFMO building contract and: which implications does this have for the added value of a project?”

8.2 The role of the F component
Characteristic of DBFMO projects is that they make use of project finance. Project finance is a technique of raising long-term debt financing based on lending against cash flows generated by a project that is legally and economically self-reliant. Using project finance involves a systematic and well-organised approach to carry out a complex chain of interrelated tasks. The supplementary factor in project finance is that the sponsors must accept that external parties - lenders and their advisors – will get closely involved in what the sponsors have been and are doing. This process will take additional time and work and hence, the financing can be a major critical-path item. Therefore, project finance cannot be
dealt with in isolation. Based on the abundance of provisions inherent in the DBFMO Agreement, it can be said that project finance is a seamless web that does not only affect the contractual arrangements but also all other aspects of the project’s development and process. If a project uses project finance, not only the financial department and the lenders but also all those involved in the project need to have a basic understanding of how project finance works, and how their part of the project is related to and affected by the project finance structure. Since project finance affects all phases of a DBFMO project, the influence of project finance in each of the DBFMO life cycle phases is investigated. Based on the analyses of the presence of project finance in each of the DBFMO life cycle phases, it has been found that the role of the F component in DBFMO involves three core functions. The core functions discerned in this research, are: (1) financial means; (2) security for the client, and; (3) incentive for the contractor.

**Financial Means (FM)**
The first function of the role of the F component is that it is a financial means to obtain funding for a project. The combination of one single budget, the interchangeability of CAPEX and OPEX funds and broadly formulated output specifications make that there is a considerable amount of freedom for the contractor to decide how to allocate the budget among construction and exploitation activities. The output specifications and the interchangeability of budgets together provide maximum room to candidates to develop innovative and sustainable solutions while keeping the life cycle costs in mind. In this way the output specifications combined with the interchangeability of budgets contribute to the integrated approach characteristic of DBFMO projects. By creating innovative solutions and allocating the budget efficiently between construction and exploitation, the F component becomes a valuable instrument to finance projects.

**Security for the Client (SC)**
The second function of the role of the F component is that it provides assurances or securities for the client. The securities for the client are closely related to the active involvement of lenders in the project’s operations. This is because the interests of the client and the lenders in a DBFMO project are to a certain extent equated. As lenders receive no guarantees beyond the right to be paid from the cash flows of the project, one can assume that they will have a particular interest in whether the project really performs and that sufficient cash flows are generated. In order to safeguard sufficient cash flows, lenders demand that the risks inherent to the project are allocated to appropriate parties other than the SPV or mitigated if possible. To ensure that all necessary information about the project is available and that all project risks are identified, lenders perform due diligence on contracts and continue monitoring after the contracts are signed. Not only the lenders themselves, but also the client will benefit from the due diligence and monitoring activities performed by lenders. These activities, along with one fixed overall budget, the issued bank guarantees and distinctive project finance structure, provide strong guarantees towards the client as regards the proper functioning of the object.

**Incentive for the Contractor (IC)**
The third function of the role of the F component is that it generates incentives for the contractor to perform well. This function has to do with the fact that the DBFMO contract is a performance-based contract. Under performance-based contracts, strategic performance standards are developed and payments are directly linked to performance against these standards. During the exploitation phase the debt services are repaid through an availability fee. The availability fee connects the contractor’s performance to the payment made by the client. The payment mechanism in DBFMO projects offers room for penalties and discounts in
case of non-performance or non-availability. Therefore, the client is allowed to pay a discounted fee in case of non-performance or non-availability. In view of that, it can be said that the payment mechanism functions as a financial incentive for the contractor to do what is agreed upon in the contracts.

8.3 Consequences of excluding the F component

The three key functions discerned have been used as a guidance for further case study research. Two Dutch DBMO cases are selected and extensively studied with the aim of discovering the measures taken in the DBMO contract to overcome the absence of the F component. Per function, the cases have been analysed. The four most important deficiencies of the two analysed DBMO cases regarding the three functions, are: (1) limited interchangeability of budgets; (2) absence of lenders; (3) weakened financial security, and; (4) reduced performance incentive.

Limited interchangeability of budgets

It has been found that both DBMO cases studies have separated budgets for capital expenditures and operational expenditures. As limited interchangeability of budgets bounds the contractor to invent solutions based on the formulated output specifications, it can be assumed that the separation of budgets is a weakness of both DBMO cases. Conversely, the separation of budgets can also be an advantage for the consortium as it keeps the consortium from excessive investments in capital. Suppose that the consortium is to spend part of the OPEX budget on CAPEX. If the consortium then goes bankrupt after realizing the building, it would imply that the consortium has invested more in the project than it has actually been paid for. In view of that, the separation of the budgets keeps the consortium from taking excessive risks by investing more in capital than budgeted.

Absence of lenders

The second point of attention is the absence of lenders in DBMO. In DBFMO projects, the interests of lenders and client are to a large extent equated. In the tender procedure, lenders appoint advisors to perform due diligence on the bids and the contracts. After the contracts are signed, the lenders’ advisors continue monitoring the (financial) performance of the consortium during realisation and exploitation. Neither due diligence, nor monitoring by parties other than the consortium has been carried out in the two DBMO cases. In one DBMO case, the consortium performed shadow calculations and in the other case, the municipality hired advisors to check on the proficiency of the candidates. Yet, these measures fall short against the due diligence and monitoring activities carried out by lenders’ advisors in DBFMO.

Weakened financial security

It has been found that the biggest risk in both DBMO cases is that the building does not comply with the output specifications and that the consortium cannot be held liable on the basis of the agreement or because of insolvency. This risk might lead to large adjustments costs on the side of the client. Particularly in the exploitation phase, this risk will manifest itself, for instance: when the maintenance costs are higher than estimated; the energy performance is not met, or; the indoor climate does not comply with the output specifications. The case studies show that various measures have been taken to mitigate this risk.

Reduced performance incentive

Generally, the size of the availability fee gives the opportunity to impose penalties in DBFMO projects. Only when it performs, the consortium is able to fulfill its obligation towards the
lenders. The two DBMO cases also make use of the availability fee. However, these cases only use the fee to cover the OPEX. As the fee only covers the operational expenses, the availability fee in the DBMO cases is much smaller than the availability fee generally used in DBFMO projects. A smaller fee simultaneously implies that the threat of penalties will be less severe. In view of that, it can be assumed that the performance incentives provoked by the penalty system in DBMO are less powerful compared to those in DBFMO.

8.4 Measures to overcome the loss of the F component

Based on the case study research, a set of measures has been set forth to eliminate the deficiencies resulting from the absence of the F component in DBMO. There are nine measures proposed that can help to remove the deficiencies and consequently, fulfill the role of the F component in the DBMO contract (see Table 17).

Table 17 Overview of measures proposed

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>DEFICIENCIES DUE TO ABSENCE OF THE F</th>
<th>MEASURES PROPOSED</th>
<th>INTEGRAL CHILD CENTRE ZEEBURGEREILAND</th>
<th>COMMUNITY SCHOOL JOURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>Limited interchangeability of budgets</td>
<td>1. Bringing budgets together</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SC</td>
<td>Absence of lenders</td>
<td>2. Prescribing instead of appointing performance</td>
<td>-</td>
<td>V (Very detailed set of output specifications)</td>
</tr>
<tr>
<td>SC</td>
<td>Absence of lenders</td>
<td>3. Testing during design and completion</td>
<td>-</td>
<td>V (Facility services company as lead company)</td>
</tr>
<tr>
<td>SC</td>
<td>Weakened financial security</td>
<td>4. Disbursements based on real expenses</td>
<td>V (in line with the payment schedule)</td>
<td>-</td>
</tr>
<tr>
<td>SC</td>
<td>Weakened financial security</td>
<td>5. Requesting bank guarantees and/or concern guarantees</td>
<td>V (bank guarantee that can be turned into a concern guarantee after the first year of exploitation)</td>
<td>V (bank guarantee)</td>
</tr>
<tr>
<td>SC/IC</td>
<td>Weakened financial security / Reduced performance incentive</td>
<td>6. Deferred payments / contribution of equity or corporate finance</td>
<td>-</td>
<td>V (25% of the DBM budget is spread out over the term of the contract)</td>
</tr>
<tr>
<td>IC</td>
<td>Reduced performance incentive</td>
<td>7. Imposing penalties and/or bonuses</td>
<td>V (both penalties and bonuses)</td>
<td>V (only penalties)</td>
</tr>
<tr>
<td>IC</td>
<td>Reduced performance incentive</td>
<td>8. Attaching multiple assignments to one tender</td>
<td>V (two subsequent school-related projects)</td>
<td>-</td>
</tr>
<tr>
<td>FM/SC/IC</td>
<td>Limited interchangeability of budgets / Absence of lenders / Weakened financial security / Reduced performance incentive</td>
<td>9. Establishing an uniform DBMO standard contract</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1. Bringing budgets together (FM)
The first measure to improve DBMO as financial means, is to bring budgets closer together. A recurrent problem with DBMO projects is that the budgets for CAPEX and OPEX originate from
different sources. As cash flows derive from different institutions, the extent to which life cycle optimisations occur, is narrowed. To stimulate life cycle optimisations to occur, the government should appoint one single institution that is responsible for all budgets and that is allowed to ‘play’ with the CAPEX and OPEX budgets.

2. **Prescribing instead of appointing performance (SC)**

Prescribing requirements can be particularly helpful for elements during exploitation, such as: indoor climate, maintenance level and energy performance. This is because the biggest risk of the client is that the building does not comply with the output specifications and that the consortium cannot be held liable on the basis of the agreement or due to insolvency. As the exploitation phase typically takes twenty to thirty years, non-compliance with the performance requirements can have major consequences. In order to make sure that the client gets what he wants, important elements of the building can be prescribed rather than formulated in outline.

3. **Testing during design and completion (SC)**

The second measure, contributing to the security level of the client, is testing during the design process and on the date of completion. As there is no monitoring on behalf of lenders in DBMO projects, the client should fulfil this function himself. For instance, the client could request the contractor to show him the maintenance plan, the installation concept and the calculations on energy performance. The client could also perform technical due diligence on the bids and contracts. If necessary, the client can involve external advisors to check on the plans and the proficiency of the candidates in the tender.

4. **Disbursements based on real expenses (SC)**

The third measure, contributing to the security level of the client, is imposing a payment schedule based on real expenses. In DBMO, a fixed availability fee typically poses a risk on the client. This is because under a fixed annual availability fee the replacement investments are paid in advance. For instance, if the contractor goes bankrupt just before a large replacement, the payments already made by the client to the contractor will be gone. This situation can be prevented by demanding that payments are made after the actual work has been carried out. In that case, if the contractor goes bankrupt just before a large replacement, then the client did not have paid any advance payments yet. In view of that, it can be concluded that disbursements based on real expenses during exploitation protect the client against unanticipated additional costs caused by insolvency by the contractor.

5. **Requesting bank guarantees and/or concern guarantees (SC)**

The fourth measure, contributing to the security level of the client, is the issuance of bank guarantees and/or concern guarantees. The client is allowed to include a bank and/or concern guarantees in the DBMO contract. When the contractor does not comply with the performance statements, the bank and/or concern guarantee can be called upon. However, a concern guarantee provides limited assurance, especially in the event of bankruptcy. Bank guarantees, on the other hand, provide much greater certainty, but lead to stringent capital requirements and high costs for the contractor.

6. **Deferred payments / contribution of equity or corporate finance (SC/IC)**

Deferred payments combined with the contribution of equity capital may improve the security level of the client as well as it may strengthen the performance incentives. A variant of PPS light is to pay approximately 80 per cent of the investment by way of one-time payments. The remaining 20 per cent of the investment sum is then withheld and should be
pre-financed by the contractor by means of equity capital. The contractor can recover the amount pre-financed through availability payments paid over the exploitation phase, similar to the way this is done in DBFMO. In this way, the deferred payments create financial incentives for the contractor to deliver the building in the adequate condition and to ensure availability.

7. **Imposing penalties and/or bonuses (IC)**
Imposing a system of penalties and bonuses will motivate the contractor to perform well. It is expected that even without interest and principal payments, the contractor receives significant amounts from the client for operational and maintenance activities over the term of the contract. Under the condition that the payments during exploitation are large enough, the bonus-malus system stipulated in the DBFMO Agreement can be equally applied to DBMO projects.

8. **Attaching multiple assignments to one tender (IC)**
Attaching multiple assignments to one tender can be a true incentive for the contractor. Since DBMO projects typically have smaller project sizes as compared to DBFMO projects, tender costs are respectively high for DBMO projects. By connecting multiple projects with the same concept to one single tender, savings can be made in tender costs. As there is only one tender procedure for multiple projects, the candidates in the tender procedure will be encouraged to submit their very best offer, as winning the tender implies jobs and income over the longer term. By promising multiple projects to one consortium, the learning curve effect might come into force. The learning curve effect implies that the consortium will learn from the mistakes made in the first assignment and as a result, will be able to reduce the size of its failure costs in the subsequent assignments.

9. **Establishing an uniform DBMO standard contract (FM/SC/IC)**
The last measure is the creation of a DBMO standard agreement exclusively for DBMO projects. A standard model could accommodate all required measures that are currently added to the various contracts of DBMO projects. The new DBMO standard model can be established on the basis of three current foundations. First, it can be built on the DBFMO Agreement minus the F component. Second, it can be founded on the UAC-GC conditions with expansion of the M&O part or last, it can be built on the UAC-GC terms and conditions for the D&B part combined with a Service Level Agreement (SLAs) for the M&O part. Beside the existing structures for the foundation of the standard, it is also possible to develop the DBMO standard from scratch.

8.5 **Implications for the level of added value**
As the F component is not only a financial means but simultaneously a security for the client as well as an incentive for the contractor to perform well, it has been suggested that the integration of the F component adds value to a project. Conversely, it can be assumed that since DBFMO is not always feasible especially for projects of smaller scope, DBMO projects have smaller sizes of added value due to the absence of the F component. This research focussed on the implications for the level of added value of omitting the F component. Based on the case study research conducted, it is discovered that leaving the F component out of the building contract has five significant implications for the level of added value. These implications are: (1) transaction cost savings; (2) financial cost savings; (3) reduced size of life cycle optimisations; (4) enhanced probability of time overruns, and; (5) improved service quality.
**Transaction cost savings (+)**
The first positive implication for the level of added value of the exclusion of the F component is the saving in transaction costs. The research shows that the transaction costs are much higher for DBFMO projects than for DBMO projects. Transaction costs rise when lenders get involved in the project. This is because aspects such as due diligence and financial advice are omitted. By leaving the F component out of the building contract, significant savings can be made in transaction costs.

**Financial cost savings (+)**
The second positive implication of the exclusion of the F component is the saving in financial costs. The financial costs of DBFMO are higher because in DBFMO risks are explicitly accounted for in the price of capital, while this is not the case under public financing. It is in this respect that the higher financial costs under DBFMO reflect a reward for the private sector carrying those risks. The cost of capital under DBFMO is also higher because project financing is on a non or limited recourse basis, which implies that lenders are only entitled to the repayment from the cash flows originating from the project and not from other assets of the borrower. As a result, a risk premium is required which reflects the likelihood that the work may not be available at some point during the term of the contract and subsequently, no payments will be received to recover the debt. Moreover, all fees on the side of the financial institutions for arranging the project financing with respect to the DBFMO project are counted in the interest rates of project finance debt. In view of that, project finance rates are higher than interest rates on government debt. Therefore, it can be readily argued that savings are made in financial costs by leaving the F component out of the building contract.

**Reduced size of life cycle optimisations (-)**
The first negative implication of the exclusion of the F is the reduced size of life cycle optimisations. The research shows that more life cycle optimisations are induced in DBFMO projects than in DBMO projects. There are multiple reasons why more life cycle optimisations are induced under DBFMO contracting. First, it seems that more life cycle optimisations are induced if the contractor is free to spend the budget between CAPEX and OPEX. From the case study research, it appears that DBMO projects can have separate budgets for CAPEX and OPEX purposes, whereas DBFMO projects generally involve one overall budget for CAPEX and OPEX. Additionally, it is discovered that the extent to which life cycle optimizations are realized also depends on the level of competence of the contractor, the competition in the market, and the nature of the award criteria. The case studies show that if the focus is more on quality criteria rather than cost criteria, the life cycle optimisations induced are less severe. In this respect, it can be argued that because in DBFMO banks are looking over the shoulder of the contractor, the focus is more on cost control and hence, there is more pressure on life cycle optimisations in DBFMO projects.

**Enhanced probability of time overruns (-)**
The second negative implication for the level of added value is the increased probability of time overruns under DBMO contracting. Although time overruns hardly occur under both DBFMO and DBMO contracting, the research shows that the probability of time overruns is still slightly higher under DBMO. This is because the incentives to deliver the project on time are more stringent under DBFMO contracting. Since the availability fee is larger in DBFMO projects, the threat deriving from the penalty system is more severe. Additionally, the active involvement of lenders along with their step-in rights put even more pressure on the DBFMO contractor to deliver the project on time. Since the threat of penalties is smaller and there are
no lenders present under DBMO, the incentives to deliver the project on time are less powerful and hence, the probability of time overruns is slightly higher.

**Improved service quality (+)**

The third positive implication of the exclusion of the F component is the improved service quality. The research shows that the quality of services does not benefit from the presence of the F component. The case studies demonstrate that the level of service quality is higher under DBMO than under DBFMO. Mainly because of the long-term relationship between the client and the contractor, it is supposed that the quality of the services is higher than in traditionally procured projects. Since DBMO contracts typically are commitments for periods of twenty to thirty years, the financial consequences of the use of inferior products can be substantial. If the consortium uses an inferior product, the consortium will have to live with the consequences for the duration of the contract. The threat of the penalty system makes sure that the services deliver good performance. Also, the guarantee of income and work over the long term is a motivation for the service provider to do his job properly. In DBFMO projects there is a similar long-term relationship and a comparable threat of the penalty system. In view of that, it seems rather strange why the quality of the services is lower than in DBMO projects. There is, however, an explanation why the service level scored lower under DBFMO. This has to do with the presence of lenders in the project’s operations. As the primary focus of lenders is to recover their loan, it seems logical to understand that lenders make sure that the required service quality is met, but also no more than that. This is in contrast to DBMO projects, where the contractor himself decides whether he will exceed the quality level stated in the minimum requirements or not. A DBMO contractor might decide to provide a higher service level, for instance to show his capability to the outside world, hoping to get subsequent projects.

**8.6 Practical relevance**

By looking at the effects on added value, it can be seen that there are two significant negative implications of the absence of the F component in DBMO. These implications are the reduced size of life cycle optimizations and the enhanced probability of time overruns. These implications are the result of the deficiencies that emerged due to the exclusion of the F component. The reduced size of life cycle optimizations is particularly the result of the limited interchangeability of budgets, whereas the enhanced probability of time overruns is the effect of the reduced performance incentive, absence of lenders and the weakened financial security in DBMO. As can be seen in Table 17, certain measures have already been taken in the two analyzed DBMO cases. For instance, bank guarantees were issued to counter the weakened financial security, whereas penalties were already applied to strengthen the incentives towards the contractor. In the Community School Joure, there were some traces found of testing during design and completion and the presence of prescriptive elements on top of the output specifications to fulfill the monitoring role of lenders. To strengthen the financial security towards the client, a payment structure based on real expenses was used in the Integral Child Centre Zeeburgereiland, while in the Community School Joure project the municipality deliberately withheld a proportion of the payments. Last but not least, two additional projects were attached to the tender of the Integral Child Centre to boost the performance incentives for the contractor. Nevertheless, all these measures did not prevent the two negative implications from showing up. In order to eliminate these negative implications to occur in the future, additional measures have to be included. By means of a survey that was held among the interviewees, the practical relevance of the measures proposed was tested (see Appendix I). In consideration of the two
negative implications, the interviewees had to score the measures according to their usability in practice.

**8.6.1 Relevance of the measures proposed**

Although the research provides a good impression of the measures that can be taken to overcome the exclusion of the F component, it does not tell whether the measures are actually useful from a practical perspective. In order to verify whether the measures proposed are beneficial for practice, the experts of the case studies were asked about their opinion regarding the measures proposed. A survey has been held among the eight interviewees, in which they had to score the nine measures according to their practical applicability (see Appendix I). A range of 1 to 5 has been designed, where 1 stands for not useful and 5 for very useful. The results of the survey are stated in Appendix J. Seven out of eight interviewees were able to complete the survey. One of the interviewees refrained from doing the survey as he declared that he had no experience with DBMO projects.

Based on the results of the survey, the measures have been classified. Since the means ($\mu$) of the scores does not tell whether the interviewees agree with each other or whether the opinions of the interviewees diverge, the ranking of the measures with respect to the practical applicability is done based on the number of interviewees that gave the measure a high score. A high score is defined by this research as a score of at least 4. This is because a score above 3 means that the interviewee truly recognises the practical applicability of the measure concerned. As seen in Table 18, all seven interviewees acknowledge the relevance of the formation of a DBMO standard contract by giving measure 9 a score above 3. Six of the seven interviewees acknowledge the practicability of bringing budgets together by appointing one single institution (measure 1) and doing payments based on real expenses (measure 4), whereas withholding payments by bringing in equity (measure 6); requesting bank guarantees (measure 5) and; imposing penalties (measure 7) were appreciated by five out of seven respondents. The remaining three measures: prescribing instead of appointing performance (measure 2), attaching multiple assignments to one tender (measure 8) and testing during design and completion (measure 3) were considered to be the least helpful from a practical perspective.

Table 18 Ranking of the measures based on relevance

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**Table 18** Ranking of the measures based on relevance
<table>
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<tr>
<th>Measure</th>
<th>Description</th>
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<tr>
<td>MEASURE 5:</td>
<td>Requesting bank guarantees and/or concern guarantees (µ=4,14)</td>
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<tr>
<td>MEASURE 4:</td>
<td>Disbursements based on real expenses (µ=4,29)</td>
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<tr>
<td>MEASURE 7:</td>
<td>Imposing penalties and/or bonuses (µ=4,14)</td>
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<tr>
<td>(µ=3,00)</td>
<td>one tender (µ=3,00)</td>
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<tr>
<td>performance (µ=3,57)</td>
<td>equity or corporate finance (µ=4,29)</td>
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<td>appointing one single institution that is responsible for all budgets and that is allowed to 'play' with the CAPEX and OPEX budgets (µ=4,43)</td>
<td>contract (µ=4,86)</td>
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8.6.2 **Recommended measures for the future**

From the survey, it became apparent that the development of an uniform DBMO standard contract was considered to be the most valuable measure. Just as with the DBFMO standard agreement, certain aspects such as completion dates, penalty clauses, payment structures and performance standards can be legally enforced by stipulating these elements in a standard agreement. By including these elements in the DBMO standard, the negative implication as regards the enhanced probability of time overruns can be tackled. An incidental coincidence of the creation of an uniform DBMO standard is that it might even further reduce the size of the transaction cost.

Aside from the proposal to develop an uniform DBMO standard, there is another measure that according to the experts is most likely to improve the added value of DBMO projects. This measure is closely related to the interchangeability of budgets. It is assumed that the limited interchangeability of budgets hampers life cycle optimizations to occur. As DBMO projects normally use separate budgets for CAPEX and OPEX, it is recommended to bring these budgets together. However, the problem with bringing budgets together is that the CAPEX and OPEX budget cannot simply be tossed in a pile. This is because there are accounting issue involved. Though, it is possible to appoint one single institution that is allowed to ‘play’ with the CAPEX and OPEX budgets. By giving one institution the right to make small alterations in the OPEX and CAPEX budgets, more scope is provided to private parties to realise life cycle optimisations.

Based on these results, it can readily be said that the formation of an uniform DBMO contract standard along with the appointment of one single institution in charge of all budgets have the best chance of countering the negative implications resulting from excluding the F component in DBMO. Therefore, it is expected that if these two measures were to be deployed together, the added value of DBMO as a whole will augment.
8.7 Do we really need the F in DB(F)MO?

The final question of this thesis remains: “Do we really need the F in DB(F)MO?” Although the research conducted provides a good impression of the measures that can be taken to overcome the exclusion of the F component as well as the implications of the exclusion of the F component on the level of added value, a crystal-clear answer to this question is still hard to provide. This is because there are some content and process related footnotes that put a stamp on the validity of the answer. Therefore, before an attempt is made to answer the final question, reflection is done on the content (§8.7.1) and the process (§8.7.2).

8.7.1 Content-related remarks

It should be noted that project size does matter. By this is meant that project size has influence on the effects on added value, regardless of the contract structure. As DBFMO contracts typically involve high financial and transaction costs, large projects are more eligible for DBFMO contract structures than small projects. Then again, by using DBMO for large projects, significant savings can be made in transaction and financial costs. However, it should be noted that for projects of larger scale the transaction costs of DBMO will rise as well. As more money is involved with projects of larger scope, they simultaneously acquire more attention. Certain features of the F component, such as due diligence and monitoring by other parties than the contractor, may then become necessary for large DBMO projects as well. These activities will increase the size of the transaction costs. As Sterkenburg (2014) notes: “Perhaps for larger scale the DBMO contract structure requires due diligence, but for a school project of only 3.300 square meter it is not that important” He believes that you should not make small projects more important than they are. Therefore, a critical note should be made that the project size is a variable that affects the results of the research.

A second content-related note is that the results of the research are purely based on the current situation in the Netherlands. As DBFMO and DBMO contract structures are respectively new in Dutch construction, the contract forms has gradually been developed over the last couple of years. Therefore, the content of these contract structures have been subject to a slow process of improvement. Since the research focused on four recently procured cases, the results are only validated in the current Dutch context. It may well be that the content of these contracts will be subject to change in the upcoming years, making the findings no longer valid. In view of that, the zeitgeist must be taken into account, when considering the results of the research.

A third content-related note is associated with the magnitude of the effects on added value. The research showed that there are implications for the level of added value with respect to five criteria. The question whether the net added value is the same without the F component, can still not be answered. This is because the research is not specifically directed at measuring the magnitude of the implications. Rather than a measuring tool, the criteria framework developed in this research was intended to be an evaluating tool. In view of that, it is not possible to say whether the positive implications (i.e. transaction cost savings, transaction cost savings and improved service quality) more than outweigh the negative implications (i.e. reduced size of life cycle optimisations and enhanced probability of time overruns). Besides, the involvement of time and quality criteria makes it even more difficult.

A final content-related remark is concerned with the validity of the statements of the interviewees regarding the criterion: service quality. This is because most of the cases selected are in the beginning of their contract terms. Even more, some of the cases are still in the realisation phase. As most cases are in the first few years of their contract period or still in
the realisation phase, the interviewees could only give their future expectations regarding the level of service quality. Therefore, the validity of the results on this particular criterion are questionable and thus, it is recommended to verify the outcomes on this criterion at a later point in time.

8.7.2 Process-related remarks

As regards the process, there are two important remarks. First, the representativeness of the cases selected for the case study research is contentious. For the case study research, two Dutch DBFMO and two DBMO cases were selected. Thus far, seven DBFMO building projects have been implemented in the Netherlands and currently, around ten DBFMO projects are in their preparation/realisation phase. As the number of DBFMO building projects implemented in the Netherlands is rather small, the sample size of two DBFMO cases is reasonable. The representativeness of the two DBFMO cases is not in question, all the more since the DBFMO standard is the foundation whereupon all current DBFMO projects are established. However, the representativeness of the two DBMO cases is more problematic. This is because there is no standard agreement available for DBMO projects. As there is no standard, DBMO contracts diverge widely from each other. As the content of each DBMO contract is rather different, it can be expected that the measures taken and the level of added value will also differ among different DBMO projects.

A second process-related concern is the validity of the statements made by the interviewees. Some people question the objectivity of the research as the findings are largely based on qualitative data. For each case, interviews were held with experts at both contractor and client side. As the perceptions of the experts were used for data gathering, traces of subjectivism have crept into the research. Factors that impede the objectivity of the research are the large variety of external variables, individual perspectives and the attitude of the researcher as the questions asked influence the responses obtained. Although traces of subjectivism are present in the research, one should not forget to acknowledge the value and relevance of qualitative studies. A qualitative approach was deliberately chosen as it can be used to go beneath the surfaces of problems and issues which are subject of quantitative studies, and thereby, enables understanding for basic causes, behaviours and principles. Another reason for the use of the qualitative approach was that the term added value holds multiple perceptions and for that reason, the viewpoints of diverse experts had to be taken.

8.7.3 So: “Do we really need the F in DB(F)MO?”

Considering these remarks, it is not easy to provide an unilateral answer to the question: “Do we really need the F in DB(F)MO?” As the motivation behind the use of DBFMO is to realise more quality for less money with regard to Dutch building projects, it is questioned to what extent the F component is replaceable. Just by looking at the results of the research, it can be concluded that leaving the F out of the building contract results in savings in transaction costs, savings in financial costs and an improved service level. In view of that, it can be assumed that excluding the F component is beneficial for the project. On other hand, leaving the F out of the contract also leads to a loss in life cycle optimisations and an enhanced probability of time overruns. In this respect, it remains disputed whether the benefits accruing from leaving the F out of the contract more than offset the losses and thus, an unilateral answer to this question is not possible. However, by looking at the added values of DBFMO and DBMO cases separately, it can be seen that similar levels of added value are created with respect to: price certainty; lead time construction time; quality process; quality object,
and innovative thinking. Therefore, it can be concluded that it depends on the criteria selected whether the F component adds value to a project or not.

In this research nine measures have been proposed to overcome the loss of the F component. Some of these measures have already been included in one of two case studies. As regards the measures already implemented in the two reviewed DBMO cases, the use of a payment schedule based on real expenses; withholding payments; the application of a penalty system, and; the use of bank guarantees were considered to be the most useful from a practical perspective. Yet, these measures haven't stopped the negative implications from getting feet on the ground. Remarkably, the survey among the interviewees showed that the two measures that have not yet been applied in one of the two analysed cases were considered to be the most effective. These two measures are the establishment of an uniform DBMO contract standard and the appointment of one single institution that is responsible for all budgets. By stipulating securities, obligations and ratifications in an uniform DBMO standard, the probability of time overruns is expected to drop. The loss of life cycle optimisations is presumed to be counteracted by appointing one institution that is responsible for all budgets and hence, is allowed to make small alterations in the CAPEX and OPEX budgets. Based on these findings, it can readily be said that the formation of an uniform DBMO contract standard along with the appointment of one single institution in charge of all budgets have the best chance of countering the negative implications resulting from excluding the F component in DBMO. In view of that, it can be assumed that if these two measures are added to the existing measures, the gap in added values between DBFMO and DBMO will diminish and so, the F will lose some of its superiority. However, only the future will show whether these measures actually possess the ability to fully replace the role of the F in DBMO.
RECOMMENDATIONS

In this last chapter, recommendations are provided regarding the content of this research. Based on the findings of this research, some practical improvements are recommended. Also, some subjects for further research crossed the author’s mind, which did not fit in the scope of the research when establishing this research. These subjects are summed and briefly elaborated in the second part of this chapter.

9.1 Recommendations for practice

There are four practical recommendations proposed with regard to the content of this research. These are: An uniform DBMO standard contract (§9.1.1); One single institution that is allowed to ‘play’ with the CAPEX and OPEX budgets (§9.1.2); Balanced level of detail in output specifications (§9.1.3), and; DBMO for schools and hospitals (§9.1.4).

9.1.1 An uniform DBMO standard contract

It is recommended to develop an uniform DBMO standard contract for DBMO projects. The UAC-GC 2005 terms and conditions were used in the two DBMO cases of the case study research. However, the UAC-GC conditions are not mandatory for DBMO projects. Other contract structures may also be applied to DBMOs. In order to simplify the proceedings of the establishment of the DBMO contract, it is recommended to develop an uniform DBMO standard. A standard model could then accommodate all required measures that are currently added to the various contracts of DBMO projects. The new DBMO standard model can be established on the basis of three current foundations: it can be built on the DBFMO Agreement minus the F component; it can be founded on the UAC-GC conditions with expansion of the M&O part or; it can be built on the UAC-GC terms and conditions for the D&B part combined with a Service Level Agreement (SLAs) for the M&O part. Beside the existing structures for the foundation of the standard, it is also possible to develop the DBMO standard from scratch.

9.1.2 One single institution that is allowed to ‘play’ with the CAPEX and OPEX budgets

The research showed that due to the fact that the flows of funds between construction, maintenance and operation stem from different sources, there is limited interchangeability of budgets in Dutch school-related projects. The limited interchangeability of budgets is accused of jeopardizing the size of the life cycle optimizations to be induced. Since one of the negative implications on added value is that less life cycle optimizations are induced under DBMO, it is recommended to facilitate the interchangeability of budgets. This can be done by appointing a single institution that is allowed to hustle the budgets for OPEX and
CAPEX purposes. By doing so, the interchangeability of budgets can be steered in a most convenient way.

9.1.3 **Balanced level of detail in output specifications**
The research showed that the level of detail in the output specifications has effects on the added value of a project. Too much detail hampers preparation time, stifle innovation and increases transaction costs, whereas too less detail results in a loss of foundations and increased failure costs. Therefore, it is recommended to find an optimal balance of prescribing and performance requirements in the output specifications.

9.1.4 **DBMO for schools and hospitals**
The F component has not yet materialized in healthcare because the institutions are not creditworthy enough (Aalbers, 2013). Also, there are some difficulties with taxes making it impossible to use project finance for healthcare institutions (Koster & Wieland, 2014). In other words, it is not because hospitals are not suitable for DBFMO, but because there are a few obstacles that hamper the application of project financing in healthcare. Therefore, if healthcare institutions are considering integrated contract structures for their buildings, DBFMO does not stand a chance of success. This is even more so, since hospitals are required to bear the risk of their own housing recently and therefore, are not allowed to shift these risks to the government anymore (Koster & Wieland, 2014). In view of that, DBMO is increasingly seen as an attractive solution for the large need for housing in Dutch health care. As regards housing for schools, there are no DBFMO projects for schools in the Netherlands. The main reason of no DBFMO projects for schools is that the budget for construction and the budget for maintenance and operation are managed by separate institutions. As long as the budgets come from different sources, DBFMO remains problematic and DBMO continues to be the best means. For that reason, DBMO contracting is recommended for housing for schools and hospitals, in particular.

9.2 **Recommendations for further research**
There are ten recommendations for further research proposed. These are: repeat the research with a larger sample a few years from now (§9.2.1); investigate DBMO for non-educational purposes (§9.2.2); reuse the research instruments (§9.2.3); investigate the size of the implications (§9.2.4); reconsider the selected added value criteria with respect to mutual exclusivity (§9.2.5); elaborate on the measures proposed (§9.2.6); search for causalities between measures proposed and effects (§9.2.7); learn from experience with publicly financed PPPs in other countries (§9.2.8); examine the influence of project size on results (§9.2.9), and last; study differences in stakeholder’s perception (§9.2.10).

9.2.1 **Repeat the research with a larger sample a few years from now**
The research conducted for this thesis should be repeated in a few years from now. Since the effects of some quality criteria might change over time, it is useful to explore to what extent the findings are consistent in the long run. Moreover, as most of the selected cases are in the first few years of their contract period or still in the realisation phase, the interviewees could only give their future expectations regarding certain criteria. This goes specifically for the criterion service quality. Therefore, it is recommended to verify the results at a later point in time, when the required data is available.

In addition, it is recommended to do this research again with a larger case sample. As this research was purely aimed at obtaining first insights into the measures that can be taken to overcome the loss of the F component and the implications for the added value, a sample of
two DBFMO and two DBMO cases was chosen. Now the initial findings are mapped, it would be valuable to redo the research with a larger case sample.

9.2.2 Investigate DBMO for non-educational purposes
The two DBMO cases selected for the case study research were housing projects for educational purposes. Since both cases embody housing for schools, the research did not cover housing for any other purposes. As it may well be that DBMO projects for hospitals or prisons lead to other results, it is recommended that further research should be done into DBMO projects for non-educational purposes.

9.2.3 Reuse the research instruments
Some research instruments developed in this research can also be used in other studies. Particularly, the checklist (Table 3) and the multi-criteria framework (Appendix H) explicitly designed for this research are tools that can be reused in other researches. The checklist can be used to evaluate how the role of the F component is covered in other integrated projects, whereas the multi-criteria framework can be used to evaluate the level of added value of future DBMO and DBFMO projects, after which they can be mutually compared. Next to integrated building projects, the research instruments developed for this research can be used in the same way to study infrastructural PPPs. Therefore, it is recommended that the research tools developed in this thesis should be treasured.

9.2.4 Investigate the size of the implications
Further research should be done into the magnitude of the implications on added value. This research only provides insights into the sort of implications. As the case samples of DBFMO and DBMO projects were rather small, no generalised conclusions could be made on the basis of the conducted case study research regarding the actual size of the implications. In order to give a validated answer to the question whether or not the overall level of added value is the same under DBMO as under DBFMO, further research is needed into the magnitude of the implications.

9.2.5 Elaborate on the measures proposed
In this research, nine measures are proposed to overcome the loss of the F component out of the building projects. As the practical application is left out of the scope of the research, these measures are just propositions. Further research is needed into how these measures can actually be applied in Dutch practice. In view of that, this research provides a solid foundation, whereupon further research into the practical application can be established.

9.2.6 Reconsider the selected added value criteria regarding mutual exclusivity
A recommendation for further research is to reconsider the criteria selected in this research. This particularly goes for the criterion transaction cost, cost of capital and life cycle optimisations. Due to the fact that parts of the transaction cost also belong to the life cycle costs of a project, the list of criteria was not completely mutual exclusive. This did not harm the validity of this research as the list of criteria was used as a evaluating tool rather than a measuring tool. However, when the size of the effects per criterion is to be measured, then it becomes essential that the criteria are mutually exclusive. Therefore, it is recommended for further research to reconsider the added value criteria by taking the mutual exclusivity of the criteria into account.

9.2.7 Search for causalities between measures proposed and effects
By analysing the measures taken in the two DBMO cases to overcome the absence of the F component and the effects on added value, causations and other relationships are found.
On the bases of the findings of the case study research conducted, three important relations are mentioned in this research. As the case study research conducted is based on a limited case sample, the findings merely provides early insights into the potential causalities between the measures and effects. Further research is definitely needed to check whether the causations mentioned (see §7.4.4) can be generalised and if there are more causalities between the measures proposed and the effects on added value.

9.2.8 Learn from experience with publicly financed PPPs in other countries
It is recommended to investigate how publicly financed PPPs are organised across the Dutch borders. As this research was purely focussed on the DBMO contract structure from a Dutch perspective, the international perspective was excluded from the scope of this research. Since comparable structures are applied in other countries, especially in Scandinavia, further research can focus on how is dealt with these kinds of structures in other economies as well as what sort of measures could be adopted.

9.2.9 Examine the impact of project size on results
The research showed that project size is a variable that has influence on certain outcomes of the research conducted. Project size plays a role, particularly with respect to the criteria transaction cost and life cycle optimizations. As the influence of project size falls outside the scope of this research, it is recommended that the impact of project size on the results found should be investigated in further research.

9.2.10 Study differences in stakeholder’s perception
It might be valuable to explore the differences in stakeholder’s perception with regard to added value in Dutch construction. As the term added value holds multiple perceptions of actors involved in a project, the differences between stakeholders’ valuation can be studied. In this research, the views of experts of both client and contractor side had been taken. Yet, it is not possible to draw conclusions on the results of the interviews taken because of the small sample of applicants in this research. In order to be able to draw generalized conclusions, the sample of applicants needs to be bigger. Therefore, it is recommended for further research to explore the differences in value perception between the key actors involved in a construction project.


Appendix A: DBFMO process
### Appendix B: List of project finance related articles in the DBFMO Agreement

#### IMPORTANT ELEMENTS PREPARATION PHASE

| Key obligations of the contractor | Article 2.1 |
| Key obligations of the contracting authority | Article 2.2 |
| Obligation to use Project Finance | Article 3.1 |
| Obligation to reach Financial Close | Article 3.2 |
| Financial Close Guarantee | Article 3.3 |
| Obligation to set insurances | Article 14 |
| Direct Agreement | Annex 6 |
| Financial Model (determination WACC & gross availability payment) | Part 4 of Annex 7 |

#### IMPORTANT ELEMENTS REALISATION PHASE

| Performance Bond | Article 3.4 |
| Bank Guarantees | Article 3.6 |

#### IMPORTANT ELEMENTS EXPLOITATION PHASE

| Obligation of the contractor to maintain the availability of the object | Article 5.2 |
| Transfer guarantee | Article 7.3 |
| Obligation of the contractor to monitor based on a monitoring plan | Article 8.1 |
| Obligation of the contractor to provide monitoring reports | Article 8.5 |
| Rectification obligation of the contractor | Article 8.8 |
| Availability Payment | Part 1 of Annex 2 |
| Regulations about non-availability corrections | Part 2 of Annex 2 |
| Regulations about non-performance corrections | Part 2 of Annex 2 |
| One-time payment option | Part 5 of Annex 2 |

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21 For more information about the content of the articles, download the DBFMO Agreement of the Government Building Agency from the website [http://www.ppsbijhetrijk.nl/Publicaties](http://www.ppsbijhetrijk.nl/Publicaties).
Appendix C: Example Cash flow profile

Characteristic of DBFMO projects is the time profile of the net operating cash flows. A typical DBFMO building project involves a large initial upfront investment, and operations and maintenance costs (O&M) paid over the term of the contract. The ratio investment to O&M costs is roughly 60 to 40 per cent for standard DBFMO building projects (Meesters, 2014). Figure 38 represents a typical time profile of the cash flows occurring in a typical DBFMO building project. In this example, it is assumed that the interest rate is 12 per cent and that the availability fee is indexed at 2 per cent a year. Furthermore, it is supposed that the debt services will grow 2 per cent each year. The debt services are the payments that are required for a particular time period to cover the repayment of interest and principal on a debt. As one can see the capital expenditures occur during the first four years. After year four, the project is completed and the maintenance and operating costs come into play. In this example, the periodic fees over the life of the project are used to pay off debt by year 25. After the initial capital expenditure, the main objective of the project is to promote case flows and use them to pay for outstanding debt and to generate dividends for the sponsors (Engel et al., 2010).

![DBFMO Cash flow structure](image)

**Figure 38 DBFMO Cash flow structure as in: Engel et al. (2010)**
Appendix D: Questionnaire interviews (Dutch)

DEEL 1: KORTE INTRODUCTIE

1) Wanneer is het project op de markt gezet en wanneer is het project opgeleverd?
2) Wat is de duur van het contract?
3) Wat was het totale budget en/of contractomvang voor realisatie en exploitatie?
4) Wat is de omvang van het gebouw in BVO?
5) Wat waren de belangrijkste uitgangspunten van het project?
6) Welke diensten zitten er in de scope van het contract?

DEEL 2: FINANCIERING VAN HET PROJECT

A. Financieel middel

7) Hoe is het budget opgesteld? Is er één budget (pot met geld) voor het hele project of zijn er gescheiden budgeten voor realisatie en exploitatie?
8) In welke mate was de opdrachtnemer vrij om het budget te besteden over de verschillende activiteiten? Is er sprake van uitwisselbaarheid van budgetten?
9) Is er gebruik gemaakt van functioneel specificeren (output specificaties)?
10) Hoe zijn betalingen tijdens realisatie en exploitatie vormgegeven?

B. Zekerheden aan de opdrachtgever

11) Hoe zijn de risico’s verdeeld in het project? Welke risico’s zijn wel en niet overgedragen aan de private partij?
12) Hoe is er controle uitgevoerd op de kwaliteit van de biedingen en de inhoud van contracten in de voorbereidingsfase? Is er sprake van due diligence? Zo ja, hoe is dit geregeld?
13) Hoe is er in de constructiefase controle uitgevoerd op de prestaties van de aannemer?
14) Hoe wordt er in the exploitatiefase controle uitgevoerd op de kwaliteit van de diensten van het object en het onderhoudsniveau?
15) Is er gebruik gemaakt van garanties en/of andere zekerheidsstellingen om de opdrachtnemer te binden? Zo ja, wat voor bank-, concerngaranties en/of uitgestelde betalingen zijn er gebruikt?

C. Prestatieprikkel voor de opdrachtnemer

16) Hoe heeft de opdrachtgever ervoor gezorgd dat de opdrachtnemer doet wat hij belooft nadat bij oplevering de investering al door de opdrachtgever is gefinancierd?

If you are interested in the detailed interviews, please contact the author: stephanievdassem@hotmail.com.
17) Hoe werkt het betalingsmechanisme en zitten er prikkelorden voor de opdrachtnemer in het betalingsmechanisme?

18) Hoe wordt er gebruik gemaakt van bonussen en kortingen in het betaalsysteem?

19) Hoe zijn de prestatie-eisen geregeld en hoe verloopt de monitoring van prestaties?

D. Reflectie

20) Terugkijkend, denkt u dat de functies van de F één op één zijn te vertalen naar DBMO?

21) Zijn er bepaalde functies minder goed geregeld dan het geval zou zijn geweest onder een DBFMO structuur?

22) Wat zou de opdrachtgever anders gedaan moeten hebben m.b.t. de financiering?

DEEL 3: MEERWAARDE

A. Kosten

23) **Transactiekosten (t.o.v. traditionele variant)** zijn gedefinieerd als alle kosten aan de kant van de opdrachtnemer voor het voorbereiden, het sluiten van, het uitvoeren en het controleren van het contract. Hoe hoog zijn de transactiekosten van het project en/of hoeveel hoger zijn de transactiekosten t.o.v. de traditionele variant?

24) **Gewogen gemiddelde vermogenskostenvoet/ rentevoet (%)**. Wat is de gewogen gemiddelde vermogenskostenvoet (WACC)/ rentevoet van het project?

25) **Levensduurkosten optimalisatie m.b.t. realisatie en exploitatie (t.o.v. traditionele variant)** is gedefinieerd als het percentage kostenbesparingen in de realisatie en exploitatie fase als gevolg van een integrale benadering in verhouding tot de traditionele variant. Hoe hoog is het percentage kosten optimalisatie m.b.t. de realisatie en exploitatie dat is bereikt in het project?

26) **Budgetoverschrijdingen (% van realisatiebudget)** is gedefinieerd als percentage van het realisatiebudget waarmee het oorspronkelijke realisatiebudget is overschreden. Hoe hoog waren de budgetoverschrijdingen bij de oplevering van het gebouw als percentage van het oorspronkelijke realisatiebudget?

27) **Prijszekerheid (t.o.v. traditionele variant)** is gedefinieerd als de mate van lange termijn zekerheid van prijzen ten opzichte van de traditionele variant. In welke mate is er sprake van prijszekerheid in verhouding tot het traditionele contract?

B. Tijd

28) **Tijdsduur totale voorbereidingsfase (in weken/maanden)** is gedefinieerd als de tijd tussen het moment dat het project geïnitieerd werd en de start van de realisatie fase. Wat was de tijdsduur van de voorbereidingsfase?

Denkt u dat dit langer/korter was dan als het project traditioneel was aanbesteed?
29) **Tijdsduur initiatief tot start aanbesteding (in weken/maanden)** is gedefinieerd als de tijd tussen het moment dat het project geïnitieerd werd en de start van de aanbesteding. Wat was de tijdsduur?

Denkt u dat dit langer/korter was dan als het project traditioneel was aanbesteed?

30) **Tijdsduur aanbesteding (in weken/maanden)** is gedefinieerd als de tijd tussen de start van de aanbesteding en de bekendmaking van de winnende tender. Wat was de tijdsduur van de aanbestedingsfase?

Denkt u dat dit langer/korter was dan als het project traditioneel was aanbesteed?

31) **Tijdsduur winnende tender tot en met de start realisatie (in weken/maanden)** is gedefinieerd als de tijd tussen het moment de winnende tender is geselecteerd en de start van de realisatiefase. Wat was de tijdsduur?

Denkt u dat dit langer/korter was dan als het project traditioneel was aanbesteed?

32) **Tijdsduur bouw (in weken/maanden)** is gedefinieerd als de tijd tussen de start van de bouw en de oplevering van het gebouw. Wat was de tijdsduur van de bouwfase?

Denkt u dat dit langer/korter was dan als het project traditioneel was aanbesteed?

33) **Tijdsoverschrijdingen (in weken/maanden)** is gedefinieerd als de tijd tussen de oorspronkelijk geplande oplevering en de werkelijke oplevering van het gebouw. Was er sprake van een verlaten oplevering en zo ja, hoe veel weken/maanden?

Denkt u dat dit langer/korter was dan als het project traditioneel was aanbesteed?

C. **Kwaliteit**

34) **Flexibiliteit van het contract (t.o.v. traditionele variant)** is gedefinieerd als de mate waarin het contract ruimte biedt voor wijzigingen, aanpassingen en/of onvoorziene omstandigheden. Denkt u dat het contract meer of minder flexibiliteit bezit dan als het project traditioneel was aanbesteed?

35) **Kwaliteit proces (t.o.v. traditionele variant)** is gedefinieerd als de kwaliteit van het verloop van het project. Factoren die met de kwaliteit van het proces samenhangen zijn samenwerking, transparantie en de aanwezigheid van afstemmingsproblemen. Denkt u dat het proces meer of minder kwaliteit bezat dan als het project traditioneel zou zijn aanbesteed?

36) **Kwaliteit gebouw (t.o.v. traditionele variant)** is gedefinieerd als de kwaliteit van het gebouw. Denkt u dat het gebouw meer of minder kwaliteit bezit dan als het project traditioneel was aanbesteed?

37) **Kwaliteit diensten en onderhoud (t.o.v. traditionele variant)** is gedefinieerd als de kwaliteit van de diensten en onderhoud. Denkt u dat de diensten en het onderhoud meer of minder kwaliteit bezitten dan als het project traditioneel was aanbesteed?
38) Innovatief denken (t.o.v. traditionele variant) is gedefinieerd als het bedenken en voortbrengen van vernieuwde, verbeterde en/of duurzame technieken, systemen en oplossingen. Denkt u dat er meer innovatief nagedacht is dan in traditionele projecten?
# Appendix E: Project overview DBMO cases

<table>
<thead>
<tr>
<th>Project</th>
<th>DBMO ICC Zeeburgereiland</th>
<th>DBMO Community School Joure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contracting authority</strong></td>
<td>City Council of Amsterdam East</td>
<td>Municipality ‘De Friese Meren’</td>
</tr>
<tr>
<td><strong>Winning consortium</strong></td>
<td>Verlaat Uden Bouwsystemen</td>
<td>Facilicom Services Group</td>
</tr>
<tr>
<td><strong>Start market consultation</strong></td>
<td>December 2011</td>
<td>June 2011</td>
</tr>
<tr>
<td><strong>Project delivery date</strong></td>
<td>August 2013</td>
<td>July 2014 (expected)</td>
</tr>
<tr>
<td><strong>Net Present Value (realisation) (exploitation)</strong></td>
<td>3.376 m² (540 m²)</td>
<td>4.300 m²</td>
</tr>
<tr>
<td><strong>Gross floor area (incl. expansion potential)</strong></td>
<td>3.376 m² (540 m²)</td>
<td>4.300 m²</td>
</tr>
<tr>
<td><strong>Contract term</strong></td>
<td>30 years</td>
<td>25 years</td>
</tr>
<tr>
<td><strong>Scope contract</strong></td>
<td>- Design; - Build; - Maintenance, and; - Operation, including: - energy - waste management - cleaning &amp; small repairs (10 years)</td>
<td>- Design; - Build; - Maintenance, and; - Operation, including: - cleaning - garbage collection - alarm system</td>
</tr>
</tbody>
</table>
## Appendix F: SWOT analyses DBMO cases

### Figure 39 SWOT analysis Integral Child Centre Zeeburgereiland

<table>
<thead>
<tr>
<th><strong>STRENGTHS</strong></th>
<th><strong>WEAKNESSES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Separated budgets protect the contractor against excess investments during realisation (FM).</td>
<td>Limited interchangeability of budgets inhibits the freedom/efficiency of the contractor (FM).</td>
</tr>
<tr>
<td>Issued bank guarantee that can be turned into a concern guarantee after one year (SC).</td>
<td>No due diligence executed (SC).</td>
</tr>
<tr>
<td>Disbursements are based on real expenses (SC).</td>
<td>No monitoring during realisation by a third party (SC).</td>
</tr>
<tr>
<td>Application of bonuses/penalties (IC).</td>
<td>No monitoring during realisation by a third party (SC).</td>
</tr>
<tr>
<td>The tender also contains two potential future projects (IC).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>OPPORTUNITIES</strong></th>
<th><strong>THREATS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic growth could accelerate the implementation of the two subsequent assignments (IC).</td>
<td>The performance of the building does not comply with the output specifications (SC).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>STRENGTHS</strong></th>
<th><strong>WEAKNESSES</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Separated budgets protect the contractor against excess investments during realisation (FM).</td>
<td>No interchangeability of budgets inhibits the freedom/efficiency of the contractor (FM).</td>
</tr>
<tr>
<td>Issued bank guarantee (SC).</td>
<td>No due diligence executed (SC).</td>
</tr>
<tr>
<td>Deferred payments (IC/SC).</td>
<td>No monitoring during realisation by a third party (SC).</td>
</tr>
<tr>
<td>Application of penalties (IC).</td>
<td>No monitoring during realisation by a third party (SC).</td>
</tr>
<tr>
<td>The MO company is the lead party and therefore, carefully monitors the realisation (SC).</td>
<td></td>
</tr>
<tr>
<td>Next to what is to be achieved, there still are some specifications that prescribe how (SC).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>OPPORTUNITIES</strong></th>
<th><strong>THREATS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The development of energy efficient systems will be beneficial for the consortium, as it is allowed to keep the profits out of energy savings (IC).</td>
<td>The performance of the building does not correspond with the output specifications (SC).</td>
</tr>
<tr>
<td></td>
<td>The consortium cannot be held liable on the basis of the agreement or due to insolvency (SC).</td>
</tr>
<tr>
<td></td>
<td>High costs for the client if large adjustments are needed after the contractor drops out as a result of bankruptcy. This could have major financial impacts for the client over the term of the contract (SC).</td>
</tr>
</tbody>
</table>

### Figure 40 SWOT analysis Community School Joure

<table>
<thead>
<tr>
<th><strong>STRENGTHS</strong></th>
<th><strong>WEAKNESSES</strong></th>
</tr>
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</tr>
<tr>
<td>Issued bank guarantee (SC).</td>
<td>No due diligence executed (SC).</td>
</tr>
<tr>
<td>Deferred payments (IC/SC).</td>
<td>No monitoring during realisation by a third party (SC).</td>
</tr>
<tr>
<td>Application of penalties (IC).</td>
<td>No monitoring during realisation by a third party (SC).</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td></td>
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<tr>
<td></td>
<td>High costs for the client if large adjustments are needed after the contractor drops out as a result of bankruptcy. This could have major financial impacts for the client over the term of the contract (SC).</td>
</tr>
</tbody>
</table>

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### Appendix G: Project overview DBFMO cases

<table>
<thead>
<tr>
<th>Project</th>
<th>DBFMO Education Executive Agency &amp; Regional Tax Office Groningen</th>
<th>DBFMO The Supreme Court The Hague</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contracting authority</td>
<td>Government Building Agency</td>
<td>Government Building Agency</td>
</tr>
<tr>
<td>Winning consortium</td>
<td>Consortium DUO²</td>
<td>Consortium ‘Poort van Den Haag’</td>
</tr>
<tr>
<td>(Future) users</td>
<td>- Education Executive Agency; - Regional Tax Office Groningen.</td>
<td>- The Dutch Supreme Court.</td>
</tr>
<tr>
<td>Start market consultation</td>
<td>September 2006</td>
<td>December 2010</td>
</tr>
<tr>
<td>Project delivery date</td>
<td>March 2011</td>
<td>November 2015 (expected)</td>
</tr>
<tr>
<td>Net Present Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross floor area</td>
<td>48.000 m² (offices) 10.000 m² (parking) 9.000 m² (city garden)</td>
<td>15.000 m² (excl. parking)</td>
</tr>
<tr>
<td>Contract term</td>
<td>20 years</td>
<td>30 years</td>
</tr>
<tr>
<td>Scope contract</td>
<td>- Design; - Build; - Finance; - Maintain, and; - Operate, excluding: o ICT o Front Office o Post</td>
<td>- Design; - Build; - Finance - Maintain, and; - Operate, excluding: o ICT o Post o Surveillance of detainees o Visual arts</td>
</tr>
</tbody>
</table>
Appendix H: Results of the case study research

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>DBMO INTEGRAL CHILD CENTRE ZEEBURGEREILAND</th>
<th>DBMO COMMUNITY SCHOOL JOURE</th>
<th>DBFMO THE SUPREME COURT THE HAGUE</th>
<th>DBFMO EDUCATION EXECUTIVE AGENCY &amp; REGIONAL TAX OFFICE GRONINGEN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AD</td>
<td>GS</td>
<td>HvdM</td>
<td>BN</td>
</tr>
<tr>
<td>COSTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction Cost</td>
<td>4x trad. ± €100.000 (trad = €25.000)</td>
<td>Very low</td>
<td>/</td>
<td>€250.000 (trad. &lt; DBMO&lt; DBFMO)</td>
</tr>
<tr>
<td>Cost of Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life cycle optimisation with respect to construction and exploitation cost</td>
<td>Just below target price</td>
<td>5-10%</td>
<td>Limited</td>
<td>5-10%</td>
</tr>
<tr>
<td>Budget overruns</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Price Certainty</td>
<td>+4 (much)</td>
<td>+4 (much)</td>
<td>+4 (much)</td>
<td>+4 (much)</td>
</tr>
</tbody>
</table>

**TIME**

<table>
<thead>
<tr>
<th>Lead time preparation</th>
<th>Initiation - Start tender</th>
<th>Start tender - awarding</th>
<th>Awarding - start realisation</th>
<th>Lead time construction</th>
<th>Time Overruns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shorter; 4 months (trad = 18 months)</td>
<td>Longer; 5 months (trad = 3 months)</td>
<td>Same; 6 months</td>
<td>Shorter; 7/8 months (trad = 12 months)</td>
<td>Same; 4 weeks (caused by bad weather)</td>
</tr>
<tr>
<td></td>
<td>Shorter; 4 months (trad = 24 months)</td>
<td>Longer; 18 months (trad = 12 months)</td>
<td>Same; 8 months</td>
<td>Shorter; 6 months (excl. bad weather) (trad = 12 months)</td>
<td>Shorter; 10 days (trad = much longer)</td>
</tr>
<tr>
<td></td>
<td>Longer; due to political concerns</td>
<td>Longer; due to complexity</td>
<td>Shorter; 8 months (final design already made in tender)</td>
<td>/</td>
<td>Shorter; none expected (trad = 3/6 months)</td>
</tr>
<tr>
<td></td>
<td>Slightly longer (due to adding of services)</td>
<td>Longer; 20 months (trad = 3 months)</td>
<td>Same; 9 months</td>
<td>Same; 27 months expected</td>
<td>Shorter; 9 months (due to time pressure)</td>
</tr>
<tr>
<td></td>
<td>Same; 8 months</td>
<td>Longer; 15 months (trad = 3 months)</td>
<td>Same; 9 months (due to time pressure)</td>
<td>Shorter; 27 months expected</td>
<td>Same; 8 months</td>
</tr>
<tr>
<td></td>
<td>/</td>
<td>Longer; 15 months (trad = 3 months)</td>
<td>Same; 8 months</td>
<td>Shorter; 28 months</td>
<td>Same; 8 months</td>
</tr>
<tr>
<td></td>
<td>Same; 8 months</td>
<td>Longer; 15 months (trad = 3/4 months)</td>
<td>Same; 8 months</td>
<td>Shorter; 28 months</td>
<td>Same; 8 months</td>
</tr>
<tr>
<td></td>
<td>Same;</td>
<td>Longer; 15 months (trad = 3/4 months)</td>
<td>Same; 8 months</td>
<td>Shorter; 28 months</td>
<td>Same; 8 months</td>
</tr>
<tr>
<td></td>
<td>8 months</td>
<td>Longer; 15 months (trad = 3/4 months)</td>
<td>Same; 8 months</td>
<td>Shorter; 28 months</td>
<td>Same; 8 months</td>
</tr>
<tr>
<td></td>
<td>/</td>
<td>Longer; 15 months (trad = 3/4 months)</td>
<td>Same; 8 months</td>
<td>Shorter; 28 months</td>
<td>Same; 8 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Longer; 15 months (trad = 3/4 months)</td>
<td>Same; 8 months</td>
<td>Shorter; 28 months</td>
<td>Same; 8 months</td>
</tr>
</tbody>
</table>

169
<table>
<thead>
<tr>
<th>QUALITY</th>
<th>0 (same)</th>
<th>+3 (quite)</th>
<th>+2 (just)</th>
<th>-2 (just)</th>
<th>-3 (quite)</th>
<th>-2 (just)</th>
<th>0 (same)</th>
<th>-3 (quite)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexibility of the contract</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality process</td>
<td>+4 (much)</td>
<td>+3/4 (quite/ much)</td>
<td>+3 (quite)</td>
<td>/</td>
<td>+2 (just)</td>
<td>+5 (extremely)</td>
<td>+4 (much)</td>
<td></td>
</tr>
<tr>
<td>Quality object</td>
<td>+4 (much)</td>
<td>+4 (much)</td>
<td>+3 (quite)</td>
<td>+3 (quite)</td>
<td>+3/4 (quite/ much)</td>
<td>+3 (quite)</td>
<td>+3 (quite)</td>
<td>0 (same)</td>
</tr>
<tr>
<td>Service quality</td>
<td>-4 (much)</td>
<td>+3 (quite)</td>
<td>+3 (quite)</td>
<td>+2 (just)</td>
<td>+2/3 (just/ quite)</td>
<td>0 (same)</td>
<td>0 (same)</td>
<td>0 (same)</td>
</tr>
</tbody>
</table>

(AD) Albèr Duyt
(GS) Gerald Sterkenburg
(HvdM) Helga van der Molen
(BN) Bas Niese
(JB) Jos Buijs
(PvL) Peter van Leeuwen
(JvdV) Jacco van der Vegte
(KvO) Kees van Oosteren
Appendix I: Survey validation measures & trustworthiness interviewees

Beste experts,

Aan de hand van de interviews die ik met jullie heb gehouden, heb ik een lijst met maatregelen opgesteld om het wegvallen van de rol van de F in DBMO projecten te ondervangen. Ik ben erg benieuwd wat jullie van deze maatregelen vinden. Denken jullie dat deze maatregelen goed zullen werken in de praktijk? Graag zou ik jullie willen vragen om deze korte enquête van slechts 3 minuten binnen een week in te vullen. Ik studeer volgende maand af en dit is de laatste verificatie stap, dus ik zou jullie ontzettend dankbaar zijn als jullie de moeite willen nemen.

1. Wat is uw naam? *

2. Hoelang zit u al in deze branche? *
   - 0-3 jaar
   - 4-6 jaar
   - 7-9 jaar
   - >9 jaar

3. Heeft u zelf ervaring met DBMO projecten? *
   - Ja, hoe lang al?
   - Nee

4. Heeft u zelf ervaring met DBFMO projecten? *
   - Ja, hoe lang al?
   - Nee

5. Heeft u ervaring met andere geïntegreerde contractvormen? Zo ja, welke? *
   - D&B
   - DBM
   - Geen
   - Anders....

6. Hoe lang heeft u al ervaring met geïntegreerde contractvormen? *
   - 0-3 jaar
   - 4-6 jaar
   - 7-9 jaar
   - >9 jaar

---

7. Hoe waardevol denkt u dat deze maatregelen in de praktijk zijn om het wegvallen van de F prikkel in DBMO projecten te ondervangen?

<table>
<thead>
<tr>
<th>Maatregel</th>
<th>niet waardevol</th>
<th>waardevol</th>
<th>n/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Het benoemen van 1 instantie die verantwoordelijk is over alle budgetten en die tevens de bevoegdheid heeft om te schuiven met het realisatie en exploitatie budget.</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>2. Voorschrijvende eisen opnemen in output specificaties, met name voor belangrijke onderdelen tijdens exploitatie.</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>3. Toetsen gedurende ontwerpproces en bij oplevering</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>4. Betalingsritme op basis van werkelijke uitgaven</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>5. Bank garanties en/of concerngaranties laten opnemen</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>6. Achterhouden van eenmalige betalingen en/of inbreng van eigen vermogen</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>7. Kortingen op resterende betalingen</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>8. Prestatieprikkel creëren door meerdere opdrachten aan 1 tender te binden</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
</tbody>
</table>

Hartelijk dank voor het invullen van deze enquête. Na mijn afstuderen (18 augustus) stuur ik een copy van het onderzoek op! Zonder jullie was het nooit gelukt!

Met vriendelijke groet,

Stephanie
Appendix J: Results survey as to the relevance of the measures proposed

MEASURE 1: Bringing budgets together by appointing one single institution that is responsible for all budgets and that is allowed to ‘play’ with the CAPEX and OPEX budgets

not useful (1) - very useful (5)

- 

\[ \mu = 4.43, \quad n = 7 \]

MEASURE 2: Prescribing instead of appointing performance

not useful (1) - very useful (5)

- 

\[ \mu = 3.57, \quad n = 7 \]

MEASURE 3: Testing during design and completion

not useful (1) - very useful (5)

- 

\[ \mu = 3.00, \quad n = 7 \]

MEASURE 4: Disbursements based on real expenses

not useful (1) - very useful (5)

- 

\[ \mu = 4.29, \quad n = 7 \]

MEASURE 5: Requesting bank guarantees and/or concern guarantees

not useful (1) - very useful (5)

- 

\[ \mu = 4.14, \quad n = 7 \]

MEASURE 6: Deferred payments / contribution of equity or corporate finance

not useful (1) - very useful (5)

- 

\[ \mu = 4.29, \quad n = 7 \]
MEASURE 7: Imposing penalties and/or bonuses
not useful (1) - very useful (5)

$\mu=4,14$
$n=7$

MEASURE 8: Attaching multiple assignments to one tender
not useful (1) - very useful (5)

$\mu=3,00$
$n=7$

MEASURE 9: Establishing an uniform DBMO standard contract
not useful (1) - very useful (5)

$\mu=4,86$
$n=7$
Appendix K: Dutch summary

Een empirisch onderzoek naar het ondervangen van het wegvallen van de F component in Nederlandse DBMO huisvestingsprojecten en de effecten daarvan op de meerwaarde

DBFMO contract structuur

In de Nederlandse bouwsector zijn afgelopen jaren talrijke nieuwe varianten van integrale contracten ontwikkeld, waarbij niet alleen het ontwerpen en bouwen, maar ook de andere fasen van de levenscyclus zijn gebundeld in één contract. Het traditionele UAV 2012 (voormalig 1989) model en het DBFMO model zijn twee uitersten, waarbinnen talloze combinaties mogelijk zijn. De afkorting DBFMO staat voor de Engelse benaming van de verschillende fasen van een project: Design (D), Build (B), Finance (F), Maintain (M) en Operate (O). In het DBFMO contract worden het ontwerp en de bouw samen met het onderhoud en de exploitatie, maar belangrijker nog, de financiering van een bouwproject gecombineerd. Kenmerkend voor DBFMO-contracten is dat de financiering van het project wordt gelegd bij de DBFMO-opdrachtnemer. In ruil daarvoor zal de opdrachtnemer van de opdrachtgever een periodieke vergoeding ontvangen gedurende de gehele looptijd van het contract. Omdat de opdrachtnemer niet wordt betaald voor de levering van het werk, maar slechts een maandelijkse vergoeding ontvangt voor de beschikbaarheid van het werk gedurende de looptijd van het contract, is voorfinanciering vereist om de activiteiten door de opdrachtnemer te laten uitvoeren. Voor de voorfinanciering wordt kapitaal aangetrokken door uitgifte van aandelen aan aandeelhouders. Echter, de aandeelhouders zijn vaak niet toereikend genoeg om de financiering volledig op zich te nemen en daarom zal de opdrachtnemer afspraken met externe financiers maken, die dan het grootste deel van de financiering zullen verstrekken. In de praktijk wordt een aanzienlijk deel (tot 92 procent) van de investering gefinancierd met geleend geld. De looptijd van een DBFMO contract is meestal rond de 20 tot 30 jaar. Zodra de looptijd van het contract is beëindigd, is de opdrachtnemer verplicht om het project in de afgesproken staat over te dragen aan de opdrachtgever. De rol van de opdrachtgever is beperkt in dit model. De opdrachtnemer stuurde de aannemer niet op basis van een reeks specifieke eisen, maar beperkt zich tot het formuleren van breed geformuleerde functionele criteria (output specificaties).

Meerwaarde potentieel

DBFMO is een belangrijk instrument van de overheid om meer kwaliteit voor minder geld te realiseren met betrekking tot grote publieke bouwprojecten. De belangrijkste reden dat DBFMO door de Rijksgebouwendienst wordt toegepast, is omdat men gelooft dat op deze wijze meerwaarde kan worden bereikt. De verwachting is dat DBFMO contracten meerwaarde op het gebied van tijd, geld en kwaliteit genereren in vergelijking tot andere contractvormen. Ook in de literatuur wordt DBFMO geprezen om haar meerwaarde in vergelijking met traditionele contracten. Er wordt o.a. verondersteld dat DBFMO projecten resulteren in betere prestaties, lagere kosten en meer innovatieve oplossingen. Andere waarde toevoegende factoren veelvuldig genoemd in literatuur zijn: lagere projectkosten; kortere bouwtijd; mogelijkheid tot het initiëren van projecten die anders niet zouden worden gerealiseerd; hogere algemene kwaliteit en; voordelen die voortvloeien uit het vrijlaten van de private sector in het bedenken van innovatieve oplossingen.
De F component

Specialisten menen vaak dat het succes van DBFMO deels kan worden toegeschreven aan de bijzondere rol van de component F in DBFMO. In tegenstelling tot andere vormen van geïntegreerde contracten die geleidelijk zijn geëvalueerd vanuit de traditionele UAV-2012 (1989) contract, is de DBFMO standaard volledig gegrondvest op de principes van projectfinanciering. Nogal anders dan alle andere vormen van geïntegreerde contracten is dat met DBFMO projecten een private partij en niet de overheid de financiering op zich neemt. Omdat de financiële component centraal staat in het DBFMO-contract, ontstaat er een geheel andere contractstructuur die zijn eigen kenmerken dienovereenkomstig heeft. Naast de eminente functie van de F component om het project op een bepaalde wijze te financieren, lijken er meerder functies verbonden te zijn aan de F. Zo wordt er gesuggereerd dat de F tevens gebruikt wordt om de opdrachtnemer tot goede prestaties te prikkelen. Maar zelfs als de financiële component bijdraagt aan het succes van DBFMO, is er een keerzijde aan de medaille. In de praktijk is geconstateerd dat de F component zijn zwakheden kent en dat deze tekortkomingen met toenemende mate ertoe hebben geleid dat de F component steeds vaker uit het contract wordt weggelaten, met name bij projecten van kleine(re) schaal.

Nieuwe bewegingen in de Nederlandse praktijk

Door de problemen rondom de F component, blijkt dat er in toenemende mate aandacht wordt besteed aan het verkennen van de alternatieven van projectfinanciering. Nieuwe vormen van geïntegreerde contracten worden ontwikkeld zonder de F component, maar die echter wel gericht zijn op het behouden van de voordelen van de F. Zo blijkt uit de praktijk dat in DBMO overeenkomsten steeds vaker aanvullende maatregelen worden ingebouwd om vergelijkbare prikkels als de F te creëren, waarbij tegelijkertijd getracht wordt de complicaties die de F normaal met zich meedraagt te vermijden. Terwijl nieuwe ervaringen uit de praktijk aantonen dat de F component steeds vaker wordt uitgesloten en dat aanvullende afspraken in DBMO overeenkomsten worden gemaakt om dezelfde meerwaarde te bereiken als met DBFMO, is het opgevallen dat de theoretische kennis nog ver achterloopt.

Het onderzoek

Met het oog op deze nieuwe bevindingen, is dit onderzoek gericht op het verkrijgen van een beter beeld van de mechanismen die ten grondslag liggen aan de rol van de F component in DBFMO en hoe de rol van de F component in DBMO zou kunnen worden opgebouwd zonder het daadwerkelijke gebruik van private financiering. Sinds de heersende opvatting lijkt te zijn dat de F component bijdraagt aan de meerwaarde van DBFMO, gaat dit onderzoek tevens dieper in op de vraag of dezelfde meerwaarde kan worden bereikt als de F component bewust achterwege gelaten wordt. Daarom luidt de hoofdvraag van dit onderzoek: "Welke maatregelen kunnen worden genomen om het wegvallen van de F component uit het Nederlandse DBFMO contract te ondervangen, en; welke gevolgen heeft dit op de meerwaarde van een project?"

I ROL VAN DE F COMPONENT

Beginstellen van projectfinanciering

DBFMO projecten maken gebruik van projectfinanciering. Projectfinanciering is een techniek die vaak gebruikt wordt om fondsen binnen te halen voor grote projecten, zoals infrastructuur, elektriciteitscentrales en andere vastgoedontwikkelingsprojecten. Projectfinanciering is gedefinieerd door Yescombe (2014) als een methode voor het
binnenhalen van langlopende leningen voor de financiering van grote projecten door middel van ‘financial engineering’ op basis van lenen tegen de kasstroom van het project. Kenmerkend voor projectfinancieringsstructuren is dat ze gebruik maken van hoge schulden, waarbij financiers geen garanties krijgen naast het recht om te worden terugbetaald uit de kasstromen afkomstig van het project. Het project wordt meestal uitgevoerd door middel van een ‘Special Purpose Vehicle’ (SPV), waarvan het project de enige business activiteit is. Een ander essentieel kenmerk van projectfinanciering is dat de financiering sterk afhankelijk is van de inkomsten uit de activiteiten van het project in de vorm van een vergoeding die pas beschikbaar wordt gesteld nadat het object opgeleverd is. Hierdoor is de opdrachtnemer pas in staat om zijn investering terug te verdienen gedurende de exploitatie van het object. De inkomstenstroom die wordt gegenereerd uit de exploitatie van het object staat daarom centraal binnen projectfinanciering.

Due diligence & monitoren
Omdat financiers weinig tot geen garanties krijgen dan het recht te worden betaald uit de inkomsten afkomstig van de operationele activiteiten van het project, kan men aannemen dat financiers een bijzondere belangstelling hebben voor de vraag of het project echt werkt en of uiteindelijk voldoende kasstromen gegenereerd zullen worden. In tegenstelling tot corporate kredietnemers, heeft een SPV geen zakelijk verleden om als basis voor de beslissing tot kredietverlening te dienen. Ondanks de extra risico’s verbonden aan de hoge schulden die inherent zijn aan projectfinanciering moeten financiers vertrouwen hebben dat ze zullen worden terugbetaald. Om de terugbetaling te garanderen, vereisen financiers adequate due diligence ten aanzien van de technische, financiële en juridische aspecten van het project en blijven ze het project monitoren gedurende de operationele fase.

Financiering en de DBFMO Overeenkomst
Hoewel een DBFMO contract structuur suggereert dat de financiering is geïntegreerd in het contract, is het DBFMO-contract géén financiële overeenkomst. De financiering zelf is verder geregeld door afzonderlijke contracten tussen de SPV en de financiers. Toch is het juist het financieringscomponent dat de relatie tussen de partijen in een DBFMO-contract in sommige opzichten zo anders maakt dan de relaties in andere vormen van bouw- en onderhoudscontracten. Omdat de financiering direct afhankelijk is van de inkomsten die worden gegenereerd uit het project, zullen de financiers hun eigen visie hebben op vrijwel alle contract componenten. Omdat de contractuele afspraken nogal complex zijn door de betrokkenheid van financiers, is er in Nederland een gestandaardiseerd DBFMO-contract ontwikkeld. Dit rijsbrede DBFMO standaard omvat alle regelingen en voorschriften die voortvloeien uit de integratie van projectfinanciering in het DBFMO-contract.

Aanwezigheid van projectfinanciering in de voorbereidingsfase
Al in de voorbereidingsfase kan de aanwezigheid van projectfinanciering worden opgemerkt. Tijdens het voorbereidingsfase worden diverse externe adviseurs bij het project gehaald door zowel de opdrachtnemer en de opdrachtgever als de financiers. Adviseurs kunnen immers een belangrijke rol spelen in de ontwikkeling van een project. De gehele structuur van het project moet voldoen aan de projectfinanciering eisen, waardoor de financieel adviseur moet anticiperen op alle problemen die zich kunnen voordoen tijdens de due diligence proces van de financiering, zodat alles juist in de contracten wordt opgenomen. Tijdens de aanbestedingsprocedure, worden de gegodigden verplicht om een financieel model in hun voorstel op te nemen, dat laat zien hoe ze bij hun eindbod zijn gekomen. Onmiddellijk na de bekendmaking van de winnende tender, zal de winnende partij worden verzocht om een (Financial Close) bankgarantie te stellen, die aangesproken kan worden.
wanneer de Financial Close niet op tijd wordt bereikt. Zodra de financiers, de opdrachtnemer en de opdrachtgever overeengekomen zijn dat het financieel model en de berekeningen erin het project en de contracten correct weerspiegelen, wordt de Financial Close gesloten.

**Aanwezigheid van projectfinanciering in de realisatiefase**

Het project staat niet stil na Financial Close, en de aanwezigheid van de financiers blijft voelbaar gedurende de realisatie van het object. Aangezien de meeste problemen zijn te verwachten tijdens de bouw, zullen financiers er alles aandoen om te zorgen dat er geen problemen ontstaan tijdens de bouw die de terugbetaling van de leningen in gevaar zullen brengen. Daarom wordt er zodra de bouw in volle gang is door de financiers een technische adviseur aangewezen die periodieke rapporten uitbrengt over de voortgang van de opdrachtnemer. Daarnaast houdt de technische adviseur toezicht op de bouw en stelt hij rapporten op over de (financiële) prestaties op regelmatige basis. Ook wordt er een uitvoeringsgarantie verlengd van de opdrachtnemer in deze fase. De uitvoeringsgarantie beschermt de opdrachtgever tegen de kans op gebreken van de opdrachtnemer in de vroege stadia van de bouw als het project nog niets waard is.

**Aanwezigheid van projectfinanciering in de exploitatiefase**

Tijdens de exploitatiefase, zal de financiering volledig worden terugbetaald door middel van een beschikbaarheidsvergoeding. De beschikbaarheidsvergoeding is een maandelijkse vergoeding voor de beschikbaarheid van het object gedurende de looptijd van het contract. De opdrachtgever doet alleen de betaling als de overeengekomen prestatie is geleverd. De vergoeding wordt gereduceerd in geval van niet-beschikbaarheid, en als de geleverde diensten niet conform de vereiste norm zijn. Ook de adviseurs van de financiers blijven monitoren en rapporteren over operationele prestaties en onderhoud. Dit komt omdat financiers er belang bij hebben dat de opdrachtnemer zich houdt aan het prestatieniveau dat is overeengekomen met de opdrachtgever. Dit is omdat slechte prestaties kunnen leiden tot boetes en kortingen op de beschikbaarheidsvergoeding, wat dan de terugbetaling van de schuld in gevaar zou kunnen brengen. De opdrachtnemer wordt tevens verzocht om een overdrachtsgarantie aan het einde van deze fase af te leveren. De overdrachtsgarantie is bedoeld om de opdrachtgever te beschermen tegen verzuim van de opdrachtnemer vlak voor het einde van het contract. Dit is omdat vlak voor het einde van de looptijd het grootste deel van de beschikbaarheidsvergoeding al betaald is en er dus weinig prikkels voor de opdrachtnemer overblijven voor het uitvoeren van de laatste onderhouds- en vervangingsactiviteiten.

**De drie functies van de F component**

Op basis van de analyse van projectfinanciering in de DBFMO levensfasen is de rol van de F component in DBFMO vertaald in drie samenhangende kernfuncties:

- **Financieel middel** Projectfinanciering in DBFMO impliceert dat één totaal budget wordt gebruikt voor het gehele project. De combinatie van één totaal budget, de uitwisselbaarheid van CAPEX en OPEX fondsen en breed geformuleerd output specificaties maken dat er een aanzienlijke mate van vrijheid voor de opdrachtnemer is om te beslissen over hoe hij het budget het best kan spenderen over de realisatie en exploitatie activiteiten. Door die ruimte aan de opdrachtnemer te bieden om het budget naar eigen vindingrijkheid te verdelen, wordt de F component een dierbare instrument om projecten te financieren.
- **Zekerheid voor de opdrachtgever** De zekerheden voor de opdrachtgever zijn nauw verbonden met de betrokkenheid van financiers in de activiteiten van het project. Dit komt omdat de belangen van de opdrachtgever en de financiers in een DBFMO project tot op zekere hoogte zijn gelijkgesteld. Niet alleen de financiers, maar ook de opdrachtgever profiteert van de due diligence en de toezicht van adviseurs op de activiteiten. Deze activiteiten, samen met het achterhouden van één zak met geld, de afgegeven bankgaranties, risico-overdracht en typische projectfinanciering structuur bieden sterke garanties jegens de opdrachtgever met betrekking tot het proper functioneren van het project.

- **Prestatieprikkel voor de opdrachtnemer** De beschikbaarheidsvergoeding verbindt de prestaties van de opdrachtnemer aan de betaling door de opdrachtgever. Het betalingsmechanisme in DBFMO projecten biedt ruimte voor boetes en kortingen in geval van onder prestaties. De opdrachtgever is toegestaan om een gereduceerde vergoeding te betalen in geval van onder presteren. Met het oog hierop, kan worden gezegd dat de betaling mechanisme werkt als een financiële prikkel voor de opdrachtnemer om te doen wat is vastgelegd in het contract.

Deze set van functies is gebruikt als houwast voor het empirisch onderzoek, waarin onderzocht is hoe deze functies zijn vervuld in DBMO projecten.

**II VERVANGENDE MAATREGELEN IN DBMO**

**DBMO contract structuur**

De DBMO structuur is relatief nieuw in Nederland en daarom is er nog vrij weinig ervaring opgedaan met deze contract structuur. De afkorting DBMO staat voor de Engelse benaming van de verschillende fasen van een project: Design (D), Build (B), Maintain (M) en Operate (O). Onder een DBMO contract is de DBMO opdrachtnemer niet alleen verantwoordelijk voor het ontwerp en de constructie als het geval is met Design & Build contracten, maar neemt ook de verantwoordelijkheid voor het onderhoud (M) en de exploitatie (O) nadat het object is gerealiseerd. In tegenstelling tot DBFMOs, die gebruik maken van de speciaal ontworpen rijksbrede DBFMO Overeenkomst, beschikken DBMOs niet over een eigen op maat gemaakt contract. In veel gevallen is een set van algemene voorwaarden van toepassing genaamd de UAV-GC 2005 voorwaarden. Het is echter niet per definitie dat de UAV-GC voorwaarden worden gebruikt; andere contractvormen zijn eveneens van toepassing. Onder de UAV-GC 2005 wordt de opdrachtnemer verantwoordelijk gesteld voor het gehele ontwerp, uitvoering en exploitatie proces, terwijl de opdrachtgever verplicht wordt gesteld de opdrachtnemer een bedrag te betalen zoals vermeld in het DBMO contract. Toch zijn de UAV-GC voorwaarden niet expliciet ontworpen voor DBMO projecten. Deze gelden immers ook voor Design & Build en DBM structuren. Aangezien de UAV-GC voorwaarden generaliserend van aard zijn, wordt er ruimte in het DBMO contract geboden om specifieke aanvullende maatregelen te doen.

**Het vervullen van de functie als financieel middel**

Twee DBMO casussen zijn geselecteerd voor het onderzoek naar hoe de rol van de F is vervuld in Nederlandse DBMO projecten. Kenmerkend van DBFMO projecten is dat er slechts één budget is om de CAPEX en OPEX te dekken. Vanwege het feit dat er slechts één budget, is er een aanzienlijke mate van vrijheid voor de opdrachtnemer om te beslissen hoe het budget gespendeerd dient te worden over de realisatie en exploitatie activiteiten. Dit wordt ook wel de uitwisselbaarheid van budgetten genoemd. Uitwisselbaarheid houdt in dat het budget voor de realisatie en het budget voor onderhoud en services uitwisselbaar zijn.
Hierdoor is er geen sprake van gescheiden budgetten voor CAPEX en OPEX. De uitwisselbaarheid van budgetten heeft voordelen boven het gebruik van afzonderlijke budgetten. Dit is omdat de tegengewogen bij het indienen van een bod worden gedwongen om rekening te houden met alle kosten die voortkomen gedurende de hele looptijd van het contract. Door de geïntegreerde aanpak kunnen levensduuroptimalisaties optreden. Echter hadden beide DBMO casussen (Integraal Kind Centrum Zeeburgereiland en de Brede School Joure) gescheiden budgetten voor CAPEX en OPEX. De scheiding van budgetten is te wijten aan het feit dat de kasstromen voor realisatie, onderhoud en exploitatie van school gerelateerde projecten in Nederland voortkomen uit verschillende instituties. Als gevolg daarvan was er nauwelijks uitwisselbaarheid van budgetten mogelijk in het Brede School project in Joure als in het Integraal Kind Centrum project op Zeeburgereiland.

Het vervullen van de functie als zekerheid voor de opdrachtgever
Net als in DBFMO projecten, zijn in beide DBMO casussen de risico's voornamelijk overgedragen aan de private sector. Kenmerkend voor beide casussen is dat het risico van kostenoverschrijdingen ligt bij het opdrachtnemer. De opdrachtgever maakt een bepaald budget beschikbaar en de opdrachtnemer is verantwoordelijk voor het realiseren van het project binnen dat budget. In géén van de casussen is officiële due diligence uitgevoerd. Toch zijn er een aantal handelingen die in zeer beperkte mate eenzelfde werking hebben als de due diligence uitgevoerd door adviseurs in DBFMO projecten. Aangezien er geen financiers betrokken zijn bij DBMO, zijn er logischerwijs ook geen monitoringsactiviteiten door adviseurs van financiers. In beide casussen voert de opdrachtnemer namens de opdrachtgever kwaliteitsenquêtes uit en legt deze vervolgens voor aan de opdrachtgever voor erkenning. In dit opzicht werkt het systeem van output specificaties gecombineerd met een prestatie meetstelsel hetzelfde als in DBFMO. Ook worden in beide casussen bankgaranties afgegeven om de opdrachtgever te beschermen tegen nalatigheid van de opdrachtnemer.

Het vervullen van de functie als prestatieprikkel voor de opdrachtnemer
In zowel het Integraal Kind Centrum Zeeburgereiland als de Brede School Joure, worden de investeringen in termijnen betaald volgens het betalingsschema opgesteld door de opdrachtnemer. Voor het Integraal Kind Centrum Zeeburgereiland worden de betalingen volgens een betalingsschema gedaan op basis van de werkelijke kosten van de DBM activiteiten. De Brede School Joure maakt echter gebruik van uitgestelde betalingen om de opdrachtnemer te stimuleren om goed prestaties te leveren tijdens de exploitatie. De uitgestelde betalingen worden vervolgens gespreid over de exploitatiefase. Voor de operationele uitgaven wordt in beide casussen gebruik gemaakt van een beschikbaarheidsvergoeding gedurende de looptijd van het contract. Omdat de beschikbaarheidsvergoeding in beide casussen alleen de operationele kosten dekt, is de periodeke vergoeding in de DBMO casussen veel kleiner dan de beschikbaarheidsvergoeding over het algemeen gebruikt in DBFMO projecten. Aangezien de omvang van de beschikbaarheidsvergoeding de mogelijkheid geeft om kortingen op te leggen, betekent een kleinere vergoeding impliciet dat de dreiging om te korten minder intens is. Hierdoor kan worden aangenomen dat de prestatieprikkel tenminste in DBMO minder krachtig zijn dan die in DBFMO.

Voorgestelde maatregelen
Op basis van het casusonderzoek zijn negen maatregelen aangedragen om het wegvallen van de F component in DBMO projecten te ondervangen. De eerste maatregel is om budgetten voor CAPEX en OPEX dichter bij elkaar te brengen (1). Een veel voorkomend probleem van DBMO projecten is dat de budgetten voor CAPEX en OPEX afkomstig zijn van
verschillende instellingen. Om uitwisselbaarheid van budgetten mogelijk te maken, zou de overheid een enkele instelling moeten benoemen, die kan schuiven in de OPEX en CAPEX begrotingen. Omdat de exploitatiefase doorgaans 20 tot 30 jaar duurt, kan het niet voldoen aan de prestatie-eisen grote gevolgen hebben. Om ervoor te zorgen dat de opdrachtgever krijgt wat hij wil, zouden belangrijke elementen van het gebouw voorgeschreven moeten worden in plaats van het benoemen van de prestaties (2). Aangezien er geen monitoring door financiers wordt geregeld in DBMO projecten, wordt de opdrachtgever aangeraden deze functie zelf te vervullen of externe partijen hiervoor aan te stellen. Daarom is het aan bevolen dat de opdrachtgever testen uitvoert tijdens het ontwerpproces en op de datum van oplevering (3). In DBMO projecten vormt een vaste beschikbaarheidsvergoeding vaak een risico voor de opdrachtgever. Dit is omdat onder een vaste jaarlijkse beschikbaarheidsvergoeding de vervangingsinvesteringen vooruit worden betaald. Dit risico kan worden gereduceerd door te eisen dat de betalingen pas gedaan worden nadat de feitelijke werkzaamheden zijn uitgevoerd (4). De vijfde maatregel, wat bijdraagt aan het zekerheid van de opdrachtgever, is de uitgifte van bankgaranties en/of concerngaranties (5). De zesde maatregel is het achterhouden van eenmalige betalingen en de inbreng van eigen vermogen (6). Hierdoor worden financiële prikkels gecreëerd voor de opdrachtnemer om het gebouw in de afgesproken staat op te leveren en de beschikbaarheid gedurende de looptijd van het contract te garanderen. Ook het opleggen van een kortingen en bonussen systeem (7) zal de opdrachtnemer tot goede prestaties prikkelen. Acht, door meerdere projecten met hetzelfde concept te koppelen aan één tender, kunnen aanzienlijke kosten worden bespaard in de voorbereiding. Bovendien, als er slechts één aanbestedingsprocedure is voor meerdere projecten (8), zullen de gegadigden geprikkeld worden om hun beste bod uit te brengen, aangezien het winnen van de tender tevens werk en inkomens op langer termijn inhoudt. Tenslotte, de vervulling van contractueel overeengekomen prestaties kunnen wettelijk worden afgedwongen door het ontwikkelen van een uniforme DBMO standaard (9).

### III EFFECTEN OP DE MEERWAARDE

**Meerwaarde in de Nederlandse bouwsector**

Omdat de F component niet alleen een financiële middel is, maar tegelijkertijd een zekerheid jegens de opdrachtgever evenals een stimulans voor de opdrachtnemer om goede prestatie te leveren, wordt dikwijls gedacht dat de integratie van de F component ware doet voegt aan een project. Meerwaarde is een uitdrukking veelvuldig gebruikt in uiteenlopende disciplines en sectoren. In deze thesis wordt meerwaarde in de breedste zin gedefinieerd als *het netto effect van het toevoegen van functies aan een basis lijn of model*, waarvan de prestatie van de acties de totale waarde van de goederen en/of diensten verhoogt, rekening houdende met de verschillende waarde percepties van de betrokken actoren. De Rijksgebouwdienst gebruikt echter de term meerwaarde om het verschil tussen het traditieel contract model en het bod door de private partij aan te duiden.

**De geselecteerde criteria**

Technisch gezien kunnen de effecten die uiteindelijk resulteren in meerwaarde worden gemeten met behulp van een aantal criteria. Diverse criteria kunnen gebruikt worden om de effecten van diverse contractmodellen te meten. Aangezien de Rijksgebouwdienst gelooft dat DBFMO in vergelijking tot andere contractvormen meerwaarde kan genereren in termen van kosten, tijd en kwaliteit, wordt in dit proefschrift gebruikgemaakt van de kosten-tijd-kwaliteit-driedeling als onderbouwing voor de selectie van de criteria. Op basis van de kosten-tijd-kwaliteit-driedeling zijn twaalf criteria geselecteerd die op een bepaalde manier...
gelinkt zijn aan de F component in DBFMO. De twaalf criteria zijn vervolgens gebruikt om de effecten van twee DBFMO en twee DBMO casussen te meten met als doel het onderzoeken van wat de gevolgen van het wegvallen van de F component zijn op de meerwaarde van een project.

**Effecten op de kostencriteria**

Door de effecten van de DBFMO casussen onderling te vergelijken met de effecten van de DBMO casussen is gebleken dat DBFMO projecten aanzienlijk hogere transactiekosten (1) hadden dan de DBMO projecten. Met betrekking tot de financieringskosten (2) is geconstateerd dat de gewogen gemiddelde vermogensvoet (WACC) van beide DBFMO gevallen hoger was dan de rentevoet, waartegen de gemeenten in de twee DBMO gevallen leenden. Uit het casusonderzoek is ook gebleken dat meer levensduuroptimalisaties met betrekking tot de realisatie en exploitatie kosten (3) optraden in de DBFMO gevallen. Met betrekking tot prijszekerheid (4) scoorden zowel de DBFMO casussen als de DBMO casussen hoog. Alle geïnterviewde experts gaven aan dat er geen budgetoverschrijdingen waren met betrekking tot de geselecteerde casussen. Dit heeft te maken met het feit dat het DBMO contract evenals het DBFMO contract ‘fixed price contracts’ zijn.

**Effecten op de tijdcriteria**

Uit het onderzoek bleek dat het moeilijk was om de voorbereidingsduur (5) van de casussen onderling te vergelijken. Dit kwam omdat er tevens andere factoren zijn die invloed uitoefenen op de voorbereidingstijd. Zo heeft het politieke besluitvormingsproces in de Brede School Joure project de voortgang van de voorbereiding van het project aanzienlijk belemmerd. Daarnaast bleek ook dat de complexiteit en detailniveau van de output particularities invloed hebben op de duur van de aanbestedingsprocedure. Met betrekking tot de bouw (6), gaf de meerderheid van de geïnterviewde experts aan dat in zowel de DBFMO als de DBMO casussen de doorlooptijd van de bouw korter was dan wanneer het project traditioneel zou zijn aanbesteed. Ook geloofden alle geïnterviewde experts dat tijdsoverschrijdingen (7) korter van duur zijn onder DBFMO en DBMO contract structuren dan onder traditionele contracten. Echter bleek uit het case studie onderzoek wel dat kleine tijdsoverschrijdingen nog steeds mogelijk waren onder DBMO en daarom werd geconstateerd dat de kans op tijdsoverschrijdingen iets hoger was onder DBMO dan onder DBFMO.

**Effecten op de kwaliteitscriteria**

Zowel de DBMO als de DBMO casussen scoorden hoog op de criteria proceskwaliteit (8) en de kwaliteit van het object (9). De kwaliteit van de dienstverlening (10) kreeg echter een lagere score in de DBFMO casussen. Met betrekking tot innovatieve oplossingen, kan er een onderscheid gemaakt worden tussen technologische innovaties en procesinnovaties. Technologische innovaties kunnen vervolgens worden opgesplitst in onbewezen en bewezen innovaties. De geïnterviewde experts verklaarden dat onbewezen technologische innovaties nauwelijks voorkwamen in de DBFMO en DBMO casussen, terwijl bewezen technologische innovaties zich wel voordeden. Wat betreft procesinnovaties, zowel de DBFMO als de DBMO casussen werden geprezen om de hoeveelheid procesinnovaties. Eén van de experts noemde deze innovaties slim-denken innovaties, terwijl een ander sprak over creativiteit binnen het proces. Uit het casus onderzoek bleek dat innovatief denken (11) ook sterk afhankelijk is van de gunningscriteria. De gunningscriteria voor het Integraal Kind Centrum Zeeburgereiland, bijvoorbeeld, boden voldoende ruimte voor innovatief denken en dit is direct terug te zien in een hoge score. Ten aanzien van de flexibiliteit van het contract (12)
zijn de meningen van de experts verdeeld en daarom was het niet mogelijk om gegeneraliseerde conclusies te trekken op basis van slechts het casestudie onderzoek.

Gevolgen op de meerwaarde
Op basis van de analyse, zijn er vijf gevolgen te identificeren van het wegvallen van de F component op de meerwaarde.

- **Transactiekostenbesparing** Het onderzoek toont aan dat DBFMO projecten hogere transactiekosten hebben in vergelijking tot DBMO projecten. Transactiekosten stijgen wanneer financiers bij het project betrokken worden. Daardoor kunnen er aanzienlijke (transactie)kosten worden bespaard als de F component weglaten wordt uit het geïntegreerd bouwcontract.

- **Financiële kostenbesparing** De kosten van projectfinanciering zijn doorgaans hoger dan de kosten van overheidsleningen. Dit komt omdat bij projectfinanciering de risico’s expliciet zijn opgenomen in de prijs van de lening, terwijl dit niet gebeurt bij overheidsleningen. De hogere financiële kosten onder DBFMO kunnen worden gezien als een beloning voor de private partijen voor het dragen van deze risico’s. Daarnaast zijn de financiële kosten van DBFMO hoger omdat projectfinanciering in het algemeen op basis van beperkt of zelfs geen regresrecht is, wat betekent dat financiers alleen het recht hebben op terugbetaling van de kasstromen afkomstig van het project en niet van andere activa van de kredietnemer. Hierdoor wordt er een risico premie gerekend.

- **Afname van levensduuroptimalisaties** Het onderzoek toont aan dat meer levensduuroptimalisaties worden behaald in DBFMO projecten dan in DBMO projecten. Er worden verschillende redenen aangedragen waarom meer levensduuroptimalisaties worden gerealiseerd onder DBFMO contracting. Ten eerste lijkt het erop dat meer levensduuroptimalisaties worden geïnduceerd als de opdrachtnemer vrij is om het budget tussen CAPEX en OPEX te besteden. Gezien het feit dat DBMO projecten vaak aparte budgetten hanteren, terwijl DBFMO projecten juist gebruikmaken van één overkoepelende begroting, wordt er verwacht dat het gebruik van één overkoepelende begroting een positief effect heeft op de mate waarin levensduuroptimalisaties worden gerealiseerd. Daarnaast blijkt uit het onderzoek dat de mate waarin levensduur-optimalisaties worden waargemaakt, tevens afhangt van de vakbekwaamheid van de opdrachtnemer, de concurrentie op de markt, en de aard van de gunningscriteria.

- **Verhoogde kans op tijdoverschrijdingen** Hoewel tijdoverschrijdingen nauwelijks voorkomen bij DBFMO en DBMO projecten, blijkt uit het onderzoek dat de kans op tijdoverschrijdingen net iets hoger is onder DBMO. Dit komt omdat de prikkels om het project op tijd op te leveren minder hard zijn onder DBMO contracting. Omdat de beschikbaarheidsvergoeding hoger is in DBFMO projecten, is de dreiging die van het penalty systeem afkomt ook sterker in DBFMO.

- **Verbeterde servicekwaliteit** De case studies tonen aan dat het kwaliteitsniveau van de dienstverlening hoger is onder DBMO dan onder DBFMO. Er is een logische verklaring waarom de dienstverlening minder hoog scoort onder DBFMO. Dit heeft te maken met de aanwezigheid van financiers in de activiteiten van het project. Omdat het primaire doel van financiers is om hun lening terug te verdienen, is het begrijpelijk dat financiers er alles aandoen om te zorgen dat de vereiste kwaliteit van de dienstverlening wordt voldaan, maar ook niet meer dan. Dit is in tegenstelling tot DBMO projecten waarbij de aannemer zelf bepaalt of hij het kwaliteitsniveau - vastgelegd in de minimale eisen - overschrijdt of niet. Een DBMO aannemer zou bijvoorbeeld kunnen besluiten om een hoger service niveau te bieden om zijn bekwaamheid aan de buitenwereld te laten zien, in de hoop om volgende projecten binnen te halen.
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