الجمهورية الجزائرية الديمقراطية الشعبية
Ministry of Higher Education and Scientific Research
وزارة التعليم العالي والبحث العلمي
People's Democratic Republic of Algeria

HIGHER SCHOOL OF MANAGEMENT AND DIGITAL ECONOMY

H.S.M.D.E

المدرسة العليا للتسيير والاقتصاد الرقمي

A Thesis Submitted in Partial Fulfilment of the Requirements for Master degree

Specialty: E-Business

Title:

The Simultaneous Management of Multiple SAP S4/HANA Implementation Projects

CAS: PwC

Submitted by:

Miss BOUDALIA Amel

Supervised by:

Mrs BENGANA Feriel

Promotion:

2024-2025

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Summary

Dedications

I dedicate this work to my beloved parents, ***BOUDALIA Smain*** *and* ***BOUDALIA Salima****, for being my unwavering support system. For standing by me through every high and low, for always asking about me, listening to me, and believing in me. your presence gave me the strength to keep going and the desire to make you proud.*

I dedicate this work to ***myself*** *to the person I have become through this journey. To the strength I found in difficult times, to the lessons I've learned. This work reflects every challenge I overcame and every step I took to become a better version of myself.*

I dedicate this work to my dear friends ***Sawsen****,* ***Assala****,* ***Imene****,* ***Romaissa, Sara, Kamilia, Aya, Maissa*** *and* ***Malak*** *whose presence and shared moments of laughter lit the way during stressful times.*

I dedicate this work to my friend ***Islam****,* ***ouail****,* ***Taha****, who shared with me moments of joy and difficulty, from laughter to late study nights in the school library. Our shared experiences made this academic journey lighter and more meaningful.*

I dedicate this work to my brother ***Hichem*** *and my sister* ***Ines****, who were my constant source of joy, strength, and motivation. Their love gave me the courage to keep going even when everything felt overwhelming. As their older sister, I strive to be someone they can always be proud of.*

I dedicate this work to my grandparents ***Hamza*** *and* ***Zahira,*** *who always remembered me in their prayers and kept me close in their thoughts. Their spiritual support and love have always guided and protected me.*

I also dedicate this work to my grandmother ***Yamina****, may Allah protect her and keep her beside us always a pillar of love and warmth in our lives.*

This work carries a piece of each of you. Without your love, support, and presence in my life, this journey would not have been the same.

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To my school, **the Higher School of Management and Digital Economy,** I express my heartfelt thanks. The academic environment, quality of teaching, and the commitment of both the professors and administrative staff played a pivotal role in my growth. My years at ESGEN have equipped me with not only knowledge, but also the discipline and analytical mindset necessary to complete this thesis.

Lastly, I would like to extend my gratitude to the members of the **jury** for their time, attention, and consideration in reviewing and evaluating this thesis. Your feedback and remarks are deeply appreciated and contribute to the academic value of this work.

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List of Abbreviations

ABAP: Advanced Business Application Programming

AI: Artificial Intelligence

AMOA: Assistance to Project Owner

BXT: Business, Experience, Technology

CIO: Chief Information Officer

CO: Controlling

COVID-19: Coronavirus Disease 2019

CRM: Customer Relationship Management

EAM: Enterprise Asset Management

ERP: Enterprise Resource Planning

FI: Financial Accounting

GRC: Governance, Risk, and Compliance

HCM: Human Capital Management

HR: Human Resources

IDC: International Data Corporation

IT: Information Technology

KPI: Key Performance Indicator

LoS: Lines of Service

MBO: Management by Objectives

MM: Materials Management

MPM: Multi-Project Management

MRP: Material Requirements Planning

MRP II: Manufacturing Resource Planning

OBS: Organizational Breakdown Structure

PBS: Product Breakdown Structure

PERT: Program (or Project) Evaluation and Review Technique

PM: Plant Maintenance

PMBOK: Project Management Body of Knowledge

PMI: Project Management Institute

PMO: Project Management Office

PP: Production Planning

PS: Project System

PwC: PricewaterhouseCoopers

QM: Quality Management

RACI: Responsible, Accountable, Consulted, Informed

RICEF: Reports, Interfaces, Conversions, Enhancements, and Forms

SAP: Systems, Applications, and Products in Data Processing

SCM: Supply Chain Management

SMART: Specific, Measurable, Achievable, Relevant, Time-bound

S/4HANA: Suite for HANA

SF: SuccessFactors

SD: Sales and Distribution

SOW: Statement of Work

SWOT: Strengths, Weaknesses, Opportunities, and Threats

T&E: Travel & Expense

TLS: Tax, Legal Services

VR: Virtual reality

WBS: Work Breakdown Structure

Abstract

This study aims to explore how consulting firms and external experts manage the simultaneous implementation of multiple SAP S/4HANA projects, focusing not only on the technical side of implementation but also on the strategic management behind it. Unlike most existing research, which concentrates mainly on the client's experience and technical aspects like data migration, our study goes further by examining the internal "back-end" management processes within these experts.

To achieve this, we combined theoretical research with practical observations during our internship at PwC Algeria. Data were collected through interviews with consultants and PMO members, along with the analysis of internal documents and project management practices. The case study highlights the main challenges consulting firms face, including overlapping deadlines, resource bottlenecks, and communication difficulties. It also shows the key role played by the PMO and the critical need for advanced project management tools.

Our findings confirm that effective resource planning, strong PMO support, and the use of optimized advanced tools and solutions improve the ability to manage multiple projects successfully. By merging project implementation analysis with project management insights, this work offers a deeper understanding of what ERP experts do behind the scenes and what additional practices can enhance project outcomes. The thesis concludes with practical recommendations and proposes directions for future research, aiming to help consulting firms better handle the complexity of SAP S/4HANA project environments.

Key words: Project management, multi-project management, simultaneous multi-project management, SAP S4/HANA, ERP, SAP teams, Tools, Management, implementation.

_____Résumé_____

Cette étude vise à explorer comment les cabinets de conseil et les experts externes gèrent la mise en œuvre simultanée de plusieurs projets SAP S/4HANA, en se concentrant non seulement sur l'aspect technique de l'implémentation, mais aussi sur la gestion stratégique en coulisses. Contrairement à la plupart des recherches existantes, qui se focalisent principalement sur l'expérience client et les aspects techniques tels que la migration des données, notre étude va plus loin en examinant les processus internes de gestion, souvent invisibles, orchestrés par ces experts.

Pour atteindre cet objectif, nous avons combiné des recherches théoriques avec des observations pratiques réalisées lors de notre stage chez PwC Algérie. Les données ont été collectées à travers des entretiens avec des consultants et des membres du PMO, ainsi que l'analyse de documents internes et des pratiques de gestion de projet. L'étude de cas met en évidence les principaux défis auxquels les cabinets de conseil sont confrontés, notamment la superposition des échéances, les goulots d'étranglement en matière de ressources et les difficultés de communication. Elle souligne également le rôle essentiel du PMO et la nécessité critique d'outils avancés de gestion de projet.

Nos résultats confirment que la planification efficace des ressources, le soutien fort du PMO, et l'utilisation d'outils et solutions avancés optimisés améliorent la capacité à gérer plusieurs projets simultanément avec succès. En combinant l'analyse de l'implémentation des projets avec des perspectives sur la gestion de projet, ce travail offre une compréhension plus approfondie du rôle des experts ERP en coulisses et identifie des pratiques supplémentaires pour améliorer les résultats des projets. La thèse se conclut par des recommandations pratiques et propose des pistes de recherche future pour aider les cabinets de conseil à mieux gérer la complexité des environnements de projets SAP S/4HANA.

Mots clés : Gestion de projet**,** Gestion multi-projets**,** Gestion simultanée de multiples projets**,** SAP S/4HANA**,** ERP**,**Équipes SAP, Outils**,** Gestion**,** Mise en œuvre.

الملخص

هدف هذه الدراسة استكشاف كيفية إدارة شركات الاستشارات والخبراء الخارجيين للتنفيذ المتزامن لعدة مشاريع SAP S/4HANA، مع التركيز ليس فقط على جانب التنفيذ، بل أيضًا على الإدارة الاستراتيجية المصاحبة له. وعلى عكس معظم الأبحاث الحالية التي تركز بشكل أساسي على تجربة العميل والجوانب التقنية مثل ترحيل البيانات، تتعمق دراستنا في تحليل العمليات الإدارية "الخلفية" داخل هذه الشركات الاستشارية.

ولتحقيق ذلك، جمعنا بين البحث النظري والملاحظات العملية خلال فترة تدريبنا في شركة PwC الجزائر. تم جمع البيانات من خلال مقابلات مع المستشارين وأعضاء مكتب إدارة المشاريع، بالإضافة إلى تحليل الوثائق الداخلية والممارسات الإدارية للمشاريع. وتسلّط دراسة الحالة الضوء على التحديات الرئيسية التي تواجهها شركات الاستشارات، بما في ذلك تداخل المواعيد النهائية، ونقص الموارد، وصعوبات التواصل. كما توضح الدور المحوري الذي يلعبه مكتب إدارة المشاريع والحاجة الملحة لاستخدام أدوات إدارة متقدمة.

تؤكد نتائجنا أن التخطيط الفعّال للموارد، والدعم القوي من مكتب إدارة المشاريع، واستخدام الأدوات المتقدمة المحسّنة تسهم جميعها في تحسين القدرة على إدارة مشاريع متعددة بنجاح. ومن خلال دمج تحليل تنفيذ المشاريع مع رؤى من إدارة المشاريع، توفر هذه الدراسة فهماً أعمق لما يقوم به خبراء نظم تخطيط موارد المؤسسات خلف الكواليس، وما هي الممارسات الإضافية التي يمكن أن تعزز نتائج المشاريع. وتختتم الرسالة بتوصيات عملية وتقترح توجهات للبحث المستقبلي، بهدف مساعدة شركات الاستشارات على التعامل بشكل أفضل مع تعقيدات بيئة مشاريع SAP S/4HANA.

الكلمات المفتاحية: إدارة المشروع، إدارة المشاريع المتعددة، الإدارة المتزامنة لعدة مشاريع، SAP S/4HANA، تخطيط موارد المؤسسة (ERP)، فرق SAP، أدوات، إدارة، تنفيذ.

General Introduction

General Introduction:

"The best way to predict the future is to create it." -Peter Drucker-

"In today's fast-changing world, digital transformation has become a strategic priority for most organizations. Businesses across all sectors are adopting IT solutions to improve efficiency, performance, and competitiveness. At the heart of this transformation are ERP systems, which integrate key functions such as finance, supply chain, and human resources into a unified platform." -Angela Merkel-

Project management has always been important in business, but managing the implementation of IT solutions, especially ERP systems, is more complex than managing traditional projects. Therefore, organizations increasingly rely on consulting firms and external experts to support these initiatives, particularly for large systems like SAP S/4HANA.

SAP S/4HANA, SAP's latest ERP system, is known for its real-time data analysis, simplified data structure, and faster operations. However, it is also one of the most difficult and expensive ERP systems to implement. A successful SAP S/4HANA project affects almost every part of a business, and even small mistakes can cause serious financial and operational problems. Managing one such project is already challenging; managing multiple implementation projects simultaneously, across different industries and clients, introduces even greater complexity and risk.

Today, these external experts as the consulting firms are expected not just to deliver one SAP S/4HANA implementation, but to manage several simultaneously for their different clients. They must coordinate different schedules, move SAP teams between projects, manage shared risks, and deliver successful outcomes for every client all with limited people and resources. Overlapping deadlines, competition for the same resources, and risks spreading across projects make this task extremely demanding. A delay in one project can easily affect others.

Although these consulting firms and external experts play a crucial role in ERP implementations, most research focuses primarily on the client side, studying areas such as data migration, change management, or user training. The work of consulting firms the experts who plan, organize, and manage these complex projects is often overlooked, despite being essential to the success of large-scale technology initiatives like SAP S/4HANA. These firms must carefully

build teams, allocate them efficiently across different projects, and manage risks that can impact multiple clients simultaneously.

As students of e-business, we chose to focus on a topic that bridges technology and real-world business challenges, emphasizing the project management aspects of ERP implementations. Our research shifts attention away from the client's perspective to these external expert's firms, examining how they manage multiple SAP S/4HANA projects at once. Specifically, we aim to understand how firms like PwC **manage several SAP S/4HANA projects simultaneously**, the main challenges they face, and the strategies and best practices they employ to succeed in such complex environments.

Our motivation for this research stems from our internship at PwC Algeria, a leading consulting firm recognized for its SAP S/4HANA expertise. During this period, we observed PwC's internal operations, focusing on how the firm organizes its people, teams, and systems to manage several large ERP projects concurrently.

By combining insights from project management and ERP research, this thesis aims to go beyond traditional studies and provide a deeper understanding of the complex, behind-the-scenes work that enables digital transformation. In doing so, we hope to fill an important gap in both academic research and professional practice.

Several academic works are closely related to our topic, including:

- **Heldman, Kim (2018), Project Manager's Spotlight on Risk Management, Wiley, New Jersey, p. 56.**

Heldman discusses the importance of risk management for project success. She explains methods for identifying, analyzing, and addressing risks an essential practice when managing multiple projects where risks can multiply.

- **Project Management Institute (2021), A Guide to the Project Management Body of Knowledge (PMBOK Guide), 7th Edition, PMI Publications, Pennsylvania, USA.**

The PMBOK Guide shifts from process-based to principle-based project management. It introduces 12 key principles, such as leadership, stakeholder engagement, and adaptability, along

with 8 performance domains. It emphasizes hybrid methods (traditional, Agile, Lean) and highlights the importance of flexible systems and value creation in projects.

- **Wessel, M. (2019), SAP S/4HANA: An Introduction, SAP Press, Heidelberg, pp. 102–112.**

Wessel provides an overview of SAP S/4HANA's architecture and new features, such as in-memory computing (HANA) and enhanced real-time reporting through Embedded Analytics. He also explains the simplification of the data model, which is key for faster operations.

Our research examines the progress of external consulting in the digital age, addressing a question: **How can SAP teams effectively manage and overcome the challenges of handling multiple SAP S4/HANA implementation projects simultaneously while optimizing resources?**

This central inquiry leads to several sub-questions:

- What are the main challenges SAP teams face when managing multiple SAP S/4HANA projects?
- How can project management officers (PMOs) support SAP teams in overcoming these challenges?
- What strategies can be employed to optimize resource allocation in multi-project environments?
- What are the best practices for balancing multiple projects without compromising on quality and deadlines?
- How can technology and tools be leveraged to enhance multi project management efficiency?

To address these questions, we propose the following hypotheses:

Hypothesis 1: Effective resource management strategies help SAP teams successfully manage multiple SAP S/4HANA implementation projects.

Hypothesis 2: Strong support from PMOs enhances SAP teams ability to manage several projects simultaneously.

Hypothesis 3: The use of technology and management tools improves the efficiency of simultaneous multi-project management of SAP implementation.

The objectives of this research are:

- To identify the main challenges consulting firms face when managing several SAP S/4HANA projects at once.
- To explore strategies for improving resource allocation in multi-project environments.
- To analyze the role of PMOs in supporting SAP teams.
- To identify best practices for maintaining project quality and meeting deadlines.
- To evaluate how digital tools and technologies can enhance project management efficiency.

This research merges our interest in project management and SAP S/4HANA, offering insights from the team's perspective rather than the client's, in the management of ERP projects.

Research methodology

To validate our hypotheses, we adopted a descriptive and analytical approach. First, we conducted a literature review of academic articles, books, and company reports to build a strong theoretical foundation.

During our internship at PwC Algeria, we conducted participant observations of the simultaneous management of multiple SAP S/4HANA projects. This was complemented by a qualitative field study, using semi-structured interviews with PMO managers and consultants actively involved in SAP projects.

Structure of the thesis

This thesis is structured into two main parts:

Part 1: Theoretical Framework

Chapter one: "Navigating Multi-Project Management: SAP Teams and the Dynamics of S/4HANA Implementation." This chapter establishes the theoretical foundation of the study. The first section begins by defining project management principles, with a focus on multi-project management, which is key to understanding the complexities consulting firms face. The second section provides an overview of ERP systems, particularly SAP S/4HANA, discussing its functionalities and strategic importance in digital transformation. The third section explores the management of SAP S/4HANA implementation projects, highlighting SAP teams.

Part 2: Practical Application

Chapter two: “Case Study and Research Methodology”. This chapter presents the empirical study conducted during our internship at PwC Algeria. It starts with an overview of the company and the strategic context of SAP S/4HANA implementation projects. The next section details the research methodology and tools used for data collection and analysis, including internal observations and semi-structured interviews with key project stakeholders. The chapter then presents and analyzes the study’s findings, emphasizing the practices, challenges, and strategies PwC uses to manage multiple SAP projects simultaneously, and concludes with practical recommendations based on the study’s outcomes.

The thesis ends with a general summary of the main findings, acknowledges the research limitations, and suggests directions for future research.

Chapter One: Navigating multi-project management; SAP teams and the dynamics of S/4HANA implementation

Introduction

In today's fast-paced digital world, companies must quickly upgrade their systems to stay competitive. Many choose SAP S/4HANA to improve efficiency. However, managing multiple SAP S/4HANA implementations for different clients significantly increases complexity.

This chapter introduces key concepts such as project management, simultaneous multi-project management, SAP S/4HANA as an ERP system, and its project management methods. It also explains the key roles involved in these projects.

Successful implementation requires strong teamwork, planning, and communication. While some companies may attempt to manage it on their own, many will need external support to manage the project effectively. These external support companies will face the challenge of handling multiple implementation projects simultaneously.

Chapter One: Navigating multi-project management: SAP teams and the dynamics of S/4HANA implementation

Section 1: Project management and simultaneous Multi project management

Managing projects requires strategic planning, resource optimization, and stakeholder coordination. Multi-project management adds complexity, demanding balance across priorities and timelines.

Using proven methodologies enhances efficiency, mitigates risks, and drives long-term success. This section explores the best practices and strategies for effective project execution.

1.1 Foundations of projects

Projects are the foundation of business success, driving innovation and operational efficiency. This subsection explores key principles, methodologies, and challenges in executing successful projects.

1.1.1 The project history

The term "project" originates from the Latin word "Projicio," which conveys the idea of "throwing forward."

The word "project" first appeared in 1470. By 1529, it had a technical meaning, describing a plan shown as a drawing. Over time, its definition changed, and by 1950, it included both creating a plan and carrying it out, making the meaning of "project" more complete.[1]

1.1.2 The project definition

A project can be defined in many ways. It is a temporary effort to create something unique, like a product, service, or result.[2]

[1] Boutinet Pierre (2008), *Le projet en question*, Edition Eyrolles, Paris, pp.04
[2] Project Management Institute (2021), *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, 7th Edition, Project Management Standard Collection, PMI Publications, Pennsylvania, USA, pp. 56.

A project can also be described as a unique set of coordinated activities, carried out by an individual or organisation with clearly defined start and finish points, to attain predetermined goals to a specified schedule, cost and performance criteria. [1]

A project is a complex, unique, and non-repetitive effort, constrained by time, budget, and resources, as well as execution specifications designed to meet a client's needs.[2]

Based on these definitions, the main goal of a project is client satisfaction, and it is distinguished from other organizational activities by several key elements:

- A project has a clear goal, with resources, stakeholders, and methods chosen to meet that goal.
- Projects are unique and not repetitive, whether creating a new product or improving existing processes.
- Specialists like engineers, financial analysts, marketers, and quality control experts collaborate under a project manager.
- Projects are limited by time, cost, and efficiency, requiring effective management to optimize resources and achieve the best results.

1.1.3 The golden triangle of a project

The Golden Triangle of a Project consists of scope, cost, and time, which must stay balanced for successful execution. Changes in one require adjustments to the others to maintain quality as shown in figure 01 below:[3]

[1] Albert Lester (2014), *Project Management, Planning and Control: Managing Engineering, Construction, and Manufacturing Projects to PMI, APM and BSI Standards*, 6th edition, Butterworth-Heinemann, Oxford, United Kingdom, pp. 78

[2] Gray, Clifford & Larson, (2014), *Management de projet*, Chenelière Éducation, 2nd edition, Montréal, pp. 05.

[3] Asana, le triangle d'or de la gestion de projet, *https://asana.com/fr/resources/project-management-triangle*, Retrieved 23rd April 2025 at 02:00PM

Figure 01: The project golden triangle

Source : Asana, le triangle d'or de la gestion de projet, *https://asana.com/fr/resources/project-management-triangle*, Retriever 23rd April 2025 at 02 :00PM

- **Scope** refers to the size and complexity of a project, including its details, and expected results. A larger scope requires more time and resources. Key factors include project complexity, number of deliverables, result quality, performance capacity.
- **Cost** involves financial and material resources, such as budget, team size, equipment, and strategic investments.
- **Time** covers scheduling, deadlines, and execution phases. Adjustments in scope or budget impact timelines. Important factors include total project duration and work hours.

Beyond the project triangle, innovation is a transformative force as it helps businesses work faster and make more money without changing important project limits as; improving key tools can speed up tasks or reduce the number of people needed or making production processes smoother helps teams work better while keeping high quality.

1.1.4 The project goals

Clear and well-defined project goals assist in executing and measuring successful outcomes. Developed by George T. Doran in 1981, the SMART goal setting framework offers a structured method to define objectives to improve project clarity, feasibility, and effectiveness.[1]

The figure 02 below highlights the SMART goals:

Figure 02: The SMART goal

Source*:* ASANA ,Qu'est-ce qu'un objectif SMART ?,*https://asana.com/fr/resources/smart-goals,* Retrieved 16 April 2025 at 03:00PM

The SMART goals are explained as follows:[2]

- **Specific** The goal should be clear and focused. Instead of saying "improve visibility," it should say exactly what needs to be done.
- **Measurable** The goal should have ways to track progress, like using KPIs to show improvements over time.
- **Achievable** The goal should be realistic with the resources available. Breaking big goals into smaller steps makes them easier to achieve.
- **Relevant** The goal should fit within time, budget, and team limits. Unrealistic goals can reduce motivation and effectiveness.
- **Time-bound** The goal should have a deadline to ensure progress is tracked and focus is maintained.

[1] ASANA ,Qu'est-ce qu'un objectif SMART ?,*https://asana.com/fr/resources/smart-goals,* Retrieved 16 April 2025 at 03:00PM

[2] Harvard Business School Publishing (2009), *Setting Goals: Expert Solutions to Everyday Challenges*, Pocket Mentor Series, n° HF5549.5. G6S48 2009, pp. 12.

When implemented SMART goals make a project much more structured, offering the teams the possibility to save the resources, minimize the risks and guarantee that the project meets the strategic objectives.

1.1.5 Project types

There are various types of projects, reflecting differences in timelines, adaptability to environmental changes such as technological innovation, and their significance within an organization. Projects can be categorized according to distinct typologies, which are explained and outlined in table 01 below:

Table 01: Project types

Type	Category	Explanation
By Project nature	**Construction**	Projects like tunnels or buildings, with clear roles and formal planning**.**
	Industrial product development	New products for mass production like cars
	Complex systems implementation	Technologically complex or IT infrastructure deployments requiring tight coordination.
By Financial importance	**Type A: High-value projects**	Big, expensive projects that are important for strategy.
	Type B: Project-led organizations	Companies where most work is done through projects, like big IT consulting firms.
	Type C: Multiple independent projects	Managing many smaller, flexible projects, like a consulting agency handling different client campaigns.
	Type D: Project-based companies	Temporary companies created to work on one big project.

By customer definition	**Known customer and fixed requirements**	Projects for specific clients with fixed budgets and defined scopes as a construction company is hired by a client to build a shopping mall.
	Market-driven and adaptive	Projects without specific clients, adapting to market needs as a fitness app that evolves based on user feedback.
By time criticality	**Strategic for organizations**	Long-term projects to boost organizational capacity like IT implementation for a multinational to enhance digital transformation
	Operational projects	Projects with specific, short-term operational targets like to enhance customer engagement and optimize marketing campaign management

Source: Garel Gilles (2004), *Conducting Research in Project Management*, FNEGE Collection, FNEGE Publishing, Paris, France, pp. 76.

1.1.6 Project lifecycle

A project has a limited duration, from idea conception to completion, depending on its scale and complexity.

Its life cycle consists of five phases, where transitions involve a technical transfer or shift in responsibility. Deliverables are evaluated to ensure they meet requirements before moving to the next phase, these phases are represented in the figure 03 as below:[1]

[1] Neupane Ganesh (2020), *A Project Plan for the Implementation of S/4HANA*, Thesis, Centria University of Applied Sciences, Industrial Management, pp. 43.

Figure 03: Project lifecycle

Source: Done by us

a. Project initiation

Defines the project's scope, feasibility, and purpose, establishing the project charter which is a formal document that outlines the key details of a project, including its objectives, scope, stakeholders, resources, and timeline and securing stakeholder commitment. Various tools were employed during the conception phase:

- **SWOT matrix** A strategic tool for evaluating Strengths, Weaknesses, Opportunities, and Threats, assisting organizations in defining clear objectives, as illustrated in Figure 04.

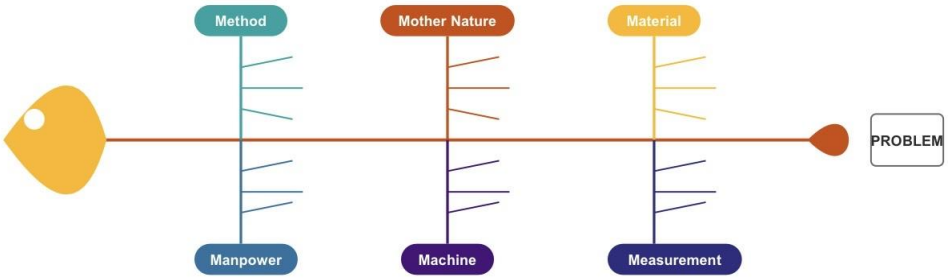
Figure 04: SWOT matrix

Source: Ted Scott, how to do a swot analysis, *https://www.leadertask.com/articles/swot-analysis*, Retrieved 29 March 2025 at 06:00PM

- **Ishikawa diagram** Also known as the Cause-and-Effect Diagram, it helps identify the root causes of problems using the 5M approach Material, Method, Machines, Mother Nature, Measurement, and Manpower[1], as depicted in Figure 05:

[1] Reid R. Dan & Sanders Nada R. (2017), *The Basics of Quality Management: A Comprehensive Guide to Quality Tools, Techniques, and Methods*, Pearson, Upper Saddle River, NJ, pp. 150.

Figure 05: Ishikawa diagram



Source: Done by us

b. Project planning

Develops detailed specifications, schedules, and a structured roadmap, defining goals, roles, and performance measures. Various tools were utilized during the conception phase:

- **Potential analysis** Assesses feasibility, risks, and resource requirements to ensure alignment with project objectives.

c. Project execution

Teams focus on deliverable development, status meetings, resource allocation, and procurement, ensuring continuous tracking of project progress. Various tools were employed during the conception phase:

- **Compatibility matrix** Evaluates the alignment between resources, workflows, and project objectives to maintain efficiency.

d. Performance & monitoring

Measures project success using KPIs such as goal completion, quality deliverables, cost tracking, and adaptability to evolving challenges.

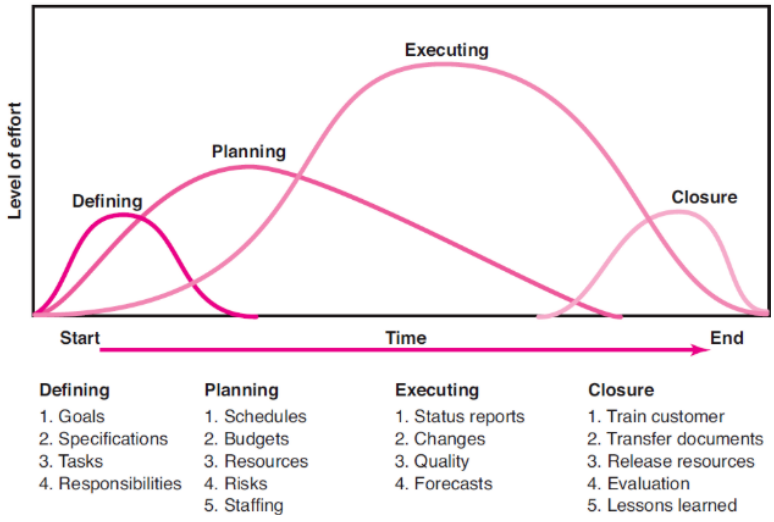
e. Project closure

Conducts final evaluations, releases contractors, and completes final reports and budgets. Various tools were employed during the conception phase:

- **Closure report** Summarizes project outcomes, identifies gaps between expectations and results, and recommends improvements for future initiatives.

The last remaining step is to conduct lessons-learned studies to examine what went well and what didn't. Through this type of analysis, the wisdom of experience is transferred back to the project organization, which will help future project teams as mentioned in figure 06 below[1]:

Figure 06: Project lifecycle



Source: Kloppenborg Timothy J. (2009), *Contemporary Project Management*, South-Western CENGAGE Learning, Mason, OH, pp. 8.

Most project life cycles have these common features:

- Phases that happen one after another, with tasks handed over between teams.
- Costs and resources.
- There's a lot of uncertainty and risk at the start, which gets lower as the project progresses.
- Stakeholders have the most influence at the beginning.

[1] Kloppenborg Timothy J. (2009), *Contemporary Project Management*, South-Western CENGAGE Learning, Mason, OH, pp. 8.

1.1.7 Project stakeholders

Project stakeholders are individuals and organizations actively involved in the project or whose interests may be impacted by its execution or completion. They can also influence the project's goals and outcomes.[1]

Project stakeholders must be identified, their requirements determined, and their influence managed to ensure project success. The stakeholders in each project are defined as follows:[2]

- **Project manager** The person responsible for initiating and leading the project, appointed by senior management and granted explicit authority.
- **Client or User** Also known as the project owner, this is the individual or organization for whom the project's product is intended and who will ultimately use it.
- **Executing company (Contractor)** The organization whose employees are most directly involved in carrying out the project.
- **Project owner** the physical or legal entity that owns the project, responsible for defining objectives, budget, and completion deadlines.
- **Project Management Office (PMO)** is a centralized unit within an organization that oversees project management processes, ensuring efficiency, standardization, and alignment with business objectives. It provides governance, manages resources, and monitors project performance.
- **Project team members** Individuals who perform the actual project work.
- **Sponsor** The person or group that funds the project.

1.2 Project management

Companies face constant disruptions and evolving goals. Project management ensures adaptability, resource optimization, and successful execution despite uncertainties.

[1] Project Management Institute (2004), *A Guide to the Project Management Body of Knowledge* (PMBOK Guide), 3rd Edition, Project Management Standard Collection, PMI Publications, Pennsylvania, USA, pp. 20.
[2] Gray, Clifford F (2014), *Project Management: The Managerial Process*, 6th edition, McGraw-Hill Education, New York, pp. 120-130.

1.2.1 Project management evolution

Unlike fields such as marketing, accounting, and strategic analysis, project management lacks a well-documented historical progression[1]. Its origins date back to ancient times when multiple projects were initiated without recognizing the need for a structured approach.[2]

Monumental constructions like the Great Pyramid of Giza, the Great Wall of China, and the Colosseum required detailed planning and coordination. Early engineers and architects acted as project managers, though historical records of their methodologies are scarce. Many construction techniques were closely guarded secrets within specialized groups.[3]

The foundations of modern project management emerged in the late 19th century. Henri Fayol (1841–1925) introduced five managerial functions: planning, organizing, commanding, coordinating, and controlling. Around the same time, Henry Gantt (1861–1919) developed the Gantt Chart (1910–1915) to visualize project schedules.[4]

Formal project management gained prominence in the 1950s with the development of methodologies like Review Technique (PERT) in 1958. These techniques were applied in large-scale projects such as the Polaris missile program and industrial constructions.[5]

By 1969, structured methodologies were further established with the creation of the Project Management Institute (PMI) and the evolution of frameworks such as the PMBOK Guide. These initiatives provided standardized approaches to managing projects across various industries.

Despite advancements in tools and methodologies, project management remains rooted in age-old principles. Structured planning, leadership, and execution continue to be fundamental for achieving ambitious human endeavors.

[1] Garel, G. (2003*). Pour une histoire de la gestion de projet, Gérer et comprendre*, number 74, Vol. 1, pp. 77-78.
[2] Idem, pp. 77-78.
[3] Seymour Tom, Sara Hussein (2014), *The History of Project Management*, number 4, Vol. 18, pp. 233-235.
[4] Idem, *pp . 233-235.*
[5] *Ibid, pp . 233-235.*

1.2.2 Project management definition

Project management involves the practice of applying knowledge, skills, tools, and techniques to finish a project as per the need of the internal or external client as well as the organization itself.[1]

Project management is the art of supervising the project so that it is done correctly in relation to objectives, budget, and timelines. Because of these constraints, as well as other time and cost constraints.[2]

In summary, project management involves setting objectives, determining the appropriate strategy to achieve them, identifying the necessary resources to implement the strategy, and organizing them efficiently and effectively. It also requires adaptability to unexpected changes in the environment.

1.2.3 Project management related documents

Key documents simplify project management by outlining best practices and rules. They clarify the project's purpose, objectives, features, budget, and timeline, ensuring everyone understands and collaborates effectively and provide structure and align stakeholders for a successful outcome, as shown in Table 02 below:

Table 02: Project management documents

Document	Definition (with How It's Used)	Purpose	When used
Project charter	A formal document that authorizes the project, defines objectives, key stakeholders, and assigns the project manager. It is used to	Authorize projects, define high-level goals.	At project start.

[1] *Rota, V. M. (2008). Introduction dans* Gestion de projet : vers les méthodes agiles, *Collection Eyrolles, Eyrolles, Paris.*
[2] *Project Management Institute (2021).* A Guide to the Project Management Body of Knowledge (PMBOK Guide), 7th Edition. *Project Management Standard Collection, PMI Publications, Pennsylvania, USA.*

	officially start the project and guide all initial activities.[1]		
Statement of work (SOW)	A detailed document that specifies project scope, deliverables, deadlines, and requirements. It is used as a formal agreement between the client and project team to define expectations before work starts.[2]	Define detailed client requirements	Before execution.
Milestones plan	A list of key achievements and significant points in the project timeline. It is used to track progress and verify that important phases or deliverables are completed on time.[3]	Track major events and progress.	Throughout project.
Meeting minutes	Written records summarizing discussions, decisions, and action items from a meeting. They are used to ensure all	Record discussions, decisions, and assigned tasks.	After every meeting.

[1] Project Management Institute (2021), *Opcit*, pp. 45.
[2] Kerzner, Harold (2017), *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, Wiley, New Jersey, pp. 123.
[3]Lock, Dennis (2020), *Project Management*, Routledge, London, pp. 78.

participants are aligned, remember agreements, and follow up on assigned tasks.[1]

Source: *Done by us*

1.2.4 Project management methods

Project management methods provide structured frameworks for planning, executing, and controlling projects to achieve specific objectives efficiently divided into:[2]

a. Project management methods for resource optimization

When managing limited resources, certain methodologies focus on efficiency, minimizing waste, and optimizing workflows such as:

- **Waterfall** A structured approach where project phases are completed sequentially. Since each phase depends on the previous one, flexibility is required in case of delays. This method works well for projects with clearly defined requirements, such as construction or large-scale software development.
- **Lean** Designed to minimize costs and resource usage without compromising quality. Lean project management reduces unnecessary tasks, allowing teams to either extend deadlines or narrow the project scope to stay within budget. Commonly used in manufacturing and service industries, Lean eliminates inefficiencies and enhances productivity.

b. Project management methods for time efficiency

When speed is critical, these methods prioritize adaptability, collaboration, and streamlined execution.

- **Agile** Focuses on flexibility, enabling teams to quickly respond to changes without significant impacts on cost or schedule. Agile emphasizes continuous improvement,

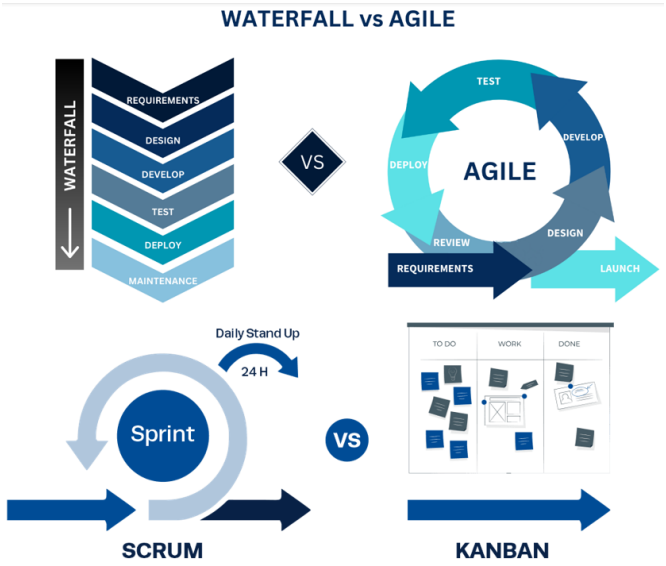
[1] Heldman, Kim (2018), *Project Manager's Spotlight on Risk Management,* Wiley, New Jersey, pp. 56.
[2] ASANA Project management methods *https://asana.com/fr/resources/project-management-methodologies*, Retrieved 16 April 2025 at 0-6:00PM

iterative development, and regular feedback loops, making it popular in software development and fast-paced industries.

- **Scrum** A specialized Agile framework featuring short work cycles (sprints) and daily team meetings, reducing downtime and ensuring rapid progress. Scrum is widely used in software development and product management.
- **Kanban** Uses visual workflow management to minimize delays. Kanban boards help teams track ongoing work in real time, ensuring tasks are completed efficiently. This method is particularly useful in IT, operations, and customer service environments.
- **Scrum Ban** A combination of Scrum's structured check-ins with Kanban's continuous workflow visualization, further reducing work delays and improving collaboration.

The figure 07 below highlights the difference between Scrum and Kanban

Figure 7: Comparison between waterfall, agile, scrum, and kanban methodologies



Source: ASANA Project management methods *https://asana.com/fr/resources/project-management-methodologies*, Retrieved 16 April 2025 at 06:00PM.

1.2.5 Project organisational structure

A project succeeds when teams are well-organized, and work is divided into clear tasks. Businesses also need a structure to manage operations, decision-making, and teamwork effectively as:[1]

a. Organizational structure definition

An organizational structure helps companies divide work among different teams and ensure coordination. It determines how resources are allocated and how different stakeholders interact within the company.

b. Organizational structure types

Organizational structures help businesses allocate tasks, coordinate teams, and manage operations effectively. They are generally classified into traditional and modern models.

- **Traditional structures**

  - **Hierarchical structure** A centralized system where employees report to one manager, ensuring clear authority but limiting flexibility.
  - **Functional structure** Divides the organization into specialized departments like marketing, finance, and production, improving efficiency but creating silos.

- **Modern Structures**

  - **Divisional structure** Separates business units by product, customer type, or geography, allowing greater autonomy and market responsiveness.
  - **Matrix structure** Employees report to both a functional and a project manager, fostering collaboration but potentially causing conflicts in leadership.
  - **Management by Objectives (MBO)** Departments operate with clear, goal-driven autonomy, either as independent entities or through simulated decentralization.

[1] PM4DEV, Project Management Organizational Structures, *www.pm4dev.com*, Retrieved May 11, 2021, at 05:30 PM

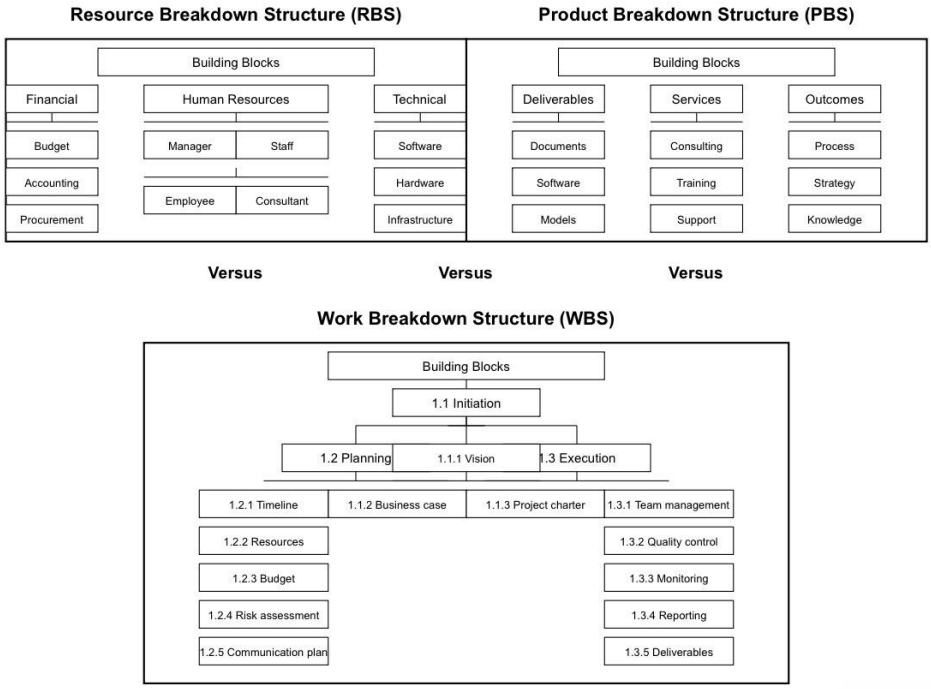
1.2.6 Project management breakdown techniques

Effective project management follows a structured sequence, ensuring clarity in execution. This involves:[1]

- Defining tasks what needs to be accomplished.
- Assigning resources who will carry out each task.
- Establishing deliverables how the results should be presented.
- Setting milestones on how progress and completion will be validated.

This example of IT project management in Figure 08 outlines the difference between the three most important techniques:

Figure 8: Project breakdown techniques PBS vs WBS vs OBS



Source*:* Done by us based on ; Belaid Cherif (2010), *Management de projet*, Collection Ed Bleues, Ed Bleues, Paris, pp. 34.

[1] Belaid Cherif (2010), *Management de projet*, Collection Ed Bleues, Ed Bleues, Paris, pp. 34.

a. PBS (Product Breakdown Structure)

The PBS focuses on the project's deliverables. It organizes final products into a tree structure, offering a clear vision of outcomes. This framework is established before the project begins but remains adaptable throughout its lifecycle.

b. WBS (Work Breakdown Structure)

The WBS breaks the project into manageable segments, detailing the tasks required for each PBS element. This structured approach enhances clarity, ensuring all team members understand their roles and responsibilities.

c. OBS (Organizational Breakdown Structure)

The OBS identifies who is responsible for each task. It aligns duties with individuals or teams, streamlining resource allocation whether personnel, equipment, or materials to optimize efficiency.

1.2.7 Essentials of project planning

Effective project planning aligns a project with market needs, client expectations, and financial limits while maintaining high efficiency. A structured approach minimizes risks, improves workflow, and boosts project success.[1]

a. Task breakdown [2]

- Organizing tasks in a clear structure ensures smooth project flow.
- Tasks can be sequential (one after the other) or parallel (simultaneous), improving efficiency and reducing time

b. Time and cost estimation[3]

- Estimates task durations and costs individually, then aggregates them for the overall project.
- Allocates total project time and budget to individual tasks to stay within limits.

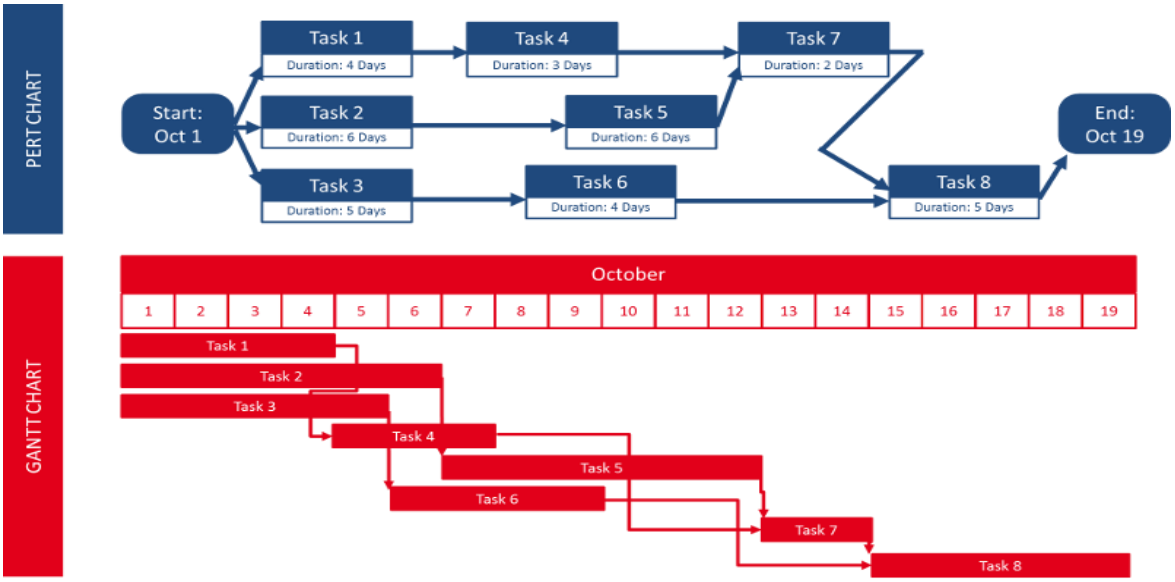
[1] Kerzner, Harold. (2017), *Opcit*, pp. 112.
[2] Schwalbe, K. (2015), *Information Technology Project Management*, 8th edition, Cengage Learning, pp. 98.
[3] Meredith, J. R., & Mantel, S. J. (2017), *Project Management: A Managerial Approach,* 9th edition, Wiley, pp. 123.

c. Project visualization tools[1]

- **Gantt charts** Visual timelines help schedule tasks, track progress, and allocate resources but need frequent updates.
- **PERT method** Structures tasks in a network, showing dependencies and flow, and includes milestones and dummy tasks

In the figure 09 below, we present an imaginary exercise designed to provide a clearer understanding of the PERT and Gantt charts. This exercise helps to illustrate how these project management tools can be utilized to visualize and organize tasks, timelines, and dependencies in a structured and efficient manner

Figure 9: Gantt and PERT methods examples



Source: Netronic ,What is a Gantt Chart Scheduler, *https://blog.netronic.com/what-is-a-gantt-chart-scheduler*, Retrieved 30 May 2025 at 10:00 AM.

[1] PMI (2017), *Opcit* , pp. 45

d. Resource allocation

Proper allocation of human and material resources ensures no task faces shortages or overloads, improving efficiency and preventing delays.[1]

1.2.8 Strategic project management considerations in intensive environments

In organizations where multiple projects are executed concurrently, managing individual projects becomes increasingly complex. The interdependencies among projects, shared resources, and competing priorities necessitate a strategic approach to ensure alignment with organizational objectives.

This environment, often referred to as a project-intensive setting, requires a shift from traditional project management to a more integrated multi-project management approach. Such a transition emphasizes the need for centralized coordination, prioritization frameworks, and resource optimization to achieve strategic goals effectively.

1.3 Theoretical progression from single to multi-project management

As companies take on more simultaneous projects, management challenges grow, increasing organizational complexity and making effective multi-project management more crucial.[2]

Managing multiple projects amplifies challenges, requiring careful coordination and control to foster collaboration and prevent conflicts.[3]

1.3.1 Multi-project management history[4]

Multi-project management developed as a response to the increasing need for organizations to handle several projects at the same time. In the early 20th century, project planning tools such as the Gantt chart were introduced, followed by the development of PERT in the 1950s.

[1] PMI (2017), *Opcit* , pp. 45.
[2] Fernez-Walch, S., & Romon, F. (2013*), Introduction dans Management de l'innovation de la stratégie aux projets*, Collection Vuibert, Vuibert, Paris, pp. 56.
[3] Fernez-Walch, Sandrine (2004), *Le management multi-projets, vecteur d'intégration des projets dans l'entreprise [in] Congrès francophone du management de projet : Projets,* Entreprise, Intégration, Paris, France.
[4] Seymour Tom & Hussein, Sara (2014), *The History of Project Management*, The Clute Institute, Minot State University, USA.

These innovations supported the execution of large, complex projects, particularly in construction, defense, and aerospace. However, as businesses became more interconnected and technology-driven, they needed to manage multiple interdependent projects across departments and locations.

This gave rise to MPM as a distinct discipline in the 1980s and 1990s, with an emphasis on prioritization, resource optimization, and portfolio alignment. The adoption of information systems accelerated this evolution, demanding more structured approaches to handle simultaneous implementations efficiently.

1.3.2 multi-project management definition

Multi-project management involves coordinating multiple projects to optimize resources and prevent conflicts. As organizations handle more concurrent projects, effective management becomes essential for maintaining efficiency and achieving strategic goals.

Multi-project management refers to the coordinated planning, execution, and oversight of multiple projects within an organization, ensuring resource optimization, strategic alignment, and efficiency across interconnected initiatives. It involves balancing priorities, managing dependencies, and mitigating risks to achieve organizational objectives[1].

1.3.3 Characteristics of multi-Project management

Multi-Project Management involves managing multiple projects simultaneously, ensuring they align with organizational goals and share resources efficiently. It introduces complexity due to interdependencies and competing priorities, requiring strategic coordination between:[2]

- **Resource allocation** Projects share limited organizational resources, requiring careful distribution.
- **Interdependencies** Projects may rely on each other, affecting schedules and outcomes.
- **Conflicting priorities** Managers must balance operational efficiency with strategic alignment.

[1] Patanakul, Peerasit (2015), *Project Management in Multi-Project Environments*, Routledge Studies in Business Organizations and Networks, Routledge, New York., pp. 70.
[2] Project Management Institute (2017), Opcit, pp37

- **Complexity management** Different projects have varying levels of importance, requiring oversight and adaptability

1.3.4 Multi projects management challenges

Managing multiple projects is complex due to their differences and interdependencies. It requires strategic planning and context-specific techniques to ensure efficiency. Organizations face various challenges, which can be analyzed through empirical findings and addressed with structured project management processes to streamline tasks and decision-making. These challenges can be:

a. Project content management

Project content management focuses on organizing and prioritizing essential tasks to maximize value and achieve project goals. The project manager ensures all work aligns with client requirements and the schedule, balancing resources and staying on track without unnecessary tasks.

b. Projects deadlines management

Ensuring timely project completion is a major challenge. Delays in less critical areas must not affect the final deadline, requiring careful planning and execution to keep the project on track.[1]

c. Project cost management

Estimating, budgeting, and cost control ensure projects stay within approved costs. Organizations assess various factors before selecting projects, raising questions about financing methods and the financial challenges they face in managing multiple project.

d. Project quality management

Quality management involves setting policies, defining objectives, and assigning tasks to ensure project goals are met. Every project must adhere to agreed standards, as failure can lead to

[1] *Project Management Institute (2008), Opcit, pp45*

significant stakeholder issues. Identifying key actions is crucial to achieving expected quality outcomes.[1]

e. Human resource management in projects

Team management involves organizing, leading, and ensuring effective communication among project members. Multi-project management requires companies to refine coordination mechanisms across projects and departments.[2]

f. Project communication management

Effective project communication ensures timely and accurate information flow. In multi-project environments, open communication is crucial for team coordination, stakeholder engagement, and tool selection. Proper strategies help monitor key information, maintain project alignment, and support crisis management to keep operations stable.

1.3.4 Effective strategies for managing multiple projects

Effective multi-project management requires strategic planning and structured execution. Key methodologies include:[3]

- **Prioritization** Selecting projects based on value, resources, and risks to improve completion rates.
- **Resource optimization** Allocating resources effectively to minimize conflicts and delays.
- **Communication & Teamwork** Ensuring open dialogue for progress tracking and early issue resolution.
- **Strong project initiation** Proper scheduling to prevent time losses and optimize resource use.
- **Proactive risk management** Identifying and mitigating risks while monitoring interdependencies.

[1] Project Management Institute (2017), *Opcit*, pp. 112.
[2] Project Management Institute (2008*)*, *Opcit*, pp. 89.
[3] Anastasia Wranek, "Multi-Project Management", *http://experte.com/project-management/multi-project-management*, Retrieved 2 April 2025 at 11:00PM

- **Realistic deadlines & milestones** Balancing urgency and flexibility to maintain steady progress.

1.3.5 Enhancing synchronization across multiple projects

Managing multiple projects requires more than separate oversight demands synchronization of resources, timelines, and dependencies to reduce conflicts and optimize outcomes.

This approach evolves into simultaneous multi-project management, where real-time coordination and adaptive planning are essential. Leveraging advanced tools and integrated communication systems allows organizations to dynamically align priorities, improve resource sharing, and mitigate risks across projects running in parallel. This enhances efficiency and strategic alignment in complex project environments.

1.4 Simultaneous multi-project management

Simultaneous multi-project management is the practice of overseeing multiple projects at once, ensuring efficiency, resource optimization, and strategic alignment within an organization.

1.4.1 Definition and scope

Simultaneous multi-project management refers to the execution of several projects concurrently within an organization. This approach involves managing shared resources, timelines, and goals, requiring tight synchronization and advanced coordination techniques.[1]

1.4.2 Complexity and challenges

Managing several projects in parallel introduces unique constraints and difficulties, requiring adaptive capabilities:[2]

- Resource conflicts Competing needs stress availability
- Prioritization issues Frequent shifts in focus
- Communication overload Information exchange becomes critical

[1] Patanakul, Peerasit, Milosevic, Dragan (2009), The effectiveness in managing a group of multiple projects: Factors of influence and measurement criteria, International Journal of Project Management, vol. 27, no. 3, pp. 216–233.
[2] Patanakul, Peerasit, Milosevic, Dragan (2008), A competency model for effectiveness in managing multiple projects, Journal of High Technology Management Research, vol. 18, no. 2, pp. 118–131.

1.4.3 Integrated approaches for managing simultaneous multi-project environments

To handle the complexity of simultaneous multiple projects management, organizations adopt a combination of proven methodologies, digital tools, and coordination practices to optimize execution and reduce risks.

a. Agile project management

Agile promotes flexibility through iterative work cycles and frequent feedback, making it well-suited for dynamic project environments.[1]

b. Microsoft project

A widely used project management tool offering real-time scheduling, resource tracking, and visual dashboards for multi-project oversight.[2]

c. Spreadsheets and dashboards

Custom Excel tools remain effective for visualizing progress and tracking resource use, especially when integrated with ERP systems.[3]

1.5 Simultaneous project management complexity

Managing multiple projects is already complex but when these projects involve ERP systems like SAP S/4HANA, the challenge becomes systemic. ERP projects affect every business function and require intensive coordination, making simultaneous management particularly difficult.

For example, SPAR Group's $100M SAP S/4HANA project failed due to poor planning and integration, causing severe operational disruptions and financial losses. This highlights why simultaneous ERP implementations represent one of the most demanding project environments.[4]

[1] Highsmith Jim (2010), Agile Project Management: Creating Innovative Products, Addison-Wesley, Boston, pp. 27–34.
[2] Microsoft Corporation, Microsoft Project Overview, *https://www.microsoft.com/en-us/microsoft-365/project*, Retrieved 17th May 2025 at 11:30PM
[3] Kerzner Harold (2017), *Opcit*, pp. 278–280.
[4] Kimberling Eric (2024), Inside the Massive $100M SAP S/4HANA Failure at SPAR Group, *https://www.linkedin.com/pulse/inside-massive-100m-sap-s4hana-failure-spar-group-eric-kimberling-swelc*, Retrieved 17th May 2025 at 11:45PM

Conclusion

The evolution from single to multiple and finally to simultaneous multi-project management illustrates the growing complexity organizations face in today's dynamic environments. Each stage introduces new layers of interdependence, resource challenges, and strategic alignment needs. Simultaneous management, in particular, demands robust coordination, standardized methodologies, and digital tools to ensure coherence across projects.

These complexities are further magnified in ERP implementations, where the systemic impact of each project extends across the entire organization. This increasing complexity justifies a focused exploration of ERP systems particularly SAP S/4HANA in the next section.

Section 2: Exploring ERP foundations and the evolution of SAP S/4HANA

In this section, we will provide a comprehensive overview of ERP systems, where we will cover their definition, history, types, and advantages. Then we will focus on one of the leading ERP vendors, SAP. We will emphasize SAP's organizational history and groundbreaking products it offers, especially SAP/S4 HANA, it latest version of ERP software.

This section is designed to make us highlight the importance and the complexity of ERP systems and the role that SAP/S4 HANA contributes to business success and digital transformation.

2.1 The role of ERP in business transformation

Emerging digital technologies are transforming industrial businesses by introducing new processes and improving existing ones. Businesses must digitize operations with the help of advanced tools to stay competitive.

These technologies improve efficiency, information sharing, and collaboration. One of the pillars of this transformation is ERP, which consolidates company functions and improves performance. Without ERP, there are:

- Delays.
- Inaccurate data.
- Communication issues in organizations.

Affecting decisions, finance, supply chains, customer service, and HR. ERP systems simplify processes and provide accurate data, allowing businesses to grow in the digital age.

2.1.1 General definition of ERP

ERP is a very comprehensive software setup that is designed to integrate several various functions and operations of a company into a single consistent system of information.

ERP is also defined as a system of functional modules connected to a common database, covering the major functions of a company and integrated within a unified information system.[1]

An ERP system can also be described as an integrated management software package that collects all company data in a common database. The database is accessed by all the organizational processes that fetch the necessary information for optimal performance.[2]

The ERP system serves as a key solution for organizations striving to achieve their desired level of competitiveness and performance, while also addressing other strategic goals and priorities.[3]

Based on the definitions provided, an ERP system can be described as a centralized database that is designed to integrate and automate all the activities in-order to facilitate efficient management and monitoring in a firm. It consists of specialized modules that handle various operations to provide smooth coordination through a shared database that enhances communication among departments and processes.

When we examined the ERP definition, we found three important elements:

- Jean-Erick Forge came up with the term "software package" in 1973. It was formed from "product" and "software" and means selling software as a complete product. By 1974, it was defined as a package that includes a program, test sets, and documentation, all of which are ready for use by many users.
- The word "management" signifies that the software package is meant for IT management. This means the programs included are intended to manage some of the management functions in a business.

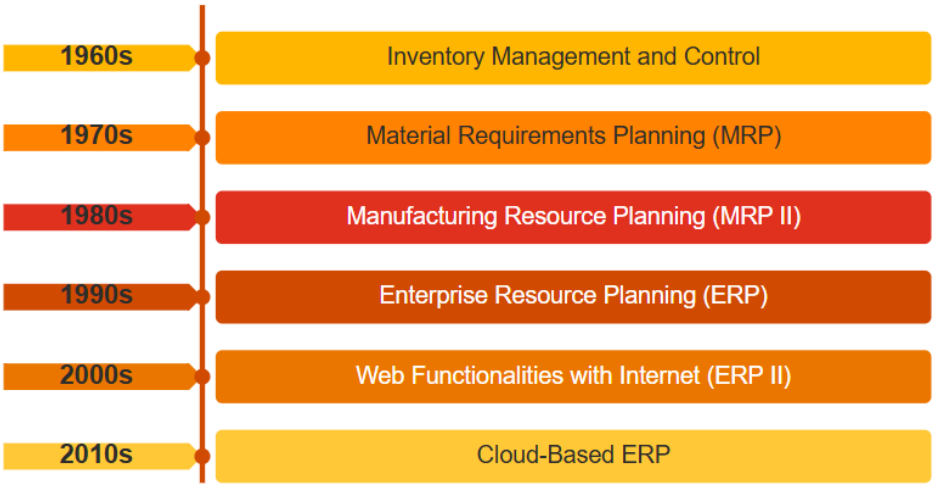
[1] Monaco Laurence (2022), DCG 8 - *Systèmes d'information de gestion : Cours et applications corrigées*, Collection Expert Sup, Gualino, Paris, pp. 45.
[2]Karouri, Moneir (2021), *Le système d'information de gestion : DCG 8 en fiches et en schémas*, Collection DCG, Ellipses, Paris, pp. 78.
[3] Chipriyanova, G., & Chipriyanov, M. (2022), *Business Intelligence Competence and Enterprise Resource Planning (ERP) Systems Tools, Business Management /* Biznes Upravlenie, number 2, vol. X, pp. 5–20.

- The word "integrated" explains the application of the system within a particular firm or organization. It emphasizes the requirement for coordinated management of corporate data.

2.1.2 Origins of ERP: development and key innovations

ERP has evolved significantly over time, adapting to technological advancements and business needs. Figure 10 below illustrates this progression, we will explore its development in more detail, starting with its origins:

Figure 10: ERP evolution



Source: *Done by us*

➢ **The beginning: MRP**

Material Requirements Planning (MRP) was introduced in the 1960s to help manufacturers reduce costs and manage inventory more efficiently. Inspired by Toyota's production system, MRP aimed to solve the problem of planning material needs for production.

During this time, companies started using centralized computer systems to track inventory. In the 1970s, MRP systems were developed further so that companies could plan material according to their production schedules. [1]

[1] Rashid Mohammad A. (2002), The Evolution of ERP Systems: A Historical Perspective in Enterprise Resource Planning: Solutions and Management, Idea Group Publishing, USA.

- **The origins of ERP**

ERP originated in the early 1990s from MRP II systems that were developed during the 1980s. MRP II possessed both operational control and financial management. ERP, however, expanded on those features by incorporating them with some of the other business processes into a single system.[1]

- **Adoption and popularity**

By the mid -1990s, companies started recognizing ERP's worth in data structuring and improving operations. Leading vendors of software like SAP, Oracle, and Baan emerged as market leaders through the period.[2]

- **Innovations and integration of internet**

In the late 1990s and early 2000s, ERP systems began to offer e-business functionality. This allowed companies to handle online transactions, customer relationship management, and e-commerce, expanding the scope of ERP beyond internal operations.[3]

- **Globalization and flexibility**

2000s: ERP systems developed to address globalization requirements by incorporating functionality to sustain operations in many countries, facilitating multiple languages and currencies.[4]

- **ERP and cloud computing**

ERP has moved from traditional on-premises applications, in which companies housed their own servers, to cloud-based applications. This has lowered costs.

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[1] Klaus, H., Rosemann, M., & Gable, G. (2000), *What is ERP?*, *Information Systems Frontiers*, number 2**,** vol. 2.pp. 141–162.
[2] Davenport, T. (1998), *Putting the Enterprise into the Enterprise System*, Harvard Business Review, number 4, vol. 76, pp. 121–131.
[3] Shehab, E.M., Sharp, M.W., Supramaniam, L., & Spedding, T.A. (2004), *Enterprise Resource Planning: An Integrative Review*, Business Process Management Journal, number 4, vol. 10, pp. 359–386.
[4] Hawking, P., & Foster, S. (2004), *Revisiting ERP systems: Benefit realization, in Proceedings of the 37th Hawaii International Conference on System Sciences*, Hawaii, pp. 45–56.

The 2010s witnessed the emergence of cloud-based ERP, which made the technology more accessible and affordable for small and medium sized enterprises. Cloud ERP lowered costs and maintenance activities while enhancing flexibility.[1]

- **Artificial Intelligence and Automation**

2020s: ERP systems now include artificial intelligence to execute processes independently and provide predictive analytics that enhance strategic organizational decision making.[2]

Today, ERP incorporates AI for automation and smarter decision-making, offering on-premises, cloud, and hybrid options to suit different business needs that are explained on table 03 below:

Table 03: Comparison of ERP Cloud vs On-Premises ERP vs Hybrid ERP

Feature	Cloud ERP	On-Premises ERP	Hybrid ERP
Definition	Hosted online by a provider, allowing businesses to store and access data without maintaining their own hardware.	Installed on company-owned servers, giving full control over security, customization, and compliance.	Combines on-premises and cloud, providing security and control while benefiting from cloud flexibility.
Implementation Time	Faster setup with minimal hardware investment	Longer deployment time due to physical infrastructure setup.	Cloud part is quick, but local integration takes time.

[1] Wang, Y., Kung, L., & Byrd, T.A. (2018), *Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations*, Technological Forecasting and Social Change, number 126, vol. 126, pp. 3–13.
[2] Bradford, M. (2020), *Modern ERP: Select, Implement, and Use Today's Advanced Business Systems*, McGraw-Hill, North Carolina, pp. 78.

Customization	Offers standardized solutions with limited customization options.	Highly customizable to meet specific business needs.	Customization depends on the balance between cloud and local control.

Source*:* *Done by us*

2.1.3 Key characteristics of an ERP system

ERP systems aim at simplifying business processes by bringing together several functions in one suite. ERP systems provide efficiency, standardization, and real time management of an enterprise's data. Below are the most significant features that make a system an ERP:[1]

- **Centralized database** A single source of legitimate information that ensures uniform data dissemination and offers a broad, multidisciplinary perspective of the enterprise.
- **Integrated analytics** Inbuilt reporting capabilities, self-service business intelligence capabilities, and compliance capabilities that provide insightful analysis across all organizational processes.
- **Data visualization** Interactive dashboards, KPIs, and simple-to-use analytics tools that facilitate quick, data-driven decision-making.
- **Uninterrupted integration** Facilitating continuous connectivity among business processes, workflows, and external software applications.

2.1.4 ERP functions

The business function names are different and are designed as modules that can be developed to address particular- requirements. The modules are based on the data model of the firm, providing data harmony and security

[1] Things to look for in an ERP system, *https://www.sap.com/mena/products/erp/what-is-erp.html*, Retrieved March 6, 2025, at 04:00 AM.

As per Tomas J-L and Y Gal, an ERP system encompasses six key areas:[1]

- **Purchasing & Procurement** Orders, suppliers, invoices, and planning are managed.
- **Production** Directs performance, product setup, and production processes.
- **Inventory management** Manages stock levels, inventory monitoring, and purchasing.
- **Sales** Manages customer accounts, orders, pricing, and logistics.
- **Finance & Accounting** Deals with budgeting, accounting, cash flow, and financial analysis.
- **Human resources** Oversees payroll, employee records, training, and recruitment

The interconnected nature of ERP modules, supported by a unified central database, enhances data collection across all organizational units. Thanks to an integrated workflow system, information moves instantly between processes, ensuring smooth operations without data flow disruptions.[2]

2.1.5 Advantages of ERP systems

The ERP system has numerous benefits; the following are some of the benefits:[3]

- **Enhanced customer service** ERP consolidates customer data, enabling faster, more personalized service. It tracks orders and real-time inventory, ensuring accurate, timely deliveries, leading to higher customer satisfaction and retention.
- **Customizable reporting** ERP provides real-time data reporting across finance, inventory, procurement, and HR. Businesses can tailor reports to KPIs, allowing for better decision-making with up-to-date insights.
- **Improved collaboration** with integrated applications, teams work seamlessly, reducing redundancies and enhancing cross-departmental communication. A single platform fosters efficiency and streamline workflows.

[1] Slimani, Radia (2020), *L'impact de l'adoption des nouveaux outils de management et la gestion de leur mise en place sur la performance des entreprises Algérienne* : cas des systèmes ERP dans les entreprises de la wilaya de Bejaia, doctoral thesis, business management, Enterprise management, pp. 33–34.
[2] Allal-Chérif, O. (2014), *Optimisez votre système d'information : Vers la PME numérique en réseau*, AFNOR, France, pp. 56.
[3] ERP Advantages, *https://www.ibm.com/think/insights/enterprise-resource-planning-advantages-disadvantages*, Retrieved 6 March 2025 at 05:00PM

- **Greater transparency & insights** ERP centralizes data, providing leaders with a comprehensive view of business operations. It enables accurate forecasting, process optimization, and enhanced decision-making, while also improving security.

2.1.6 ERP Systems disadvantages

The ERP system has also some disadvantages; the following are some of them:[1]

- ERP systems are powerful but require careful planning to avoid inefficiencies and poor ROI.
- Some businesses may find them too complex, making training and simplification essential.
- Customization extends deployment time, so a clear strategy and dedicated team are key to success.

2.1.7 Categories of ERP systems

As classified by (Gérard, Samir, & André, 2015) ERP publishers fall into three categories: proprietary ERPs, open-source ERPs, and sector-specific ERPs: [2]

a. Proprietary ERPs

- **SAP** SAP is known to be the global market leader in ERP. It offers software that addresses all the processes across the supply chain and hence is immensely popular with large companies
- **Oracle-People-Soft** Provides software products that address four overall functional areas:
  - Customer Relationship Management
  - Supply Chain Management
  - Human Resource Management
  - Financial Management

[1] ERP Disadvantages, *https://www.ibm.com/think/insights/enterprise-resource-planning-advantages-disadvantages*, Retrieved 6 March 2025 at 06:00PM
[2] Gérard, B., Samir, L., & André, T. (2015), *Maîtriser les Progiciels ERP*, ECONOMICA, Paris, pp. 78.

- **Geac** Geac provides solutions under two categories: general ERPs and specialized ERPs, designed for particular business reasons
- **SAGE** primarily targets SMEs. Its product is geared towards businesses employing fewer than 500 people.
- **Microsoft dynamics** Microsoft has two significant ERP products:
  - Dynamics NAV for SMEs employing 250 employees or less
  - Dynamics AX is suited for large organizations with more than 250 employees.

b. Open-Source ERPs

Open-Source ERPs have the support of partners like IT service companies or consulting firms. They are cheaper to implement as no license fees are paid. However, the maintenance and technical support costs must be included in the cost.

Some of the examples of Open-Source ERPs are: Aria, Compiere, ERP ODOO, ERP 5, Fosterra.

c.Sector-specific solutions

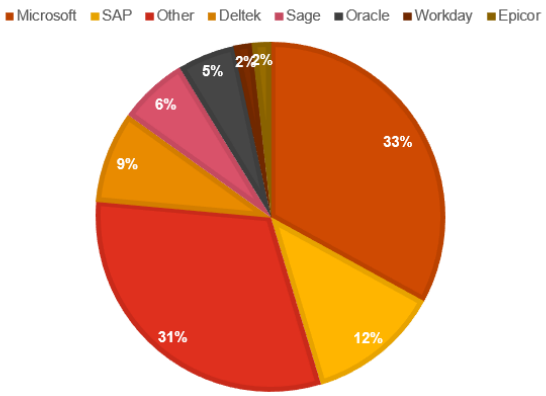
Individual sectors requirements are addressed by specialized software programs, for example, Commerce, Food Industry, Life Sciences, Process Industries, Environment, Construction, Service Providers, Maintenance and Repairs, and Automotive.

2.1.8 Market leading ERP solutions

An ERP system aims to enhance business processes by making employees more productive, operations simpler, and reporting more accurate. Based on research the data identified best vendors

The following chart illustrates the market share distribution of the dominant ERPs in the world during 2022:

Graph 1: Top ERP System Providers by Market Share



Source: *Top ERP System Providers by Market Share, https://softwareconnect.com/erp/erp-market/, Retrieved 8 March 2025 at 01:00PM*

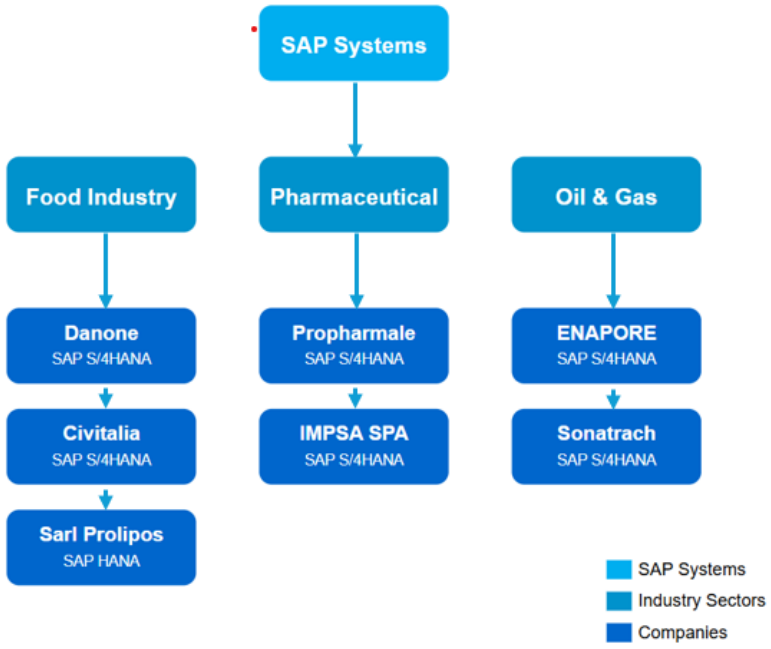
- **ERP Market in Algeria**

SAP, as the first ERP system, paved the way for enterprise resource planning solutions, giving way to a multitude of other ERP systems. Its head start and robust functionalities established its market leadership with a 46% global market share in 2008[1]. SAP has maintained its significance over the years, particularly in Algeria, where it is the most installed ERP solution.

Based on a survey conducted in 2024, SAP is still the preferred choice for Algerian and multinational companies. Among the numerous SAP solutions, SAP S/4HANA is the most utilized, primarily due to the fact that it is efficient, scalable, and has industry-specific advantages as it's mentioned in Figure11 below:[2]

[1] Tomas, J.-L., & Gal, Y. (2011), *ERP et conduite des changements : Alignement, sélection et déploiement*, 6th edition, Dunod, pp. 28.
[2] Aksas, Mouhamed Imad Eddine, Ghoufrane, Rahim, & Meddahi, Atmane (2024), *La contribution du progiciel ERP-SAP S/4HANA sur l'efficacité opérationnelle de la fonction logistique amont : le progiciel SAP le plus utilisé sur le marché algérien*, Final-year thesis, Higher School of Management, pp. 50.

Figure 11: SAP S/4HANA: The Leading Choice for Algerian and Multinational Companies in 2024



Source: Aksas Mouhamed Imad Eddine, Ghoufrane Rahim, & Meddahi Atmane (2024),*La contribution du progiciel ERP-SAP S/4HANA sur l'efficacité opérationnelle de la fonction logistique amont :le progiciel SAP le plus utilisé sur le marché algérien*, Final-year thesis ,Higher school of management . pp. 50.

2.2 SAP solutions

With the fast-evolving technology of today impacting all firms, firms are forced to evolve to keep up with competition. One of the most powerful tools for business growth and efficiency is SAP.

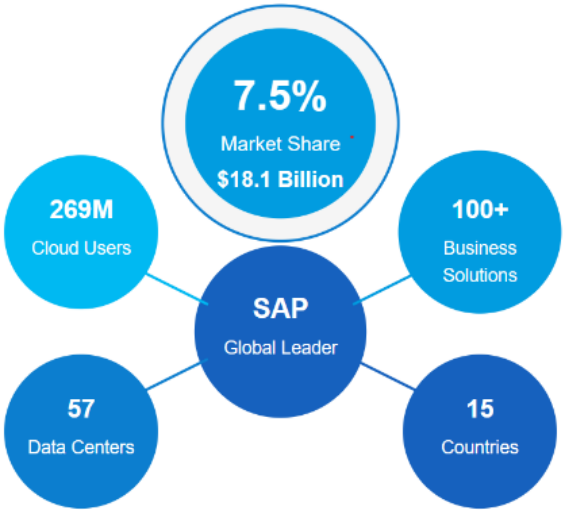
- **SAP is a company**

SAP is not a product, but a company a widely held misconception. It's a German software company that creates enterprise solutions to assist companies in running their businesses effectively.

➢ SAP in numbers

SAP dominates the business applications market, supported by significant figures presented in Figure 12 below, highlighting its strong global footprint:[1]

Figure 12: SAP Company in numbers



Source : Done by us based on ; What's an SAP, *https://crystal-placement.com/blog/sap-cest-quoi/*, Retrieved 16March 2025 at 00:38 AM

➢ SAP products

SAP is most renowned for its ERP system, although it has other products as well, such as Ariba, Concur, APO, and cloud-based solutions. SAP's newest ERP release is SAP S/4HANA, which is built for its in-memory HANA database and is therefore quicker and more capable than its predecessors.

SAP offers solution portfolios from asset management and finance to marketing and manufacturing and supports software that meets a client's unique, day-to-day needs as mentioned here in the figure 13 below:

[1] What's an SAP , *https://www.apps4bcn.cat/quest-ce-que-sap-signification-et-definition-du-logiciel-erp-sap/*, Retrieved 16March 2025 at 00:26 AM.

Figure 13: SAP Company solutions portfolio

Source: Aaron le, tarmeem kazi , (2024) ,PwC A&D Industry Edge, internal document

With the fast-evolving technology of today impacting all firms, firms are forced to evolve to keep up with competition. One of the most powerful tools for business growth and efficiency is SAP.

The new SAP system, particularly SAP S/4HANA, is gaining much traction in Algeria and globally, and as such, it is the motivation for our study to learn more about it.

SAP S4/HANA is not software but a vast system that reshapes working paradigms in organizations. Time and planning in the implementation are huge due to various challenges, including data migration, system integration, and staff training. The process is lengthy, ranging from business needs to post-launch support.

2.2.1 Definition of SAP S/4HANA

SAP S/4HANA is an advanced ERP system designed for digital transformation, enabling faster data processing, improved business agility, and cloud-based innovation. Its implementation requires expert guidance, with experienced partners assisting businesses in its successful activation.[1]

SAP S/4HANA is a future-ready ERP system developed with next-generation intelligent technologies such as AI, machine learning, and advanced analytics. It makes business processes

[1] SAP S4/HANA, *https://www2.deloitte.com/il/en/pages/technology/articles/sap-s4hana-deloitte*, Retrieved March 8, 2025, at 01:00 PM.

smarter and operates on SAP HANA, a high in-memory database with real-time processing capabilities for data and a unified, singular data structure.[1]

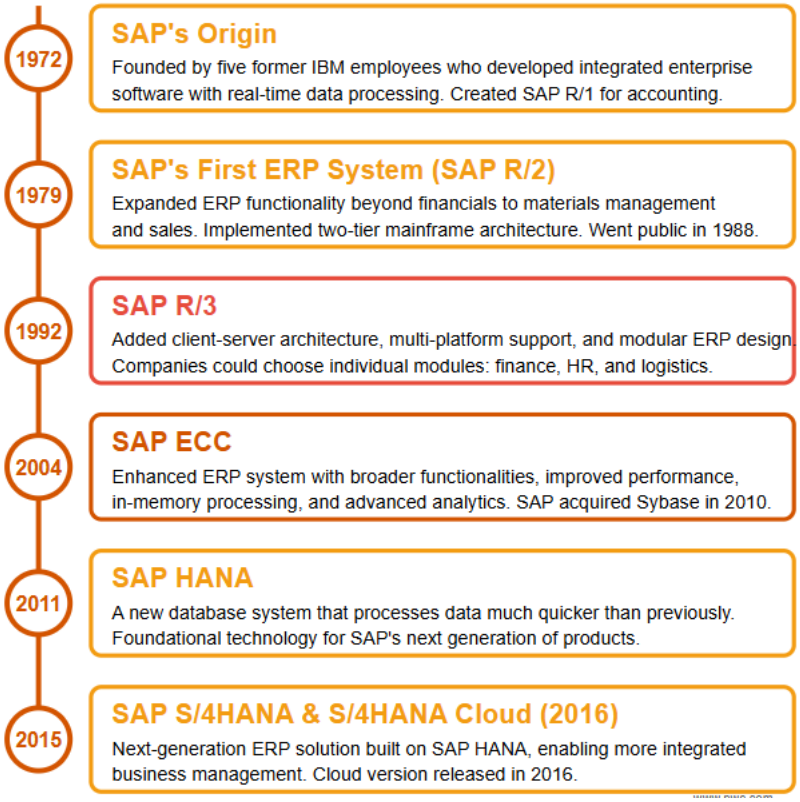
SAP S/4HANA is a cutting-edge ERP system built for digital transformation, offering enhanced business agility, real-time data processing, and cloud-based innovation. Powered by SAP HANA. Its successful implementation requires expert guidance, with experienced partners helping organizations activate and integrate their capabilities efficiently.

2.2.2 Timeline of SAP's ERP systems

SAP has evolved from a simple financial system into a sophisticated, intelligent ERP solution. Its innovation enables seamless operations, efficiency, and data-driven decisions. Moving from mainframes to client-server models, SAP S4/HANA now harnesses in-memory computing and cloud technology to meet modern business needs as showcased on figure 14 bellow:[2]

[1] SAP S4/HANA overview, *https://api.sap.com/products/SAPS4HANA/overview*, Retrieved March 20, 2025, at 02:00 AM.
[2] SAP ERP SYSTEMS: EVOLVING FROM ON-PREMISES MODELS TO THE NEXT-GEN SYSTEMS, *https://www.tjc-group.com/blogs/sap-erp-systems-evolving-from-on-premises-models-to-the-next-gen-systems*, Retrieved March 20, 2025, at 05:00 AM.

Figure 14: SAP S4/HANA evolution



Source: SAP ERP SYSTEMS: EVOLVING FROM ON-PREMISES MODELS TO THE NEXT-GEN SYSTEMS, *https://www.tjc-group.com/blogs/sap-erp-systems-evolving-from-on-premises-models-to-the-next-gen-systems/*, Retrieved March 20, 2025, at 05:00 AM.

Over the decades, SAP has continuously evolved, adapting to the changing demands of businesses and technological advancements. From its humble beginnings in 1972 to the introduction of intelligent ERP solutions, SAP has transformed enterprise management with real-time data processing, modular architecture, and cloud-based innovations.

2.2.3 SAP S4/HANA characteristics

SAP S/4HANA has many characteristics; these are the main ones:[1]

- **Instant data access** Provides immediate access to the latest information, reducing delays in decision-making.

[1] Wessel, M. (2019), *SAP S/4HANA: An Introduction*, SAP Press, Heidelberg, pp. 102.

- **Real-time analytics** Leverages in-memory computing technology for instant reporting, predictive analytics, and complex data analysis.
- **Faster transactions** Speeds up business processes like sales orders, procurement, and financial operations for enhanced efficiency.
- **Predictive insights** Analyzes real-time data to anticipate trends, risks, and opportunities, enabling proactive business strategies.
- **Real-time reporting** Generates up-to-date reports and dashboards instantly, helping stakeholders monitor performance metrics.
- **Improved efficiency** Streamlines operations and accelerates workflows.
- **Enhanced decision-making** Enables data-driven business strategies with immediate insights.
- **Integration hub** Facilitates smooth data flow and system connections.

2.2.4 SAP S/4HANA migration risks

SAP S/4HANA has many risks; these are the main ones:[1]

- **Data migration complexity** Transferring legacy data to SAP S/4HANA requires careful planning to ensure accuracy and consistency.
- **Integration with existing systems** Compatibility issues may arise when connecting SAP S/4HANA with older applications and third-party solutions.
- **User adoption & training** Employees may resist change, requiring comprehensive training programs to ensure smooth adoption.
- **High implementation cost** the transition can be expensive, including licensing, infrastructure, and consulting fees.
- **Business process disruptions** Critical operations may be temporarily affected during the migration, necessitating contingency plans.
- **Security & compliance risks** Ensuring data protection and regulatory compliance is crucial, especially when handling sensitive business information

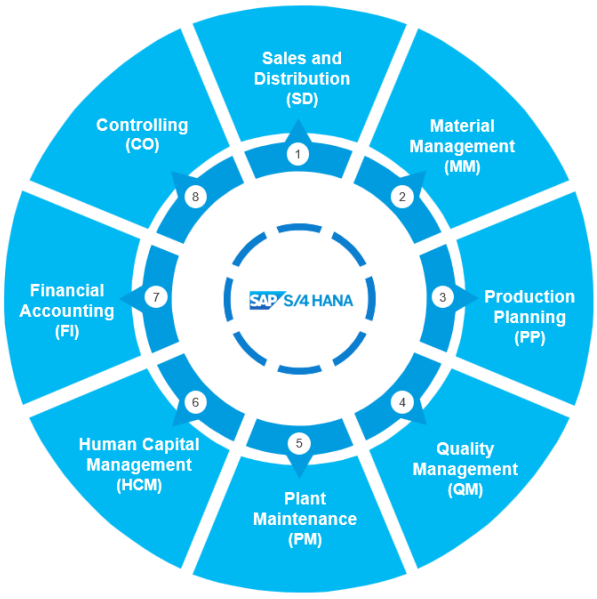
[1] Camm, J. (2020), *SAP S/4HANA Migration: A Comprehensive Guide to Transitioning to the New ERP*, Springer, New York, pp. 231.

- **Performance optimization** Fine-tuning the system for optimal speed and efficiency is necessary to avoid bottlenecks

2.2.5 SAP S4/HANA modules

The above Figure 15 provides an overview of the different modules covered by SAP S/4HANA:

Figure 15: SAP S/4HANA modules overview



Source: *Realized by us*

SAP consists of a wide range of modules for the purpose of improving the business process efficiency. The main modules of SAP are presented as below:[1]

- **SD (Sales and Distribution):** Handles sales and customer distribution procedures.
- **MM (Materials Management):** Procurement, inventory, and supply chain management are its responsibilities.
- **PP (Production Planning):** Facilitates manufacturing and production activities.

[1] Kirana, D., Saputra, M., & Puspitasari, W. (2021), *Enterprise Resource Planning of Procurement Process with SAP MM Module*, International Journal of Innovation in Enterprise System, number 1, vol. 5, pp. 55–64.

- **QM (Quality Management):** Ensures quality control and compliance.
- **PM (Plant Maintenance):** Maintains and repairs equipment and buildings.
- **HR (Human Resources):** Manages staff operations.
- **FI (Financial Accounting):** Enables financial reporting and transactions.
- **CO (Controlling):** It deals with internal accounting and cost control.

2.2.6 The exploration of SAP S/4HANA beyond the software

SAP S/4HANA is more than just an ERP system it requires strategic planning, commitment, teamwork, and proper training. Implementation is not just technical but involves transforming company operations and ensuring all personnel are prepared for the change.

A case study conducted by PwC examined the SAP S/4HANA implementation at BPC Biopharma Company, a Fortune 500 enterprise producing biological and pharmaceutical vaccines across more than 120 countries. The study spanned a 1.5-year period 6 months before and 1 year after implementation and highlighted that the system's technical capabilities were undermined by significant human resource challenges. Employees struggled with learning due to inadequate, overly simplistic online training that lacked hands-on, transaction-level practice.[1]

Feedback indicated that comprehensive, face-to-face training, supported by local consultants, would have been more effective. The case emphasizes that, beyond technical customization and predictability, commitment, teamwork, and proper training of personnel are critical to the success of SAP S/4HANA implementations.[2]

[1] Olson, D.L., & Bouchek, Z., Case study of SAP implementation in a corporation network plant, *https://nestellassociates.com/wp-content/uploads/2019/07/Case-study-of-ERP-implementation.pdf*, Retrieved April 5, 2025, at 03:52 PM.
[2] Idem, Retrieved April 5, 2025, at 03:52 PM.

Conclusion

In today's fast-evolving business environment, ERP systems play a crucial role in enabling companies to streamline operations, integrate data, and enhance decision-making. As organizations grow larger and their structures become more complex, their ERP needs evolve accordingly.

SAP, as one of the leading ERP providers, offers scalable and sophisticated solutions, particularly SAP S/4HANA, to address the needs of large enterprises. These systems are not only changing how companies operate internally but are also redefining how they compete in global markets.

Section 3: The Management of SAP S/4HANA Implementation

Successful SAP S/4HANA adoption hinges on a well-structured implementation team often overlooked despite its critical role.

The key to execution lies in a simple yet powerful formula: the right people, with the right skills, using the right methodology. To maximize success, team selection must be tightly integrated into the planning process.

3.1 Driving SAP S4/HANA implementation success for client organizations

SAP S4/HANA implementation is not just about software, it is about guiding client organizations through large-scale business transformation.

Success hinges on the ability to prepare clients for structural change, cultural shift, and process integration.

3.1.1 Defining SAP S4/HANA implementation

SAP S/4HANA implementation is the overall process of installing and transforming the SAP S/4HANA system in a company.

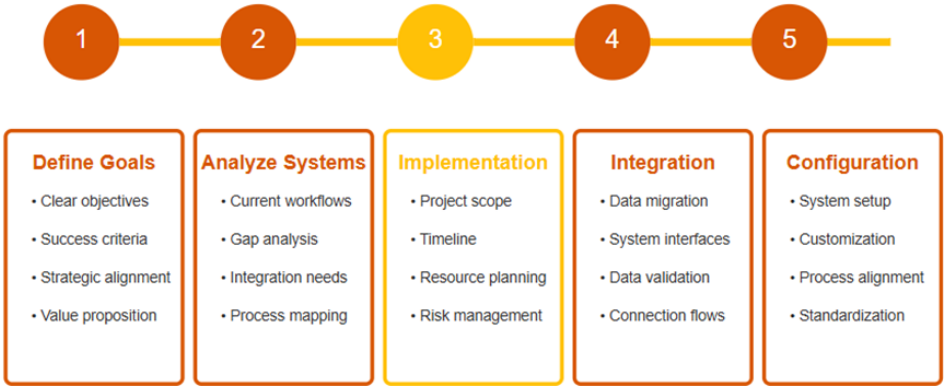
It includes planning, data migration, integrating systems, training people, and managing change. Successful implementation is not solely about technical configuration, it aligns with the client's business goals, minimizes migration risks, ensures internal and external resources, and helps with long-term business transformations.[1]

3.1.2 Implementing SAP S4/HANA roadmap

Successful deployment of SAP S/4HANA needs a well-defined, phased solution. The following is a common roadmap mentioned on the figure 16 below:

[1] Pillai, Manoj (2016), Successful SAP Implementation Strategy, *https://www.mphasis.com/content/dam/mphasis-com/global/en/services/applicationservices/erp-sap/brochures/Implementation%20Strategy.pdf*, Retrieved March 29, 2025, at 11:00 AM.

Figure 16: Implementation phases roadmap



Source: Done by us

Without forgetting about:

- **Test system performance** Perform unit, integration, and user acceptance testing to confirm functionality and performance.
- **User training & change management** Deliver role-based training and guide teams through the adoption process using facilitated change management tools.
- **Go-live & post go live support** Transition fully to SAP S/4HANA and continue monitoring, supporting, and optimizing the system post-launch.

3.1.3 Challenges in navigate SAP S4/HANA implementation

Organizations must navigate a variety of challenges during implementation, including technical, cultural, and structural shifts. These challenges include:[1]

- **Disruptive change** S/4HANA may necessitate radical changes in the way an enterprise function. It eliminates hierarchical structures, maximizes openness of information, and changes decision-making.
- **Restructuring of organization** Change from departmentally structured to process-oriented organizational designs is the requirement for SAP S4/HANA success. It calls

[1] Wall, S., & McKinney, R. (1998), *Wall-to-wall change, Across the Board,* number 5, vol. 35, pp. 2–3.

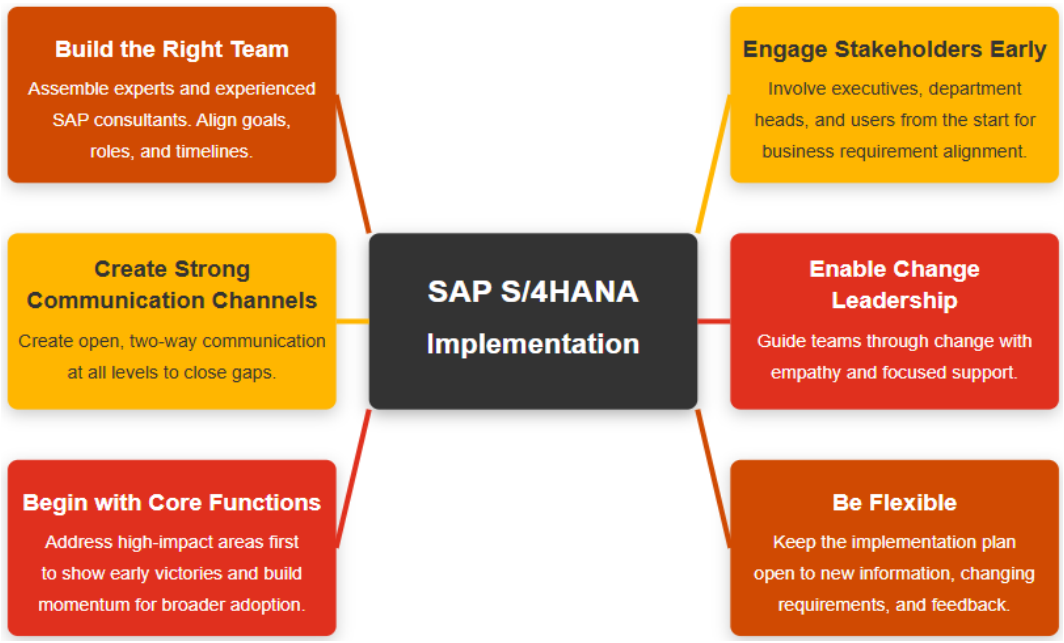
for integration, visibility, and openness across the company, demanding the questioning of traditional job definitions and workflows.

- **Training & empowerment** Customers need more than basic training; they must know how SAP enables them to make smart decisions and work more efficiently, and with the power of choice.
- **Communication & change management** Communication is key to overcoming resistance. Having stakeholders on board, explaining the reason for change, and being open throughout are necessary to enable smooth uptake.

3.1.4 The success factors of SAP S4/HANA implementation

Several best practices optimize the chances for successful SAP S/4HANA implementation, most of them are mentioned in figure 17 below:

Figure 17: SAP S4/HANA implementation key success factors



Source: Done by us

3.1.5 From the implementation decision to execution

Successful SAP S/4HANA deployment goes beyond technology, it depends on expert collaboration. While implementation drives structural, cultural, and process changes, long-term success relies on consultants, project managers, and cross-functional teams for post-implementation support.

Enterprise-wide participation is essential. The project team, though not directly executing the implementation, plays a vital role in planning, managing, securing support, and keeping momentum until completion.

Once integrated, the real challenge begins ensuring adoption, efficiency, and optimization. The transition from decision to execution is critical, requiring strong engagement from consultants, managers, and end-users to sustain success and continuous improvement.

3.1.6 The importance of SAP S4/HANA team composition

Successful SAP S/4HANA projects require more than technical expertise they thrive on collaboration and strategic execution. Key factor for success include:[1]

- **Understanding the software** A solid grasp of SAP S/4HANA's functionality is essential.
- **Building a strong team** Clear roles and responsibilities ensure smooth execution.
- **Encouraging collaboration** A unified team mentality drives efficiency and adaptability.

For an effective implementation, organizations must assemble a skilled team capable of managing complexity, resolving challenges, and optimizing the system. With the right people in place, SAP S/4HANA delivers maximum value through improved efficiency, quality, and flexibility.

[1] Creating SAP Teams, *https://www.linkedin.com/pulse/creating-sap-teams-ignitesap-jzhoe/*, Retrieved March 22, 2025, at 10:00 AM.

3.2 SAP S4/HANA implementation team structure

Before exploring SAP team collaboration, it's essential to understand their roles. SAP S/4HANA implementation team ensure smooth software operations, with some members from the organization and others providing external expertise, support, and implementation services.

3.2.1 Project direction team

The project direction team oversees strategy, alignment, and execution to ensure a successful SAP S/4HANA implementation.

a. Project sponsor the strategic leader

A project sponsor is a senior leader responsible for ensuring project success. They provide resources, advocate for the team, and align the project with company goals. In SAP S/4HANA implementations, their role is vital guiding strategy, securing support, and overcoming challenges to drive successful execution.:[1]

- **Vision & strategic alignment** Ensures the project supports long-term business objectives.
- **Budget & funding approval** Secures financial resources and maintains cost control.
- **Governance & decision-making** Provides direction, ensures compliance, and removes barriers.
- **Stakeholder engagement** Communicates project benefits, fosters collaboration, and resolves issues.
- **Risk management** Identifies and mitigates risks to ensure stability.
- **Resource allocation** Secures skilled teams and prevents conflicts.
- **Performance monitoring** Tracks progress, approves milestones, and ensures timely delivery.
- **Final approval & success** assessment Verifies completion, evaluates success, and ensures value realization.

[1] SAP Implementation Team Roles, *https://noeldcosta.com/essential-sap-implementation-team-roles/*, Retrieved March 22, 2025, at 11:00 AM.

b. Project manager the operational coordinator

An SAP S/4HANA Project Manager oversees and coordinates business projects using SAP S/4HANA to optimize core functions like finance, sales, and stock management.

They ensure projects are well-planned, on schedule, and within budget, collaborating with teams, troubleshooting issues, and maintaining communication with leadership. Strong project management, SAP expertise, and leadership skills are essential for seamless execution.[1]

Their major responsibilities and duties are [2]

- **Project planning** Creates project plans, defines the scope, establishes timelines, and develops deliverables.
- **Team coordination** Assigns work, fosters collaboration between teams, and aligns stakeholder expectations.
- **Communication and reporting** Provide regular updates on status to stakeholders and maintains appropriate communication throughout the project.
- **Manages the scope of the project** manages change requests, and minimizes disruption.
- **Quality assurance** Ensures that project deliverables conform to quality norms and business goals.
- **Issue resolution** Identifies and solves problems, raises concerns where appropriate, and facilitates prompt resolution.
- **Project closing** Oversees final delivery, conducts post-project evaluations, and documents valuable lessons learned. Through firm leadership, meticulous strategic planning, and proactive risk management, a project manager facilitates the successful execution of an SAP S4/HANA ERP implementation, thereby empowering enhanced efficiency and business development.

Table 04 below gives the key differences between the project manager and project sponsor

[1]SAP Implementation Team Roles, *https://www.theknowledgeacademy.com/blog/sap-project-manager/*, Retrieved March 19, 2025, at 8:00 PM.
[2] Idem, Retrieved March 19, 2025, at 8:00 PM.

Table 04: The difference between Project manager vs Project sponsor

Category	Project manager	Project sponsor
Role	ProvideFunding,strategic direction	Manage day to day project execution and salary
Responsabilities	Approves scope, timeline,budget	Plan , execute , manage team and resources
Focus	Strategic overseight and high level descision making	Operational execution and problem solving
Engagement with stakeholders	Engages with senior executives and external stakeholders to secure support and resources for the project	Communicates with internal stakeholders and project team members to ensure alignment and progress

Source: Project sponsor vs Project manager,*https://www.indeed.com/career-advice/finding-a-job/project-sponsor-vs-project-manager?utm_* Retrieved 20 March 2025 at 05:00PM

c. The strategic power of PMO in SAP S4/HANA implementations

- **SAP S4/HANA PMO definition[1]**

In SAP S/4HANA implementations, the Project Management Office plays a pivotal role in ensuring project alignment, governance, and execution. It bridges the gap between business objectives and project delivery, providing structure and control.

The SAP S/4HANA PMO facilitates smooth integration, monitors risk, ensures compliance, and optimizes performance, making it a key driver of success in technology transformation initiatives.

[1]Hussain, Basit, Khan, Ahmed Waleed, & Khokhar, Aman, Project Management Office Services, *https://www.deloitte.com/middle-east/en/services/tax/services/project-management-office.html*, Retrieved March 25, 2025, at 04:00 PM.

➢ The Role of PMO in SAP S4/HANA implementation projects [1]

The SAP S/4HANA Project Management Office (PMO) plays a crucial role in ensuring a smooth, well-structured implementation.

It provides governance, strategic alignment, and coordination across teams while leveraging SAP Activate methodology to optimize project execution. By managing risks, tracking progress, and facilitating communication, the PMO ensures efficient delivery and long-term success.

- **Project planning & setup** Defines project type using Focused Build templates and activities.
- **Issue & risk monitoring** Tracks risks, problems, and overall project performance.
- **Sprint management** Initiates and oversees sprint cycles to achieve specific objectives.
- **Progress tracking** Manages workflow, deadlines, and quality assurance.
- **Document archiving & organization** Stores and structures key project documentation.
- **SAP Activate framework** Follows the Discover, Prepare, Explore, Realize, Deploy, and Run phases.
- **Stakeholder coordination** Acts as the central communication hub for sponsors, managers, and teams.
- **Governance & control** Ensures project alignment, best practices, and risk mitigation.

➢ Processes managed by PMO

These tools and processes are designed to uphold standardization, efficiency, and oversight in all SAP S4/HANA implementation projects:[2]

- **Time tracking and management systems** Monitors employee/consultant work hours as Timesheet templates, procedural guidelines, time reporting tools.

[1] Project Management Office, *https://help.sap.com/docs/Focused_Build_Focused_Insights/53cb8e90c8504f31bb44d4f0029b4b98/85d24168145b4d4a9c8f7ce1d04fb8e2.html*, Retrieved March 25, 2025, at 5:00 PM.
[2] Anderson, George D. (2009), B*uilding the SAP Project Management Office in SAP Implementation Unleashed: A Business and Technical Roadmap to Deploying SAP*, Sams Publishing, Paris, pp. 45.

- **Travel & Expense (T&E) management** tools Ensures expenses comply with company policies. *Includes:* T&E policies, expense report templates, approval workflows.
- **Shared team space platforms** Facilitates collaboration and centralized document access. *Examples:* SharePoint, Google Workspace, internal drives.
- **Collaboration & communication tools** Enhances team connectivity across locations as Microsoft Teams

3.2.2 SAP partners

Most companies implementing or upgrading an SAP system hire a certified partner due to the complexity of SAP technologies and limited in-house expertise. Experienced firms ensure a successful, timely, and budget-friendly deployment.[1]

The SAP consulting market is competitive, with projects ranging from $5–10 million to over $100 million for large implementations. The ecosystem includes established IT firms, some offering end-to-end solutions, while others specialize in specific industries or technologies.[2] SAP partners fall into three categories:

- SAP Business and Application Partners
- SAP Technical Partners
- SAP Project management

These groups follow a structured implementation roadmap, working individually or collaboratively for successful SAP deployments.

SAP partners are professionals who assist companies in getting the best from their SAP software. They ensure that all is working properly and well configured. SAP partners tailor and extend SAP solutions, such as SAP S/4HANA, to fit each company's individual requirements, leading them through their digital transformations. [3]

[1] Anderson, George D. (2009), Opcit, pp. 50.
[2] Idem, pp. 80.
[3] SAP partners,*https://www.sap.com/mena/partners/find.html*, Retrieved 25 March 2025 at 11:57PM

With the assistance of experts worldwide such as Accenture, Deloitte, IBM, and PwC, organizations can use SAP S/4HANA to become more intelligent, well-managed businesses.

a. SAP S4 /HANA business partners

Also known as application or business consultants, specialize in specific applications and industries. Their expertise helps map customer processes to SAP systems, leveraging past implementations to apply best practices. They often assist in developing detailed design requirements and customizing applications via Java and ABAP programming.[1]

These consultants possess industry domain knowledge, translating business processes into SAP module requirements. Typically, more business-oriented than technical, many have prior industry experience**.**

b. SAP technical partners

Also known as NetWeaver or Basis consultants, specialize in systems integration, administration, architecture, and SAP infrastructure implementation.

They focus on SAP NetWeaver system components rather than industry-specific applications. Their expertise covers various technology platforms, including Microsoft Windows and multiple database servers.[2]

c. SAP project management partners

Oversee the schedule, budget, resources, risks, and deliverables of an SAP implementation. With industry and application experience, they provide accurate estimations based on prior projects. In large-scale engagements, a PMO is established to coordinate subprojects and manage multiple teams. The PMO ensures accountability and risk visibility, often as a shared responsibility between the customer and partner.[3]

[1] George D. Anderson (2009), No Implementation Is an Island: P*artner Required in SAP Implementation Unleashed: A Business and Technical Roadmap to Deploying SAP*, Sams Publishing, Paris. pp. 55.
[2] Idem, pp. 61.
[3] Ibid, pp. 70.

3.2.3 SAP S 4/HANA consultants

a. SAP S/4HANA functional consultants[1]

An SAP Functional Consultant translates business requirements into SAP solutions, ensuring seamless implementation and workflow integration.

They optimize processes, resolve issues, and drive continuous improvement. With specialized consultants for each module HCM, MM, SD, and more they play a vital role in successful SAP adoption.

- **Functional consultant's main responsibilities**

  - **Requirement gathering** Coordination with stakeholders to learn about business processes, issues, and goals. Workshops, interviews, and analysis for requirement gathering.
  - **Solution designs** the process of translating business requirements into SAP S 4/HANA solutions by configuring modules, customizing features, and designing processes that meet business objectives and best practices.
  - **Implementation** Leadership or support of SAP S 4/HANA module deployment, facilitating seamless transition with minimum business disruption. This includes data migration, system integration, and user training.
  - **Testing** Rigorous testing for SAP S 4/HANA solutions functionality and integrity, for instance, unit, integration, and user acceptance testing in order to identify and fix defects.
  - **Support and maintenance** Ongoing user support, troubleshooting of problems, and installation of updates to enhance system performance and ease of use.

[1] Zohra, Ikram, *https://www.linkedin.com/pulse/role-sap-functional-consultant-responsibilities-skills-ikram-zohar-hq5rc*, Retrieved March 25, 2025, at 11:00 PM.

➢ **SAP functional consultant technical skills**

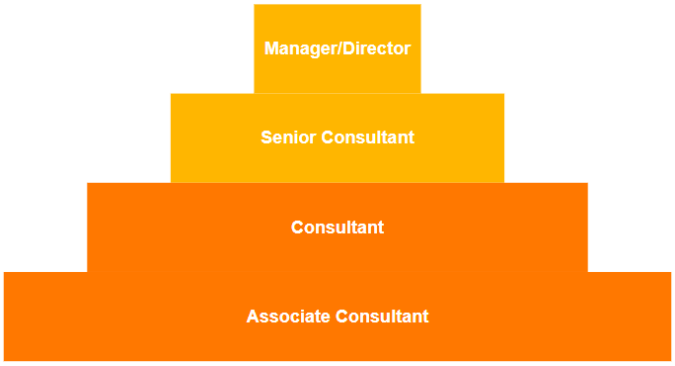
As well as soft skills to be successful for functional consultants. The technical skills necessary are:

- **SAP expertise** Sound knowledge of relevant SAP modules (FI/CO, MM, SD..), encompassing configuration, customization, and integration.
- **Problem-solving** Analytic skills to identify root causes, troubleshoot, and create creative solutions to business issues.
- **Project management** Manage multiple priorities, timely completion of tasks, and collaboration with teams to deliver projects successfully within scope and budget.

➢ **SAP S4/HANA consultants career path**

A career as a SAP Functional Consultant typically evolves through several positions as mentioned on the Figure 18 bellow including:

Figure 18: SAP S4/HANA consultants career path



Source: Done by us

- **Associate consultant** Starting role for learning SAP, acquiring experience, and performing projects under guidance.
- **Consultant** Mid-level position with a concentration on requirement gathering, solution designing, and implementation, with specialization in some SAP modules or industries.

- **Senior consultant** Known as the stream lead leadership role with responsibilities of guiding juniors and project planning in terms of strategy.
- **Manager/Director** Manages several projects, manages customer relationships, and guides business growth in SAP consulting services.

Among these consultants, the most knowledgeable in a specific area, for example, a very competent HCM consultant, will lead the implementation in that area.

He or she will guide and direct the work of other HCM consultants to make certain that everything goes well and gets accomplished successfully.

b. SAP S/4HANA technical consultants

In the SAP S/4HANA world, technical consultants are crucial for making the system work effectively, integrate seamlessly with other software applications, and meet the individual requirements of an enterprise.[1]

Technical consultants take care of the architecture, security, customization, and performance of SAP landscapes to make the system run stable and optimized. Their major roles can be resumed in:

- **SAP Basis consultant** IT administrators managing installations, updates, security, and system stability to ensure continuous, secure SAP operations.
- **SAP ABAP developer** Software engineers customizing SAP using ABAP and web technology, optimizing functionality and user experience.
- **SAP integration consultant** Experts in connecting SAP with third-party, cloud, or proprietary applications, ensuring seamless data flow and integrity.

[1] Functional vs Technical Aspects of SAP S/4HANA, *https://www.linkedin.com/pulse/functional-vs-technical-aspects-sap-s4hana-snisourcing-zzlkf*, Retrieved March 25, 2025, at 11:57 PM.

3.2.4 Integrators

SAP S/4HANA Integrators assist companies in implementing and integrating SAP S/4HANA with existing systems. They ensure seamless communication between SAP S/4HANA and applications like accounting, CRM, and inventory management.

By addressing technical challenges and customizing solutions, they optimize workflows and enable smooth data flow across departments.

3.2.5 SAP S4/HANA users

An SAP S/4HANA users represents the client who performs daily business transactions like data entry, executing processes, and generating reports.

3.3 The necessity of structured project management in SAP S4/HANA implementations

SAP S/4HANA implementation is complex, requiring strategic oversight and coordination. Success depends on clear objectives, efficient resource management, and strict timeline control.

A structured project management framework ensures stakeholder collaboration, system alignment, and seamless integration of business processes, data migration, and customization.[1]

3.3.1 SAP S4/HANA activate project implementation methodology

a. SAP activate methodology definition

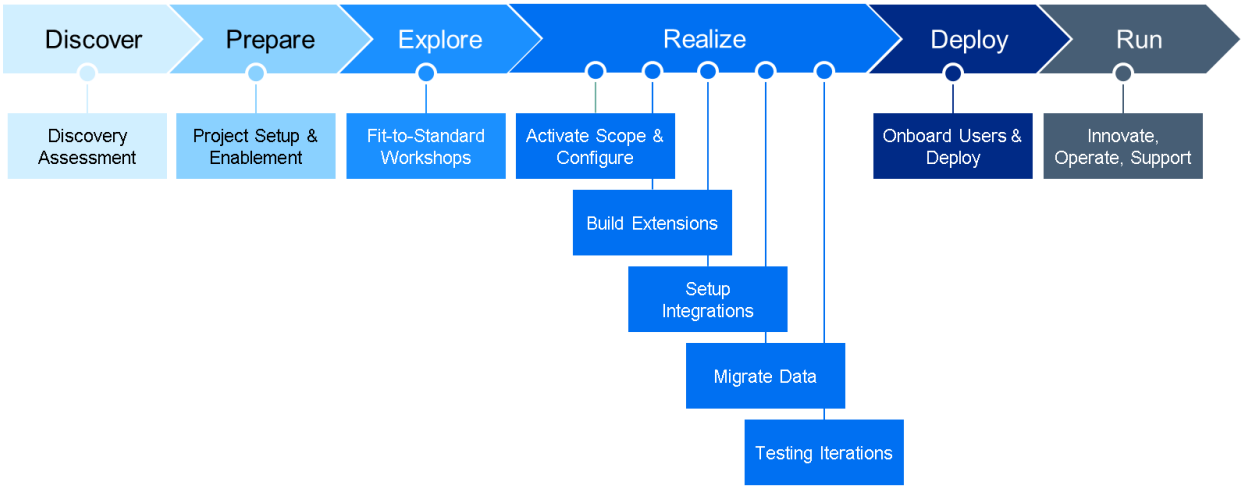
SAP Activate is a simple and flexible method for setting up and improving SAP systems. It helps businesses move to SAP S/4HANA smoothly by providing step-by-step guidance, real-time insights, and better ways to manage resources. This approach combines both structured planning and flexible adjustments, making ERP projects faster and more effective.[2]

[1] *Project Management Institute (2021), Opcit, pp70*
[2] *SAP activate methodology https://www.leanix.net/en/wiki/tech-transformation/sap-activate-methodology, Retrieved 12 April 2025 at 08:00PM*

b. SAP activate implementation phases

The implementation of the SAP Activate Methodology covers six phases explained on figure 19 below:

Figure 19: SAP activate implementation phases



Source: SAP activate methodology *https://www.leanix.net/en/wiki/tech-transformation/sap-activate-methodology*, Retrieved 12 April 2025 at 08:00PM

These six phases include:[1]:

- **Discover** Defines the digital transformation strategy and highlights the benefits of SAP S/4HANA.
- **Prepare** Initiates the project with key planning activities:
  - Defines goals, scope, and governance.
  - Establishes roles, tracking mechanisms, and reporting requirements.
  - Sets up the system environment for a ready-to-run process.
  - Creates project charter and management plan.

[1] *SAP activate methodology,* Opcit, *Retrieved 12 April 2025 at 08:00PM*

- **Explore** Focuses on solution scoping, validation, and integration:
  - Conducts validation workshops.
  - Integrates legacy systems.
  - Defines and adjusts configuration values.
  - Implements training strategies, fit-gap analysis, and data integration.

- **Realize** Builds and configures the technical architecture:
  - Configures solutions in a controlled environment.
  - Conducts end-to-end testing.
  - Manages change and provides end-user training.

- **Deploy** Ensures readiness for production go-live:
  - Executes the cutover plan.
  - Completes final testing and operational setup.
  - Closes the project and transitions to post-go-live operations.

- **Run** Maintains system stability and drives improvements:
  - Monitors system performance.
  - Implements minor enhancements and fixes.
  - Continuously optimizes processes based on user feedback.

SAP Activate ensures efficient, scalable, and innovative SAP S/4HANA implementations, helping organizations align technology with business needs.

3.3.2 Project management for SAP S/4HANA deployment

Effective management of SAP S/4HANA implementation projects necessitate a structured approach encompassing multiple critical phases. The process begins with Initiation, followed by Planning, progresses through Execution, and concludes with Closure.

These phases ensure that deliverables align with stakeholder expectations and adhere to established quality and governance standards.

a. Initiation phase: program preparation

The Initiation Phase serves as the formal authorization of the project, defining its scope and strategic direction. It's key objectives are:[1]

- Establish project vision.
- Collaborating with the PMO to review progress
- Define project authority through a formal charter.
- Align stakeholders with project objectives.

The key activities in this phase include:

- **Project sponsorship and leadership**
  - Selection of a Project Sponsor.

- **Development of the project charter**
  - A formal document that establishes the project's foundational framework. That includes Project definition, objectives, and scope and implementation methodology and high-level approach.

- **Preliminary scope and budget definition**
  - Initial outline of project deliverables, specifying inclusions and exclusions.
  - Financial projections to ensure alignment with organizational constraints.

b. Planning phase: business blueprint

The Planning Phase translates the strategic vision into actionable implementation plans, minimizing inefficiencies and ensuring stakeholder alignment. Its key objectives are:[2]

[1] Gray, Clifford F. & Larson, Erik W. (2014), *Project Management: The Managerial Process*, 6th edition, McGraw-Hill Education, New York, pp. 210-220.
[2] Kerzner, Harold (2017), *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, Wiley, New Jersey, pp. 180-190.

- Formulate comprehensive execution strategies.
- Define and validate the scope, budget, and timelines.
- Establish governance frameworks to mitigate project risks.

The key activities in this phase include:

- **Development of the project management plan**

A comprehensive document addressing:

- Implementation schedules, milestones, and deliverables.
- Documentation standards, communication strategies, and risk mitigation plans.
- Budget validation and resource allocation protocols.

- **Scope definition and documentation**
  - Creation of a WBS that delineates project phases, milestones, dependencies, and resource assignments.

- **Project scheduling**
  - Utilization of structured scheduling tools as Gantt chart to define tasks, durations, and interdependencies.

- **Governance and standardization**
  - Establishment of standardized procedures for documentation, budgeting, scope definitions, and acceptance criteria.

- **Budget validation and financial planning**

Refinement of financial estimates, categorized by:

- Internal team costs and contingency reserves.

- **Stakeholder communication and training strategies**
  - Development of stakeholder engagement frameworks.
  - Implementation of user adoption programs, incorporating workshops and knowledge transfer initiatives.

- **Data migration and technical preparations**
  - Assessment of legacy data sources and formulation of migration strategies.
  - Coordination of technical components, including Reports, Interfaces, Conversions, Enhancements, and Forms (RICEF).

- **Contracting and vendor management**
  - Identification of third-party requirements.
  - Procurement planning and establishment of service contracts.

c. Executing phase: realization and final preparation

The Executing Phase converts planning frameworks into tangible results by mobilizing resources, ensuring adherence to quality benchmarks, and facilitating adaptive change management. Its key objectives are:[1]

- **Deliverable oversight**
  - Monitoring completion of work products.
  - Validating conformance with predefined quality and project standards.
  - Ensuring comprehensive documentation to maintain compliance.

- **Change management framework**
  - Reviewing and Implementing Change Requests
  - Structured evaluation of modification requests, including business justification and impact assessments.
  - Integration of change reviews within periodic status meetings.
  - Ensuring formal approval and documentation of all adjustments.

[1] Camm, J. (2020), *SAP S/4HANA Migration: A Comprehensive Guide to Transitioning to the New ERP*, Springer, New York, pp. 231-240.

- **Risk and issue management**
  - Identification and resolution of emerging issues before escalation.
  - Continuous evaluation of risk parameters, integrating real-time adjustments.

- **Performance monitoring and reporting**
  - Evaluation of delays, budget variances, and critical path deviations.
  - Comparative analysis between actual outcomes and project baselines.
  - Documentation of schedule adherence, resource utilization, and budgetary compliance.

- **Stakeholder and communication management**
  - Ensuring alignment of project deliverables with stakeholder expectations.
  - Polling mechanisms to refine communication effectiveness.
  - Utilization of varied communication channels as dashboards, reports, briefings.
  - Addressing multilingual considerations for diverse stakeholder groups.
  - Implementation of corrective measures to ensure project alignment

d. Closure phase: project finalization

The Closure Phase formalizes project completion, ensuring deliverables are officially recognized, financial settlements are concluded, and contractual obligations are resolved.its key activities are: [1]

- **Administrative project closure**
  - Comprehensive documentation of the final project state.
  - Formal acceptance of all deliverables by key stakeholders.
  - Execution of stakeholder and customer satisfaction assessments.
  - Knowledge preservation through lessons-learned documentation.
  - Official release of project team members.

[1] Wessel, M. (2019), *SAP S/4HANA: An Introduction*, SAP Press, Heidelberg, pp. 102-112.

- **Formal client approval**
  - Acquisition of written confirmation from the client regarding project completion.
  - Recognition of official project closure to facilitate organizational handover.

3.4 Managing SAP S/4HANA implementation challenges

SAP S/4HANA is a next-generation ERP system designed to enhance business operations with real-time data processing and automation. It supports key processes such as finance, supply chain, and customer relations, improving efficiency and decision-making. Successful implementation requires a blend of technical expertise and essential soft skills, including:

- Problem-solving
- Motivation
- Leadership
- Conflict management
- Communication

However, the team will still encounter numerous challenges due to the complexity of SAP S/4HANA project management, including:[1]

- **Customization complexity** Adapting SAP S/4HANA to unique business needs demands deep workflow expertise.
- **Business alignment & analytics** Ensuring that reporting mechanisms support strategic goals requires careful calibration.
- **Operational misalignment** Streamlining business functions while aligning with corporate strategies poses difficulties.
- **Change & adoption management** Resistance, lack of training, and miscommunication can delay implementation success.
- **Downtime & risk mitigation** Balancing speed and accuracy is essential to prevent costly disruptions.

[1] Kerzner, Harold (2017), *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, Wiley, New Jersey, pp. 320-330.

- **Specialized training** Employees need tailored instruction to ensure effective system adoption.
- **Comprehensive documentation** Poor record-keeping leads to inefficiencies, errors, and compliance risks.

Managing SAP S/4HANA projects requires both technical execution and strategic leadership to overcome challenges and ensure successful deployment.

Conclusion:

The implementation of SAP S/4HANA is a highly complex and transformative process. It goes beyond just software installation, it impacts the entire organizational structure, requiring significant adaptation, coordination, and change management. For this reason, a well-structured, competent, and cross-functional team is essential. Success hinges not only on technical skills but also on strategic planning, clear communication, and meticulous management of both people and processes.

Chapter Two: The case study and research methodology

Chapter Two: The case Study and Research Methodology.

Section 1: Company Overview and Strategic Context for SAP S/4HANA Implementation projects at PwC

To fully grasp PwC's approach to managing multiple SAP S/4HANA implementation projects simultaneously, it is crucial to first understand the firm's organizational foundation.

This section provides an overview of PwC's global operations, history, services, and its strategic collaboration with SAP. It further highlights the firm's presence in Algeria, detailing its consulting capabilities and specific expertise in managing SAP S4/HANA implementation. By presenting this background, we create a solid foundation for understanding PwC's project management practices in the context of large-scale ERP implementations.

1.1 Company profile

In this part, we introduce the company involved in the case study, detailing its background, sector, and market orientation. Going to begin with PwC. We are introducing PwC, who is the consulting firm assisting with the S/4HANA implementation.

1.1.1 PwC international

PwC, one of the Big Four audit and consultancy firms alongside Deloitte, Ernst & Young, and KPMG, is a major British organization. It provides industry-focused services in assurance, tax, HR, transactions, performance improvement, and crisis management, supporting businesses, governments, and non-profits worldwide.

In figure 20 below, you will find more details about the significant figures in PwC:

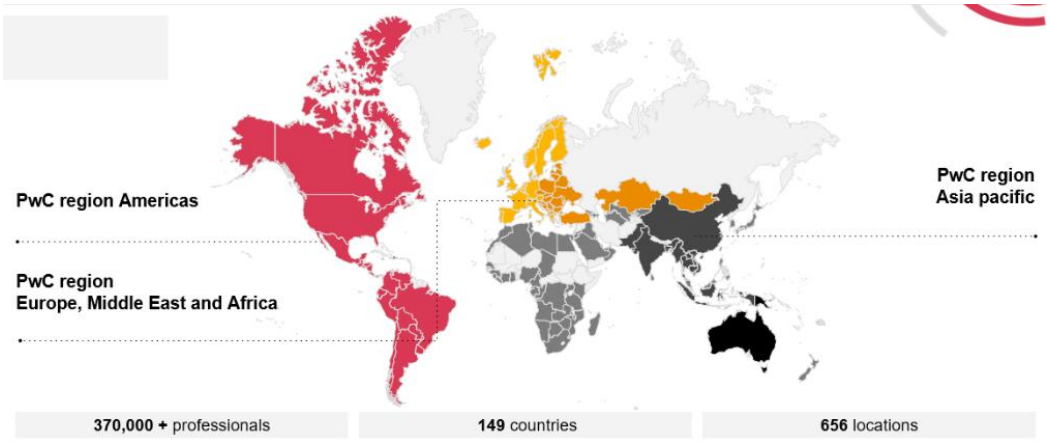
Figure 20: PwC 2024 figures

Source*:* Companies internal documents

a. PwC offices around the world

PwC operates extensively across the United States, Canada, Mexico, Central and South America, and the Caribbean as mentioned on the figure 21 bellow:

Figure 21: PwC offices around the world



Source*:* PwC internal documents

b. Abbreviation and logo

- **Full name: P**rice**w**aterhouse**C**oopers.
- **Logo:** The official symbol features the letters "PwC" in black, accompanied by a dynamic, multi-shaded square that symbolizes innovation, collaboration, and multidimensional thinking as demonstrated in the following figure 22:

Figure 22: PwC logo

Source*:* *https://www.pwc.com/us/en/about-us/pwc-corporate-history.html*, Retrieved 22 April 2025 at 12:00AM

- **Brand philosophy** PwC blends a legacy of reliability with a forward-looking commitment to modernity and digital transformation.

c. History of the firm[1]

PwC was formed in 1998 following the merger of two distinguished firms: Price Waterhouse, established in London in 1849, and Coopers & Lybrand, founded in 1854.

This union created a leading force in audit, assurance, tax, legal, and consulting services, recognized for its commitment to precision, innovation, and integrity. Today, PwC has a presence in over 150 countries, employing more than 328,000 professionals as of 2024, with its global headquarters based in London, UK.

Below are some key milestones in the history of both firms:

- **1849** Samuel Lowell Price is set up in business in London.

[1] History,*https://www.pwc.com/us/en/about-us/pwc-corporate-history.html*, Retrieved 22 April 2025 at 12:00AM

- **1854** William Cooper establishes his own practice in London, which seven years later becomes Cooper Brothers.
- **1865** Price, Holyland and Waterhouse join forces in partnership.
- **1874** Partners change name to Price, Waterhouse & Co.1898 - Robert H. Montgomery, William M. Lybrand, Adam A. Ross Jr. and his brother T. Edward Ross form Lybrand, Ross Brothers and Montgomery.
- **1957** Cooper Brothers & Co (UK), McDonald, Currie and Co (Canada) and Lybrand, Ross Bros & Montgomery (US) merge to form Coopers & Lybrand.
- **1982** Price Waterhouse World Firm forms.
- **1990** Coopers & Lybrand merges with Deloitte Haskins & Sells in a number of countries around the world.
- **1998** Price Waterhouse and Coopers & Lybrand merge to create PricewaterhouseCoopers.
- **2002** PricewaterhouseCoopers' partners approve sale of PricewaterhouseCoopers Consulting to IBM.
- **2004** PricewaterhouseCoopers implements the Connected Thinking methodology.
- **2010** PricewaterhouseCoopers formally shortens its brand name to PwC but legally remains PricewaterhouseCoopers.
- In April **2014**, PwC merged with international consulting firm Booz & Company.

d. PwC global services and offerings

PwC delivers expertise across five core domains that are mentioned on the figure 23 below:

Figure 23: PwC global services and offerings

Source Mohamed Kande (2024) *Global Annual Review*, pwc.com/annualreview, *Retrieved 19th May 2025 at 02:00PM*

- **Assurance audit and risk management** PwC checks financial records to make sure they're correct and helps businesses manage risks.
- **Advisory and consulting; strategy, management, and technology** PwC helps businesses create plans, improve management, and use technology like SAP and ERP systems to improve operations.
- **Tax and legal services** PwC helps businesses with taxes, making sure they follow the law, and gives legal advice on contracts and business issues.
- **Deals & transaction advisory** PwC guides businesses through buying, selling, or restructuring companies to help them make the best decisions.

e. PwC and SAP

PwC and SAP have built a robust global partnership, collaborating to deliver transformational solutions across industries. Their combined expertise drives business innovation through strategic initiatives, industry-specific solutions, and talent acquisition.

PwC has been recognized for its outstanding contributions to SAP implementations:

- 2019 Pinnacle Award for S/4HANA Public Cloud and SuccessFactors (SF)
- PwC IP for BXT digital client co-creation events and agile methodology

- S/4HANA P3 global industry templates, Leonardo industry solutions, business insights, and analytical tools
- Expansion to SAP business areas, including tax, insurance, financial efficiency, and transactions

PwC continues to enhance its SAP expertise by:

- Recruiting top talent from leading universities
- Expanding its direct intake team with professionals experienced in product and industry domains
- Being a member of the S/4HANA Product Advisory Board

PwC has been recognized for SAP implementation success across various regions:

- PwC India SAP ACE Award for Best Service Providers
- PwC Russia Gold Star Award for Best Implementation in CIS
- PwC Azerbaijan & India SAP Quality Award for Large Enterprises
- PwC Japan Multiple SAP Award of Excellence, including Project of the Year

PwC has earned SAP Special Expertise Partner status across multiple fields:

- Supply chain & GRC (PwC US, 2014/2013)
- Public sector, Health, and Education (PwC Spain, 2008-2011)
- Distribution (PwC Spain, 2008-2011)

PwC is positioned as a Leader in SAP Implementation Services, according to leading analysts:

- Gartner's FY15 Magic Quadrant for SAP Implementation Providers
- IDC's FY16 MarketScape Worldwide SAP Implementation Ecosystem Vendor Assessment

PwC maintains a strong global presence in SAP consulting:

- 9,200 SAP consultants across 53 countries
- 5,000 trained experts specializing in S/4HANA
- Ranked 5th globally and 1st in S/4HANA partnerships
- $125M impact from SAP software licenses
- 334 completed S/4HANA projects

1.1.2 PwC Algeria

PwC Algeria, established in 2008 as EURL PwC Algeria, has strengthened its presence in the Mediterranean region as part of the PwC France et Maghreb network. With over 120 professionals based in its Algiers office, the firm leverages its proximity to clients to provide comprehensive advisory services and a deep understanding of economic dynamics.

Drawing from extensive experience with both local businesses and international firms operating in Algeria, PwC has developed significant expertise in the country's legal, tax, economic, and financial landscape. The firm operates through two legal entities:

- **PricewaterhouseCoopers Algeria**
- **PASA Audit Services Algeria**

Both entities collaborate closely with PwC member firms across the PwC International network, particularly PwC France and Maghreb, ensuring clients benefit from extensive technical and industry-specific expertise.

With a presence in Algeria for more than 15 years, PwC has established itself as a trusted advisor in financial auditing, regulatory compliance, tax optimization, and increasingly, digital transformation.

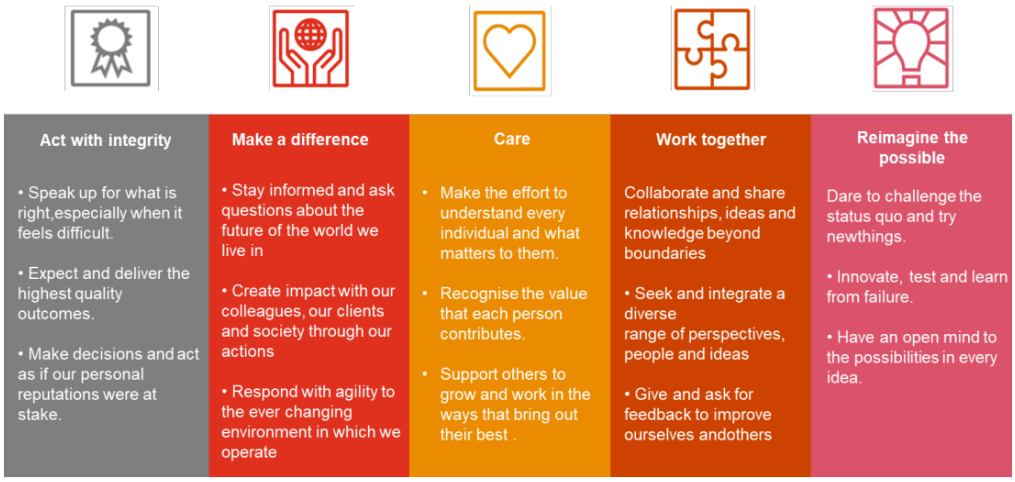
The firm actively supports Algeria's economic growth across various industries, including agrifood, manufacturing, pharmaceuticals, financial services, oil & gas, steel, and metallurgy. Additionally, as a member of the PwC Africa and Francophone Network, PwC Algeria harnesses shared resources, regional expertise, and international collaboration to enhance its service offerings.

a. Value of PwC Algeria

PwC's strategic ambition reflects its global mission: "Build trust in society and solve important problems." This vision is designed to help stakeholders adapt to significant transformations in business models and society.

The firm's global values, illustrated in Figure 24 f orm the foundation of its mission. These core principles include integrity, the drive to make a difference, empathy, teamwork, and the ability to reinvent the possible. They shape PwC's approach, guiding its efforts to support businesses in overcoming current challenges and preparing for the future

Figure 24: PwC Algeria values



Source *PwC internal documents*

b. Business areas of PwC Algeria

PwC provides audit and consulting services in strategy, management, transactions, legal, and tax to a broad clientele, from small businesses to multinational corporations, across both public and private sectors in Algeria and internationally.

PwC Algeria's key areas of involvement include:

- **Insurance** statutory audit and risk management consulting.
- **Consulting** advice on strategy, management, and operational solutions.
- **Deals** assisting companies with acquisitions, disposals and restructuring projects.
- **TLS** A multidisciplinary law firm specializing in tax, business, and labor law, and combining its expertise with other PwC businesses where appropriate.
- **Internal functions** supporting partners and associates in their day-to-day tasks.

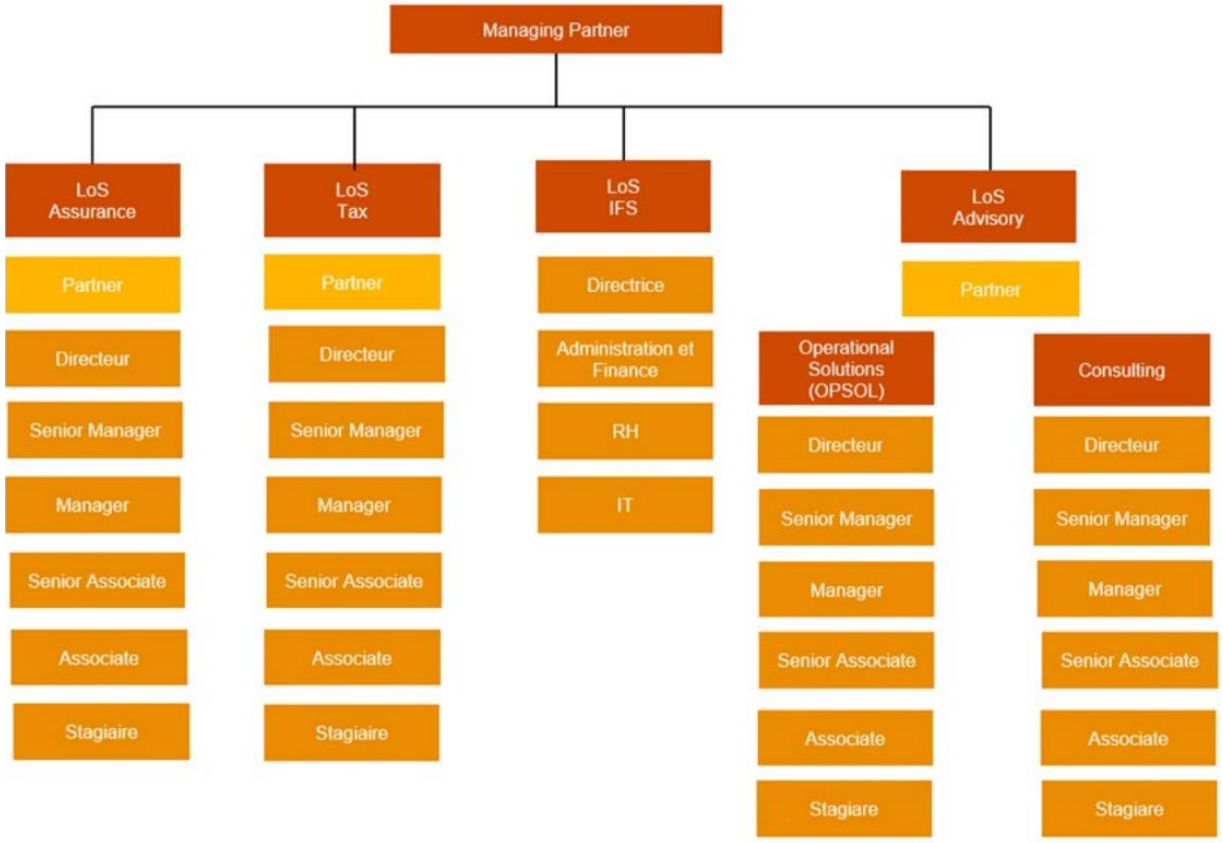
c. PwC Algeria key figures

- 100+ employees in Algeria
- Headquarters in Algiers
- Strategic partnerships with both private and public sectors
- Expertise in audit, consulting, legal, and tax services
- Part of PwC France and Maghreb, with access to a global network

d. PwC Algeria organizational structure

PwC's structure is characterized by a degree of autonomy granted to each team, while encouraging strong cooperation and an exchange of expertise on assignments that are generally multidisciplinary. This structure is shown in figure 25 below:

Figure 25: PwC Algeria organization chart.



Source PwC internal documents

The organization chart shows that PwC Algeria's structure is made up of two parts:

- **Operational side** Brings together the various departments that provide the services mentioned earlier.
- **Administrative (Support) section** Covers the various support functions required to run the firm, such as HR, Accounting, IT, etc.

e. PwC Algeria consulting department

PwC Algeria offers comprehensive consulting services across various domains, helping businesses enhance their strategies, operations, and technology adoption.

- **Technology** Advising on emerging applications and technologies, Cloud and connectivity, providing support to Chief Information Officers (CIOs), managing ERP systems, data, and analytics, as well as cybersecurity and Salesforce.
- **Strategy** Providing support to senior management in matters of growth, competitiveness, and innovation.
- **Finance** Developing financial strategies, optimizing operations, managing cash flow, and improving overall corporate performance.
- **People and organizations** People-based organization, change management, HR performance and transformation, restriction, and social management.
- **Operations** Managing purchasing and procurement, optimizing the supply chain, and promoting operational excellence.
- **Financial institutions** Offering specific consulting services to financial institutions.

PwC's consulting teams use globally shared sectors and business knowledge bases, as well as common methodologies and working tools, to offer suitable support to client companies. In close collaboration with the management consulting teams of the PwC network, as well as with other local expertise (audit, tax, and legal), PwC consultants provide their expertise to help companies:

- Sustainably improve their performance
- Manage their digital transformation projects
- Strengthen their risk management

1.1.3 PwC Algeria consulting technology department

PwC Algeria's Consulting Technology Department where we're currently interning as "Junior Consultant Trainee" for our final year project plays a crucial role in supporting businesses with digital transformation, including SAP S/4HANA implementation. Here are some key aspects of their expertise:

- **ERP and digital transformation** PwC Algeria help companies implement ERP solutions as SAP S/4HANA, ensuring seamless integration and optimization of business processes.
- S**trategic partnerships** Collaborates with major technology providers like SAP, Microsoft, Oracle, and Salesforce to deliver cutting-edge solutions.
- C**ybersecurity & risk management** Provides cybersecurity consulting to protect businesses from digital threats and ensure compliance with regulations.
- **Cloud & AI integration** Supports cloud migration, AI-driven analytics, and automation to enhance operational efficiency.
- **Industry-specific solutions** Tailors technology strategies for sectors such as finance, manufacturing, energy, and public services.

➢ **PwC Algeria consulting technology department and SAP**

PwC Algeria's SAP practice is experiencing significant growth, driven by digital transformation initiatives across various sectors.

- A team of +20 functional SAP consultants, specializing in key modules such as FI, CO, MM, SD, PM, and PS.
- Successful implementation of large-scale digitalization projects for the public and private sector.
- An expanding client base across industries like energy, utilities, manufacturing, and banking.
- Strategic collaborations with leading SAP integrators to enhance technical expertise.

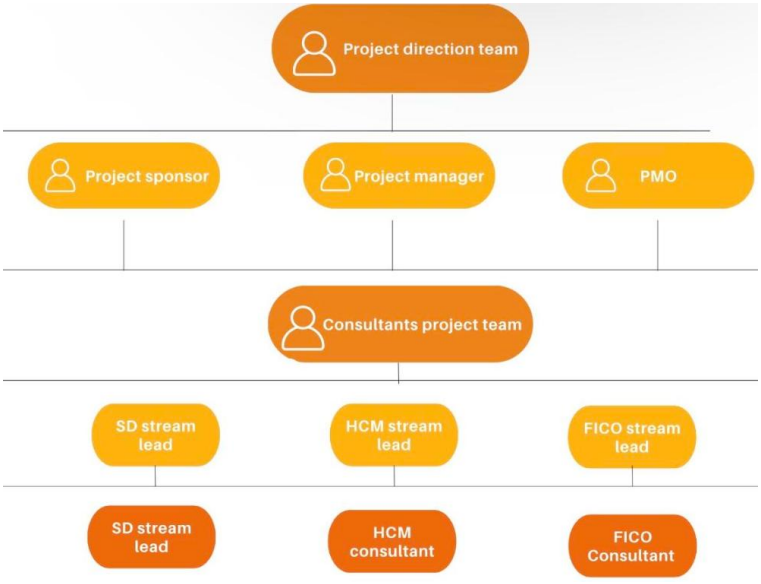
1.2 Organizational structure for managing SAP S4/HANA implementation projects within PwC

PwC's capability to manage SAP S/4HANA projects comes from an organizational structure that is flexible enough to meet client's specific needs. This structure is designed to keep projects running smoothly, whether the client is implementing a full SAP S/4HANA system or just a part of it.

1.2.1 SAP S4/AHANA project team structure at PwC

For each project, PwC assembles a team with well-defined roles tailored to the project's scope, as shown in the example, demonstrates how the structure is organized in Figure 26 below. This figure is provided as an example to illustrate the structure.

Figure 26: Illustrative example of PwC's project team structure



Source: Done by us based on internal informations

- **Project sponsor** A senior executive who ensures the project aligns with the client's objectives and and leads high-level negotiations and approvals.
- **Project manager** Responsible for day-to-day management, ensuring the project stays on schedule while maintaining strong client relationships.
- **PMO** Oversees the project to ensure it follows the SAP Activate methodology, monitors progress and facilitates communication.

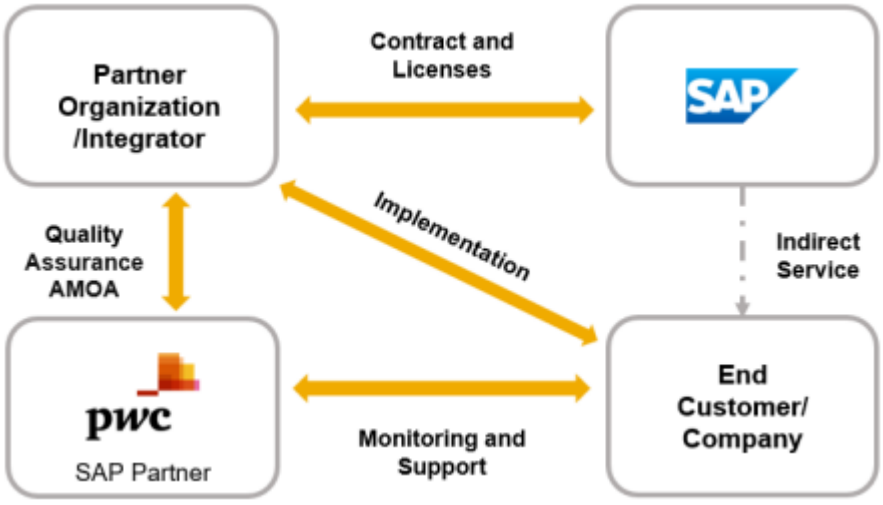
- **Functional consultants** Specialists who provide expertise to guide and train the client's team, assist with system setup, and offer ongoing support.
- **Stream lead** An experienced consultant who leads a functional stream, assigns tasks, and provides technical and functional guidance. While PwC's stream leads are experienced in technical/functional aspects, complex configuration tasks are managed by the external integrator.
- **Associates/Junior consultants** Assist with tasks like documentation and testing.

1.2.2 PwC and the integrator

PwC collaborates with an external integrator who is responsible for the configuration and technical aspects of the implementation. This complements the technical/ functional expertise of PwC's teams.

The figure 27 below explains the collaboration framework between PwC integrator and the client:

Figure 27: Collaboration framework between PwC and integrators in SAP S/4HANA implementation



Source : GHEZAL Amina (2024*), Monitoring the implementation and management of the Enterprise Resource Planning SAP S/4HANA within a large company.:* SAP S4/HANA project implementation background, Higher school of management and digital economy pp. 74.

1.3 Operational practices in SAP S4/HANA implementation project delivery

Successful SAP S/4HANA implementation projects require strong operational practices that ensure that the project is delivered on time, meets business objectives, and enables a smooth transition to the new system. The following outlines the key operational practices commonly applied during SAP S/4HANA implementation projects:

1.3.1 Collaboration and coordination in managing projects

The PMO makes sure that all projects are well-coordinated. Key tasks include:

- **Tracking progress,** The PMO watches over the project timelines and resources to make sure everything is on track.
- **On-time delivery** The PMO makes sure that projects meet deadlines and stay within scope.
- **Facilitating communication,** The PMO keeps communication clear between project managers, consultants, and clients.
- **Identifying issues** The PMO spots potential problems early and makes changes to keep projects on track.

1.3.2 Client communication and stakeholder governance

PwC's communication with clients is key to successful projects. The Project Sponsor, Project Manager, and PMO handle this by:

- **Evaluating new projects** The Project Sponsor and Manager work with clients to define the scope of new projects.
- **Leading kickoff meetings** These meetings set expectations and help align everyone on the project goals.
- **Relaying critical information** The Project Sponsor and Manager ensure important updates and decisions are shared with all stakeholders.

Consultants also work directly with clients to gather information, test solutions, and provide training.

1.3.3 Change management program

Managing change is important when adopting a new system like SAP S/4HANA. PwC makes sure that client's employees are prepared and engaged through:

- **Open communication** Keeping client's employees informed about the changes and how they will benefit the business.
- **Training programs** Offering training to ensure client's employees can use the new system effectively and smoothly.

1.3.4 Operational and technical factors

PwC addresses important factors to ensure the success of the implementation, including:

- **Team composition** PwC makes sure the implementation team has the right mix of business, technical, and change management experts.
- **Dedicated IT team** After the system goes live, a dedicated IT team provides ongoing support.
- **Software testing** PwC conducts rigorous testing to ensure the system works properly before launch.
- **Vendor support** PwC works with integrators to provide continuous support.

1.3.5 Project deliverables

PwC ensures that everything about the SAP S/4HANA implementation is well-documented. This makes it easier to track progress and use the information for future projects or upgrades.

These deliverables serve to align stakeholders, formalize project milestones, and provide the necessary infrastructure for smooth business transformation the deliverables include:

a. Documentation

Comprehensive project documentation ensures clear scope definition, structured processes, accountability, and seamless execution, supporting a successful SAP S/4HANA implementation as:

- **Project charter** Defines the project's scope, objectives, stakeholders, timelines, and success criteria.
- **Business blueprint** Documents detailed business processes and maps them to SAP S/4HANA functionalities.
- **RACI matrix** Establishes roles and responsibilities across all project activities.
- **Scoping documents** Outline the functional scope, modules, and customizations included in the project.
- **Data import templates** Standardized formats for collecting legacy data for migration into SAP S/4HANA.
- **Phase closure reports** Summarize phase completion, including approvals and lessons learned.
- **Data validation reports** Verify data accuracy and completeness post-migration.
- **Training materials** User guides, manuals, e-learning modules, and workshops tailored for end users.
- **Go-Live checklists and cutover plans** Provide detailed task lists and schedules to guide the system transition.
- **Post-production review and post-closure reports** Formal assessments and final project documentation.

b. System and technical deliverables

The System and Technical Deliverables ensure a seamless SAP S/4HANA implementation, integrating core functionalities, custom enhancements, data migration, and testing to optimize enterprise operations as:

- **SAP S/4HANA system** A fully configured and customized ERP platform, deployed on the client's infrastructure or cloud.
- **Custom developments and extensions** Enhancements tailored to specific client requirements within SAP S/4HANA.
- **Data migration** Seamless transfer of legacy data into the new SAP environment, ensuring integrity and usability.

- **System integration** Interfaces and connections with other enterprise systems and third-party applications.
- **Testing deliverables** Test scripts, test cases, and defect logs from unit, integration, user acceptance, and performance testing phases.

c. Support and Post Go-live services

A structured support and post-go-live service kit ensures system stability, ongoing maintenance, performance optimization, and continuous improvements for long-term success as in:

- **Go-Live support** A dedicated hyper care period during which PwC Algeria provides intensified issue resolution and system stabilization assistance.
- **Post-Go-Live support contracts** Ongoing support agreements covering system maintenance, upgrades, and user assistance.
- **Performance monitoring and optimization** Tools and reports designed to track system performance and recommend improvements.
- **Continuous improvement plans** Strategic recommendations for future enhancements and process optimizations, based on user feedback and system usage.

Conclusion

This section has provided a comprehensive overview of PwC's global presence, historical evolution, and strategic positioning, with a particular focus on its consulting services and expertise in SAP S/4HANA implementations. By examining both the international organization and the specific structure and operations of PwC Algeria, we have highlighted the firm's capabilities in managing large-scale digital transformation projects.

Understanding PwC's organizational foundation, service offerings, and its collaboration with SAP sets the groundwork for analyzing the firm's approach to managing multiple SAP S/4HANA projects simultaneously. It also offers critical context for assessing the operational practices, project governance structures, and challenges that emerge in multi-project environments insights that will be explored further in the following sections of this case study through our various research methodologies.

Section 2: Methodological approach of the research

In this section, we present the methodology of our research, explain the motivation behind choosing the topic, and describe the steps taken to reach our results. We outline the framework and data analysis for studying the simultaneous management of multiple SAP S/4HANA implementation projects. This foundation allows us to explore the challenges and strategies involved in managing these complex projects.

Using an analytical and exploratory approach, we aim to comprehend the internal management processes of multiple SAP S/4HANA projects concurrently. Internal observations, documentation reviews, and qualitative interviews served as our primary data collection methods. These methods provided the insights necessary to understand the challenges, strategies, and best practices applied in managing several projects at once.

2.1 The choice of subject

In today's fast-changing world, digital transformation has become a strategic priority for most organizations. Businesses across all sectors are adopting IT solutions to improve efficiency, performance, and competitiveness. At the heart of this transformation are ERP systems, which integrate key functions such as finance, supply chain, and human resources into a unified platform.

As e-business students, we wanted to explore a topic that connects technology with real-world business challenges, specifically in the project management aspect of ERP implementation. Our focus was on understanding how these complex projects are delivered and coordinated, particularly when consulting firms manage multiple ERP projects for different clients simultaneously.

This led us to examine the simultaneous management of multiple SAP S/4HANA implementation projects. SAP S/4HANA is one of the most advanced and costly ERP systems. Its implementation impacts nearly every area of a business, and even small errors can result in significant financial or operational consequences. Managing one such project is challenging, and managing different industries and clients introduces even more complexity and risk.

In reviewing existing research, we found a significant gap. While there are studies on project management, multi-project management, simultaneous project management, ERP systems, and SAP S/4HANA, few address the simultaneous management of multiple SAP S/4HANA projects.Most studies on SAP S/4HANA focus on the client's perspective, neglecting the consulting firms that implement these systems.

This gap motivated us to study the simultaneous management of multiple SAP S/4HANA implementation projects. Our research aims to understand how consulting firms manage the complexity of running several projects at once, including the strategies they use, the tools they rely on, and the risks they face.

Our goal is to provide a deeper understanding of how large-scale ERP solutions, particularly SAP S/4HANA, are successfully delivered in parallel, and to identify the skills and strategies required to succeed in this demanding field. To achieve this, our research focuses on three main objectives:

- Understanding how consulting firms, specifically PwC, manage multiple SAP S/4HANA implementation projects simultaneously.
- Identifying the main challenges and risks associated with managing multiple concurrent projects.
- Exploring the strategies and best practices consulting firms employ to effectively navigate multi-project environments.

2.2. Internship context

Our research was made possible thanks to our internship at PwC Algeria which is widely recognized for its role in supporting clients with the implementation of SAP S/4HANA through its Technology consulting department.

We chose PwC for our study not only because of its expertise in SAP S/4HANA implementation but also because of the unique opportunity to see how the company manages multiple projects at the same time.

Instead of focusing on the client side such as how they manage data migration or internal change, we wanted to observe the back end: how PwC, as the consulting partner, organizes its internal resources, teams, and processes to manage several ERP projects simultaneously.

This point of view is rarely discussed in existing research, but it is crucial. The client often has no prior experience with SAP S/4HANA and relies completely on the consulting company.

Therefore, the consulting firm becomes responsible for planning and managing the entire implementation. That's why organization, coordination, and excellent project management are essential especially when handling multiple projects simultaneously.

2.3 The methodology of research

The methodology chosen for this research is qualitative. Since our aim is to understand the internal processes and challenges related to managing several SAP S/4HANA projects at once, a qualitative approach allows for in-depth exploration and interpretation of real-life practices.

This method is suitable for complex and dynamic environments like ERP project implementation and enables us to gather insights through observation and interaction with professionals directly involved in these projects.

2.4 Data collection tools and methods

In this subsection, we describe the data collection tools used in the study. The qualitative approach is based on these main instruments:

2.4.1 Documents analysis

This tool was highly valuable in our research. We consulted academic articles, specialized books on SAP and project management (such as the *PMBOK Guide* by the Project Management Institute), and internal company documents found on SharePoint, as well as databases used by PwC. Additionally, we accessed online platforms like Google Scholar, which provided a wide range of literature and resources, contributing to the depth of our analysis.

This comprehensive approach allowed us to build a solid theoretical foundation by combining academic research with practical insights. We also made extensive use of the PwC archive and

internal databases, which offered valuable materials and documents that enriched our research, providing different perspectives and strengthening our conclusions.

By examining internal documents such as project reports and correspondence, we gained deeper insights into real-world practices and strategies. This was crucial for identifying the gaps between theoretical knowledge and actual implementation, particularly in the context of managing multiple SAP S/4HANA projects simultaneously. These documents also helped us understand the technical and managerial aspects of the implementation process, which were essential for our study.

2.4.2 Direct observation

In addition to the interviews, direct observations were conducted in the workplaces. This method allows us to capture data on natural interactions and behaviors within their real context, providing an additional layer of validity and depth to the qualitative analysis.

Observations helped verify the statements made in interviews and observe aspects of the implementation process that may not have been explicitly discussed during the interviews.

2.4.3 Interviews

Interviews are a core qualitative research method that allows the researcher to explore participants' attitudes, beliefs, experiences, perspectives, and behaviors in relation to a specific issue. The main goal of research interviews is to collect in-depth informations about the participants' views, lived experiences, and understanding of the subject matter. Interviews can be structured, semi-structured, or unstructured, with the format chosen depending on the research approach[1]. For our research, we opted for:

a. Semi structured interviews

For our research, we chose semi-structured interviews to gather insights from SAP consultants and PMO members involved in SAP S/4HANA implementations. The objectives of the interviews were to:

[1] Liamputtong, Pranee, (2019), Handbook of Research Methods in Health Social Sciences, School of Science and Health, Western Sydney University, Penrith, NSW, Australia, Springer Nature Singapore Pte Ltd. p.391-408

- Identify experienced professionals in SAP S/4HANA implementation and management.
- Understand the challenges and strategies involved in managing multiple SAP S/4HANA projects simultaneously.
- Provide best practices for managing multiple simultaneous ERP projects.

Participants were selected based on their extensive experience in managing large-scale SAP S/4HANA projects. Each participant was involved in at least one significant implementation project. Their expertise provided valuable insights into the real-world dynamics of managing multiple SAP S/4HANA projects simultaneously.

b. The interview guide

The interview guide is a document used during interviews to structure the discussion between the researcher and the participant. It typically contains a list of questions or topics to be addressed, ensuring that the key points of the research are systematically covered.

To achieve this, we created a semi-structured interview guide (Appendix 1), directed to SAP consultants and PMO. The guide considers the participants' responsibilities and involvement in managing multiple SAP S4/HANA projects simultaneously.

The purpose of the interview guide was to gather data on the operational implementation of SAP S/4HANA and its management in a simultaneous project context. For PMO managers, the guide focused on understanding their role in coordinating multiple SAP implementation projects, managing timelines, resources, and teams, as well as their perception of the various phases of SAP Activate and how they ensure the smooth delivery of several projects at once.

c. Research population

For our study on the simultaneous management of multiple SAP S/4HANA implementation projects, we selected participants with direct experience and expertise in this area. This qualitative method allowed us to gather in-depth insights from individuals whose roles are critical to the governance and execution of such projects.

Our sample comprised PMO members and SAP consultants specializing in various modules. PMO members were included due to their central role in overseeing multiple projects, ensuring

alignment with strategic objectives, and managing resources across initiatives. SAP consultants were selected for their hands-on experience in implementing and configuring SAP S/4HANA modules, providing valuable perspectives on the operational challenges and methodologies employed in concurrent project environments.

The diversity in roles and expertise among the interviewees enriched our understanding of the complexities involved in managing several SAP S/4HANA implementations simultaneously. By focusing on these key stakeholders, we aimed to capture a comprehensive view of the strategies, challenges, and best practices associated with multi-project management in the context of SAP S/4HANA. The table 6 below provides a comprehensive overview of each interviewee's background:

Table 05: Characteristics of the interviewees

Respondents	Current position	Experience	SAP S4/HANA Occupation	Date of interviews
A.G	Junior consultant	1 year	HCM Consultant	14/05/2025
A.K	Stream lead	5 years	HCM,FI ; CO Consultant	14/05/2025
S.M	Stream lead	4 years	PS,SD Consultant	14/05/2025
M.S	Junior consultant	6 months	EAM,SD Consultant	14/05/2025
M.B	Stream lead	5 years	FI; CO; PS Consultant	14/05/2025
A.K	Senior Associate	2 years	FI CO ; HCM Consultant	14/05/2025
S.F	Junior consultant	1 year	EAM, PS Consultant	14/05/2025
F.K	Junior consultant	1 year and 6 months	MM Consultant	14/05/2025

B.B	Senior Consultant	3 years	FI ;CO Consultant	14/05/2025
R.S	Stream lead	7 years	MM Consultant	14/05/2025
K.A	Junior consultant	3 years	FI ;CO	14/05/2025
R.G	Stream lead	5 years	MM, SD Consultant	14/05/2025
C.H	PMO	1 year	Project management officer	
S.A	PMO	2,5 years	Project management officer	14/05/2025

Source: Established by ourselves using the Results of interviews

2.5 Methods and analysis tools:

Methods and analysis tools are crucial in any research process, enabling the processing, interpretation, and structuring of data. A method refers to the systematic approach used to examine data and extract meaningful patterns, while an analysis tool facilitates the application of this method for data collection, organization, or interpretation.

For this study, we combined qualitative methods and specific analysis tools tailored to our topic.

a. Methods

We used qualitative content analysis as the main method to process data. This approach involves interpreting, categorizing, and synthesizing verbal data from semi-structured interviews and relevant documents, ensuring an objective reading of participants' statements.

Specifically, we employed thematic content analysis, which organizes and interprets responses based on predefined categories, revealing implicit meanings, representations, and declared practices.

This thematic analysis method offers a relevant framework for exploring professional practices, challenges, and representations, while considering the organizational environment of the interviewees. It also helps in formulating hypotheses and operational recommendations aligned with the issues raised during data collection.

b. Analysis tools

We used Python, specifically the Matplotlib libraries, for data visualization, ensuring reliability in the analysis. This automated process extracted trends while preserving the qualitative richness of the interviews.

We selected the most relevant responses from the interviews, cleaned, anonymized, and coded them. These codes were then used to generate quantitative visualizations, such as theme frequency, to enhance data interpretation.

Also, we presented the methods and tools used, ensuring the reliability of our results.

2.6. Ethical considerations

Ethical standards were maintained throughout the research process:

- Participants were informed of the study's purpose and voluntarily consented to participate.
- Data was anonymized to protect participant confidentiality.
- The information collected was used strictly for academic purposes, ensuring compliance with research ethics guidelines.

2.7. Limitations of the methodology

While the study provides valuable insights, it is not without limitations:

- The research focuses on a single consulting firm (PwC Algeria), limiting generalizability to other firms or industries.
- As interns within the organization, our perspective may carry inherent bias.
- The sample size, while sufficient for qualitative purposes, remains small compared to large-scale quantitative studies.

Despite these limitations, the use of data triangulation and diverse participant profiles enhances the credibility and depth of our findings.

Conclusion:

This research aims to deepen the understanding of how large-scale ERP solutions, like SAP S/4HANA, are delivered in parallel. Specifically, it seeks to examine how consulting firms manage multiple implementations simultaneously, identify key challenges and risks, and explore the strategies and best practices applied in multi-project environments.

Section 3: The results of the research.

In this section, we present the results of our data analysis, which focuses on the simultaneous management of multiple SAP S/4HANA implementation projects.

Using a deductive and exploratory approach, our goal is to understand how organizations specifically PwC successfully manage several SAP S/4HANA projects simultaneously. The primary data collection methods were qualitative, combining interviews, direct observations, and internal documentation analysis. These sources helped identify the challenges, strategies, and best practices for effective multi-project management.

3.1 Documentation and observation data presentation

Following our active participation during the internship at PwC, we closely observed and contributed to several ongoing SAP S/4HANA implementation projects. This hands-on experience allowed us to gain valuable insights into how PwC manages these projects.

The data presented below reflects our observations and internal findings, showcasing how projects are structured and executed in practice. It also highlights the key challenges PwC faces in managing concurrent implementations challenges that underline the complexity and demanding nature of simultaneous multi-project management in large-scale ERP environments.

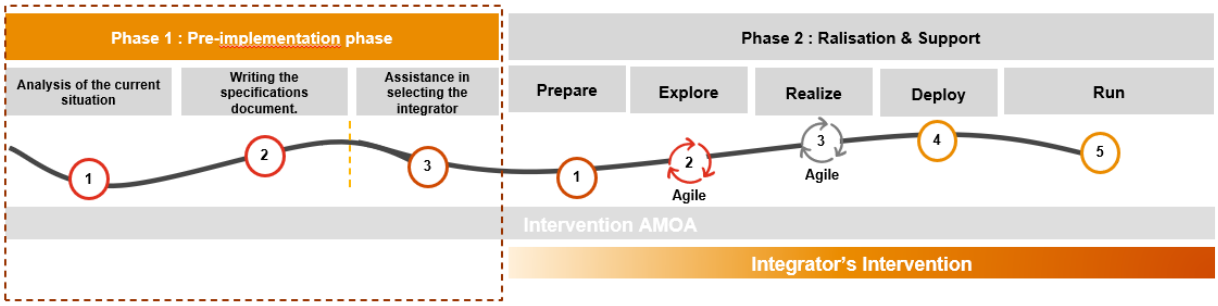
3.1.1 Managing SAP S4HANA implementation within PwC

When PwC decides to implement SAP S/4HANA, it requires:

- **The integrator** The technical partner responsible for configuring and setting up the SAP system.
- **PwC as AMOA (Assistance to Project Owner)** PwC helps manage the entire project, ensuring it aligns with business goals and supports both planning and execution. While not handling technical SAP configuration, PwC plays a key role in guiding the client, ensuring the solution meets their needs and the project runs smoothly.

Figure 28 illustrates the two main phases of the SAP S/4HANA implementation process: the Pre-implementation phase and the Realization & Support phase.:

Figure 28: Phases of SAP S/4HANA implementation project within PwC



Source*:* PwC internal documents

➢ **Pre-implementation phase (before choosing the integrator)**

This phase focuses on understanding the client's needs, laying the groundwork for the project, and preparing for the technical setup. It primarily revolves around planning and gathering requirements, with no technical work taking place during this phase.

d. Framework workshops

PwC organizes workshops with various client departments (as HR, Finance, SD…) to:

- Understand the company's current processes.
- Identify existing strengths and areas for improvement.
- Clarify the client's expectations for the new SAP system.

Each PwC consultant is responsible for gathering detailed information on current processes for their specific module.

b. Writing the specification document

After the workshops, each consultant drafts a specification document for their specific module. PwC's PMO consolidates these individual documents into a single, comprehensive specification document that:

- Clearly outlines the client's requirements.
- Helps the client select the right integrator.

c. Assisting the client in selecting the integrator

PwC supports the client throughout the integrator selection process by:

- Releasing the specification document for public tendering.
- Helping evaluate potential integrators based on cost, experience, and proposal quality. Once the integrator is chosen, the project transitions into the SAP Activate methodology.

➢ **Project execution with SAP activate methodology**

The SAP Activate methodology consists of five key phases: Prepare, Explore, Realize, Deploy, and Run. PwC provides continuous support throughout these phases to ensure the project's success.

a. Prepare Phase

In this phase, PwC helps with:

- Defining roles and responsibilities within the project.
- Creating a detailed project plan with clear milestones.
- Estimating the project budget based on resources and consultants.
- Setting up governance rules for decision-making.
- Organizing the kickoff meeting to align integrators on project goals and scope, ensuring successful preparation and planning.

This phase occurs only between the client, integrator team, project manager, sponsor, and PwC PMO.

e. Explore phase

Key activities include:

- Validating business processes in detail and understanding how they will translate into SAP.
- Collaborating with the integrator to design how SAP will meet business needs.
- Defining training needs and setting up the future organizational structure.

PwC plays a key role in change management by organizing meetings to explain the reasons for change, addressing user concerns, and building trust. This ensures employees are prepared and receptive to change, minimizing resistance.

c. Realize phase

In this phrase:

- The integrator configures SAP based on the client's needs.
- PwC assists in preparing test scenarios and guides the client through multiple rounds of testing.
- PwC delivers test scripts and training materials.

d. Deploy phase

PwC supports the client by:

- Overseeing the final data migration from legacy systems into SAP.
- Training users who will support others.

e. Run phase

After the system goes live, PwC helps with:

- Monitoring system performance and gathering user feedback.
- Providing post-go-live support to resolve any issues.
- Delivering an Operating Mode document that explains:
    - What to do if something goes wrong.
    - How to get support from super-users, IT, or PwC.

PwC's role in SAP S/4HANA project management is critical to the project's success. While PwC does not handle the technical setup, they ensure that:

- Clear goals are set, and planning is thorough.
- The client's needs are well understood and documented.
- The right integrator is chosen.

- Users are properly trained, and ongoing support is provided. With PwC's guidance, the client is well-equipped to manage their SAP S/4HANA project, ensuring the system delivers real value to their business.

3.1.2 Real life challenges in the simultaneous management of SAP S/4HANA implementation projects

The simultaneous management of multiple SAP S/4HANA implementation projects allow PwC to optimize consultant utilization and manage client expectations effectively.

However, we noticed that this approach introduces several challenges that are organizational, operational, and human nature. These challenges highlight the complexities of coordinating the various phases of the SAP Activate methodology across multiple clients, timelines, and resource availability.

a. Project phase overlap

One common problem in managing multiple projects is the overlap of different phases. In the SAP Activate methodology, PwC teams are involved at different stages of each project. For example, during the Prepare phase, only the PMO, project manager and the project sponsor are involved in client discussions. Consultants at this stage often do not have clear tasks and may be moved to other projects in later phases, like Explore or Realize.

However, the order of these phases is not always predictable. Sometimes, consultants are waiting for the integrator to be chosen for Project A, but are also helping with the Explore phase of Project B. When the integrator is selected for Project A, consultants must work on both projects at once. This creates pressure, overlapping tasks, and difficulty meeting deadlines, which leads to consultant fatigue.

b. Project delays and feedback loops

Delays, especially from integrators, can cause significant problems. PwC often must wait for integrators to start the SAP Activate methodology. If the client delays in choosing an integrator, it can delay the entire project.

For example, in one project, PwC was supposed to review proposals from different integrators to help the client select the best one. However, the client delayed posting the specification document for over a week. During this waiting period, the PwC team couldn't easily adjust their work because they were already busy with other tasks. When the documents finally arrived, they came all at once, overwhelming the consultants and causing scheduling conflicts with other projects.

c. Project extension

A real example of multi-project challenges happened during a large SAP S/4HANA project that started just before the COVID-19 pandemic. The project was supposed to take two years, but it was extended to five years because of pandemic like limited remote access and delays in client decisions.

While the extension could have been managed in normal conditions, the situation became more difficult when new projects started during the extended timeline. At one point, PwC consultants had to work on three or four projects at the same time, with overlapping workshops and meetings.

3.2 Interviews data presentation

To complement our observations, we conducted interviews with participants involved in SAP S/4HANA AMOA implementation projects to gain insights into their perspectives on the simultaneous management of multiple SAP S/4HANA projects within the company and the challenges they currently face. Data was collected through notes and recordings made during the interviews. This has enabled us to present the research findings, analyze key responses, and carry out a detailed qualitative analysis.

To deepen our understanding and complement the documentation and observation phase, we conducted interviews with two key stakeholders from the SAP implementation team:

- SAP S/4HANA Consultant with experience different modules
- Members of the PMO

Both interviewees emphasized the challenges of managing multiple projects at once, particularly in terms of setting priorities and distributing resources effectively.

The responses gathered through these interviews supported and expanded upon the insights obtained from documentation and observation. Together, they offered a well-rounded and consistent perspective on how PwC Algeria manages the simultaneous implementation of several SAP S/4HANA projects.

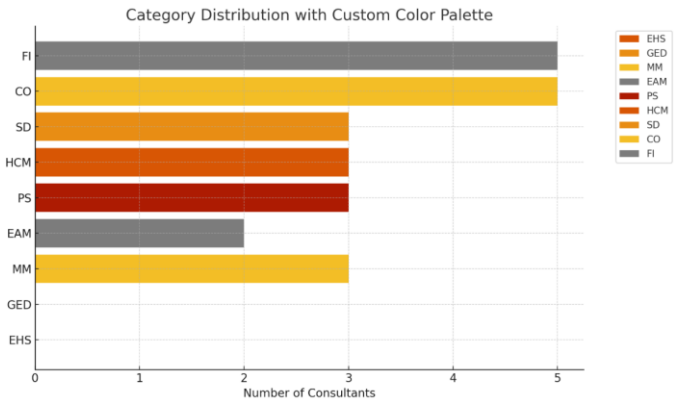
3.2.1 Consultants interviews

a. Profile of interviewees

Question 01: What is your role/specialization?

Graph 2: Distribution of consultants across SAP modules (based on conducted interviews)

Graph 01 shows how many consultants work on each SAP S/4HANA module. FI and CO have the most, with 5 consultants each, because. MM has 3 consultants. PS, HCM, and SD each have 3 consultants. EAM has 2 consultants. Which indicates how these modules are the highest in client demand and GED, EHS aren't used now but could be added if a client requests it.

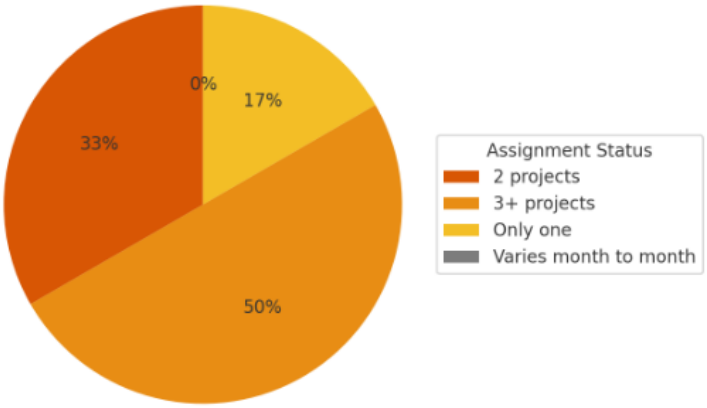


Source : Created by us using the Python library matplotlib

b. Simultaneous multiple project management expertise

Question 02: Are you currently assigned to more than one project?

Graph 3: **Current consultant's assignment to multiple projects**



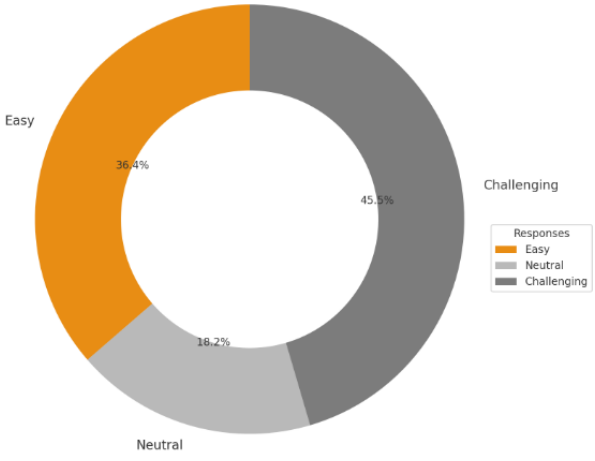
Source : Created by us using the Python library matplotlib

The chart illustrates how SAP S/4HANA consultants are distributed based on the number of projects they are currently assigned to. It shows that most consultants handle multiple projects, with 50% assigned to 3 or more, 33% to 2 projects, and only 17% working on a single project. No consultants reported a varying workload, indicating a strong trend of multi-project involvement.

Question 03: How easy or difficult is it for you to switch between different projects during the same workday or week?

Graph 4: **Difficulty in switching between multiple projects**.

This pie chart illustrates how consultants perceive the challenge of managing multiple projects simultaneously. It shows that 45.5% find it difficult, primarily stream leads and senior consultants. Conversely, 36.4% find it easy, mostly juniors handling smaller responsibilities. The remaining 18.2% feel neutral, also mainly juniors. This highlights how varying levels of experience and responsibility impact the ability to manage multiple tasks effectively.



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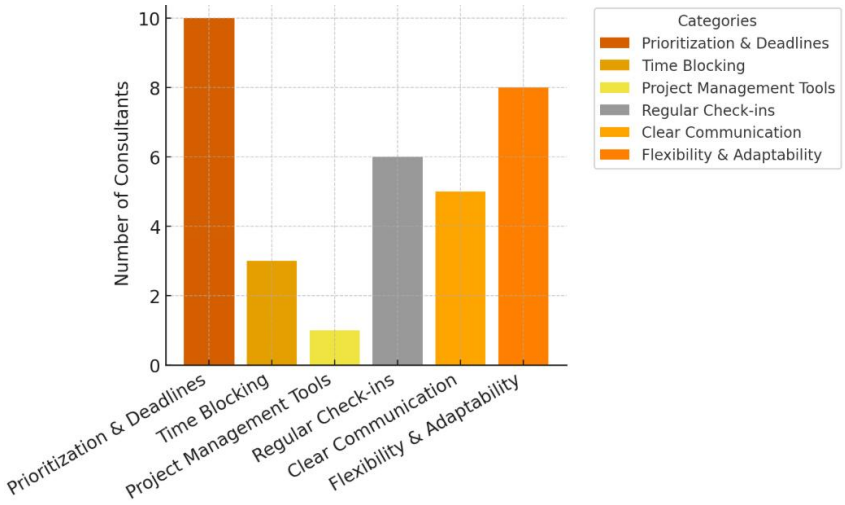
Question 04: How do you manage your time and workload across multiple projects?

Graph 5: Consultants' strategies for managing time and workload across multiple projects



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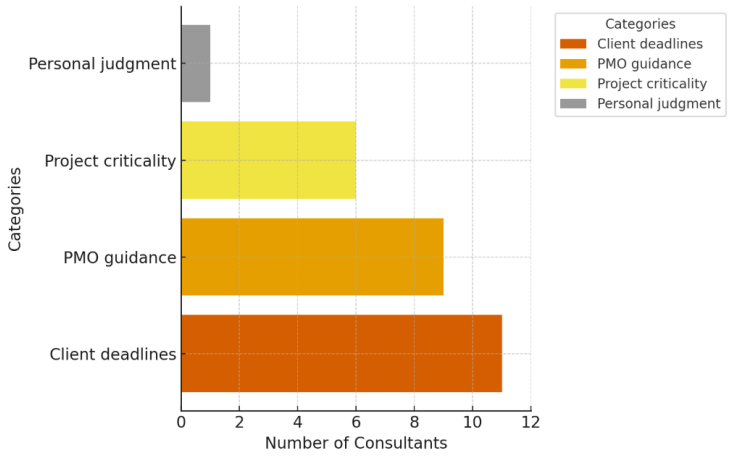
This chart shows how consultants manage their time across multiple projects. prioritization and deadlines was the most common approach, answered by 10 consultants. Flexibility and adaptability followed, answered by 8 consultants. Regular check-ins were mentioned by 6 consultants, while 5 highlighted clear communication. Time blocking was used by only 3 consultants, and just 1 consultant mentioned using a Project Management tool specifically Microsoft Project. Overall, the responses show a strong preference for flexible and communication-focused strategies over tool-based planning.

Question 05: How do you determine which tasks to prioritize when multiple urgent needs arise?

Graph 6: Consultants' task prioritization methods across multiple projects



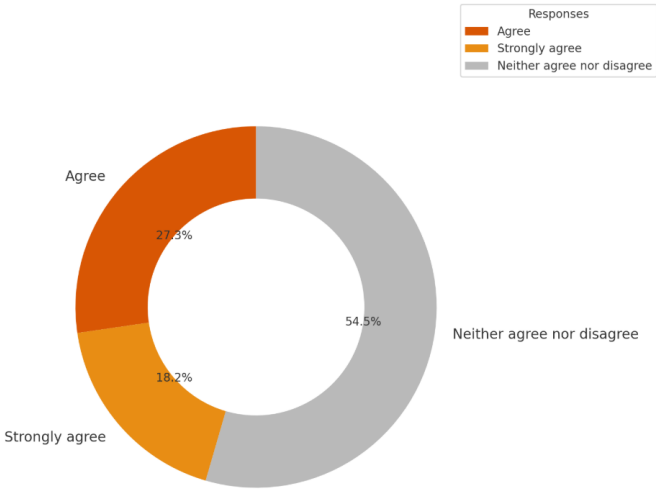
Source : Created by us using the Python library matplotlib

The graph illustrates how consultants prioritize tasks across multiple projects. The most common prioritization method is Client Deadlines, mentioned 11 times, followed by PMO Guidance, mentioned 9 times. Project Criticality was considered by 6 consultants, while only 1 consultant relies on Personal Judgment. This indicates that consultants primarily prioritize based on different factors, such as client demands and PMO guidelines, or project importance.

Question 06: Do you ever feel overwhelmed due to competing deadlines across different projects?

Graph 7: Consultants' perception of feeling overwhelmed due to competing demands and deadlines across projects

The pie chart shows how consultants perceive being overwhelmed by competing demands or deadlines across projects. 54.5% of consultants neither agree nor disagree, indicating a neutral viewpoint. 27.3% agree, with senior consultants being the most affected due to more complex tasks. 18.2% strongly agree, highlighting that experienced consultants are significantly impacted by multiple demands. This suggests that while many consultants manage deadlines well, more experienced ones may feel more pressure due to their higher responsibilities.

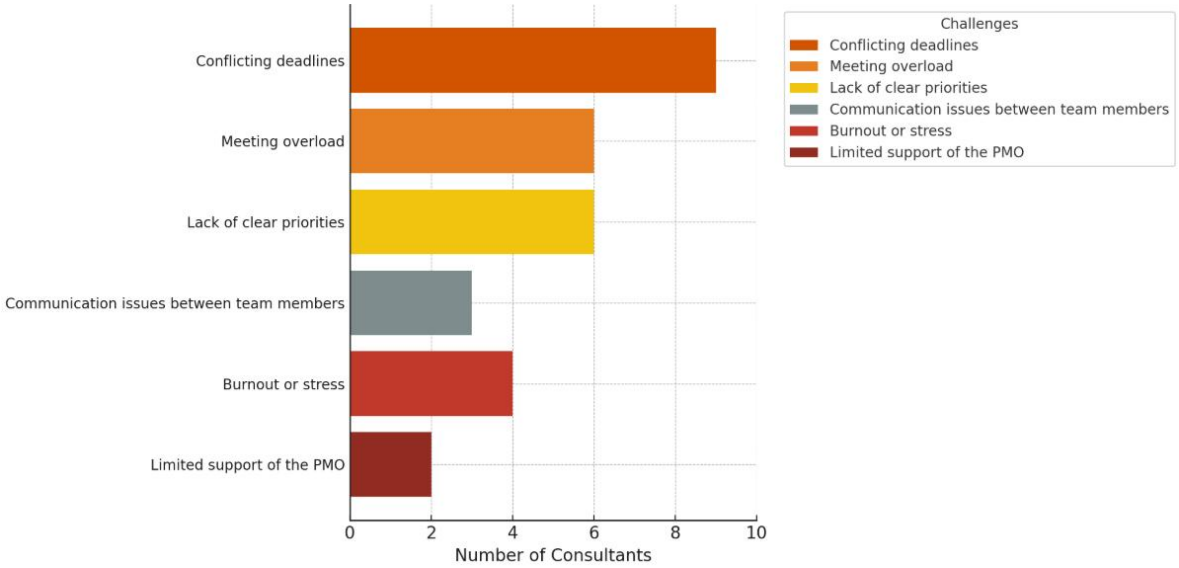


Source : Created by us using the Python library matplotlib

c. Challenges of multi-project management

Question 07: What are the top challenges you typically face when working on several projects simultaneously?

Graph 8: Top challenges faced by consultants when working on several projects



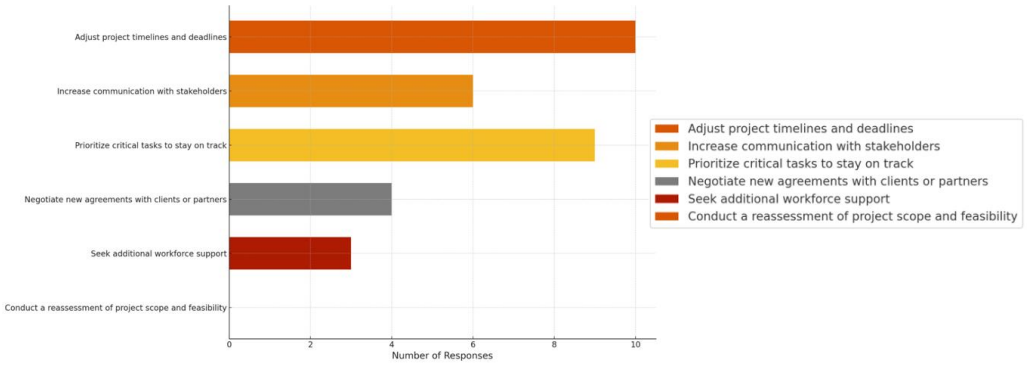
Source *:* Created by us using the Python library matplotlib

The graph presents answers to the most significant challenges faced by consultants when managing multiple projects. The most common issue is conflicting deadlines, mentioned 9 times, followed by meeting overload and lack of clear priorities, each mentioned 6 times. Other challenges include communication difficulties, mentioned 3 times, burnout or stress, mentioned 4 times, and limited support from PMO management, mentioned 2 times.

These issues prove the importance of time management, clearer task prioritization, improved communication, and stronger management support to enhance project efficiency and consultant well-being for the consultants.

Question08: What typically happens when a project requires more time or shifts its schedule unexpectedly?

Graph 9: Consultants's actions when a project requires more time or schedule shift



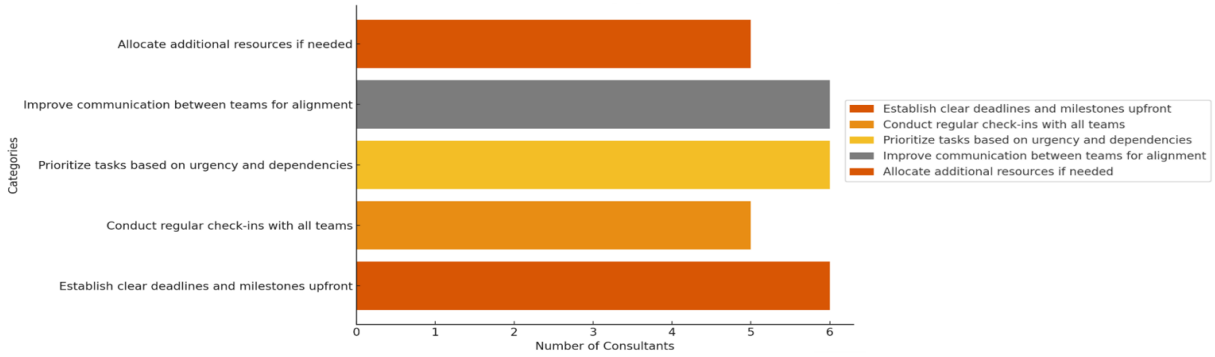
Source *:* Created by us using the Python library matplotlib

The graph shows the actions consultants take when a project requires more time or schedule shifts. The most common action, taken by 10 consultants, is adjusting project timelines and deadlines. The second most frequent action, cited by 9 consultants, is prioritizing critical tasks to stay on track. 6 consultants mentioned increasing communication with stakeholders, while fewer 4 consultants negotiate new agreements with clients. 3 consultants seek additional support.

Overall, consultants prioritize adjusting timelines and focusing on critical tasks, with less emphasis on renegotiation or revising the project scope.

Question09: How are deadlines managed when you have deliverables across multiple projects?

Graph 10: Consultants' approaches to managing deadlines across multiple projects



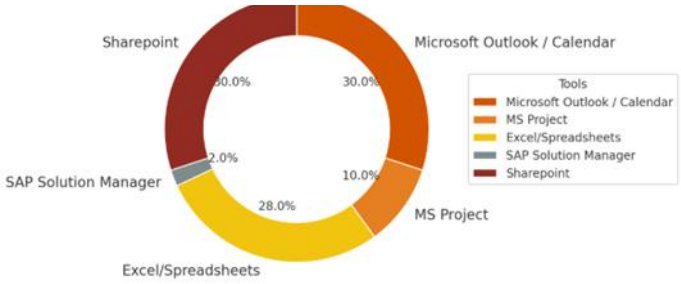
Source *:* Created by us using the Python library matplotlib

The graph shows consultants' preferences for managing deliverables across multiple projects. The most common strategies include setting clear deadlines and milestones, improving communication between teams, and prioritizing tasks based on urgency and dependencies, all mentioned by 6 consultants. Allocating additional resources was mentioned by 5 consultants, and conducting regular check-ins was mentioned by 4.Consultants focus on planning, task prioritization, and communication to manage competing deadlines, with check-ins playing a secondary role.

d. Tools and technology

Question 10: What systems or tools do you use to track and manage your tasks across different projects.

Graph 11: systems and tools used to track and manage tasks across different projects



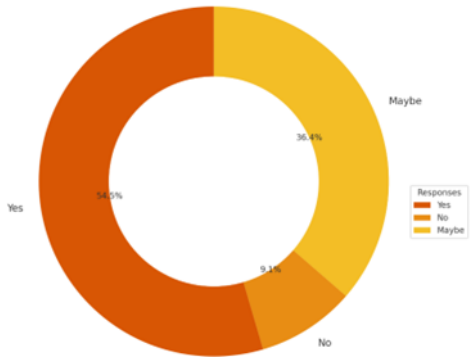
Source *:* Created by us using the Python library matplotlib

The chart shows consultants' task-management tools: Outlook/Calendar and SharePoint lead at 30 % each, Excel/Spreadsheets follows at 28 %, MS Project at 10 %, and SAP Solution Manager at 2 %. Overall, consultants use flexible, familiar tools over specialized project-management software.

Question 11: Do you feel your availability is clearly communicated and well managed across all your projects?

Graph 12: Consultants's perception of feeling overwhelmed due to competing demands and deadlines across projects.

The pie chart illustrates how consultants feel about the clarity and management of their availability across multiple projects. The pie chart shows that 54.5% of consultants feel their availability is well managed, while 9.1% feel it is not. 36.4% are unsure, indicating mixed feelings about the clarity and management of their availability across projects**.**

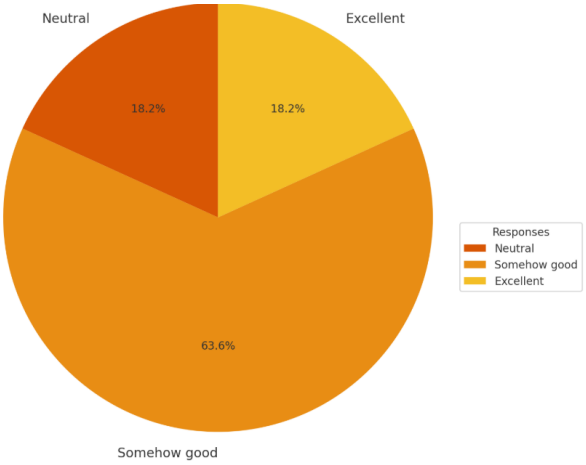


Source : Created by us using the Python library matplotlib

Question 12: How would you rate the communication and coordination between the different project team members you're involved with?

Graph 13: Rating of communication and coordination between project team members

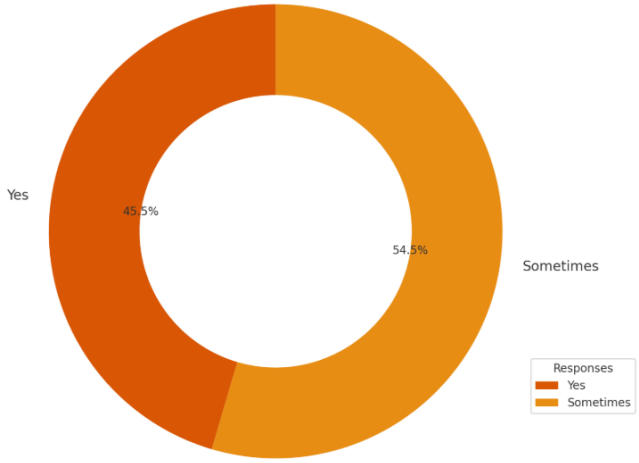
The pie chart shows the ratings of communication and coordination between project team members. Most respondents, 63.6%, rated it as "Somehow good", suggesting a room for improvement. 18.2% of respondents rated it as "Neutral", indicating indifference or uncertainty about the effectiveness of communication and coordination. Similarly, 18.2% rated it as "Excellent", highlighting that a portion of consultants experience strong communication and coordination within their teams. This distribution suggests that while many are satisfied, there is a split opinion, with a significant number feeling that further improvements are needed.



Source : Created by us using the Python library matplotlib

Question 13: Do you receive timely updates from all project teams regarding progress, changes, or expectations?

Graph 14: Timely updates from project teams regarding progress, changes



Source : Created by us using the Python library matplotlib

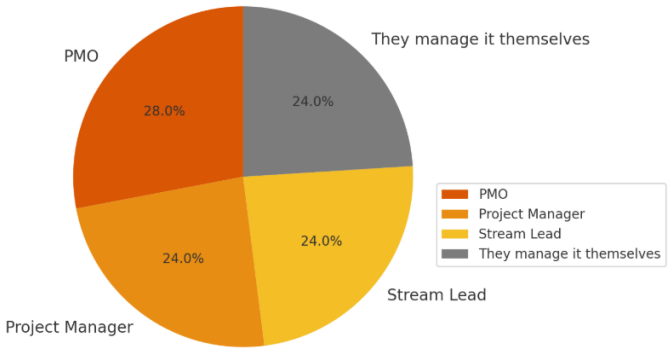
The pie chart shows that most respondents, 54.5%, indicated that they receive timely updates sometimes. 45.5% of respondents reported that they always receive updates on time.

This suggests that while most consultants experience some level of communication regarding project updates, there is room for improvement in ensuring consistency and timely information across all project teams.

f. SAP S4/HANA consultants and the PMO's

Question 14: Who typically assists you in resolving scheduling conflicts (example; overlapping meetings or deadlines)?

Graph 15: Assistance in resolving scheduling conflicts in SAP S/4HANA implementation projects



Source : Created by us using the Python library matplotlib

The pie chart provides insights into who typically assists SAP consultants in resolving scheduling conflicts. It shows that PMOs are the most common source of assistance, with 28% of consultants relying on them. Both Project Managers and Stream Leads assist equally, with 24% of consultants depending on them. Interestingly, 24% of consultants manage scheduling conflicts on their own, indicating some level of autonomy. Overall, the chart highlights a collaborative approach, with leadership roles taking the lead while some consultants handle conflicts independently.

Question 15: In what ways do the Project Managers or PMO support you in managing your workload?

Figure 29: Key aspects of project management support in SAP S/4HANA implementation projects

Source : Created by us using the Wordart

The word cloud points to five key parts of project management. First, "**Clear communication**" and "**Regular communication**" show that keeping everyone informed all the time is vital. Second, "**Deadline adjustment**," "**Meeting deadlines**," and "**Periodic reminders**" remind us that plans must be flexible and that it helps to send regular reminders about important dates. Third, "**Organizing meetings**," "**Follow-up workshops**," and "**Client schedules**" stress the need for careful planning of meetings and schedules. Fourth, "**Defining priorities**" and "**Resource allocation**" tell us that we must decide which tasks matter most and assign the right people or tools to them. Finally, "**Client schedules**" and "**Meeting deadlines**" highlight that we must always match our work to the client's needs and stick to agreed dates.Together, these ideas form a simple, flexible approach to managing projects well.

3.2.2 PMO interviews

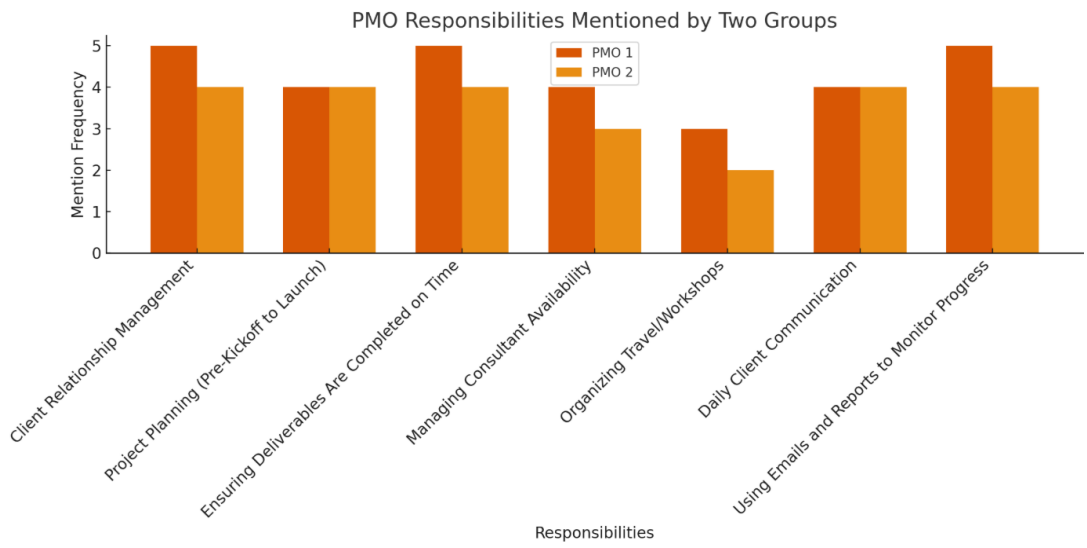
To understand how simultaneous SAP S/4HANA implementation projects are managed, we interviewed two PMOs from PwC (Appendix 02). PMO 1 has 2.5 years of experience, and PMO 2 has one year of experience within PwC.

They each manage different projects, but their work overlaps, as they share the same consultants and sponsors. The goal of the interviews was to learn how they coordinate resources and tasks across multiple projects. The results are shown based on the most common themes mentioned during the interviews.

f. PMO roles and responsibilities in simultaneous multi-Project context

Question 16: What are your responsibilities as a PMO across multiple SAP implementation projects?

Graph 16: PMO responsibilities across multiple SAP implementation projects



Source : Created by us using the Python library matplotlib

The graph illustrates the responsibilities of two PMOs across multiple SAP implementation projects. The analysis shows that "Client Relationship Management", "Project Planning» and "Ensuring Deliverables Are Completed on Time" are the most frequently mentioned responsibilities by both PMOs, with both PMOs giving these tasks high priority.

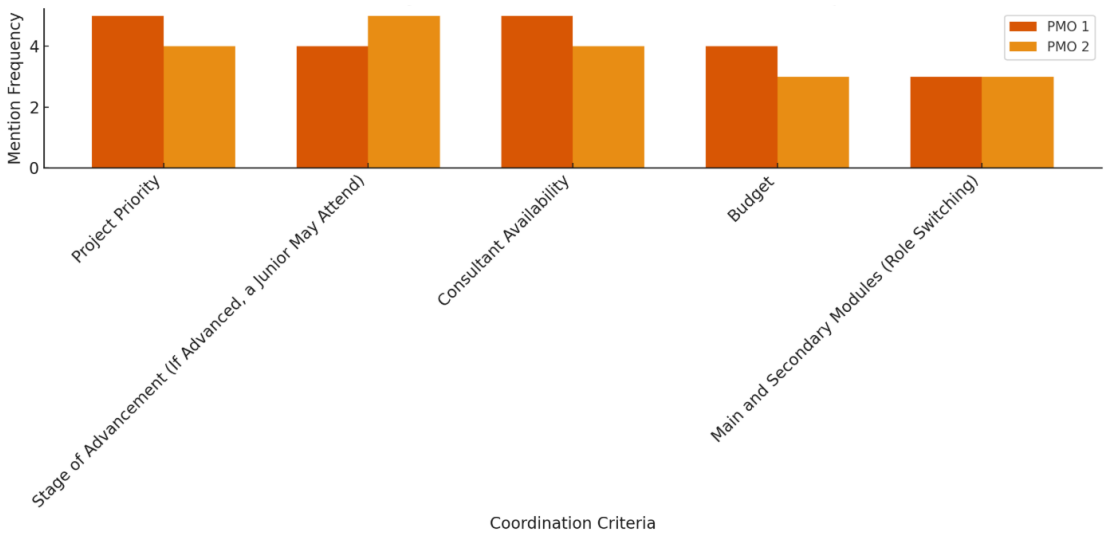
"Managing Consultant Availability" and "Using Emails and Reports to Monitor Progress" also received consistent mentions, with both PMOs rating them similarly. However, "Organizing Travel/Workshops" and "Daily Client Communication" were slightly mentionned.

Overall, both PMOs prioritize the strategic aspects of project management, such as client relationship management, ensuring timely deliverables, and project planning.

g. Coordination and resource management across simultaneous projects

Question 17: How do you manage the coordination of resources (consultants) across multiple simultaneous SAP S/4HANA projects?

Graph 17: PMO coordination criteria for managing consultants across simultaneous SAP S/4HANA projects.



Source *:* Created by us using the Python library matplotlib

This graph illustrates the coordination criteria used by PMOs when managing consultants across simultaneous SAP S/4HANA implementation projects.

The most frequently mentioned criterion is project priority. Both PMOs emphasized how they prioritize based on which project came first, which has the largest budget, which needs the most attention, and which phase the project is in. This shows how critical it is to allocate resources depending on project importance and level of advancement.

The second most mentioned factor is consultant availability. Resource planning is based on who is available. For example, if two projects are running at the same time and both need the same consultant, the PMOs will decide who goes where based on which project is more advanced or needs more expertise. In some cases, the senior consultant assigns a junior to the less critical project.

Budget also plays a key role. If a project has a smaller budget, it may not afford a senior consultant, so the team adjusts accordingly.

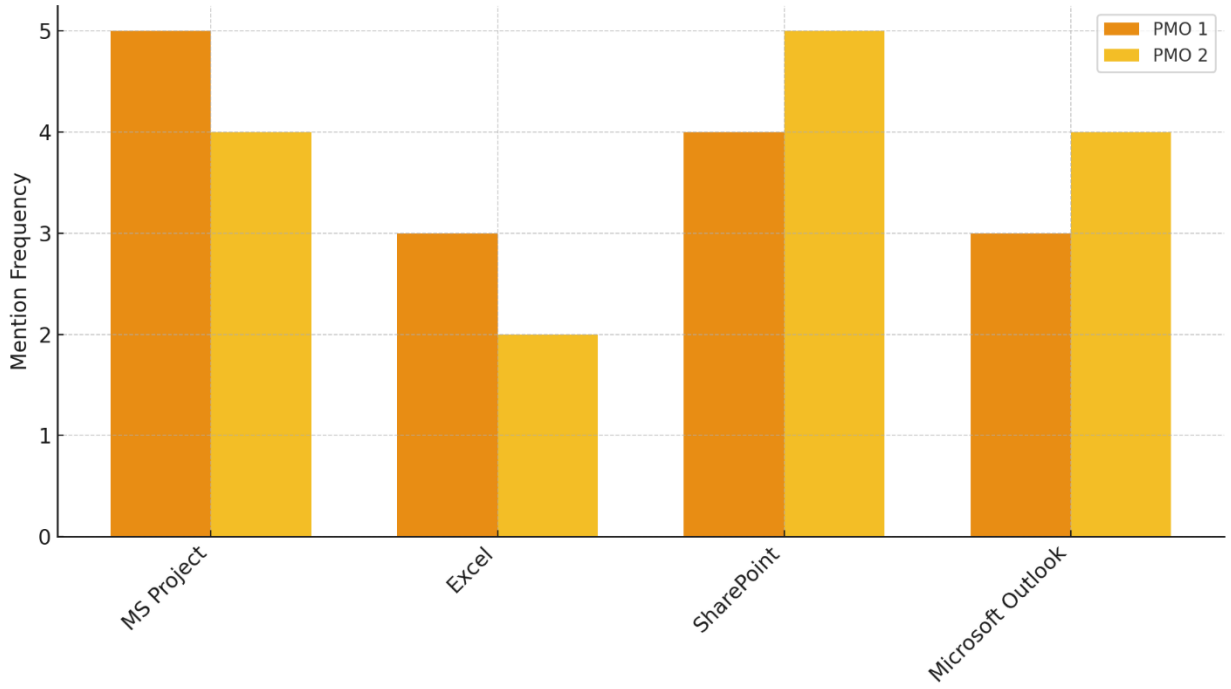
Lastly, main and secondary modules help with flexibility. At PwC, each consultant usually works on two modules. So, if two projects need the same module, and one consultant has it as a secondary skill, they can still support the project depending on priority and need.

This highlights how PMOs balance project needs, consultant availability and expertise to manage multiple SAP projects effectively.

c. Tools and systems for managing multiple projects

Question 18: What tools do you use for tracking and managing SAP S/4HANA implementation projects? What are the limitations?

Graph 18: Tools used by PMOs for managing SAP S/4HANA implementation projects



Source : Created by us using the Python library matplotlib

The bar chart illustrates the tool usage frequencies for both PMOs. MS Project is heavily used by PMO 1, particularly for resource management. Excel is widely mentioned across both PMOs for planning and managing availability. SharePoint shows strong usage for managing deliverables, with PMO 1 relying on it more for document sharing and collaboration. Microsoft Outlook is also crucial for communication, though its frequency is lower compared to the other tools, with PMO 2 using it slightly more than PMO 1.

Overall, the chart highlights how the tools cater to various project management needs: MS Project is essential for resource management, Excel is central for planning, SharePoint supports collaboration, and Outlook is vital for communication.

3.3 Discussion and findings

This section presents and discusses the key insights gathered from interviews with SAP S/4HANA consultants and PMOs at PwC. The aim is to better understand the challenges of

managing multiple SAP S4/HANA implementation projects at the same time and to highlight how the PMO can help improve this process. Here are the main points found:

3.3.1 High demand for certain SAP S4/HANA modules

Many clients request the same SAP modules especially FICO, MM, SD and HCM. As a result, consultants who specialize in these modules are often assigned to many projects at once. In some cases, one consultant is responsible for several modules or projects at the same time.

If PwC consultants are already handling several similar projects and then receive even more at once, this creates a risk of overload: they may end up handling multiple engagements simultaneously, which strains resource allocation and time management.

3.3.2 Consultants handle multiple projects at the same time

Most consultants work on more than one project, and some even manage three or more. This is especially difficult when the projects are at different stages. For example, one project might be starting while another is close to the final phase.

Senior consultants have a harder time managing this, as they have more complex responsibilities. Junior consultants usually find it easier because their tasks are smaller. However, for everyone, switching between projects takes time and energy, and can affect concentration.

3.3.3 Time and workload are managed manually

Consultants mostly manage their time and workload in a manual and informal way. They use personal judgment, client deadlines, and simple tools like emails or SharePoint.

This shows that there is no consistent system for managing time and tasks across teams. As projects increase, these methods can create problems such as miscommunication.

3.3.4 No clear prioritization system

When consultants need to choose what task to work on, they mostly decide based on what feels most urgent. Sometimes they follow PMO advice, but there is no standard method for setting task priorities across different projects which can cause confusion, especially when many deadlines are close.

3.3.5 Risk of poor communication

Many consultants, especially senior ones, say they feel stressed and overworked. The main reasons are unclear priorities, too many responsibilities, and frequent changes in plans.

3.3.6 Tools are not connected

The most common tools used by consultants and PMOs are Excel, Outlook, and SharePoint. More advanced project tools are rarely used.

Because of this, project information is spread across different files and platforms. This makes it challenging to track tasks and people. In a multi-project environment, this lack of integration can lead to errors and confusion.

3.3.7 Availability and project updates are not always clear

Some consultants said that their availability and project updates are well communicated. However, others disagreed and said they sometimes receive late or unclear information, tasks or deliverables to adjust.

3.3.8 PMO plays an important role

PMOs help consultants by managing schedules, communicating with clients, organizing workshops and solving conflicts. However, some consultants said that they still must deal with conflicting priorities by themselves.

This shows that while the PMO is essential, its support is not always enough. Improving the PMO's tools and visibility across all projects could help consultants more effectively.

3.3.9 No centralized project management system

One of the most important findings from the PMO interviews is the lack of a central system to track all projects, consultants, and tasks.

Currently, each element (availability, timelines, project progress) is managed in a separate Excel file. This makes it hard to see the overall situation.

Conclusion

The interviews with consultants and PMOs show that while teams are highly skilled and committed, they face real challenges in managing multiple SAP S/4HANA projects. Tools and communication practices are not always in place to support this level of complexity.

To make the most of its project teams, PwC could strengthen its internal coordination, update its tools, and provide more day-to-day support through PMOs. With these steps, the company can improve project delivery, reduce consultant overload, and maintain high client satisfaction.

General Conclusion

Our research focused on how consulting companies with their SAP teams like PwC Algeria, manage several SAP S/4HANA implementation projects at the same time. We combined theory from books and articles with real-life experience from our internship at PwC. The main goal was to understand the contribution of PwC Algeria and it's consulting SAP teams to these projects and to learn how difficult it is to manage many projects together. We also wanted to find out what strategies help consulting firms overcome these challenges and see how project management tools and the PMO's help in this situation.

First, it is important to remember that our study focused on one big question: **How can SAP teams effectively manage and overcome the challenges of handling multiple SAP S4/HANA implementation projects simultaneously while optimizing resources?** This question helped us focus on an important, but often ignored, part of digital transformation the way consulting firms manage their SAP S/4HANA projects internally.

We chose PwC Algeria for our field study because it is well-known for its SAP consulting expertise and has experience with many SAP S/4HANA projects across different industries. This gave us a good chance to observe how project teams deal with overlapping deadlines, shared consultants, and different client demands.

During our internship, we watched how teams work and conducted interviews with consultants and PMO members. We also analyzed company documents. From this, we found the following:

- Managing several SAP S/4HANA projects at once is very complicated. Major problems include overlapping project phases, and communication difficulties.
- The most common problems are deadlines that overlap, consultants being overloaded, and lack of centralized project coordination.
- The PMO plays a vital role in organizing and coordinating projects, demonstrating impressive adaptability and efficiency by leveraging familiar tools like Excel and SharePoint to deliver results.

- Consultants often work on several projects at the same time. They must manage conflicting deadlines carefully because there are no standard tools to help prioritize work.
- The most used tools are Excel for manual data entry, along with other applications such as Teams and Outlook for updates, and SharePoint for managing deliverables.
- Despite these challenges, the PwC Algeria teams show strong flexibility and commitment. They manage to successfully deliver most projects, although this can lead to stress and occasional inefficiencies.

The hypotheses we proposed at the start of the study were mostly confirmed:

Hypothesis 1: Effective resource management strategies help SAP teams successfully manage multiple SAP S/4HANA implementation projects.
Hypothesis confirmed: Our interviews showed that well organized resource planning such as managing consultant assignments and their availability helps avoid consultant overload.

Hypothesis 2: Strong support from PMOs enhances SAP team's ability to manage several projects simultaneously**.**
Hypothesis partially confirmed: PMOs are very important, but they need better tools to improve their support. Many PMO teams still rely on software like Excel and SharePoint instead of improving the use of advanced project management tools such as Microsoft Project or similar centralized platforms.

Hypothesis 3: The use of technology and management tools improves the efficiency of simultaneous multi-project management of SAP implementation.
Hypothesis confirmed: Our study showed a clear need for tools like Jira, Asana or Microsoft azure, or even more centralized solutions like automated Excel dashboards, instead of using many separate decentralized Excel files for the same project. This would greatly improve project tracking, collaboration, and efficiency.

We also faced some challenges during our research. Although our theoretical base was strong, the real-world situation was different. While we expected the use of advanced project management systems, most teams still worked with tools and traditional methods.

Still, we were able to closely observe how simultaneous project management works and raise awareness about the need for better tools and practices when managing multiple complex ERP projects like SAP S/4HANA.

Like any study, our research had a few limits:

- We studied only one company PwC Algeria so the results may not apply to all consulting firms.
- We conducted interviews with a limited number of consultants and PMO members. A bigger sample could have made our findings even stronger.

However, using multiple sources interviews, observations, and document analysis made our research more reliable and gave us a complete picture.

Based on what we observed and the results of our interviews, here are some recommendations to improve the simultaneous management of multiple SAP S/4HANA projects:

- **Daily stand-up meetings** Organize short daily meetings between consultants and the PMO. These meetings ensure quick identification of issues, better coordination, and keep everyone aligned with project goals.
- **AI resource allocation** Leverage AI tools to assign consultants to tasks based on real-time skill mapping and availability. This optimizes resource use and prevents consultant overload. Examples include Microsoft Azure AI for intelligent workload balancing.
- **Projects knowledge sharing** Hold monthly knowledge sharing sessions where consultants discuss challenges and solutions from different projects. This fosters continuous learning and allows successful practices to be applied across multiple projects.
- **VR training for SAP** Implement Virtual Reality (VR) based training programs to simulate real SAP S/4HANA scenarios. VR offers a risk-free, immersive environment for consultants to practice and build confidence before handling real client implementations.
- **Post project reviews** Conduct formal review sessions at the end of each project. Discuss successes, identify improvement areas, and document best practices to refine future project executions and avoid repeating mistakes.

- **Strict agile method adherence** Ensure that both consultants and the PMO rigorously follow agile principles. Introduce continuous deliverable reviews for example, review documents like Minutes of Meeting and specification documents rather than waiting for final submissions, ensuring consistent quality and early problem detection.
- **Use of project management tools** Adopt project management tools like Jira or Asana to track tasks, progress, and deliverables across multiple projects. These tools enhance transparency, ensure accountability, and make it easier to monitor project milestones in parallel projects.
- **Standardized deliverable templates** Provide pre-designed templates for key deliverables (as specification document in Word or Excel template for MoM). Standard templates reduce administrative workload, enabling consultants to focus more on value-added activities and manage time across multiple projects effectively.
- **Coaching and mentoring programs** Introduce a mentoring system where experienced consultants coach newer team members. This accelerates learning, promotes skill development, and ensures team alignment with project management standards and agile best practices.
- **Change management strategy for agile adoption** Establish a proactive change management plan to ease the transition to agile methods. regular communication, leadership support, and feedback mechanisms help manage resistance and embed agile practices effectively across the consulting teams.

During interviews with PMOs at PwC Algeria, many mentioned the difficulty of managing multiple Excel files for different projects and tracking consultant availability informally. They needed a simpler and more organized solution. To solve this, we propose creating a single tool to centralize all project and consultant data in one place:

- **Centralized project and consultant management tool for PwC Algeria's PMO**

This solution is an automated solution designed to make project management and consultant tracking easier for PwC Algeria's PMO team. Right now, the PMO faces problems with managing multiple SAP S/4HANA projects using several separate Excel files, making it hard to track

consultant availability and project progress. This new tool will combine all project and consultant data into one place, making it easier to manage everything.

The tool will allow the PMO team to track project phases, consultant tasks, and resources in real-time, giving them clear visibility into progress. With automatic updates and dashboards, the tool will reduce errors and help decision-making. The PMO team will no longer need to use multiple spreadsheets. Instead, all data on consultants, projects, and deadlines will be in one place.

By using this tool, the PMO will improve planning, resource management, and reporting, with all team members having access to the same up-to-date information. This will reduce administrative work, letting the PMO focus on key tasks like improving project results and working with clients. This tool will change the way the PMO works, making it more efficient and easier to manage multiple projects. More details will be in the appendices (**Appendix 0 3).**

Our study opens the door for future research on:

- Studying how advanced project management tools improve the management of many SAP projects.
- Comparing how large international firms and smaller local firms manage multiple SAP S/4HANA projects.
- Exploring how cultural differences affect the management of simultaneous projects.
- Analyzing the effects of hybrid project management methods (mixing Agile and Waterfall) on SAP project success.
- Investigating how AI and machine learning can help improve resource planning and risk management when dealing with many projects at the same time.

By showing the real work behind large SAP S/4HANA projects, our research provides useful insights for academic studies and helps people who want to learn more about SAP S/4HANA. It also dives deeper into the management aspects of SAP S/4HANA implementation projects and can help consulting firms improve how they manage these complex projects.

Writing this dissertation was a real personal challenge and a valuable learning experience. It required a lot of discipline, motivation, and focus. Balancing the research work with the tasks

we had during our internship at PwC Algeria was not always easy. However, working closely with the teams and observing real SAP S/4HANA projects helped us better understand the practical side of project management. It also improved our ability to organize our ideas, manage our time, and stay focused on the main research goal. Although it was our first time writing a research study of this size, it has given us the confidence and skills that we will use in our future academic and professional projects. We hope that our modest work will be useful for future research and for companies looking to improve the management of multiple SAP projects.

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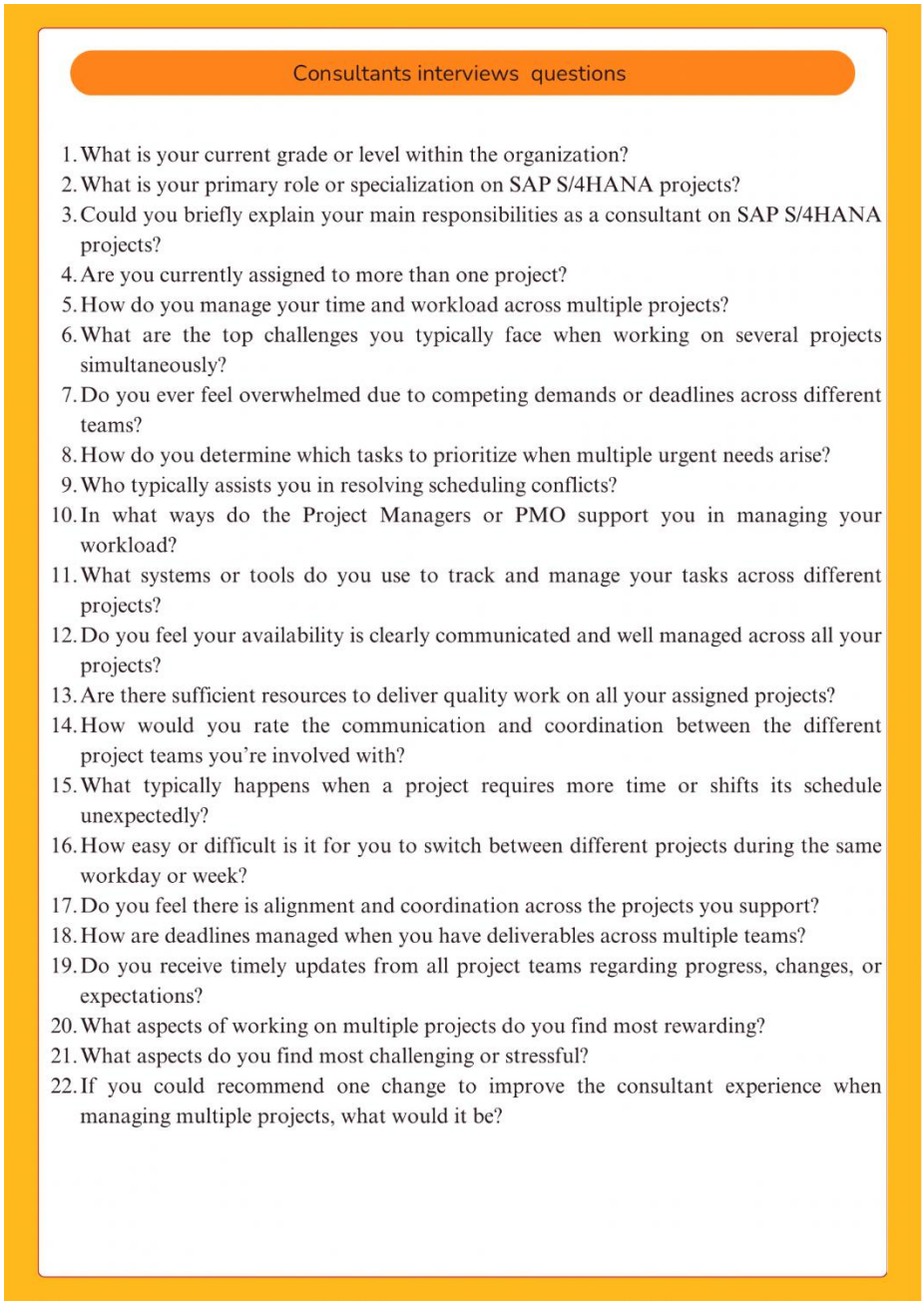
Appendices

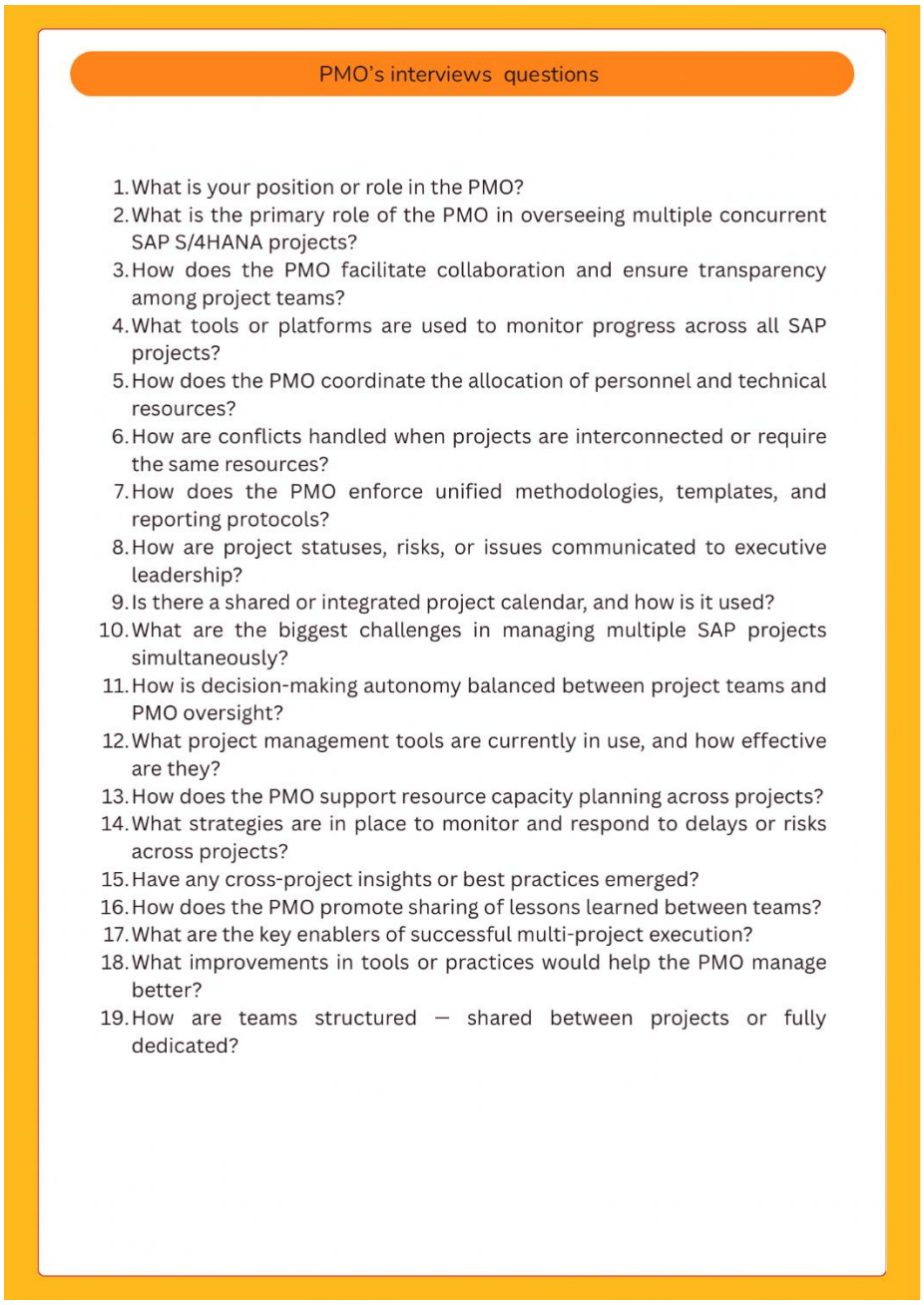
A. Appendix 01 : Consultants interview guide



Consultants interviews questions

1. What is your current grade or level within the organization?
2. What is your primary role or specialization on SAP S/4HANA projects?
3. Could you briefly explain your main responsibilities as a consultant on SAP S/4HANA projects?
4. Are you currently assigned to more than one project?
5. How do you manage your time and workload across multiple projects?
6. What are the top challenges you typically face when working on several projects simultaneously?
7. Do you ever feel overwhelmed due to competing demands or deadlines across different teams?
8. How do you determine which tasks to prioritize when multiple urgent needs arise?
9. Who typically assists you in resolving scheduling conflicts?
10. In what ways do the Project Managers or PMO support you in managing your workload?
11. What systems or tools do you use to track and manage your tasks across different projects?
12. Do you feel your availability is clearly communicated and well managed across all your projects?
13. Are there sufficient resources to deliver quality work on all your assigned projects?
14. How would you rate the communication and coordination between the different project teams you're involved with?
15. What typically happens when a project requires more time or shifts its schedule unexpectedly?
16. How easy or difficult is it for you to switch between different projects during the same workday or week?
17. Do you feel there is alignment and coordination across the projects you support?
18. How are deadlines managed when you have deliverables across multiple teams?
19. Do you receive timely updates from all project teams regarding progress, changes, or expectations?
20. What aspects of working on multiple projects do you find most rewarding?
21. What aspects do you find most challenging or stressful?
22. If you could recommend one change to improve the consultant experience when managing multiple projects, what would it be?

B. Appendix 02 : PMO's interview guide



C. Appendix 03

Explanation document for PMO SAP S/4HANA multi-project management optimized tool

1. Project title

PMO Dashboard for Managing Multiple SAP S/4HANA Projects

2. Objective

The goal is to create a tool that helps the PMO team manage many SAP S/4HANA projects at the same time. This tool should solve the problems of using many separate Excel files by gathering all information in one place. It will make it easier to plan, track, and report on projects and consultants.

3. Background

Today, PwC's PMO team is facing difficulties because:

- Each project is tracked separately in different Excel files.
- There is no central way to see consultant availability.
- Progress tracking is manual and time-consuming.
- Important project information is scattered.

This tool will fix these problems by creating a simple, centralized, and automated Excel file.

4. Overview of the solution

The tool will be with:

- A clean and easy-to-use homepage with buttons to move between tabs.
- A list of all consultants and their assignments.
- A list of all ongoing and finished projects.
- A detailed view for each project, showing project phases and progress.
- Dashboards with key performance indicators (KPIs) like % of work done.
- A library of templates and important documents.
- A glossary with important SAP and PMO terms.

Tab Name	Purpose
Home	Welcome page with navigation buttons to other tabs.
Consultant Profile	List of all consultants, what SAP module they work on, and if they are available.
Projects	List of all SAP projects with start and end dates, and status (ongoing or finished).
Project [X]	A page for each project with phases (preparation, implementation) and deliverables.
Dashboards	Graphs and charts showing project progress, resource use, risks, and budgets.

Templates & Docs	Downloadable templates like specification documents and kickoff slides.
Glossary	Explanations of common SAP and PMO words for easy understanding.

5. Home page layout

- Welcome message
- Buttons to go to :Consultant Profile, Projects, Dashboards, Templates & docs

6. Consultant profile tab

Name	Module	Email	Role	Project Assigned	Availability
KD	SD	kd@pwc.dz	Senior consultant	Project A	Available
AB	FICO	ab@pwc.dz	Stream lead	Project B	Staffed

7. Projects tab

Project Name	Client	Status	Start Date	End Date	Link to Project Details
Project A	Client X	Ongoing	Jan 2025	Dec 2025	[Go to Project A]
Project B	Client Y	Completed	Mar 2024	Mar 2025	[Go to Project B]

8. Individual project tab layout (Example: Project A)

Phase	Task	Person Responsible	Status	Progress (%)
Pre-Implementation	Workshops with Client	PwC Consultant	Done	100%
Pre-Implementation	Specification Document	PMO	Ongoing	60%
Prepare	Project Planning	PMO	Planned	0%
Explore	Business Process Review	PwC + Integrator	Planned	0%
Realize	System Configuration	Integrator	Planned	0%
Deploy	Data Migration	Integrator	Planned	0%
Run	Go-Live Support	PwC	Planned	0%

9. Dashboards tab features

- Show overall project progress (% complete).
- Show consultant workload (who is busy or free).
- Risk heatmap showing project risks.
- Budget vs actual spending.
- Filters to view: By project, By consultant, By project status (Not Started, In Progress, Completed)

10. Templates & docs tab

Template Name	Purpose	Link
Specification Document	Template to collect client needs	[Download]
Kickoff Meeting Slides	Standard slides for starting projects	[Download]
Risk Log	Track project risks	[Download]
Lessons Learned Document	Document for recording best practices	[Download]

Table of Content