Effective Project Methodology = Successful Business Intelligence Projects

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Business Intelligence (BI) projects are notoriously difficult to complete on time and on budget. Like all projects, project overruns are caused by risks that are not properly mitigated. Why are there so many more risks inherent in a BI project? There are the typical project risks such as resource constraints and unrealistic scheduling. BI projects also suffer from lack of clarity about data at the outset of a project.

The only BI projects where this data risk is reduced (not eliminated) is when the source data has been used for a previous project. In these cases the development team is more aware of the data issues.

Nevertheless, the best way to mitigate data risks in a BI project is to execute an effective project process methodology.

The six phase process used by OnApproach has proven effective in implementing BI projects to deliver the expected results on time and on budget. The phases are treated as “gates”, each of which must complete before a subsequent gate can officially begin.

The six phases are:

1. Discovery
2. Requirements
3. Design
4. Development
5. Deployment
6. Support and Knowledge Transfer

Each phase has its own:

Objectives
What is the intent of the phase?

Activities
What specific actions are performed to meet the objectives?

Artifacts
Artifacts are documentation used in that phase. These documents capture the essential information output of each activity. Artifacts from one phase are typically expanded and enhanced in subsequent phases. All artifacts should be stored in a location that all stakeholders can access at any time. However, permissions to edit the documentation needs to be tightly controlled.

Milestones
A phase milestone is an event that signifies the “gate” of the phase is completed and project can move forward to the next phase..

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This project process will appear familiar to many experienced project practitioners. The crucial difference is that it is "tuned" to particular nuances of BI projects.

Discovery

A notable difference from conventional project processes is the Discovery phase. Many projects launch into requirements gathering once the project charter and scope have been approved. For BI projects, the Discovery phase is the first iteration of requirements gathering. The results of the requirements gathering activities will be expanded and enhanced in the Requirements phase.

Successful BI projects are naturally iterative, particularly when it comes to data. Thoroughly understanding the data in the project is essential. Comprehensive data knowledge by the development team is the number one success factor for completing the project as intended.

DISCOVERY PHASE

OBJECTIVES	ACTIVITIES	ARTIFACTS	MILESTONES
Initial business requirements	Interviews/Test Scenarios	Business Requirements Document (BRD)	Approved initial BRD
Initial technical requirements	Report dissection	Technical Requirements Document (TRD)	Approved initial TRD
	Data analysis	Initial project plan	
	Technical validation		
	Peer review		

Discovery Objectives

This objective of this phase is to gather initial requirements. As noted above, these requirements will be expanded and enhanced in the Requirements phase.

Discovery Activities

Interviews/Test Scenarios

Interviews are carried out with technical and/or business people who have been designated as the subject matter experts by the organization. It is important for these experts to be as specific as possible in describing the requirements that are needed for the project. In cases where a report needs to be duplicated or expanded from a base report, the specific elements of the report need to be called out using report dissection as noted below.

In cases where there are no specific reports or an ad hoc reporting capability is to be developed, users need to specify exactly what results they need reported in order to meet their information goals. One way to do this is for users to develop a draft test plan. This document describes scenarios in which users would go about finding, analyzing, and reporting data. These scenarios need to be comprehensive and specific. While they can be refined in subsequent phases, significant changes or additions could jeopardize the project schedule.

Report Dissection

Report dissection is performed on all target reports. Reports need to be analyzed column by column, row by row. All calculations need to be documented and their individual data elements need to be specified and traced back the tables from which they originate. If additional information is needed on the new reports, the subject matter experts need to give specific feedback on what additional data elements are needed and what calculations need to be performed.

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Data Validation

Data validation is a key differentiator of the BI project process. It emphasizes understanding the source data and data in existing data warehouse structures.

Source Data

For source data, avenues of exploration are:

Table List: What is the "universe" of tables that will be needed for the project? This list needs to include lookup tables and data from external sources. Aside from existing documentation, internal resources from both the technical and business groups will be helpful in gathering this information. However, it is interesting to note that even these "experts" are frequently unaware of important aspects of their own data.

Table Layouts: What columns (fields) exist in each table and how are they defined? Locating a source data dictionary is very helpful. Otherwise, a significant amount of time will be consumed in developing one for the needs of the project.

Data Quality: What is the condition of the data? Are there nulls in columns that were otherwise thought to the 100% populated? Are there values in columns that are unexpected (e.g. – alpha characters where only numerals were expected)?

Data Relationships: What are the relationships between tables in the source data? What columns are joined?

Existing DW Structures

Table List: What fact and dimension tables exist in the current data warehouse? Are there conformed dimensions that are intended to be used across the data warehouse? This list will also need to include tables in operational data stores (ODS) and other intermediate tables between the source data and the data warehouse.

Table Layouts: What are the columns in the tables? What are their logical and physical names (i.e. – business names versus actual column names of the tables)? Where is the metadata source that describes the data and how is it maintained?

Data Relationships: What are the relationships in between the fact tables and dimensions? In other words, how are they joined? What roles are played by important data such as dates (e.g. – posting date, invoice date, etc.)?

Data Transformations: Between the source data and the target tables in the data warehouse, what transformations occur (e.g. – data cleansing, format changes, logic to select certain values over others)? What are the rules for populating columns were data is missing or invalid (e.g. – inserting "xxxx" as a default value where source data is null)?

The fact is not all data issues will be discovered in the Discovery phase. This brings up the point that the BI project process is by its nature iterative. Problems not found in the Discovery phase will usually surface in later stages. However, a significant output of this phase is to understand as much about the data as possible before the Requirements phase.

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Technical Validation
Technical validation is intended to create an understanding of the technical landscape in which the development team will be operating. This includes:

- Hardware used in the environment
- Operational and developmental software used
- System interfaces
- Existing project processes – standards, approvals, documentation artifacts

Peer Review
At many points during the project process, peer reviews are conducted to validate the direction of the development team. In these cases, a larger group is convened to review work of the developers to evaluate the quality and accuracy of the artifacts produced.

Discovery Artifacts

The artifacts arising from the Discovery phase are the Business Requirements document (BRD) and Technical Requirements document (TRD). The other artifact to be created in this stage is the initial project plan.

In this phase the BRD is the first draft of the project requirements from the business point of view. It documents the business rationale for the project and lays out the project scope and deliverables from a non-technical perspective. The initial TRD documents what is known about the technical environment so far and what the first cut at data analysis has revealed.

The initial project plan is also an artifact of this phase. Armed with the information uncovered in this first pass at requirements, a realistic first draft of the project plan is possible. However, this document will modified as the result of new information revealed in the Requirements phase.

Documentation of interviews, test scenarios, report dissection, data analysis, and technical validation will be included in the BRD and TRD.

Discovery Milestones

The milestones for the Discovery phase are approvals by the project sponsor of the initial BRD and TRD. It is essential that the sponsor gives a clear signal that the project is proceeding as expected.

Even though this approval is essential, it does not mean that work on the next phase cannot begin. Typically, it is most efficient for preliminary work on the subsequent phase to begin prior to formal approval of the existing phase. The degree to which work proceeds along these lines is dictated by how likely approval of the existing stage will be.

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Requirements

Solid requirements gathering is the heart of meeting project expectations. The requirements are simply the detailed deliverables for the project. The Requirements phase is not substantially different between a BI project and a conventional project except that it is iterative by design. These iterations help mitigate the risk of missing the desired BI deliverables as outlined initially in the Discovery phase version of the BRD and TRD.

REQUIREMENTS PHASE

OBJECTIVES	ACTIVITIES	ARTIFACTS	MILESTONES
Final business requirements	Interviews/Test Scenarios	Business Requirements Document (BRD)	Approved final BRD
Final technical requirements	Report dissection	Technical Requirements Document (TRD)	Approved final TRD
	Data validation	Project Plan	Approved final project plan
	Technical validation	Cardinality Diagrams	
	Peer review	Meeting Summaries	
	Project meetings	Change Orders	

Requirements Objectives

This objective of this phase is to finalize requirements. Much of the same terrain covered in the Discovery phase will be covered as the development team does a “deep dive” into the data.

Requirements Activities

All the activities of the Discovery phase are repeated. The same techniques are used to thoroughly uncover all the aspects of the project. Documented interviews with subject matter experts are especially important to answer questions as they arise. In this phase, data analysis has evolved to data validation where the emphasis is on a finalizing a picture of the data landscape.

At this point in the project a meetings with stakeholders will be necessary. Sometimes interviews with one or more subject matter experts are not adequate. Problem-solving meetings with a larger group may be the most effective way to answer tough, complex questions. Such meetings also serve to create consensus and keep the larger constituency within the organization aware of the progress and direction of the project. Also, regularly scheduled status meetings with sponsors are essential to keeping the top stakeholders informed.

Requirements Artifacts

The BRD and particularly TRD are expanded and enhanced as the Requirements phase proceeds. Also, the project plan is finalized as the full breadth of the project is understood.

An additional document produced is the Cardinality Diagram. This document spells out the one-to-one, one-to-many, or many-to-many relationships in the data. Capturing knowledge of these relationships is central to understanding the underlying data.

Meeting summaries are essential for keeping all stakeholders informed. These summaries are especially helpful in documenting decisions made during meetings. Memories can be short in the course of fast-moving projects. Timely, comprehensive meeting notes that are distributed widely are a great way to prevent confusion about project direction and intent.

If new information revealed in the Requirements phase is of such a magnitude that scope is impacted, a change order must be prepared and approved. Such changes can have a negative impact on the timeline if they are not handled effectively. There needs to be a mutually agreed upon change management process, quick identification and documentation of scope changes, and swift decision making on whether or not to approve a change.

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Requirements Milestones
The milestones for the Requirements phase are approvals by the project sponsor of the final BRD, TRD, and project plan.

Design
The Design phase is the blueprint of how the data in source and in existing data warehouse structures will be used to produce the desired result as spelled out in the BRD and TRD.

DESIGN PHASE

OBJECTIVES	ACTIVITIES	ARTIFACTS	MILESTONES
Final design	Data architecture	Data Architecture diagrams	Approved data architecture
	Report design	Cardinality Diagrams	Approved reporting specs
	Peer review	Reporting Specifications	Approved Test Plan
	Project meetings	Aggregation Specifications	
		Data Dictionary	
		Source to Target	
		Test Plan	
		Meeting Summaries	
		Change Orders	

Design Objectives
This objective of this phase is to design the architecture and underlying processes for the project. It's success is dependent on the accuracy and thoroughness of the preceding stages.

Design Activities
All activities in this phase are aimed at creating comprehensive, clear, and accurate artifacts. Peer review is especially important here to prevent the design from proceeding down "blind alleys" that will cause delays due to redesign in the Development phase.

Design Artifacts
The Design artifacts are all "blueprint" documents that will guide the development team in the next phase. The Data Architecture Diagrams can be developed with a range of tools from Visio to more specialized tools like ER\win. We recommend the latter since the design and metadata capabilities of such software greatly improves productivity and creates superior documentation.

The Source to Target (STT) document is truly a unique animal in the BI development world. This document traces the flow of data from source to target and is the primary design of the ETL processes. It details the extraction from source tables, specifies the transformation of the source data, and stipulates the load of the target tables in the data warehouse. One of the most important disciplines in the BI project process is to keep the STT document updated as changes in data architecture are made.

Aggregation specifications are an important aspect of data architecture and thus are called out separately. Aggregations done in the ETL process can greatly simplify report development and substantially improve query performance.

The Test Plan is the formalization of the test scenarios developed in the two previous stages.

Design Milestones
The milestones for the Design phase are approvals by the project sponsor of the final data architecture, report specification, and test plan. While work on the Development phase can start prior to formal approval, changes to the Design can severely impact the efficient progress project. Therefore, significant work on the next stage should proceed only after approval.

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Development

In an ideal scenario, the Development phase should progress smoothly based in the design artifacts. However, even the best design fails to uncover every issue, particularly with regard to data. The artifacts from the Design phase will typically be modified as these issues arise. The objective is, however, that these changes be minimal so the project stays on schedule.

DEVELOPMENT PHASE

OBJECTIVES	ACTIVITIES	ARTIFACTS	MILESTONES
Completed ETL	ETL development	Data Architecture diagrams	Approved ETL
Completed reporting	Report/query development	Cardinality Diagrams	Approved reporting
User acceptance	Testing	Reporting Specifications	User Acceptance signoff
	Peer reviews	Aggregation Specifications	
	Deliverable review with users	Data Dictionary	
	Project meetings	Source to Target	
		Test Results	
		User Acceptance Form	
		Meeting Summaries	
		Change Orders	

Development Objectives

This objective of this phase is to complete the ETL and report development according to the design such that users will test and approve the final outcome.

Development Activities

The efficient progress of this phase will be a reflection of how well the prior stages were completed. Another issue is, however, the performance of development tools and infrastructure. Even the best designed architecture can be difficult to implement if the ETL and/or report design tools are not working at maximum efficiency.

Development Artifacts

The Development artifacts include those from the Design phase simply to allow for changes (hopefully minimal). The most important new document, however, is the User Acceptance sign off. This is the formal acknowledgement that what was promised was delivered.

Development Milestones

Final signoff on deliverables is the reward of an effective project process. However, the work is not done until the finished product is in the hands of the customer.

Deployment

Deployment involves putting the finished product into production. Close planning and coordination with the organization's infrastructure team is critical to completing this phase successfully.

DEPLOYMENT PHASE

OBJECTIVES	ACTIVITIES	ARTIFACTS	MILESTONES
Migration to production	Production transition	Production Migration Plan	Approved production migration plan
Informed users	User training	Training Plan	Completed migration signoff
	Project meetings	Migration Completion Form	

Deployment Objectives

This objective of this phase is simple: roll out the new system and train the users.

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Deployment Activities
Individuals involved only peripherally up to this point now take center stage. The activities of infrastructure personnel and trainers must be coordinated. Also, unexpected differences between the development and production environments sometime crop up so contingency planning for such risks is important.

Deployment Artifacts
The Deployment artifacts are simply planning documents to guide the activities. Production migration documentation is developed in conjunction with infrastructure personnel. Training documentation takes into account who is to be trained and what permissions they will have, the manner of training (group or individual), and how trainers will be prepared. Finally, the sponsor signifies successful deployment with a signoff.

Deployment Milestones
Successful completed migration is signified by approval that users are effectively using the finished product to meet the expected business objectives.

Support and Knowledge Transfer
Support and Knowledge Transfer truly closes the project. Users should be gaining the value added with their new reporting capabilities. This phase is to tie up all the loose ends to ensure the new project is completely integrated as a part of normal business processes.

SUPPORT AND KNOWLEDGE TRANSFER PHASE

OBJECTIVES	ACTIVITIES	ARTIFACTS	MILESTONES
Support turnover	Knowledge transfer	Project and Support documentation	All support materials transferred
Documentation archived	Organize and store documentation		All documentation complete
	Lessons Learned meeting		

Support and Knowledge Transfer Objectives
This objective of this phase is to ensure the organization possesses and understands the complete documentation of the project such that it can be supported as a part of normal business operations.

Support and Knowledge Transfer Activities
The development team ends its activities once it makes sure all the appropriate people in the organization have knowledge about how the new processes work and where all documentation is stored.

Finally, a Lessons Learned meeting of key stakeholders is a best practice that will ensure that information about what worked well and what could have been done better is carried forward to benefit future projects.

Support and Knowledge Transfer Artifacts
The entire body of artifacts created by the project needs to be transferred and stored.

Support and Knowledge Transfer Milestones
The project is done when the development team moves on knowing the output of the project is working as expected and fully supported as a standard business process.

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