Required Reading

Nicholas, J.M. & Steyn, H., (2020) Project management for engineering, business and technology. Routledge.

- Chapters 1, 3, 5, and 10.

Chapter 1

Summary

Chapter 1 introduces project management as a distinct discipline essential for achieving unique, goal-oriented endeavors across various industries. It contrasts project management with traditional, non-project management by emphasizing its focus on temporary, cross-functional teams and the integration of diverse resources under a single project manager. The chapter outlines the five core functions of management—planning, organizing, leadership, control, and goal assessment—and highlights how these apply uniquely to projects due to their dynamic and uncertain nature. Key features of project management include the role of the project manager as an integrator, the temporary nature of project teams, and the need for flexibility in handling changing priorities. The chapter traces the evolution of project management from ancient construction projects to modern methodologies like PERT and CPM, underscoring its growing importance in complex, high-stakes environments. Examples from construction, product development, and disaster recovery illustrate the versatility of project management, while criteria like unfamiliarity, magnitude, and multifunctional effort help determine its appropriateness for a given undertaking. The chapter concludes by differentiating project management from related forms like program management, new venture management, and portfolio management, emphasizing its adaptability to diverse contexts.

Reflection

Reading this chapter deepened my understanding of project management as both a methodology and a mindset tailored for complexity and change. The emphasis on the project manager's role as an integrator resonated with me, particularly the challenges of navigating dual reporting lines and fostering collaboration among disparate teams. The historical evolution of project management tools, from Gantt charts to modern software, highlighted how the discipline has adapted to increasing project scale and uncertainty. However, the chapter's broad applicability—from space missions to kitchen remodels—left me curious about the limits of project management: when might its structured approach stifle creativity or prove overbearing for small, routine tasks? The examples, like the Statue of Liberty renovation, effectively illustrated the balance between rigidity and adaptability, but I wondered about lesser-known industries where project management might be underutilized. Moving forward, I'm intrigued by the idea of "management by project" (MBP) and how its principles could be applied to personal goals or non-traditional sectors. This chapter served as a compelling foundation, but it also hinted at the tension between standardization and customization in project management—a theme I hope to explore further.

Chapter 3
Summary

Chapter 3 explores the project life cycle and project conception, emphasizing the systems approach to project management. It begins by introducing the concept of a life cycle, drawing parallels between natural systems and human-made projects, where projects progress through phases of birth, growth, maturity, and decline. The chapter outlines the four-phase systems development cycle (SDC): conception, definition, execution, and operation. The project life cycle spans the first three phases, concluding when the project transitions into operational use. The conception phase involves identifying needs, conducting feasibility studies, and preparing proposals. Key activities include defining user requirements, analyzing alternative solutions, and addressing environmental and sustainability considerations. The chapter also details the RFP (Request for Proposal) process, proposal evaluation, and contractual agreements, highlighting the importance of clear communication between stakeholders to ensure project success.

Reflection

This chapter provides a comprehensive framework for understanding how projects are initiated and structured, emphasizing the critical role of the conception phase in laying the foundation for success. The discussion on feasibility studies and stakeholder requirements underscores the importance of thorough planning and alignment between user needs and proposed solutions. The examples, such as the Apollo spacecraft proposal, illustrate the complexities and high stakes involved in large-scale projects. One key takeaway is the necessity of clear, well-defined requirements to avoid misunderstandings and ensure project deliverables meet expectations. The chapter also highlights the growing emphasis on sustainability, showing how modern projects must balance technical and financial feasibility with environmental and social responsibility. Overall, it reinforces the idea that effective project management begins with a solid conception phase, where careful analysis and stakeholder engagement set the stage for subsequent phases.

Chapter 5
Summary

Chapter 5 focuses on the execution and closeout phases of a project, detailing the stages of detail design, production/build, implementation, and termination. The execution phase is often the longest and most resource-intensive, involving the transformation of system specifications into tangible outputs. The detail design stage converts concepts into functional and physical designs, ensuring alignment with user requirements while avoiding unnecessary complexity ("bloatware"). Production/build involves fabrication, testing, and preparation for implementation, where the project manager coordinates efforts and ensures quality. Implementation includes user training, acceptance testing, and system installation, with strategies like parallel, pilot, or cold turkey conversion. Termination involves formal closeout activities, such as finalizing contracts, addressing punch lists, and conducting post-completion reviews. The chapter also highlights the importance of post-installation reviews to assess system performance and the potential for future enhancements or replacements, marking the transition to the operation phase.

Reflection

This chapter underscores the critical nature of execution and closeout in ensuring project success. The discussion on design stages emphasizes the balance between thoroughness and efficiency, particularly the risks of fast-tracking versus the benefits of meticulous planning. The focus on user training and acceptance testing highlights the importance of aligning deliverables with user needs, a recurring theme in project management. The termination phase, often overlooked, is presented as vital for formalizing lessons learned and ensuring contractual obligations are met. The inclusion of post-installation reviews reinforces the idea that a project's true success is measured by its long-term utility and performance. Overall, the chapter provides a comprehensive guide to navigating the

complexities of execution and closeout, stressing proactive management and stakeholder engagement to achieve project goals.

Chapter 10
Summary
Chapter 10 focuses on cost estimating and budgeting in project management, emphasizing their critical role in project planning and financial success. Accurate cost estimates are foundational for setting realistic budgets and measuring actual performance. The chapter discusses various sources of cost escalation, such as inflation and changing requirements, and highlights the importance of phased (rolling wave) planning to refine estimates as the project progresses. Different estimation methods—expert opinion, analogy, parametric, and cost engineering—are explored, with an emphasis on using the Work Breakdown Structure (WBS) for bottom-up or top-down approaches. The chapter also covers the creation of control accounts, time-phased budgets, and cash flow forecasts to ensure adequate funding. Life-cycle costing is introduced as a broader perspective beyond project costs, considering long-term operational expenses. The chapter concludes with practical applications, including case studies, to illustrate the challenges and strategies in cost estimation and budgeting.
Reflection
This chapter underscores the complexity and significance of cost estimation and budgeting in project management. The discussion on cost escalation serves as a cautionary reminder of how easily projects can exceed budgets without careful planning. The phased planning approach resonates as a practical strategy to balance early-stage uncertainty with the need for accuracy. The emphasis on the WBS for detailed estimation reinforces the idea that breaking down work into smaller, manageable components leads to more reliable forecasts. The inclusion of life-cycle costing is particularly insightful, as it shifts the focus from short-term project costs to long-term value, encouraging more sustainable decision-making. The case studies, such as the hypothetical spaceship fleet and the Chunnel project, effectively highlight real-world challenges, making the theoretical concepts more tangible. Overall, the chapter provides a comprehensive framework for managing project finances, stressing the need for diligence, adaptability, and stakeholder alignment.

Project Management Institute. (2020) A Guide to the Project Management Body of Knowledge PMBOK Guide, 7th Edition. Newtown Square, PA: Project Management Institute.

Summary
The book provides a comprehensive framework for project management, emphasizing principles, performance domains, and value delivery. Unlike previous editions, the seventh edition shifts from a process-based approach to a more flexible, principle-driven methodology, focusing on outcomes and adaptability. It introduces 12 project management principles, such as stakeholder engagement, holistic thinking, and navigating complexity, which guide practitioners in delivering successful projects. The guide also highlights eight performance domains—including stakeholder, team, and delivery—that interact dynamically to ensure project success. Additionally, it underscores the importance of tailoring approaches to fit unique project contexts, making it more applicable across diverse industries and methodologies.
Reflection
The seventh edition of the PMBOK® Guide marks a significant evolution in project management thinking, moving away from rigid processes toward a more adaptive and principle-centered approach. This shift resonates with my experience, as it acknowledges the unpredictable nature of projects and the need for agility. The emphasis on value delivery and stakeholder collaboration aligns with modern workplace demands, where outcomes often matter more than adherence to fixed steps. However, the broader, less prescriptive

nature of the guide may pose challenges for those accustomed to detailed process maps. For me, this edition reinforces the importance of critical thinking and contextual adaptation in project management, encouraging a balance between structure and flexibility. It serves as a reminder that successful project leadership requires both foundational knowledge and the ability to innovate.

Mircea, E. (2019) Project Management using Agile Frameworks.

Summary
The article explores Agile methodologies, focusing on Scrum and Kanban as the most prominent frameworks in modern project management. It traces the evolution from traditional models like Waterfall to Agile, emphasizing its core values of flexibility, iterative progress, and customer collaboration. Scrum is presented as a structured framework with defined roles (Product Owner, Scrum Master, Development Team), time-boxed sprints, and rituals like daily stand-ups and retrospectives. Kanban, derived from Toyota's Lean philosophy, prioritizes visualizing work, limiting work-in-progress (WIP), and continuous flow. The paper also introduces Scrumban, a hybrid approach blending Scrum's structure with Kanban's adaptability. Key benefits of Agile include managing changing priorities, improving team morale, and accelerating delivery. The study underscores Agile's applicability beyond IT, advocating for its principles in fostering collaboration, transparency, and incremental improvement across industries.
Reflection
This paper deepened my appreciation for Agile as both a methodology and a mindset. The contrast between Scrum's rigidity and Kanban's fluidity highlighted the importance of selecting the right framework based on team maturity and project needs. I was particularly struck by the emphasis on human values—trust, respect, and honesty—as foundational to Agile success, reinforcing that tools alone are insufficient without cultural alignment. The discussion on distributed teams and the challenges of maintaining Agile practices remotely resonated with my experiences, underscoring the need for robust communication tools. However, the paper's optimism about Agile's universal applicability could benefit from addressing common pitfalls, such as resistance to change or misapplication in non-iterative projects. Moving forward, I aim to integrate Scrumban's flexibility into my work, balancing structure with adaptability to optimize team performance and outcomes.

Manfletti, C., Guimarães, M. and Soares, C. (2023) 'AI for Space Traffic Management', Journal of Space Safety Engineering, 10(4), pp. 495–504. doi:10.1016/j.jsse.2023.08.007.

Summary
The document presents a systematic literature review (SLR) on software design patterns The paper explores the application of artificial intelligence (AI) in space traffic management (STM) to address the growing challenges posed by space debris and increasing satellite congestion. With the space economy projected to reach $1 trillion by 2040, the need for scalable, automated solutions is critical. Current STM methods struggle with insufficient data, high false alerts, and lack of automation, leading to unnecessary costs and risks for satellite operators. The authors highlight Neurospace's AI-driven approach, which includes data fusion, machine learning for conjunction classification, collision prediction, and uncertainty forecasting to enhance decision-making and reduce operational burdens. The paper also emphasizes the importance of public-private collaboration and regulatory frameworks to foster space sustainability. Innovations like autonomous satellite systems and advanced risk assessment tools are presented as key to mitigating collision risks and ensuring the long-term viability of space activities.

Reflection
This paper underscores the transformative potential of AI in tackling one of space's most pressing issues: debris and traffic management. The integration of machine learning for real-time risk assessment and decision-making is particularly compelling, as it addresses the limitations of traditional, manual processes. However, the reliance on AI also raises questions about data quality, model transparency, and the ethical implications of autonomous systems in space. The call for stronger public-private partnerships and regulatory measures is timely, as the current fragmented approach may hinder global progress. Moving forward, balancing innovation with robust governance will be essential to ensure that AI-driven STM solutions are both effective and accountable, safeguarding the sustainable use of space for future generations.

McManus, J. (2004) Risk Management in Software Development and Software Engineering Projects.

The link is missing in the list of Required Reading

The Association for Project Management (APM). (2023) What is a Gantt Chart?

Summary
The APM website provides a comprehensive guide to Gantt charts, a widely used project management tool for visualizing project schedules. The resource explains that Gantt charts display tasks along a timeline, showing their start and end dates, durations, dependencies, and progress. It highlights the benefits of using Gantt charts, such as improved planning, better communication among team members, and enhanced tracking of project milestones. The guide also covers practical steps for creating a Gantt chart, including defining tasks, setting timelines, identifying dependencies, and updating the chart as the project progresses. Additionally, it mentions the availability of various software tools that can simplify the creation and management of Gantt charts, making them accessible for both beginners and experienced project managers.
Reflection
The APM's resource on Gantt charts effectively demystifies this essential project management tool, making it approachable for professionals at all levels. The clear explanation of its benefits reinforces why Gantt charts remain a staple in project planning and execution. However, while the guide is informative, it could benefit from including real-world examples or case studies to illustrate how Gantt charts solve common project challenges. The mention of software tools is useful, but a brief comparison of popular options would help users choose the right one for their needs. Overall, this resource serves as a solid introduction to Gantt charts, emphasizing their role in fostering clarity and accountability in project management. It reminds me of the importance of visual tools in simplifying complex projects and ensuring team alignment.

McKinsey. (2023) The Status of AI in 2022.

The link is missing in the list of Required Reading

Additional Reading

Successful projects. (n.d.) Project Management Methodologies.

Chapman, R. (2019) Exploring the Value of Risk Management for Projects: Improving
     Capability Through the Deployment of a Maturity Model. IEEE Engineering
     Management Review 47(1): 126-143.