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DETAILED PERFORMANCE MONITORING FRAMEWORK FOR CONSTRUCTION PROJECT FINANCIERS

by
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AN ABSTRACT OF THE THESIS OF

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Project financiers have traditionally dealt with the large amount of risks perceived in construction lending by transferring them via contracts to other parties. However, since the credit-worthiness of a project is based on its forecasted cash flow instead of the securities used to mitigate its perceived risks, financiers would greatly benefit from being more involved in the process of project performance monitoring. This thesis aims at producing a detailed performance monitoring framework for private sector construction project financiers that will allow them to have a proactive approach to evaluating, monitoring, and mitigating the risks of the projects they fund rather than assuming a passive one.

A unified project performance monitoring framework developed earlier by Choucair (2007) has been detailed, drawing on the project appraisal and monitoring guidelines of international and regional financiers, experienced consultants, and project management best practices. Process maps are detailed for the *Unified Due Diligence* and *Implementation-Monitoring* processes to a level that allows them to be actionable. Interdependencies which may exist between these two processes are explored in depth. Finally, suggestions for future work are made, including the final verification of the framework.

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To My
Beloved Family

CHAPTER 1

INTRODUCTION

1.1. Background

Financing refers to providing the financial resources available to make a project or an initiative possible. Project-based debt financing is a specific type of financing in which an entity is funded to deliver a particular project or event. Within the construction industry, project owners and real estate developers rely on project-based debt financing for the majority of their developments. Fund providers or financiers invest in credit-worthy projects principally for the future financial or economic benefits these provide. Financiers are interested in a project based on its expected cash flow generation and ability to service its debt. Collaterals are risk aversion tools usually required as a security, yet these only provide a guarantee in case of the project defaulting; they are not the financiers' main interest. Consequently, financiers would benefit more from adopting a proactive approach to evaluating, monitoring, and mitigating the risks of the projects they fund rather than assuming a passive one.

For a project to succeed, careful initial planning is a requisite. However, if the implementation of the proposed plan is not monitored to take necessary action whenever factors affecting the original assumptions emerge, even the most well planned project has a chance of failure. Adequate performance monitoring is therefore a key factor of project success. During the performance monitoring phase, and whenever changes affecting the original assumptions surface, proactive financiers have an obligation to intervene and have a range of actions to be taken in response to changes: from taking no action in the face of minor changes to giving a notice of default to their borrowers when

confronted with large deviations. Notwithstanding the severity of the action taken, a choice could mean the difference between project success and failure.

Selecting worthy projects is no simple task as a loan or financing decision carries substantial risks. The decision to fund a project in its simplest form is a valuation exercise for a project and its future cash flow (Lowell 1992). Therefore the decision to grant a loan is related to the financial input and output of the project as well as the timing of each. In order to value a project, these components need to be accurately defined and projected. In a proactive approach to financing, these components also need to be monitored during implementation and intervened with, if necessary. In the construction process, these components translate into 1) funds dispersed into the project, 2) revenues generated from the venture, and 3) the timing these funds or revenues are going to be input or output. Among many, the component of revenue is affected by other variables such as the *scope* of the project and its *quality* at completion. The times of financial input and output are affected by many variables, such as agreements of duration for the project, terms of fund drawdown, and any delays to the project completion. Many financial institutions realize the importance of due evaluation and proactive monitoring of projects and have integrated these procedures into their financing activities.

Examples of financial institutions that adopt a pro-active attitude to financing risks are the World Bank (WB) (Bank Procedures… 2001), the Europe Investment Bank (EIB) (The Project Cycle… 2001), the Kuwait Fund (KF) (Kuwait Fund… 2005), and the International Financial Corporation (IFC) (Investment Guidelines 2007). These institutions provide specific guidelines for the development of the projects they fund. Each, through its developed methods, uses monitoring and evaluation tools as part of its performance monitoring activities. Governments of countries have also been giving the

project performance issue considerable attention. For instance, the Office of Government Commerce (OGC) in the UK has developed the Achieving Excellence in Construction Procurement Guide, providing guidance in dealing with issues of monitoring over the project lifecycle (Improving performance 2003).

According to Choucair's work (2007), private sector financiers and project owners traditionally have dealt with risks passively by contractually transferring them to third parties such as contractors or insurance companies (Abdul-Malak 2001). Choucair contends that this passive solution is not optimal and could result in project failure if the party ultimately required to assume the risk is neither able to control nor mitigate it. The consequences, she argues, range from owner default to repay the loan to lengthy disputes and litigation. She clarifies that using the facility as collateral is also not very effective since a project that costs more to build due to design or construction problems will have a market price equal to that of an on budget project (Lowell 1992) It follows that these financiers may benefit greatly from adopting a proactive rather than a passive transfer approach to project evaluation and monitoring, and to mitigating risks. This is accomplishable by making use of investment and project management best practices.

Choucair's research aimed to help lenders of the private sector use this proactive method in evaluating projects and monitoring their performance using project management tools and techniques. She says that since no project can be implemented without the proper funding, involving lenders early on in the process will help them discover problems, allowing them to set up mitigation plans before the borrower fails to deliver the project. The product of her work is a *Unified Project Monitoring Framework* that does just that.

1.2. Scope of Work

Choucair's *Unified Project Monitoring Framework* is based on the information she gathered about how successful financial institutions manage their loans and how project management tools are applied to provide for this success. Her framework devised three primary processes: a *Unified Due Diligence*, *Implementation-Monitoring*, and *Completion Certification* process. Due Diligence is the process of project Appraisal and loan negotiation. It also sets the baseline for the succeeding activity of project monitoring. Project implementation is concerned with what is to be done to monitor project performance for construction financiers until project completion. Project completion certification, the final process on which Choucair focuses, is when the financier verifies that the completion as defined in the project contracts has been achieved and that the overall performance was within acceptable tolerances. Choucair has given more attention to the Due Diligence part, what she correctly defines as the more important process in her *Unified Project Monitoring Framework*. She has also proposed some future work such as framework verification.

In order for Choucair's *Unified Project Monitoring Framework* to be ready for verification, detailing some parts of the processes of *Unified Due Diligence* and *Unified Implementation-Monitoring* are necessary prerequisite sets. In this thesis, we propose to develop and detail these processes, preparing the framework for its final test of verification.

1.3. Methodology of Research

In order to assess the need for this thesis, the current practices of financiers needed evaluation. A first step towards this evaluation was conducting interviews with a mix of local, regional, international, and multilateral financial institutes with the aim of

assessing their current practices. A semi-formal questionnaire was developed to test the procedure these financial institutes follow during project Appraisal and performance monitoring and their proactivness in evaluating, monitoring, and mitigating the risks of the projects they fund. The questions asked were in 2 main categories and 4 subcategories:

- Appraisal
    - Level of detail in risk identification and assessment
    - Form of risk response
- Performance monitoring
    - Progress reporting and assessment
    - Range of action by financier

Five leading private sector financial institutes were selected as case studies based on their presence in the banking sector, regionally and globally, as well as their involvement in projects in the local markets they have representation in. These banks have been named Bank 1 to 5 in the below table in order to maintain confidentiality. The interviewees were a Sr. Credit Manager from a local bank in Lebanon, a Senior Relationship Manager from another local bank in Lebanon, the Country Manager of Corporate Banking an International Bank, an Associate Investment Officer from a multilateral financial institute (those that involve multiple nations acting together), and a Senior Financial Management Analyst from another multilateral financial institute.

The information collected from the interviews was used to compare the procedures of the interviewed financial institutes. Their comments can be summarized as follows:

Table 1.1. Responses to semiformal interviews with financial institutes

	Level of detail in Risk Identification and Assessment	Form of Risk Response	Progress Reporting and Assessment	Range of Action by Financiers
Bank 1	Low	Securities	Low	Small
Bank 2	Low	Securities	Low	Small
Bank 3	Medium	Securities	Low	Small
Bank 4	High	Risk Response Plan, Interim Monitoring, Securities	High	Large
Bank 5	High	Risk Response Plan, Interim Monitoring, Securities	High	Large

Designations of low to high or small to large have been used to summarize the responses recorder. A designation of low in "Level of detail in risk identification and assessment" was reserved for financial institutes that identify risks based only on their industries and sponsors, ignoring project specific risks. A low level of "risk identification" showed high correlation with limited "risk response," as shown in the third column of the table. The same was true for "progress reporting," where a designation of low meant financiers attached little importance to reviewing and analyzing progress reports. Consequently, this meant the financier had a small range of actions in the face of impending risks.

The analysis of these responses verified that practices among financial institutes differ based on their sophistication. The above table shows a large difference in practices of banks 1 to 3, and banks 4 and 5. Banks 1 to 3 are local and international private banks while banks 4 and 5 are multilateral financial institutions. It follows that less sophisticated private sector banks are less proactive in evaluating, monitoring, and mitigating the risks of the projects they fund in comparison to their multilateral counterparts. The former stressed that sponsor assessment was the most important factor in evaluating credit-worthiness of their investments, not project cash flows. They also

explained that demanding collateral securities were their main response to project risks. And while they specified reporting requirements from their borrowers during performance monitoring, they reserved action to the server case of an events of default (section 3.5.4.1.). On the other hand, the multilateral financial institutes had a detailed framework for risk identification and assessment, and a detailed risk response plan produced during project Appraisal. They also had a defined performance monitoring procedure that specified in detail the interim reporting requirements to be submitted by the borrower, as well as the actions available in the face of deviation from planned baselines.

The results produced from this semi-formal survey of the above-mentioned financial institutes indicates a need for *Performance Monitoring for Construction Project Financier* that will allow financier of the private sector to adopt a proactive approach to evaluating, monitoring, and mitigating the risks of the projects they fund rather than to assume a passive one. This will be further investigated in this thesis' literature review.

The literature on construction project Appraisal and performance monitoring will be closely studied to identify what aspects are of interest to financiers, and what reporting is required from the borrower at each stage of the project lifecycle to monitor these performance measures (Cheung 2004).

According to Choucair's (2007) *Unified Project Monitoring Framework*, the *Due Diligence* process involves 6 major steps taken to appraise a project:

- Gathering inputs and forming Appraisal team
- Reviewing and analyzing gathered information
- Identifying risks
- Analyzing risks, both quantitatively and qualitatively

- Determining risk response
- Compiling Report and Drafting Financing/Loan Agreement

These steps will be detailed as necessary to develop an actionable Due Diligence process.

This is then followed by the *Unified Implementation-Monitoring* (Choucair 2007) process, which involves 5 major steps:

- Accessing Project Status/ Progress
- Analyzing Variances & Changes to project variables (*scope, cost, time, quality*, and *expected revenue*)
- Re-evaluating Risk
- Updating Cash Flow Sensitivity Analysis
- Report Compilation and Action by Financier

These steps will also be detailed in order to produce a complete *Implementation-Monitoring* process that is ready for verification.

The possible options of the financier towards the owner will also be identified. These options range from no action to the last resort of giving notice of an event of default and accelerating loan repayment, depending on the significance of the analyzed project variances. While a financier can take action against a borrower anytime until full repayment, the financier has the most power before its final disbursement of funds. This has a direct effect on the leverage a financier has during the project life cycle. In this range of options, risk flags or triggers (section 3.5.4.3) will be identified with possible corresponding actions to be taken by the financier (section 3.5.4.2).

In order to identify these risk triggers, several Due Diligence processes will need to be developed. A contractual baseline (section 3.2.7.) for monitoring risk variables will be established and used as a basis for comparison during the analysis of

variances and re-evaluation of risks. It is thus reasonable to expect the majority of the work of the financiers to be during the Due Diligence phase of the process where as the *Implementation-Monitoring* phase will serve as a reiteration of some of the processes of Due Diligence.

CHAPTER 2

LITERATURE REVIEW

2.1. The Project Cycle vs. the Finance Cycle

Since this thesis is concerned with project financing form the financier's point of view, the project cycles from operational and financial perspectives need to be interrelated and explained. These two cycles move in juxtaposition, especially if the financier is brought on board a project at an early stage. The following description of both cycles will illustrate how they progress in parallel.

2.1.1. The Project Cycle

The project cycle from an operational point of view broadly consists of the following five phases: Pre-Project Planning, Design, Bidding, Construction, and Operation phases. This section will provide detailed information about each.

2.1.1.1. Pre-project Planning

According to the Construction Industry Institute, Pre-Project Planning is defined as a "process by which owners gather enough information to address project risks and decide if a decision to commit resources to a particular project will be made." Other designations for Pre-Project Planning include Feasibility Analysis, Conceptual Planning and Front-End Planning (Gibson 1995).

During this phase the technical, environmental, financial, and economic feasibility aspects of the project are considered. Alternatives for project site, scope, and technology may be assessed. These are then evaluated based on project objectives and

constraints. The option presenting the largest number of advantages for the owner's business is selected for further study. This involves further identifying and analyzing the business, project, environmental and operational risks, defining the scope, design criteria, execution approach, and control guidelines for the selected alternative and documenting the findings in what is called the Project Definition Package (Gibson 1995).

The financial feasibility conducted during Pre-Project Planning produces a Validated Project Budget. The technical feasibility is the first evaluation of the project's procurement approach (design-build, build-operate-transfer, etc.), the facility program (functional divisions, e.g., number of guest rooms in a hotel), and an overall project time schedule. The topographical survey, existing buildings, geotechnical reports and existing utilities are compiled as well. These details are drafted by the owner or sponsor of a project into a Development Proposal to introduce financiers to the project. Other terms such as Investment Proposal or Information/Offering Memorandum also refer to this project introduction. All outputs from this phase are used as inputs in the following phase (Gibson 1995).

2.1.1.2. Design

The American Institute of Architects breaks down the Design Phase into three consecutive stages separated by review periods, namely the Schematic Design, the Design Development, and the Construction Documents stages.

2.1.1.2.1. Schematic Design Stage

During Schematic Design, the project's scale is adjusted as required and the relationship between the various functions as documented in the facility program is

examined. Preliminary engineering, such as basic sizing and systems identification, is performed. The products of this Schematic Design stage are submitted for the client's review. These include: a site plan with an urban context analysis, diagrammatic sections, preliminary perspectives and study models, preliminary drawings and reports for structural, mechanical and electrical systems, telecommunications report, permits and approvals needed, typical and roof plans, elevations, area volume statistics, principle interior finishes, room name and number systems reports, updated cost estimate and schedule, equipments and furnishings preliminary schedules, assumptions and design criteria as spelled out in the project definition package, and codes and regulations used as a basis for the preliminary design (Choucair 2007).

The *cost* estimate at this stage could be a monetary value per square meter or project unit (e.g., cost per hospital bed), aggregated by function or system or a combination. The estimate should be comprehensive and realistic given the project's complexity and type. The owner reviews this estimate along with all the Schematic Design deliverables.

2.1.1.2.2. Design Development Stage

During this stage detailed design is launched in each trade, while accounting for the owner's feedback on the Schematic Design. The specifications for major materials and systems are developed. Contractor pre-qualification may start as well. The Design Development stage deliverables include: plans, sections and elevations, outline specifications and bills of quantity, design calculations, cost estimate, and schedule update (Abdul-Malak 2007).

A second major owner review cycle follows to evaluate the Design Development deliverables. The cost estimate at this stage is more detailed than

Schematic Design. The design is 80% complete and crude specifications and bill of quantity (BOQ) exist making the cost estimation process more accurate (Abdul-Malak 2007).

2.1.1.2.3. Construction Documents Stage

This is the last stage where the design is detailed for construction purposes. A high level of coordination is needed to ensure the resulting execution drawings and tender documents are consistent and free from errors and omissions (Abdul-Malak 2007). Construction Documents deliverables include: final drawings and calculations for all disciplines, final BOQ's for all disciplines, final specifications for all disciplines, priced BOQ's, conditions of the contract, final soil investigation report, and final topographic survey (Choucair 2007).

The owner reviews the deliverables to ensure construction and tender documents produced are satisfactory. The cost estimate derived at this stage is what is known as the Engineer's Estimate. This estimate is the aggregation of priced BOQ items, based on detailed specifications and execution drawings, as conducted by the Project Engineer.

2.1.1.3. Bidding

Once the design is complete, contractors may be invited to bid on the project. In most large projects, only pre-qualified contractors are allowed to participate. Bids are evaluated and a Notice to Proceed is issued to the elected contractor.

2.1.1.4. Construction

This phase starts with the issuance of the Notice to Proceed and ends with

Substantial Completion. Substantial Completion entails the point in time where the works have essentially been completed, and only a punch list needs to be attended to. This milestone marks the start of the Defects Liability period where the contractor is responsible to rectify any defects seen as such by the Owner/Engineer. At the end of the defects liability period, the contractor's Retention amount is released and its Performance Bond returned.

2.1.1.5. Operation

Operation begins with Substantial Completion and continues until the facility is sold or salvaged. If the project at hand is a development project, sales start concurrently with construction. Otherwise, it is during Operation that the project starts generating income. Whether the project is sold or generates income otherwise, project success primarily depends on its revenue above its cost of capital.

2.1.2. The Owner's Project Finance Cycle

After the aforementioned review of the Project Cycle, the Owner's Project Financing Cycle is presented based on the practices of major financing institutions such as those of the WB, EIB, KF, IFC, and as proposed in Choucair's work (2007). Based on the aforementioned, the *Finance Cycle* could be divided into the following phases: The Screening for Eligibility, Preliminary Review, Due Diligence, Negotiation, Financial Close, Drawdown, and Completion phases. This section will provide detailed information about each.

2.1.2.1. Screening for Eligibility

At this phase, project eligibility for funding is assessed. This phase starts with

the borrower presenting a feasibility study to the financier, and ends either by the financier dismissing this project, or by showing interest in pricing this venture by issuing a Letter of Intent. At the WB, this phase is replaced by the Identification and Preparation phases where the project is tailored to the requirements of both the borrowing country and the WB (Bank Procedures 2001). At the EIB this phase is titled Initial Examination, to determine whether the proposed project complies with the EIB's fundamental lending criteria (The project cycle… 2001). The KF puts all projects before their execution starts under Pipeline status. Their screening for eligibility ends with a Preliminary Approval (Kuwait Fund… 2005). The IFC names this phase the Project Early Review (Operational Procedures… 2010).

2.1.2.2. Preliminary Review

After the Screening for Eligibility phase ends and the Letter of Intent is issued, the owner usually launches Schematic Design. At the completion of Schematic Design, a preliminary review of documents begins, sometimes complemented by a site visit. The purpose of this phase is for the financier to price the financing and present preliminary conditions or Indicative Terms for lending. This information is compiled in the Commitment Letter or Mandate Letter, which serves as an outline for the drafting of the Financing Agreement at a later stage. This phase marks the Beginning of the Appraisal phase as named by the WB, EIB, KF and the IFC.

2.1.2.3. Due Diligence

After Preliminary Review of a project and the issuance of a Commitment Letter, The owner launches the Design Development stage. The Design Development deliverables, along with owner developed contractor pre-qualification criteria are then

passed on to the financier. The project then undertakes a thorough Appraisal based on more detailed and updated project information in order to reach a final price and set of lending conditions. Although the terms of the Commitment Letter are not final and binding, they still constitute a constraint since they are the terms that won the borrower's interest. To the WB, the EIB, KF and the IFC this phase constitutes the final part of the Appraisal phase. The Due Diligence phase is followed by some negotiation and finally ends with the production of a final Financing Agreement or Loan Agreement document.

2.1.2.4. Negotiation

In this phase the terms and conditions of a draft Financing Agreement document are negotiated to reach a final signed agreement. The debt to equity ratio, repayment schedules, lender fees, interest rates, the extent of lender control on the project company's cash flow, prepayment provisions, lender's security, conditions precedent, representations and warranties, covenants, events of default and their enforcement are among the issues considered during negotiation (Yescombe 2002). At the WB and the IFC, this is when the approval of the Board of Directors is sought in order to proceed with the next phases (Bank Procedures 2001; Operational Procedures… 2010).

2.1.2.5. Financial Close

This is the phase where funds become ready for withdrawal. However, the signature of the Financing Agreement alone does not make the funds available for disbursement. The loan agreement typically contains a set of Conditions Precedent and Covenants the borrower has to meet before reaching Financial Close. Conditions

Precedent and Covenants include items such as revision of Tender Documents as per financier recommendations, submission of selected contractors' credentials, bid price being in conformance with the project's cost estimate or within a certain margin from it, and submission of progress and completion reports (Hoffman 1997). Financial Close to the WB, the EIB, the KF, and the IFC is the final approval necessary before project funds are available for disbursement.

2.1.2.6. Drawdown

Drawdown does not begin until Financial Close is completed, which signals the beginning of the project *Implementation-Monitoring* period. Drawdown is initiated by the borrower who submits a formal interim Draw Request stating the amount required. Sometimes the contractor's payment request certified by the supervising engineer should be attached to this draw request is submitted on a monthly basis. A comparison of the interim and cumulative *cost* figures with the baseline budget, and proof that enough funds exist to complete the project should also be included. The borrower also needs to state that he remains in compliance with all Conditions Precedent and Covenants. The financier then reviews these submittals and decides whether to authorize the Drawdown or not. This is repeated until Completion (Yescombe 2002).

2.1.2.7. Completion

Construction Substantial Completion is the first completion instance in various project Financing Agreements. It can be considered as the milestone marking the beginning of the Completion phase. However, the end of this phase varies from a project and borrower to another. For some projects where particular project performance criteria are expected, completion could be that point in time during project Operation

where such performance levels are reached. For development projects where sales start in parallel with construction the breakeven between construction costs and sales revenues may be reached before the end of the loan term. In this case, the borrower may decide to foreclose the loan. On the other hand, Completion for projects needing additional long-term financing for operation expenses may be reached upon Financial Close of the long-term financing contract.

2.1.3. Relating the Project Cycle and Finance Cycle

In this section, the interrelation between the Project Cycle with the Finance Cycle will be given in detail based on the constraints of both cycles as presented in the work of Choucair as shown in Figure 2.1 (Choucair 2007).

2.1.3.1. Cycle Interdependencies Prior to Financial Close

When examining both the Project Cycle and the Finance Cycle, one will find that they are strongly interrelated. The cycles are dependent on each other for inputs to proceed with subsequent phases. For example, deliverables output from Project Cycle phases are required as input to some Finance Cycle phases. The owner's decision to launch particular Project Cycle phases may also be dependent on proof of financier commitment mainly when this owner is not willing to take the risk of incurring design costs for a project that may not be given the go-ahead due to insufficient funding. This dependency between the phases places constraints on when these phases can be launched. The following explanation will shed light on some of these constraints.

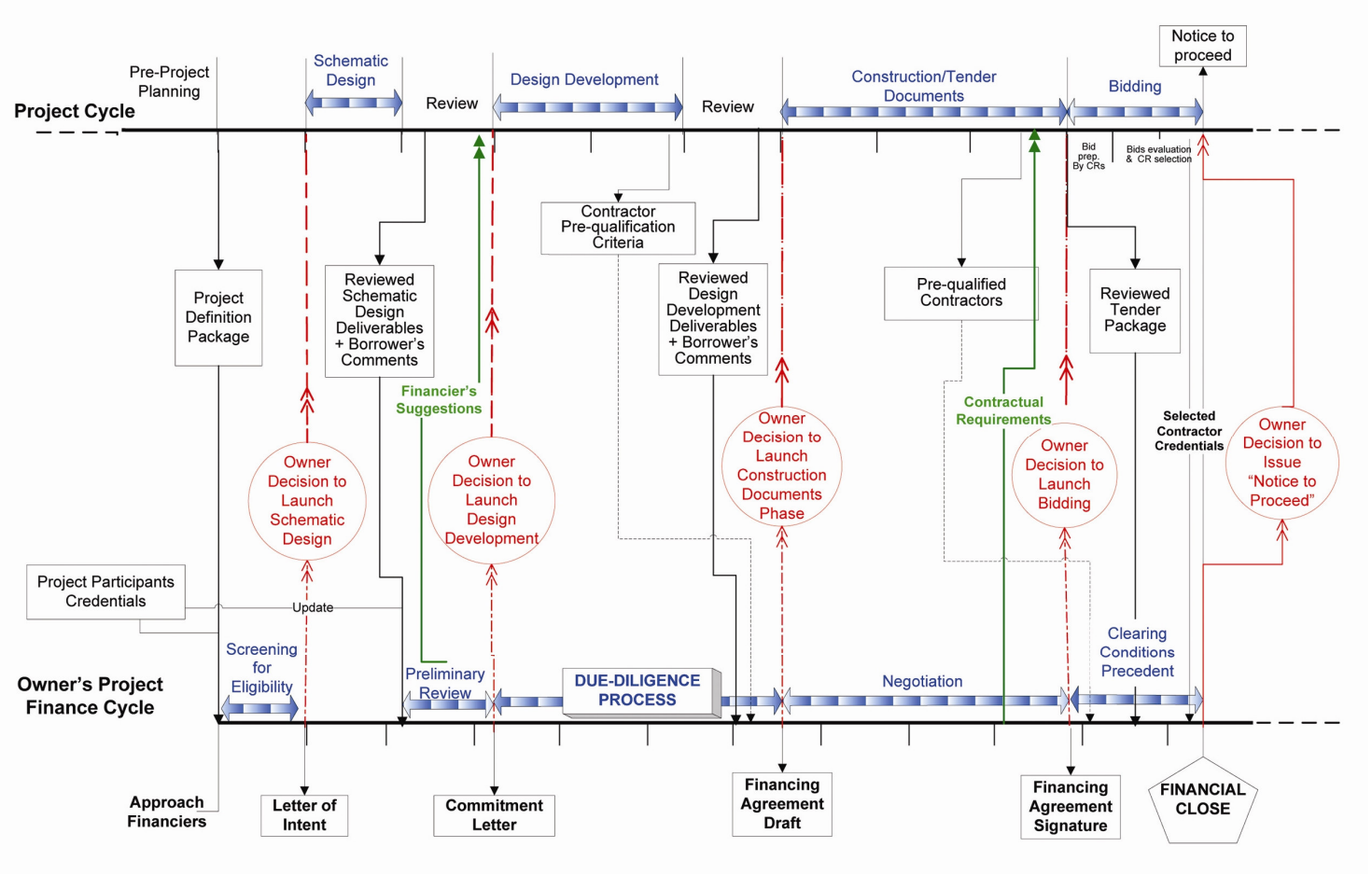

Fig. 2.1. Relating the Project Cycle and Finance Cycle Prior to Financial Close
Source: Tania Choucair. "Project Performance Monitoring for Construction Financiers." Unpublished Project. Engineering Management Graduate Program, American University of Beirut. 2007.

2.1.3.1.1. Pre-project Planning, Screening for Eligibility, and Schematic Design

Pre-project Planning is an exercise borne by the owner of a project. At the end of this exercise, a Development Proposal is drafted. To screen a project for eligibility, financiers need information on the project: proof that it is feasible, its capital structure, some information on the borrower, and information on project participants among other things. These are all summarized in that proposal (Thomas 2001; Larkin 2004). Thus, the output of the Pre-project Planning phase is an integral input for the Screening for Eligibility phase. On the other hand, the Letter of Intent issued by financiers for projects worthy of Appraisal is the first indication that a project concept is worth developing further, an output that encourages owners to launch project Schematic Design.

2.1.3.1.2. Schematic Design, Preliminary Review, and Design Development

A copy of the Schematic Design deliverables is issued by the project owner for the financier's review. The latter then begins the Preliminary Review phase as previously explained in section 2.1.2.2. This input from the project owner allows the financier to ascertain that the facility scope, program, and cost estimate update are in line with those presented in the project's feasibility study.

The Commitment Letter issued by the financier at the end of preliminary review is also key input into the Project Cycle. The terms of financing in the Commitment Letter are the first indicators on the cost of financing the project. Based on these, the owner can decide if it will be profitable to finance the project as it stands. Some changes in scope or technology, for example, may need to be incorporated as per financier feedback. If agreement is reached on the terms included in the Commitment Letter, the owner can then begin the Design Development phase.

2.1.3.1.3. Design Development, Due Diligence and Construction/Tender Documents

After the Design Development phase ends and its deliverables passed on to the financier, the phase of Due Diligence begins. During Due Diligence, the financier undertakes a thorough review of the project; the more developed the information provided to the financier as part of the Design Development deliverables, the less risky the project will appear. This in turn yields better lending terms and less restrictive conditions.

The major output of Due Diligence is the draft Financing Agreement or Loan Agreement. This is a firm commitment on behalf of the financier towards providing the funds required to implement the project. The owner can thus conservatively launch the Construction/Tender Documents stage based on the financier's renewed commitment.

2.1.3.1.4. Construction/Tender Documents, Negotiation, and Bidding

Construction/Tender Documents cannot be finalized before an agreement to the provisions of the Financing Agreement. The provisions of this agreement are a contractual allocation of project risks between the owner and the financier, and are based on the financier's risk tolerance as conveyed to the owner during Negotiation. The owner, in turn, may give the go ahead for the Bidding process once consensus on these provisions is reached and a final Financing Agreement is signed.

2.1.3.1.5. Bidding and Financial Close

Before funds can be released for a project, a set of Conditions Precedent and Covenants need be met by the owner. All Conditions Precedent and Covenants need to be cleared before Financial Close. The owner in turn may request evidence of the availability of sufficient funds before he gives the Notice to Proceed to the contractor.

Legal advisors of the owner, the contractor, and the financier may arrange for a simultaneous closing of documents. The financier may also impose a commitment fee on funds not-yet-drawn as of Financial Close. Thus, the time lag between Financial Close and the first Drawdown should be minimized. Ideally, the financial close will coincide with the Notice to Proceed, making the down payment on the construction contract the first Drawdown on the loan (Yescombe 2002).

2.1.3.2. Cycle Interdependencies Post Financial Close

Some interdependencies exist between the Project Cycle and the Finance Cycle after the Financial Close. We shall examine those interdependencies between Financial Close and the first Drawdown, during Drawdown cycles, and at Completion (as shown in Figure 2.2).

2.1.3.2.1. Between Financial Close and the First Drawdown

Before the first Drawdown on the loan can be made, the borrower needs to be in compliance with the Covenants stipulated in the financing agreement. Obtaining required permits, satisfactory insurance coverage, and performance bonding are examples of these conditions. Also, an update of the project schedule and cash flow which should be in line with the ones submitted as a Condition Precedent to Financial Close. The financier in addition needs to verify that the credentials of the project team assigned by the contractors are in accordance with what was submitted with the Tender Documents (Hoffman 1997).

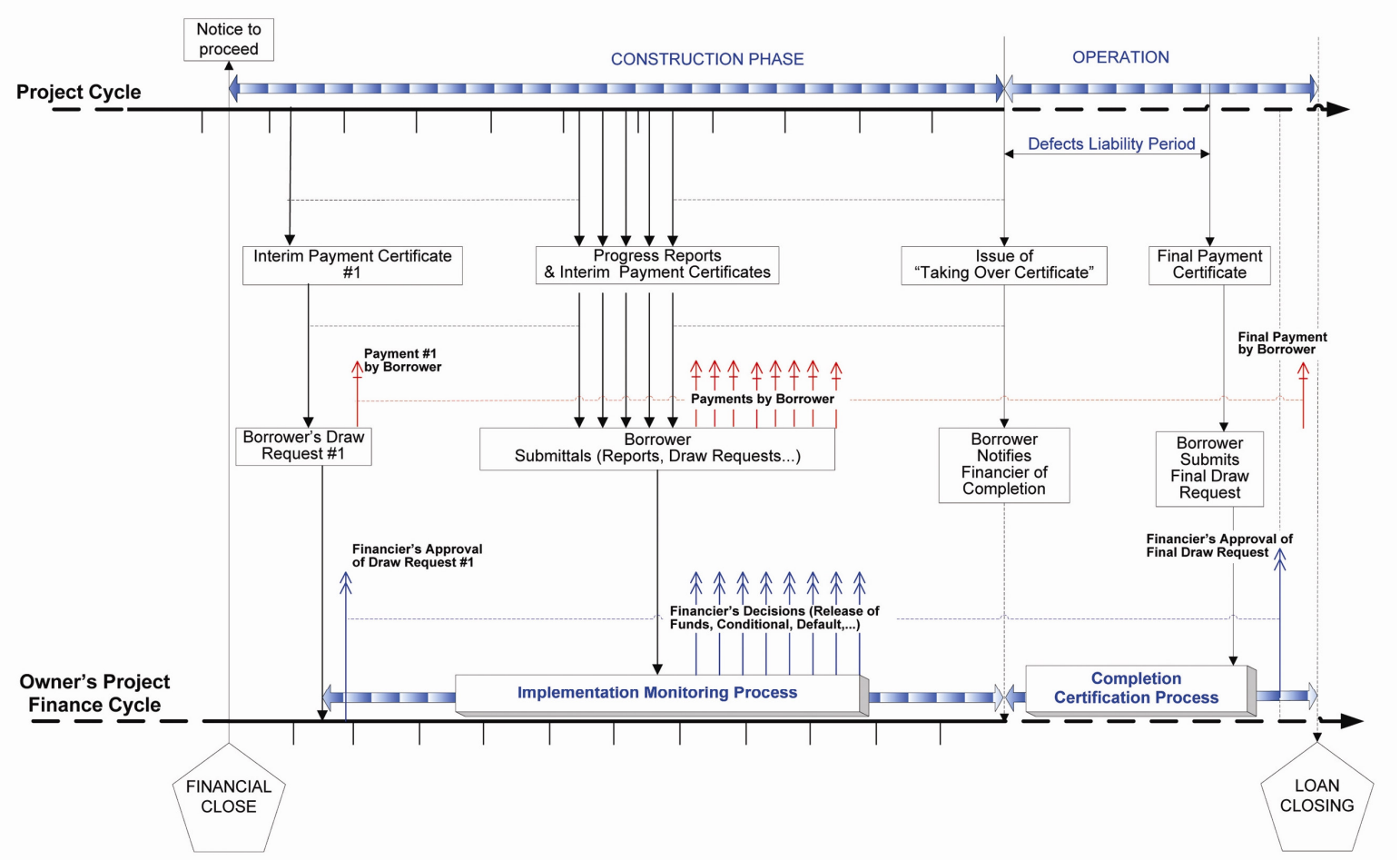

Fig. 2.2. Relating the Project Cycle and Finance Cycle Post Financial Close
Source: Tania Choucair. "Project Performance Monitoring for Construction Financiers." Unpublished Project. Engineering Management Graduate Program, American University of Beirut. 2007.

2.1.3.2.2. During Drawdown

Drawdown period begins with the first Drawdown and ends with Completion. During Drawdown, the main constraints the cycles exercise on one another pertain to time lags. The contractor issues an Interim Payment Request based on the work executed during a one month period. FIDIC 1999 standard form of contract allows the engineer a maximum of 28 days to issue the Interim Payment Certificate as per construction contract terms. When Drawdowns are made on a month basis, the project owner includes the Interim Payment Certificate issued by the engineer, along with the corresponding contractor's Interim Payment Request in its Draw Request. The financier then reviews the Draw Request before funds are released to the owner and consequently to the contractor. The FIDIC 1999 construction contract allows the owner another 28 days between the engineer's Interim Payment Certificate and the contractor's Interim Payment due, i.e., a total of 56 days between the contractor's Interim Payment Request and the contractor's Interim Payment due (Conditions of Contract... 1999).

As per the above-mentioned FIDIC 1999 lags, and in case the owner submits monthly Draw Requests, it is viable to consider that the owner's deadline to submit its request to the financier shall be 7 days after the Interim Payment Certificate is issued. This is followed by 14 days for the financier to provide his decision on the Draw Request, and a 7 day buffer for administrative procedures and fund transfer to the contractor. This allocation of time periods ensures funds are available when the payment is due to the contractor as per the FIDIC 1999.

Typically, financiers require quarterly project monitoring and audit reports cycles since monthly cycles do not allow sufficient time for assessment and report compilation. Each monitoring cycle will have an observation period of three months during which site visits are conducted on a monthly basis, and observation reports

prepared. These visits could be scheduled with the borrower's submission of the monthly draw request.

2.1.3.2.3. At Completion

The existence of interdependencies between the Project Cycle and Finance Cycle at Completion depends on how Completion is reached. When the borrower forecloses the loan because the facility is able to self-finance, no interdependency exists. For the construction contract case, Substantial or Technical Completion requires a Take-over certificate from the supervising engineer. Conversely, the loan term might be linked to the issuance of occupancy permits as determining Completion. If Completion, however, is defined as the handing over of the facility to the operator or the off-take purchaser, then it could be conditional upon their verifying that the facility is able to operate to the performance standards stipulated in the off-take agreement.

2.2. Unified Project Monitoring Framework

This section presents a unified project-monitoring framework as devised by Choucair (2007). This framework has been prepared based on the practices of local and international financing institutions, while making use of project management best practices. It consists of 3 stages: *Unified Due Diligence, Implementation-Monitoring, and Completion Certification*. Each of these stages will be developed further in the chapters 3 and 4, preparing the framework for final verification.

2.2.1. The Unified Due Diligence Process

According to Choucair, "the most important process of the project financing cycle prior to financial close, from a financier's perspective, is, with no doubt, the Due

Diligence process." Hoffman (1997) defines Due Diligence as "the process of reviewing and analyzing the various project participants and contracts for the purpose of determining the risks present in a project." During Due Diligence, the financier gets a chance to appraise the project and price the financing based on the financier's risk tolerance and assumption of project risk. However, pricing needs to be calculated with care since an over-priced project might cost the financier the business opportunity. Due Diligence also defines the Baselines (section 3.2.7.) for subsequent monitoring activities carried out during implementation. Based on Hoffman's outline, the framework Choucair devised consisted of 6 steps as follows:

Step 1: Gather Inputs and Form Appraisal Team

Step 2: Review and Analyze Gathered Information

Step 3: Identify Risks

Step 4: Analyze Risks

Step 5: Determine Risk Response

Step 6: Compile Report and Draft Financing Agreement

2.2.1.1. Step 1: Gather Inputs and Form Appraisal Team

Logically, the first step before any review or Appraisal can be done is the collection of all information required as input to Due Diligence. All information requested by the financier should be honored and any missing document is requested from the borrower. If the required information cannot be submitted until later on in the process, the financier should note this as a source of risk. The input information gathered from the literature pertains to the following six categories 1) Project introductory information such as the description of the venture, its objectives, its advantages, expected risks, and property information. 2) Developer and borrower data

including general background information/personal statement, the borrower's legal information, the borrower's financial information/credit standing, the borrower's experience in developing similar projects, the development team's résumés, and the developer's conflict of interest if any. 3) Market data such as a market study including sub-markets, comparable sales evidence, land sales comparables, lease comparables, competitive property information, population, demographics data, area aerials, sales projection, and expected risks and their impact. 4) Proof of technical feasibility in the form of preliminary drawings, preliminary specifications, implementation program, manpower and raw materials requirements, environmental issues/health and safety plans and files, location layout, and archeological, topographical, geotechnical, transport surveys. 5) Financial and economic data such as sales policy and organization, employment, cost breakdown (between land, construction, and operating costs), interest, installed equipment, working capital and foreign exchange component, cash flow projections (number of years depending on the duration of the loan), cash flow analysis showing annual income larger than annual expenses and loan servicing, rate of return analysis/profitability, sensitivity analysis, capital and exit plan, economic terms (including assumptions), types and amount of financing needed (loan/equity/quasi-equity /combination), financial structure (sources and terms of equity and debt), and operating cost plan. 6) Socio-Environmental Data as those presented in environmental impact assessments, environmental management plans, public consultation measures, and measures to comply with or exceed standards. 7) Legal documents including contracts, guarantees, collateral, and permits and authorizations (Choucair 2007).

The Project Definition Package produced at the end of pre-project planning phase of the project cycle will contain the project, market, conceptual technical feasibility, financial/economic feasibility and socio-environmental data. Schematic

Design deliverables will provide an update on the *cost* and *time* estimate as well as a list of permits required. Borrower and contractor financial and experience information need to supplement the project-cycle deliverables to enable Due Diligence to be launched. Design Development deliverables will provide the more precise cost and time estimates along with 80% drawings, specifications and bill of quantity. These are essential for the validation of the project's feasibility information submitted earlier. They have to be made available before the Due Diligence exercise can be completed. The financier needs to ensure all the required information is available, usually through document checklists.

Once the required input is gathered, an Appraisal team is formed. Porter (2002) explains that the skills needed to perform Due Diligence are a deep understanding of the project delivery process, business plans, project costs, time schedules, specifications, and risk management. In addition, a detailed knowledge of sector funding and project management best practices complemented by an understanding of the market, relevant legal agreements, good design, cost in use and fund monitoring costs is required. The team needs to understand what elements of the project have a critical role in the business plan and are likely to influence its success. It follows that the Due Diligence team's skills should be a mix of project management and finance complemented by some business, marketing, engineering and legal knowledge.

2.2.1.2. Step 2: Review and Analyze Gathered Information

The second Due Diligence activity is to review and analyze inputs. This involves a review of project documents and participants. This is done by: 1) Critical reading of contracts paying special attention to documents consistency, peculiar variances from standard provisions, change clauses, terms, differing site conditions,

force majeure clauses, detailed Appraisal of *cost* and *time* estimates in terms of adequacy, reasonableness, reliability of base data, comprehensiveness, breakdown, review of design to check if it is standard or unique, review of whether design has reached Design Development stage or not, compliance with applicable regulations and industry procedures, constructible, drawings format and amount acceptable, review of owner and its architect/engineer's project management qualifications, comment on the contractor's experience, monitoring and control methods, and checking that statutory applications, approvals, licenses and consents exist and are suitable.

Once the project documents are reviewed and analyzed, baselines for the variables that are to be monitored during implementation are set. According to Choucair 2007), the following 5 main variables need be monitored: *scope, time, cost, quality*, and *revenue generation*. The description of the venture under project data, the preliminary drawings and specifications under technical feasibility, along with the latest design deliverables allow financiers to set a baseline for the *scope* variable. The updated project schedule submitted as part of Design Development deliverables proposal is the *time* variable baseline. *Cost* is tackled through the financial and economic set of data updated by the budget estimates submitted as part of the latest available design deliverables. Preliminary specifications relate to the *quality* variable. Design development phase specifications will further clarify the project's quality standards. Finally, market related data, marketing plans, and project cash flows will set the baseline for the *revenue generation* variable.

In addition to variable baselines, the review activity could reveal non-compliance instances which should be dealt with as part of the Conditions Precedent, representations and warranties or covenants sections of the Financial Agreement. These are sources of project risks and should be considered as part of the project risk

identification.

2.2.1.3. Step 3: Identify Risks

Special attention need to be accorded to project *Risks* based on their probabilities and possible outcomes, due to their potential adverse impact on the attainment of project objectives. According to Choucair (2007), sources of information used for identifying risks include, but are not limited to, system engineering documentation, life-cycle cost analysis, plans and work breakdown structure decomposition, schedule analysis, baseline *cost* estimates, requirements documents, lessons learned file of the financing institute, assumptions analysis and sensitivities, trade studies and analysis, brainstorming, expert Judgment, checklists, and diagramming techniques.

A listing of project risks is not the only output from risk identification; risk triggers (section 3.5.4.3.) can also be identified to be used later on as a warning that a risk event has occurred or is about to occur. For example missing an interim milestone is a delay risk trigger. The risk identification exercise may reveal the need for further details from the borrower and could be repeated during Due Diligence for specific project risks whenever updates are available.

2.2.1.4. Step 4: Analyze Risks

Risks have causes, probabilities of occurrence and impacts. They can be evaluated both qualitatively and quantitatively. A qualitative analysis is useful identifying the risks while quantitative analysis can help prioritize them and identify those which require more attention and for which further analysis may be needed (PMBOK 2002). Quantitative analysis also entails testing the validity of assumptions

and their impact on project objective should they be false. The reliability of results is thus highly dependent on the quality of the data used. The most significant risks are thus short-listed and prioritized.

For private sector financiers, project objectives of most interest are those related to *cost, time, scope, quality* and *revenue generation* (Choucair 2007) since their goal revolves around being profitable. Financiers need to develop internal guidelines for classification of risks based on probability and impact combinations for each objective and an accompanying baseline for these. Actions in case of deviation from baselines need be included in these guidelines. These can be in the form of financial ratios and figures, thresholds for *time, cost* and *expected revenues* and allowable variances. All these should be documented in the loan agreement to be used as a basis for monitoring later on. Risk analysis will be discussed in detail in Chapter 3.

2.2.1.5. Step 5: Determine Risk Response

Risks can be kept at acceptable levels when procedures and controls to manage them are in place, says Giordano (Giordano 2004). Porter explains that there is a general tendency to transfer as much risk as possible to the contractor without considering alternative balanced risk approaches or the implications on the project's business case (Porter 2002). Notwithstanding, it is important for risks to be allocated to the party best able to handle them for any mitigation to be effective and in order to avoid unnecessary increased contingency costs by these contractors.

The project documents submitted by the owner should include a risk response plan for the risks identified and analyzed by it during *Pre-Planning*. The financier should evaluate this plan in terms of adequacy and acceptability. If it is judged inadequate, the financier could develop a more appropriate plan based on its perception

of project risks. Response strategies for the additional risks identified during Due Diligence should be proposed. Financiers have one of 4 options when responding to risk: Avoidance, Transfer, Mitigation, and Acceptance. Avoidance may be chosen by effecting change to the project or its execution approach in a way that evades certain risks. Transfer implies that risks be transferred to the owner, contractor, or a third party via guarantees. Mitigation is the option where a risk's impact or probability is reduced. The last resort would be Acceptance whereby contingency amounts are set aside for specific risk instances.

2.2.1.6. Step 6: Compile Report and Draft Financing Agreement

The Due Diligence report summarizes the findings of the above-mentioned steps. From Step 1 variable baselines and recommendations on issues to be incorporated in the financing agreement provisions under Conditions Precedent and Covenants. From steps 2 and 3 the project's risk profile including a prioritized listing of project risks with impact on *time, cost* and *expected revenues*; a list of risk triggers; thresholds for judging variable variances; sensitivity analysis results, etc. From step 4 and 5 the results of the risk analysis along with recommendations for amendments to the owner's risk response plan.

The Financing Agreement is of great importance as it is the only legal document binding the parties beyond Financial Close. It is the main product of Due Diligence, where recommendations of this phase are often translated into Conditions Precedent in order to protect the financier from the identified risks. Drafting the Financing Agreement, however, is constrained by the provisions of the Commitment Letter at the basis of the deal, yet should clearly stipulate all rights of the financier during Drawdown. Based on the works of Shaw (Shaw 1989), financiers need to give

particular consideration to the following in designing the Financing Agreement:

- Relevant laws: The borrower should make "a detailed representation that describes the zoning status of the project", what approvals have been obtained and what is still in process. The bank should have checked with the relevant authorities what zoning regulations are applicable, requested copies of all approvals granted and made sure changes in regulations do not impose major redesign and loss of revenue generating units.

- Physical defects: This refers mainly to constraints resulting from the site's subsurface conditions. The financier is advised to request copies of geotechnical consultants' reports. These may be informative on issues that could introduce a high level of uncertainty to the excavation and retaining system works such as soil stability and water table. Shaw suggests including a clause in the loan agreement tackling the spectrum of possible soil related problems. Borrowers are typically required to provide a representation that, to "their best knowledge", the lot is geotechnically sound. This forces the financier to prove, in case of a lawsuit that the borrower knew of the differing subsoil condition.

- The tenant/buyer factor: When a contract with a major credit worthy tenant is at the basis of granting funds to a project, such as governments promising to buy all volumes received by a port project, the loan document should define a "major tenant/buyer contract" that is not to be "amended, extended, terminated, enlarged, or contracted without the lender's prior written consent". Furthermore, the financier could require all major tenants to provide written consent to this requirement as a Condition Precedent to each Drawdown on the construction loan.

- Controlling change orders: Borrowers may be compelled to enhance the project's quality through change orders in response to increased competition. Changes

to project contracts, unless immaterial, are also prohibited by the Financing Agreement since they are likely to induce variances on project revenues, operating costs, and risks. Such variances may undermine the cash flow used as a basis for granting the financing (Hoffman 1997). Their scope may be kept hidden from the financier until claims place liens on the project due to the budget being exhausted. Shaw suggests that the lender's prior approval be required for variations. To ensure this is respected, a financier-contractor agreement is proposed by Shaw.

- Borrower as contractor: Control is difficult when the borrower is the project's general contractor. Lenders can avoid this by knowing the identity of the constructor who should have proper licensing and no pending "disciplinary actions or complaints."

- Casualties during building: Financiers are advised to document in the agreement whether insurance proceeds shall be applied to repay the debt or to repair damages in case of casualty. This, for example, would be the case when a fire destroys a substantial part of the facility.

The project owner or sponsor is a major stakeholder in this arrangement and thus its experience and reputation are essential issues to project success. If project owner sells an important part of their stakes in the project company their commitment to project completion becomes questionable. This causes a great deterioration in the project risk profile. Thus, to protect their interests, financier will restrict the owner from going through with such a deal without its prior consent (Hoffman 1997).

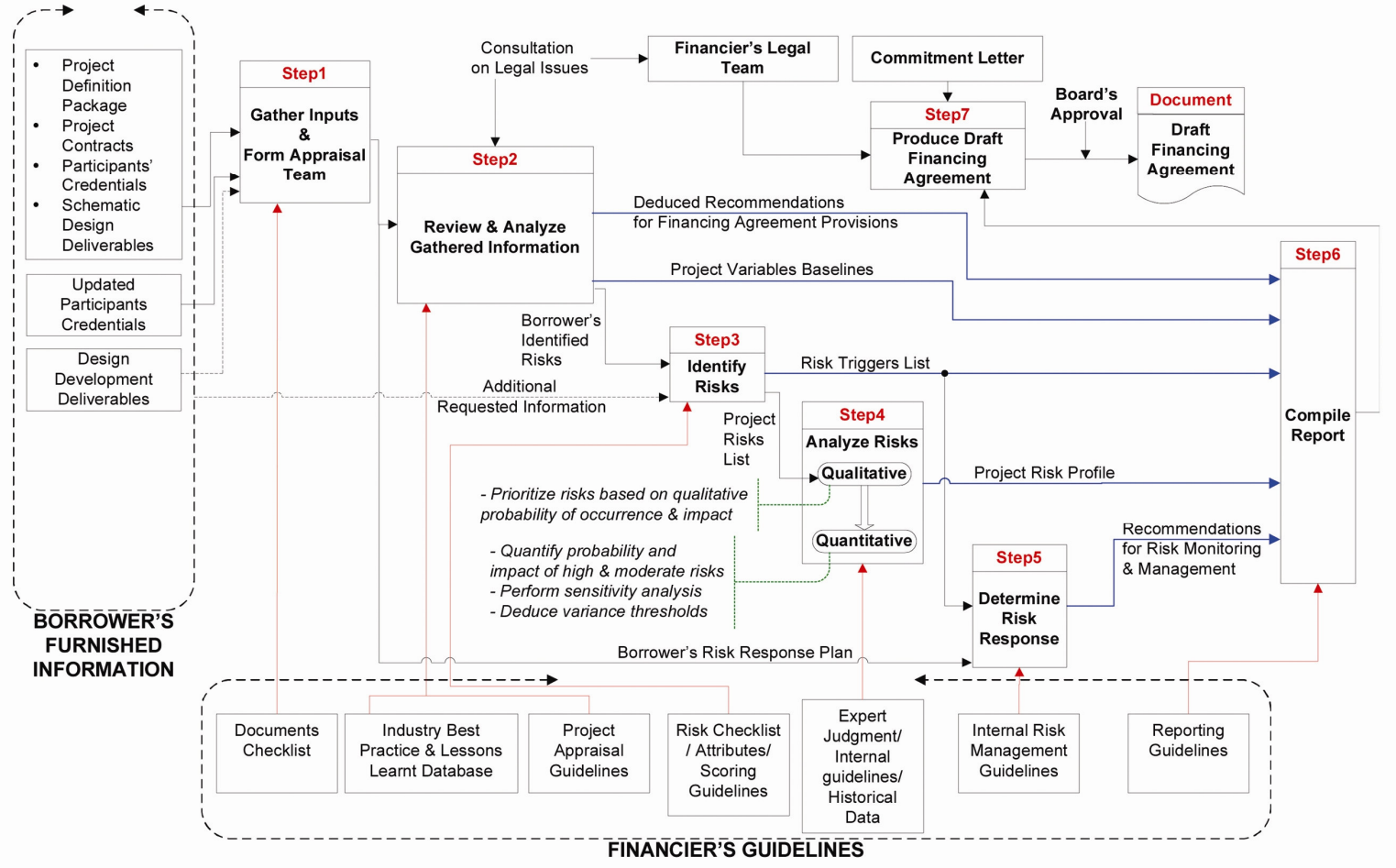

Fig. 2.3. Unified Due – Diligence Process

Source: Tania Choucair. "Project Performance Monitoring for Construction Financiers." Unpublished Project. Engineering Management Graduate Program, American University of Beirut. 2007, 66.

2.2.2. The Unified Implementation-Monitoring Process

Porter explains that the financier's goal is a project that operates in accordance with its established business plan, generating expected profits. This involves more than on time and within budget delivery. Choucair's framework is based on three project performance monitoring models: The Project Management Institute's Project Management Book of Knowledge (Project Management… 2000), the KPI Working Group's Report to the Minister for Construction (KPI report 2000), and Cheung's web-based project performance monitoring system (Cheng 2004). The variables of *time, cost* and *quality* appear in all models. *Scope* appears in the three models but under different appellations. The KPI working group's model names it Client Changes. The Cheng web-based project performance monitoring system monitors scope changes by tracking Variation Orders as one of the key indicators under the *cost* category. The Project Management Institute's *quality* variable includes the quality of project management, while other models tackle each factor of project management on its own.

Time, cost, quality, and *scope*, all affect the cost or outflow elements of the project's cash flow. Financiers are equally interested, if not more, by the project's ability to generate expected revenues. Thus, for financiers *revenue generation* should be added to the list of variables for project follow up. Based on these variables, Choucair argues that any *Unified Implementation-Monitoring Process* needs to cover the following issues:

- Compliance with financing agreement provisions
- Changes
- Forecasting cost at completion and project completion time
- Project progress
- Risk

- Lessons learned

The Project Management Institute's Project Management Book of Knowledge (2000) section on project monitoring and control process provides good basis for a *Unified Implementation-Monitoring Process* as it covers all the above issues, except the compliance checks. As such, The *Unified Implementation-Monitoring Process* steps are proposed as follows (see Figure 2.4):

Step 1: Assess Project Status and Progress

Step 2: Analyze Variances and Changes

Step 3: Re-Evaluate Risks

Step 4: Update Cash Flow Sensitivity Analysis

Step 5: Report Compilation and Action by Financier

2.2.2.1. Step 1: Assess Project Status and Progress

Assessment starts with the owner's submission of a Draw Request. At that time, the financier checks project compliance with the various Conditions Precedent and Covenants stipulated in the Financing Agreement. Any non-compliance triggers an event of default. Non-compliance instances may also be risk triggers or flags, indicating a risk event has or is about to occur. Risks are re-evaluated as part of step 3 of the *Unified Implementation-Monitoring Process.*

Assessment starts by comparing the baselines established during Due Diligence with the progress reports submitted by the owner. Financing Agreement documents and technical attachments such as the baseline schedule and cash flow are compared to updated schedules and cash flows obtained from the information included in the Draw Request.

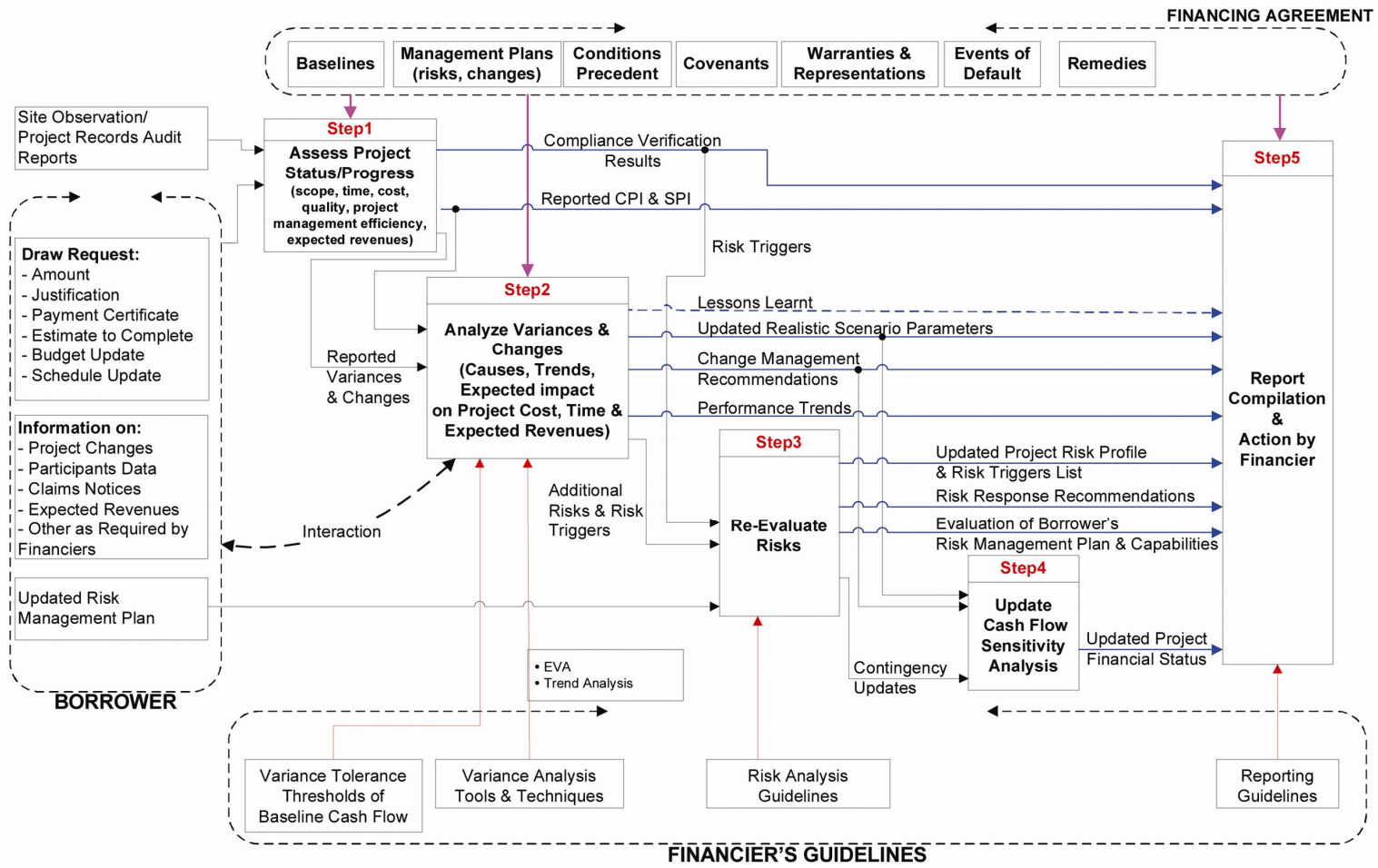

Fig. 2.4. *Unified Implementation-Monitoring* Process

Source: Tania Choucair. "Project Performance Monitoring for Construction Financiers." Unpublished Project. Engineering Management Graduate Program, American University of Beirut. 2007, 86.

Actual progress data collected through site visits and collected in observation reports would assist in the verification of progress information submitted by the owner. The Financing Agreement could also include a clause allowing financiers access to information such as Project Records, Variances, and Earned Value analysis techniques, all serving the same purpose of progress assessment. Some financier monitoring teams even attend progress meetings, are copied on project correspondence, which puts them in a position to clear pending issues, agree on changes and implement corrective action in a mitigative fashion. Outputs of step 1 of the monitoring process include:

- Comments on the project's compliance with the financing agreement and resulting risk triggers;
- Cost and schedule performance indices;
- Listing of reported variances; and
- Listing of reported project changes which may or may not be resulting from variances.

The first two are documented in the monitoring report, they are inputs to step 5. Risk triggers are needed for risk re-evaluation. The last 3 outputs will be the inputs of the next step where variances and changes are analyzed.

2.2.2.2. Step 2: Analyze Variances and Changes

The *Unified Implementation-Monitoring Process's* purpose is to ensure for financiers that project objectives of *cost* and *time* are within acceptable limits and that the project's risk profile has not unacceptably deteriorated. It is also a way to secure a timely warning when a risk event is expected to occur. Analyzing variances and changes serves this particular purpose.

However, not all changes and variances should be a source of alarm. Only those negatively impacting project objectives of total *cost*, completion *time* and *expected revenue* generation beyond acceptable thresholds are. Thus, forecasting the impact of variances and changes is an essential part of this analysis step. This often correlates with the availability of funds to complete the project within a reasonable time frame, one of the main concerns of a financier. In this thesis, some tools and techniques will be proposed for this challenging task. Typically, the borrower is required to provide such an estimate with every Draw Request. The financier will need to make certain the impacts of additional risks are incorporated and that the technique used to obtain the estimate is appropriate.

The cause of variances is also of grave importance, and needs to be investigated. Only then can an appropriate response be formulated. Sometimes cause of one variance may have an effect on other project activities. Realizing this possibility early could serve as valuable risk trigger; this can be done if impacts are identified, quantified and mitigated when possible.

Based on the analysis of changes, variable baselines should be looked into and updated when necessary. These updates should also forecast the future impact of these variances on project objectives. Significant variances need to be managed according to the change management procedure agreed with the borrower. Additional project risks and risk triggers could be revealed based on the updated variable baselines, and should be accounted for. Lessons learned can be compiled to capture reasons behind the variances and the rationale behind any corrective action proposed as well its effectiveness and efficiency. According to Choucair, the outputs of impact assessment can be summarized as follows:

- Lessons learned;

- Actual values for sensitivity analysis parameters;
- Change management recommendations;
- Performance trends; and
- Additional risks and risk triggers.

Performance trends will assist the decision making process at the end of the assessment period. Risks will be further studied in the following step. The second and third output will be used in step 4 to update the sensitivity analysis results.

2.2.2.3. Step 3: Re-Evaluate Risks

As mentioned earlier, *Risks* are future uncertain events which have a probability of occurrence and consequences when they occur. Some risks may not occur at all. Others may occur, but have a smaller than expected impact. The accuracy of estimated risk probability is higher whenever the time frame of their occurrence is shorter. As work progresses, additional information becomes available, and a more accurate assessment of project risks is possible. Because of this dynamic nature of risk, monitoring and controlling risks requires continuous re-evaluation of project risks in light of updated project information.

The impact of additional risks on the project's risk profile needs to be determined as well. This is done similarly to the Risk Analysis performed during Due Diligence. Additional risk response plans not included in the borrower's project monitoring report need to be devised while respecting the provisions of the Financing Agreement. The project risk profile needs to be updated to reflect any changes.

Finally, the findings of this review are included in the Monitoring Report and recommendations may be included for discussion with the owner.

2.2.2.4. Step 4: Update Cash Flow Sensitivity Analysis

During Due Diligence, financiers perform sensitivity analysis on the project's financial model for different scenarios. For example a triangular distribution of pessimistic, realistic and optimistic scenarios for a risk is a good simplification for many risk types. Other risks can be simulated by different distributions depending on the data available to the financier from previous projects or lessons learned. As progress information becomes available, values for the *cost*, *time* and *expected revenues* parameters used in the original sensitivity analysis and their accompanied distributions are updated. Revisiting the initial sensitivity analysis will allow lenders to obtain updated project Cash Flows. The resulting Cash Flows and their Sensitivities could be compared against corresponding Thresholds documented in the Financing Agreement. Some changes could be suggested to mitigate the effect of such variations. Finally, the adequacy of the project's risk management plan and the owner's performance in applying this plan should be reviewed and the status of contingencies updated.

2.2.2.5. Step 5: Compile Report and Action by Financier

The last step of the monitoring process is to compile the project Monitoring Report which will be used as a basis for financier action. According to Choucair, the report will contain:

- An update on the project's and project participants' status with regards to financing agreement provisions;
- Significant variances from the baselines with their causes and impacts;
- Significant project changes with their impact and recommended remedial actions;

- Actual values for sensitivity analysis parameters;
- Change management recommendations;
- Performance trends;
- Updated prioritized list of project risks;
- Impacts and response plan for additional risks;
- Updated project risk profile;
- Assessment of the risk management plan's efficiency and borrower risk management performance;
- Update on expected project revenues;
- Updated project financial status;
- Estimated cost at completion and project completion time;
- Monitoring team comments regarding any of the above; and
- Lessons learned.

Based on the project Monitoring Report, the financier chooses the appropriate action to be taken. If project progress is as per, or slightly deviating from, baselines the Drawdown is authorized. If significant deviations exist, the financier may authorize the Drawdown but place constraints on the owner. These will have to be cleared within a cure period, the time typically given for an owner to remedy any breach of Financing Agreement. If relatively large deviations occur, or if the owner does not remedy deviations with the Cure Period, a Notice of Default is served after the Event of Default is triggered.

2.2.3. Unified Completion Certification Process

Unless the loan is foreclosed, the financier will need to verify that Completion has been achieved as defined in the Financing Agreement, and as explained in section

2.1.3.2.3. Depending on the nature of the financed project, the *Completion* of the construction of the project could be close to loan closing. In other instances a period of project operation and debt repayment may separate the two, and can be as long the Financial Agreement specifies. Debt repayment is then followed by the evaluation of the project's overall performance and the efficiency of the monitoring process implemented. This review will allow the financier to later fine tune the process and maximize benefits. The WB, EIB, and the IFC have established ex-post evaluation processes to do just that. Finally, a database of Lessons Learned, as stressed throughout the Project Management Body of Knowledge (2000), will allow the experience to be captured for use in future projects before the official Loan Closing of the project. Figure 2.5 provides a graphical representation of this process.

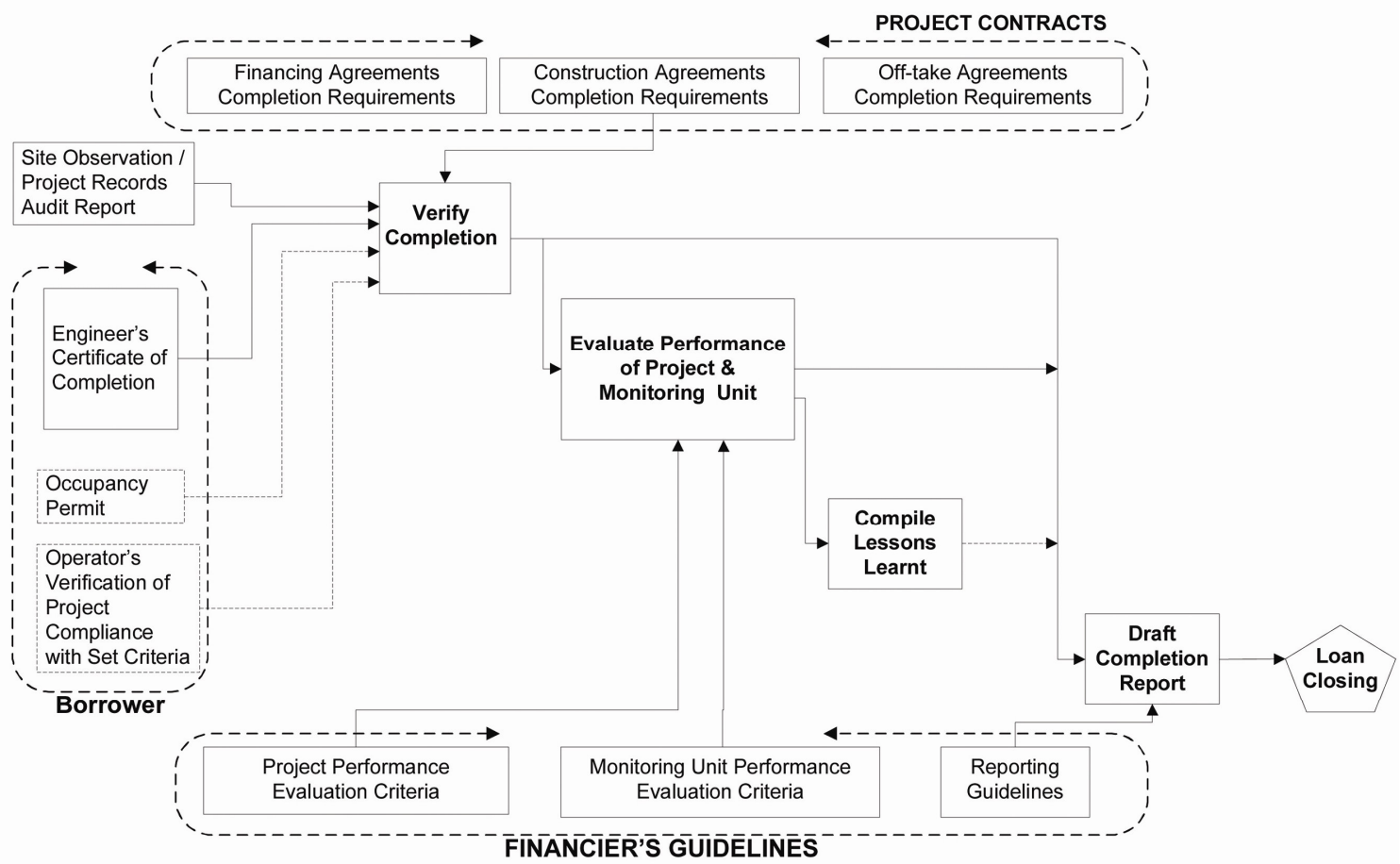

Fig. 2.5. Unified Completion Certification Process

Source: Tania Choucair. "Project Performance Monitoring for Construction Financiers." Unpublished Project. Engineering Management Graduate Program, American University of Beirut. 2007, 94.

CHAPTER 3

UNIFIRED DUE DILIGENCE

Choucair's *Unified Project Monitoring Framework* provides excellent basis for a *Detailed Performance Monitoring Framework for Construction Project Financiers*. The 3 stages of the Framework: *Unified Due Diligence, Implementation-Monitoring, and Completion Certification,* logically dissect the process of Project Monitoring. The steps of each stage further clarify the process into defined hubs, while highlighting the inputs and outputs respectively. However, the level of detail of some steps under *Unified Due Diligence* and *Implementation-Monitoring* cannot support practical application or verification of this framework. And although this thesis concerns itself with the Performance Monitoring or *Unified Implementation-Monitoring* part of Choucair's framework, detailing some parts of the *Unified Due Diligence* is a necessary prerequisite of this task. Thus, this thesis will attempt to provide sufficient detail to the steps of these stages divided between chapters 3 and 4. This chapter will focus on detailing steps of the *Unified Due Diligence* stage, while chapter 4 will tackle steps of *Unified Implementation-Monitoring.*

As explained in section 2.2.1.2, the main variables to be monitored throughout the project life-cycle are *scope, time, cost, quality,* and *revenue generation*, and these in turn impose risks on project objectives. Each step of the *Unified Due Diligence* and *Implementation-Monitoring* will be detailed while the corresponding risks will be grouped in categories that influence these main variables.

Entering into the *Unified Due Diligence* process, the financier has the following from Project Preliminary Review (section 2.1.2.2.):

- The *Project Definition Package*: this is a description of the project, business model, and objectives of the project. At this stage, the description is usually in the form of a narrative and does not go into operational details (Hong Shanghai Bank of China Credit Assessment… 2009; Commercial International Bank Credit Assessment Guidelines 2009; IFC-Preparing and Submitting 2005)

- *Project Legal Documents:* this includes all project contracts, documents, and authorizations, in addition to guarantees as required by the financier from the borrower or from third parties, assuring project development if it is to receive funding. Legal contracts are an assurance the project has been cleared by the concerned authorities and guarantees serve as a security that the project team that is being approved for funding does not change during project Appraisal. Absence of legal documents increases the risk of changes in project *scope, time*, and *cost*, postponements, or project cancellation. Changes in the project team may result in a change in *quality* of the project and consequently a change in *revenue generation* (IFC-Preparing and Submitting 2005; Giordano 2003).

- *Participants' Credentials, Updated:* these include a check on the background and qualifications of the borrower, project procurement and management teams, as well as borrower legal information, previous experience in similar project, and information showing its financial standing. This information is crucial in the Appraisal of a project as it increases the financier's perception of borrower credit-worthiness. It also allows the financier to better understand the borrower's financial capabilities and thus its ability to repay the loan, mitigating the risk of a decrease in *revenue generation* (European Investment Bank the project cycle… 2001; IFC-Preparing and Submitting… 2005; Larkin 2004)

- *Schematic Design and Design Development Deliverables*: These serve to

define the *scope* of the project and decrease the associated risk. Although Schematic Design Deliverables do not completely define project *scope*, Design Development Deliverables will provide 80% of the final drawings, specifications, and bill of quantity. These are essential for validating the project feasibility and must be available before the *Unified Due Diligence* is completed (Choucair 2007).

- *Others*: This should include all other information the lender finds fundamental to the project approval. An example of such information is the developmental aspect that the WB requires in any of its projects or the environmental aspect that the IFC cares about in its projects (IFC-Preparing and Submitting 2005).

This information, along with those to be collected in the first step of the *Unified Due Diligence* Process, will be the basis for the risk assessment.

3.1. Step 1: Gather Inputs and Form Appraisal Team

For a comprehensive Appraisal of a project, all of the below-mentioned information needs to be collected as input. Any information not available during *Due Diligence* will increase the risks associated with this financing facility and may affect its pricing, securities required, or deem the project or sponsor not credit-worthy. The input information to be gathered should fall under one of the following categories:

3.1.1. Information for Industry Analysis

This analysis should include general information on suppliers, customers, barriers to entry, regulatory environment, competition, and substitutes for the product or service the project will provide. This should also include a forecast of market size this project is competing in and the demand for the product or service it provides. It must also cover a detailed rationale behind starting the project and its timing. Although this

industry analysis exercise is usually done by the borrower and reported in the *Project Definition Package,* financiers should perform such analysis independently in order to develop an objective view of this industry and its attractiveness for investment. In many instances financiers outsource this task to specialized consulting firms that have the industry experience to accurately produce such analysis (European Investment Bank The Project Cycle 2001; Lowel 1992; Malone 1981; IFC-Operational Procedures 2010)

3.1.2. Breakdown of the funds

This item shows the total funds required for this project adding up to the total cost of the investment. This is what is known as the *uses* of the funds. In addition, this section should include a proposal of the structure for the financing divided between the amount to be borrowed from the financier and the funds that will be provided by the owner and other lenders involved. This is what financiers call the *sources* of the funds. Financiers usually have a minimum requirement for the percentage of equity an investor is required to invest in the financed project, in order to guarantee its commitment to the project. The IFC puts this minimum value at 20% European Investment Bank The Project Cycle… 2001 and Lowel 1992; IFC-Operational Procedures 2010; Commercial International Bank Credit Assessment… 2009).

3.1.3. Preliminary Risk Identification

This is based on the financier's knowledge of general project risks as well as risks specific to this industry. This identification of risks is usually done by the financiers themselves, or based on third party reports on the sector. This input is usually in the form of a list of risks, qualified with reasons for their inclusion, without any quantitative analysis of these uncertainties. This section also includes a description of

items that can serve as securities for this loan, such as land to be purchased by the project or a concession agreement guaranteeing a certain demand for the project's products and services (Thomas 2001; Hong Shanghai Bank of China Credit Assessment 2009).

3.1.4. Financial Data of Project

These are submitted by the borrower and include models that project financials of the company over a period of time. This time period must cover the life of the loan expected, and may extend beyond that, based on the expected life of the project. Projected financial statements (also known as pro forma financials) from the borrower may also be available at this stage (Larkin 2004; Thomas 2001 and IFC-Operational Procedures 2010 and Hong Shanghai Bank of China Credit Assessment 2009).

3.1.5. Operational Feasibility

These should go into details of project business plan and its implementation, manpower and employment, organizational structure, raw materials, sales policies, operating costs and needed working capital, permits and compliance with country codes, and all other operational details to be collected from the borrower (Larkin 2004; Thomas 2001; Hong Shanghai Bank of China Credit Assessment 2009).

3.1.6. Environmental and Social Data

Data on the social and environmental impact of the project needs to be included in the Appraisal of every project to allow for accurate assessment of its sustainability. Depending on the nature of the financing institution and the type of the project financed, requirements may be minimal or stringent. Conscious financiers will

require that the project have minor impact in the above mentioned areas or that whoever is being impacted receives fair compensation (European Investment Bank The project cycle… 2001; World Bank World Bank Project Cycle 2005; The Equator Principles 2010).

3.1.7. Others

Other data may be required by different financiers depending on their mandates. The WB and the IFC have special requirements related to the Green House Gas emissions of their projects and the developmental role of their investments. The European Investment Bank needs data on how the project will develop Europe. This data should also be collected before step 2 of the *Unified Due Diligence* (European Investment Bank The project cycle… 2001; World Bank World Bank Project Cycle 2005; The Equator Principles 2010).

The above data is gathered in parallel to the process of selecting the Appraisal *Team*. A project team leader is already on board before the data collection starts, but the rest of the team is usually formed as data gathering progresses. Savvy financiers will have a team that includes finance professionals in addition to industry, regional, legal, insurance, and environmental and social impact experts. These are either partially or completely mapped to a project depending on projects size and on the time commitments of the financier's team to other projects.

3.2. Step 2: Review and Analyze Gathered information

This step starts by a detailed review of the gathered data by the financier's team. This is then followed by a number of interrelated analysis exercises that are aimed at assessing the project's credit-worthiness. Special attention needs to needs to be given

to inter-document consistency as these can bring to bear potential project problems. The most common exercises are:

3.2.1. Financial Analysis of the Sponsor

This is done by a calculation of some financial ratios that better illustrate the financial position of a borrower. Ratios analyzed are the same across industries and geographies being assessed. As mentioned earlier, this analysis ultimately serves as a security against the risk of lower than projected *Revenue Generation*. These ratios and figures can be divided into 6 main categories (IFC-Operational Procedures 2010; Hong Shanghai Bank of China Credit Assessment 2009; Commercial International Bank Credit Assessment 2009; Moody's Financial Analysis Ratio Report 2007).

3.2.1.1. Leverage

These are ratios that show the amount of debt the borrower already has before it commits to the current project. The most common ratio for this is Debt/Equity. This is then compared to what the financier deems a health leverage ratio.

3.2.1.2. Liquidity

These show the borrower's ability to meet its short term obligation and avoid insolvency. The most important of these are a Current Assets/Current Liabilities ratio, the amount of operating cash produced or consumed, and the amount of working capital available to this entity. These figures are then compared to the industry averages and financier set thresholds.

3.2.1.3. Coverage

These are values that show the borrower's ability to do what financiers call 'service the debt.' In other words, these ratios or values show the borrower's ability to repay its loans portions and interest as these mature. The most commonly used ratio here is the Debt Service Coverage Ratio (DSCR). This ratio is a calculation of the Cash Flow of a project divided by the debt payment required by the financiers. Acceptable coverage values change as the uncertainly associated with a project or industry changes and thus only comparable benchmarks should be used when analyzing these ratios.

3.2.1.4. Profitability

These values show the return on this investment. Ratios of *Return/Assets* or *Return/Equity* analyze profitability the best. This is also compared to industry norms and the required return financiers expect from their borrowers.

3.2.1.5. Efficiency

These are figures that show how well this entity manages its operations. Ratios including Inventory Turnover or Capacity Utilization are among many analyzed here. These values can then be compared to industry averages, helping the financier make a judgment regarding the borrower's credit-worthiness.

3.2.1.6. Growth

This shows the trend followed by the key figures in the borrower's financial statements or computed ratios. Growth of Asset, Liabilities, and Net Profit are among the most important in this category.

3.2.2. Review of Borrower Management and Procurement Team

The data gathered in the *Project Preliminary Review* on Management and Design professionals is supplemented by information on the Contractors' prequalification criteria to allow for a complete assessment of the *Borrow Management and Procurement Team.* This is done by going over the resumes of the key positions currently employed such as the Design Project Manager as well as evaluating candidates for important upcoming position such as the Contractor's Project Manager or the Operations Manager of the completed project. This can also be supplemented with background checks on the same, either done in-house or outsourced to external agencies. The review of the design professional or project architect is aimed at identifying the risks surrounding the *quality* of the final project in step 3 of this Due Diligence, while the assessment of the Executive Management of the completed project will identify some of the uncertainties in *Revenue Generation* (IFC-Operational Procedures 2010; Hong Shanghai Bank of China Credit Assessment 2009; Commercial International Bank Credit Assessment 2009; Moody's Financial Analysis Ratio Report 2007; Lowell 1992).

3.2.3. Review of Design Deliverables

This review goes into the details of the design of the project in order for the financier to clearly define the *scope* of the project it is about to finance as well as the expected time schedule it is expected to follow. Towards the end of the Appraisal, the design deliverable should be around 80% complete, allowing for *scope*, *time, and cost* risk identification to be largely accurate (Giordano 2004; Malone 1987; Porter 2002).

3.2.4. Critical Understanding of Project Operations

This involves a detailed reading of the description of the project and Operational Feasibility in order for the Appraisal team to adequately understand what the business model of the project entails. This can be supplemented by a reading of any concessions or agreements that carry a significant right or obligation the project has to honor. This exercise is another that will allow the financier to identify some of the risks associated with *Revenue Generation* (Giordano 2004; Malone 1987; Porter 2002; Lowell 1992; World Bank Procedures 2001).

3.2.5. Financial Modeling of Project

This exercise is among the most important in the Appraisal as it allows financial institutions to estimate with reasonable accuracy the flow of funds within a project and ultimately its ability to repay its debt. This is a mathematical model designed to represent a simplified version of the performance of the project. In its simplest form this process starts by a cash flow projection for the period of the loan—a breakdown of all cash income-generating activities as well as all cash expenses associate with this venture. The amount of cash remaining after subtracting the mentioned expenses form the income is called the *Operating Cash Flow.* When a project has a positive cash flow (i.e. interim income in excess of interim expenses) allowing it to repay its debt, it is deemed credit-worthy. A number of complications make this analysis less than straightforward, including projects expected to have negative cash flows during its early years, the priority of the debt-issuing financiers in receiving interest and debt repayment, and volatility of the cash flow projects. All of the complications associated with a certain project need be included in the risks of a project and should be reflected in the pricing of the loan as well as the securities required in the

loan agreement. Among the most important metrics output from a debt financed financial model is the DSCR (as explained in section 3.1.1.3.). Depending on the nature of the project and its riskiness, the minimum expected DSCR ratio can (range from as low as 1.2 to as high as 2 or above). This will be further explored in the covenants and securities required in the loan agreement (section 3.5.3). In order for this financial model to cover the different expected performances of a project, a quantitative sensitivity analysis should be run with different scenarios for the expected cash income of a project. This sensitivity will allow the financier to identify many of the major risks expected to impact the projects ability to repay its debt and thus allow it to device mechanisms to mitigate them (IFC-Investment Guidelines 2007; Hong Shanghai Bank of China Credit Assessment 2009; Commercial International Bank Credit Assessment 2009).

3.2.6. Legal Review

Another major station in the Appraisal of a project is the review of its legal aspects. A review of the construction contract, contracts the project will enter into such as concessions or long term supply, and the level of liability the borrower is committing to are among the most important here. The financier's legal team, with the assistance of the project's technical team, needs to fully review and understand these legal documents before they devise the loan agreement and its clauses (Giordano 2004; Gordon 2003; Lowell 1992; Malone 1987; IFC-Investment Guidelines 2007).

3.2.7. Baselines

Once all of the above processes have been concluded, baselines for the variables that are to be monitored during implementation are set. Although all of the

above have some impact on all the different variables, some have more direct consequences than others. The *Review of Design Deliverables* allows the financiers to directly set a baseline for the project *scope* and *quality* variables. *Quality* baseline is also set and guaranteed by the *Review of Project Procurement Team. Understanding of Project Operations* as well as the project schedule allow for setting a baseline for the *time* variable in the form of a project timeline. *Cost* baseline is set from the *Financial Modeling of the Project. Critical Understanding of Project Operations, Review of Borrow Management,* and the *Legal Review* help in defining and setting the baseline for *Revenue Generation,* while the *Financial Analysis of the Borrower* helps guarantee loan repayment in the form of the limited recourse it offers the financier. This will also be further explored in the covenants and securities required in the loan agreement section (Choucair 2007; Hong Shanghai Bank of China Credit Assessment… 2009; IFC-Investment Guidelines 2007).

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3.3. Step 3: Identify Risks

After gathering and analyzing the information in steps 1 and 2 of the Appraisal (including borrower identified risks), the financier begins to identify the most important risks associated with the project from its point of view. The main categories of risks are relatively standard across projects, however, sub-categories are not. Country, Industry, Project, and Sponsor specific uncertainties are the 4 main categories of risk, and should be used as a guideline in identifying sub-categories. Sub-categories—such as construction risk under Project related risk or Exposure under Sponsor related—are very different from one project to the next. Identifying all of them is a challenging process and takes an experienced financier with an accumulation of previous experience and lessons learned to adequately identify and analyze them. Only then can the financier be

in a position to *Eliminate, Transfer, Mitigate, or Accept* these risks. The main categories of risks are:

3.3.1. Country Risks

This refers to the risk of investing in a project as a function of the country it operates within and the business environment of that country. Country risk is external to the project team and management generally has a low level of control on these. For example, financial factors such as currency controls or regulatory changes, or stability factors such as mass riots, civil war and other potential events contribute to companies' country risks. This term is also sometimes referred to as political risk. Political risk and credit risks professional use different methods to assess and rate countries' comparative risk exposure. Credit rating agencies tend to use quantitative econometric models and focus on financial analysis, whereas political risk providers tend to use qualitative methods, focusing on political analysis. There is no consensus on methodology in assessing credit and political risks and a combination of both is recommended. Section 3.4.1 will suggest a best practice approach to deciding between qualitative and quantitative analysis of a risk.

3.3.2. Industry Risks

These are risks companies or investors face by virtue of the industry they are in. This risk is external to the company a financier is considering, and both the borrower and lender have little to no influence on. As such, it is important that the financier be comfortable with the level of risk an industry imposes on its potential projects since it is ultimately sharing exposure to it. Many financiers will have industry analysis exercises completed and their lending directed towards industries it views as compensated fairly

for the risks they carry. Based on Porter's 5 forces model, industry analysis exercises need to cover the following (Hong Shanghai Bank of China Credit Assessment … 2009; IFC-Loan Pricing Manual 2009):

- *Barriers to entry:* The barriers facing a new entrant to an industry, including government regulation.
- *Buyer Power:* the power the consumers of this product or service have in this industry.
- *Supplier Power:* the power the suppliers have here.
- *Treats of Substitutes:* the potential for a substitute product or service to compete with the incumbents'.
- *Rivalry:* the degree of competition in the industry.

The output of this analysis is a list of risks that are given ordinal ratings of high, medium, or low. Risks that score medium or high merit further risk quantification, which will be discussed in section 3.4.1. on risk analysis.

3.3.3. Project Specific Risks

These risks apply specifically to the project being evaluated. Project risks are mostly internal and management has a higher level of control on these. In general, these risks fall under one of the following categories (Choucair 2007; IFC-Operational Procedures 2010; Hong Shanghai Bank of China Credit Assessment 2009; Commercial International Bank Credit Assessment 2009; IFC-Loan Pricing Manual 2009):

3.3.3.1. Construction Risk

This is an umbrella term that encompasses all uncertainty surrounding the completion of a project on time, according to specifications, with no cost overrun. As

such, the variables to be monitored here are *scope, time, cost,* and *quality*. As expected of the construction industry, a large number of uncertainties bound these variables. The following sheds some light on of the important risks affecting each variable:

3.3.3.1.1. Scope

Identifying and managing this risk has a primary task: to ensure that the project includes all the work required to complete the project, and nothing more than that. As explained earlier, the Design Development Deliverables are completed before Appraisal ends. As such, the design is 80% complete and crude specifications and bill of quantity (BOQ) exist. This allows the financiers to have reasonable definition of the *scope* of the project it plans to invest in. Yet some uncertainty still exists since design is not 100% complete. The risk here stems from the owner changing project scope between Appraisal and the substantial completion of project construction. Since the financier is basing its credit-worthiness decision on the chances of success of the project, any changes to the *scope* poses significant risk.

3.3.3.1.2. Time

The main task of managing *time* is to ensure timely completion of the construction of the project. This variable is dependent on a large number of sub activities and thus it is unreasonable to explore each. However, a few activities merit more analysis since they have a more profound effect on this variable.

- Critical Activities: These include all activities that are on the schedule's critical path or are near critical (with floats of less than a week for example). These activities are more likely to delay the project and thus should be examined more and identified as risks affecting *time* to the extent that a detailed schedule of time is

available at this stage.

- Long Lead Material Procurement: Since these are not physical activities in the construction of a project, they are often excluded from its schedule. However, due to their long lead nature, their delay cannot be easily recovered from. These also merit detailed analysis and may be included as risks affecting *time*.

- Schedule rationale: Another *Risk* affecting the *Time* variable is the rationale of dependencies of project activities. A project with activities running serial to one another is less risky than one where all activities are scheduled in parallel since the former has the potential for acceleration if equipment and labor is dispatch to work while the later does not. This risk, though more technical than the mentioned above, caries significant risks with regards to project *time* and thus should be examined when possible.

3.3.3.1.3. Cost

Risks surrounding the *cost* variable are ultimately aimed at ensuring that the project is completed within the approved budget. As with *time*, analyzing and identifying all uncertainties surrounding *cost* is unreasonable. And although risks affecting cost are usually transferred to the Contactor or borrower via contracts, the uncertainty surrounding these can get to levels where the liable party defaults. This re-exposes the financier to these risks at a stage when it can no longer manage them. Some of the major risks financiers need look for are:

- Largest BOQ items by monetary value: These logically have the highest potential to change total project cost as a small percentage change in these results in large changes in total project cost.

- BOQ items with a history of price volatility: these usually include items in

short supply. Demand for steel before the economic crisis of 2008 caused its price to dramatically change over a period of 2 years. Other examples include items with only one supplier domestically or globally where these suppliers have a lot of power in price negotiation.

- Extension of Time Compensation: Since there is likelihood that a project gets extended as a result of changes the owner is liable for, the compensation for such an extension of time needs to be examined, and its breakdown need be tackled in the contract with the contractor.

3.3.3.1.4. Quality

The Risks accompanying this variable are the most difficult for the financier to directly identify since they require the most technical expertise. As such, financiers spend time during Appraisal in examining the track record of the Architect/Engineer who will in turn exert all efforts to guarantee the final quality of the project.

3.3.3.2. Operational Risks

These are the risks facing the project post substantial completion of its construction. *Operational Risks* are those that have the most effect on the *Revenue Generation* variable. According to the IFC's Investment Guidelines, the following areas must be explored during Appraisal (Choucair 2007; IFC-Operational Procedures 2010; Hong Shanghai Bank of China Credit Assessment 2009; Commercial International Bank Credit Assessment 2009; IFC-Loan Pricing Manual 2009):

3.3.3.2.1. Debt Coverage Forecast

This tests the ability of the borrowing project to repay its debt according to the

repayment schedule it is expected to honor. As mentioned earlier the most common ratio to examine is the Debt Service Coverage Ratio (DSCR) and is calculated by dividing the interim Free Cash Flow of a project by its debt service obligations (i.e. debt principle + interest). The operating cash flow is calculated after obtaining the following drivers.

- Forecast of the total market: this covers the market the project is operating within (i.e. the total demand for the product or service the project is producing).
- Forecast of the market: this estimates the share of the market the project is expected to gain.
- Forecast of the profit margin: this shows the margin the operation is expecting based on comparable projects or industry averages.
- Other Debt facilities: this is important if the project has debt that is more senior and thus is serviced before the new financing.

Examining the DSCR against comparable projects allows the financier to identify that risk exists at that level, and directs it to analyze the DSCR drivers and identify the exact source of risk to repayment.

3.3.3.2.2. Management Quality

Rating of management involves subject judgment about the extent to which the success or failure can be attributed to the executives. It reflects management's strategy and success in implementation. It therefore covers a wide area of qualitative characteristics such as integrity, reputation, project commitment, completeness and feasibility of management's plans, organization structure including succession planning, teamwork and competence, and relationships with creditors, shareholders, government, regulators, and other stakeholders. Construction and production build up phases are

quite critical. Therefore, until project substantial completion, a greater emphasis should be placed on management's (Project Management or the Engineer) ability to complete the project according to the defined scope, on time, within budget, and up to the quality expected.

3.3.3.2.3. Environmental and Social Rating

This underscores the importance of managing social and environmental performance throughout the life of a project. Although this risk is often overlooked by financiers, it has significant importance in our world today. Governments and business professionals are increasingly demanding environmental and social impact assessment studies as their institutions mature. This exercise is aimed at identifying and assessing social and environment impacts, both adverse and beneficial, in the project's area of influence. It also tries to avoid, or where avoidance is not possible, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment. Today, 70 financial institutions are signatories to voluntary standards called the "Equator Principals." These serve as a financial benchmark for determining, assessing, and managing environmental and social risk in project finance.

3.3.3.2.4. Insurance Classification

This exercise examines the coverage of the project's insurance policies. This review is subjective. Inadequate insurance coverage should be identified as a source of risk.

3.3.3.3. Conflict of Interest

As financiers get bigger and become engaged in more lines of business, they

will increasingly face actual, potential and/or perceived conflicts of interest in relation to their interrelated activities. As such, conflict of interest needs to be examined and resolved. Unresolved issues need to be included in the list of risks identified by the section. Conflict of interest also extends to the sponsor of the project if they are in other businesses that could conflict with the project being considered (Thomas 2001; IFC-Investment Guidelines 2007).

3.3.4. Sponsor Risk

Other than their track record and business knowledge (which has been tackled in the Management Quality section), risk may arise from the Sponsor's background or the total exposure of a financier to the same sponsor. The following subsections illustrate this point:

3.3.4.1. Background

These are risks related to sponsor integrity and transparency. These have an effect on the project and financier directly if they affect project credit-worthiness and indirectly when the reputation of the project or financier suffers as a result of this investment. Spending time in identifying these is important (IFC-Investment Guidelines 2007).

3.3.4.2. Financial Exposure

Since sponsors play a significant role in supporting a project and backing its financial securities, the total exposure of a financier to a sponsor needs to be monitored and managed where needs be. Many financial institutions have a cap on the total amount of expose to single sponsor, which is a function of their own financial strength.

Identifying the total exposure to a sponsor is thus an important part of project Appraisal.

All of the above contribute to the output of this exercise: a list of the risks that have a significant probability of occurrence and with considerable impact on the project. *Risk Identification* is then followed by the next stage of the project Appraisal, *Analyzing Risks* (IFC-Investment Guidelines 2007).

3.4. Step 4: Analyze Risks

In a debt facility with limited recourse, *Debt Coverage* maximization (which is best represented by the DSCR) is the main objective, while the risks identified are uncertainties affecting this object. Risks have causes, probabilities of occurrence, and impacts. In project Appraisal, risks have been identified and their causes examined. This stage is thus concerned with analyzing the range of probability of each risk and estimating its impacting on our main objective (IFC-Investment Guidelines 2007; Moody's Financial Analysis Ratio Report 2007).

Risk analyses are divided into 2 types: Qualitative and Quantitative. Depending on the type of Risk and the data available for it, one or both of these types of analyses is performed. Qualitative analysis requires contextual or descriptive data that is more easily obtained, whereas quantitative analysis requires mathematical data. As such, all of the *Identified Risks* are qualitatively analyzed, while only high or moderate priority risks, where mathematical data are available, are quantitatively scrutinized. The following analyses are thus performed:

3.4.1. Qualitative Analysis

Qualitative analysis can take a wide variety of forms and it differs from quantitative research in its focus on language and description rather than numbers.

Qualitative methods are best applied for exploration before quantitative analysis is applied, or in the lack of numerical data. The Project Management Body of Knowledge (2000) proposes a best practice method to analyze and explain these risks. The following 2 steps illustrate:

- Describing, for each risk identified, its probability of occurrence and impact on each project objective. This can be done using ordinal (high, moderate, and low) or cardinal (1, 2, 3, etc.) scales. Financiers need to develop internal guidelines for the classification of these risks based on their risk appetite desired exposure.

- For each risk, the probability and impact scores of each are multiplied to obtain a combined score. The reliability of results here is highly dependent on the quality of the data used and thus the Appraisal team needs to exercise care.

- In order to obtain an overall project qualitative risk rating, the weighted average of the combined risk scores is calculated. Each risk product (obtained from step 2) is given equal weight in this exercise.

The Appraisal qualitative risk analysis outputs are thus:

  - A prioritized listing of risks
  - An overall project's qualitative risk rating.

After exploring all of the *Identified Risks* qualitatively, high and moderate risks that have numeric data need undergo quantitative analysis and verification.

3.4.2. Quantitative Analysis

For finance professionals, quantitative analysis in the form of sensitivity analysis and simulation are the most widely acceptable. In this *Unified Due Diligence* framework, this means testing the impact shortlisted risks obtained from the qualitative analysis. To do so, the quantitative assumptions underlying these risks are varied and

their effect on project objectives are observed and analyzed.

3.4.2.1. Sensitivity Analysis

This is the study of how the variation in the output of our financial model can be apportioned to different sources of variation in the input of the model. In limited recourse debt facilities the output is the financier's DSCR and the inputs are the risks obtained from the qualitative analysis. In its simplest form, this sensitivity analysis systematically changes one or two risks in the financial model to determine the effects such changes have on the project DSCR. This provides insight into how each risk (or two) changes the DSCR in isolation. This sensitivity can be very useful is determining which risks have the largest impact on the project objective and thus the guide in deciding the appropriate risk response (Hong Shanghai Bank of China Credit Assessment 2009; Commercial International Bank Credit Assessment 2009; IFC-Investment Guidelines 2007; IFC-Loan Pricing Manual 2009).

3.4.2.2. Monte Carlo Simulation

Simulation is a type of sensitivity analysis that runs multiple trial runs using random variables to approximate the probability of the output. In contrast to the simple sensitivity analysis, simulation allows for a comprehensive assessment of the combined effect of all the uncertainties on the objective being tested. In our Due Diligence, this means testing the effect of all of the short-listed risks on the DSCR. Since this exercise involves a large amount of computation, it is most suited for calculations by a computer. And although this analysis can be done using any computer spread sheeting tool, making use of a simulation software has its advantages in terms of speed and simplicity of use. Two of the many useful outputs of a simulation software package are the

distribution curve it produces for the objective as well as a tornado chart. The distribution curve is a representation of the range of probable outcomes for the out DSCR and the probability of each. The tornado chart is a diagram that graphically shows the list of risks and their corresponding effect on the project object in descending order. By varying the assumed values of each risk between a maximum and a minimum value, it allows for a quantitative prioritization of risks according to their effect on the outcome (IFC-Investment Guidelines 2007; McGrath and MacMillan 1995).

3.5. Step 5: Determining Risk Response

Risk response planning refers to the act of developing and enlisting a series of options in hopes of reducing any threats that may exist to the predefined project objectives. In this *Unified Due Diligence,* risk response refers to reacting to the *prioritized list of risks* output from the qualitative and quantitative analyses of the project.

3.5.1. Eliminate, Mitigate, Transfer, and Accept

Generally speaking, risk response is divided into elimination, transfer, mitigation, and acceptance. Selecting between these different risk responses is dependent on the level of influence the financer and borrower have over the risks surrounding a project. Country and Industry risks are external and thus the project team has less influence on. A financier has a choice of entering into a country or industry, or avoiding them, but once they decide to enter they are in fact choosing to accept the accompanying risks. In return, they need to price their facilities accordingly; higher country and industry risk requires higher compensation. On the other hand financiers have more control over project and sponsor risks and need to respond to these. Best

practices suggest that these internal risks should be eliminated whenever possible. The risk of over leverage can be eliminated by an affirmative covenant that the borrower decreases their exposure by increasing equity before a loan agreement is signed. It may include a negative covenant that prevents the borrower from increasing its debt without the prior consent of the financier. If the identified risks cannot be eliminated, then effort should be made to mitigate their impacts. This involves reducing the severity of the loss from that risk or the likelihood of that loss. The risk of delays in the procurement of a long lead item from a global supplier can be mitigated by procuring this item from a local supplier. Another way to mitigate this risk is to begin the procurement process as early as possible, while arranging for a location for storage of the ordered items where they are readily available for installation. Should efforts to mitigate some risks prove difficult, then these can be transferred to other parties more able to assume them. An owner is in a better position to assume the risk of cost overrun since it had the most influence in defining the *scope*, and will ultimately own the project. If elimination, mitigation, and transfer prove to be unreasonable or not cost effective, the financiers should consider accepting these risks and in turn asking for compensation in the form of higher loan pricing (Project Management Body 2000; World Bank Procedures 2001; Yescombe 2002; World Bank Drafting loan agreements 2009).

3.5.2. Loan Pricing

Lenders grade borrowers and offer different rates and terms based on country, industry, project, and sponsor identified risks. In general, pricing reflects a compensation for the risks the financier could not eliminate or transfer to other parties as explained in section 3.5.1. The approach most used by financiers to determine the interest rate is a risk-based pricing model (IFC-Loan Pricing 2009; The Equator

Principles 2010). The structure of this pricing scheme is as follows:

3.5.2.1. Structure of Risk-Based Pricing

The risk-based pricing model divides the interest rate into both macroeconomic project risk spread.

3.5.2.1.1. Macroeconomic Risk

The country's macro spread reflects the basic level of risk experienced by all entities operating in the country. This takes into account the impact of potential macroeconomic difficulties on a country's overall credit-worthiness. A sovereign's creditworthiness is often used as a practical proxy for the level of macroeconomic risk. Sources for these rates are databases such as Loanware, Bondware, or financial market publications (Hong Shanghai Bank of China Credit Assessment… 2009; Commercial International Bank Credit Assessment… 2009; IFC-Loan Pricing 2009).

3.5.2.1.2. Project Risk

Project risk spread on the other hand is industry, project, and sponsor specific risks and is based on an assessment of the particular risk factors affecting the commercial viability of the borrower (including technical, market, management, and financial factors) and the repayment risk of the transaction (including the availability of collateral security and the degree of sponsor support). Project spread determines loan pricing by its quality and by maturity. Quality refers to the risk of default of a business and its ability to recover. Generally, a start-up company or project requires a higher loan spread than an established operation because of the higher risk of default as well as because of the possibility of substantially lower recovery rates after a default. Maturity

refers to the duration of the loan. The longer the duration of a loan, the more risky it is (Brealey 2007; Metric 2006).

3.5.2.2. Types of Loans

There are two types of loans demanded in the project finance market: Fixed rate and variable rate loans. The distinguishing feature of variable rate loans is that the interest rate is a fluctuating short-term rate reset at six-month intervals according to a currency-specific LIBOR market rate (or other such appropriate standard benchmark), plus a macroeconomic- and project-risk spread. Thus, while principal payments are known once the loan is disbursed, interest payments vary from period to period. Fixed rate loans have a fixed principle and interest rate payment regardless of the period. The structure of *Risk-Based Pricing* holds for both types (Brealey 2007; Metric 2006).

3.5.2.3. Non-Senior Loans

The marked differential in spreads between senior loans and subordinated instruments is that, in a default situation, the recovery levels of subordinated instruments tend to be significantly lower than those for senior secured loans. Spreads on subordinated (i.e., non-senior) debt tend to be a multiple of senior loan spreads for the same client. Generally, subordinated debt spreads are roughly twice those of senior debt (IFC-Loan Pricing 2009)

3.5.3. Securities

Financiers assume the commercial risk of projects that it finances. However, in making senior loan financiers normally require either security or a guarantee adequate to cover its loan exposure. These are securities aimed at fully or partially compensating

the lender in case of borrower default to service its debt. Securities are considered risk *transfer* if the entire exposure of the financier is covered in the agreement. These are also considered risk *mitigation* when they only partially indemnify the lender in case of borrower default. Of the many securities included in a limited recourse debt facility, the following are the most widely used (Hong Shanghai Bank of China Credit Assessment… 2009; Commercial International Bank Credit Assessment… 2009; IFC-Investment Guidelines 2007):

3.5.3.1. Project Funds Agreement

Although financiers bear the commercial risk of a project, they expect the risk that a project will not attain physical completion to be covered by the sponsor and/or other parties. Accordingly, financiers will normally require that the sponsor or other backers of the project agree to provide additional funding (i.e., outside the original financial plan) if such funding is necessary to replace shortfalls in financing or cover an increase in the project's cost above initial projections. Such undertakings are intended to ensure physical completion of a project as well as the availability of sufficient initial working capital. Financiers seek to mitigate risks associated with project completion through a number of measures before signing the agreement. This includes negotiation of various standard agreements that set forth in advance how sponsors will proceed to overcome project funding shortfalls. Notwithstanding these measures, projects often incur shortfalls in their financial plans due to a variety of situations including cost escalation, time delays, committed sources of funding dropping out, or internal cash generation failing to meet expectations. Based on the probability of this shortfall, this security is one of the most important in project finance when a large component of the funds is directed towards the construction of the project (Hong Shanghai Bank of China

Credit Assessment… 2009; Commercial International Bank Credit Assessment… 2009; IFC-Investment Guidelines 2007).

3.5.3.2. Guarantees

Guarantees are obligations from the sponsor or a third party that whenever the borrower does not service the loan, they will pay the due amounts on its behalf. This is why the financial analysis of the borrower is an important exercise during project Appraisal. It serves to transfer the risk of debt coverage to the sponsor, shielding the financier in the event of loan default (Hong Shanghai Bank of China Credit Assessment… 2009; Commercial International Bank Credit Assessment… 2009; IFC-Investment Guidelines 2007).

3.5.3.3. First Lien Position on Mortgage

This means that the financier is in the first or a priority position to benefit from any liquidation of the collateral which secures the loan, in the event that the loan is in default and the property is to be sold. A mortgage may cover real estate or physical assets depending on the type of project and the assets is owns. This security mitigates or transfers the risk of default as the sale of these assets should recover part or all of the funds disbursed (Hong Shanghai Bank of China Credit Assessment… 2009; Commercial International Bank Credit Assessment… 2009; IFC-Investment Guidelines 2007).

3.5.3.4. Share Pledges

This security is a promise from the sponsors to transfer their shares or equity in the project to the lender if an instance of default is triggered. Financiers then proceed to

sell these shares in order to cover the due loan payments and return excess fund, if any, to the sponsors (IFC-Investment Guidelines 2007).

3.5.3.5. Pledge of Account

Another type of pledge that acts as a security is a *Pledge of Account*. This security is a promise to transfers to the financier a certain account from the balance sheet of the project. For example, a pledge that funds covering a duration of 6 month of *Debt Service* may be part of a *Pledge of Account* security (IFC-Investment Guideline 2007).

3.5.4. Risk Triggers and Actions by the Financier

As part of a risk response plan, financiers need to establish their risk tolerances and set *thresholds* for allowable change to the variables of *scope, time, cost,* and *revenue generation*. Lenders need to spend time determining their appetite for risk during Appraisal in order to document these thresholds in the loan agreement. Determining financier *thresholds* at this stage also allows for identification of risk *triggers* to be used during *Implementation-Monitoring* as a flag that a risk event has occurred or is about to occur.

3.5.4.1. Events of Default

If any *event of default* occurs (whether it is voluntary or involuntary, or results from operation of law or otherwise), the financier may, by a *notice of default* to the borrower, require it to repay the loan immediately. On receipt of any such notice, the borrower shall repay the loan and all interest accrued on it and any other amounts payable under the loan agreement. The loan agreement contains a section that covers the

definition of events of default, their causes, and the effects these will have on the loan and its repayment. Some of the common events of default are (Hong Shanghai Bank of China Credit Assessment… 2009; Commercial International Bank Credit Assessment… 2009; IFC-Investment Guidelines 2007):

- When the borrower fails to pay when due any part of the principal or interest on this loan or any other loan from the financier to the borrower and when this failure continues beyond the relevant period of grace provided for in the loan agreement.
- If any representation or warranty made by the borrower in connection with the execution of it is found to be incorrect in any material respect.
- If any authority takes any action that would prevent the borrower or its officers from carrying on all or a substantial part of its business or operations.
- If the borrower is liquidated or declared bankrupt
- If the borrower or a sponsor
  - Takes any step seeking a deal or other form of composition with its creditors or relief from its due obligation.
  - Ceases to carry on its business or any substantial part of its business.
  - Fails to obtain any authorization necessary for lawfully running the business.
  - Fails to obtain any Security document required, or if any Security document or any of its provisions ceases to be in full force and effect or ceases to provide the security intended, without the prior consent of the borrower.

Any of these events may trigger a borrower default and result in the financier requesting an immediate repayment of all borrowed amounts. An *event of default* can be considered as a *trigger* of immediate loan acceleration, the most severe action a

financier can take against a borrower. However, a proactive approach to project evaluation and monitoring suggests that a range of actions is available to the financier before the final resort of loan acceleration. This range changes as the project passes through its life cycle.

3.5.4.2. Action Options for Financiers

The financier passes through 2 phases of influence during the project life cycle. Phase 1 is before the final disbursement of its project funds and phase 2 after the final disbursement. Before the final disbursement, the financier has more influence, mainly in the form of controlling the remaining disbursements. This tool ceases to exist after the financier has disbursed all funds committed to this project. Notwithstanding the phase the financier is in, the range of actions available to it is largely dependent on how the project is categorized in terms of its prospects for success. Generally speaking, projects are seen as a *Going Concern,* a *Candidate for Divestment,* or a *Candidate for Legal Action.* Below are some of the issues associated with each (Hong Shanghai Bank of China Credit Assessment… 2009; Commercial International Bank Credit Assessment… 2009; IFC-Investment Guidelines 2007):

3.5.4.2.1. Going Concern

A going concern is a project that functions without a serious threat of liquidation for the foreseeable future, however, has hit a risk *trigger.* This *trigger* indicates that the project has deviated from the baseline assumptions for its identified risks, and merits closer supervision and action when possible. The range of actions available to the financier for *Going Concern* projects are (Hong Shanghai Bank of China Credit Assessment… 2009; IFC-Investment Guidelines 2007):

- Close Monitoring: This action is the default whenever a risk *trigger* is observed. It involves an increase in monitoring of the risk at hand, which can be in the form of more frequent reporting on its progress or more detailed information on it and its causes. This action is the first action a financier takes when a risk deviation from baseline occurs since it has the least impact on project progress and loan agreement. Thus, it is reserved for what the financier identifies as a low deviation from baselines and continues until this risk deviation is eliminated.

- Conditional Disbursement: This action is only available to financiers in the first phase when they have not disbursed all of the project funds. It is the most power action available since the borrowers are usually more responsive when there is a direct impact on the continuation of the project. As its name implies, financiers request that the borrower reverse the deviation from the baseline in return for an undisrupted disbursement of funds. This action should be reserved for moderate to high deviations, and can allows the borrower a sufficient curing period for it to reverse this variation.

- Debt to Equity ratio: This response calls for an adjustment to the originally agreed *debt to equity ratio* in the loan agreement. If the project cost or performance significantly deviates from baselines, the financier can request that the sponsor increase the equity portion in the project. This implies an increase in the sponsor's share of project risk, and lowers the risk associated with higher *debt to equity ratios*. This action should be reserved for high deviations since it involves a change in the loan agreement.

- New Security: This action allows the financier to request additional securities in return for deviation from baselines and what it preserves as ongoing and nonreversible higher risk. This action can also be done at any time during project life cycle. Similar to a change in *debt to equity ratios,* this action should be reserved for high deviations since it involves a major change in the loan agreement.

- Change pricing: This action is similar to adding a *new security* since it assumes that the deviation is serious and nonreversible. It involves a change in the pricing of the loan in the form of a onetime fee or a permanent increase in the project spread. This action can be taken at any time during project life cycle and should be reserved for high deviations.

- New Investors: This measure calls for new investors joining the creditors of the project in sharing the additional risk. This action is mostly used when there is project cost overrun that cannot be shared between the financier and the borrower, yet the project still has a chance to succeed. This action is suggested in special circumstances and is best used with high cost overruns.

- New Management: This action involves the financier requesting a change in the management of the project if the deviation from baselines in attributed to poor management or project procurement. Although most debt financiers do not normally get involved in management, this action is sometimes one of the last alternatives to an *acceleration of loan*. This is thus reserved for high deviation risks.

- Debt Rescheduling: Should all other efforts fail in reversing deviations or sharing risks, the financier may resort to *debt rescheduling*. This action only occurs after all project funds are disbursed and after the grace period for the project elapses. In this situation, the financier changes the originally scheduled loan timings in order to allow the borrower and its project more time to repay the borrowed amounts and the accrued debt.

3.5.4.2.2. Candidate for Divestment

A project is tagged a *candidate for divestment* when the deviations in the *identified risks* exceed the financier's risk tolerance, while at the same time there exists

a secondary market for their facility. This process is far from straight forward and usually involves the financier incurring a loss on their invested amount during the sale. Other creditors and shareholders need also be considered when making such as decision since their investment are also affected by this action. Rights to the loan can be sold to project sponsors or to third parties (Hong Shanghai Bank of China Credit Assessment… 2009; IFC-Investment Guidelines 2007)

3.5.4.2.3. Candidate for Legal Action

When all else fails, the financier may have to resort to a *loan acceleration* followed by *legal action* against the borrower and sponsor. This action is costly, lengthy, and usually with uncertain outcomes. These factors are mainly dependent on the country the project is in and its judicial system, factors the financier has little to no influence on. As such, many of the projects that fall under this category are written-off from the financial statement of the financiers during or after the legal process is completed (Hong Shanghai Bank of China Credit Assessment… 2009; IFC-Investment Guidelines… 2007).

3.5.4.3. Risk Triggers

In order for the financiers to decide on the appropriate action to be taken in response to a change in the baseline assumptions for the *identified risks*, a system of notification of the occurrence of these changes is necessary. This system will better serve the monitoring entity if it allows for early warning that in turn allows for timely remedial action.

As mentioned earlier, the *identified risks* that are external to the project and financier are difficult to transfer or eliminate. As such, country and industry risks are

best dealt with by being accepted. In addition, risks falling under these categories have a wide range of unexpected sources. It follows that monitoring triggers for these will have associated costs and little benefit in managing expected risks. However, the financier is in a much better position to manage *Project* and *Sponsor risks.* For these, determining *triggers* can have the largest benefit and the potential to reverse their deviation from baselines. Establishing risks triggers however is not a straight forward exercise and requires significant subjective judgment on the part of the Appraisal team. Notwithstanding, the following are some recommended approaches to determining risk triggers for risks that can be managed, based on the IFC's guidelines to debt investments (IFC-Investment Guidelines 2007; IFC-Credit Risk 2008):

3.5.4.3.1. Project – Construction Risk

The risks surrounding construction fall under one of the 4 variables mentioned earlier:

- *Time*: Following this variable is straightforward since there is a detailed construction schedule for the project. Triggers can be consumption of project float, missing a set milestone, a planned finish date exceeding the contracted one, or an extension of time request by the contractor. The IFC considers delays less than a third of the planned construction period a moderate risk and delays beyond that as high risk.

- *Cost*: Establishing *triggers* associated with *cost* are also straight forward since these are easily measured. *Triggers* can be followed by monitoring of variation orders or the increase in cost claims since these can have a direct effect on project cost variable. The IFC sees cost overruns between 10-25% as moderate deviations, between 25-50% as high, and above 50% as extreme.

- *Scope*: This can also be followed by monitoring of construction *variation*

orders since it is the best proxy to changes in *scope*. *Triggers* can be set at a percentage of project budget, also depending on the size of the project and the level of scope definition prior to construction commencement. These variations are already captured in the *cost* variable and thus need not be duplicated.

- Quality: This variable is the most difficult to follow since it is hard to measure. Financiers usually rely on the Architect/Engineer in maintaining a certain level of project *quality*.

3.5.4.3.2. Project – Operation Risk

The variable at stake here is *revenue generation* as explained in the *risk identification* section, and thus a number of *triggers* can flag deviations in the assumed risk levels. The IFC has set the following to monitor closely:

- DSCR: This *trigger* is also easy to follow since it is a simple calculation based on data available in any project financial statement. The IFC considers a DSCR between 1.5 and 2 as medium deviation, between 1 and 1.5 as high, and below 1 as extreme.

- Management Quality: This refers to the senior team managing the project during its operation. Making decisions on this risk is highly subject and thus should be approached with caution. A good proxy for this is the financial result of the project, managers' ability to anticipate changes, spot opportunities, or take actions to enhance performance. Good corporate governance and reporting are also a good indicator, as well as managements' timeliness in requesting waivers from the financier, if any. The IFC regard isolated incidents of poor performance as a low variation, frequent incidents as moderate, and a trend of poor performance as high variation.

- Social and Environmental rating: setting *triggers* here is subject to the

borrowers' compliance with the financier's set standards, such as the commonly adopted equator principles. The level of violation is directly proportional to variation rating of this risk

- Insurance Rating: The insurances provided by the project and its components should be deemed adequate at all times and a deficiency in that respect should trigger appropriate action on behalf of the financier. Rating of this risk is also subjective.

3.5.4.3.3. Project – Sponsor Risk

Sponsors of projects either manage the projects or have considerable involvement in day-to-day operations. Therefore, the IFC's guidelines suggest rating them together with *Management Quality* (IFC-Investment Guidelines 2007; IFC-Credit Risk 2008).

As a final step after establishing risk *triggers* and range of *action available to the financier* is to relate the two. The financier needs to decide what action does each risk trigger merit, and which response has the best change of reversing the deviation from the baseline risk. This exercise is highly contextual and time specific. Although a risk response plan will provide broad guidelines as to the action some triggers should provoke, the exact response is best left for the *Implementation-Monitoring* team at the time of the deviation. The details of the monitoring process will be explained in chapter 4 of this thesis.

3.6. Step 6: Compiling Report

The Appraisal report summarizes the findings of the aforementioned sections (3.1-3.5) and should clearly define the following (Choucair 2007):

- *Scope, time, cost, quality*, and *revenue generation* variable baselines.
- A prioritized listing of risks from the qualitative analysis.
- An overall project's qualitative risk rating that is the weighted average of the combined risk scores.
- Result of the quantitative sensitivity analysis and simulation including a tornado chart.
- A risk response plan including loan pricing, the list of securities to be requested, as well as risk thresholds, triggers, and actions by the financier to be used during *Implementation-Monitoring*.

3.6.1. Drafting Loan Agreement

A *loan agreement* is the main legal document entered into between the borrower and lender which regulates the terms of a loan. All rights, obligations, and requirements need to be stipulated in this document as this will be the reference for all future inquiries or disputes. The starting point for the drafting of a *loan agreement* is the *commitment letter* since the term include therein are the basis upon which the Appraisal was initiated. The findings of the analysis performed during Appraisal also serve as basis for different sections of the *loan agreement*. In general, a *loan agreement* includes (Hong Shanghai Bank of China Credit Assessment… 2009; Commercial International Bank Credit Assessment… 2009; IFC-Investment Guidelines 2007; World Bank Drafting Loan Agreements 2009):

- Project Description
- Breakdown of funds (section 3.1.2.)
- Information on loan and terms of agreement:
  - Pricing (section 3.5.2)

  - Schedule of disbursement, repayment, condition of prepayment, cancelation by financier or borrower
  - Securities (section 3.5.3.)
- Condition of first and subsequent disbursement and other Covenants
  - Reporting requirements (section 4.1.)
- Events of default
  - Threshold and triggers (section 3.5.4.)
- Other items

This *loan agreement* is first drafted and later amended during negations between the financier and borrower until an agreement is reach, at which point the final agreements is set and signed between the parties.

The following chart details the steps of the *Unified Due Diligence Process*, divided into the previously-mentioned 6 steps, in addition to step 0 from the Preliminary Review. This chart explains what each step of this process entails, in addition to its relationship to succeeding step. Succeeding steps are shown below each sub-step, and are divided into two types of relationships. Strong or prerequisite relationships and weak or supplementary. Strong relations are underlined while weak relations are not.

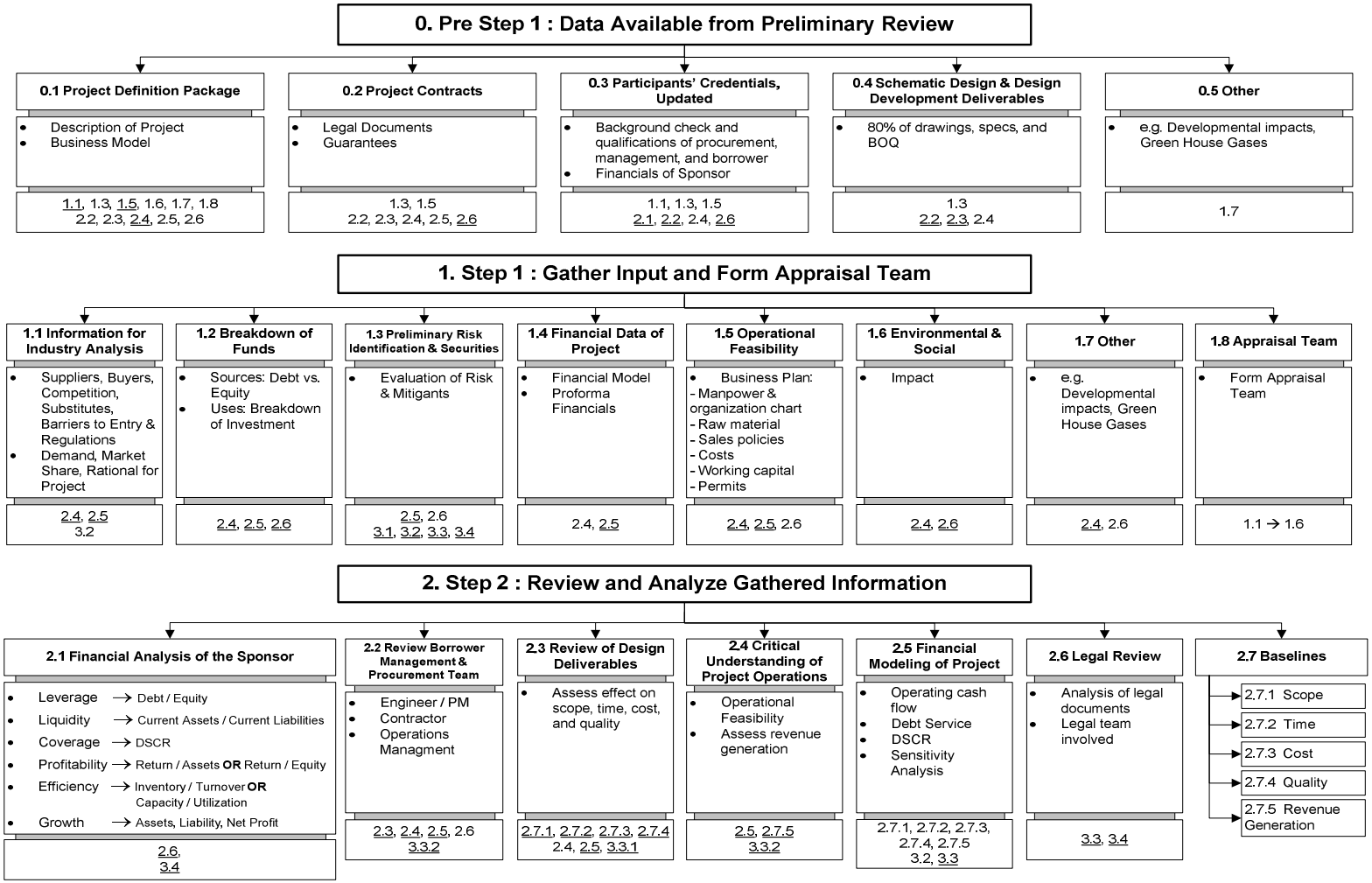


Fig. 3.1. Detailed *Unified Due Diligence* Process Steps 0 - 2

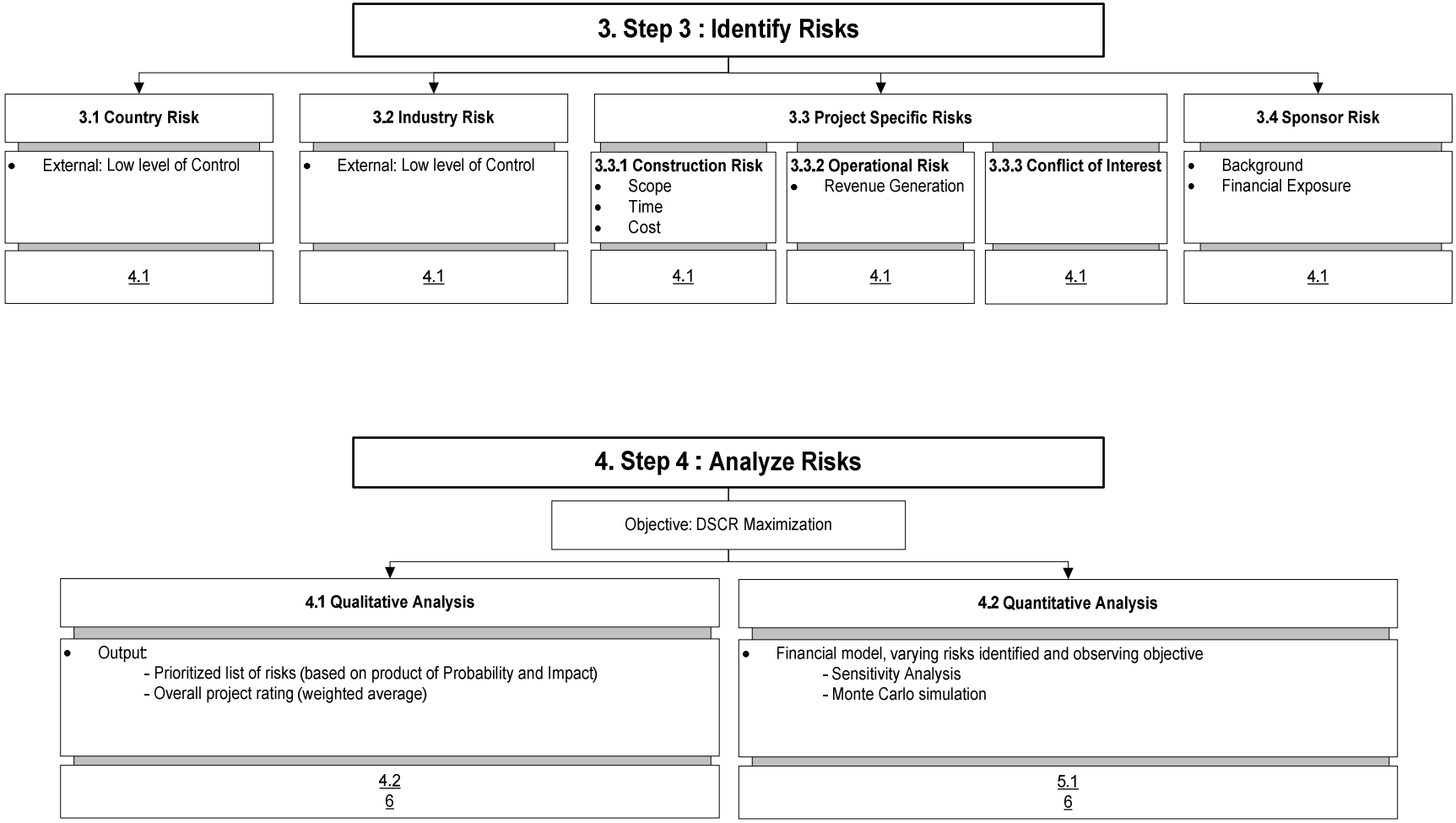


Fig. 3.2. Detailed *Unified Due Diligence* Process Steps 3 and 4

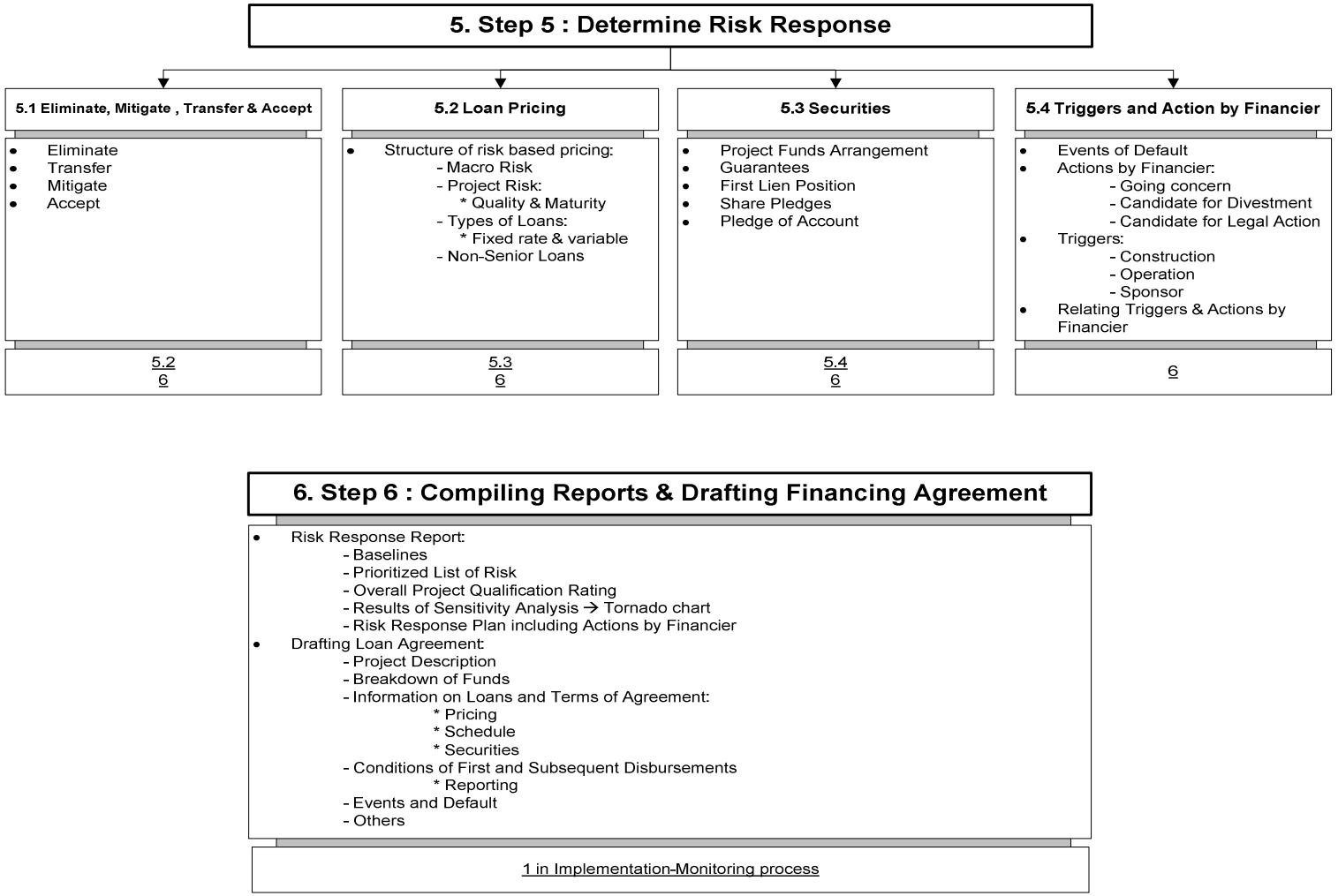


Fig. 3.3. Detailed *Unified Due Diligence* Process Steps 5 and 6

CHAPTER 4

UNIFIED IMPLEMENTATION-MONITORING

The *Unified Implementation-Monitoring* process starts after the financier commits to a project by signing a *loan agreement*. In the period following that, and until *loan closing*, the financier goes through a cycle of steps that observe the progress of the loan, reassess its standing, and when necessary take corrective action. This cycle is repeated for the duration of the loan at a pre-set interval, usually quarterly or monthly. Since *revenue generation* of a project with a construction component is not expected to coincide with the financial cycle of the loan, a grace period is usually stipulated in the *loan agreement*. The *Implementation-Monitoring* process is thus divided into 2 phases. Phase 1 is a period of project construction and ramp-up where the business is not yet profitable, that coincides with the a grace period where the borrow does not start repaying the loan. Phase 2 is when the business starts to become operationally profitable and the loan is being repaid.

According to Choucair's work, the *Unified Implementation-Monitoring* process proposed unfolds in five consecutive steps (Choucair 2007):

- Step 1: Assess Project Status and Progress
- Step 2: Analyze Variances and Changes
- Step 3: Re-Evaluate Risks
- Step 4: Update Cash Flow Sensitivity Analysis
- Step 5: Compile Report and Choose Action

This chapter will detail these steps, preparing this framework for the final step of validation.

As explained in section 3.6 of the previous chapter, the main outputs of the *Unified Due Diligence* are:

- *Scope, time, cost, quality*, and *revenue generation* variable baselines.
- A *prioritized listing of risks* from the qualitative analysis.
- An *overall project's qualitative risk rating* that is the weighted average of the combined risk scores.
- Result of the quantitative sensitivity analysis and simulation including a tornado chart.
- A *risk response plan* including loan pricing, the list of securities to be requested, as well as risk *thresholds*, *triggers*, and *actions by the financier* to be used during *Implementation-Monitoring*.

Together with the information collected in step 1 below, these will serve at the basis for the *Unified Implementation-Monitoring* process*:*

4.1. Step 1: Assess Project Status/Progress

In order for the process of *assessing project progress* to be streamlined, the *loan agreement* needs to explain in detail the reporting requirements needed from the Borrower during the *Unified Implementation-Monitoring*. The reporting requirements should correspond to the needed update of the identified risks of the project. These requirements differ depending on the phase a project is in. This usually means the reporting required should be either with every drawdown submission or corresponding to the preset interval required between monitoring cycles (usually every fiscal quarter), whichever is shortest (IFC-Credit Risk 2008).

The reporting requirements for a project are highly dependent on where in the project life cycle the projected has advanced. As mentioned earlier, the leverage a

financier has changes as funds are disbursed and as the project construction nears completion. As such, more data reporting during the construction period allows for better risk response. Risk response is more effective at this stage and thus more effort should be focused on analyzing deviations during this period and taking action respectively. The reporting requirements requested by most financiers during construction are (European Investment Bank project cycle 2001; Kuwait Fund Project Cycle 2005; Commercial International Bank Credit Assessment… 2009; World Bank Drafting loan agreements 2009).

- Items related to *time*:
  - Project schedule status or update and reasons for any schedule delays. A graphic representation of the progress of the project showing the original estimated schedule and the actual progress to date is customary here.
  - Shop Drawings Schedule, which is the status of the planned shop drawings to be submitted by the Contractor to the Engineer for the project.
  - Material Submittal Schedule, which shows the standing of the list of materials to be used in the project and its status in the approval process.
  - Quarterly look-ahead sub-schedule identifying project activities during the next reporting period and any expected changes to the schedule.
  - Anticipated problems for the duration of the project and suggested solutions.
- Items related to *cost*:
  - *Cost* status or update, in addition to a percentage estimate of the works completed this period versus the targeted amount of work to be completed next period.
  - Project cost variances, including an analysis of the reasons behind

these.

– Claims submitted or settled during the reporting period along with Engineer's opinion regarding those submitted and not settled.

- Items related to *scope* and *quality*:
  - Status of the Construction Documents.
  - Variation orders submitted along with Engineer's opinion regarding these.
  - Shop Drawings Schedule, which has an impact on the *time* is also relevant here.
- Others Items:
  - Contracts Awarded
  - Completion and acceptance of equipment and sub-project or other works
  - Listing of all tests completed and passed during the reporting period
  - Safety Report
  - Summary of negotiation with relevant authorities
  - Staffing and Training plans

After Construction has been completed, the reporting requirements are (Hong Shanghai Bank of China Credit Assessment 2009; World Bank Drafting loan agreements 2009):

- Items related to *revenue generation*:
  - Quarterly financial statements are the most common reporting requirements after completion of construction. These are usually comprehensive and contain all details required for an analysis of the status of

the project. Additional details may be requested on an as needed basis.

This information, along with the outputs of the Appraisal, serves as the basis of our next step of analyzing deviations from baselines.

4.2. Step 2: Analyze Variances and Changes

The purpose of the monitoring exercise is for financiers to *identify deviations* of *identified risks* from set *baselines* (section 3.2.) and to reassess the project's risk profile and whether or not it has deteriorated. This information can then be compared against the *risk triggers* (section 3.5.4.) to decide on financier actions and attempt to reverse unwanted deviations.

4.2.1. Identify Deviations

In order for a proper assessment to be carried out, the financier first needs to *identify deviations* from *baselines*. To perform this identification, the following tools and techniques may be employed (Project Management Body… 2000):

4.2.1.1. Variance Analysis

This tool compares actual to planned data, mostly for *cost, time*, and *scope* but also for *revenue generation*. For *time,* this means comparing the updated schedule with the *baselines* set during Appraisal. The same is true for *cost*, where the actual costs to date are compared to the *baseline* budgeted amount. *Scope* variance analysis can be performed as part of the *cost* analysis, or by analyzing the variation orders of the project. Although the variables of *time, cost,* and *scope* can each be analyzed separately, any effort to do so will disregard the interrelation these have, and are bound to err. As such, tools that integrate the different variables of a project are most useful here.

4.2.1.2. Earned Value Analysis (EVA)

In order to identify deviations from baselines, variances should be analyzed in an integrative way for a correct interpretation. Considering schedule and cost variances independently is misleading. A negative schedule variance explains a positive cost variance by "acceleration" as opposed to cost overrun. Earned value analysis (EVA) is a useful tool, at this step, to integrate *scope, cost* and *time*. As such, not all changes and variances should be a source of alarm. Only those negatively impacting project objectives beyond the acceptable thresholds are. Thus, forecasting the impact of variances and changes is an essential part of this analysis step. Financiers need to be assured that enough funds remain to complete the project within a reasonable time frame.

Earned value analysis relies on three measures determined at the point in time where progress is to be assessed:

- The planned value (PV) which is the cumulative cost that should have been spent on the project to date, also called the budgeted cost for work scheduled (BCWS).
- The actual cost (AC) which is the actual money spent on the project to date, also termed the actual cost for work performed (ACWP).
- The earned value (EV) which is the value of the work actually completed, alternatively referred to as the "budgeted cost of work performed (BCWP).

These figures are used in the calculation of the following variances and efficiency indicators to describe project performance:

- Cost variance (CV) = AC – EV, positive for a project over-budget,
- Schedule variance (SV) = PV – EV positive for projects experiencing delays,
- Cost performance index (CPI) = EV/AC, and

- Schedule performance index (SPI) = EV/PV.

The Estimate at Completion (EAC) is the most likely total project budget at completion given the project's current performance and risk profile. The formula used for obtaining the EAC depends on whether current variances are atypical, typical or indicative of serious flaws in the assumptions underlying the original estimate. In the first case, EAC is obtained by adding the remaining budget to the actual costs. In the second, EAC is the actual cost plus remaining budget divided by the CPI. In the last instance, a new estimate for remaining works is developed and added to the cumulative actual costs (Project Management Body… 2000).

4.2.1.3. Trend Analysis

Trend analysis refers to the concept of collecting information and attempting to spot a pattern, or trend, in that information. In project management trend analysis is a mathematical technique that uses historical results to predict future outcome. This is achieved by tracking variances in *scope, cost, time,* and *revenue generation*. From this analysis, one can visualize if performance is improving or worsening during the time period analyzed. Examples of trends followed by financiers are floats—in milestones or project completion date—for *time*, total increased costs or trends in CPI for *costs*, total value of variation orders for *scope*, and net income or DSCR for *revenue generation* (IFC-Credit Risk 2008; Moody's Financial Analysis Ratio Report 2007).

4.2.2. Updated Overall Risk Rating

This tool is a critical component in the *Implementation*-Monitoring process as it summarizes the credit health of specific investments. It is an effective predictor of loan defaults and investment impairment, and is also used in determining general loan

loss provisions for financiers. The *risk rating* for a project is determined by using the same model that was used during Appraisal in section 3.4.1., while using updated assessment for each of the risks. It assigns an ordinal or cardinal score for each of the previously *identified risks*, and then averages them to generate an overall project credit rating. As mentioned earlier, assessment here is based partly upon qualitative information that requires that the financier use subjective judgment as to what is appropriate (IFC-Credit Risk 2008).

4.3. Step 3: Re-Evaluate Risks

The project's risk profile is not static in nature. As work progresses, additional information becomes available. This enables a better assessment of project risks. Thus, monitoring and controlling risks requires the re-evaluation of project risks in the light of updated project information and the determination of additional risks on the project's risk profile. The tasks involved are identical to the risk analysis performed during *Due Diligence.*

The step of *analyzing variances & changes*, including identification of deviation from *baselines* and an analysis of the causes of these deviations, can unveil higher potential of occurrence of previously *identified risk*, higher impact for previously *identified risks*, or new risks altogether (IFC-Credit Risk 2008). This *update of the identified risks* and their probability and impact need go through the same process of qualitative analysis as per sections 3.4.1. of the Appraisal process. The output of this section is:

- An updated prioritized listing of risks
- An updated overall project's qualitative risk rating

4.4. Step 4: Update Cash Flow Sensitivity

During Due Diligence, lenders carry out a sensitivity analysis on the project's financial model for a range of possible assumptions for the *identified risks*.

As new data becomes available to the financier, updating the sensitivity analyses of section 3.4.2. is merited. This exercise aims to analyze how the updated variation in identified risks will affect the financier's objective. As explained earlier, the DSCR is a good proxy of this objective. The results of this new sensitivity should be compared against corresponding thresholds documented in the loan agreement. In addition, some changes could be suggested to mitigate the effect of such variations (IFC-Investment Guidelines, 2007 and Metric, 2006).

4.5. Step 5: Report Compilation & Action by Financier

The information gathered along with the findings of the analysis exercise and the *re-evaluation of risks* are summarized in a performance report. Such report should also contain lessons learned from this project, to be aggregated at the end of the loan into a sector or industry lessons learned database. This report should be a basis for the action to be made by the financier in the face of any variances or changes.

4.5.1. Report Compilation

Among the outputs of this performance report (Project Management Body, 2000):

- For *scope*: the deliverables completed to date as compared to the baseline, along with scope variances likely to cause problems.
- For *time:* performance measurements, variance analysis, causes behind variances and potential impact on other activities, corrective action needed, and the

updated project schedule.

- For *cost*: a comparison of actual costs to planned costs, revised cost estimates which could call for particular clearances, budget updates which could involve the setting of a new *cost* baseline, corrective action, estimate at completion capturing *cost* variance causes, and corrective action and reasoning behind them.
- For *quality*: the acceptance or rejection of pending rework decision and corrective or preventive action.
- The *updated project identified risk* list.
- The *updated overall project risk rating*, reflecting changed project conditions.
- The updated *risk response plan, triggers*, workaround plans, and *financier action* needed.
- Lessons Learned.

4.5.2. Action by Financier

Based on the project performance report, the financier will be able to take action. If there are no alarming conditions, the loan progresses and the financier does not need to take any corrective action. If some concerns exist or triggers have been observed, the lender may place constraints on the borrower as discussed in section 3.5.4.2. These will have to be cleared within a cure period or else a stronger response is provoked (IFC-Credit Risk 2008; World Bank Drafting loan… 2009). Finally, the variations may be so large that an event of default is triggered and the loan is accelerated. If the loan is not accelerated or foreclosed, and the borrower repays all its debt and the accruing interest, the financier will need to verify that completion has been achieved as defined in the various project contracts. This will mark the conclusion of

this project loan.

The following Figure 4.1 details the steps of the *Unified Performance Monitoring Process*, divided into the previously-mentioned 5 steps. This chart also explains what each step of this process entails, in addition to its relationship to succeeding step. As in other charts previously presented, succeeding steps are shown below each sub-step and are divided into strong and weak relations.

4.6. Relating *Unified Due Diligence* and Performance Monitoring Processes

The processes of project *Unified Due Diligence* and *Implementation-Monitoring* are heavily interrelated. The Due Diligence stage sets the stage for the steps of *Implementation-Monitoring*. This is observed in the output of the many steps of due diligence. Baselines, Risk Triggers and Actions, List of Risks, Overall project Rating, and Results of Sensitivity Analysis collectively produce a project Risk Response Report and a Draft Loan Agreement. These in return serve as input to the interim process of performance monitoring. In addition, and as new risks are identified during the *Unified Implementation-Monitoring*, these risks are re-evaluated and their impact updated using the same tools explained in analysis steps of *Unified Due Diligence*. Figure 4.2 relates the *Unified Due Diligence* and *Implementation-Monitoring* processes.

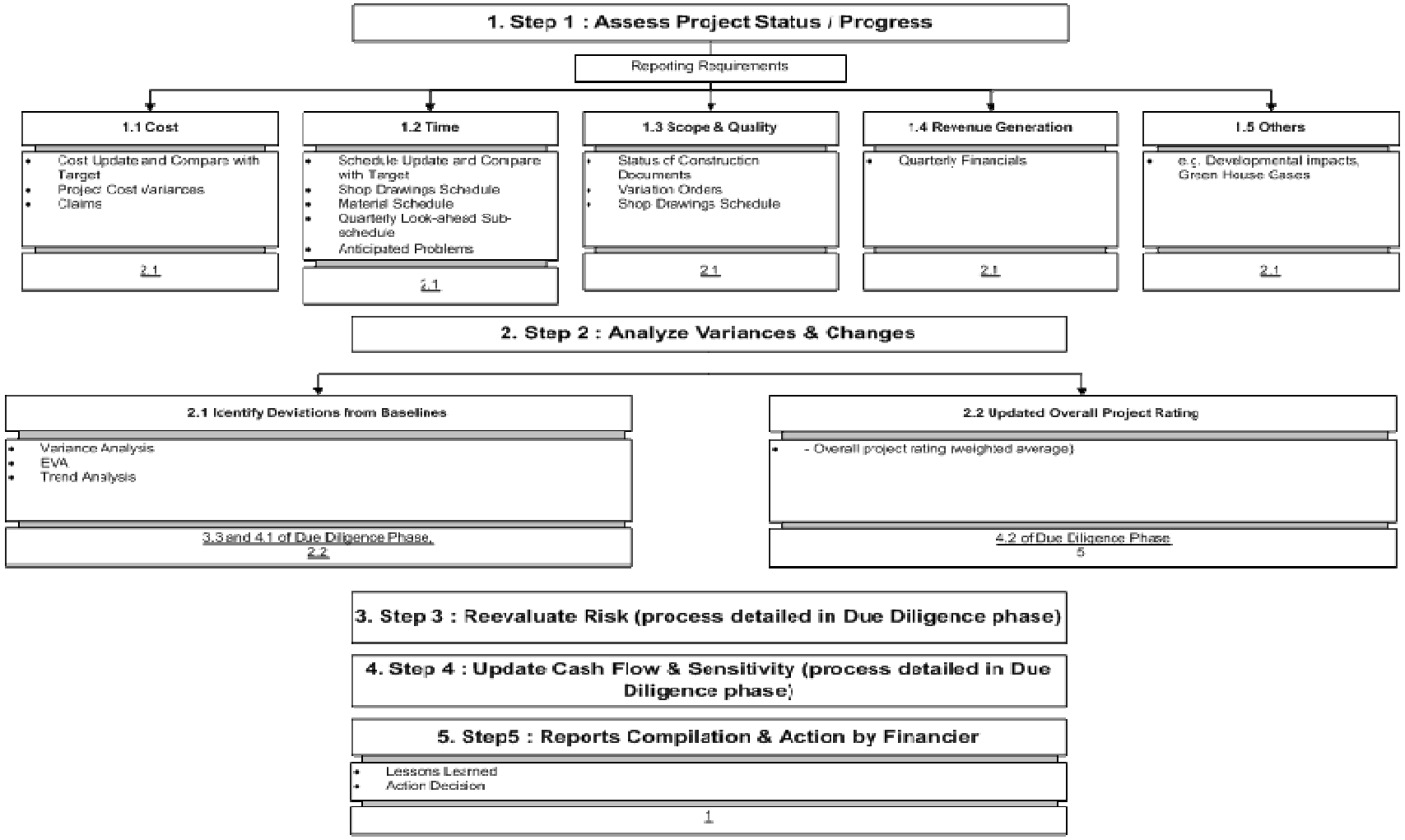


Fig. 4.1. Detailed *Unified Implementation-Monitoring* Process

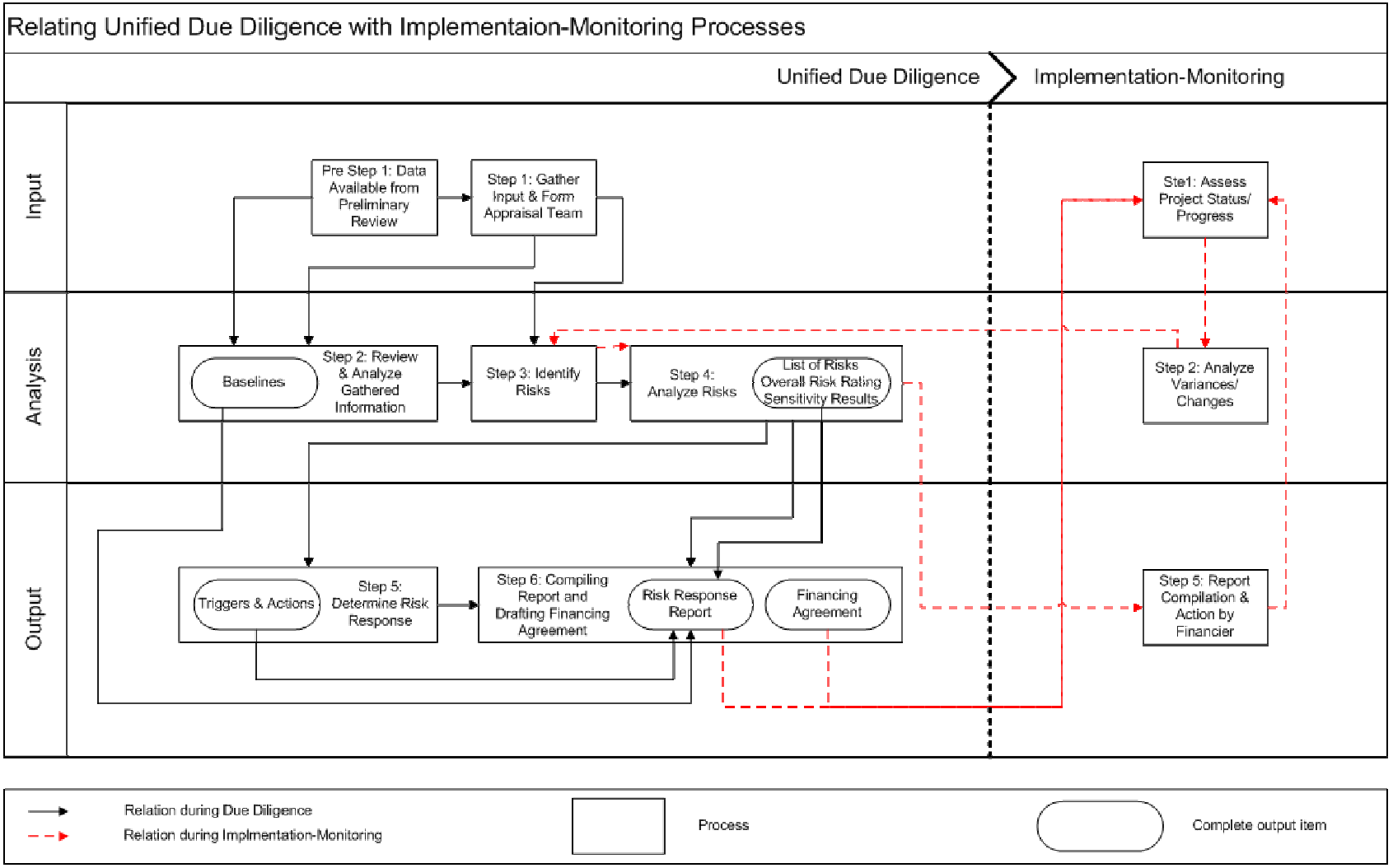


Fig. 4.2. Relating *Unified Due Diligence* and *Implementation-Monitoring* Processes

Relations between processes, indicated with arrows between process boxes above, are further detailed in the below tables. Each table shows all relationships between the processes, the direction of flow of information and data from one sub-step to another, and the strength of this relationship. As mentioned earlier, relationships are divided into strong or prerequisite relationships and weak or supplementary. Strong relations are shown in bold font arrows while weak relations are represented by the smaller arrows. As for the direction of flow of information, single headed arrows indicate unidirectional follow of information, whereas double headed arrows indicate an exchange of information between the related sub-steps. Regarding the robustness of these relations and the extent of their objectivity, these relations can also be divided into 2 groups. The first group consists of all the strong relations, which are self-evidently objective (IFC-Operational Procedures 2010; Hong Shanghai Bank of China Credit Assessment 2009; Commercial International Bank Credit Assessment 2009). The second group consists of all weak relations, which are more subjective and based on inferences from the practices of the banks studied during the literature review.

As shown in Table 4.1, relations between steps 0 (Data Available from Preliminary Review) and 1 (Gathering Inputs and Forming Appraisal Team) and 0 and 2 (Reviewing and Analyzing Gathered Information) of Due Diligence are all unidirectional. This shows the sequential nature of these steps. In addition, this table shows how steps 0and 1 mostly supplement each other, whereas steps 0 and 2 have more of a strong or prerequisite relation.

Table 4.1. Relationships initiated at step 0 of Due Diligence

	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
0.1	⬈		↗		⬈	↗	↗	↗
0.2			↗		↗			
0.3	↗		↗		↗			
0.4			↗					
0.5							↗	

	2.1	2.2	2.3	2.4	2.5	2.6	2.7				
							2.7.1	2.7.2	2.7.3	2.7.4	2.7.5
0.1		↗	↗	⬈	↗	↗					
0.2		↗	↗	↗	↗	⬈					
0.3	⬈	⬈		↗		⬈					
0.4		⬈	⬈	↗							
0.5											

Table 4.2. Relationships initiated at step 1 of Due Diligence

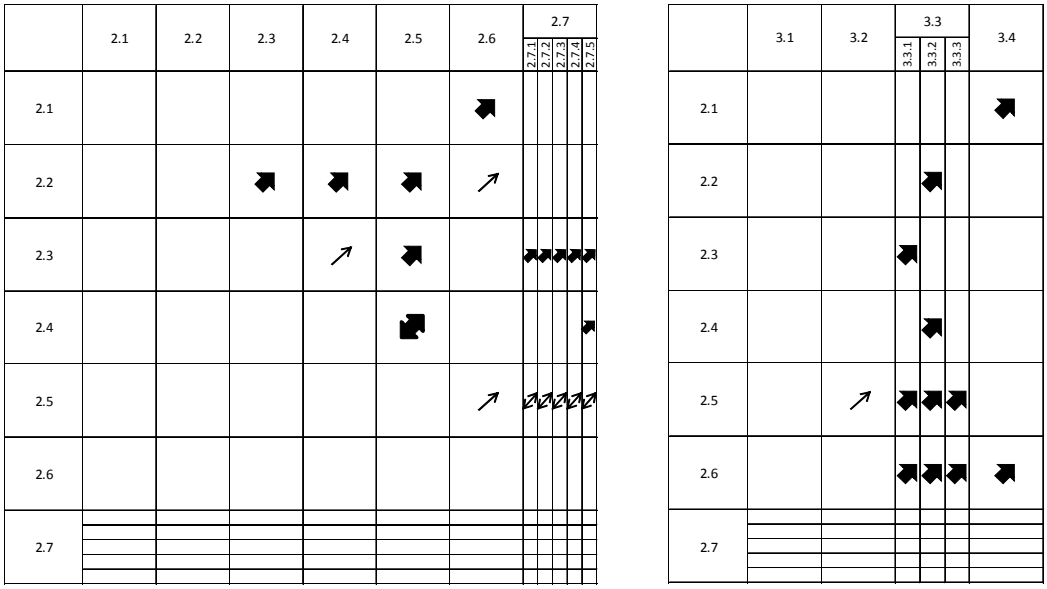
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8
1.1								↖↘
1.2								↖↘
1.3								↖↘
1.4								↖↘
1.5								↖↘
1.6								↖↘
1.7								
1.8								

	2.1	2.2	2.3	2.4	2.5	2.6	2.7					
							2.7.1	2.7.2	2.7.3	2.7.4	2.7.5	
1.1				↖	↖							
1.2				↖	↖	↖						
1.3					↖	↗						
1.4				↗	↖							
1.5				↖	↖	↗						
1.6				↖	↖							
1.7				↖		↗						
1.8												

	3.1	3.2	3.3			3.4
			3.3.1	3.3.2	3.3.3	
1.1		↗				
1.2						↖
1.3	↖	↖	↖	↖	↖	
1.4						
1.5						
1.6						
1.7						↗
1.8						

Table 4.2 shows the relations between steps 1 (Gathering Inputs and Forming Appraisal Team) and itself, 1 and 2 (Reviewing and Analyzing Gathered Information) and 1 and 3 (Analyze Risks). Within step 1, a high level of interaction is observed where step 1.8 (Form Appraisal Team) interacts with every other sub-step. On the other hand, the relations between steps 1 and 2 and 1 and 3 are unidirectional where the first (step 1) feeds into the second (steps 2 and 3). Strong relations also dominate all these relations

Table 4.3. Relationships initiated at step 2 of Due Diligence



Relations between steps 2 (Reviewing and analyzing gathered information) and itself are a mix of unidirectional and interactive, and show strong relations between most steps. Relations between steps 2 and 3 (Analyze Risks) are unidirectional, and exhibit a high level of strong dependency.

Table 4.4. Relationships initiated at step 3 of Due Diligence

		4.1	4.2
3.1		↗	
3.2		↗	
3.3	3.3.1.	↗	
	3.3.2.	↗	
	3.3.3.	↗	
3.4		↗	

Table 4.4 shows that all sub-steps of step 2 are prerequisite inputs to sub-step 4.1 (Qualitative Analysis).

Table 4.5. Relationships initiated at step 4 of Due Diligence

	4.1	4.2
4.1		↗
4.2		

	5.1	5.2	5.3	5.4
4.1	↗			
4.2				

	6
4.1	↗
4.2	↗

Table 4.5 also show how sub-step 4.1 (Qualitative Analysis) feeds into sub-step 4.2 (Quantitative Analysis) and 5.1 (Eliminate, Mitigate, Transfer, Accept), whereas both steps 4.1 and 4.2 are prerequisite inputs to step 6 (Compiling Report and Drafting Loan Agreement).

Table 4.6. Relationships initiated at step 5 of Due Diligence

	5.1	5.2	5.3	5.4
5.1		↗		
5.2			↗	
5.3				↗
5.4				

	6
5.1	↗
5.2	↗
5.3	↗
5.4	↗

In turn, each of the sub-steps of step 5 (Determine Risk Response) feeds into the next forming a series of prerequisite steps. They also are crucial inputs into step 6.

Table 4.7. Relationships initiated at steps 1, 2, and 5 of *Unified Implementation-Monitoring*

	2.1	2.2
1.1	↗	
1.2	↗	
1.3	↗	
1.4	↗	
1.5	↗	

	2.2	3.3 of Due Dilgence	4.1 of Due Dilgence	4.2 of Due Dilgence	5
2.1	↗	↗	↗		
2.2				↗	↗

	1
5	↗

Relations between steps 1 (Assess Project Status / Progress) and 2 (Analyze Variances and changes) of Implementation-Monitoring, 2 and itself of Implementation-Monitoring, 2 of Implementation-Monitoring and 3.3 (Project Specific Risks), 4.1(Qualitative Analysis) and 4.2. (Quantitative Analysis) of Due Diligence, and 5 (Report Compilation and Action by Financier) and 1 of Implementation-Monitoring are all strong and unidirectional. Table 4.7 clearly shows the difference between the mentioned steps and those between the steps of Due Diligence. Whereas the former are more interactive and parallel to one another, the latter are sequential. This observations is reasonable since steps of Due Diligence are more complex and require a large amount of interaction, whereas steps of Implementation-Monitoring are more streamlines and systematic.

CHAPTER 5

CONCLUSION

5.1. Summary

In order for financiers to increase the chances of success of their project, careful initial planning is crucial. This is represented in *the Unified Due Diligence* of this thesis. However, without the follow-up of performance monitoring represented by this thesis' *Unified Implementation-Monitoring* process and taking necessary action whenever factors affecting the original assumptions come to surface, even the most well thought out plan remains ineffective. Adequate performance monitoring and action is therefore a key ingredient of this framework. The aim of this thesis has been to produce a detailed guiding framework that can help lenders play a proactive role in monitoring the performance of the projects they fund using project management and finance best practices. After reviewing practices of sophisticated financial institutions such as the WB, the EIB, the KF and the IFC and identifying the main processes, *Unified Due Diligence* and *Implementation-Monitoring*, their steps have been detailed to a level that makes them actionable.

The first contribution of this thesis was detailing the various steps of the *Unified Due Diligence Process*, their significance, and how these relate to subsequent steps. Input step were explained and their sources identified. Analysis steps were scrutinized and the tools used in them explicated. Output steps were described in detail and their products specified. This phase prepares the financier for its critical successor, performance monitoring.

The second contribution involved detailed the steps of the *Unified*

Implementation-Monitoring Process. Input, Analysis, and Output steps were also clarified and detailed, allowing the financier to identify deviations from set baselines and to respond respectively in compliance with the terms of the financial agreement.

The final task was explaining how the *Unified Due Diligence* and the *Unified Implementation-Monitoring* processes are interrelated. The outputs of the former are inputs to the latter, in addition to the similarity between the analyses steps of each rendering them iterations of the same process.

5.2. Framework Properties

The product of this thesis, the *Detailed Performance Monitoring Framework*, is both universal and generic. Universal refers to its disconnection from any geographical location while generic refers to its detachment from any specific industry. As such, a financier needs to customize it based on their risk appetite and desired exposure. For example, the risk triggers identified during Due Diligence need take into consideration the industry a project is in, the geographic location it operates within, and the preferences of the financier in terms of the amount of risk undertaken. This customization is also true for the range of action to be taken by the financier in the face of devotions from baselines.

5.3. Future Work

5.3.1. Piloting and Verifying

Although this Framework combines the practices of 3-5 international and multilateral financial institutions, its step need verification. This need stems from the combination of the procedures of these different financial institutions into one unified framework, adopting the best parts of each approach. As such, the logical next step

would be verification that the developed framework in its aggregate helps the financier be more proactive in its approach to managing risks, which in turn increase the chances of project success and timely loan repayment.

5.3.2. Modifying the Framework for Equity Investments

Since this framework is applicable to debt financed projects, modifying it for equity investments could be of value to financiers with an appetite for this kind of exposure. This will require major changes to the framework and thus merits further investigation and development.

5.3.3. Modifying the Framework for Specific Industries

Since this framework is generic, it could benefit from industry specific customization. This customization should span across all steps of the framework, further preparing it for verification and application. For example, a framework for maritime ports would focus on projects that are in this sector, while customizing the framework for the risks associated with this type of project.

5.3.4. Devising a Systematic Automated Solution Based On This Framework

A final suggestion for future work is devising a decision tool that is based on the steps of this framework. Ideally, this decision tool can receive all the input steps as explained in chapters 3 and 4, and output decisions on whether the financier should proceed with this facility or not, in addition to suggested actions by the financier in the face of deviations from set baselines.

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