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THE ENVIRONMENT IN WHICH PROJECTS OPERATE

2.1 OVERVIEW

Projects exist and operate in environments that may have an influence on them. These influences can have a favorable or unfavorable impact on the project. Two major categories of influences are enterprise environmental factors (EEFs) and organizational process assets (OPAs).

EEFs originate from the environment outside of the project and often outside of the enterprise. EEFs may have an impact at the organizational, portfolio, program, or project level. See Section 2.2 for additional information on EEFs.

OPAs are internal to the organization. These may arise from the organization itself, a portfolio, a program, another project, or a combination of these. Figure 2-1 shows the breakdown of project influences into EEFs and OPAs. See Section 2.3 for additional information on OPAs.

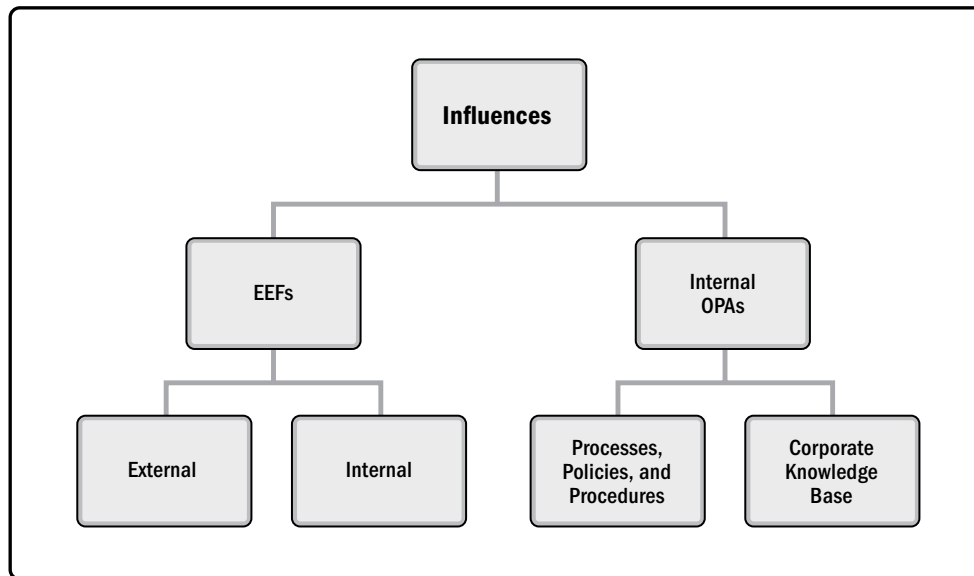


Figure 2-1. Project Influences

In addition to EEFs and OPAs, organizational systems play a significant role in the life cycle of the project. System factors that impact the power, influence, interests, competencies, and political capabilities of the people to act within the organizational system are discussed further in the section on organizational systems (see Section 2.4).

2.2 ENTERPRISE ENVIRONMENTAL FACTORS

Enterprise environmental factors (EEFs) refer to conditions, not under the control of the project team, that influence, constrain, or direct the project. These conditions can be internal and/or external to the organization. EEFs are considered as inputs to many project management processes, specifically for most planning processes. These factors may enhance or constrain project management options. In addition, these factors may have a positive or negative influence on the outcome.

EEFs vary widely in type or nature. These factors need to be considered if the project is to be effective. EEFs include but are not limited to the factors described in Sections 2.2.1 and 2.2.2.

2.2.1 EEFS INTERNAL TO THE ORGANIZATION

The following EEFs are internal to the organization:

- ◆ **Organizational culture, structure, and governance.** Examples include vision, mission, values, beliefs, cultural norms, leadership style, hierarchy and authority relationships, organizational style, ethics, and code of conduct.
- ◆ **Geographic distribution of facilities and resources.** Examples include factory locations, virtual teams, shared systems, and cloud computing.
- ◆ **Infrastructure.** Examples include existing facilities, equipment, organizational telecommunications channels, information technology hardware, availability, and capacity.
- ◆ **Information technology software.** Examples include scheduling software tools, configuration management systems, web interfaces to other online automated systems, and work authorization systems.
- ◆ **Resource availability.** Examples include contracting and purchasing constraints, approved providers and subcontractors, and collaboration agreements.
- ◆ **Employee capability.** Examples include existing human resources expertise, skills, competencies, and specialized knowledge.

2.2.2 EEFS EXTERNAL TO THE ORGANIZATION

The following EEFs are external to the organization.

- ◆ **Marketplace conditions.** Examples include competitors, market share brand recognition, and trademarks.
- ◆ **Social and cultural influences and issues.** Examples include political climate, codes of conduct, ethics, and perceptions.
- ◆ **Legal restrictions.** Examples include country or local laws and regulations related to security, data protection, business conduct, employment, and procurement.
- ◆ **Commercial databases.** Examples include benchmarking results, standardized cost estimating data, industry risk study information, and risk databases.
- ◆ **Academic research.** Examples include industry studies, publications, and benchmarking results.
- ◆ **Government or industry standards.** Examples include regulatory agency regulations and standards related to products, production, environment, quality, and workmanship.
- ◆ **Financial considerations.** Examples include currency exchange rates, interest rates, inflation rates, tariffs, and geographic location.
- ◆ **Physical environmental elements.** Examples include working conditions, weather, and constraints.

2.3 ORGANIZATIONAL PROCESS ASSETS

Organizational process assets (OPAs) are the plans, processes, policies, procedures, and knowledge bases specific to and used by the performing organization. These assets influence the management of the project.

OPAs include any artifact, practice, or knowledge from any or all of the performing organizations involved in the project that can be used to execute or govern the project. The OPAs also include the organization's lessons learned from previous projects and historical information. OPAs may include completed schedules, risk data, and earned value data. OPAs are inputs to many project management processes. Since OPAs are internal to the organization, the project team members may be able to update and add to the organizational process assets as necessary throughout the project. They may be grouped into two categories:

- ◆ Processes, policies, and procedures; and
- ◆ Organizational knowledge bases.

Generally, the assets in the first category are not updated as part of the project work. Processes, policies, and procedures are usually established by the project management office (PMO) or another function outside of the project. These can be updated only by following the appropriate organizational policies associated with updating processes, policies, or procedures. Some organizations encourage the team to tailor templates, life cycles, and checklists for the project. In these instances, the project management team should tailor those assets to meet the needs of the project.

The assets in the second category are updated throughout the project with project information. For example, information on financial performance, lessons learned, performance metrics and issues, and defects are continually updated throughout the project.

2.3.1 PROCESSES, POLICIES, AND PROCEDURES

The organization's processes and procedures for conducting project work include but are not limited to:

◆ **Initiating and Planning:**

- Guidelines and criteria for tailoring the organization's set of standard processes and procedures to satisfy the specific needs of the project;
- Specific organizational standards such as policies (e.g., human resources policies, health and safety policies, security and confidentiality policies, quality policies, procurement policies, and environmental policies);
- Product and project life cycles, and methods and procedures (e.g., project management methods, estimation metrics, process audits, improvement targets, checklists, and standardized process definitions for use in the organization);
- Templates (e.g., project management plans, project documents, project registers, report formats, contract templates, risk categories, risk statement templates, probability and impact definitions, probability and impact matrices, and stakeholder register templates); and
- Preapproved supplier lists and various types of contractual agreements (e.g., fixed-price, cost-reimbursable, and time and material contracts).

◆ **Executing, Monitoring, and Controlling:**

- Change control procedures, including the steps by which performing organization standards, policies, plans, and procedures or any project documents will be modified, and how any changes will be approved and validated;
- Traceability matrices;
- Financial controls procedures (e.g., time reporting, required expenditure and disbursement reviews, accounting codes, and standard contract provisions);

- Issue and defect management procedures (e.g., defining issue and defect controls, identifying and resolving issues and defects, and tracking action items);
 - Resource availability control and assignment management;
 - Organizational communication requirements (e.g., specific communication technology available, authorized communication media, record retention policies, videoconferencing, collaborative tools, and security requirements);
 - Procedures for prioritizing, approving, and issuing work authorizations;
 - Templates (e.g., risk register, issue log, and change log);
 - Standardized guidelines, work instructions, proposal evaluation criteria, and performance measurement criteria; and
 - Product, service, or result verification and validation procedures.
- ◆ **Closing.** Project closure guidelines or requirements (e.g., final project audits, project evaluations, deliverable acceptance, contract closure, resource reassignment, and knowledge transfer to production and/or operations).

2.3.2 ORGANIZATIONAL KNOWLEDGE REPOSITORIES

The organizational knowledge repositories for storing and retrieving information include but are not limited to:

- ◆ Configuration management knowledge repositories containing the versions of software and hardware components and baselines of all performing organization standards, policies, procedures, and any project documents;
- ◆ Financial data repositories containing information such as labor hours, incurred costs, budgets, and any project cost overruns;
- ◆ Historical information and lessons learned knowledge repositories (e.g., project records and documents, all project closure information and documentation, information regarding both the results of previous project selection decisions and previous project performance information, and information from risk management activities);
- ◆ Issue and defect management data repositories containing issue and defect status, control information, issue and defect resolution, and action item results;
- ◆ Data repositories for metrics used to collect and make available measurement data on processes and products; and
- ◆ Project files from previous projects (e.g., scope, cost, schedule, and performance measurement baselines, project calendars, project schedule network diagrams, risk registers, risk reports, and stakeholder registers).

2.4 ORGANIZATIONAL SYSTEMS

2.4.1 OVERVIEW

Projects operate within the constraints imposed by the organization through their structure and governance framework. To operate effectively and efficiently, the project manager needs to understand where responsibility, accountability, and authority reside within the organization. This understanding will help the project manager effectively use his or her power, influence, competence, leadership, and political capabilities to successfully complete the project.

The interaction of multiple factors within an individual organization creates a unique system that impacts the project operating in that system. The resulting organizational system determines the power, influence, interests, competence, and political capabilities of the people who are able to act within the system. The system factors include but are not limited to:

- ◆ Management elements,
- ◆ Governance frameworks, and
- ◆ Organizational structure types.

The complete information and explanation of the organizational system factors and how the combination of these factors impacts a project are beyond the scope of this guide. There are disciplines with associated literature, methodologies, and practices that address these factors in more depth than is possible within this guide. This section provides an overview of these factors and their interrelationship.

This overview begins by discussing systems in general. A system is a collection of various components that together can produce results not obtainable by the individual components alone. A component is an identifiable element within the project or organization that provides a particular function or group of related functions. The interaction of the various system components creates the organizational culture and capabilities. There are several principles regarding systems:

- ◆ Systems are dynamic,
- ◆ Systems can be optimized,
- ◆ System components can be optimized,
- ◆ Systems and their components cannot be optimized at the same time, and
- ◆ Systems are nonlinear in responsiveness (a change in the input does not produce a predictable change in the output).

Multiple changes may occur within the system and between the system and its environment. When these changes take place, adaptive behavior occurs within the components that in turn add to the system's dynamics. The system's dynamics are defined by the interaction between the components based on the relationships and dependencies that exist between the components.

Systems are typically the responsibility of an organization's management. The organization's management examines the optimization trade-offs between the components and the system in order to take the appropriate action to achieve the best outcomes for the organization. The results of this examination will impact the project under consideration. Therefore, it is important that the project manager take these results into account when determining how to fulfill the project's objectives. In addition, the project manager should take into account the organization's governance framework.

2.4.2 ORGANIZATIONAL GOVERNANCE FRAMEWORKS

Recent PMI research reveals that governance refers to organizational or structural arrangements at all levels of an organization designed to determine and influence the behavior of the organization's members [9]. This research suggests that the concept of governance is multidimensional and:

- ◆ Includes consideration of people, roles, structures, and policies; and
- ◆ Requires providing direction and oversight through data and feedback.

2.4.2.1 GOVERNANCE FRAMEWORK

Governance is the framework within which authority is exercised in organizations. This framework includes but is not limited to:

- ◆ Rules,
- ◆ Policies,
- ◆ Procedures,
- ◆ Norms,
- ◆ Relationships,
- ◆ Systems, and
- ◆ Processes.

This framework influences how:

- ◆ Objectives of the organization are set and achieved,
- ◆ Risk is monitored and assessed, and
- ◆ Performance is optimized.

2.4.2.2 GOVERNANCE OF PORTFOLIOS, PROGRAMS, AND PROJECTS

The *Governance of Portfolios, Programs, and Projects: A Practice Guide* [10] describes a common governance framework aligning organizational project management (OPM) and portfolio, program, and project management. The practice guide describes four governance domains of alignment, risk, performance, and communications. Each domain has the following functions: oversight, control, integration, and decision making. Each function has governance supporting processes and activities for stand-alone projects, or projects operating within the portfolio or program environments.

Project governance refers to the framework, functions, and processes that guide project management activities in order to create a unique product, service, or result to meet organizational, strategic, and operational goals. There is no one governance framework that is effective in all organizations. A governance framework should be tailored to the organizational culture, types of projects, and the needs of the organization in order to be effective.

For more information regarding project governance, including its implementation, see *Governance of Portfolios, Programs, and Projects: A Practice Guide* [10].

2.4.3 MANAGEMENT ELEMENTS

Management elements are the components that comprise the key functions or principles of general management in the organization. The general management elements are allocated within the organization according to its governance framework and the organizational structure type selected.

The key functions or principles of management include but are not limited to:

- ◆ Division of work using specialized skills and availability to perform work;
- ◆ Authority given to perform work;
- ◆ Responsibility to perform work appropriately assigned based on such attributes as skill and experience;
- ◆ Discipline of action (e.g., respect for authority, people, and rules);
- ◆ Unity of command (e.g., only one person gives orders for any action or activity to an individual);
- ◆ Unity of direction (e.g., one plan and one head for a group of activities with the same objective);
- ◆ General goals of the organization take precedence over individual goals;
- ◆ Paid fairly for work performed;

- ◆ Optimal use of resources;
- ◆ Clear communication channels;
- ◆ Right materials to the right person for the right job at the right time;
- ◆ Fair and equal treatment of people in the workplace;
- ◆ Clear security of work positions;
- ◆ Safety of people in the workplace;
- ◆ Open contribution to planning and execution by each person; and
- ◆ Optimal morale.

Performance of these management elements are assigned to selected individuals within the organization. These individuals may perform the noted functions within various organizational structures. For example, in a hierarchical structure, there are horizontal and vertical levels within the organization. These hierarchical levels range from the line management level through to the executive management level. The responsibility, accountability, and authority assigned to the hierarchical level indicate how the individual may perform the noted function within that organizational structure.

2.4.4 ORGANIZATIONAL STRUCTURE TYPES

Determination of the appropriate organizational structure type is a result of the study of tradeoffs between two key variables. The variables are the organizational structure types available for use and how to optimize them for a given organization. There is not a one-size-fits-all structure for any given organization. The final structure for a given organization is unique due to the numerous variables to be considered. Sections 2.4.4.1 and 2.4.4.2 give examples of some of the factors to be included when considering the two variables given. Section 2.4.4.3 discusses one organizational structure that is prevalent in project management.

2.4.4.1 ORGANIZATIONAL STRUCTURE TYPES

Organizational structures take many forms or types. Table 2-1 compares several types of organizational structures and their influence on projects.

2.4.4.2 FACTORS IN ORGANIZATION STRUCTURE SELECTION

Each organization considers numerous factors for inclusion in its organizational structure. Each factor may carry a different level of importance in the final analysis. The combination of the factor, its value, and relative importance provides the organization's decision makers with the right information for inclusion in the analysis.

Factors to consider in selecting an organizational structure include but are not limited to:

- ◆ Degree of alignment with organizational objectives,
- ◆ Specialization capabilities,
- ◆ Span of control, efficiency, and effectiveness,
- ◆ Clear path for escalation of decisions,
- ◆ Clear line and scope of authority,
- ◆ Delegation capabilities,
- ◆ Accountability assignment,
- ◆ Responsibility assignment,
- ◆ Adaptability of design,
- ◆ Simplicity of design,
- ◆ Efficiency of performance,
- ◆ Cost considerations,
- ◆ Physical locations (e.g., colocated, regional, and virtual), and
- ◆ Clear communication (e.g., policies, status of work, and organization's vision).

Table 2-1. Influences of Organizational Structures on Projects

Organizational Structure Type	Project Characteristics					
	Work Groups Arranged by:	Project Manager's Authority	Project Manager's Role	Resource Availability	Who Manages the Project Budget?	Project Management Administrative Staff
Organic or Simple	Flexible; people working side-by-side	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Owner or operator	Little or none
Functional (centralized)	Job being done (e.g., engineering, manufacturing)	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Functional manager	Part-time
Multi-divisional (may replicate functions for each division with little centralization)	One of: product; production processes; portfolio; program; geographic region; customer type	Little or none	Part-time; may or may not be a designated job role like coordinator	Little or none	Functional manager	Part-time
Matrix – strong	By job function, with project manager as a function	Moderate to high	Full-time designated job role	Moderate to high	Project manager	Full-time
Matrix – weak	Job function	Low	Part-time; done as part of another job and not a designated job role like coordinator	Low	Functional manager	Part-time
Matrix – balanced	Job function	Low to moderate	Part-time; embedded in the functions as a skill and may not be a designated job role like coordinator	Low to moderate	Mixed	Part-time
Project-oriented (composite, hybrid)	Project	High to almost total	Full-time designated job role	High to almost total	Project manager	Full-time
Virtual	Network structure with nodes at points of contact with other people	Low to moderate	Full-time or part-time	Low to moderate	Mixed	Could be full-time or part-time
Hybrid	Mix of other types	Mixed	Mixed	Mixed	Mixed	Mixed
PMO*	Mix of other types	High to almost total	Full-time designated job role	High to almost total	Project manager	Full-time

*PMO refers to a portfolio, program, or project management office or organization.

2.4.4.3 PROJECT MANAGEMENT OFFICE

A project management office (PMO) is an organizational structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques. The responsibilities of a PMO can range from providing project management support functions to the direct management of one or more projects.

There are several types of PMOs in organizations. Each type varies in the degree of control and influence it has on projects within the organization, such as:

- ◆ **Supportive.** Supportive PMOs provide a consultative role to projects by supplying templates, best practices, training, access to information, and lessons learned from other projects. This type of PMO serves as a project repository. The degree of control provided by the PMO is low.
- ◆ **Controlling.** Controlling PMOs provide support and require compliance through various means. The degree of control provided by the PMO is moderate. Compliance may involve:
 - Adoption of project management frameworks or methodologies;
 - Use of specific templates, forms, and tools; and
 - Conformance to governance frameworks.
- ◆ **Directive.** Directive PMOs take control of the projects by directly managing the projects. Project managers are assigned by and report to the PMO. The degree of control provided by the PMO is high.

The project management office may have organization-wide responsibility. It may play a role in supporting strategic alignment and delivering organizational value. The PMO integrates data and information from organizational strategic projects and evaluates how higher-level strategic objectives are being fulfilled. The PMO is the natural liaison between the organization's portfolios, programs, projects, and the organizational measurement systems (e.g., balanced scorecard).

The projects supported or administered by the PMO may not be related other than by being managed together. The specific form, function, and structure of a PMO are dependent upon the needs of the organization that it supports.

A PMO may have the authority to act as an integral stakeholder and a key decision maker throughout the life of each project in order to keep it aligned with the business objectives. The PMO may:

- ◆ Make recommendations,
- ◆ Lead knowledge transfer,
- ◆ Terminate projects, and
- ◆ Take other actions, as required.

A primary function of a PMO is to support project managers in a variety of ways, which may include but are not limited to:

- ◆ Managing shared resources across all projects administered by the PMO;
- ◆ Identifying and developing project management methodology, best practices, and standards;
- ◆ Coaching, mentoring, training, and oversight;
- ◆ Monitoring compliance with project management standards, policies, procedures, and templates by means of project audits;
- ◆ Developing and managing project policies, procedures, templates, and other shared documentation (organizational process assets); and
- ◆ Coordinating communication across projects.