



مدیریت پروژه بر اساس PMBOK به همراه الحاقیه ساخت (ویرایش هفتم)

بخش چهارم:

بررسی تفصیلی راهنمای پیکره دانش مدیریت پروژه PMBOK + الحاقیه ساخت

ارائه دهندگان:

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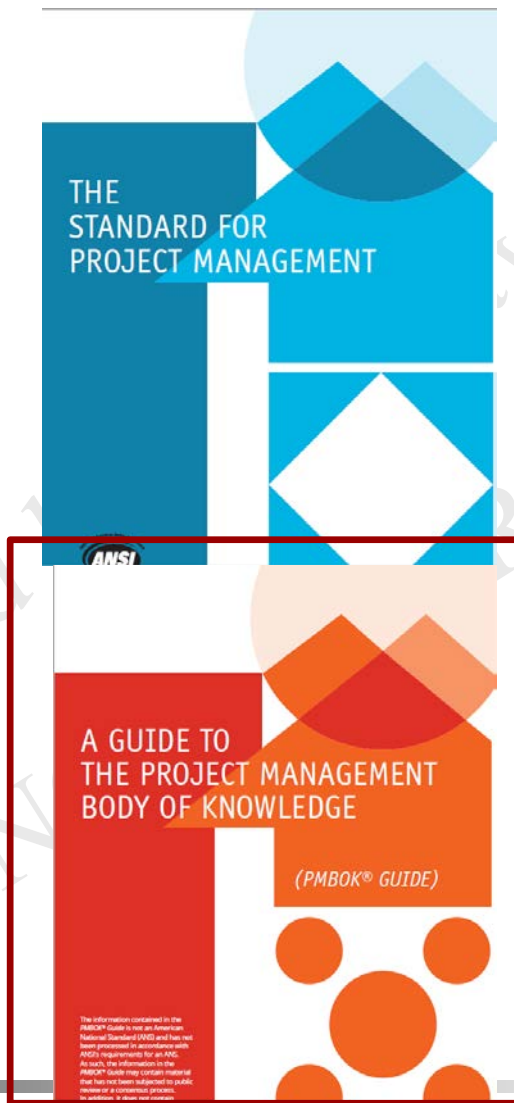
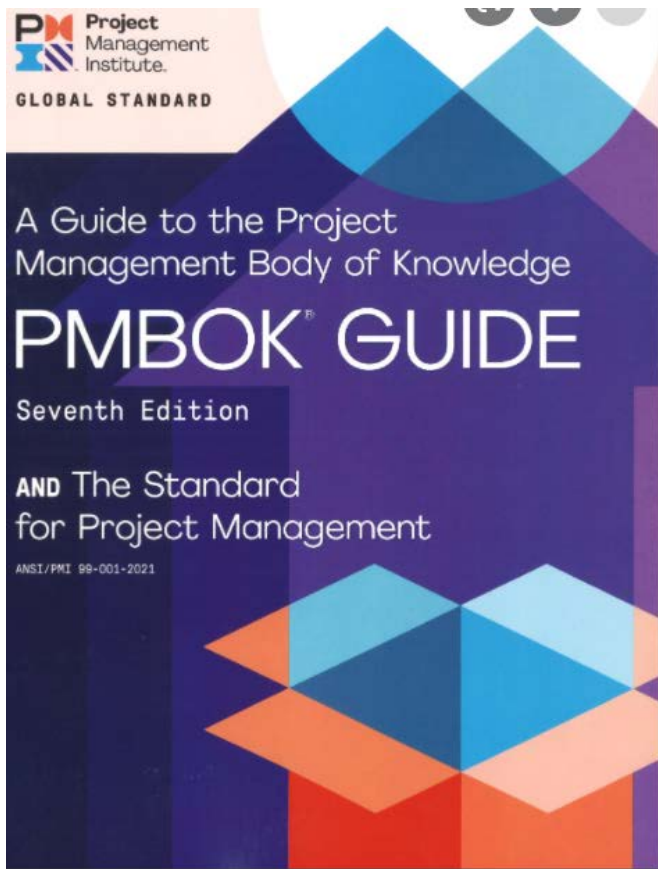
(PhD, PMP, CMIT)

دانشگاه Illinois Tech آمریکا

What we will learn?

- ❑ Introduction
- ❑ A Guide To the Project Management Body of Knowledge
 - ❖ 7th Edition – Project Performance Domains
 - ❖ Domain 1 (7th edition + PMBOK Construction Extension)
 - ❖ Domain 2 (7th edition + PMBOK Construction Extension)
 - ❖ Domain 3 (7th edition + PMBOK Construction Extension)
 - ❖ Domain 4 (7th edition + PMBOK Construction Extension)
 - ❖ Domain 5 (7th edition + PMBOK Construction Extension)
 - ❖ Domain 6 (7th edition + PMBOK Construction Extension)
 - ❖ Domain 7 (7th edition + PMBOK Construction Extension)
 - ❖ Domain 8 (7th edition + PMBOK Construction Extension)

A guide to the project management body of knowledge in PMBOK 7th Edition

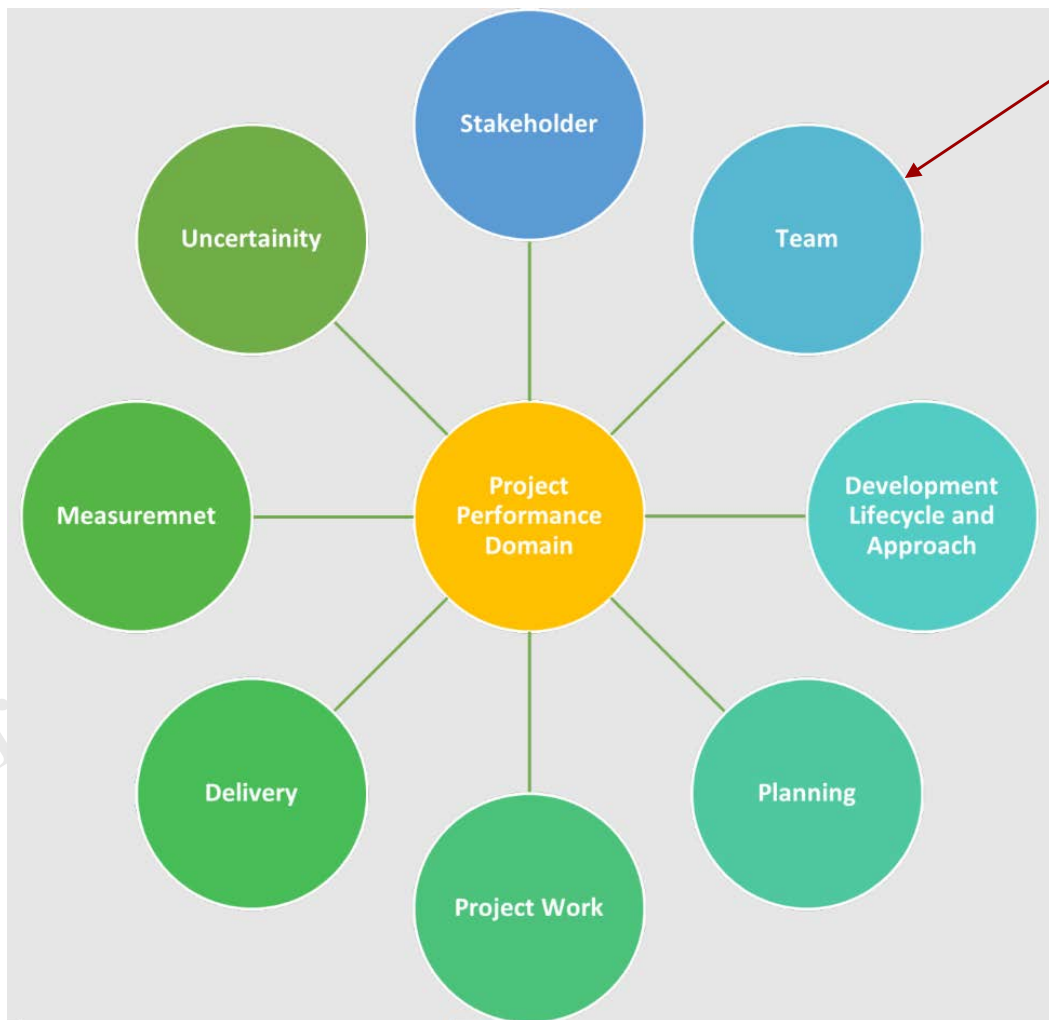


What is the difference with 6th Edition?

A Guide To the Project Management Body of Knowledge

(Domain 2: Team Performance Domain)

Project performance domains



Team performance domain – Project team management and leadership

Example of Starbucks

- ☐ Legacy organization – Established in 1912
- ☐ Number of employees – 190,000 worldwide
- ☐ Annual approximate revenue - \$17 billion
- ☐ Menu – Infinite potential menu combinations
- ☐ With all this variability, how can Starbucks create the “same” cup of coffee in Tampa, FL as it does in Seattle, WA?



Process, Tools and Accountability

Team performance domain – Project team management and leadership

❑ Automation, systems in conjunction with experts



Team performance domain – Project team management and leadership

- ❑ Adjustment to thinking approach to minimize risk



Team performance domain – Project team management and leadership

❑ Facial recognition software



A police officer wearing facial recognition glasses spotted a heroin smuggler. Cameras helped catch 24 criminal suspects.

<https://www.nytimes.com/2018/07/08/business/china-surveillance-technology.html>

Team performance domain – Project team management and leadership

❑ Remember and cater to people



<https://www.youtube.com/watch?v=e1o4Y-92k8Q>

Automates service for ordering and receiving food which makes it possible to remember your favorite orders!



مدیریت پروژه بر اساس PMBOK به همراه الحاقیه ساخت
بررسی تفصیلی راهنمای پیکره دانش مدیریت پروژه PMBOK + الحاقیه ساخت

Team performance domain – Project team management and leadership

❑ Drone in construction



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Team performance domain – Project team management and leadership

Top 10 reasons project and field managers do not become business leaders

1. Your company does **not have a vision** that motivates key employees and/or a strategic plan for **executing on the vision**
2. Your **organizational structure** and/or roles are **not clear**, thus impacting lines of accountability
3. Your company does **not have a structured performance management** and development plan for key employees, so they **do not know how to work toward the “next” level**

What do you mean?



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Team performance domain – Project team management and leadership

Top 10 reasons project and field managers do not become business leaders

Remember this right?



Turning project managers into leaders

...what does this mean? Turning PMs into business managers means **developing leadership skills and increasing business focus** – giving PMs the skills to advance and add further value to the organization

Career Focus Matrix (with Example Positions)

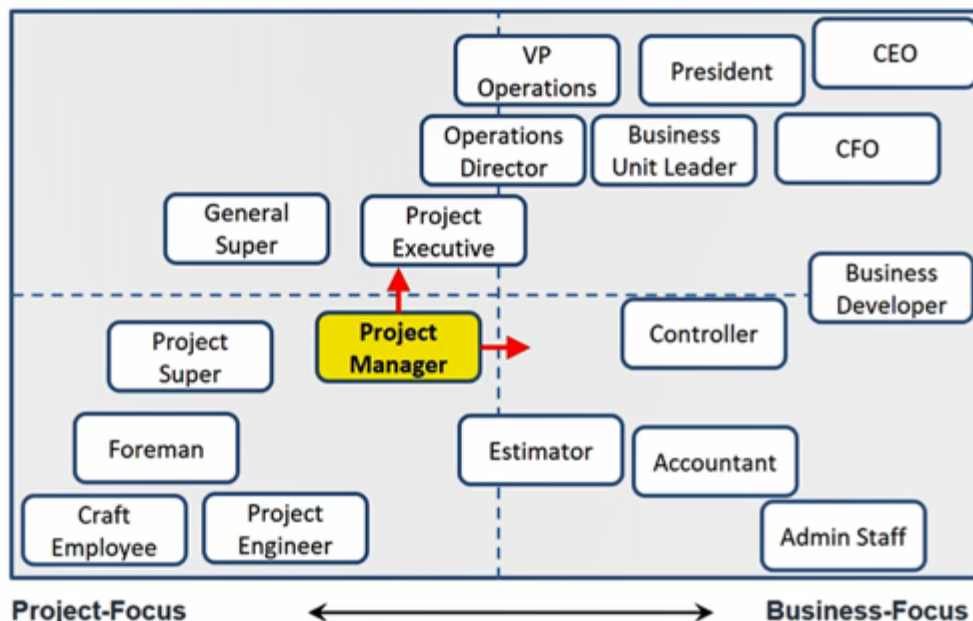
Leadership Needs

- Set Goals
- Align Resources
- Motivate Staff



Managerial Needs

- Plan
- Organize
- Control



By: Alavipour, PhD, PMP, CMIT

www.dralavipour.com ذکر مطالب فوق تنها در صورت ذکر منبع بلامانع است.

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Team performance domain – Project team management and leadership

Top 10 reasons project and field managers do not become business leaders

4. Top performers do not have a portion of their pay that is truly performance/incentive-driven
5. Training and development investment does not exist, or is ill-defined

If you are not growing you are dying



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Remember VQ?

Team performance domain – Project team management and leadership

Top 10 reasons project and field managers do not become business leaders

6. **Field and project managers** do not have a means of tracking units of production (earned value)
7. There is an **inherent fear** of **sharing information** with the **field**
8. **No one outside** of ownership/senior management is **involved in setting direction** for your company
9. Your company does **not have productivity processes** in place with field and project management responsible for **implementing/measuring processes**
10. Field and project managers do not have any **formal** responsibility of **providing mentorship** to more junior staff

Team performance domain – Project team management and leadership

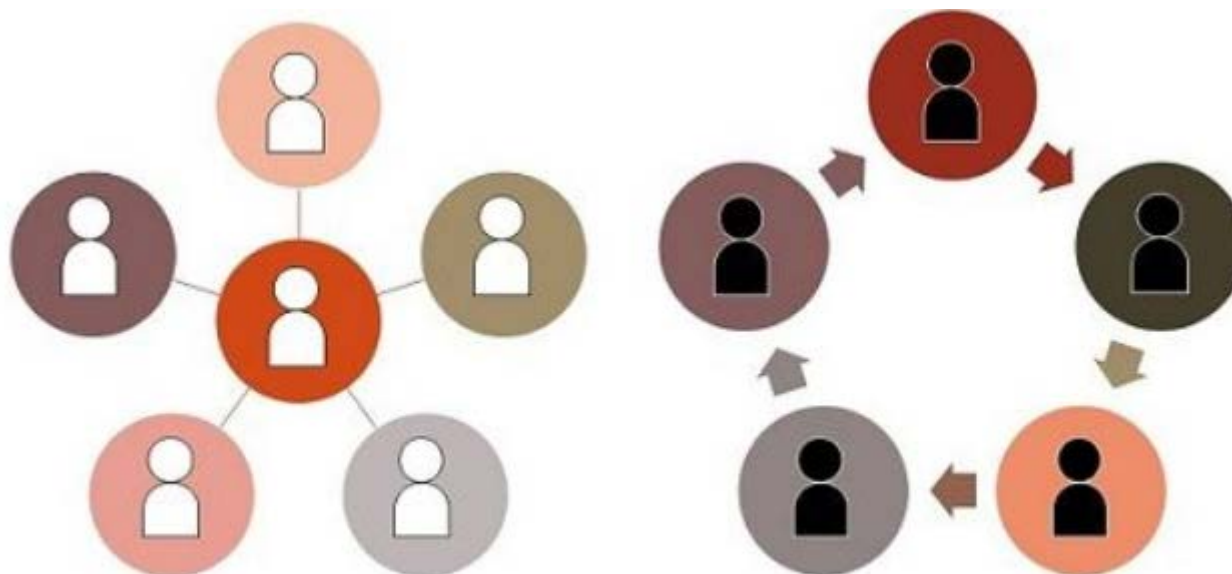
- **Leaders** Do more than follow procedures.
They make positive things happen!
- **Witnesses** Watch the project go by and wonder
what happened at the end



We have two types of leadership:

1. **Centralized**
2. **Distributed**

Team performance domain – Project team management and leadership: Centralized



CENTRALIZATION VS DECENTRALIZATION

Prefer
DO NOT

Team performance domain – Project team management and leadership: Centralized

❑ **Accountability** (being answerable for an outcome), is usually assigned to one individual,

such as the **project manager or similar role**.

❖ In these situations, a **project charter or other authorizing document**

can provide **approval for the project manager** to **form a project team** to achieve the project outcomes.

How about **distributed management and leadership**?

Team performance domain – Project team management and leadership: Distributed

❑ Sometimes project management activities are **shared** among a project management team,

and **project team members** are responsible for completing the work.

❖ There are also situations where a **project team may self-organize** to complete a project.

❖ Rather than having a **designated project manager**, **someone within the project team** may serve as facilitator to enable communication, collaboration, and engagement.

*This role may **shift** among project team members.*

What does **servant leadership** mean?

Team performance domain – Project team management and leadership: Distributed

- ❑ Servant leadership is a **style of leadership** that focuses on understanding and addressing the **needs and development of project team members**
in order to enable the **highest possible project team performance**.
- ❑ Servant leaders place emphasis on **developing project team members** to their **highest potential** by focusing on addressing questions, such as:
 - ▶ Are project team members **growing** as individuals?
 - ▶ Are project team members becoming healthier, wiser, freer, and more autonomous?
 - ▶ Are project team members more likely to become servant leaders?

Team performance domain – Project team management and leadership: Distributed

TRADITIONAL LEADERS

Sees leadership as a rank to obtain.

Uses power & control to drive performance.

Measures success through output.

Speaks.

Believes its about them.

SERVANT LEADERS

Sees leadership as an opportunity to serve others.

Shares power & control to drive engagement.

Measures success through growth & development.

Listens.

Understands its not about them.

Team performance domain – Project team management and leadership: Distributed

Servant leaders allow project teams to self-organize when possible and increase levels of autonomy by passing appropriate decision-making opportunities to project team members. Servant leadership behaviors include:

- ▶ **Obstacle removal.** Since it is the project team who generates the majority of business value, a critical role for the servant leader is to maximize delivery by removing impediments to their progress. This includes solving problems and removing obstacles that may be hampering the project team's work. By solving or easing these impediments, the project team can deliver value to the business faster.
- ▶ **Diversion shield.** Servant leaders protect the project team from internal and external diversions that redirect the project team from the current objectives. Time fragmentation reduces productivity, so shielding the project team from noncritical, external demands helps the project team stay focused.
- ▶ **Encouragement and development opportunities.** The servant leader also provides tools and encouragement to keep the project team satisfied and productive. Learning what motivates project team members as individuals and finding ways to reward them for good work helps keep project team members satisfied.

What are the **common aspects** of team development?

Team performance domain – Project team management and leadership: Common aspects of team development

❑ **Regardless** of how the management activities are structured, there are **common aspects of project team development** that are relevant for most project teams. These include:

- ▶ **Vision and objectives.** It is essential that everyone is aware of the project vision and objectives. The vision and objectives are communicated throughout the project. This includes referencing the intended outcomes when the project team is engaged in making decisions and solving problems.
- ▶ **Roles and responsibilities.** It is important to make sure project team members understand and fulfill their roles and responsibilities. This can include identifying gaps in knowledge and skills as well as strategies to address those gaps through training, mentoring, or coaching.

Team performance domain – Project team management and leadership: Common aspects of team development

❑ **Regardless** of how the management activities are structured, there are **common aspects of project team development** that are relevant for most project teams. These include:

- ▶ **Project team operations.** Facilitating project team communication, problem solving, and the process of coming to consensus may include working with the project team to develop a project team charter and a set of operating guidelines or project team norms.
- ▶ **Guidance.** Guidance can be directed to the overall project team to keep everyone headed in the right direction. Individual project team members may also provide guidance on a particular task or deliverable.

Team performance domain – Project team management and leadership: Common aspects of team development

❑ **Regardless** of how the management activities are structured, there are **common aspects of project team development** that are relevant for most project teams. These include:

► **Growth.** Identifying areas where the project team is performing well and pointing out areas where the project team can improve helps the project team to grow. Working collaboratively, the project team can identify goals for its improvement and take steps to meet those goals.

This also applies to each individual on the project team. Individuals may want to grow their skills and experience in certain areas, and the project manager can assist with that.

Team performance domain – Project team management and leadership: Common aspects of team development

When project teams form across different organizations based on a contract, strategic partnership, or other business relationship, specific roles that perform various functions may be more formalized and less flexible depending on the contract or other terms. Such arrangements often require more up-front work to establish a “one team” mindset, ensure project team members understand how everyone contributes to the project, and establish other enablers that integrate skills, capabilities, and processes.

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Team performance domain

□ We will talk about the following in this section:

1. Project team management and leadership
2. Project team culture
3. High-performing project teams
4. Leadership skills
5. Tailoring leadership styles
6. Interactions with other performance domains
7. Checking results

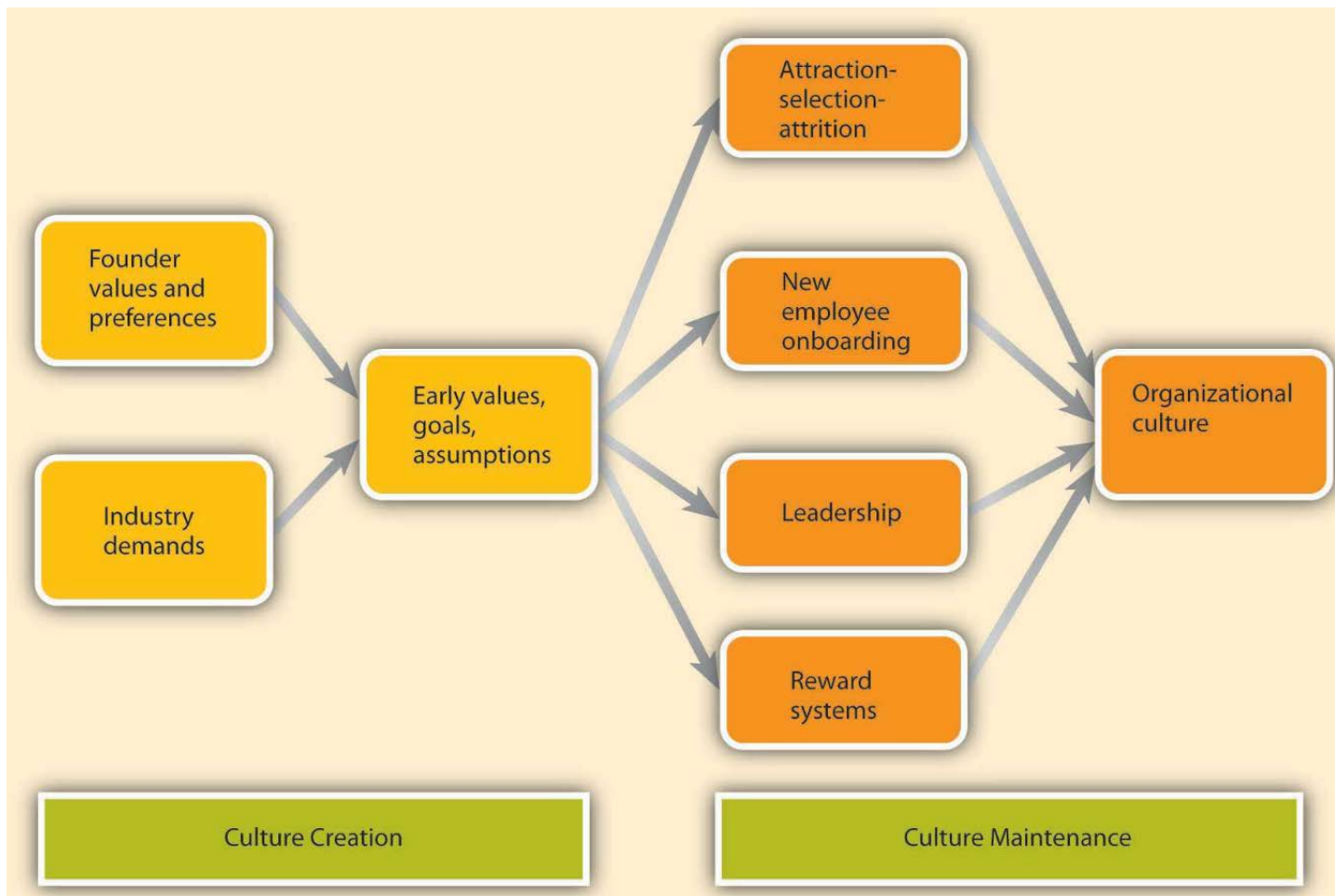
Team performance domain – Project team culture

- ☐ Each project team develops its **own team culture**.
- ☐ The **project team's culture** may be established
 1. **Deliberately** by developing project team **norms**, or
 2. **Informally** through the **behaviors and actions** of its project team members
- ☐ The project team culture operates **within the organization's culture**
but reflects the **project team's individual ways of working** and
interacting.

Team performance domain – Project team culture

Human beings have a set of biases, some of them unconscious and some of them conscious. For example, one person may feel that unless a schedule is displayed using a software-generated Gantt chart, that it is not a true or valid schedule. Another person may have a contrasting bias that detailed planning any further out than 30 days is a waste of time. Being open and transparent about biases up front establishes a culture of openness and trust that can enable consensus and collaboration.

Team performance domain – Project team culture



How project manager could accomplish desired behavior?

Team performance domain – Project team culture

- ▶ **Transparency.** Being transparent in how one thinks, makes choices, and processes information helps others identify and share their own processes. This can extend to being transparent about biases as well.
- ▶ **Integrity.** Integrity is comprised of ethical behavior and honesty. Individuals demonstrate honesty by surfacing risks, communicating their assumptions and basis of estimates, delivering bad news early, ensuring status reports provide an accurate depiction of the project's status, and in many other ways. Ethical behavior can include surfacing potential defects or negative effects in product design, disclosing potential conflicts of interest, ensuring fairness, and making decisions based on environmental, stakeholder, and financial impacts.

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Team performance domain – Project team culture

- ▶ **Respect.** Demonstrating respect for each person, how the person thinks, the person's skills, and the perspective and expertise the person brings to the project team sets the stage for all project team members to adopt this behavior.
- ▶ **Positive discourse.** Throughout the project, diverse opinions, different ways of approaching situations, and misunderstandings will occur. These are a normal part of conducting projects. They present an opportunity to have a dialogue rather than a debate. A dialogue entails working with others to resolve divergent opinions. The goal is to arrive at a resolution that all parties can embrace. A debate, on the other hand, is a win-lose scenario where people are more interested in winning personally than they are in being open to alternative solutions to a problem.

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Team performance domain – Project team culture

- ▶ **Support.** Projects can be challenging from the perspectives of technical challenges, environmental influences, and interpersonal interactions. Supporting project team members through problem solving and removing impediments builds a supportive culture and leads to a trusting and collaborative environment. Support can also be demonstrated by providing encouragement, showing empathy, and engaging in active listening.
- ▶ **Courage.** Recommending a new approach to a problem or a way of working can be intimidating. Likewise, it can be challenging to disagree with a subject matter expert or someone with greater authority. However, demonstrating the courage that it takes to make a suggestion, disagree, or try something new enables a culture of experimentation and communicates to others that it is safe to be courageous and try new approaches.
- ▶ **Celebrating success.** Focusing on project goals, challenges, and issues often sidelines the fact that individual project team members and the project team as a whole are steadily progressing toward those goals. Because work takes priority, project team members may defer recognizing demonstrations of innovation, adaptation, service to others, and learning. However, recognizing such contributions in real time can keep the project team and individuals motivated.

DO

Team performance domain

□ We will talk about the following in this section:

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Team performance domain – High performing project teams

- ❑ There are a **number of factors** that contribute to high-performing project teams.
- ▶ **Open communication.** An environment that fosters open and safe communication allows for productive meetings, problem solving, brainstorming, and so forth. It is also the cornerstone for other factors, such as shared understanding, trust, and collaboration.
- ▶ **Shared understanding.** The purpose for the project and the benefits it will provide are held in common.
- ▶ **Shared ownership.** The more ownership of the outcomes that project team members feel, the better they are likely to perform.
- ▶ **Trust.** A project team in which its members trust each other is willing to go the extra distance to deliver success. People are less likely to do the extra work it may take to succeed if they do not trust their project team members, project manager, or the organization.

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Team performance domain – High performing project teams

- ❑ There are a **number of factors** that contribute to high-performing project teams.
 - ▶ **Collaboration.** Project teams that collaborate and work with each other rather than work in silos or compete tend to generate more diverse ideas and end up with better outcomes.
 - ▶ **Adaptability.** Project teams that are able to adapt the way they work to the environment and the situation are more effective.
 - ▶ **Resilience.** When issues or failures occur, high-performing project teams recover quickly.
 - ▶ **Empowerment.** Project team members who feel empowered to make decisions about the way they work perform better than those who are micromanaged.
 - ▶ **Recognition.** Project teams who are recognized for the work they put in and the performance they achieve are more likely to continue to perform well. Even the simple act of showing appreciation reinforces positive team behavior.

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Team performance domain

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Team performance domain – Leadership skills

- ☐ Whether in an environment with a centralized or shared authority, the following describes some of the traits and activities associated with leadership:
 1. Establishing and maintaining vision
 2. Critical thinking
 3. Motivation
 4. Interpersonal skills

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Team performance domain – Leadership skills: Establishing and maintaining vision

- ☐ Powerful **motivational** tool
- ☐ **Common** vision
- ☐ A vision developed collaboratively between project team members and key stakeholders should **answer these questions:**
 - ▶ What is the project purpose?
 - ▶ What defines successful project work?
 - ▶ How will the future be better when the project outcomes are delivered?
 - ▶ How will the project team know that it is drifting from the vision?

Team performance domain – Leadership skills: Establishing and maintaining vision

- ❑ A good vision is clear, concise, and actionable. It does the following:
 - ▶ **Summarizes** the project with a powerful phrase or short description,
 - ▶ **Describes** the best achievable outcome,
 - ▶ **Creates** a common, cohesive picture in project team members' minds, and
 - ▶ **Inspires** passion for the outcome.

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Team performance domain – Leadership skills: Critical thinking

- ☐ Recognize **bias**
- ☐ Identify the **root cause** of problems
- ☐ Consider **challenging issues**
- ☐ **Includes** disciplined, rational, logical, evidence-based thinking.
- ☐ Requires an **open mind** and the ability to **analyze objectively**
- ☐ Includes **reflective thinking** and **metacognition**
 - ❖ Thinking about thinking and being aware of **one's awareness**

Team performance domain – Leadership skills: Critical thinking



How to motivate team members?

Team performance domain – Leadership skills: Motivation

❑ Two aspects:

1. Understanding **what motivates**
2. **Working with team members** in such a way that they remain committed

❑ Motivation to perform can be:

1. **Intrinsic**: comes from inside the individual (finding pleasure in the work)
2. **Extrinsic**: because of an external reward such as a bonus

Much of the work done on projects is aligned with **intrinsic motivation!**

Team performance domain – Leadership skills: Motivation

❑ Examples of intrinsic motivation factors include:

- ▶ Achievement,
- ▶ Challenge,
- ▶ Belief in the work,
- ▶ Making a difference,
- ▶ Self-direction and autonomy,
- ▶ Responsibility,
- ▶ Personal growth,
- ▶ Relatedness, and
- ▶ Being part of a project team.

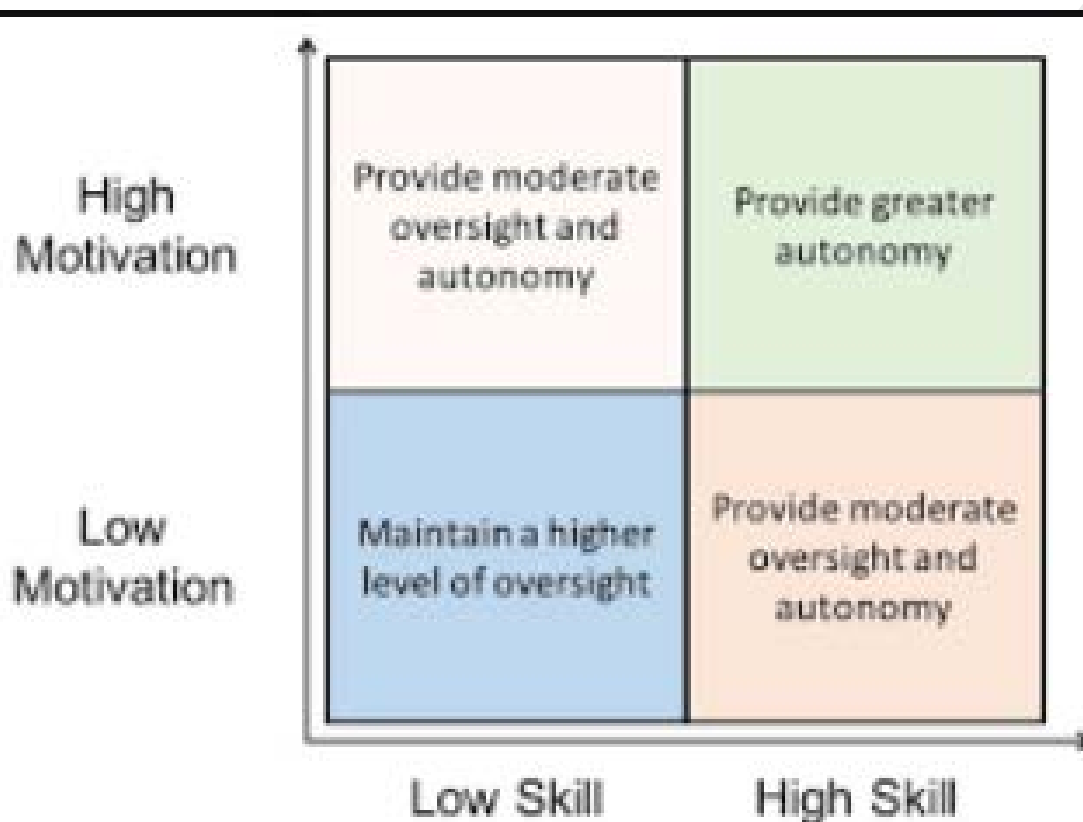
Are people motivated by just one thing?

Team performance domain – Leadership skills: Motivation

- ❑ People are **not motivated by just one thing**; however, most people have a **dominant motivator**.
- ❑ To effectively motivate project team members, it is helpful to **know each member's dominant motivator**.



Team performance domain – Leadership skills: Motivation



Team performance domain – Leadership skills: Interpersonal skills

There are multiple models for defining and explaining emotional intelligence. They converge on four key areas:

- ▷ *Self-awareness.* Self-awareness is the ability to conduct a realistic self-assessment. It includes understanding our own emotions, goals, motivations, strengths, and weaknesses.
- ▷ *Self-management.* Self-management, also known as self-regulation, is the ability to control and redirect disruptive feelings and impulses. It is the ability to think before acting, suspending snap judgments and impulsive decisions.
- ▷ *Social awareness.* Social awareness is about empathy and understanding and considering other people's feelings. This includes the ability to read nonverbal cues and body language.
- ▷ *Social skill.* Social skill is the culmination of the other dimensions of emotional intelligence. It is concerned with managing groups of people, such as project teams, building social networks, finding common ground with various stakeholders, and building rapport.

DO 1

Team performance domain – Leadership skills: Interpersonal skills

Some models for emotional intelligence include a fifth area for motivation. Motivation in this context is about understanding what drives and inspires people.

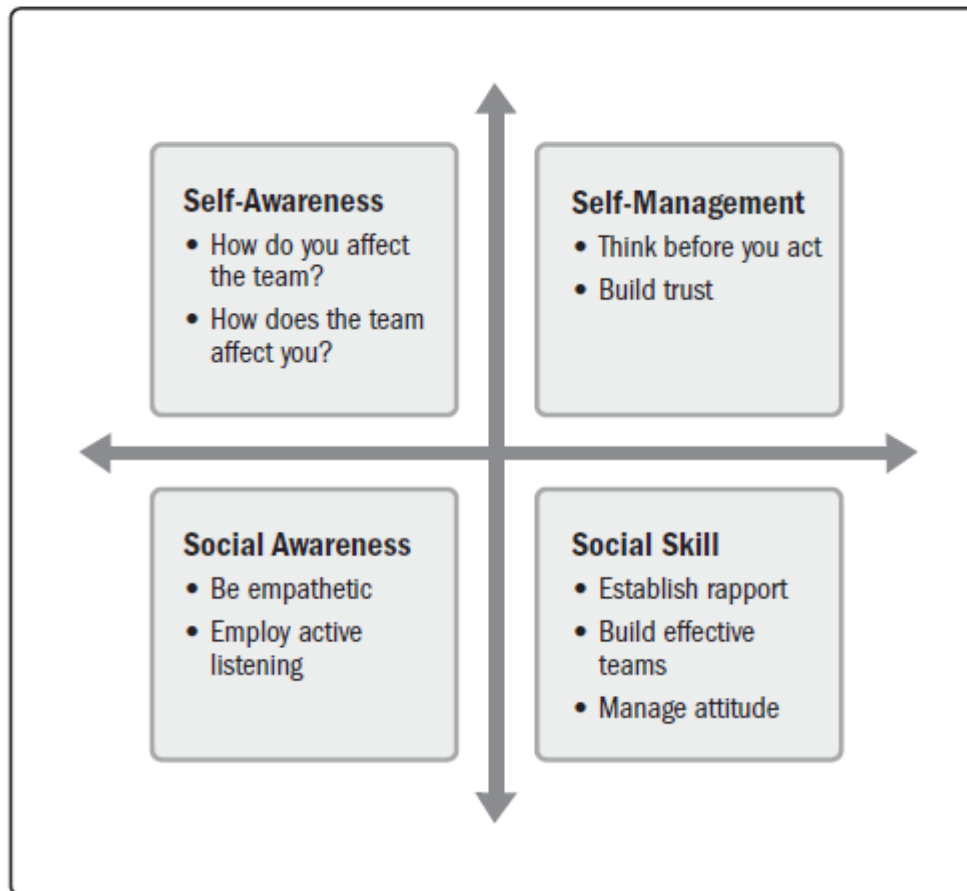


Figure 2-5. Components of Emotional Intelligence

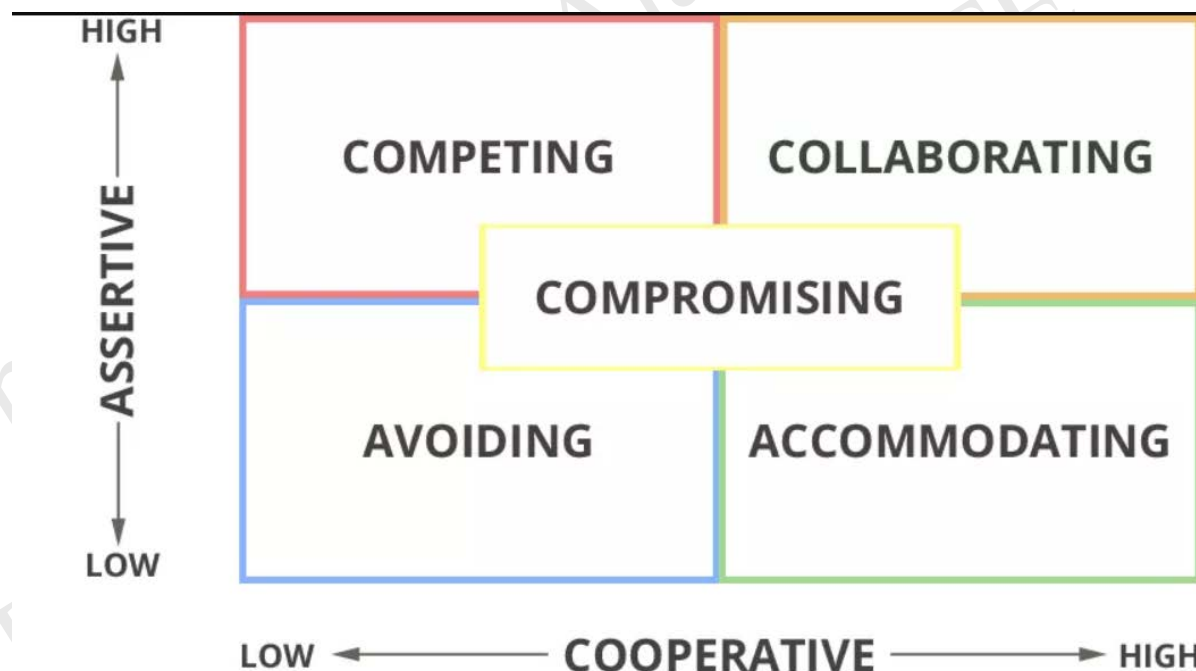
Team performance domain – Leadership skills: Interpersonal skills

- **Decision making.** Project managers and project teams make many decisions daily. Some decisions may be fairly inconsequential to the project outcome, such as where to go for a team lunch, and others will be very impactful, such as what development approach to use, which tool to use, or what vendor to select.



Team performance domain – Leadership skills: Interpersonal skills

- **Conflict management.** Conflict happens on all projects. Projects operate in dynamic environments and face many mutually exclusive constraints including budget, scope, schedule, and quality, which can lead to conflicts. It is not uncommon to want to avoid conflict, but not all conflict is negative. How conflict is handled can either lead to more conflict or to better decision making and stronger solutions.



Team performance domain – Leadership skills: Interpersonal skills

Addressing conflict before it escalates beyond useful debate leads to better outcomes.

The following approaches can help:

- ▷ *Keep communications open and respectful.* Because conflict can cause anxiety, it is important to keep a safe environment to explore the source of the conflict. Without a safe environment, people will stop communicating. Make sure words, tone of voice, and body language remain nonthreatening.
- ▷ *Focus on the issues, not the people.* Conflict is based on people perceiving situations differently. It should not be personal. The focus is on resolving the situation, not casting blame.
- ▷ *Focus on the present and future, not the past.* Stay focused on the current situation, not past situations. If something similar happened previously, bringing up the past will not resolve the current situation. In fact, it can serve to intensify the current situation even more.
- ▷ *Search for alternatives together.* Damage incurred from conflict can be repaired by looking for resolutions and alternatives together. It can also create more constructive relationships. This moves the conflict into more of a problem-solving space where people can work together to generate creative alternatives.

Team performance domain

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Team performance domain: Tailoring leadership styles

- ❑ As with all aspects of projects, leadership styles are also tailored to meet the needs of the project, the environment, and the stakeholders.



Team performance domain: Tailoring leadership styles

- ❑ Some of the **variables** that **influence** tailoring of leadership styles include:
- ▶ **Experience with the type of project.** Organizations and project teams with experience on a specific type of project may be more self-managing and require less leadership. When a project is new to an organization, the tendency is to provide more oversight and to use a more directive leadership style.
 - ▶ **Maturity of the project team members.** Project team members who are mature in the technical field may need less oversight and direction than project team members who are new to the organization, the team, or the technical specialty.
 - ▶ **Organizational governance structures.** Projects operate within a larger organizational system. There may be the expectation that the organizational leadership style of top management is recognized and reflected in the team's leadership. The organizational structure influences the degree to which authority and accountability are centralized or distributed.

Team performance domain: Tailoring leadership styles

❑ Some of the **variables** that **influence** tailoring of leadership styles include:

- ▶ **Distributed project teams.** A global project workforce is more common today than in the past. In spite of the best efforts to connect people virtually, it can be challenging to create the same level of collaboration and relatedness that is achieved when working face to face. To minimize the pitfalls of distributed project teams, technology can be used to increase and improve communication. Examples include:
 - ▷ Ensure there are collaboration sites for working together.
 - ▷ Have a project team site to keep all relevant project and project team information available.
 - ▷ Use audio and video capabilities for meetings.
 - ▷ Use technology to maintain ongoing contact, such as messaging and texting.
 - ▷ Build in time to get to know remote project team members.
 - ▷ Have at least one face-to-face meeting to establish relationships.

DO

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Team performance domain – Interactions with other performance domains

- ❑ The **Team Performance Domain** emphasizes the skills used by **project managers** and **project team members** throughout the project.
- ❑ These skills are **woven into all other** aspects of the project.
 - ❖ *Communicating the project vision and benefits to stakeholders while planning and throughout the life cycle is one example.*
 - ❖ *Another example is **employing critical thinking, problem solving, and decision making** while engaging in project work.*
 - ❖ ***Accountability** for outcomes is demonstrated throughout the Planning and Measurement Performance Domains.*

Team performance domain

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Team performance domain – Checking results

Table 2-3. Checking Outcomes—Team Performance Domain

Outcome	Check
Shared ownership	All project team members know the vision and objectives. The project team owns the deliverables and outcomes of the project.
A high-performing team	The project team trusts each other and collaborates. The project team adapts to changing situations and is resilient in the face of challenges. The project team feels empowered and empowers and recognizes members of the project team.
Applicable leadership and other interpersonal skills are demonstrated by all project team members	Project team members apply critical thinking and interpersonal skills. Project team member leadership styles are appropriate to the project context and environment.

A Guide To the Project Management Body of Knowledge

(Domain 3: Development Approach and Life Cycle Performance Domain)

Project performance domains



Development approach and life cycle performance domain

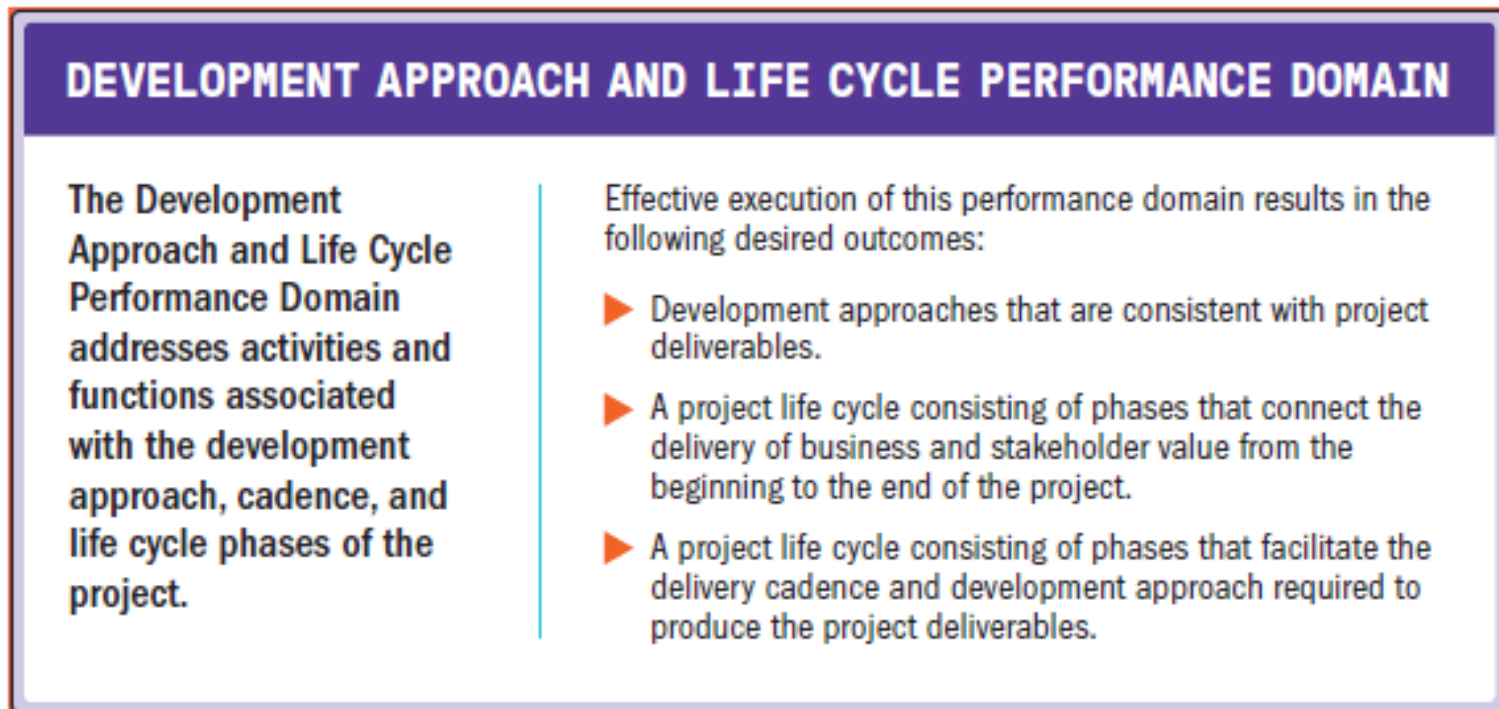


Figure 2-6. Development Approach and Life Cycle Performance Domain

Development approach and life cycle performance domain

The following definitions are relevant to the Development Approach and Life Cycle Performance Domain:

Deliverable. Any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project.

Development Approach. A method used to create and evolve the product, service, or result during the project life cycle, such as a predictive, iterative, incremental, adaptive, or hybrid method.

Cadence. A rhythm of activities conducted throughout the project.

Project Phase. A collection of logically related project activities that culminates in the completion of one or more deliverables.

Project Life Cycle. The series of phases that a project passes through from its start to its completion.

Development approach and life cycle performance domain

□ We will talk about the following in this section:

1. **Development, cadence, and life cycle relationship**
2. **Delivery cadence**
3. **Development approaches**
4. **Considerations for selecting a development approach**
5. **Life cycle and phase definitions**
6. **Aligning of delivery cadence, development approach, and life cycle**
7. **Interactions with other performance domains**
8. **Measuring outcomes**

Development approach and life cycle performance domain – Development, cadence, and life cycle relationship

1. The **type of project deliverable(s)** determines how it can be developed.
2. The **type of deliverable(s)** and the **development approach** influence the number and cadence for **project deliveries**.
3. The **deliverable approach** and the **desired delivery cadence** determine the project life cycle and its phases.

Development approach and life cycle performance domain

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3. Development approaches
4. Considerations for selecting a development approach
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Development approach and life cycle performance domain – Delivery cadence

- ❑ **Delivery cadence** refers to the timing and frequency of **project deliverables**.
- ❑ Projects can have a single delivery, multiple deliveries, or periodic deliveries.

Let's see them!

Development approach and life cycle performance domain – Delivery cadence

- ▶ **Single delivery.** Projects that have a single delivery deliver at the end of the project. For example, a process reengineering project may not have any deliveries until near the end of the project when the new process is rolled out.
- ▶ **Multiple deliveries.** Some projects have multiple deliveries. A project may have multiple components that are delivered at different times throughout the project. A project to develop a new drug may have multiple deliveries, such as preclinical submissions, Phase 1 trial results, Phase 2 trial results, Phase 3 trial results, registration, and then launch. In this example, the deliveries are sequential. Some projects have deliveries that are developed separately rather than sequentially, such as a project to update building security. Deliveries may include physical barriers to entry, new badges, new key code pads, and so forth. Each of these is a separate delivery, but they do not need to come in a specific order. All of the deliveries are concluded before the project is considered to be completed.
- ▶ **Periodic deliveries.** Periodic deliveries are like multiple deliveries, but they are on a fixed delivery schedule, such as monthly or bimonthly. A new software application may have internal deliveries every two weeks, and then periodically release the deliveries into the market.

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Development approach and life cycle performance domain – Delivery cadence

Another delivery option is called continuous delivery. Continuous delivery is the practice of delivering feature increments immediately to customers, often through the use of small batches of work and automation technology. Continuous delivery can be used for digital products. From the product management perspective, the emphasis is on delivering benefits and value throughout the product life cycle. Similar to a project, there are aspects that are development oriented. However, similar to a program, there can be many development cycles as well as maintenance activities. This type of undertaking works better with project teams that are stable and remain intact. Because the project teams are focused on one product, they can apply learning about the product, the stakeholders, and the market. This allows the team to respond to market trends and stay focused on value delivery. This practice is included in several approaches such as DevOps, #noprosjects and Continuous Digital, for example.

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Development approach and life cycle performance domain

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Development approach and life cycle performance domain – Development approaches

- ❑ A **development approach** is the means used to create and evolve the product, service, or result **during the project life cycle**.
- ❑ There are different **development approaches**, and different industries may use **different terms** to refer to development approaches.
- ❑ Three **commonly used approaches** are predictive, hybrid, and adaptive.

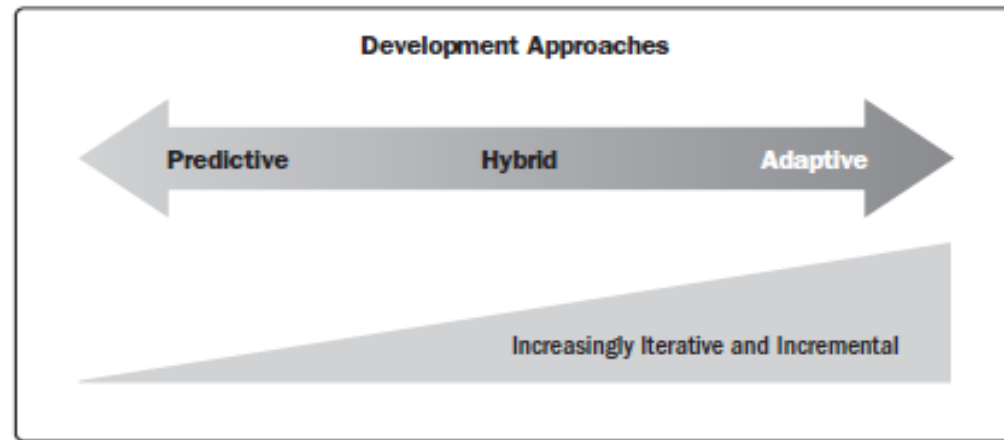


Figure 2-7. Development Approaches

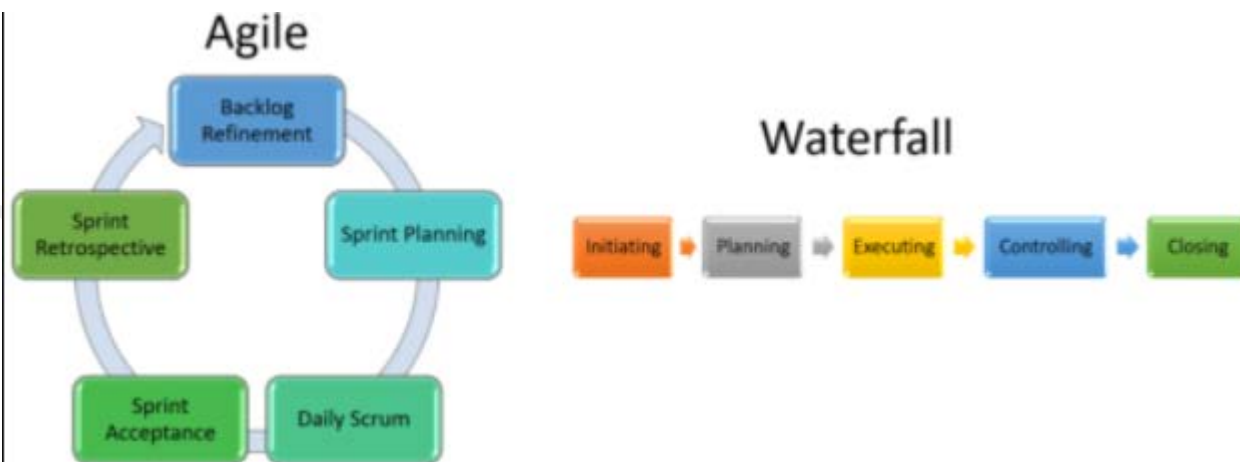
Development approach and life cycle performance domain – Development approaches

1. Predictive
2. Hybrid
3. Iterative
4. Incremental
5. Adaptive

Let's see them first!

Development approach and life cycle performance domain – Development approaches: Predictive

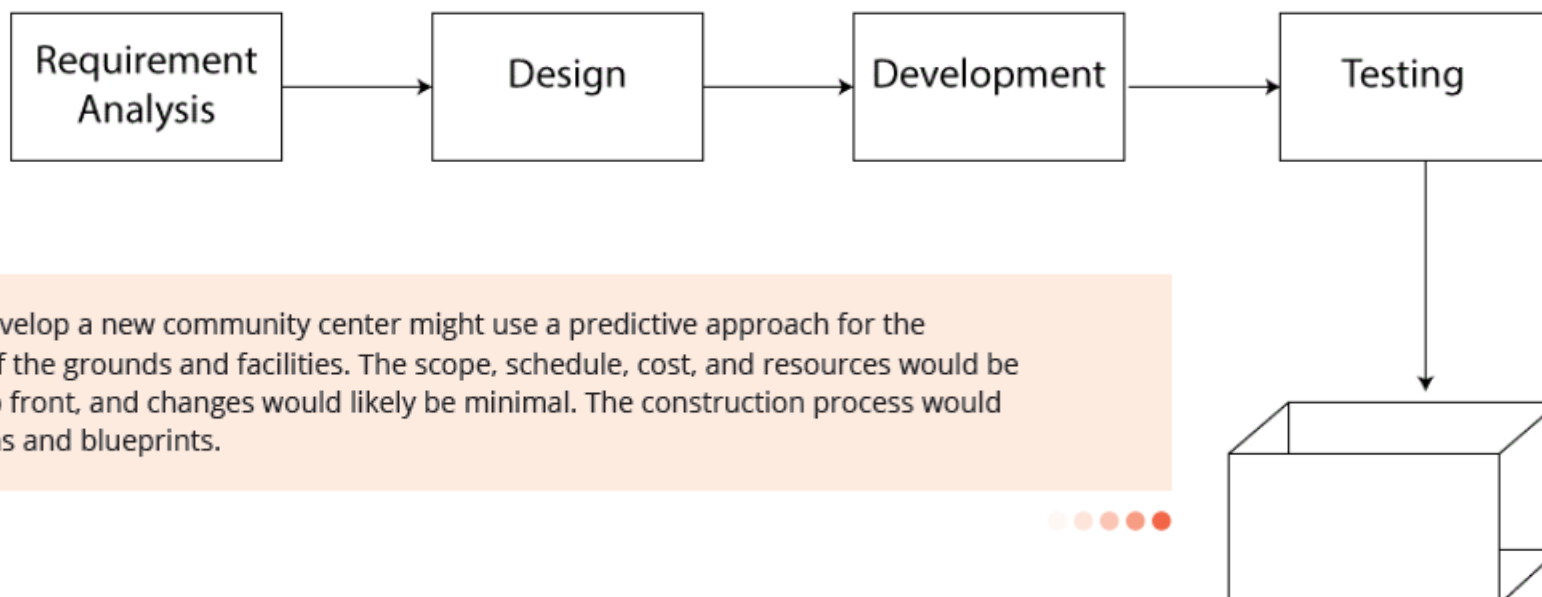
- **Predictive approach.** A predictive approach is useful when the project and product requirements can be defined, collected, and analyzed at the start of the project. This may also be referred to as a waterfall approach. This approach may also be used when there is a significant investment involved and a high level of risk that may require frequent reviews, change control mechanisms, and replanning between development phases. The scope, schedule, cost, resource needs, and risks can be well defined in the early phases of the project life cycle, and they are relatively stable. This development approach allows the project team to reduce the level of uncertainty early in the project and do much of the planning up front. Predictive approaches may use proof-of-concept developments to explore options, but the majority of the project work follows the plans that were developed near the start of the project. Many times, projects that use this approach have templates from previous, similar projects.



Development approach and life cycle performance domain – Development approaches: Predictive

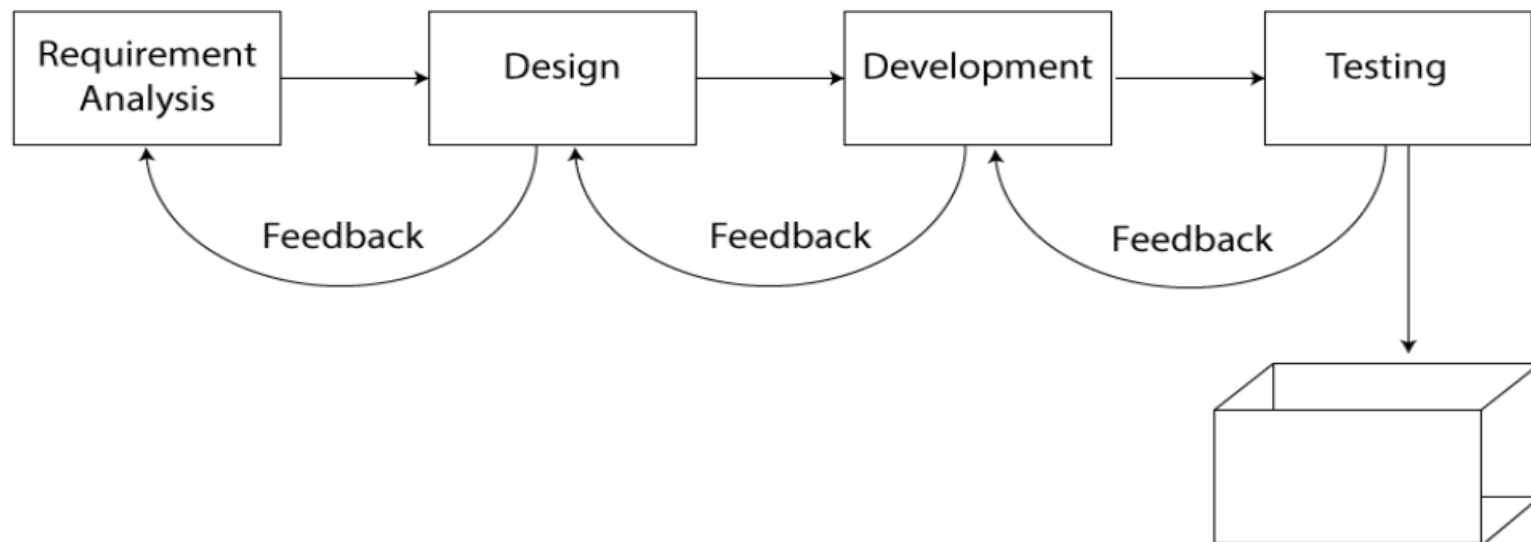
First of all, we shall look at what is a Predictive Life Cycle according to the [PMBOK® Guide](#):

Predictive Life Cycle: A form of project life cycle in which the project scope, time, and cost are determined in the initial phases of the life cycle.



Development approach and life cycle performance domain – Development approaches: Predictive

You can see we are sequencing phases of work. And, If we need any feedback, it comes from the successor phase to the previous one. Like Requirement Analysis gets feedback from the design phase.



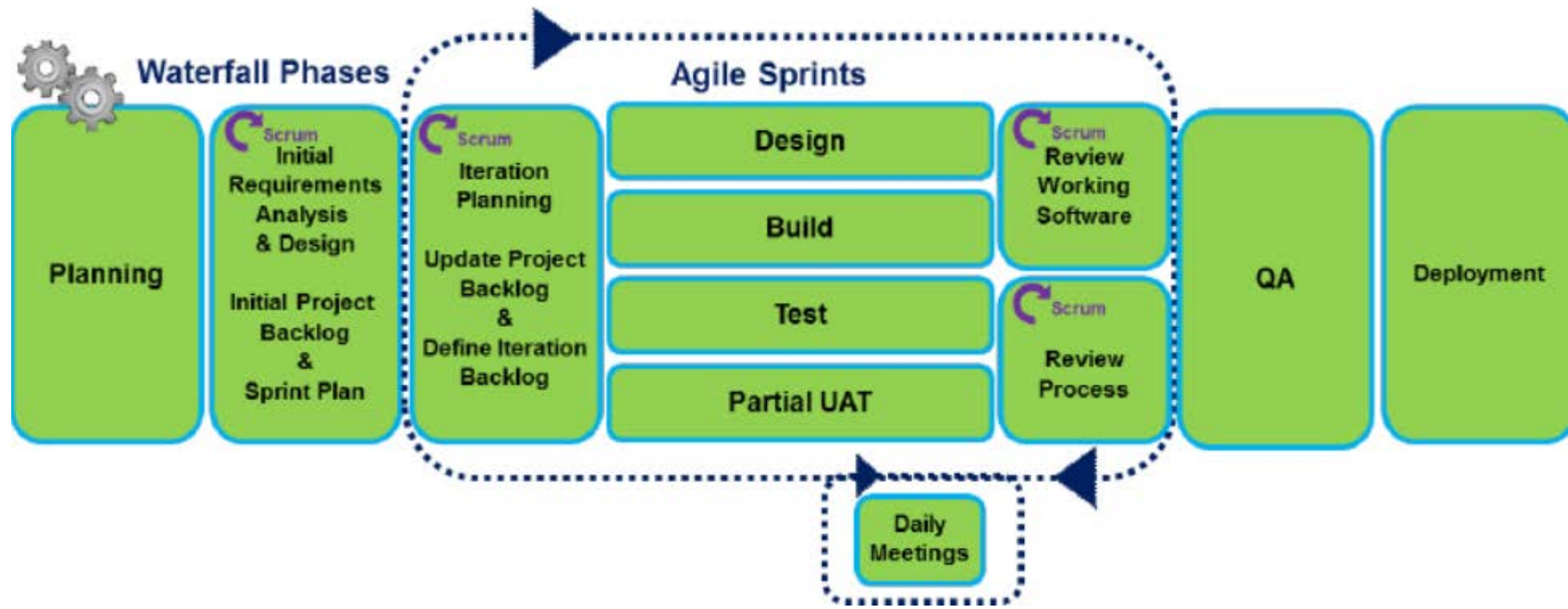
In this predictive life cycle, expected changes are minimal because work is quite predictive and known. We can say the life cycle is quite foretelling like technology is proven; the team is matured in estimation techniques. Etc.

In other words, the team knows where they are heading? And what they need to follow the sequence. It is a plan-driven life cycle, where we plan work upfront, and we make changes as an exception. It's like a yearlong project will have Planning, Analysis, Design, Code, testing phases one by one and then the final result is delivered over a year.

Development approach and life cycle performance domain – Development approaches: Hybrid

- **Hybrid approach.** A hybrid development approach is a combination of adaptive and predictive approaches. This means that some elements from a predictive approach are used and some from an adaptive approach are used. This development approach is useful when there is uncertainty or risk around the requirements. Hybrid is also useful when deliverables can be modularized, or when there are deliverables that can be developed by different project teams. A hybrid approach is more adaptive than a predictive approach, but less so than a purely adaptive approach.

Hybrid Waterfall and Agile Approach



Development approach and life cycle performance domain – Development approaches: Iterative

Based on [*PMBOK® Guide*](#):

“Iterative Life Cycle: A project life cycle where the project scope is generally determined early in the project life cycle, but time and cost estimates are routinely modified as the project team’s understanding of the product increases. Iterations develop the product through a series of repeated cycles, while increments successively add to the functionality of that product”

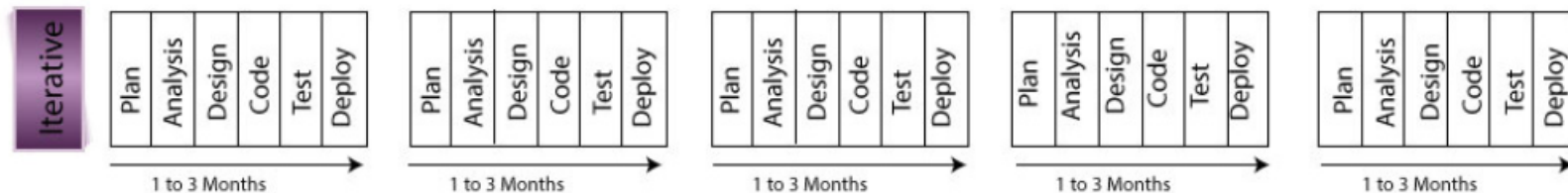
In summary, this life cycle says –

We cannot create a complete product using the approved requirements only; we need to show and take feedbacks frequently. We need to learn continually and refine the product base on these learnings.

It is an example of repeatedly development and refinement and makes this life cycle iterative. We move to the final product after continuous refinements or iterations. And, as a result of feedback, we are open to the changes to any developed part of the product. Changes are not an exception here. these are welcome in iterative development.

Development approach and life cycle performance domain – Development approaches: Iterative

Like a yearlong project will have three months iterations. And, each iteration will execute Planning, Analysis, Design, Code, testing phases, and deliver the result at the end of the iteration. This delivered result may not be usable, but it is shown to give a feel for the final product. This feeling encourages a discussion of a product that will really solve the problem.



With this life cycle, project phases proceed through sequential or overlapping mode in every iteration. And, the end result is delivered at the end of each iteration.

So, if we are doing something new and we need to see where we are moving and how this product is going to look and how will it solve –

We allow using that half-cook product before investing further.

Development approach and life cycle performance domain – Development approaches: Incremental

Now come to the incremental life cycle:

“Incremental Life Cycle: An adaptive project life cycle in which the deliverable is produced through a series of iterations that successively add functionality within a predetermined time span. The deliverable contains the necessary & sufficient capability to be considered complete only after the final iteration.”

In simple words, it is like we need to develop ten things, we develop them one by one instead of picking all in one go. This life cycle delivers features incrementally, and whatever we develop, it is usable and consumable.

What is the difference between iterative and incremental?

Development approach and life cycle performance domain – Development approaches: Incremental

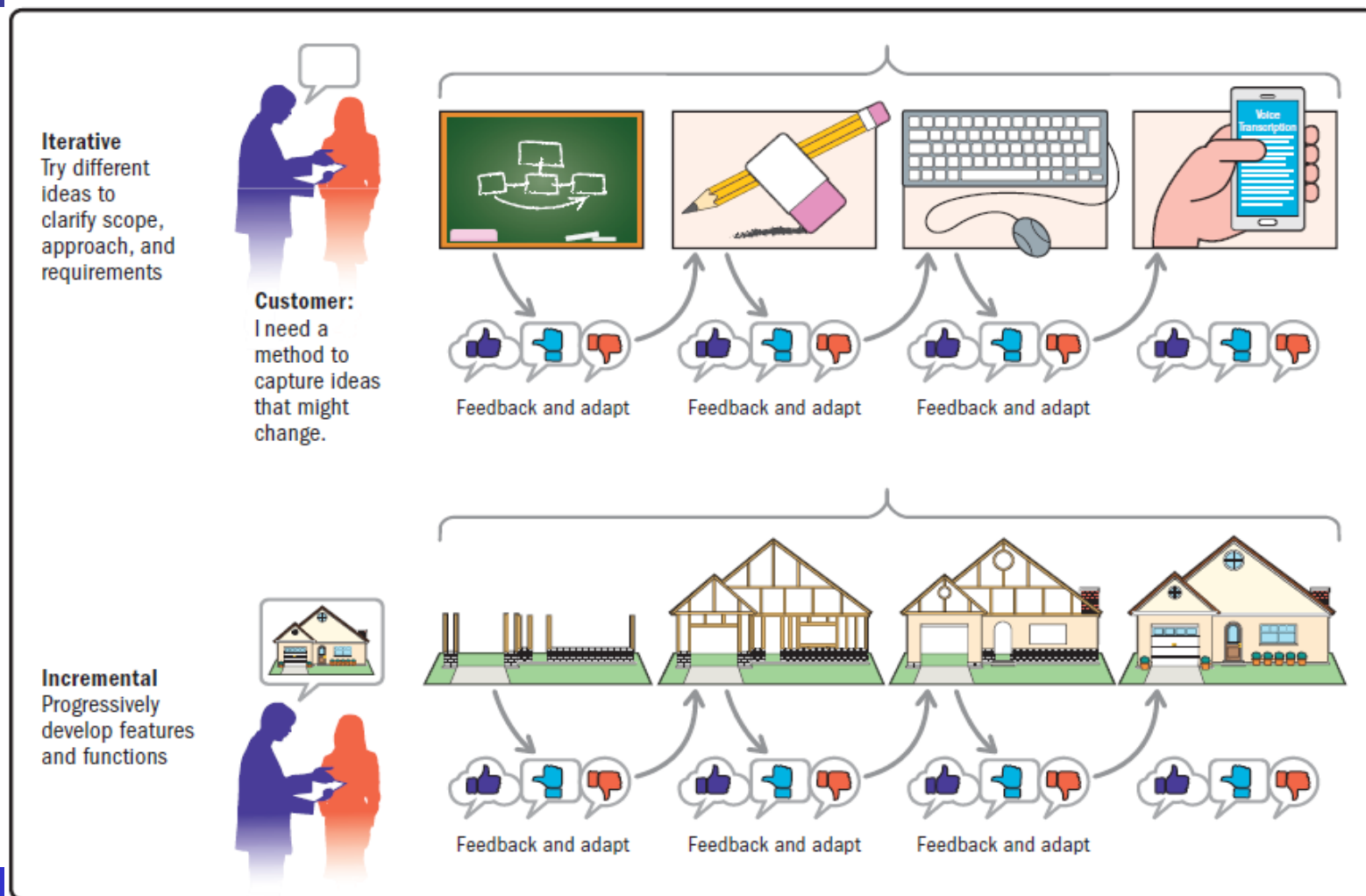


Figure 2-8. Iterative and Incremental Development

Development approach and life cycle performance domain – Development approaches: Incremental

As part of the community center, a project to establish senior services could be developed and deployed iteratively. For example, the first iteration could be a Meals on Wheels program. This could be followed by a transportation service, then group outings and events, caregiver relief, adult day care, and so forth. Each service would be complete on its own and could be deployed when it was available. Each additional service would improve and increase the senior services for the community.

A project to establish training for community action patrol volunteers could use an incremental approach. The training, comprised of basic training, logistics training, and patrol training, can be developed by different people. It can be developed at the same time in modules, or one module can be developed, feedback gathered, and then subsequent modules can be developed. However, the community action patrol training program will only be complete after all the modules are developed, integrated, and deployed.

Development approach and life cycle performance domain – Development approaches: Adaptive

- ▶ **Adaptive approach.** Adaptive approaches are useful when requirements are subject to a high level of uncertainty and volatility and are likely to change throughout the project. A clear vision is established at the start of the project, and the initial known requirements are refined, detailed, changed, or replaced in accordance with user feedback, the environment, or unexpected events.

Adaptive approaches use iterative and incremental approaches. However, on the far side of the adaptive methods, the iterations tend to get shorter and the product is more likely to evolve based on stakeholder feedback.

While agility is a wide mindset that is broader than a development framework, agile approaches can be considered adaptive. Some agile approaches entail iterations that are 1 to 2 weeks in duration with a demonstration of the accomplishments at the end of each iteration. The project team is very engaged with the planning for each iteration. The project team will determine the scope they can achieve based on a prioritized backlog, estimate the work involved, and work collaboratively throughout the iteration to develop the scope.

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Development approach and life cycle performance domain – Development approaches: Adaptive

Based on [*PMBOK® Guide*](#):

Adaptive Life Cycle: The project life cycle that is iterative and incremental.

It means this life cycle is a mix of iterative and incremental development. We add features incrementally, but they can be changed based on received feedback.

Using this life cycle, whatever is we deliver–

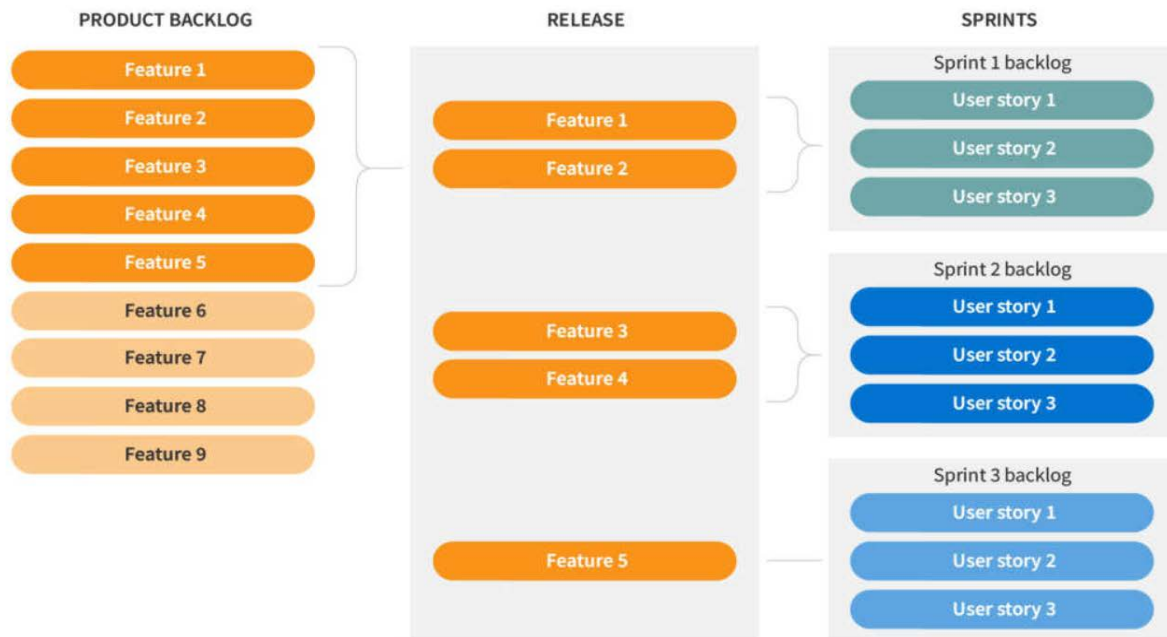
It is usable like incremental, but we are open for feedbacks and refinements based on those feedbacks.

These refinements can be done either in iterations or we can follow a kanban or lean based approach.

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Development approach and life cycle performance domain – Development approaches: Adaptive

The community center will need a website so community members can access information from their home computer, phone, or tablet. The high-level requirements, design, and page layouts can be defined up front. An initial set of information can be deployed on the website. User feedback, new services, and internal stakeholder needs would provide content for a backlog. The backlog information would be prioritized, and the web team would develop and deploy new content. As new requirements and new scope emerge, the estimates for the work would be developed, the work would be done, and once tested, it would be demonstrated for stakeholders. If approved, the work would be deployed to the website.



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Development approach and life cycle performance domain

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Development approach and life cycle performance domain – Considerations for selecting a development approach

- ☐ There are several factors that influence the selection of a development approach.
 1. Product, service, or result
 2. Project
 3. Organization

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Development approach and life cycle performance domain – Considerations for selecting a development approach: Product, service, or result

- ❑ There are **many variables** associated with the nature of the product, service, or result that **influence** the **development approach**.
- ❑ The following list outlines **some of the variables** to consider when selecting the **development approach**.
 - ▶ **Degree of innovation.** Deliverables where the scope and requirements are well understood, that the project team has worked with before, and that allow for planning up front are well suited to a predictive approach. Deliverables that have a high degree of innovation or where the project team does not have experience are better suited to a more adaptive approach.
 - ▶ **Requirements certainty.** When the requirements are well known and easy to define, a predictive approach fits well. When requirements are uncertain, volatile, or complex and are expected to evolve throughout the project, a more adaptive approach may be a better fit.

Development approach and life cycle performance domain – Considerations for selecting a development approach: Product, service, or result

❑ The following list outlines **some of the variables** to consider when selecting the **development approach**.

- ▶ **Scope stability.** If the scope of the deliverable is stable and not likely to change, a predictive approach is useful. If the scope is expected to have many changes, an approach that is closer to the adaptive side of the spectrum can be useful.
- ▶ **Ease of change.** Related to the requirements certainty and the scope stability, if the nature of the deliverable makes it difficult to manage and incorporate changes, then a predictive approach is best. Deliverables that can adapt easily to change can use an approach that is more adaptive.
- ▶ **Delivery options.** As described in Section 2.3.2 on Delivery Cadence, the nature of the deliverable and whether it can be delivered in components influences the development approach. Products, services, or results that can be developed and/or delivered in pieces are aligned with incremental, iterative, or adaptive approaches. Some large projects may be planned using a predictive approach, but there may be some pieces that can be developed and delivered incrementally.

Development approach and life cycle performance domain – Considerations for selecting a development approach: Product, service, or result

❑ The following list outlines **some of the variables** to consider when selecting the **development approach**.

- ▶ **Risk.** Products that are inherently high risk require analysis before choosing the development approach. Some high-risk products may require significant up-front planning and rigorous processes to reduce threats. Other products can reduce risk by building them modularly and adapting the design and development based on learning to take advantage of emerging opportunities or reduce the exposure to threats.
- ▶ **Safety requirements.** Products that have rigorous safety requirements often use a predictive approach as there is a need for significant up-front planning to ensure that all the safety requirements are identified, planned for, created, integrated, and tested.
- ▶ **Regulations.** Environments that have significant regulatory oversight may need to use a predictive approach due to the required process, documentation, and demonstration needs.

Development approach and life cycle performance domain – Considerations for selecting a development approach: Project

❑ **Project variables** that influence the **development approach** are centered around stakeholders, schedule constraints, and funding availability.

- ▶ **Stakeholders.** Projects that use adaptive methods require significant stakeholder involvement throughout the process. Certain stakeholders, such as the product owner, play a substantial role in establishing and prioritizing work.
- ▶ **Schedule constraints.** If there is a need to deliver something early, even if it is not a finished product, an iterative or adaptive approach is beneficial.
- ▶ **Funding availability.** Projects that work in an environment of funding uncertainty can benefit from an adaptive or iterative approach. A minimum viable product can be released with less investment than an elaborate product. This allows for market testing or market capture with minimum investment. Further investments can be made based on the market response to the product or service.

Development approach and life cycle performance domain – Considerations for selecting a development approach: Organization

❑ **Organizational variables** such as the structure, culture, capability, project team size, and location influence the **development approach**.

- ▶ **Organizational structure.** An organizational structure that has many levels, a rigid reporting structure, and substantial bureaucracy frequently uses a predictive approach. Projects that use adaptive methods tend to have a flat structure and may operate with self-organizing project teams.
- ▶ **Culture.** A predictive approach fits better in an organization with a culture of managing and directing, where the work is planned out and progress is measured against baselines. Adaptive approaches fit better within an organization that emphasizes project team self-management.
- ▶ **Organizational capability.** Transitioning from predictive development approaches to adaptive approaches and then to using agile methods is more than just stating that the organization will now be agile. It entails shifting the mindset starting at the executive level throughout the organization. Organizational policies, ways of working, reporting structure, and attitude should all be aligned in order to employ adaptive methods successfully.
- ▶ **Project team size and location.** Adaptive approaches, especially agile methods, often work better with project teams of 7 ± 2 . Adaptive approaches also favor project teams that are located in the same physical space. Large project teams and project teams that are mostly virtual may do better by using an approach that is closer to the predictive side of the spectrum. However, there are approaches that seek to scale up the adaptive approaches to work with large and dispersed project teams.

Development approach and life cycle performance domain – Considerations for selecting a development approach: Organization

Particular	Predictive	Iterative	Adaptive
Stages/ Phases	Can happen sequentially or overlap	Can happen sequentially or overlap	Can happen sequentially or overlap
Stages/Phases	Planning/ Analysis/ Design / Code/ testing all takes place	Planning/ Analysis/ Design/ Code/ testing all takes place	Planning/ Analysis/ Design/ Code/ testing all takes place
Scope	Defined upfront at the beginning	Defined for upcoming iteration and high-level vision for the rest	The scope is set in the form of features from which features are picked for the current iteration
Change	At initial phases/stages can be accommodated. Cost overruns as late it comes up during project Lifecycle	Taken care with less cost impact during the planning of the next iteration	Taken care even more rapid changes every 2-4 weeks with less cost impact during the planning of the next iteration

Development approach and life cycle performance domain – Considerations for selecting a development approach: Organization

Risk	The risk of change/ feedback is huge at later stages/ phases	The risk of change/ feedback is less as iterations reduce it naturally	The risk of change/ feedback is least as iterations are too small and reduce it naturally
Customer Feedback	Customer feedback is received at the end of the project only and customer involvement is more at the beginning and end	Customer feedback is received at the end of each iteration with which customers are involved multiple times during the project	Customer feedback is received at the end of each rapid iteration. Customers are involved/engaged continuously
Complexity	Used for projects where the product to be delivered is well understood and complexities are not there to handle	Used where a change in objectives/ scope need to be managed and complexity reduction is required as the project progresses	Used in a rapidly changing environment, where scope/ requirements are difficult to define in advance and possible to define small increments
Delivery/Value	Delivery happens at the end only once and the customer gets value at the end	Delivery happens at the end of each iteration and customer gets value early in the project	Delivery happens very rapidly after every 2-4 weeks and customer get the value delivered very frequently

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Development approach and life cycle performance domain – Life cycle and phase definition

- ❑ The type and number of **project phases** in a project life cycle depend upon many variables, chief among them the delivery cadence and the development approach, as described previously.
- ❑ **Examples** of phases in a life cycle include:
 - ▶ **Feasibility.** This phase determines if the business case is valid and if the organization has the capability to deliver the intended outcome.
 - ▶ **Design.** Planning and analysis lead to the design of the project deliverable that will be developed.
 - ▶ **Build.** Construction of the deliverable with integrated quality assurance activities is conducted.
 - ▶ **Test.** Final quality review and inspection of deliverables are carried out before transition, go-live, or acceptance by the customer.
 - ▶ **Deploy.** Project deliverables are put into use and transitional activities required for sustainment, benefits realization, and organizational change management are completed.
 - ▶ **Close.** The project is closed, project knowledge and artifacts are archived, project team members are released, and contracts are closed.

Development approach and life cycle performance domain – Life cycle and phase definition

- ❑ **Project phases** often have a phase gate review (also known as stage gate) to check that the desired outcomes or exit criteria for the phase have been achieved before proceeding to the next phase.
 - ❖ Exit criteria may tie to **acceptance criteria** for deliverables, contractual obligations, meeting specific performance targets, or other tangible measures.

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Development approach and life cycle performance domain – Life cycle and phase definition

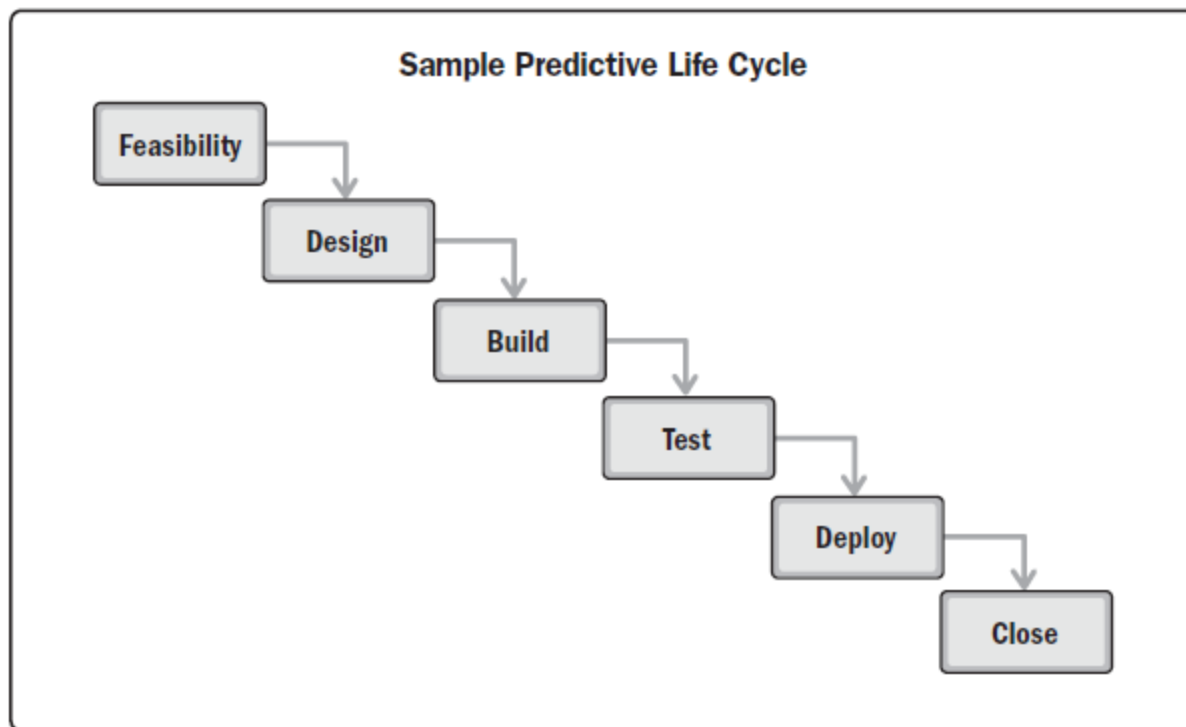


Figure 2-9. Sample Predictive Life Cycle

Development approach and life cycle performance domain – Life cycle and phase definition

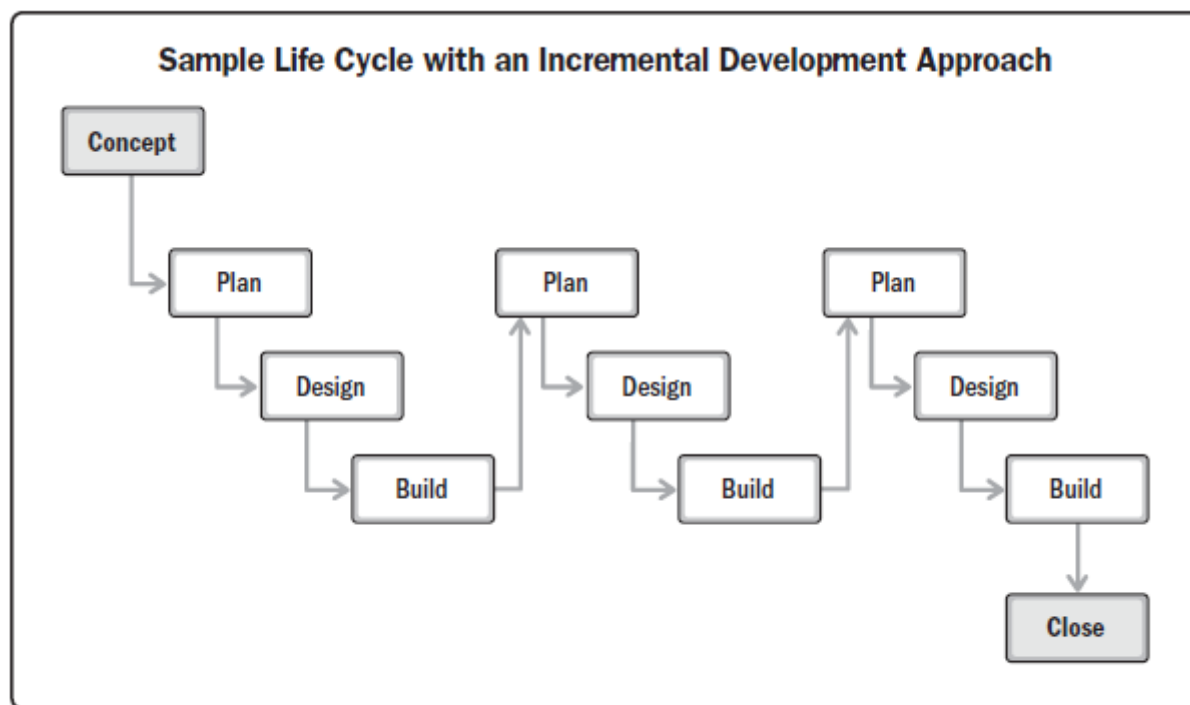


Figure 2-10. Life Cycle with an Incremental Development Approach

Development approach and life cycle performance domain – Life cycle and phase definition

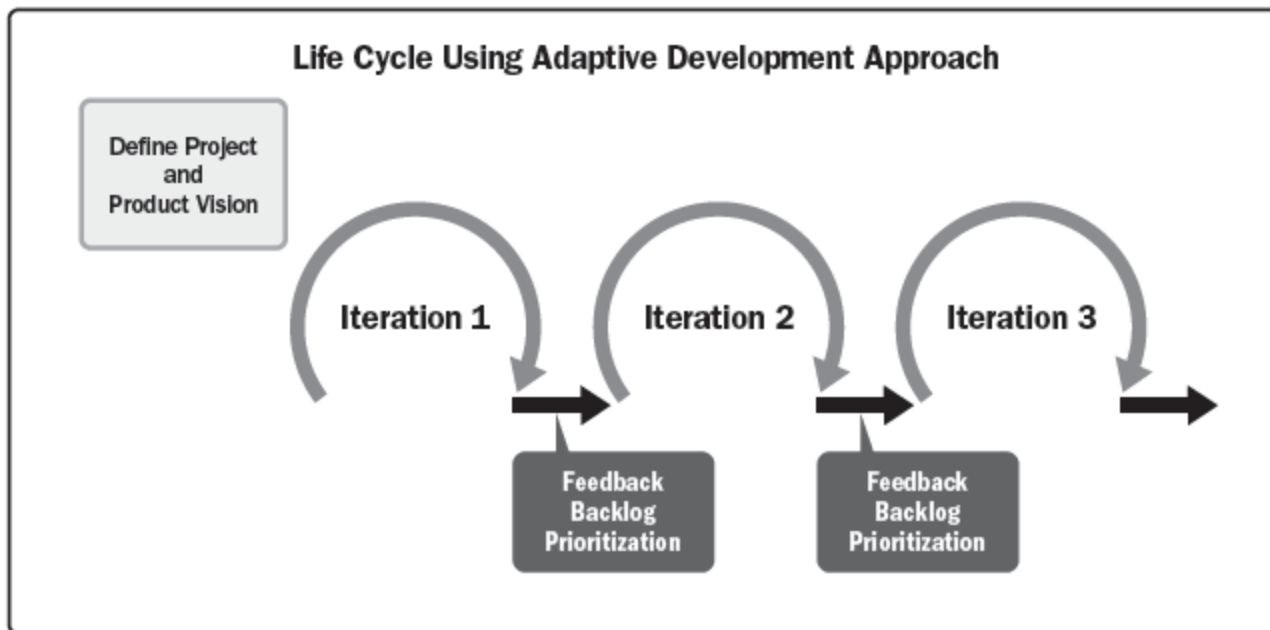


Figure 2-11. Life Cycle with Adaptive Development Approach

Development approach and life cycle performance domain – Life cycle and phase definition



Several adaptive methodologies, including agile, use flow-based scheduling, which does not use a life cycle or phases. One goal is to optimize the flow of deliveries based on resource capacity, materials, and other inputs. Another goal is to minimize time and resource waste and optimize the efficiency of processes and the throughput of deliverables. Projects that use these practices and methods usually adopt them from the Kanban scheduling system used in lean and just-in-time scheduling approaches.



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موسسه مهندسی و مدیریت ساخت علوی پور (ACEMI)

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