Digital Government Authority
هـيـئـة الحكومة الرقمـيـة

Guideline of Digital Project Management

August 2024

Document Type: Guideline
Document Classification: Public
Issue No: 1.0
Document No: DGA-1-2-1-204

Contents

1. Introduction

The Digital Government Authority (DGA) is aware of the significance of authorizing and consistently revising regulations in order to keep abreast of present and future requirements, as well as to contribute primarily in enhancing digital performance within government agencies, enhance the quality of services provided, and improve customer's experience and journey, aligning with the aspiring Saudi Vision 2030, and the strategic directions of the digitalized government, which emphasizes the importance of providing an effective and agile organizational environment that is able to adapt to future changes. It is worth mentioning that DGA is paving the way for the government agencies to support providing high-quality and efficient digital government service, hiking up investment returns and national economy value.

As moving forward with DGA's significant role in enabling and supporting governmental agencies by providing guidance throughout implementing best practices that aims of achieving the ultimate objective of the Saudi vision 2030 visions and long-term digital transformation strategy, this Guideline "**Digital Project Management** " was developed in accordance for managing Digital Projects, and act as a supporter to digital projects managers in order to enable them to increase efficiency of services and bring about excellence in project management through applying best practices in such.

This Guideline is emphasizing on implementing the digital aspects in project management, as it identifies elements of digital projects' success, and the steps should be applied to scale up planning and implementation standards. The Guideline also brings out the significant concepts and knowledge approaches required to manage digital projects by providing examples of tools used during projects' life cycles.

2. Objectives

The Guideline's main objective is to improve government agencies' performance in executing digital projects through achieving the following:

- Fostering government agencies know-how of digital project management. ،Promote the adoption of digital project management methodologies and best international practices in government agencies.
- Clarifying the concept of projects' life cycles, and the key activities throughout such projects.
- Elevate the quality and efficiency of the digital projects' outcomes to ensure seamless and swift implementation.
- A reference for mechanisms and methods for managing digital projects, which can be relied upon when needed.

3. Scope

This guide covers the most common methodologies, methods and tools used in digital project management, through the following:

- Definition of the digital projects, and their objectives.
- Clarifying the enablers and influential factors of digital projects' success in government agencies.
- The most significant approaches of planning and implementing the digital projects.
- The most significant areas of knowledge that will support the digital project manager to effectively manage the project.
- Emphasizing the importance of change management in the digital project, and defining the best change management-related tools.
- Providing an overview on Release Management, and its application mechanism of in the digital projects.
- Explaining and identifying methods of measuring the impact of the digital project.

4. Target Audience

The Guideline targets individuals involved in digital project management in government agencies.

5. Statement of the Guideline

5.1 Digital Project Definition

A digital project is a technical need that aims at providing digital solutions, software, and services to internal and external beneficiaries of a government agency. Such projects vary in their scales, level of complexity, and projects may cover individuals, teams, or organizations. Digital projects may include creating an application for smart devices, analyzing data, developing an information system, or creating a service or digital platform.

Project management requires working on various approaches that is identified by the characteristics of each project at the aim of achieving a high level of efficiency. The characteristics must cover the following:

Level of Complexity:
Digital Projects contain complex functions that vary by their scales, as well as they require diverse skills from individuals and technical expertise.

Rapid Technological Development:
Software, hardware, and digital infrastructure fast-evolvement impact the project's requirements, deliverables and timelines; that requires project managers to keep abreast of latest technologies, technical trends and best practices, at the aim of avoiding bringing about disused technologies.

Technological Integration:
Digital projects often require technological integration and compatibility with the existing regulations and e-platforms, or digital services provided by service providers.

Diverse Stakeholders Needs:
Multiple individuals and groups with various interests participate in digital projects, where sometimes have conflicting needs, necessitating extra effort in stakeholders' management.

5.2 Digital Project Objectives

The first step to ensure success of a project and to ensure that it achieves its desired impact is to identify objectives of the project in alignment with the strategic objectives through the following phases:

Phase One: Identifying the Project Objectives

At first, the framework, objectives, and expected deliverables of the project shall be defined using different methods of identifying the objectives, such as SMART Framework that requires each objective to be: Specific, Measurable, Achievable, Relevant, and Time-Bound.

Phase Two: Understanding Strategic Objectives of the Agency and Alignment with the Project Objectives

An inclusive understanding of strategic objectives, and digitalization strategy should be set for the agency, in order to identify the deliverables of the project and link them to the objective of the agency.

For instance, in case the government agency aims at enhancing services provided to citizens, and promoting accessibility through digital initiatives, the digital project aligning with the set objective may cover the following:

- ✓ Developing a user-friendly e-portal in order to manage the applications received by the general services during a specific timeframe within the digital initiative.

- ✓ The project objectives aim directly at achieving the strategic objectives of the government agency; therefore, it is necessary to ensure that the project's objectives are compatible with the agency's overall vision.

Following are steps to align the project objectives with the agency's objectives:

- Hold business meetings with the executive level management and main stakeholders to agree on the approach that the project will follow to achieve the agency's objectives.
- Linking project deliverables with set key objectives, KPIs, or operational performance indicators that the project aiming at achieving, such as: Optimizing service provision or increasing efficiency or transparency.
- Identifying the project objectives and subsequently revising the agency's strategic plans to ensure the alignment of the project and the agency's objectives.

5.3 Digital Project Success Enablers in the Government Agency

5.3.1 Digital Transformation Strategy

The Digital Transformation Strategy contributes to prioritizing the digital projects in accordance with the agency's objectives and designing a timeline to be implemented. Moreover, the strategy includes KPIs that enable those involved in the digital project to measure its impact on the overall performance of the agency.

5.3.2 Agency's Organizational Readiness

The organizational readiness of the agency includes setting up and activating the following organizational factors within the agency:

Enterprise Architecture Office: The Office aims at supporting and accelerating the digital transformation by adopting the standards and principles that contribute to enhance efficiency in operations, procedures, and technological applications within the agency.

The objectives of the Enterprise Architecture Office include the following:

- Effective governance of the digital transformation plan from a comprehensive enterprise perspective.
- Enhancing efficiency in information technology spending and investment, avoiding duplication and redundancy in the digital projects.
- Achieving alignment and integration between the business sector and information technology
- Ensuring compliance with the reference designs and architecture of the agency.

Effective Governance: The internal governance includes regulations, frameworks, and policies clarifying the roles and responsibilities of the agency's stakeholders, as to effectively achieve the project objectives. The main points should be included in the effective governance are as follows:

- Project Sponsorship: Presence of project sponsors (e.g. CEO, Vice President, Deputy, Director, etc.) at the implementation level, ensure the availability of the necessary resources, and have the authority to make critical decisions that may affect the project deliverables.
- Roles and Responsibilities: defining roles and responsibilities is crucial to ensure all project stakeholders are aware of their expected contribution to the project. one of the approaches employed to delineate roles and responsibilities is the utilization of "RACI matrix", which clarifies the role of each team member by assigning one or more of the "RACI" terms to each member, which represents the following:

Responsible	Accountable	Consulted	Informed

#	Tasks	Project Sponsor	Project Owner	Project Manager	Business Analyst	Application Developer
1	Tasks 1	C	A/R	C	I	I
2	Tasks 2	A	I	R	C	I
3	Tasks 3	A	I	R	C	I
4	Tasks 4	C	A	I	R	I

R - Responsible A – Accountable C – Consulted I - Informed

Figure 1: An example of roles and responsibilities matrix "RACI Matrix"

Decision-Making Mechanism: defining a mechanism to ensure making decisions properly and quickly as well, including the delegation of authorities to the appropriate organizational levels within the governance framework. As a result, this allows for rapid response to the obstacles, risks, and modifications occurred to a project.

Escalation Mechanism: It is essential to include an escalation mechanism within the framework, involving the project sponsor, owner, and manager, leadership committees, and team. Thus, the mechanisms, roles, responsibilities, and authorities of the stakeholders will be clarified, with the aim of addressing the project risks and challenges, and providing the necessary support.

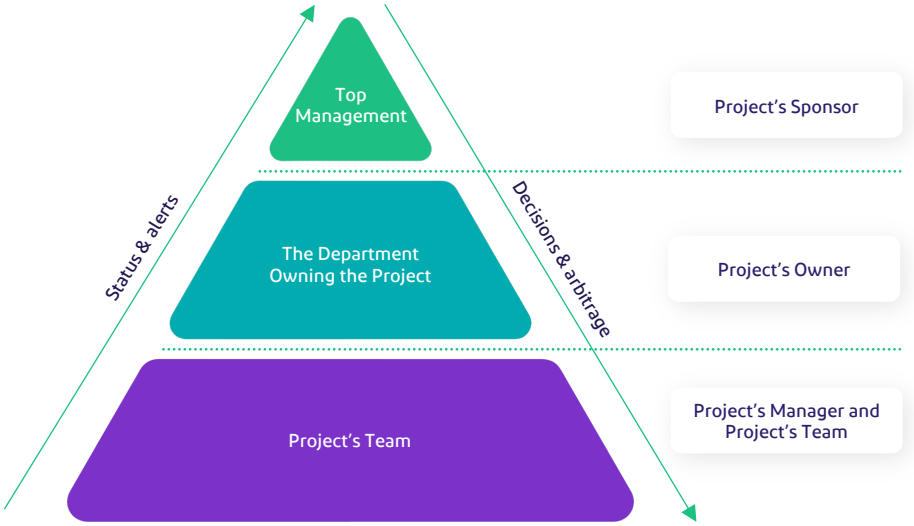

Figure 2: An example of escalation mechanism

Project's Sponsor	راعي المشروع
Project's Owner	مالك المشروع
Project Manager and Teamwork	مدير المشروع وفريق العمل
Decisions & Instructions	القرارات والتوجيهات
Senior Management	الإدارة العليا
Project's Owner Management	الإدارة المالكة للمشروع
Teamwork	فريق العمل
Challenges and Alerts	التحديات والتنبيهات

Project Management Office (PMO): The Project Management Office is "characterized as a department within the agency responsible for ensuring project execution by directing the projects and programs, and streamlining access to resources, methodologies, tools, and techniques related to projects management." Moreover, the Project Management Office is responsible for supporting the agency in project management or even directly overseeing one or multiple projects.

Project Management Methodology: The methodology provides stability and consistency in project execution through standardizing the planning, implementing, and monitoring techniques. Moreover, it contributes to enhancing compatibility among stakeholders by communicating regularly with them, which in return will ensure project success. The factors and components of the project management methodologies varies by each agency needs, as the methodology may be established according to the project life cycle (Figure 3). Examples of these approaches are Projects' Gates Methodology (shown in figure 4). Additionally, the Approach includes breaking the project down into phases separated by Check Points known as Gates. At the end of each phase, the project progress is evaluated, the risks are analyzed, and a decision is made whether to proceed to the upcoming phase allowing for necessary adjustments and early risk mitigation

Figure 3: Project life cycle

Kick off	البدء
Planning	التخطيط
execution	التنفيذ
Closing	الإغلاق
Monitoring and Controlling	المراقبة والتحكم

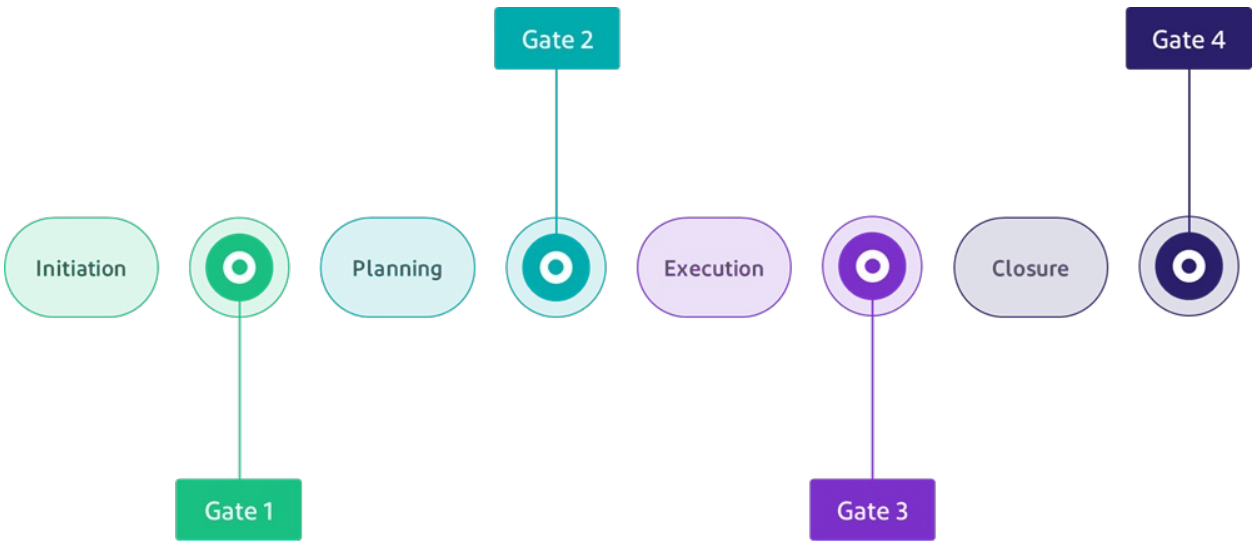

Figure 4: An example of project gates

Gate 1	بوابة 1
Gate 2	بوابة 2
Gate 3	بوابة 3
Gate 4	بوابة 4
Kick off Phase	مرحلة البدء
Planning Phase	مرحلة التخطيط
Execution Phase	مرحلة التنفيذ
Closing Phase	مرحلة الإغلاق

5.3.3 Investment in Technologies:

The investment in technologies includes procuring software, hardware, and advanced network solutions, in addition to keeping pace with emerging technologies that can contribute to maximizing the impact of the project. While implementing the aforementioned, compliance with national and global cybersecurity policies and controls must be taken into consideration. The necessary technologies that may be invest-able within the agency are as follows:

Digital Projects Management Systems:

The project management systems provide a centralized platform for planning, scheduling, and monitoring on the digital projects. such systems provide features as managing tasks, allocating resources, and progress tracking, which will result in facilitating the project implementation and communicating efficiently among the team members.

Examples of Project Management Systems:

- Microsoft Enterprise Project Management (EPM)
- Jira Atlassian
- Oracle Primavera

Documents Management Systems:

Documents management systems are used to store, retrieve, and share project-related documents and files securely and efficiently. Moreover, these systems also allow for version control and document-driven workflow, ensuring effective governance for seamless management of data, documents, and archives throughout the project life cycle (Figure 3). Document sharing programs should be available in KSA.

Data Analytics and Business Intelligence (BI) Tools:

The data analytics and business intelligence (BI) tools enables the agency to gain insights and predictions about the project statues based on the data. Additionally, these tools provide dashboards, reports, and data readings, which in turn streamline finding ways of improvement, supporting decision-making, identifying project directions, and monitoring KPIs.

Examples on Data Analysis and Business Intelligence (BI) Tools:

- Microsoft Power BI
- Tableau
- Oracle BI

Cooperation and Communication Tools:

It is essential to adopt and use collaboration and communication tools, including instant-messaging (IM) applications and video conferencing software, which leads to streamlining communication, file sharing, and cooperation among team members without spatial or temporal constraints

Examples on Cooperation and Communication Tools:

- Microsoft Teams
- Webex

5.3.4 Skills Knowledge

Identifying points of improvement in skills, and providing the necessary training, development, and certification programs to build capacities required for the success of digital projects. The knowledge skills that should be taken into consideration are as follows:

Project Management Skills:

The projects managers should acquire knowledge of project management methodologies and the tools and technologies used. Moreover, the project manager should master skills of project planning, timelining, budget preparation, risk management, and stakeholder management. The training and certification programs may enhance these skills, and ensuring compliance with the international practices of project management.

Examples of Skills and Certificates:

- PMP (Project Management Professional) Certification.
- PRINCE2 (Projects in Controlled Environments) certification.
- Project Management Skills by using Agile and Scrum Methodologies.

Digital Literacy:

The digital projects require the project management team to be adequately aware of the digital culture. This includes the basic understanding of technologies, digital tools, and platforms related to the project.

Examples of Necessary Skills:

- Familiarity of Software Development Life Cycle (SDLC).
- Basic Digital Skills:

- Basic knowledge of operational systems as: Linux and Windows.
- Sufficient knowledge of basic applications of work as: Microsoft Office.
- Technological knowledge of files and data management.
- Digital communication skills using email, live chat formal applications, and video conferencing tools.

Data Management:

- Adequate knowledge of file management systems.
- Understanding of document version control, file management, and archiving.

- Utilizing digital software and tools of projects management.
- Understanding standards and controls of cybersecurity and data confidentiality.
- Understanding the tools and tests of quality assurance and control.

Suppliers and Contracts Management:

The digital projects that are implemented by external vendors or service providers require specific skills for effectively managing or dealing with these projects. Accordingly, the government agencies recommended providing training or resources necessary for enhancing these skills within procurement and project management teams. For example, the skill of identifying the legal requirements and procurement related to vendors and contractors, and the adequate knowledge of the Government Tenders and Saudi Procurement Law.

Soft Skills:

Project managers should have sufficient personal characteristics that enable them to communicate and cooperate with others effectively to manage the relationship with stakeholders. These skills include: negotiation skills, problem-solving skills, leadership skills, and team management.

5.4 Planning and Implementing the Digital Project.

Planning and implementing the digital project include the following:

5.4.1 Choosing an appropriate Methodology to plan and implement the project.

The methodology should be chosen based on the characteristics of the project, such as: complexity of the project activities, rapid development in the project environment, and integration with technological systems. The most popular Methodologies used in planning and implementing the digital project are: Waterfall, and Agile Methodologies.

Waterfall Methodology:

This methodology is one of the most prominent traditional project management methodologies. It follows a linear and sequential process in implementing the project phases, as each phase in the project is completed prior to moving into the next phase, including collecting requirements, designing, development, testing, and deployment. Moreover, this methodology is a suitable option for projects with fixed requirements that do not require frequent updates or changes during the development phase, and a significant change in project requirements is unlikely to happen (Figure 5).

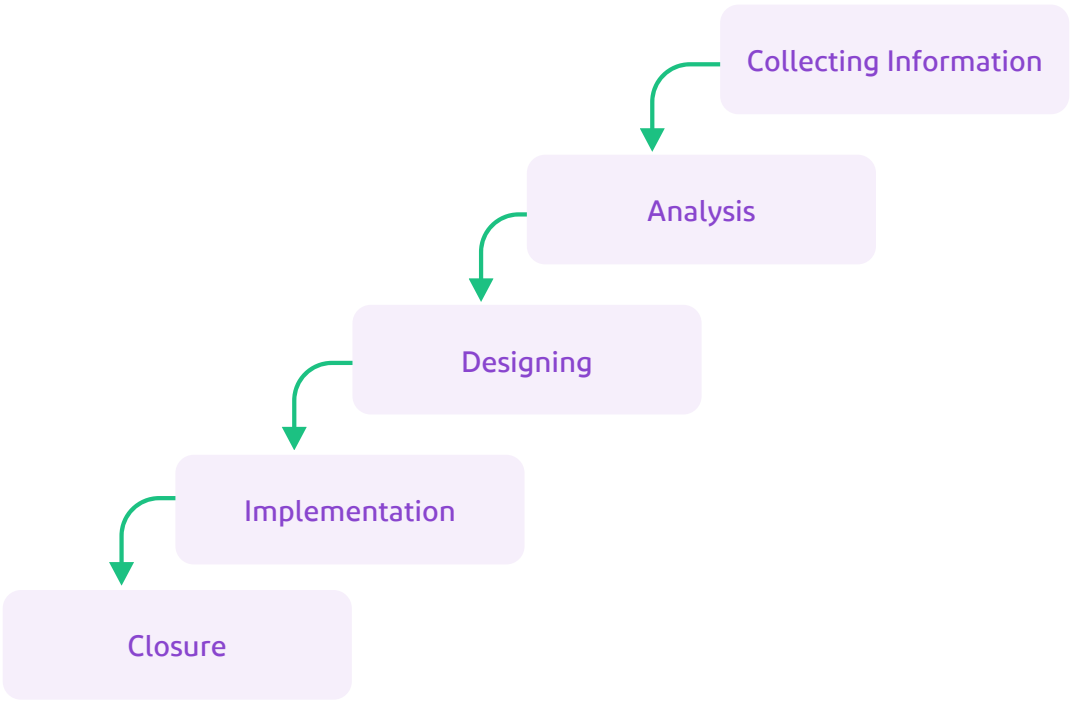

Figure 5: Example of the waterfall methodology

Agile Methodology:

This methodology is a flexible and iterative Approach that fosters flexibility, collaboration, and continuous improvement. The project approach is divided into small iterations called (Sprints), where the final project outcomes are delivered gradually and allows for frequent modifications. In addition, this approach focuses on collaboration with stakeholders, and the ability to respond to changing internal and external requirements throughout project execution.

In the context of digital projects, the Agile methodology is often preferred over the Waterfall methodology. This is due to the digital projects are often involve evolving requirements, rapid technological change, and continuous need for improvement. The Agile Management Approach enables validation of ideas, continuous improvement, and the ability of adapting with users' needs.

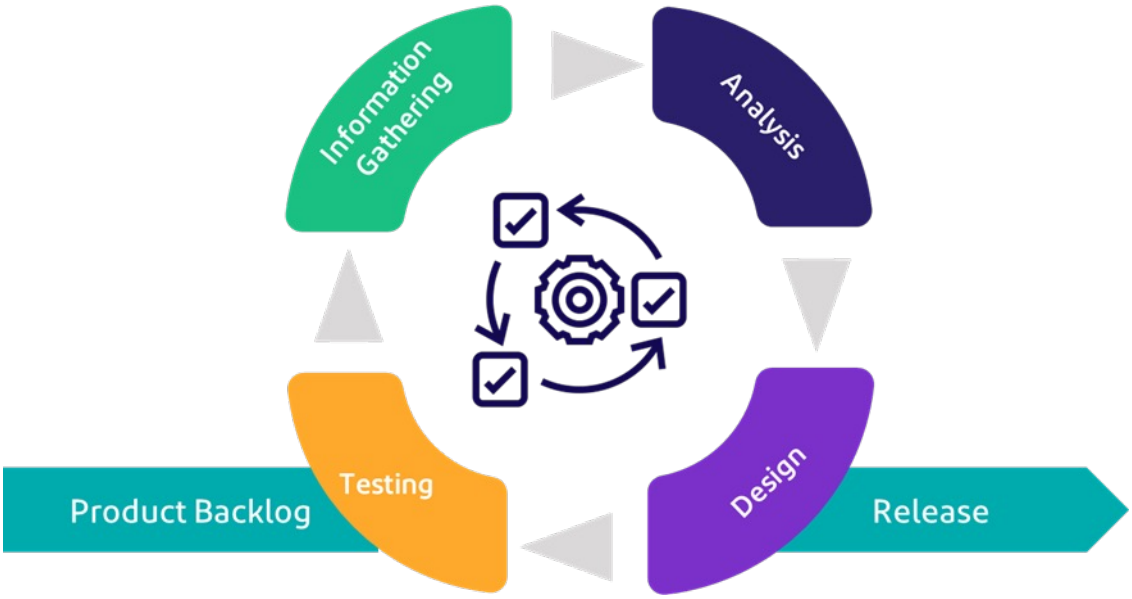

Figure 6: An example of the agile management approach

Analysis	التحليل
Collecting information	جمع المعلومات
Testing	التصميم
Designing	الاختبار
Release	الإصدار
Product backlog	قائمة المنتج

5.4.2 Principles of the Agile Management Methodology

This methodology focuses on the iterative development, continuous alignment, and flexible project planning allowing the teams to respond to requirements and evolve incrementally. To better understand the principles of the methodology better, it is important to be familiar with the following concepts:

Agile Manifesto: The document shows the main principles by which the team is committed, through implementing the project, such as: collaborating with stakeholders, responding to the change, and providing practical solutions.

Scrum Framework: Scrum is one of the most popular methods used to apply the Agile Management Approach, it also identifies a set of steps, roles and responsibilities that will be applied iteratively in Sprints, each duration is (1) to (2) weeks (Figure 7). Scrum is based on some main principles, including:

- Iterative Development: Projects are developed in short, recurring cycles called Sprints.
- Collaboration: The project team has multiple skills and collaborates closely throughout the project.
- Transparency: Keep stakeholders informed of project progress through regular meetings and reports.
- Inspection and Adaptation: Project teams regularly inspect their own work and adapt the project plan as needed.

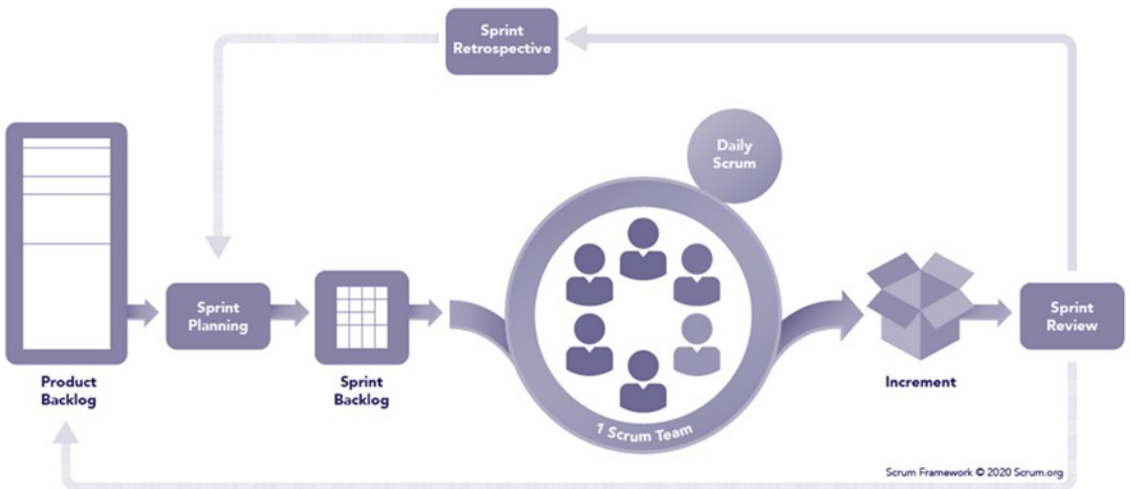

Figure 7: Example of scrum framework

Sprint Assessment	تقييم التكرار
Daily Stand-up meetings	الاجتماعات اليومية
Sprint Planning	تخطيط التكرار
Product Backlog	قائمة المنتج
Teamwork	فريق العمل
Increments	المنتجات الجزئية
Sprint Review	مراجعة التكرار

5.4.3 Implementing the Digital Project using SCRUM Framework

The SCRUM Framework is based on breaking down a work into manageable units called User Stories, which are prioritized in a list called the Product Backlog, then executed through Sprints, in order to gradually deliver value, enhance cooperating collaboration, and respond to changing requirements. The following is an explanation of SCRUM Framework elements:

Team Formation:

The first step is identifying and recruiting a multi-disciplinary team with diverse skills and experience. The importance of cooperation, self-organization and shared responsibility within the team must also be emphasized. Then, roles, responsibilities, and reporting structures are identified to ensure clarity and effective coordination.

Developing the Product Backlog:

A project manager, at the beginning of the planning phase, must create a prioritized list of User Stories or Features. This list is called Product Backlog. This list serves as the foundation for project planning and execution, as it contains all the project requirements whether features, functionalities, etc. (Figure 8).

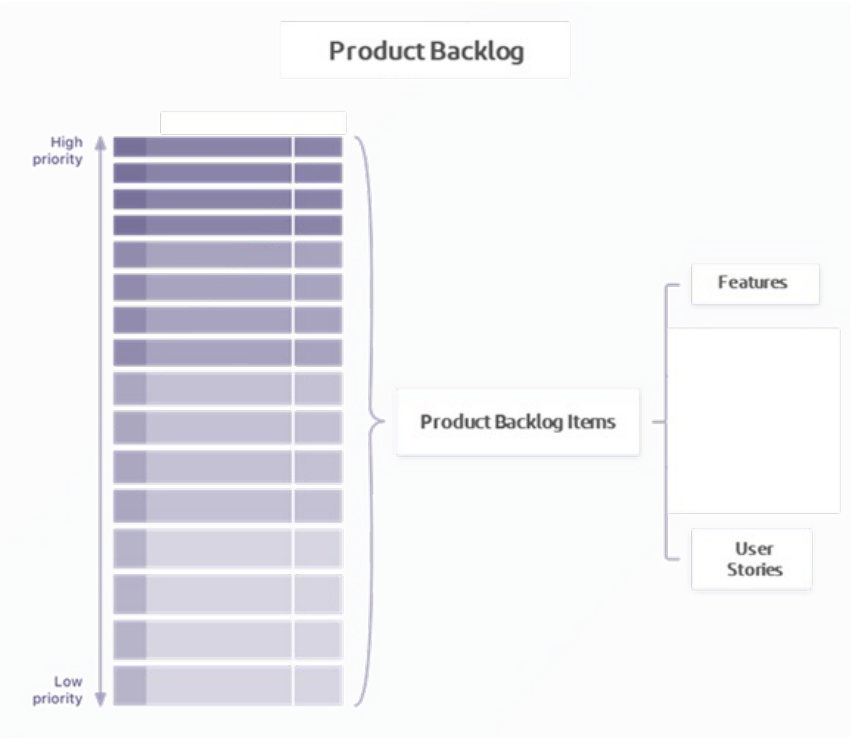

Figure 8: An example of product backlog

Product backlog	قائمة المنتج
high-priority	عالية الأولوية
Lower priority	منخفضة الأولوية
Product Backlog Elements	عناصر قائمة المنتج
Features	ميزات
User Stories	قصص مستخدم

User Stories:

User Stories are developed to capture requirements or specific functions from end users' points of view. User Stories are written in just (1) or (2) sentences that identify users' identity and their needs and why. For instance, the Users' Story will be as follows: As a database administrator, I want to automatically merge datasets from different sources, so that I can easily create reports for my internal clients.

INVEST is one of the most significant standards used in developing User Stories to refine and validate User Stories, as the letters of the word express the following:

- **Independent:** User Stories should be as much as independent to avoid reliability at work, as high-priority stories can be executed without executing other lower-priority stories.
- **Negotiable:** User Stories should be negotiable between development team and stakeholders, as they are not fixed specifications or contracts, yet starting points for cooperation and improvement.
- **Valuable:** User Stories should provide value for end users and stakeholders. Moreover, they should focus on providing tangible benefits or solutions to specific problems. Therefore, each User Story should have a clear objective that reflects its value to the project.
- **Estimable**: Development team should be able to understand User Stories and estimate the efforts, complexity to implement them accurately. Consequently, the team will be able to estimate time and resources required. Measurability also helps in prioritizing stories so that stories, that require less effort and provide the highest value, can be centralized. Story Points concept is one of the most recognizable methods to estimate efforts, and is considered a relative scale to complexity, size, efforts necessary to complete User Stories.
- **Small:** User Stories should be small enough to be finalized in one Sprint. Small User Stories contribute to plan, estimate, and track progress better, as they enable the major requirements to be more manageable parts that foster flexibility and maintain a stable delivery pace.
- **Testable:** User Stories should have clear acceptance criteria that defines how to verify successful story implementation. Moreover, testable covers the ability of development team to conduct tests and verify technological functions that contribute to provide high-quality outputs.

Sprint Planning:

Planning meetings for iteration are conducted prior to each Sprint to identify the scope of work of each iteration. User Stories that will be implemented through Sprints are identified on these meetings, and estimate efforts and time required to each Story by referring to the Product Backlog.

Sprint Backlog:

A Sprint Backlog, including the User Stories identified for iteration, their tasks, dependencies, efforts, and time expected to finalize each story, is created to be the last phase in Sprint Planning, and as a result of the meetings held (Figure 9).

User Stories	Assigned to	Status	Estimate	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
User Story #1								
Task			7	5	3	0	0	0
Task			3	1	1	5	0	1
Task			1	0.5	0	3	0	0
Task			0.5	1	2	3	1	0
User Story #2								
Task			3	3	0.5	0.5	0	0
Task			3	5	5	1	1	1
Task			2	2	5	0	1	0
Task			5	5	9	5	1	0
User Story #3								
Task			8	6	0	0	0	0
Task			3	1	3	3	3	0
Task			1.5	1	0.5	0.5	1	1
Task			2	0.5	0	0	0	0
User Story #4								
Task			9	4	2	2	1	1
Task			6	6	3	3	3	1
Task			6	2	8	8	1	0
Task			0.5	0.5	0.5	0.5	0	0

Figure 9: An example of sprint backlog

User Stories	قصص المستخدم
Implementation Responsible	المسؤول عن التنفيذ
Status	الحالة
Estimated Time	الوقت المُقدر
Day 1	اليوم الأول
Day 2	اليوم الثاني
Day 3	اليوم الثالث
Day 4	اليوم الرابع
Day 5	اليوم الخامس
User Story	قصة المستخدم
Task	مهمة

Sprint Execution:

The team implement, in this step, the planned work within the time frame set for the sprint, which range from a week to (2) weeks. The following practices can be followed to ensure an effective implementation of the sprint:

- Daily Stand-Up Meetings: The team holds a daily meeting to boost communication, coordination, and transparency within the team. Each of the team members must provide updates on its progress, the challenges it faces, and its plan for the day. Additionally, any obstacles and support requests will be discussed aiming at keeping the workflow.
- Ensuring Agile Development Quality: A regular testing is carried out and automated testing tools are used, during the implementation of sprint, aiming at guaranteeing the stability and reliability of the technical functionalities of the product or service.

Increments:

Increment is a product that can be available for users after the completion of a sprint. Moreover, a set of legitimate objectives and expectations is being identified for each increment in cooperation with the stakeholders, each increment must therefore be complete and releasable. The increment may be kicked-off, when required.

Sprint Review:

The team must carry out sprint review to enhance contentious optimizations and learning. The team review the complete work with the stakeholders. The compatibility of outputs with stakeholders' expectations is also assessed and any necessary modifications are identified. During this step, emphasis should be placed on the significance of promoting open and effective communication within the team by discussing the strengths of the work and areas that need optimization, taking enforceable actions to address them, and then implementing changes in the next sprints to optimize the project outcomes.

Sprint Retrospective:

The team reviews its performance during the sprint, identifies the strengths and weaknesses of the work mechanism, collects the team's observations, and hears their views, experiences, and suggestions for optimization aiming at fostering a culture of continuous development in the team, and enhances the efficiency of future sprints.

5.4.4 Tools and Technologies of Agile development

The following tools and technologies can be used in implementing digital projects:

Work Breakdown Structure (WBS):

WBS is a description of the work to be done during the project and is a common method used to identify all project outputs, phases, and activities (Figure 10). WBS can be used to determine the scope and priorities of the project, determine the estimated project budget and distribute it to deliverables and phases, evaluate risks and implications, and timelining the project's work.

المستوى	المستوى الفرعي	الوصف	المسؤول	البداية	النهاية	ملاحظات
1	1	المرحلة 1		12/11/2023	12/24/2023	
2	1.1	مهمة مستوى 2		12/12/2023	12/13/2023	
2	1.2	مهمة مستوى 2		12/13/2023	12/14/2023	
3	1.2.1	مهمة مستوى 3		12/14/2023	12/15/2023	
3	1.2.2	مهمة مستوى 3		12/15/2023	12/16/2023	
4	1.2.2.1	مهمة مستوى 4		12/16/2023	12/17/2023	
4	1.2.2.2	مهمة مستوى 4		12/17/2023	12/18/2023	
4	1.2.2.3	مهمة مستوى 4		12/18/2023	12/19/2023	
2	1.3	مهمة مستوى 2		12/19/2023	12/20/2023	
1	2	المرحلة 2		12/20/2023	12/24/2023	
2	2.1	مهمة مستوى 2		12/21/2023	12/22/2023	
3	2.1.1	مهمة مستوى 3		12/22/2023	12/23/2023	
3	2.1.2	مهمة مستوى 3		12/23/2023	12/24/2023	
1	3	المرحلة 3		12/24/2023	12/29/2023	
2	3.1	مهمة مستوى 2		12/25/2023	12/26/2023	
3	3.1.1	مهمة مستوى 3		12/26/2023	12/27/2023	
4	3.1.1.1	مهمة مستوى 4		12/27/2023	12/28/2023	
2	3.2	مهمة مستوى 2		12/28/2023	12/29/2023	

Figure 10: Ex. WBS

Level	المستوى
Sub-level	المستوى الفرعي
Description	الوصف
Responsible	المسؤول
Start	البداية
Finish	النهاية
Notes	ملاحظات
Phase	المرحلة
Level Task	مهمة مستوى

Gantt Chart:

Gantt Chart illustrates the projects schedules, timelines, and tasks dependencies among tasks. It also visually presents tasks, their duration, and relationships visually allowing project managers to track progress and identify critical activities (Figure 11).

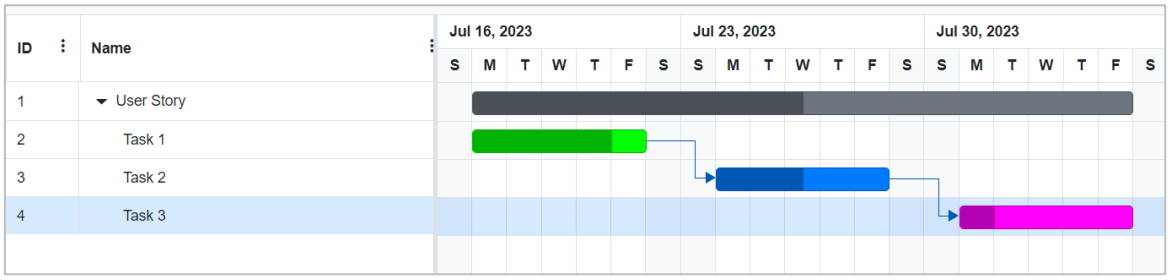

Figure 11: Ex. Gantt table

Kanban:

The project tasks can be tracked and identified by visual kanban to trace the user stories. There are (3) main states of tasks: (To do) for tasks that are yet to be started, (In-progress) for tasks that are currently being worked on, and (done) for tasks that have been completed.

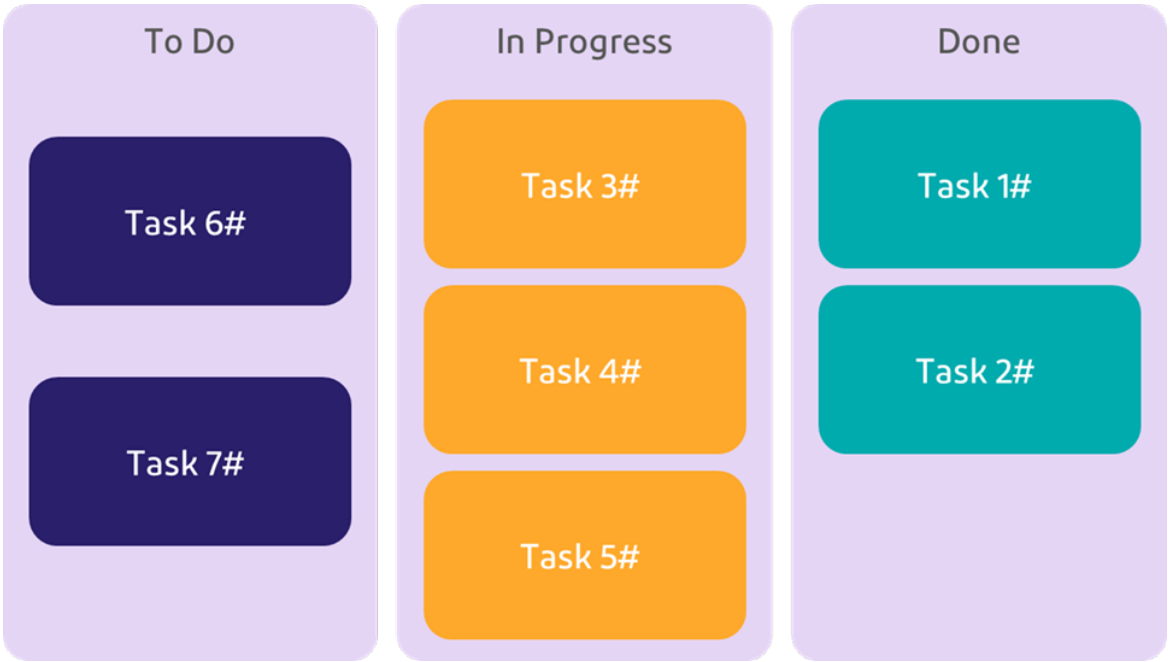

Figure 12 : Kanban

To-do	للإنجاز
In-progress	قيد التنفيذ
Done	مكتمل
Task	مهمة

Burndown Charts:

Burndown Chart is used to illustrate the progress of work during sprint and the remaining work over time, which helps the teams monitor the pae of its progress and adjust it when needed (Figure 13).

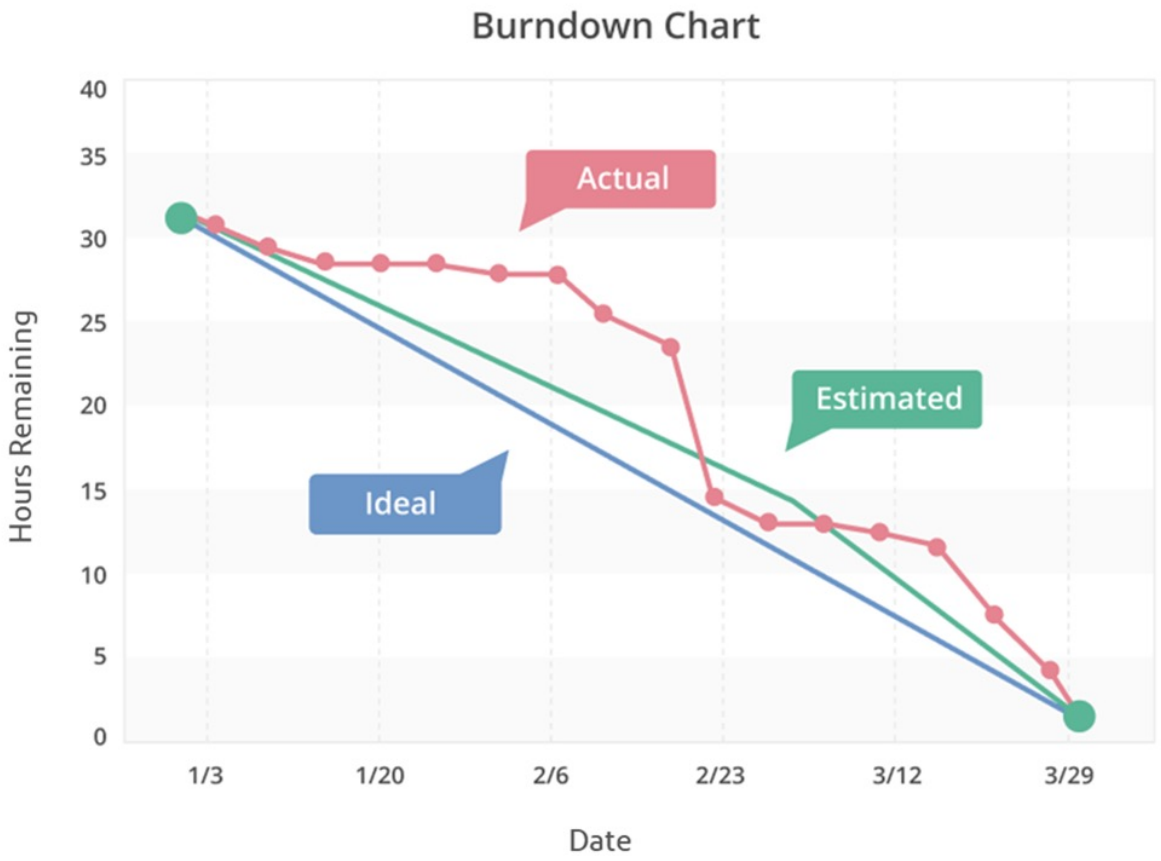

Figure 13: Ex. burndown chart

Burndown Chart	مخطط الإنجاز الكلي
Actual Completion	الإنجاز الفعلي
Estimated Completion	الإنجاز المتوقع
Optimal Completion	الإنجاز المثالي

5.4.5 Managing Change Requests in the Project

Change requests often arise due to the sophistication of stakeholders' needs, because there are opportunities that are important to seize, or because of the arise of unexpected challenges. The following are some steps that contribute to the effective management of change requests and ensure the continuity of the project's execution:

1. Documentation: The change request process must be officially documented. It must involve a detailed information including the following: Reasons of the request and its impact on the project scope, timeline, and budget.

2. Assessment: The change requests must be thoroughly evaluated. The evaluation should cover the compatibility of the change with the project objectives, and priorities are re-evaluated on the basis of urgency and relevance.

3. Communication: The communication among the stakeholders must be transparent. The stakeholders should discuss the consequences of change and possible modifications to the project scope, timeline, and budget.

4. Documentation (Again): If approved, the project documents must be updated accordingly, including the project plan, requirements, and other relevant documents.

5. Execution: The approved changes should be implemented methodically to ensure its compatibility with project objectives and limit disruption.

6. Contentious Monitoring: The monitor over the project overall status must continue and adapt as necessary.

5.5 Risk Management in the Digital Project

Risk management is a set of processes that are taken to measure and evaluate risks and develop strategies to deal with them, as digital projects within government agencies typically face a variety of risks that can impact the project success. The importance of risk management is to mitigate the potential negative impact, which would affect the scope, cost, quality, and schedule of the project. Furthermore, it contributes to establishing a common way of communication regarding risks and assign responsibilities within the team. Follow the steps below, for effective risk management:

5.5.1 Risks Identification

The first step in risk management is to identify and document potential risks that may arise throughout the project. This includes a comprehensive risk assessment and stakeholder engagement through the following methods:

- Carrying out brainstorming sessions with the project team members, stakeholders, and experts to identify potential risks.
- Reviewing learned lessons of previous projects, risk records, best practices, and relevant studies to identify possible risks.
- Carrying out interviews and surveys with main stakeholders and subject matter experts to collect their expectations on potential risks.

5.5.2 Evaluating and Prioritizing Risks

The impact and possibility of each potential risk is assessed after identifying the risks. This evaluation helps to prioritize risks based on their type, possibility of occurrence, and magnitude of impact, which enables appropriate resources to be allocated to coping efforts. The participation of relevant stakeholders in the risk assessment process must also take advantage of views. The following methods can be followed to evaluate risks:

- **Quantitative Analysis:** Quantitative analysis is carried out by allocating numerical value to assess the potential impact of the risk in terms of cost, time, and resources, or other relevant factors. For example, using scale from (1) to (5) to evaluate the possible impact of the risk on the project's objectives.
- **Qualitative Analysis:** The qualitative analysis is carried out by dedicating specific classifications: Hight, medium, or low to evaluate risk impact based on the repercussions and their types.

Additionally, risk priorities are also determined by ranking risk according to the many shared values of the impact and probability of each risk occurring, as well as qualitative risk classification. The following methods can be used to review and identify risk priority.

- **Risk Matrix:** Breakdown risks on a two-dimensional matrix (5×5) based on impact evaluation and risk probability to help visually prioritizing. The risk matrix identifies each individual risk in one of the matrix cells through the risk evaluation categories and their impact. Individual cells in the risk matrix also have a priority sequence of (1) to (25) to provide a risk classification (shown in Figure 14), prioritizing risks in the quarter of high impact and high probability.

Risk Matrix					
Probability	Impact				
	Trivial	Minor	Moderate	Major	Extreme
Rare	1	2	3	4	5
Unlikely	2	4	6	8	10
Moderate	3	6	9	12	15
Likely	4	8	12	16	20
Very Likely	5	10	15	20	25

Figure 14: Ex. risk matrix

Risk Assessment Matrix	**مصفوفة تقييم المخاطر**
Possibility	الاحتمالية
Implication	الأثر
Rare	نادر
Unlikely	مُستعبد
Moderate	مُمكن
Likely	مُحتمل
Very likely	مُرجح

Pareto Analysis

It refers to the analysis premised on the idea that 80% of problems can be solved by doing 20% of the causes. Therefore, the risks with a potential high impact must be identified and centralized at first.

Priority Risk Index (RPI)

The Priority Risk Index is calculated by multiplying impact and probability assessments to determine risk priority.

Priority Risk Index = Impact x Probability

5.5.3 Risk Mitigation Strategies

To manage and avoid the potential risk, project managers must cooperate with the stakeholders to develop corrective plans, alternative methods, and management strategies. The aforementioned plans could include methods to avoid, transfer, mitigate, or approve the risks according to the project context.
Risks and Proposed Mitigation Strategies Examples:

Risk: It is cybersecurity attacks or data breaches which affect the sensitive information.
Mitigation approach

- Implement Robust Security Measures, such as: encryption, firewalls and access controls, to protect sensitive data.
- Conducting regular safety audits and gap assessments to identify and address possible gaps.
- Training project team members on the best security practices and establishing strict protocols to restrict access to data.
- Complying with the National Cybersecurity Authority's requirements.

Risk: Failure of a critical technological systems used in the project, affecting the work progress.
Mitigation plan

- Creating backup systems and infrastructure to avoid system failure.
- Developing and implementing recovery plans to recover processes as soon as possible in case of system breakdown.
- Ensuring signing support and operation contracts with system suppliers and service providers to ensure immediate support and solutions in the event of any technical problems or failures.

5.5.4 Learned Lessons and Continuous Improvement Documentation

The digital projects provide unrivaled opportunities for continues learning and improvement. According to the aforementioned, the project managers must document and share learned lessons throughout the project life cycle (Figure 3). Analysis of previous experiences, both successes and failures, helps identify recurring risks and their management mechanisms, allowing project teams to implement the necessary preventive measures and improve future project results.

5.6 Digital Project Relationships Management

The relation management in digital projects aims at improving relations, enhance collaboration and alignment with the stakeholders in order to achieve success and improve overall performance. One of the most important aspects of relationship management for effective digital project management is as follows:

5.6.1 Stakeholder Management

Stakeholders are individuals, groups, or organizations with an interest in or who engaged in the digital project. There's an internal stakeholder, such as project sponsors and owners, office of Enterprise Architecture and Information Technology Management, or an external stakeholder such as end-users and suppliers. Stakeholder management includes identifying their concerns, engaging them at all project phases and integrating them into decision-making. The following steps can be followed to effectively manage the stakeholders:

- Identifying the stakeholders, their interests, and analyzing their expectations and impact levels by holding meetings with them, understanding, and analyzing their expectations and aspirations. Thus, a map that demonstrates each other's roles and impact on the project will be designed.
- Developing detailed communication plans with stakeholders throughout the project life cycle (Figure 3), ensuring that the stakeholders are informed of the project updates, potential risks and drawbacks, the support required to manage these risks and the work progress.
- Managing stakeholders' expectations on the project objectives, deliverables and timelines, and potential risks to avoid any misunderstandings in the future.

5.6.2 Suppliers Management

- **Supplier Selection**: The first step in the management of suppliers is to choose the right supplier for the project. The selection process includes conducting a comprehensive evaluation according to several factors, including the supplier's experience, past experience, solvency, and the conformity of its expertise with the project objectives. The agency ensures selection of the most suitable supplier by establishing clear standards and carrying out the supplier selection process.
- **Contractual Agreements and Service Level Agreements**: The agency must sign clear contractual agreements with the supplier to effectively manage them, including determining the project scope and its outputs (based on the bills of quantities), timeline, payment terms, and service level agreements. Moreover, the agency must ensure the contract is in alignment with the project objectives and mitigate the potential risks.
- **Monitoring and Evaluating Suppliers Performance**: The project managers must develop mechanisms to monitor the supplier's performance and achieve high-quality outputs. Furthermore, Key Performance Indicators (KPIs) should be identified, and the review of work progress should be carried out on a regular basis. Additionally, KPIs such as project timeline compliance, budget compliance, and output quality must also be tracked and evaluated, ensuring the early identification of any deviations and enabling timely corrective actions.
- **Dispute Resolution and Contract Management**: There are potential challenges and disputes with the supplier that could crop up throughout the process of the project. Therefore, project managers must develop mechanisms to solve problems quickly and resolve disputes with the supplier according to the pre-defined escalation paths of contractual agreements and the communication plan. The Government Tenders and Procurement Law must also be complied with.
- **Suppliers' Performance Final Evaluation**: Upon completion of the project, a comprehensive final evaluation of suppliers' performance must be done, according to pre-specified standards. The final evaluation affects the supplier's classification inside the government agency and its engagement with similar future projects.

5.7 Quality Management and Digital Project Control

The digital projects are highly dynamic and constantly improved, which requires having practices to ensure the project outputs quality and compliance with its requirements in order to achieve the expected results. The following practices for managing and ensuring quality throughout a digital project life cycle should be followed:

5.7.1 Quality Factors Definition

It refers to a product or service provided by the digital project to meet the needs and requirements of the stakeholders. The quality of the digital project has many aspects, including functional requirements, non-functional requirements, User Experience (UX) / User Interface (UI), performance, security, and scalability.

5.7.2 Establishing Quality Standards

It is crucial to establish clear standards for measuring quality factors to be a reference throughout the project life cycle. These standards can be measured throughout quality assurance activities such as reviews, tests, identifying quality control actions to ensure its compliance with established standards. These standards and processes must be communicated to all stakeholders in the project and integrated into the project framework.

Quality Standards Examples:

- Response Time: The time taken for the system to response to the user actions.
- System Throughput: A measure of how many operations a system can process in a given amount of time.
- Compliance Rate with Accessibility Guideline: Ensuring digital products and services are in compliance with the accessibility Guideline, including: Web Content Accessibility Guideline (WCAG) to ensure inclusiveness for special-needs users.

5.7.3 Quality Assurance Activities implementation

It refers to all planned activities and methodologies carried out to ensure the conformity of the product or services of the digital project with the defined quality standards in the project. The following activity could be executed to ensure quality:

5.7.3.1 Test Planning and Execution

The test planning and execution strategy is essential to ensure quality of the digital projects. Additionally, it includes creating comprehensive product test plans to meet the functional requirements and non-functional requirements, then identifies test cases in which specific test scenarios are identified, and then writes test scripts to conduct the test. Tests are carried out frequently throughout the project life cycle to detect defects and address them early. Automated Testing and Continuous Integration are some of the methods used mostly in carrying out tests iteratively. Automated Testing helps reducing the efforts exerted to make the test, improve accuracy, and minimize human errors. On the other hand, Continuous Integration allows updating continuously, so that it ensures the product stability and its compliance with quality standards. The following tools can be used in planning and carrying out tests:

Testing Management Tools:

- TestRail
- Zephyr

Quality code tools and static code analysis:

- SonarQube
- Check style

Automated Testing Tools:

- Selenium
- JUnit
- Cucumber

Continuous Integration (CI) Tools:

- Jenkins
- Travis CI

5.7.3.2 Peers Reviews

It is known as the process used by the developers to review codes developed by others, and is considered one of the quality assurance methods. Regular reviews of products and documents of the project contribute to the following: Codes, design documents, requirements of enhancing co-operation, exchange knowledge, identification of possible defects, or deviation from standards.

5.7.3.3 Continuous Improvement and Lessons Learned

Quality assurance should be considered a continuous development operation. Project Managers must capture and analyze lessons learned whether inside the project team or through the entire agency. In addition, they should carry out improvements based on the lessons learned which contributes to improving project quality and its future performance.

5.8 Change Management of the Digital Project:

The digital projects require an effective change management to guarantee its success and achieve its targets. One of the most significant strategies enabling the project managers to handle change complexity and ensure successful project outcomes are the following:

5.8.1 Understanding the Need of Change Management:

The digital projects lead to major changes in the processes, systems, and individuals within the agency , so the change management approaches should be applied to ensure that the project objectives comply with the desired results. Change management aims at reducing resistance, improving acceptance, and achieving project's benefits.

5.8.2 Assessing Change Readiness:

It includes evaluating the culture of the agency and previous changes happened in and how far the targeted agency accepts the change. Evaluating change readiness helps understanding the possible challenges, identifying the areas requiring additional support, and modifying change management strategies accordingly.

5.8.3 Change planning and Strategy:

It is crucial to develop a comprehensive plan including change management's strategies, activities, timelines, and responsibilities, and identify the necessary steps to deal with change resistance, provide training, and monitor progress. In addition, this plan should include a clear vision of change, communication strategies, stakeholders' engagement methods, and approaches to tackle change resistance. The plan and strategy of change also aim at handling change complexity and gaining stakeholders' support.

5.8.4 Implementing Change Management Methodologies:

Change management methodologies provide a structured approach aiming at managing the change complexity in the agencies by providing frameworks, tools, and technologies to guide the change process, engage stakeholders, and mitigate change resistance. PROSCI is one of the well-known approaches in change management that focuses on change management exclusively as it is supported with more than (20) years of research and best practices in the area. Moreover, PROSCI combines between scientific principles and focusing on the human side of change to deliver knowledge related to change management and ensure an exceptional performance.

To carry out the change and ensure its continuity according to PROSCI, ADKAR framework can be followed-up, as it identifies (5) essential pillars should be followed by all change management activities to achieve a successful change (Figure 15).

Figure 15: ADKAR Model

Awareness	الوعي
Awareness of the need for change is a critical foundation for overcoming resistance by providing the necessary awareness to all members.	الوعي بالحاجة للتغيير هو ركن أساس حساس للتغلب على المقاومة بتوفير التوعية اللازمة لجميع الأعضاء
Desire	**الرغبة**
Personal motivation contributes to their desire to abide by the workflow mechanism. Every member may have his or her reasons for becoming involved or resisting.	الدافع الشخصي يساهم في مستوى رغبتهم لاتباع آلية سير العمل. قد يكون لدى أي عضو أسبابة الخاصة للانخراط أو المقاومة.
Knowledge	**المعرفة**
Assisting members in gaining intellectual understanding in a way that ensures the adoption and optimal operation of the developed system.	يجب تطوير مساعدة الأعضاء على كسب فهم فكري بطريقة تضمن التبني والتشغيل الأمثل للنظام المطور.
Ability	**القدرة**
Ensure that the ability to work with the proposed changes is the optimal solution. Further, ensure that the necessary support is provided.	ضمان أن القدرة على العمل مع التغييرات المقترحة هي الحل الأمثل وأن الدعم اللازم يتم توفيره.
Reinforcement	**التعزيز**
Maintain change and monitor performance while providing positive recognition to those involved.	الحفاظ على التغيير ومراقبة الأداء مع التأكد من تقديم التقدير الإيجابي للمشاركين في التغيير.

Examples for activities achieving ADKAR pillars:

For example, when developing a new internal communication system, the government agency can commence the work of change management activities that follow ADKAR pillars. Ex.

Awareness
Launching an awareness-raising campaign. The campaign can include sending e-messages, organizing virtual seminar, publishing a content highlighting on the system advantages.

Desire
Organizing interactive workshops that allows the employees to discover and interact with a new communication platform, and know the advantages that make their work more efficient, which foster the desire to use the system.

Knowledge
Developing a comprehensive user manual of the system and educational visual videos that enable the employees to know the mechanism of using the new system effectively.

Ability
Creating communication channels to respond to the inquiries and technical support to enhance employees' capabilities for using the system confidently.

Reinforcement
Honoring and rewarding the employees who used the new platform continuously to reinforce their behaviors and encourage them to continue doing so.

All activities aforementioned are illustrative examples, and are not necessarily the only or necessary activities in each pillar.

5.8.5 Tracking Implementation Performance
Monitoring progress and effectiveness of change initiatives is essential to maintain the long-term change. Key Performance Indicators (KPIs) must be created to measure the impact of change, and control the progress and effectiveness of change on the agency. Furthermore, regular evaluations allow for identifying the improvements aspects, carrying out the necessary modifications, and ensuring the change to be a part of the agency.

5.9 Release Management in the Digital Project

Release Management includes planning, timelining, and coordinating to release the project outputs, as well as ensuring achieving a seamless transition into the operational environment, including the following activities:

5.9.1 Release Planning:

It includes the identification of release objectives, the features, or the main functions that will be delivered, and the development of milestones and a timeline for release.
The plans that can be followed throughout release planning are as follows:

Roll-out Plan: It refers to the steps clarifying the way of applying the update successfully on the product and its working mechanism to reach the expected results. Roll-out plan focuses on publishing the project outputs gradually to the users or specific targeted groups to ensure the seamless transition from development to production.

Launching Plan: Launching plan includes all activities of product launching, and focuses on the formal submission and marketing of the project outputs for the target audience. Additionally, it aims at raising awareness, arousing enthusiasm, and streamlining the successful launching.

Moreover, it is crucial to cooperate with the stakeholders throughout launching planning phase to identify priorities and requirements, manage the expectations, and ensure the compliance of the release plans with the project objectives. The release can be presented as a part of the committees works responsible for the agency or the project, for example:

- The committees responsible for ensuring the compliance of the product or the service with the business requirements and needs.
- The committees responsible for ensuring the compliance of product to the relevant quality and security standards identified previously by the relevant agencies and regulations within the agency.

5.9.2 Version Controlling

Version controlling includes maintaining a central warehouse of the project assets and documenting the changes in the release. Controlling the release enhances the transparency and traceability, and enables the referral to the previous versions in case of any problems in the last release.

5.9.3 Post-Release Evaluation

A comprehensive evaluation must be developed for each release to measure the release success and guide the future improvements. The evaluation includes: Collecting the notes of the end users, analyzing KPIs, and evaluating the general impact of the release on the project objectives.

5.10 Follow up and measure the impact of the performance of the main indicators of the digital project

To ensure effective management of the digital projects, some of the key indicators, that can be measured prior, during, post carrying out the digital project, are used. These indicators are categorize into (3) key categories: Performance indicators, Stakeholder-related indicators and financial indicators. For example, the government agencies can develop the following indicators:

Indicator	Description	Top Performance	Average Performance	Poor Performance
Sprint Performance	The effectiveness and productivity of the team in implementing user stories in each iteration.	Implement all specific user stories to the iteration.	Implement specific user stories to iterate at (90%) and (80%).	Implement specific user stories to iterate less than (80%).
Business Efficiency	The percentage of finalized user stories without rejecting or iterating from the stakeholders.	Above (80%)	Between (50%) and (80%)	Lower than (50%)
Carrying out Continuous Improvement	The percentage of specific improvement actions implemented.	>80%	Between (60%) and (80)	<60%
Compliance with the Plan	Difference between the actual progress and the timeline of the planned project	Within (+/- 5%) of the planned timeline	From (+/- 5%) to (+/- 10%) of the planned timeline	Less than (-10%) or more than (+10%) of the planned timeline
Stakeholders Engagement	The percentage of stakeholders engaging in an activity of the project	>90%	Between (70%) and (90%)	<70%
Compliance with Budget	Contrast between the actual and planned cost of the project	In the range of (+/- 5%) of the planned budget	From (+/- 5%) to (+/- 10%) of the planned budget	Less than (-10%) or more than (+10%) of the planned budget

6. Table of Definitions

The following terms and expressions, wherever mentioned in the Document hereof, shall have the meanings ascribed, unless the context requires otherwise:

Term	Definition
DGA	Digital Government Authority
Digital Government	Promotes administrative, organizational and operational processes between the various government agencies in their transitioning to a comprehensive digital transformation to allow easy and effective access to government digital information and services.
Government agencies	Ministries, authorities, public institutions, councils, national centers including any additional form of a public agency.
Digital Transformation	Digitally and strategically transforming and developing business standards and models that would rely on data, technologies, and ICT.
Beneficiary	Citizens, residents, visitors, government agencies, private sector, non-for-profit sector, inside or outside the KSA that require to interact with a government agency to receive any of the services offered in the Kingdom.
Agile Management	A methodology in the software development process in which software is created and developed through collaborative efforts within a designated, cross-functional team
Scrum	It is one of the most famous methods of implementing agile management. Furthermore, it defines the roles, responsibilities, and events that will be applied frequently in one- to two-week sprints, and it allows the team to install software regularly.
Kanban	It refers to a visual framework of the agile management and it promotes workflow improvements in minor and continuous changes of the executed process. Moreover, it is also known as “visual cards” or “sign” in Japanese.

Functional Requirements	The requirements include the analysis of the requirements described with specific use cases and key scales that define their success and verify whether the technologies meet the specific functional requirements or if their use is limited or unnecessary. Besides, it is essential to rigorously consider specific functional requirements, for example the suitability of the emerging technologies and their compliance with the existing government agency structure and the structure it aspires to adopt in the future.
Non-Functional Requirements	It refers to limits and constraints of the system to be designed and they do not affect on the Project functions, ex. security, performance, and user interface and user experience.
User Interface (UI)	It refers to the used design elements of creating programs or computerized hardware interfaces according to the user requirements to enable the interaction with the system in order to access these elements and utilize them as well as streamlining carrying out the actions. Furthermore, UI focuses on the conception of the interactive and visual design and information structuring.
User Experience (UX)	It refers to the process that developers use in manufacturing of products aimed at providing meaningful and user-centric experiences. Furthermore, the process includes developing the whole experience as follow: define the value, function, content, browsing, usability, branding, and interface design.
Digital Products and Service Security	It aims at to protecting the users' info and data from not permitted access and cyber threats.
Scalability	It refers to the ability of technology supporting digital government businesses to implement a larger workload.
Digital Product	Digital solutions serving the same scope and offered as one group through digital channels such as electronic portals and smart device applications, and these solutions enable the beneficiary to complete a request or a service. Products may include software, information, or a related set of services that are associated with providing a specific outputs to beneficiaries, such as: Passports, Traffic and Civil Affairs.
Digital Service	A set of transactions linked to each other to perform a complete function provided by the government entity to the beneficiary through digital channels such as digital portals and smart device applications so that they have one main exit defined and specified. A group of services can be linked together to form a digital product.
methodology	It refers to a structured and defined approach or set of practices used to guide work.
Stakeholder	Parties and entities that affect and are affected by decisions, directions, procedures, objectives, policies and initiatives of the digital government and share some of their interests and outputs and are affected by any change that occurs in them.

7. Table of Abbreviations

Abbreviation	Full Form
PMO	Project Management Office
RPI	Risk Priority Index

8. Appendix

8.1 Appendix 1: Figures Table

هيئة الحكومة الرقمية
Digital Government Authority

DGA.GOV.SA