Understanding the Project Management Body of Knowledge (PMBOK) Guide

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Introduction

Every discipline focuses on an elegant universe we call reality wherein the two dimensions of time and space establish the landscape for the intertwining dance between the two natural forces of change and complexity. It is within this arena that the key ingredients of teams and people, methodologies and processes, and tools and enabling technologies converge to bridge the chasm between vision and reality. However, throughout our endeavors across domains (and independent of any particular domain), the more complexity one attempts to address, the more change that occurs, and the more change that occurs, the more complexity one breeds -- it is a vicious circle that exposes challenges and veils opportunities.

There are various means for confronting these forces, but project management as a discipline and profession is at the heart of integrating all of these means to confront the forces and achieve an endeavor's ends -- seizing opportunities to improve an organization's bottom line by delivering successful projects.

The Project Management Institute (PMI) and the Project Management Body of Knowledge (PMBOK) Guide

The Project Management Institute (PMI) (http://www.pmi.org), a not-for-profit project management professional association, publishes "A Guide to the Project Management Body of Knowledge (PMBOK Guide)," a globally recognized project management stranded. The PMBOK Guide is approved as an American National Standard (ANS) by the American National Standards Institute (ANSI), recognized by the Institute of Electrical and Electronics Engineers (IEEE) as an IEEE standard, and used as an underlying reference in an International Organization for Standardization (ISO) Technical Report on managing software projects.

Fundamentally, the PMBOK Guide is similar in nature to the IEEE's "Guide to the Software Engineering Body of Knowledge (SWEBOK)," which focuses on the software engineering profession. The term PMBOK references the sum of knowledge within the profession of project management similar to how the term SWEBOK references the sum of knowledge within the profession of software engineering. The PMBOK Guide is a document that identifies and describes the generally accepted subset of the PMBOK similar to how the SWEBOK document identifies and describes the generally accepted subset of the SWEBOK. Generally accepted involves being applicable to most projects most of the time and being widely regarded as valuable and useful. Such bodies of knowledge (BOKs) provide a common lexicon and basic reference as a foundation for evolving a discipline into a profession wherein practitioners and academics collaborate, similar to how other professions such as accounting, law, and medicine have evolved.

The PMBOK Guide describes a project management framework. The PMBOK Guide is broadly applicable to different types of projects, including small-scale and large-scale projects having various degrees of managerial and technical complexity, across different domains or industries and organizational cultures. The PMBOK emerged from the efforts of the PMI, which was founded in 1969, and its constituent members through various milestones to culminate in the publication of the PMBOK Guide 1996 edition, which was subsequently followed by a PMBOK Guide 2000 edition, and is currently evolving into the upcoming PMBOK Guide 2004 edition.

Projects

A *project* is a temporary endeavor that focuses on creating a unique result. The endeavor is temporary in that it has a definite beginning and a definite end. The end is reached when a project's objectives are achieved, when it is determined that the objectives will not or cannot be achieved, or when the need for the project no longer exits, in which case the project is terminated. The result, which may be a product or service, is unique in that it is distinguishable from all other results. The temporary aspect of a project does not necessarily apply to the result of the project and the product or service may outlive the project. Furthermore, projects are critically distinguished from operations, which are ongoing and have regular or rhythmic results.

Scope

As a project integrates the concepts of temporary and unique, the distinguishing characteristics of a product or service must be *progressively elaborated*. Progressively indicates that a project must proceed in steps or increments and the distinguishing characteristics of its results must be understood in steps or increments. Elaborated indicates that a project must be developed more thoroughly as it progresses and the distinguishing characteristics of its results may be broadly defined early in the project and made more explicit and detailed as the project progresses. Progressive elaboration emphasizes that project management processes are *iterative* in nature and ongoing throughout a project such that processes may be iterated several times. However, the scope of a project, the work to be done, remains fairly constant while the scope of the result, the characteristics of the product or service, is progressively elaborated.

The distinction between project scope and product scope is essential. *Product scope* involves the characteristics of a result, the functions and features that characterize a product or service, and the product's completion is measured against the requirements of the product or service. *Project scope*, which is also known as the *work scope of a project*, involves the work that must be done to deliver a product or service with the characteristics determined by product scope, and the project's completion is measured against its plan. Thus, product scope relates to a product or service while project scope relates to a project.

Lifecycle

A project is divided into generally sequential but possibly somewhat overlapping *phases*, also known as *stages*, which are collectively known as a *project lifecycle.* Each phase results in one or more tangible and verifiable work products, which are known as *deliverables*. Each phase ends with a review, known as a *phase exit* or *stage gate* or *kill point*, of the deliverables and the project's performance to detect and correct errors and also to determine if the project should continue. A *stakeholder* is an individual or organization involved in the project, who may be positively or negatively affected by the execution or completion of the project, and who may exert influence on the project. Phases are related through their deliverables where the deliverables from prior phases are used by subsequence phases. Furthermore, each phase, which may be further divided into sub-phases and so forth, may be considered a project.

The distinction between a project lifecycle and a product lifecycle is essential. A *product lifecycle* involves phases through which a product evolves. A *project lifecycle* forms a single phase of a product life cycle. Thus, a project life cycle is but a single part of a product life cycle.

Project Management

Project management involves the application of best practices to meet project objectives. A *project manager* is the stakeholder who is responsible for managing a project. The PMBOK Guide describes an integrative project management framework, which provides a basic structure for understanding project management practices, composed of processes organized into process groups and knowledge areas. Process groups are more formally known as *project management process groups*, knowledge areas are more formally known as *project management knowledge areas*, and each knowledge area is referenced as *X management* where X is the name of the knowledge area and represents a subset of project management.

Project management, projects, and the framework are integrative in that they require focusing on goals or objectives, balancing competing demands, and leveraging feedback to ensure the goals or objectives are achieved given the competing demands. The *project triple constraint*, which includes project scope, time, and cost parameters, provides a framework for evaluating competing demands, integrating processes and their interactions, and ultimately achieving project objectives and goals. The project triple constraint is often shown as a triangle where either each side or corner represents one of the parameters being managed such that when any side or corner changes, the other sides or corners also change to maintain the shape of the triangle.

Figure 1, from "Epoch: Strategy for Success" (http://home.earthlink.net/~salhir), shows a conceptual view of the process groups and knowledge areas. The process groups are shown organized at the corners within the delimiting solid-outline rectangle and include Initiating, Planning, Executing, Controlling, and Closing. The knowledge areas are shown organized within the solid-outline rectangle around the project triple constraint triangle and include Integration, Scope, Time, Cost, Quality, Human Resource, Communications, Risk, and Procurement.
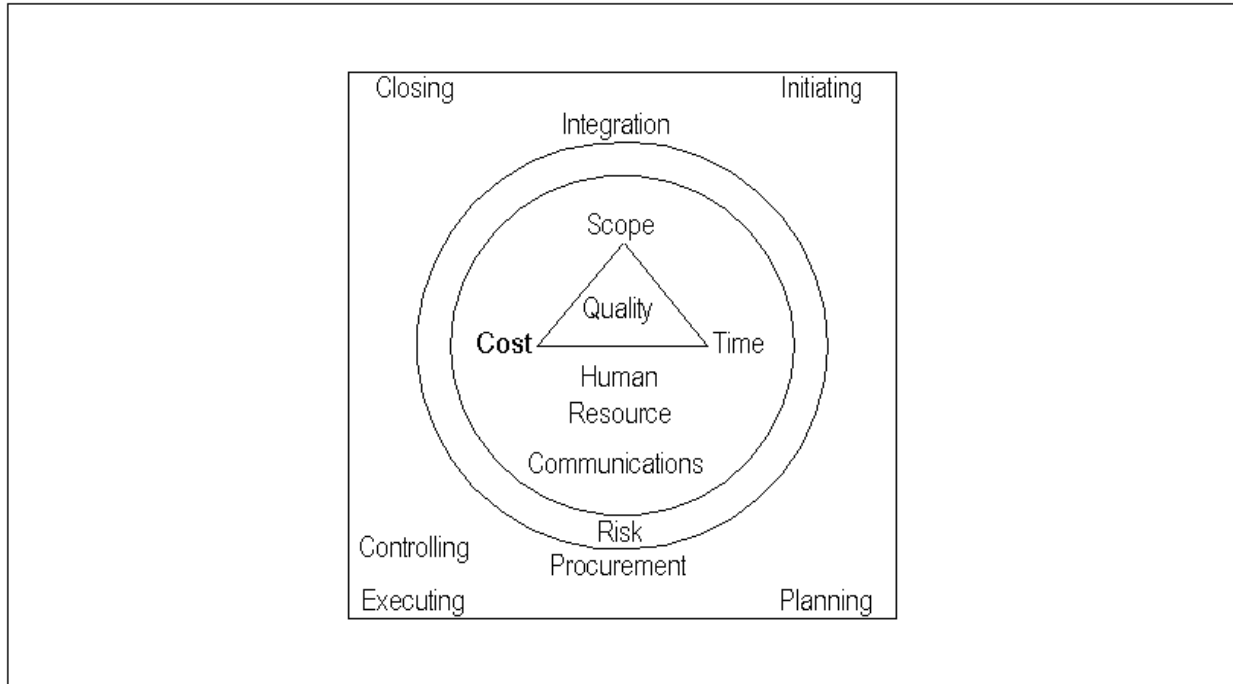

Figure 1: Process Groups and Knowledge Areas

Processes

A *process* is a collection of actions focused on producing a result. Similar to the distinction between project scope versus product scope and project lifecycle versus product lifecycle, the distinction between project management processes and product-oriented processes is essential. *Project management processes* focus on the work of a project. *Product-oriented processes* focus on a project's result, product or service. Thus, project management processes are generally accepted while product-oriented processes are application area specific, but both sets of processes are interdependent and interact throughout a project.

Processes are linked by their inputs and outputs and described by their inputs, tools and techniques, and outputs. Inputs are items that are acted upon by tools and techniques. Outputs are items that result from applying tools and techniques. Tools and techniques are mechanisms applied to inputs to produce outputs. Furthermore, processes are *iterative* in nature and ongoing such that they may be iterated several times during one phase of a project. Core processes are processes that are performed in generally the same order due to their dependencies while facilitating processes are process that are performed intermittently as needed. Furthermore, not all of the processes are needed for every project and not all of their interactions apply to every project. Core processes are bolded in the figures herein and general ordering dependences are shown using solid-line paths from the independent process groups or knowledge areas to the dependent process groups or knowledge areas.

The quintessential approach to understanding the PMBOK Guide includes understanding (1) how processes from different knowledge areas are grouped into process groups and the relationships among process groups, thus providing a broad view of project management, and (2) how processes from different process groups are grouped into knowledge areas and the relationships among knowledge areas, thus providing a detailed view of project management.

Process Groups

A process group organizes processes based on when they occur in a project or phase. Process groups are linked by the results they produce where the output from prior process groups become input to subsequence process groups. Process groups are not discrete or one-time events but are overlapping activities that are *iterative* in nature such that they may be iterated several times and occur at varying levels of intensity across a project, within and across phases of a project, and are commensurate with the scope of the project and the value the process group adds to the specific project.

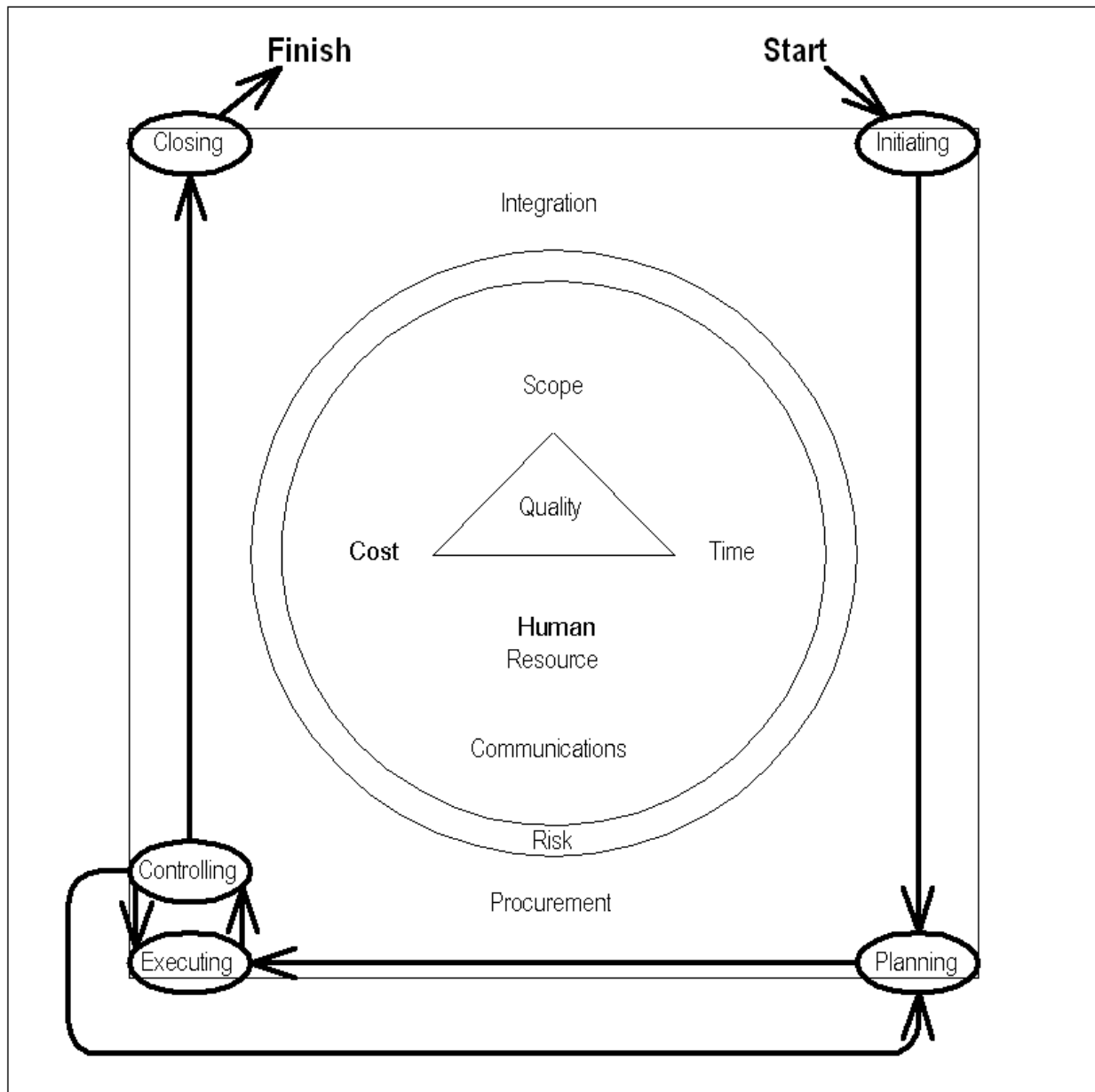Figure 2 shows the relationships among process groups for a project or phase.

Figure 2: Process Groups

Initiating

The Initiating process group focuses on authorizing a project or phase. This process group generally occurs at the beginning of a project or phase. The results from this process group become input into the Planning process group. Figure 3 highlights the Initiating processes organized by knowledge areas. Notice that the overall theme is scope.
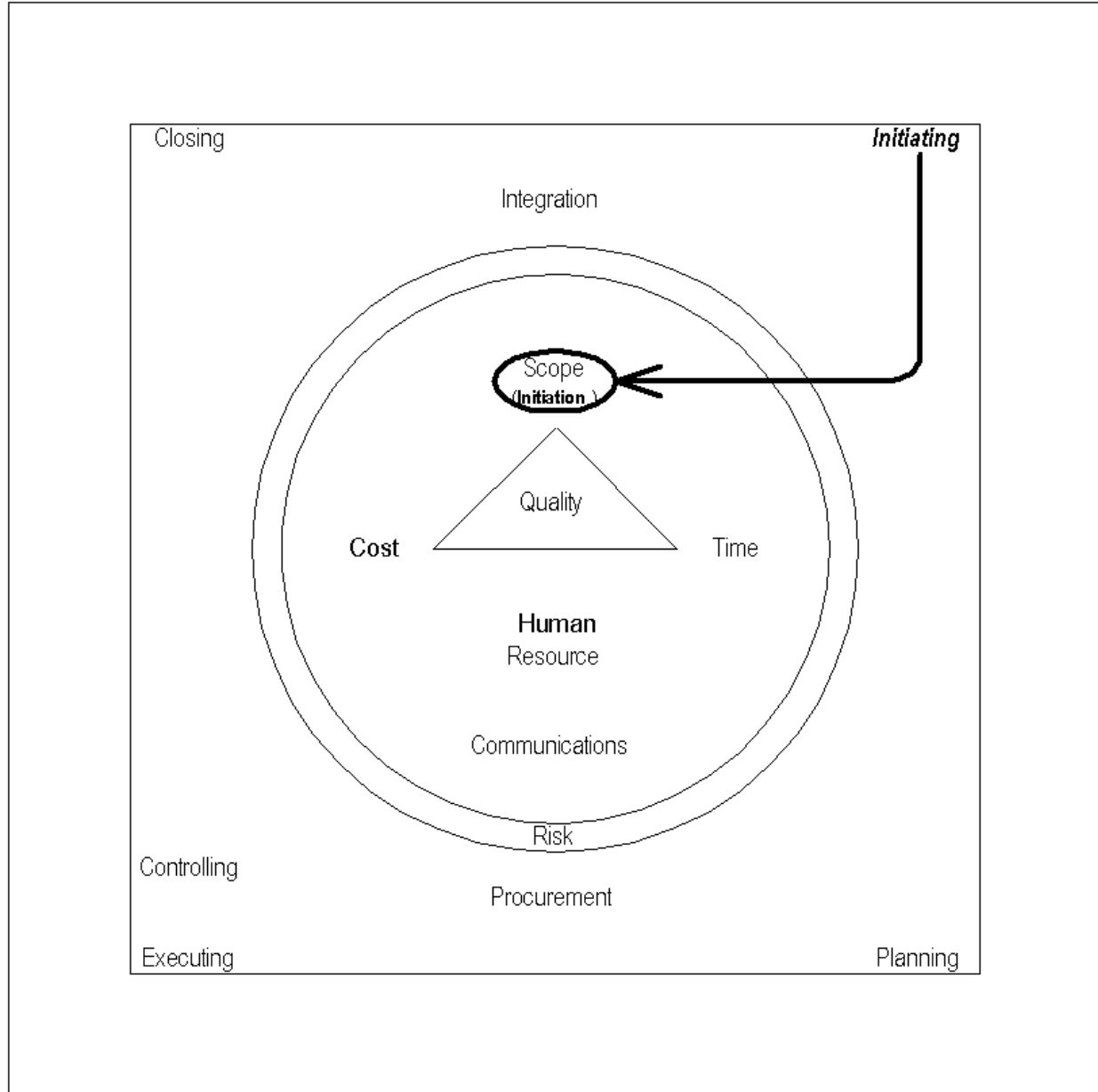

Figure 3: Initiating Processes and Knowledge Areas

Planning

The Planning process group focuses on defining project or phase objectives and determining the best alternative for attaining the objectives. This process group generally peeks early in a project or phase and steadily decreases. The results from this process group become input into the Executing process group. This process group coincides with the Plan part of the common Plan-Do-Check-Act quality cycle. Figure 4 highlights the Planning processes organized by knowledge areas with their general ordering. Notice that the overall theme involves time and cost based on scope and risk.
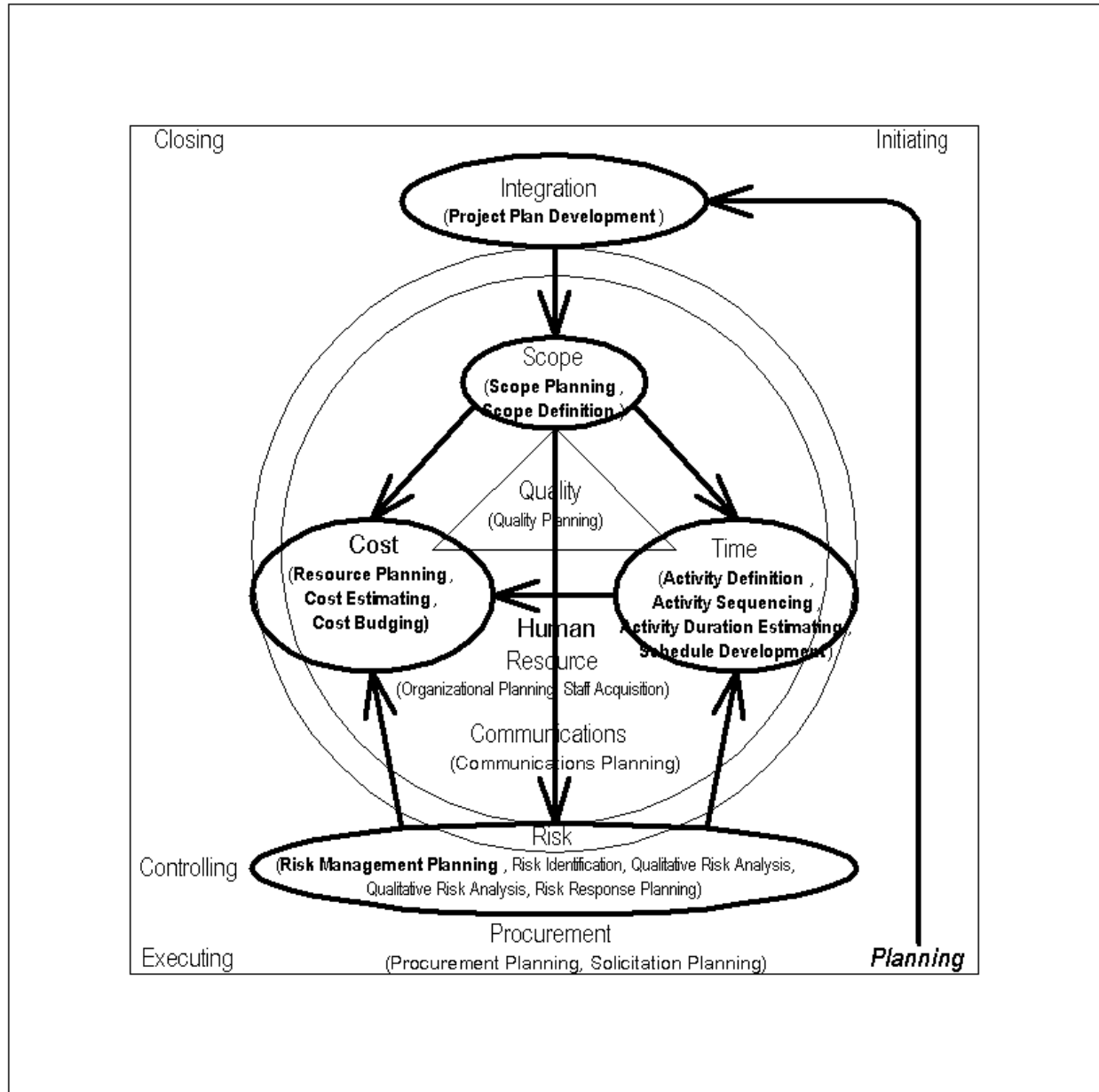

Figure 4: Planning Processes and Knowledge Areas

Executing

The Executing process group focuses on coordinating resources to perform the best alternative for attaining project or phase objectives. This process group generally steadily increases and peeks later in a project or phase. The results from this process group become input into the Controlling process group. This process group coincides with the Do part of the common Plan-Do-Check-Act quality cycle. Figure 5 highlights the Executing processes organized by knowledge areas. Notice that the overall theme is quality.
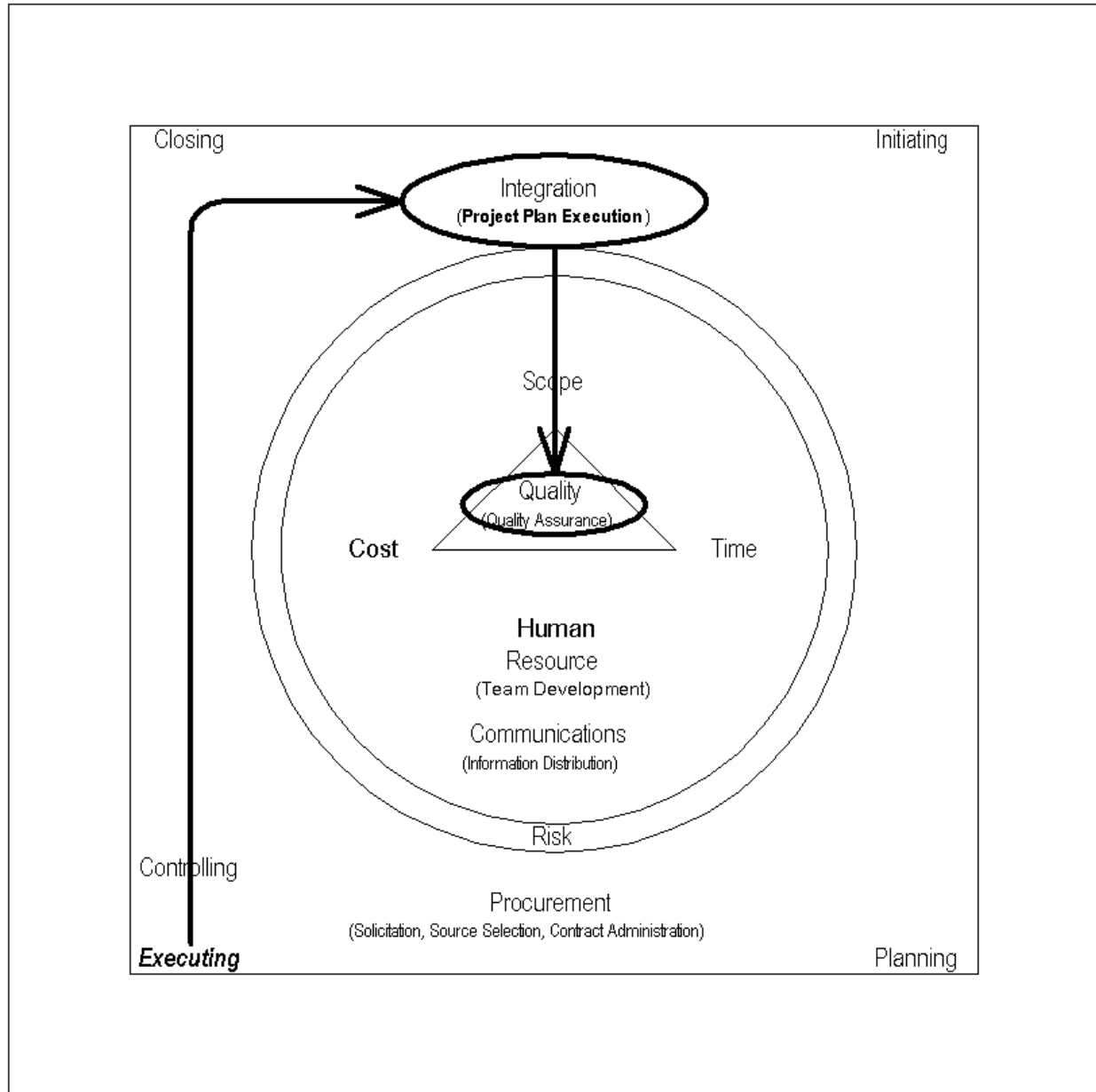

Figure 5: Executing Processes and Knowledge Areas

Controlling

The Controlling process group focuses on monitoring and measuring progress to identify variances from the best alternative for attaining project or phase objectives and take corrective actions to address the variances and ensure that the objectives are met. This process group generally steadily increases and peeks in the middle of a project or phase and steadily decreases. The results from this process group become input into the Planning, Executing, and Closing process groups. This process group coincides with the Check and Act parts of the common Plan-Do-Check-Act quality cycle. Figure 6 highlights the Controlling processes organized by knowledge areas with their general ordering. Notice that the overall theme involves time and cost based on quality and risk to address scope.
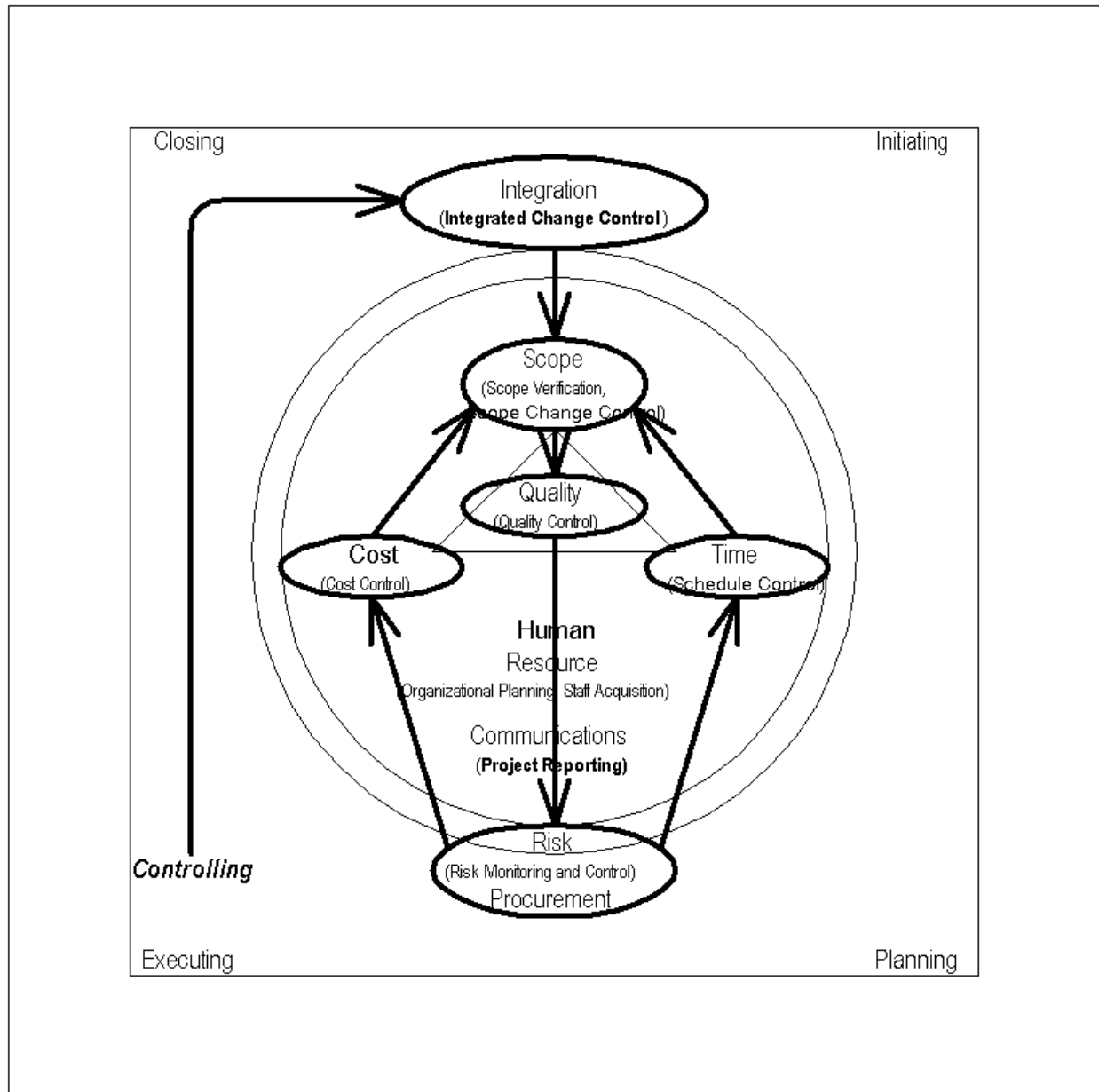

Figure 6: Controlling Processes and Knowledge Areas

Closing

The Closing process group focus on formalizing acceptance of a project or phase and ends the project or phase. This process group generally occurs at the end of a project or phase. The results from this process group become input into the Initiating process group in the next project or phase. Figure 7 highlights the Closing processes organized by knowledge areas. Notice that the overall theme is communication.
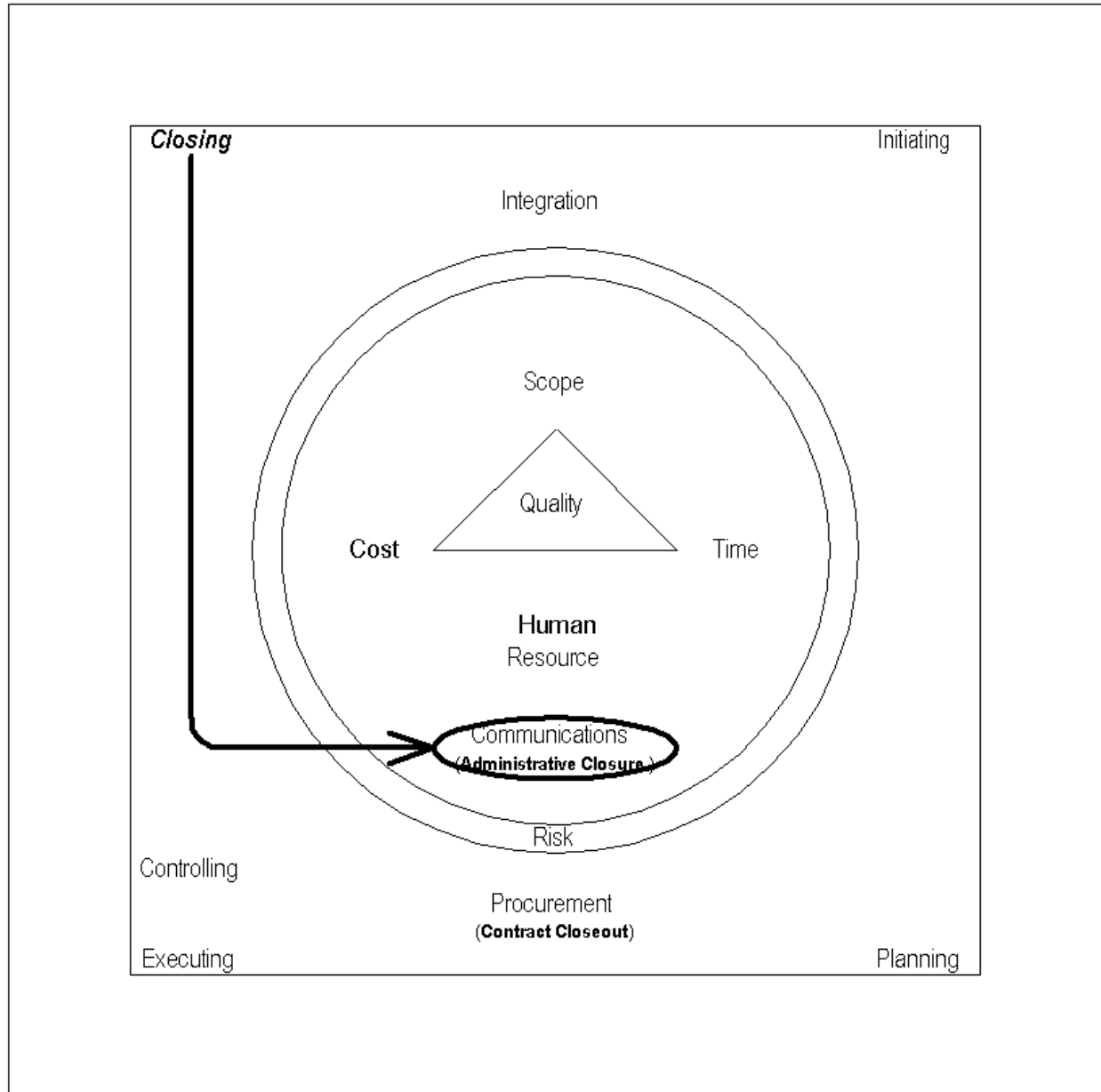

Figure 7: Closing Processes and Knowledge Areas

Knowledge Areas

A knowledge area organizes processes based on their subject or area of concern or focus. Knowledge areas are linked by the results they produce where the output from one knowledge area becomes input to other knowledge areas. Knowledge areas are not discrete or one-time events but are overlapping activities that are *iterative* in nature such that they may be iterated several times and occur at varying levels of intensity across a project, within and across phases of a project, and are commensurate with the scope of the project and the value the knowledge area adds to the specific project.

Integration

The Integration knowledge area focuses on integrating and coordinating the various elements of a project. The Project Plan Development core process focuses on developing a project plan. A *project plan* captures planning assumptions, decisions, approved baselines (scope, schedule, and cost), and facilitates communication and also guides project execution and project control. A project plan commonly includes the project charter, project management approach, scope statement, work breakdown structures, performance baseline (schedule, cost estimates, and budget), milestones, other plans, open issues, and pending decisions. The progressive elaboration of a project plan is known as *rolling wave planning* to emphasize that planning is an *iterative* and ongoing process. The Project Plan Execution core process focuses on performing the activities in the project plan. The Integrated Change Control core process focuses on addressing changes to the project.

Scope

The Scope knowledge area focuses on a project's deliverables.

The Initiation core process focuses on developing a project charter. A *project charter* authorizes a project and provides a project manager with the authority to manage the project. A project charter commonly includes a description of the business needs that the project results are intended to address and a description of the results, a product or service description.

The Scope Planning core process focuses on developing a scope statement. A *scope statement* captures a common understanding of the project scope and project objectives, which are used to make future decisions. A scope statement commonly includes project justification in terms of the business needs summarized from the project charter, project product in terms of the results description summarized from the project charter, project deliverables summarized and known exclusions identified, and project objectives. *Project objectives* are quantifiable success criteria for time, cost, and quality and include attributes, metrics, and target absolute or relative values. Any un-quantified objectives such as "customer satisfaction" entail high risk.

The Scope Definition core process focuses on developing a work breakdown structure (WBS). A *work breakdown structure* captures the work scope of a project as a hierarchical deliverable-oriented grouping of project elements where the lowest level elements are known as *work packages* and all of the elements are described in a *WBS dictionary*.

The Scope Verification facilitating process focuses on formalizing acceptance of the project scope. The Scope Change Control facilitating process focuses on addressing changes to the project scope.

Time

The Time knowledge area focuses on a project's schedule. The Activity Definition core process focuses on identifying activities in an activity list to produce the project deliverables. An *activity list* is an extension to the work breakdown structure. The Activity Sequencing core process focuses on identifying dependencies among activities. The Activity Duration Estimating core process focuses on estimating the time required for completing activities. The Schedule Development core process focuses on developing a project schedule. A *project schedule* captures the planned dates for activities and milestones. The Schedule Control facilitating process focuses on addressing changes to the project schedule.

Cost

The Cost knowledge area focuses on a project's budget. The Resource Planning core process focuses on determining the resources and their quantities required for performing project activities. The Cost Estimating core process focuses on determining an estimate of the cost of the resources. The Cost Budgeting core process focuses on determining the cost of

project activities and establishing a cost baseline. A *cost baseline* captures the planned cost for a project or phase. The Cost Control facilitating process focuses on addressing changes to the project budget.

Quality

The Quality knowledge area focuses on the quality of a project's performance and results. The Quality Planning facilitating process focuses on identifying quality standards. The Quality Assurance facilitating process focuses on evaluating project performance. The Quality Control facilitating process focuses on evaluating project results.

Human Resource

The Human Resource knowledge area focuses on the individual people involved with a project. The Organizational Planning facilitating process focuses on identifying roles and responsibilities. The Staff Acquisition facilitating process focuses on acquiring human resources. The Team Development facilitating process focuses on enhancing individual and group competencies.

Even though the preceding figures do not explicitly highlight this knowledge area, it is essential, vital, and fundamental to a project's success, and could be highlighted on the preceding figures.

Communications

The Communications knowledge area focuses on communicating appropriate project information. The Communications Planning facilitating process focuses on determining the communication needs of the stakeholders (who needs what, when, how it will be communicated, and perhaps where and why). The Information Distribution facilitating process focuses on distributing information. The Performance Reporting core process focuses on capturing and distributing performance information. The Administrative Closure core process focuses on distributing information bringing closure to a project or phase.

Even though the preceding figures do not explicitly highlight this knowledge area, it is essential, vital, and fundamental to a project's success, and could be highlighted on the preceding figures.

Risk

The Risk knowledge area focuses on confronting risks to a project. A *risk* is an uncertain event or condition that may have a positive or negative/adverse effect on project objectives if actualized. The Risk Management Planning core process focuses on deterring how to approach risk management. The Risk Identification facilitating process focuses on identifying risks and triggers. A *trigger*, also known as a *symptom* or *warning sign*, is an indicator that a risk has occurred or is about to occur. The Qualitative Risk Analysis facilitating process focuses on prioritizing risks based on their impact on project objectives. The Quantitative Risk Analysis facilitating process focuses on determining the probability of risks occurring and their effects on project objectives. The Risk Response Planning facilitating process focuses on determine how to enhance opportunities and reduce threats to project objectives. The Risk Monitoring and Control facilitating process focuses on monitoring risks, identifying new risks, responding to risks, and evaluating the effects of responses.

Procurement

The Procurement knowledge area focuses on acquiring goods and services external to the organization performing the project. The Procurement Planning facilitating process focuses on determining what to procure. The Solicitation Planning facilitating process focuses on determining procurement requirements and identifying potential sources. The Solicitation facilitating process focuses on obtaining responses from potential sources. The Source Selection facilitating process focuses on selecting a source. The Contract Administration facilitating process focuses on managing the relationship with the source. The Contracts Closeout core process focuses on bringing closure to the procurement.

Conclusion

Unequivocally, people are and will remain the "original ingredient" necessary for success. However, with the project management discipline as a profession and the PMBOK Guide, project managers and teams are further empowered not only to simply address change and complexity, but leverage change and complexity for a competitive advantage by delivering successful projects. Furthermore, it is experience, experimentation, and application of the PMBOK Guide that will enable us to realize its benefits.