Partnering for Project Success: Project Manager and Business Analyst Collaboration

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Introduction

In recent years, organizations have come to understand the critical importance of projects to drive business results, which has led to the widespread acceptance of the profession of project management and the emergence in its own right of the profession of business analysis. These developments have prompted project sponsors, team leads, and team members to consider how these two professions fit into the project framework. Unclear roles and responsibilities, confusion over job titles, and differing organizational expectations for project management and business analysis roles can create confusion and conflict that contributes to less successful project outcomes. For project managers, there may be a perception that business analysts are collecting requirements without effective coordination. There is a fear of being left "out of the loop" and that the business analyst may create unrealistic expectations among project stakeholders regarding project commitments. For business analysts, there may be a perception that project managers do not understand the breadth and complexity of defining, analyzing, and managing requirements and are unwilling to fully investigate and address stakeholder needs. As companies search for the optimal project leadership resource mix that provides maximum business value for funds invested, many are looking for guidance on the roles of the project manager (PM) and business analyst (BA) to provide effective and efficient project delivery.

The Purpose of this White Paper

The Project Management Institute (PMI)® and the International Institute of Business Analysis (IIBA)® have jointly developed this white paper to compare the underlying frameworks embodied in *A Guide to the Project Management Body of Knowledge* (*PMBOK® Guide*)—Fourth Edition and *A Guide to the Business Analysis Body of Knowledge*® (*BABOK® Guide*)—Version 2.0. This paper seeks to explore and clarify the role overlap, synergies between the PM and the BA, and potential conflicts between the roles in order to strengthen the value they bring to efficiently deliver successful project outcomes.

The Process Used to Develop this Document

A team [1] of experts in project management and business analysis reviewed the two guides to the bodies of knowledge and decided to approach the research by mapping the business analysis activities to the project life cycle Process Groups—Initiating, Planning, Executing, Monitoring and Controlling, and Closing. Three sub-teams, each consisting of a PM and BA subject matter expert (SME), were formed and assigned sections to analyze and document. The analysis was followed by a full-team review and revision cycle culminating in this white paper.

 The team wrote the paper to guide the PM on best utilizing BA capabilities to achieve the desired project outcomes. They focused on linking roles to associated activities rather than organizational or job titles.

Effective Cooperation

The *PMBOK® Guide* and the *BABOK® Guide* describe the professions of project management and business analysis. In other words, the *PMBOK® Guide* addresses the knowledge and skills required for the effective management of projects, whereas the BABOK® *Guide* describes the tasks and techniques used to understand and achieve business objectives. Within the realm of a project, a person with the job title of Project Manager may perform business analysis, just as a person with the job title of Business Analyst may perform project management. In the context of this paper, the following definitions are used to describe and differentiate the broader discipline versus the role that may be assigned on projects.

- Project Management – The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements

- Project Manager – The person assigned by the performing organization to achieve the project objectives

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[1] The team of volunteers consisted of a PM and three volunteer representatives from each respective institute. The team was selected to ensure global representation and a diverse range of experience.

- Business Analysis – The set of tasks and techniques used to work as a liaison among stakeholders in order to understand the structure, policies, and operations of an organization, and to recommend solutions that enable the organization to achieve its goals

- Business Analyst – Practitioner of business analysis

These are important definitions because titles and responsibilities are inconsistent across organizations. Individuals must understand the basic tasks of both project management and business analysis to clearly define responsibilities. Clearly documented roles and responsibilities maximize the likelihood of project success.

The roles of the PM and BA both carry leadership responsibility to effectively ensure project success and avoid conflicts or confusion in responsibilities. In order to work together in harmony during the project, here are some suggestions for successful cooperation:

- Clear, documented, and mutually agreed upon roles and responsibilities

- Constant and open communication

- Active business sponsor engagement

The BA works with the PM to determine the business analysis deliverables produced, activities performed, work estimates developed, and identify the management tools required to measure the progress of those activities and deliverables. The PM participates in business analysis planning and is responsible for ensuring those plans are integrated with the other management plans.

There are many artifacts used to document project roles and responsibilities. One common tool is a Responsibility Assignment Matrix (RAM). The RAM uses the RACI format to specify whether a role is "R," Responsible (does the work); "A," Accountable (ensures work is completed); "C," Consulted (provides input to artifact); or "I," Informed (communicated outcome). Exhibit 1 below presents an example of documenting those roles and responsibilities; it is by no means intended to be all-inclusive or appropriate for every project.

	Business Sponsor	PM	BA
Project Charter	A	R	C
Project Management Plan	I	A/R	C
Communications Plan	I	A	R
Risk Management Plan	I	A/R	C
Requirements Documentation/Package	C	A	R

Exhibit 1– Example of PM and BA RACI chart

Areas of Overlapping Responsibilities

As a result of the team review of the guides to the bodies of knowledge, four main areas of potential conflicts inherent in areas of overlapping responsibilities emerged:

- Project Scope Management

- Project Communications Management

- Project Risk Management

- Project Requirements Management

These four general areas are where the greatest potential for conflict exists and they are relevant across the project life cycle.

Scope Management

The PM is accountable for Project Scope Management, which is defined as "*the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully.*" Project scope is defined as "*the work that must be performed to deliver a product, service or result with the specified features and functions.*" The *PMBOK®️ Guide* further defines the product scope as "*the features and functions that characterize a product, service or result.*" The *BABOK®️ Guide's* term "solution scope" is equivalent to the product scope for most projects.

Business analysis work, as defined in the *BABOK®️ Guide,* includes facilitating team agreement on the product (solution) scope and working with the PM to secure approval from the stakeholders who have the appropriate authority. To facilitate agreement, the BA will ensure that all requirements fall within the product (solution) scope and will manage conflicts and issues around the requirements.

Since the interpretation of scope management terminology between the two guides to the bodies of knowledge may be different, here is one suggested approach for differentiation within the overall project context.

- The PM focuses on planning for the project processes and integrating the business analysis approach and deliverables into the overall project and the work required to deliver a product, service, or result

- The BA focuses on planning and defining the product scope—the features and functions that characterize a product, service, or result and the business analysis approach and deliverables aligned within the overall context of the project

In order to effectively meet business needs, the BA can identify, recommend, or even advocate project scope changes, as can any project team member, but cannot make commitments. The PM has the responsibility to manage the project scope.

Communications Management

Prior to project initiation, the results of business analysis activities performed in the business domain, in support of normal operations, are communicated directly to the business owner. When projects are initiated, business domain communications flow indirectly to the business owner (as project sponsor) through the project manager (Exhibit 2).
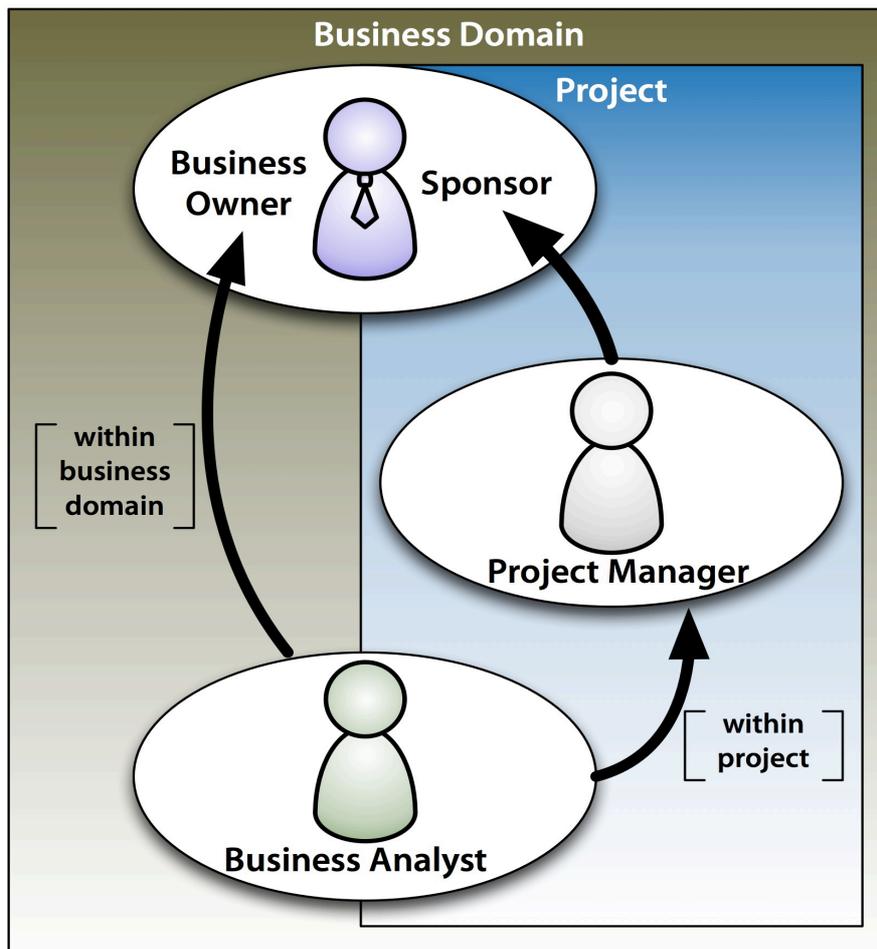

Exhibit 2– Business domain versus project communication channels for BA

The PM is accountable for Project Communications Management, which is defined as "*the processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval, and ultimate disposition of project information.*" One possible area of contention is stakeholder management. The *PMBOK® Guide* speaks to the stakeholder management strategy as "*an approach to increase the support and minimize negative impacts of stakeholders throughout the entire project life cycle.*"

A stakeholder as defined by the *PMBOK® Guide*, "*a person or organization (e.g., customer, sponsor, performing organization, or the public) that is actively involved in the project or whose interests may be positively or negatively affected by execution or completion of the project. A stakeholder may also exert influence over the project and its deliverables.*"

- The PM is accountable for all project-related communication with all project stakeholders.

- BA work primarily involves stakeholders who are directly or indirectly affected by the product (solution) requirements. These are the people who provide the requirements, use requirements to design, build, and test the solution, and those who will be impacted by the implementation of the solution. When BAs have direct reporting responsibilities to a business domain, they also maintain ongoing communications with that organization.

Both the PM and the BA need the stakeholder register and stakeholder management strategy (list, roles, and responsibilities) to perform their planning. The PM will require it to perform tasks in the Planning Process Group. Identifying stakeholders is critical to the success of the project. The BA will provide the PM with their stakeholder register input to be incorporated into the overall project stakeholder register to ensure a common understanding of the project stakeholders. The BA performs stakeholder analysis while they plan, execute, and monitor and control the business analysis work.

The BA defines the BA communications plan, describing the format, formality, and frequency of communicating business analysis deliverables to and from key stakeholders, which the PM will incorporate into the overall project communications plan.

Project Risk Management

The PM performs Project Risk Management, defined in the *PMBOK® Guide* as "*the processes of conducting risk management planning, identification, analysis, response planning, and monitoring and controlling on a project. The objectives increase the probability and impact of positive events, and decrease the probability and impact of negative events in the project.*"

The PM is responsible for the risk management plan, which includes all project risks. The PM incorporates the BA's knowledge of business analysis risks, as well as business organizational risk into the overall risk management plan. During risk identification and analysis activities, it is important to ensure the appropriate project and business risks are being captured and mitigated throughout the life cycle of the project.

- The PM is accountable for all project-related risk management activities with all project stakeholders.

- The BA works with the PM on risk identification, analysis, and strategies, including requirements prioritization and validation by focusing on the business value, business risk, likelihood of success, and assistance in obtaining stakeholder consensus.

The BA also actively assists in analyzing overall project risk by ensuring a robust business case, assessing the risk of implementation (or not), and organizational readiness.

Requirements Management

In the *PMBOK® Guide,* collect requirements (within the Project Scope Management process group) is a key input in order to accurately plan, schedule, and estimate the project, and includes project requirements as well as product requirements. Project requirements may include business, project management, and delivery requirements. Product requirements can include information on technical, security, and performance requirements. The *BABOK® Guide* refers to four types of requirements:

1) Business Requirements – higher level statement of the goals, objectives, or needs. These describe the needs of the organization as a whole and are developed and defined through Enterprise Analysis.

2) Stakeholder Requirements – describe the needs of a class, or particular stakeholder(s), a bridge between business requirements and solution requirements, and are developed through Requirements Analysis.

3) Solution Requirements – characteristics of a solution that meets business and stakeholder requirements, including functional (behavior or information of the system) and non-functional (environmental conditions under which the solution must remain effective) requirements

4) Transition Requirements – capabilities that the solution must have in order to facilitate transition from the current state of the enterprise to a desired future state.

Business analysis work has comprehensive responsibilities in the requirements area and involves:

- Elicitation (how the BA identifies and understands stakeholders' underlying needs and concerns)

- Requirements Management and Communications (how the BA manages conflicts, issues, and changes to ensure agreement on solution scope)

- Enterprise Analysis (how the BA identifies and clarifies a business need and defines the solution scope that can feasibly be implemented)

- Requirements Analysis (how the BA will prioritize and progressively elaborate stakeholder and solution requirements, assessing the current state of the business and verification and validation of the requirements)

- Solution Assessment and Validation (how the BA performs gap/fit analysis and verifies how the solution meets performance and effectiveness expectations).

To achieve the level of detail needed to fully understand the stakeholders' needs and be able to build the desired solution, requirements may be progressively elaborated using a variety of methods and tools, and documented as textual descriptions, diagrams, models, and tables.

The BA traces requirements to ensure coverage and alignment of the requirements to the business and project objectives. The BA uses the organization's process assets to identify requirements from the current project for future re-use. Requirements management also includes managing changes to requirements during the course of the project, utilizing the project change control process.

The BA creates a requirements management plan, which is a key input to the project management plan. The plan includes processes for how requirements will be analyzed, documented, and managed throughout the project. The organizational maturity, culture, complexity, and size of the project will help determine the appropriate level of formality and detail regarding the requirement management process.

Comparison of the Guides to the Bodies of Knowledge

The *PMBOK® Guide* is about managing projects; however, the *BABOK® Guide* is not about projects but about the role and value a business analyst brings to an organization. To compare the two guides, the team chose to look at how the business analyst's knowledge areas and skills align to support the project management process groups from the *PMBOK® Guide*. The matrix of this mapping is shown below. On the left side are the *BABOK® Guide's* knowledge areas and across the top are the *PMBOK® Guide's* project process groups. The tasks from the *BABOK® Guide's* Knowledge Areas are identified in the cells where intersection occurs. For each process group, this white paper includes a description of how BA tasks are related and how the PM and BA work together to accomplish the project work. The mapping is summarized in Exhibit 3, but the details should be viewed in the original bodies of knowledge.

The Enterprise Analysis knowledge area from the *BABOK® Guide* did not map to the *PMBOK® Guide*. These tasks are often performed by business analysts outside the context of a project. The team decided to add one column to the matrix called pre-initiating, indicating this work may be done before the project is initiated.

			PMBOK® Guide Process Groups				
		Pre-Initiating	Initiating	Planning	Executing	Monitoring and Control	Closing
BABOK® Guide Knowledge Areas	**Business Analysis Planning and Monitoring**		Conduct Stakeholder Analysis	Plan Business Analysis Approach Plan Business Analysis Activities Plan Business Analysis Communication Plan Requirements Management Process Manage Business Analysis Performance		Manage Business Analysis Performance	
	Elicitation		Prepare for Elicitation Conduct Elicitation Activity Document Elicitation Results Confirm Elicitation Results	Prepare for Elicitation Conduct Elicitation Activity Document Elicitation Results Confirm Elicitation Results	Prepare for Elicitation Conduct Elicitation Activity Document Elicitation Results Confirm Elicitation Results		
	Requirements Management and Communication			Manage Solution Scope and Requirements	Manage Requirements Traceability Maintain Requirements for Re-use Prepare Requirements Package Communicate Requirements	Manage Solution Scope and Requirements	
	Enterprise Analysis	Define Business Need Assess Capability Gaps Determine Solution Approach Define Solution Scope Define Business Case		Define Solution Scope			
	Requirements Analysis			Prioritize Requirements Organize Requirements Specify and Model Requirements Define Assumptions and Constraints	Prioritize Requirements Organize Requirements Specify and Model Requirements Define Assumptions and Constraints	Verify Requirements Validate Requirements	
	Solution Assessment and Validation				Assess Proposed Solution Allocate Requirements Assess Organizational Readiness Define Transition Requirements Validate Solution	Validate Solution Evaluate Solution Performance	Evaluate Solution Performance

Exhibit 3 – BA tasks aligned to project process groups

Pre-Initiating

Enterprise Analysis is performed prior to the development of the project charter in the initiation process group. Enterprise analysis is important to the PM, as the output from this knowledge area establishes the foundational components, including fully analyzing the business problems and opportunities that will eventually be used to develop the project charter. Enterprise Analysis may also be performed during a project to support proposed changes to project scope, or to ensure that the business justification for the project remains valid.

The Enterprise Analysis knowledge area describes the business analysis activities necessary to identify the business needs, problems or opportunities, define the nature of a solution that meets the needs, and justify the investment necessary to deliver that solution. Enterprise Analysis outputs provide the context to requirements analysis and solution identification for a given initiative or for long-term planning. Enterprise Analysis is often the starting point for initiating one or more projects, which could constitute a program or portfolio, and is continued as competition, strategy, or other business changes occur and more information becomes available. Enterprise Analysis also takes place during a project as new needs are identified. These changes will need to be managed throughout a project change management process.

It is through Enterprise Analysis activities that business requirements are identified and documented. Business requirements are high-level statements of goals, objectives, or needs of the enterprise. They describe the reason why a project has been initiated, the objectives that the project will achieve, and the metrics that will be used to measure its success. During the project, the other categories of requirements, stakeholder requirements, solution (functional and non-functional) requirements, and transition requirements will be elicited and documented.

Outside the scope of projects, BAs are responsible for identifying and monitoring ongoing business improvements. When assigned to a project, the BA verifies the project work is consistent and in line with the ongoing business initiatives.

Key activities include:

- Establishing business need

- Assessing capability gaps

- Determining solution approach

- Defining solution scope

- Defining business case

PMBOK® Guide Process Groups

Initiating

The initiating process group of tasks is performed to define a new project by obtaining authorization to start the project.

Business analysis activities occurring within the initiating phase include BA planning and monitoring tasks and elicitation tasks. At this point in the project life cycle, the project has been initially funded, and if a PM is assigned, traditional tasks are narrowly focused on the project.

During project initiation, the BA will primarily assist the project manager with stakeholder identification. BAs and PMs have related and somewhat divergent needs where stakeholder identification and analysis are concerned. BAs need to understand which stakeholders are sources of information that will be used to define requirements, although those resources may or may not be formally assigned to the project. The PM's focus is on stakeholders whose interest, influence and involvement is essential to maximize positive influence and mitigate potential negative impacts. It's a subtle but critical difference, because for a BA, a stakeholder with relatively little influence and authority may be a key source of requirements. Stakeholders will be evaluated on a number of factors, some of which may include:

- Influence and/or authority

- Expectations

- Roles and responsibilities

- Project involvement

- Solution impact level

Identifying the stakeholders and how they may be affected by the proposed changes are vital to understanding what needs, wants, and expectations must be satisfied by the project. The project charter, organizational process assets, procedural documents, enterprise environmental factors, the business need, and the enterprise architecture are key artifacts that assist with identification.

The second major initiation activity involves the beginning of BA elicitation. The purpose of elicitation during initiation is to define the high-level requirements, high-level project description and objectives, and high-level risks in order to validate and finalize the project charter. Elicitation during initiation provides the PM with the information needed to transition into planning activities. The BA prepares for elicitation by ensuring that all needed resources are organized and scheduled. In addition, elicitation techniques, deliverables, and outputs are confirmed.

The output of PM/BA collaboration during initiation provides the key content for the communications plan and becomes the foundation for a preliminary project RACI chart.

Planning

Project planning focuses on the activities needed to establish the total scope of effort, define and refine the objectives, and develop the course of action necessary to attain those objectives.

In the overall project context,

- The PM focuses on planning for the project processes and integrating the BA's approach and deliverables into the overall project and the work required to deliver a product, service, or result.

- The BA focuses on refining the product definition—the features and functions that characterize a product, service, or result.

During planning, business analysis work includes developing and communicating the BA approach. The BA approach describes how and when business analysis will be performed during the project, including key business analysis deliverables. Organizational approaches (formal/informal), methods, and standards are usually used as key aids, in conjunction with the business need, expert judgment, and organizational process assets. If no standards exist, the business analyst consults with the project manager and other key stakeholders to determine how the business analysis work will be accomplished. The business analyst also works with the PM to integrate the BA approach into the overall project approach.

Business analysis work during planning also determines the appropriate requirements management process, including how to manage changes to solution or requirements scope, determining the requirements repository and traceability, and attributes. The project requirements management plan, as well as the business analysis plans will be the key input into conducting requirements elicitation, managing requirements traceability, managing solution scope, as well as managing and prioritizing requirements.

The BA should work with the PM to integrate the approach for managing changes to the requirements, including determining the process for requesting, authorizing the change and aligning it with the overall project scope management plan. Although the PM is ultimately accountable for delivery of the project scope, the BA typically helps define options for changes, facilitating stakeholder concurrence on changes, determines timing and workarounds, and assists in performing business or project impact analysis, including risks or benefits of the change. The PM facilitates the overall approval of the change request, and takes into consideration the impact on the project, including scope, budget, and time frame.

Executing

The executing process group contains those processes performed to complete the work defined in the project management plan to deliver a product that meets the product requirements.

As the project enters execution, the most prevalent potential for conflict is through the project change management process associated with scope, schedule, and cost containment. At this stage in the project life cycle, communications are extremely important to managing stakeholder expectations in order for the PM and BA to ensure that a consistent message is being shared across the organization.

Some of the critical tasks for a PM during executing are to ensure that information relating to the BA work is distributed to project stakeholders as planned, to communicate and work with stakeholders to meet their needs and address their issues, and to ensure that the project delivers the agreed upon scope and only the agreed upon scope. In order to support the PM in these tasks, the BA performs various activities, which could include but are not limited to:

- Helping manage stakeholder expectations by ensuring consensus among key stakeholders regarding the set of requirements that will be implemented.

- Tracing requirements to ensure coverage and alignment to the business and project objectives within the approved project scope.

- Using the organization's process assets to identify requirements from this project for future re-use. Current and best practices encourage that, where possible, an organization will re-use successful processes and practices.

- Helping the PM distribute the status of issues related to and lessons learned about the BA work to the appropriate stakeholders as outlined in the project communications plan.

- Providing the PM with assurance that appropriate stakeholders have a common understanding of the requirements, the solution, and the intended project outcomes.

- Assisting the PM in confirming the planned solution benefits can be measured and achieved by the stakeholders once the solution is implemented.

- Validating that the solution meets the business needs.

Monitoring and Controlling

The monitoring and controlling process group contains processes required to track, review, and regulate the progress and performance of the project, identify any areas in which changes to the plan are required, and initiate the corresponding changes.

The role of the BA during the monitoring and controlling process group is to ensure that the business analysis effort produces the expected outcomes, correct them if they do not meet the stakeholder's expectations, and manage the performance of the BA activities to ensure that they are executed as effectively as possible (Business Analysis Performance Monitoring from the *BABOK® Guide*).

The activities listed below are representative of those that may be performed by the BA to assist the PM during monitoring and controlling.

- Monitor performance measures used to set expectations regarding the effectiveness of the product solution. The BA recommends action to the PM when problems have occurred that may affect the performance and/or identifies opportunities for improvement.

- When preventive or corrective actions are needed, based on the assessment of the performance, the BA engages the PM and the necessary stakeholders to identify the correct preventive or corrective actions.

Closing

The closing process group is performed to finalize all activities to formally close the project; including obtaining acceptance by the customer or sponsor that the solution delivered meets the business needs.

While lessons learned should be captured throughout the project life cycle, one final session is usually held to review all project areas for improvement opportunities and to establish a project knowledge base for best practices so that the organization can continue to evolve and improve.

During and after closing, business analysis work includes evaluating and report the performance quality and effectiveness results of the delivered solution to the business owner.

BAs gather qualitative and quantitative metrics on the performance of the solution. If the scope of the project includes the post-implementation phase, the BA works with the PM to report results to the business owner. If this assessment is outside the scope of the project, the BA works directly with stakeholders in the business area. This evaluation may lead to the creation of future projects to enhance the delivered solution.

Conclusion

Both the PM and BA need to understand each other's roles and responsibilities, especially in the areas of scope, communications, risk, and requirements management. The PM may be assigned on a project basis, whereas the BA may be permanently assigned to the business area or to a project team. The reporting structure needs to be documented and based on mutual respect to ensure both parties are able to provide successful project outcomes. The BA may have ongoing relationships with the organizational managers that need to be considered by the PM during the project. The PM is directly accountable for delivery of the project, and the BA needs to ensure that their relationships with external stakeholders do not negatively impact the project. Each must work together to build successful project outcomes and relationships within and outside the project.

Appendix

Techniques

Both guides to the bodies of knowledge contain sections describing techniques used to accomplish the work of a PM and a BA. This table was created to show the overlap and alignment of techniques contained in both guides (Exhibit 4).

BABOK® Guide Technique	PMBOK® Guide Technique	Referred to in PMBOK® Guide Task	I	P	E	MC	C	BAPM	E	RMC	EA	RA	SAV
9.1 Acceptance and Evaluation Criteria Definition	Product Acceptance Criteria	5.2.3		X	X	X		X			X	X	X
9.2 Benchmarking	Benchmarking	8.1.2.4		X							X		
9.3 Brainstorming	Group creativity techniques (Brainstorming, nominal group technique, Delphi technique, Idea/mind mapping, Affinity diagrams)			X	X			X	X			X	
9.4 Business Rules Analysis									X			X	X
9.5 Data dictionary and Glossary									X			X	
9.6 Data Flow Diagrams	Flowcharts	8.1.2.7				X			X			X	X
9.7 Data Modeling												X	X
9.8 Decision Analysis	Group decision-making techniques (unanimity, majority, plurality, dictatorship)	5.1.2.5		X	X	X		X			X	X	X
9.9 Document Analysis									X				
9.10 Estimation	Expert Judgment, Alternative Analysis, Published Estimating Data, Bottom-Up Estimating	6.3.2		X				X			X		
9.11 Focus Groups	Focus Groups	5.1.2.2		X	X	X		X				X	X
9.12 Functional Decomposition	Organizational Breakdown Structure, Decomposition	5.3.2.1			X			X			X	X	X
9.13 Interface Analysis								X			X	X	
9.14 Interviews	Interviews	5.1.2.1		X	X	X		X	X			X	X
9.15 Lessons Learned Process	Lessons Learned					X		X					
9.16 Metrics and Key													
9.17 Non-functional Requirements Analysis												X	
9.18 Observation	Observation	5.1.2.7		X	X	X		X	X			X	X
9.19 Organization Modeling	Organizational Charts				X			X	X			X	X
9.20 Problem Tracking	Issue Log	9.4.2.4				X				X		X	X
9.21 Process Modeling	Continuous Improvement models	Not a technique (pg 191)			X			X				X	X
9.22 Prototyping	Prototypes	5.1.2.8		X	X			X				X	
9.23 Requirements Workshops	Facilitated workshops	5.1.2.3		X	X			X	X	X		X	
9.24 Risk Analysis	Qualitative Risk Analysis, Quantitative Risk Analysis	3.4.17, 11.3.2.1			X	X		X	X			X	
9.25 Root Cause Analysis	Root Cause Analysis, Process Analysis, Cause and Effect Diagrams	11.2.2, 8.2, 8.3			X	X		X					X
9.26 Scenarios and Use Cases								X				X	X
9.27 Scope Modeling								X	X		X	X	
9.28 Sequence Diagrams												X	
9.29 State Diagrams												X	
9.30 Structured Walkthrough	Inspection	5.4.2.1			X	X				X		X	
9.31 Survey/Questionnaire	Questionnaires and Surveys	5.1.2.6		X	X	X		X	X			X	X
9.32 SWOT Analysis									X				
9.33 User Stories								X			X	X	
9.34 Vendor Assessment	Procurement documents	Output, not a technique 12.1.3.4			X			X					X
	Organizational Process Assets		X			X							
	Expert Judgment	10.1.2.2		X									
	Product Analysis			X									
	Alternative Identification					X							
	Variance Analysis	5.5.2.1											

Exhibit 4 – Combined technique table