v1.0

DIGITAL TOOLS FOR PUBLIC HEALTH INTELLIGENCE - HANDBOOK, Part 1

Welcome!

This handbook is a resource hub for individuals responsible for planning and executing efforts to create "**digital tools for public health intelligence"** (i.e, dashboards, data portals, etc. that organize and display critical public health data).

The first section describes "digital tools for public health intelligence" in more detail and explains the Handbook's organization and expected use.

INTRODUCTION

The main content of the Handbook presents a comprehensive 3-step approach for developing any type of digital tool and includes resources that project managers can use at each step in the process.

3-STEP APPROACH

This installment of the Handbook focuses on a process applicable to the development of digital tools generally. Part 2 of the Handbook, providing guidance on the design of specific types of digital tools for public health intelligence, will be published early in 2022.

The Digital Tools for Public Health Intelligence Handbook is being developed by **Vital Strategies** as part of the **Bloomberg Data for Health Initiative**.

Vital Strategies | Bloomberg Philanthropies DATA FOR HEALTH INITIATIVE

INTRODUCTION

What are "digital tools for public health intelligence"?

Digital Tools
for Public Health Intelligence

The explosive growth -- both in public health data and in information technologies to organize and present those data -- have led to a recent proliferation of digital tools that disseminate data on key public health topics.

Despite the seemingly-infinite array of forms they have taken, these **digital tools for public health intelligence** typically fall into a small number of specific types.

Typology of Digital Tools for Public Health Intelligence

Goal	Main use	Digital tool
Decision Support	Provide warning indicators for issues requiring action	Monitoring Dashboard
	Reveal data-driven insights on strategic priorities	Analytic Dashboard
Visual Interactive Access	increase data availability among public audiences	Data access portal
	integrate searchable data into topical reports	Interactive data report

As the table above summarizes, digital tool for public health intelligence can be grouped into two broad categories: (1) **decision support** tools designed primarily to provide government officials with data-driven insight to inform their program/policy actions and (2) **visual interactive access** tools that make it easier for stakeholders to retrieve public health data.

What content is in the Handbook?

The Handbook is a resource hub for individuals responsible for planning and executing efforts to create **digital tools for public health intelligence.**

This current version of the Handbook is organized into several sections. The section following this introduction outlines a 3-step approach**.** The three sections after that provide details on each of the specific steps in the approach.

3-STEP APPROACH

Step 1 - SPECIFY PARAMETERS

Step 2 - DEVELOP TOOL

Step 3 - OPTIMIZE USE

The four sections listed above are similarly organized. The first sub-section of each provides an ***overview*** of the approach/step, including a description of major concepts and a list of key activities and milestones. The second sub-section contains ***resources*** that those working on digital tools projects can use to complete specific tasks in the process.

The sections describing the 3-Step approach are followed by a set of additional material that may be useful to those working on digital tool project teams.

DRAFT DOCUMENTS

Notes

- The approach presented is an idealized solution development process. Actual projects inevitably will require activities, tasks, and milestones that differ from this idealized process in their specific focus and sequence.
- The final stage of the approach (**Optimize Use**) requires consistent, ongoing attention to ensure the

benefits of a digital tool are realized. The activities outlined in the Handbook are merely the initial phase of a longer-term effort.

- The Handbook will evolve, with new content regularly added to promote more effective development of digital tools for public health intelligence. For example, guidelines for the design of specific types of tools will be developed and added to the Handbook.

How should the Handbook be used?

The Handbook should be particularly useful for:

- ***Project Managers:*** individuals responsible for planning and directing the implementation of a digital tool development project;
- ***Project Sponsors***: senior executives who authorize and oversee the projects
- ***Project Team Experts***: technical professionals and staff with deep knowledge about relevant topics and/or data sources assigned to the support project implementation.

Sample Uses for Handbook

MANAGERS

As the Handbook's primary target audience, Project Managers directing efforts to develop digital tools can utilize this content for numerous purposes. For example:

At project initiation - CREATING A PROJECT PLAN

The Handbook provides comprehensive lists of critical issues that should be addressed to **launch a digital tool project**, to **develop the actual tool(s)**, and to **deploy the tool for use**. The Project Manager can use these lists as starting points to inform the development of a plan of sequenced activities to meet the specific demands of their project.

At specific project junctures - BRINGING ACTIVITIES TO COMPLETION

The Handbook provides resources that can help a Project Manager determine what is required to achieve a particular milestone (and to communicate those requirements to others). For instance, the **template for a project charter** provides a framework for organizing various parameters specified during preliminary conversations with key stakeholders into a single, succinct document.

SPONSORS

Project Sponsors who do not have significant experience in application development can use the Handbook to gain a more complete understanding of what is involved with implementing successful digital tools development projects. For example:

General knowledge - UNDERSTANDING THE LANGUAGE

As with any domain, numerous terms have specific meanings in the context of digital tool development. A Project Sponsor can use the **glossary of terms** to become more familiar with this vocabulary.

Throughout a project - ASSESSING PROGRESS

Day-to-day tracking of the implementation of activities is typically the responsibility of Project Managers. Sponsors can use the major **milestones** outlined in the Handbook to help monitor whether or not the project is generally on track.

TEAM EXPERTS

Successful digital tool development projects leverage diverse perspectives and expertise. These technical professionals, public health data analysts, and selected representatives from targeted user groups can use the Handbook to enhance their work on the project team. For example:

When joining a project team - CLARIFYING ROLES

In a digital tool team, some aspects of the work are shared by all team members but, for most tasks, one type of team member has predominant responsibility. Team members can use the

description of major team **roles and responsibilities** to better understand general expectations not only for their own contribution to the team but also for their fellow team members.

Throughout a project - CONNECTING TEAM EFFORTS

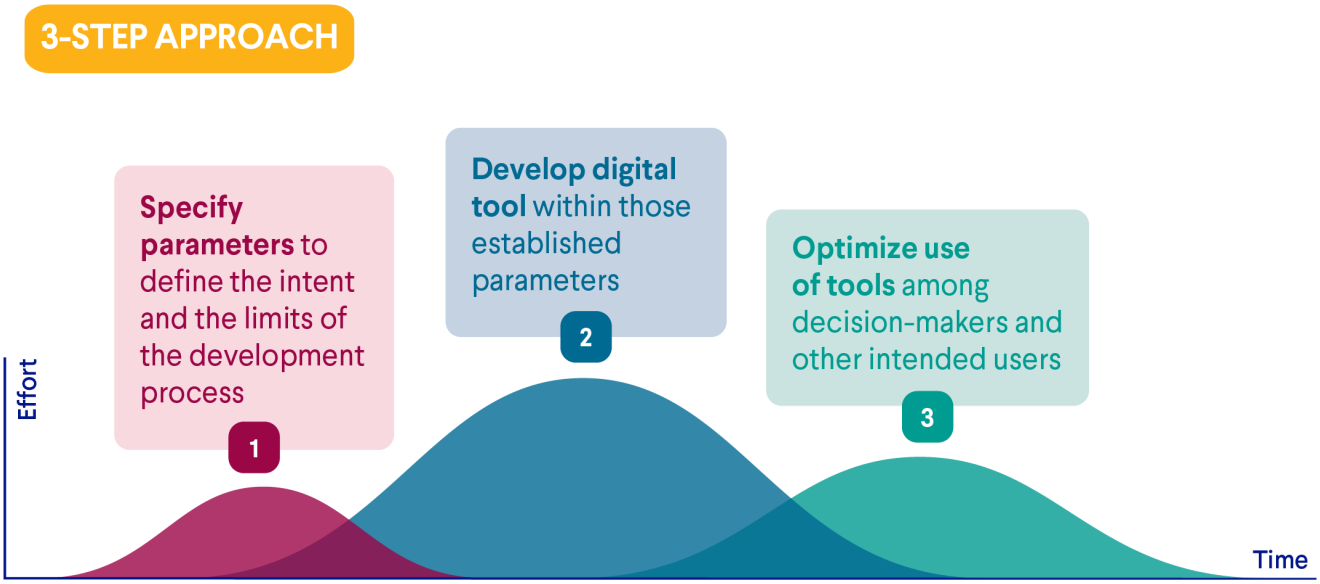
Because of their different perspectives and different roles, team members can have difficulty seeing the linkage across their individual efforts. Resources from the Handbook can help make those linkages more apparent. For instance, the Handbook's discussion of **project parameters** indicates effective parameters balance the needs of users, the realities of available data, and the constraints of the technical environment.

In addition, trainers can incorporate material from the Handbook into workshops that help strengthen the competencies of staff who will have prominent roles in digital tool development.

3-STEP APPROACH

Overview

Digital tools for public health intelligence - monitoring and analytic dashboards, data portals, and interactive reports - present data insights to inform public health policies and programs. An effective approach for creating these tools is comprised of three broad steps:



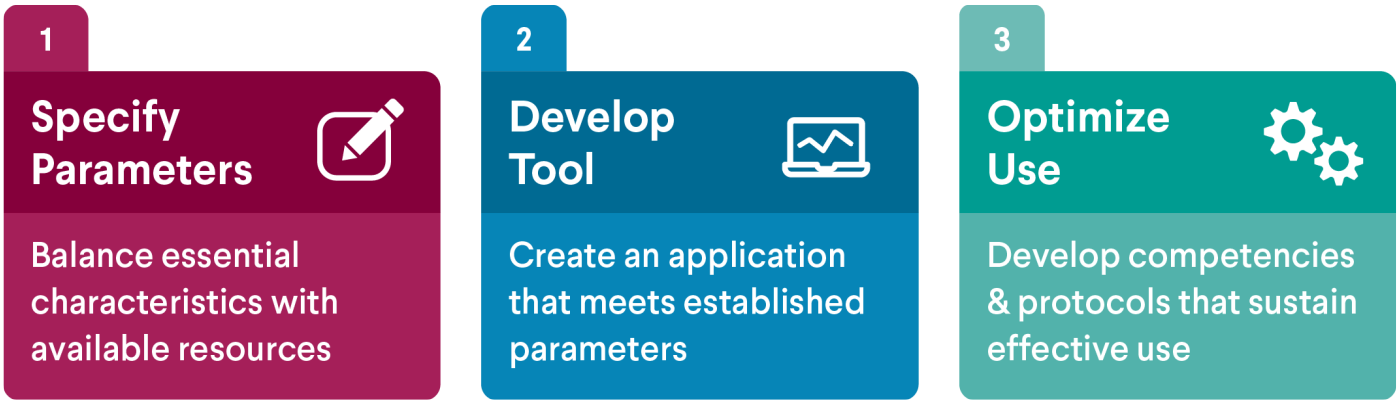
The creation of digital tools is rarely simple. But a process that follows these three steps will produce tools that effectively support data-driven decision-making.

Outcomes and Activities

3-STEP APPROACH OUTCOMES AND ACTIVITIES

The main focus of effort in digital tool projects is on developing the tool itself. However, tool development should be seen as the middle phase of a process with three overlapping steps:

- ***Specify Parameters***
- ***Develop Tool***
- ***Optimize Use***



Outcome and Sequence of Activities for Each Step

SPECIFY PARAMETERS

Outcome

Consensus on:

- Essential characteristics of the tool *(intended users, purpose, data sources)*
- Resources available for development *(IT hardware/software, personnel, funding, time)*

Sequence of Activities

- Evaluate existing tools against best practice standards
- Identify priorities for tool development
- Agree on parameters for tool development projects

Target Duration

2 to 3 months *

** The Handbook uses a scenario of a 12-month digital tool development project to provide a general idea of the relative length of time needed to complete individual activities/tasks/milestones. An actual project's complexity and the level of resources available for its implementation will alter these estimated durations.*

DEVELOP TOOL

Outcome

Deployment of a fully functioning tool that integrates:

- Well-designed features *(visualizations, interactivity, analytics).*
- Data that are structured for effective display.
- An efficient technical environment *(tool development and data access platforms)* .

Sequence of Activities

- Define detailed scenarios that identify the specific content and functionality required to meet user needs.
- Design a digital tool that effectively satisfies these requirements.
- Deploy the tool after acceptance testing among an initial cohort of users.

Target Duration

4 to 8 months *

** The Handbook uses a scenario of a 12-month digital tool development project to provide a general idea of the relative length of time needed to complete individual*

activities/tasks/milestones. An actual project's complexity and the level of resources available for its implementation will alter these estimated durations.

OPTIMIZE USE

Outcome

Foundation for effective tool use, in immediate and long-term, including:

- Current staff with basic competencies to navigate tool, manage its data, and improve its features.
- Established processes for maintaining and upgrading tool features and data flow.
- Institutional support for a long-term strategy to develop advanced staff competencies and re-design core decision-making processes to better leverage of the tool.

Sequence of Activities

- Expand and stabilize tool deployment.
- Develop plan for long-term sustainability of tools.

Target Duration

2 to 3 months *

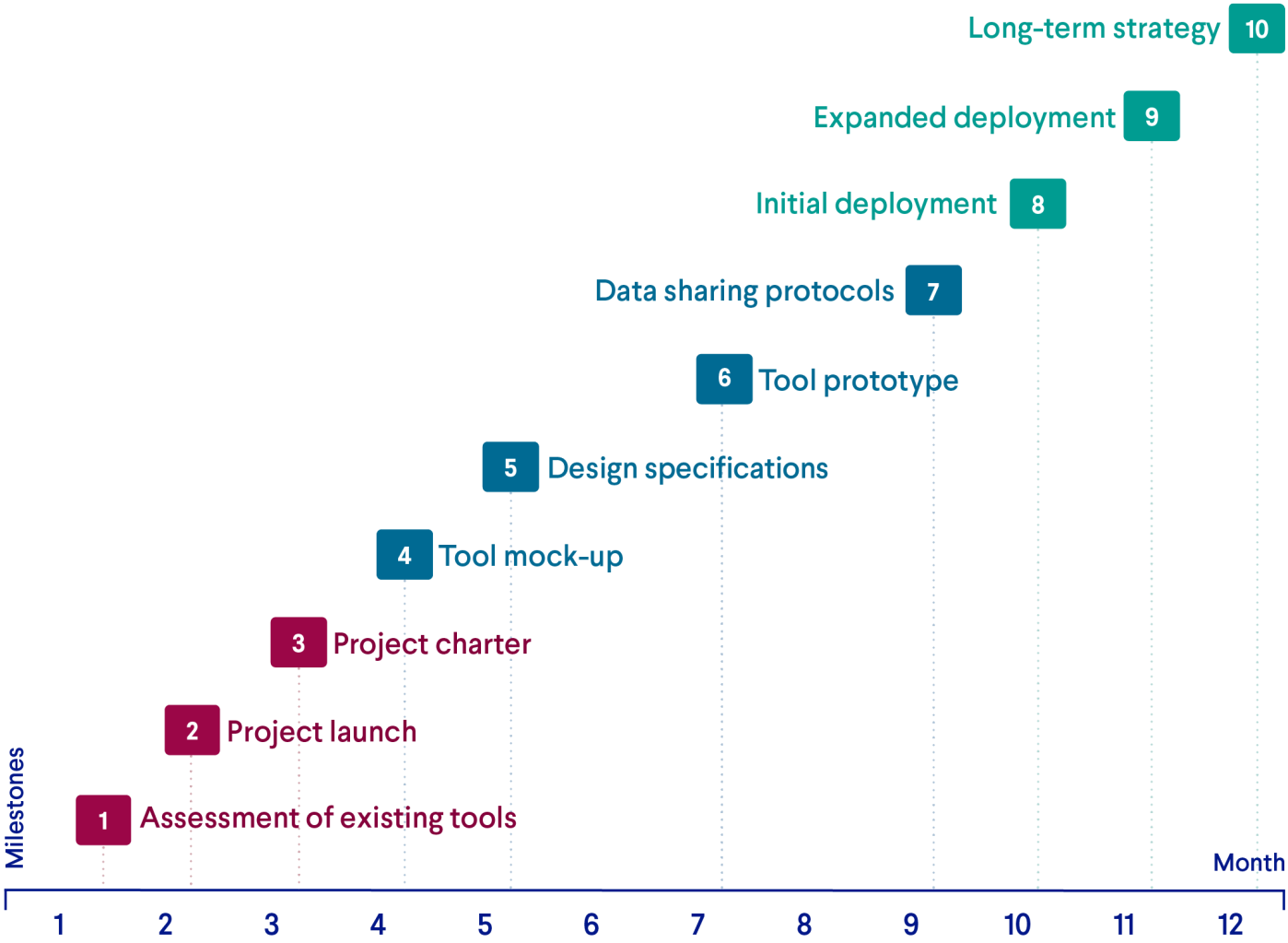
** The Handbook uses a scenario of a 12-month digital tool development project to provide a general idea of the relative length of time needed to complete individual activities/tasks/milestones. An actual project's complexity and the level of resources available for its implementation will alter these estimated durations.*

Milestones

3-STEP APPROACH MILESTONES

Throughout each step of the development approach, intermediate milestones are essential for providing benchmarks to assess progress toward successful project completion.

Suggested Milestones for Digital Tool Development Project



Note: The timeline above assumes a generic 12-month process. Targeted completion dates for milestones would need to be adjusted for projects of shorter or longer duration.

Milestone/Deliverables for Each Step

SPECIFY PARAMETERS

To agree on parameters for the tool that set an ambitious but achievable balance between tool needs and constraints.

Milestone #1: Assessment of Existing Tools

Report evaluating current situation and tools.
Target Completion: End Month 1 *

Milestone #2: Project Launch

Intensive, multi-day effort (either through in-person workshops or through remote online meetings) to identify intended users, purpose and data sources and to prioritize tool improvements.
Target Completion: End Month 2 *

Milestone #3: Project Charter

Formal project "charter" defining essential characteristics of tools to be developed and resources available to develop and deploy tool with those characteristics.
Target Completion: End Month 3 *

* *The Handbook uses a scenario of a 12-month digital tool development project to provide a general idea of the relative length of time needed to complete individual activities/tasks/milestones. An actual project's complexity and the level of resources available for its implementation will alter these estimated durations.*

DEVELOP TOOL

Develop a digital tool meeting the established parameters.

Milestone #4: Tool Mock-Up

Mock-Up showing main tool features and metrics.
Target Completion: End Month 4 *

Milestone #5: Design Specifications

Intensive, multi-day effort (either through in-person workshops or through remote online meetings) to solicit detailed guidance on tool design from representative users.
Target Completion: End Month 5 *

Milestone #6: Tool Prototype

Working prototype of tool (with real data).
Target Completion: End Month 7 *

Milestone #7: Data Sharing Protocols

Established mechanism to ensure reliable timely updating of the data the tool uses.
Target Completion: End Month 9

* *The Handbook uses a scenario of a 12-month digital tool development project to provide a*

general idea of the relative length of time needed to complete individual activities/tasks/milestones. An actual project's complexity and the level of resources available for its implementation will alter these estimated durations.

OPTIMIZE USE

To develop competencies and protocols that will satisfy the new demands of and sustain the digital tool for the long term.

Milestone #8: Initial Deployment/Implementation Training

Initial version of the tool in use by an initial cohort of users; series of workshops (in-person and/or online) strengthening foundational competencies among initial users.
Target completion: End Month 10 *

Milestone #9: Expanded Deployment

Fully-featured tool in use among larger number of trained users; established processes to use the tool in decision-making; to create a reliable flow of updated data; and to maintain/upgrade the tool.
Target Completion: End Month 12 *

Milestone #10: Long-Term Strategy

Road map for ongoing development of staff competencies and for ongoing re-design of decision-making processes to better leverage the tool.
Target Completion: End Month 12 *

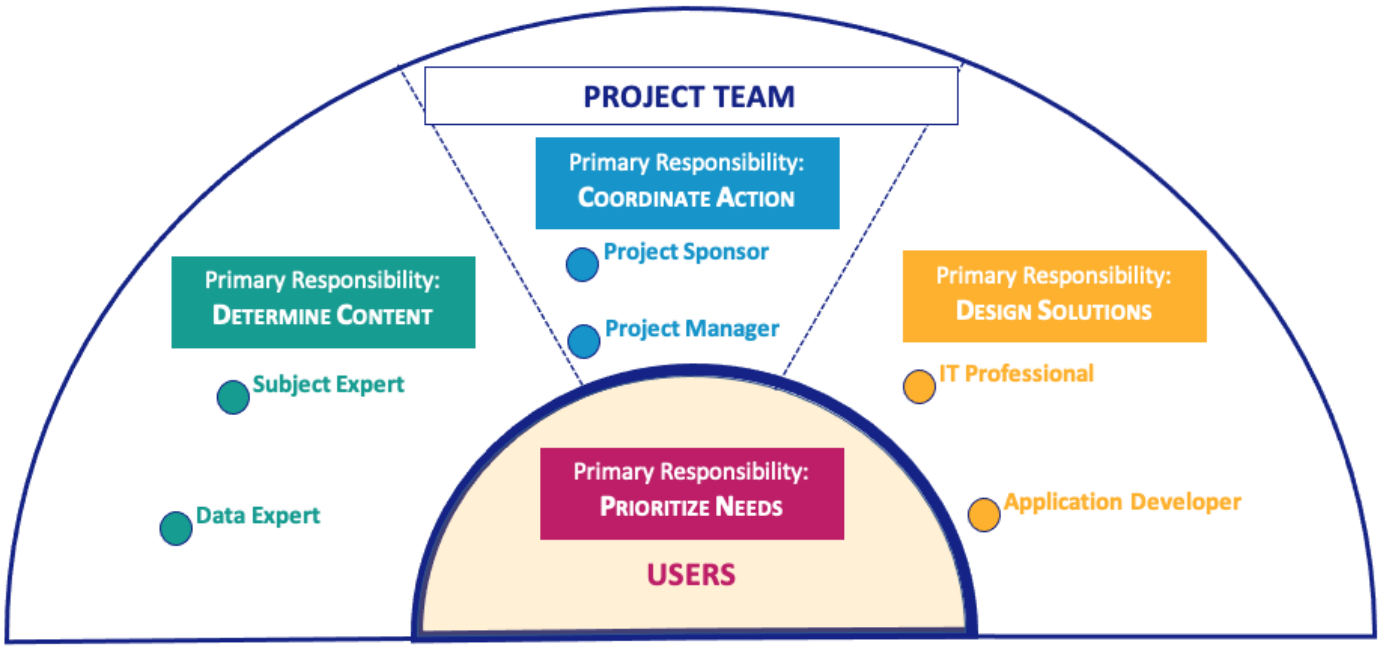
** The Handbook uses a scenario of a 12-month digital tool development project to provide a general idea of the relative length of time needed to complete individual activities/tasks/milestones. An actual project's complexity and the level of resources available for its implementation will alter these estimated durations.*

Roles and Responsibilities

3-STEP APPROACH ROLES AND RESPONSIBILITIES

Because individuals from a diverse range of stakeholder groups can be enlisted to support a digital tools development project, the exact composition of each project team will inevitably vary. However, regardless of the specific individuals comprising the team, a certain set of critical roles must be filled for an effective implementation of the project.

Key Roles and Responsibilities in Digital Tool Development Projects



The critical roles on a digital tool development project fall into four categories:

- **Users** are the individuals expected to interact directly with the tool. An effective tool development process is **user-centered**: at key junctures, representative users are engaged to identify and prioritize their needs and to provide feedback on whether the emerging tool is likely to meet those needs.
- **Project leadership** is provided by the **project sponsor** (the senior official authorizing the project) and the **project manager** (the staff person responsible for overseeing day-to-day project operations). These roles are responsible for coordinating the activities required for successful project completion.
- **Content experts** are project team members whose insights on particular public health issue(s) ensure that the information incorporated into the digital tool accurately represents the issue. **Data experts** have deep knowledge about the tool's main data sources (such as collection methods, structure, definitions, strengths/weaknesses). **Subject experts** have an extensive background in specific conditions/diseases that are used to ensure that the tool presents and interprets data correctly. (NOTE: In some instances, the same individual may be able to fill both content expert roles.)
- **Technical experts** are responsible for designing all aspects of the tool (solutions for both front-end user interface and back-end data management, as well as automated procedures to extract updated data from their sources). The **application developer** role focuses on the design of the various components

of the digital tool. The **information technology (IT) professional** knows the organizational IT environment in which the developed tool will reside and provides guidance on solutions that will best fit this environment.

More detailed descriptions of these different roles and responsibilities are provided in **Guidelines for Project Team Membership**.

Resources

3-STEP APPROACH

List of Resources

Guidelines for Project Team Membership

Use: To inform selection of qualified individuals to serve on project team.
Step/Activity: Specify Parameters (Step 1)/Prior to project work commencing
---

Guidelines for Project Team Membership

3-STEP APPROACH PROJECT TEAM MEMBERSHIP

Summary

This resource itemizes critical responsibilities for different types of digital tools project team members and describes the capabilities team members should have in order to fulfill these responsibilities effectively.

> **How to use:**
> To inform the selection of qualified individuals for a digital tools project team.

> **When to use:**
> Step 1 - Specify Parameters / Prior to project work commencing.

Digital Tools Project Team Membership

A general description of a digital tools project team is available **here**.

Members of a digital tool development project team fall into four categories:

- **Users** are the individuals expected to interact directly with the tool.
- **Project leadership** provides the general authorization and objectives of a digital tools projects and oversees day-to-day project operations).
- **Content experts** are project team members whose insights on particular public health issue(s) ensure that the information incorporated into the digital tool accurately represents the issue.
- **Technical experts** are responsible for designing all aspects of the tool (solutions for both front-end user interface and back-end data management, as well as automated procedures to extract updated data from their sources).

The tabs below provides more in-depth information about project members from each of these four groups.

USERS

Users

Users are people who have specific needs for data that can be addressed by direct interaction with the digital tool being developed.

The intended users of a digital tool are likely to be a heterogeneous group. For example, some may be **power users** (people with expertise in a particular public health area, strong data analytic skills, and a desire for deep, self-directed exploration of complicated data) while others may be **casual users** (people with a general interest in a topic who want easy access to specific pieces of data). Or some may be **internal users** (people working in the public health ministry who have authorized access to a broad range of data) while others are **external users** (members of the public whose access to certain sensitive data may be restricted).

> **User** representatives on a digital tools project team should be able to communicate the needs and preferences of the full universe of intended users.

Responsibilities
The primary responsibility of users representatives on a digital project team is to prioritize needs. They:

- Describe concrete situations in which the proposed digital tools will be used
- Itemize challenges with existing tools and identify improvements to be included in new tools
- Express user constraints (ex. degree of technical knowledge) that tool design should account for
- Provide ongoing feedback to the tool design team throughout the entire development process (from initial mock-ups through final deployment)

Capabilities
To be effective, user representatives on a project team should have the position and/or experience necessary to:

- Communicate the specific needs of a broad range of intended users
- Understand broadly the possibilities and limitations of currently available data sources and technological solutions
- Dedicate sufficient time for regularly reviewing, testing and evaluating tool design proposals generated by the development team

PROJECT LEADERSHIP

Two critical project leadership roles are the **Project Sponsor** and the **Project Manager.**

Project Sponsor

A **Project Sponsor** is the official that initiates (or sanctions) the tool development project. The

Sponsor provides a general vision of the intended use of the tool and defines the time and resources available to realize this vision. The Sponsor also facilitates the cooperation of the various contributors essential for successful tool development.

> A **Project Sponsor** should hold a position with the authority to secure the resources needed to meet the objectives of the project and to ensure the active participation of key stakeholders. As a result, this role is often played by a senior executive.

Responsibilities
Project Sponsors (together with the Project Manager) have primary responsibility to coordinate actions needed to implement a digital tools project. The Sponsor:

- Approves project parameters (organizational objective to be advanced by the new digital tool, timeframe for completion, personnel and financial resources dedicated to the project)
- Convenes personnel whose input and/or assistance are essential to project success
- Champions the project with other organizational leaders and with key external stakeholders
- Oversees project implementation and, if needed, approves changes to original parameters (ex. extending the timeframe for completion)

Capabilities
An effective Project Sponsor will have the position and/or experience necessary to:

- Express broad organizational strategic priorities and define the intended role of the digital tools in advancing those priorities
- Ensure the cooperation of personnel across all organizational levels
- Secure and sustain project funding
- Address major problems that arise in the project that require organizational solutions (i.e, issues that can not be resolved by the Project Manager)

Project Manager

A **Project Manager** directs detailed planning of project activities and coordinates the work of other project team members in order to complete those activities. The Project Manager ensures that the project delivers a digital solution that effectively meets user needs within the specify timeframe and budget. The Project Manager regularly updates key stakeholders about project progress, including, if needed. negotiating modifications to initial parameters.

> In order to better engage with project stakeholders with diverse expertise, a **Project Manager** should be knowledgeable about both digital tool development generally and the specific subject area(s) that will be the focus of the tool.

Responsibilities
Project Managers (together with the Project Sponsor) have primary responsibility to coordinate actions needed to implement a digital tools project. The Manager:

- Coordinates input of all interested parties to establish consensus on project parameters (organizational objective to be advanced by the new digital tool, timeframe for completion, personnel and financial resources dedicated to the project)
- Develops a project plan specifying the sequence of activities to develop and deploy the digital tool

- Manages activities of team members to implement the project plan
- Monitors project implementation, keeps all interested parties informed about project progress and, if needed, proposes changes to original project parameters

Capabilities
An effective Project Manager will have the position and/or experience necessary to:

- Plan activities and budgets for complex, multi-actor projects
- Administer activities plans and manage budgets for complex project
- Troubleshoot issues that arise during project implementation
- Communicate effectively with diverse audiences (senior leaders, subject area experts, technology experts, all categories of users)

CONTENT EXPERTS

Two perspectives -- from **Data Experts** and from **Subject Experts** -- should inform a project team's determination of digital tool content**.**

Data Expert

A **Data Expert** has detailed knowledge about the primary data sources that may be presented through a digital tool. For each source, they know the specific data indicators available and the process associated with generating those data. This knowledge provides the Data Expert with insights on the quality (completeness, reliability, timeliness, etc.) of each source, insights that are essential for determining what data should be incorporated into a digital tool.

> ⓘ A **Data Expert** typically is a staff person either in a central unit with general responsibility for data collection (ex. an epidemiologist in a health surveillance bureau) or in a unit focused on a specific public health area (ex. a data specialist in a maternal/child health bureau).

Responsibilities
Data Experts (together with Subject Experts) have primary responsibility for determining digital tool content. The Data Expert:

- Advises on the availability and quality of data sources that can be incorporated into a digital tool
- Makes data sources accessible for use by other project team members to support design of the digital tool
- Assists in the development of protocols that regularly extract and transform data to keep the digital tool populated with the most current data

Capabilities
An effective Data Expert will have the position and/or experience necessary to:

- Describe the range and quality of available data sources
- Identify and remedy flawed data sources (ex. how to account for missing/incomplete data)
-

Explain the structure of different sources to guide efforts to manipulate and analyze data

Subject Experts

A **Subject Expert** has detailed knowledge about specific public health topics. The Subject Experts knows the precise meaning of different indicators in that topical area, valid approaches for organizing and analyzing data on these indicators, and appropriate conclusions that can be made from these analyses..

> A **Subject Expert** can explain the insights that selected indicators provide on a specific issue and the implications of those insights for actions. The Subject Expert may be staff in a unit focused one public health area. In some instances, one person may be able to fill both the Data Expert and Subject Expert roles (ex. a program analyst in a maternal/child health bureau who also has deep knowledge of the content and structure of critical maternal/child health data sources). Also, Subject Experts are frequently among the intended users of a digital tool.

Responsibilities

Subject Experts (together with Data Experts) have primary responsibility for determining digital tool content. The Subject Expert:

- Prioritizes data that is most relevant for understanding the public health issue(s) on which the tool is focused
- Advises tool developers on appropriate methods for organizing, presenting, and explaining data in the digital tool

Capabilities

An effective Subject Expert will have the position and/or experience necessary to:

- Analyze and interpret data relevant to their subject area
- Explain insights from data in ways that will be understandable to intended users of the digital tool

TECHNICAL EXPERTS

Technical experts in a digital tools project team include **IT Professionals** and **Application Developers.**

Informational Technology (IT) Professionals

The **IT Professional** provides critical information about the organization's IT environment (ex. current platforms for database management and storage). The IT Professional helps the project team conceptualize and create new digital tools that will work effectively within the current environment and then leads the integration of these new tools into the existing IT environment.

> The **IT Professional** role on a digital tools project team should be filled by a staff person from unit overseeing all of the organization's management information systems (MIS). Such an individual can leverage their direct knowledge of current IT platforms and systems to support development deployment of new digital tools.

Responsibilities

The IT Professional (together with the Application Developer) has primary responsibility for designing and deploying solutions. The IT Professional:

- Advises on platforms, software, etc. that will work effectively within the organization's existing IT environment
- Adapt environment to support tool development (ex. acquiring/installing new software, designing interfaces between new tool and existing data sources)
- Develop plan to maintain and enhance the new tool after its initial deployment

Capabilities
An effective IT Professional will have the position and/or experience necessary to:

- Manage critical IT environments (ex. administration of relevant databases)
- Evaluate options for software and hardware to support the new digital tool

Application Developer

The **Application Developer** leads the process to conceptualize, mock up, prototype, and eventual design the new digital tools a technical person with expertise in the selected platform for development.

> The **Application Developer** can be filled using a number of different approaches. The Developer could be a staff person from the organization's MIS unit. Alternatively, an organization can contract with an external consultant to lead initial tool development. The consultant could either be an individual or a solution development firm. Whoever fills the Application Developer role should have expertise in the platforms and systems selected for tool development as well as a commitment to user-centered design.

Responsibilities
The Application Developer (together with the IT Professional) has primary responsibility for designing and deploying solutions. The Application Developer:

- Engages with users to clarify their needs
- Collaborates with content experts to understand available data
- Leads design of tool, from mockup to deployment
- Collaborates on creation of programs to train users to utilize tool
- If Developer is an external consultant, transfers responsibility for tool maintenance and enhancement to organization by providing documentation and technical training

Capabilities
An effective Application Developer will have the position and/or experience necessary to:

- Use selected platforms and software effectively and efficiently
- Design solutions with user-friendly interfaces and functionality
- Be agile and interactive throughout the development process

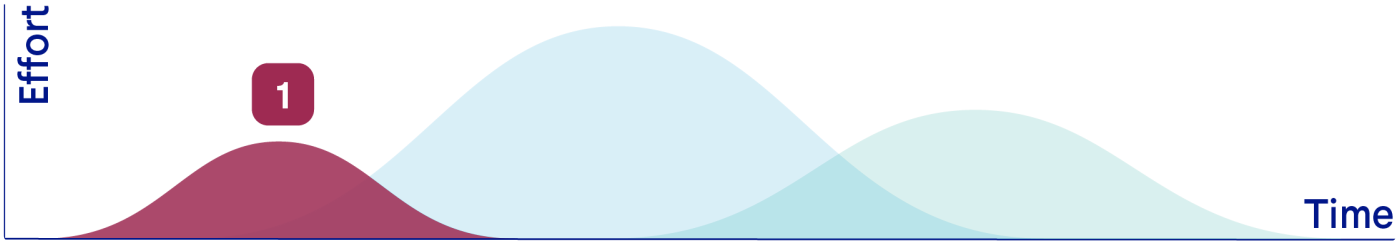
Next: Once team members have been recruited, the team can begin to evaluate existing tool(s) and identify priorities for new tool(s).

Step 1 - SPECIFY PARAMETERS

Overview

The development of an effective digital tool begins with a clear **understanding of the essential characteristics** that the tool should embody and of the **available resources** to support tool development.

STEP 1 · SPECIFY PARAMETERS



These parameters can be specified quickly. With intensive collaboration, executives, intended users, and relevant data, topical experts can evaluate existing tools, determine opportunities for improvement, and agree on parameters that set an ambitious but achievable balance between tool needs and constraints.

Step 1 Activities, Tasks and Milestones

STEP 1 ACTIVITIES, TASKS AND MILESTONES

Specify parameters involves three activities that should take up to 3 months (project months 1 to 3)* to complete.

ACTIVITY 1

Activity 1: Evaluate existing tools against best practice standards

- Assess current mechanisms for capturing and communicating data insights.

Key Tasks

- [ ] Determine the scope of the evaluation.
- [ ] Access **existing digital tools** and map current methods.
- [ ] Evaluate tools/methods to identify significant limitations.

Milestone 1

- Report of evaluation results completed.
- *Target*: End Month 1*

ACTIVITY 2

Activity 2: Identify priorities for tool development

- Determine the focus of the project to improve on current tools and methods.

Key Tasks

- [ ] Review evaluation results with decision-makers (senior executives, other **stakeholders**).
- [ ] Identify and prioritize opportunities for improving tools and methods by:
  - interviewing select intended **users**.
  - describing potential **data sources**.
  - reviewing existing technological capacity.

Milestone 2

- User, data, and resource parameters for the new digital tool and its development are evaluated and established.
- *Target*: End Month 2*

ACTIVITY 3

Activity 3: Agree on parameters for tool development project

- Specify clear objectives and constraints for digital tools project.

Key Tasks

- [ ] Test assumptions about priority project's impact/feasibility with a broader group.
- [ ] Specify the level of financial and personnel support; select **technical platforms** for tool development and data access.

- [ ] Designate "test" **users**, **subject experts**, and **data experts** to serve in the project team to guide decisions about the tool's metrics and features.
- [ ] Launch formally project (including announcing the project team).

Milestone 3

- Formal **Project Charter** adopted to define essential characteristics of tools to be developed and available resources.
- *Target*: End Month 3*

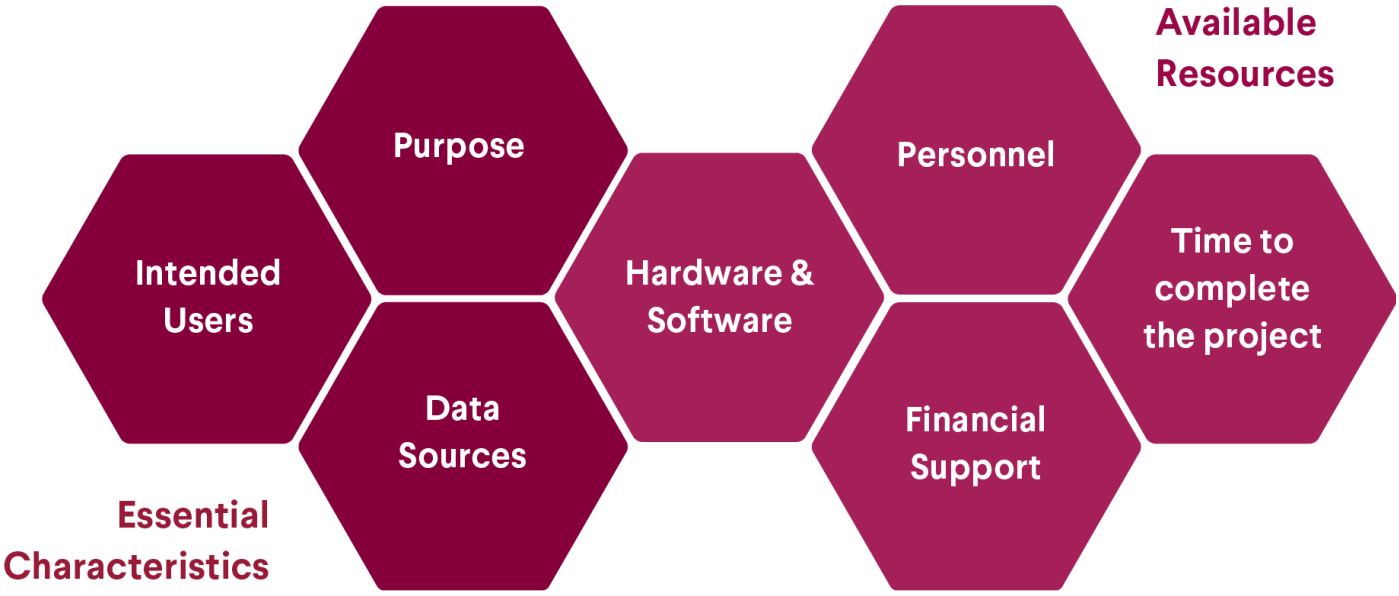
** The Handbook uses a scenario of a 12-month digital tool development project to provide a general idea of the relative length of time needed to complete individual activities/tasks/milestones. An actual project's complexity and the level of resources available for its implementation will alter these estimated durations.*

Parameters for a Digital Tool Project

STEP 1 PARAMETERS FOR A DIGITAL TOOL PROJECT

Two key elements for success of digital tool projects are (a) early consensus on the essential characteristics of the tool to be developed and (b) clear agreement on the time and resources being provided for tool development.

Parameters for a Digital Tool Project



ESSENTIAL CHARACTERISTICS

Purpose

Key informants: Sponsor and Users

The purpose of a digital tool is the general need the tool should address. Because specific tool design should align with the tool's over-arching intent, developing a common understanding of the tool's purpose is an essentially first step. Initially, the project sponsor(s) will provide direction on the tool's purpose; representatives of intended tool users, as they are identified, should refine the statement of purpose.

Examples of general purposes of a digital tool include:

- near "real time" monitoring of critical operational indicators
- in-depth exploration of public health outcomes and their causes
- using data to inform external audiences about public health issues
- helping researchers access relevant public health data

A description of common types of digital tools is available **here**.

A statement of purpose should also define the specific public health topic(s) the tool may address (i.e, will the tool attempt to cover multiple topics or be focused on a specific domain such as "health of children under 5") and the types of people who are the tool's main intended users.

Intended Users

Key informants: Sponsor and Users

Intended Users are the individuals expected to interact directly with the digital tool. A project sponsor should be able to identify, at least in general terms, the type of person who will be using the tool. However, the intended users of a digital tool are likely to be a heterogeneous group. (Different types of users are described **here**.) As representative users become part of the project team, they may be able to identify other users who may have different perspectives on the digital tool.

Divisions among intended users are based on different attributes that influence how the tool is designed. User attributes important to tool design include:

- need (i.e., why they want the tool)
- focus (big picture vs. detail)
- technological proficiency
- extent of subject area knowledge

Although there may be multiple types of of intended users, it is important to agree on the primary user whose needs are the most critical to address.

Data

Key informants: Data Experts, Subject Experts

The main data sources likely to address a tool's purpose is another important parameter to identify at the start of a digital tool project. Over the course of the project, these sources will need to be examined in detail to be used effectively. But, at launch, data and subject experts can provide a broad understanding of their strengths and weaknesses and assess their general applicability for the intended tool.

> ⓘ Many digital tool projects begin with identifying a specific data source; a tool is then designed around that source. This type of "data-forward" approach may provide better access to a single source but it misses the opportunity to create a tool that provides deeper insights that are usually necessary to guide actions. A "purpose-backward" approach starts with the action that tool is intended to facilitate and then identifies the range of data necessary to complete that action.

Step 1 - Resources

STEP 1 · SPECIFY PARAMETERS

List of Resources:

Use: To assess the existing tools used by public health staff, which will help set the specific parameters, functions, and resources of the new digital tool.

Guidelines for Assessing Existing Tools (Milestone #1)

Use: To evaluate and establish parameters (users, data, resources) for the new digital tool and its development.

Checklist for Digital Tool Project Launch (Milestone #2)

Use: To provide a formal document detailing the plan to develop the new digital tool; this includes the objectives, tasks, constraints, timeline, budget, and key stakeholders who will be participating in the digital tool development process.

Template for a Project Charter (Milestone #3)

Guidelines for Assessing Existing Tools (Milestone #1)

STEP 1 ASSESING EXISTING TOOLS

The desire to develop a new or improved digital tool must derive from a clear need that is not satisfied with existing methods. This resource can help to understand the shortcomings and benefits of exiting data tools before defining the specific parameters of the new digital tool.

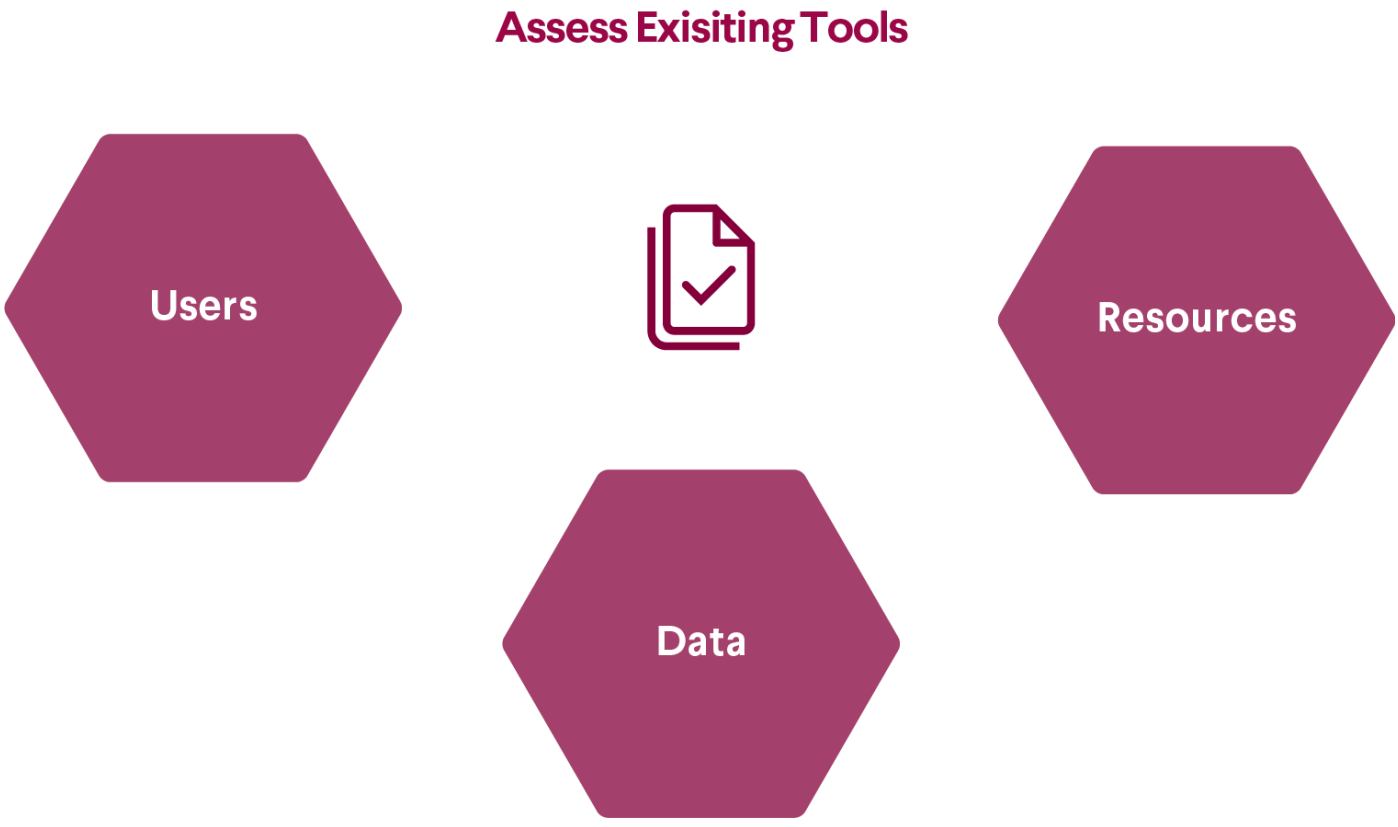
How to use:

To assess the pros and cons of existing data tools.

When to use:

Step 1 (Specify Parameter)/ Evaluate existing tools against best practice standards.

Factors to Consider for Assessing Existing Tools



It is recommended to start by making a general list of all of the existing tools used by the public health agency staff, including what kind of data is used and the types of indicators included. Existing tools do not necessarily have to be interactive digital tools, they can be written reports, Excel files, or other similar products.

> Examples of issues with existing tools are:
>
> - Tools not showing useful data for decision-making.
> - Long waiting periods for data to be analyzed and shared back.
> - Multiple tools needed to analyze related data.
> - Complicated (non-user-friendly) tools with minimal interactivity.
> - Static on-demand data reports that are not up-to-date.

With this list, review the tools using these three categories and guiding questions to summarize their pros and cons:

USERS

Users

Who currently uses the digital tool?

- [ ] What is their professional background?
- [ ] How often do they use the tool?
- [ ] When do they use the tool?
- [ ] What area of health are they skilled in?

Why do they use this digital tool?

- [ ] How do they use the tool (ex. collect data, draft reports on trends)?
- [ ] What do they like about the tool?
- [ ] Is the tool easy for them to access and use?
- [ ] Why would they use this current tool over other public health digital tools?

What issues do they have with the digital tool?

- [ ] Does the tool have enough data?
- [ ] Do they have difficulty understanding and analyzing the data?
- [ ] How shareable is the data? Can they export it to their own computers?
- [ ] How up-to-date do they want the data to be?

What is the IT background of the tool users? *(for digital tools)*

- [ ] What are the computer skills of its users?
- [ ] What hardware and/or software do its users have?
- [ ] What kinds of data do its users interact with the most?
- [ ] What **data visualizations** do its users prefer?

DATA

Data

What data is presented in the digital tool?

- [ ] What data is the tool using?
- [ ] What content is the data describing?
- [ ] Which visualizations are used to display the data?
- [ ] Why is this particular data being presented?
- [ ] How is the credibility of these data sources determined?
- [ ] How were these **data sources** found?
- [ ] Why draw from these data sources specifically?

- [ ] How do these **data sources** present their data?

How often is data updated in the digital tool?

- [ ] Why update it for this specific duration?
- [ ] How is the data updated? (Online, In-Person, Post?)
- [ ] Does the data update automatically or manually?
- [ ] Does any hardware or software help update the data?

How accurate is the data from the digital tool?

- [ ] Does the tool provide enough data for accurate analysis?
- [ ] What kind of data does the tool provide? (Ex. Quantitative, Qualitative).
- [ ] Are there any time gaps in the data?
- [ ] What is the strategy of telling apart good from bad quality data?

RESOURCES

Resources

Are there any strict data environment regulations (management and governance of data)?

- [ ] Does the digital tool have the right **data security ware** to protect its data and data privacy?
- [ ] Are there any restrictions as to what hardware and/or software can be used?
- [ ] Does the ministry/department have contracts restricting staff to work with only certain companies or other third parties?
- [ ] Who manages **data security** and **data management**?

Are there enough resources to continue long-term digital tool maintenance?

- [ ] How **sustainable** is the current tool? (ex. Hardware and/or software require minimal (or free) updates)
- [ ] Is there government funding for the maintenance of the tool?
- [ ] Is there external funding or work with a key stakeholder to fund the maintenance of the tool?
- [ ] If not, how has the tool been maintained?

What current hardware and software are needed for using the digital tool? *(mainly for digital tools)*

- [ ] Are there any hardware and/or software that must be used, due to government, technical, or other restrictions?
- [ ] Does the hardware and/or software collaborate well with the data?
- [ ] Does all of the digital tool team or ministry/department use the same hardware/software?
- [ ] Does the tool require the purchase of licensing of specific hardware/software?

To learn more about assessing the Data and Resources of existing tools, please review the Data and Resources tabs above.

Next: The **project sponsor, project manager** and other initial digital tool team members can more formally launch the project by defining the specific users and use, data and resources for the new digital tool.

Checklist for Digital Tool Project Launch (Milestone #2)

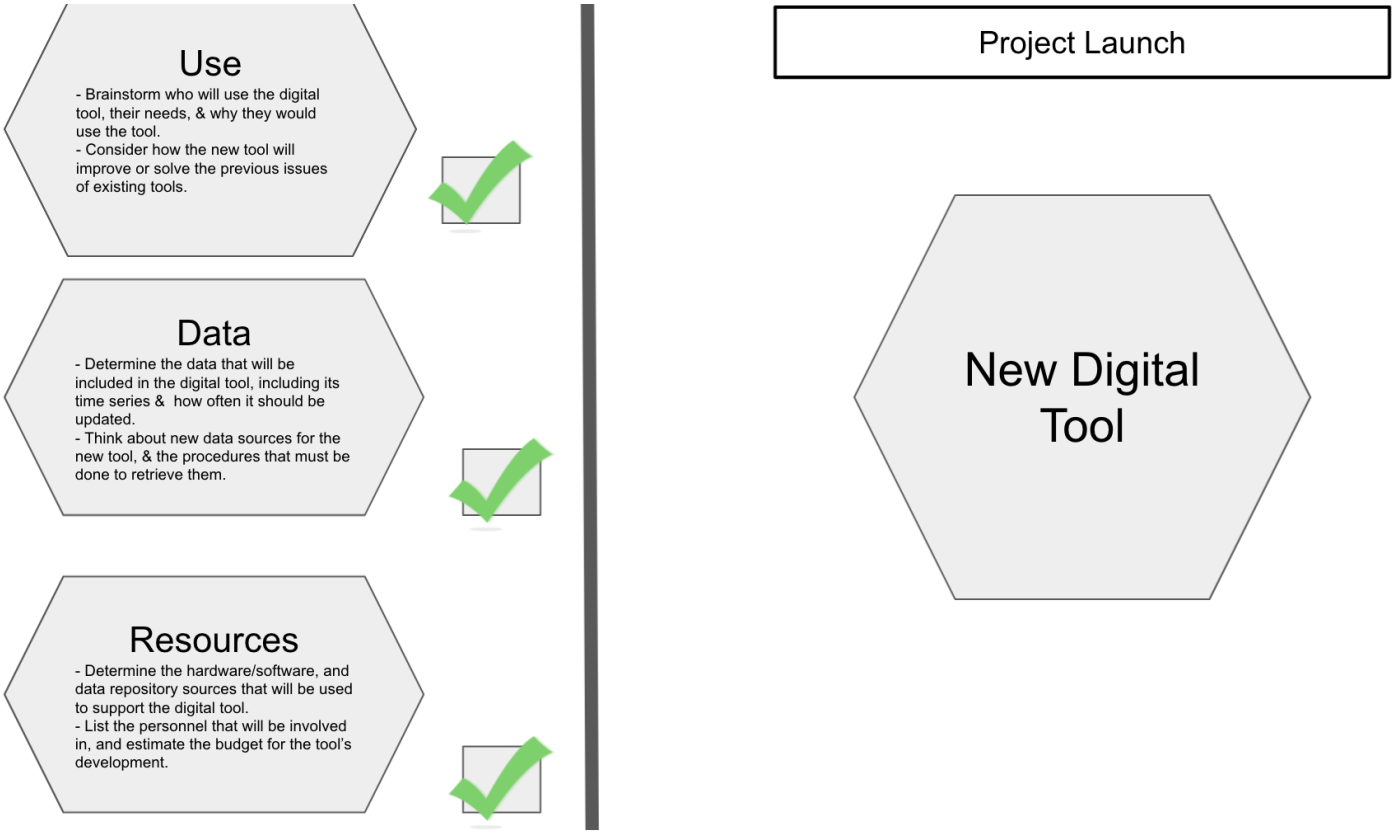
STEP 1 PROJECT LAUNCH

There are three recurring topics that are present during the development of digital tools: **Users and Use**, **Data** and **Resources**. After showing interest in a digital tool, but before committing to fully develop a tool, there should be a general agreement on these three topics.

> **How to use**:
>
> To evaluate and establish parameters (users, data, resources) for the new digital tool and its development.

> **When to use**:
>
> Step 1 (Specify Parameters)/ Identify priorities for tool development.

Project Launch Factors



The points below can be used to discuss with ministry or department staff to provide information about the purpose and objective of a new or improved digital tool.

Users and use
Strong demand from the expected primary users and a clear idea of how the tool would support their use.

Data
Availability of reliable data needed for the tool.

Resources
Basic IT environment, human and financial resources to ensure sustainability.

Users & Use	Data	Resources
Users	Content	Technological Environment
Use	Accessibility	Personnel
		Budget

USERS & USE

Users

Ensure there are **users** who are the driving force for the project because they have identified how a digital tool could benefit them.

Who will be the digital tool's primary users?

- [ ] Research and list the positions and employers the tool's users work for (professional background).
- [ ] Consider how often its primary users will be using the tool.
- [ ] Keep in mind the number of primary users that will use the tool (ex. small, medium, large number)
- [ ] Make sure users will have access to the tool.

What are the needs of the primary users?

- [ ] Make sure the digital tool will satisfy the needs of its users.
- [ ] Brainstorm how users will interact with the tool (ex. collect data, analyze trends).
- [ ] Think about why users should use the tool over other public health digital tools.
- [ ] Keep in mind when users will be using the tool.

What is the IT background of the digital tool's primary users?

- [ ] Ensure the tool's users are able to navigate and use it easily (ex. they do not need a specialized IT background).
- [ ] Survey its primary users on their IT backgrounds and experience.
- [ ] Consider how technical users would like the tool to be.
- [ ] List what technical features would satisfy users' needs the most (ex. filters, bar graphs, charts)

Use

Are there any problems with the current digital tools?

- [ ] List the various issues the current tools have, and check that the new tool will resolve these issues.
- [ ] Ensure that the data is up-to-date, or that it is updated regularly and routinely.
- [ ] Make sure the tool will present the data and its visualizations correctly.
- [ ] Make sure to include clear directions and explanations of the data if users are not familiar with the health area or data.

How will the digital tool improve existing tools or processes?

- [ ] If the new digital tool will replace an existing digital tool, inform existing tool users of this change.
- [ ] If the new tool will complement the existing tool, ensure that the new tool will cooperate technically with the existing tool or processes.
- [ ]

- [ ] To ensure the new tool will be different from the current tool, compare the deliverables and benefits of the tools side-by-side.
- [ ] If the new tool will replace the current tool, make sure the new tool's data and related functions will cooperate with the users' current hardware & software.

DATA

Content

What is the current state of the data needed for the digital tool? Technical accessibility, as well as authority over the data, are to be included in the tool.

What data sources will be used for the digital tool?

- [ ] Make sure to verify the credibility of the data used in the **data source**; follow the ministry's/department's formal procedures on this if they are available.
- [ ] To easily ensure data credibility, draw data from **data sources** belonging to governments (local, provincial, national), non-profits, international organizations, and/or international companies.
- [ ] Test whether the data from the data source will cooperate with the new tool (ex. try inserting data into tool prototype).
- [ ] When choosing data sources, be cognizant of the types of data (ex. quantitative, qualitative, geographical) users want to see, and the types of data the data source portrays.

How often will the data be updated in the digital tool?

- [ ] Ensure that the data's update routine will satisfy its users.
- [ ] If the data will be updated continuously, make sure the new data cooperates with the new tool and its current data.
- [ ] If updating the data manually, set a time during the day, week, month, quarter, or year, for someone to routinely update the data.
- [ ] For user likeability, survey the tool's users to find how often they plan to use the tool, and how updated they need the data to be.

How many years of history are available in the data?

- [ ] If the ministry/department does not have enough years of data history satisfactory for the new digital tool, consult another data source that has enough data history.
- [ ] If the ministry/department has many years of data history in the digital tool, make sure that all of it will be displayed in the tool (unless only current data is relevant).
- [ ] Check all of its data history to ensure there are not any time periods where few or no data was recorded/collected.
- [ ] If there is not enough data history, either explain why or use visualizations that make up for this lack of data history.

Accessibility

Who has authority over the data? What are existing data access and sharing policies?

-

- [ ] Ensure the person having **authority over the data** has experience managing databases, and is knowledgeable about **data accessibility and sharing policies**.
- [ ] Make sure the new digital tool follows the ministry's/department's **data governance** guidelines, especially those related to data security and privacy.
- [ ] Research, test, and list the different software programs (users commonly use) that will cooperate with the new tool.
- [ ] Before sharing data with users, provide them instructions on how to share data safely (without jeopardizing the privacy or security of the data source or ministry/department).

What are the data acquisition requirements?

- [ ] Ensure that the data's credibility will be verified by digital tool team staff or data experts that have experience doing so.
- [ ] Make sure to check there is enough data history for the new digital tool to function.
- [ ] If using data from sources outside of the ministry/department for reports or other user-facing writings, make sure to cite the data source correctly.
- [ ] Brainstorm, draft, revise, publish, and disperse to the digital tool team a list of these requirements to ensure they are followed.

Who will be involved in securing new data if needed?

- [ ] It is recommended IT staff, data experts, or other **personnel** who have experience collecting and analyzing data, secure and validate new datasets.
- [ ] If there is no one on the digital tool team that has experience securing new datasets, reach out to a third-party consultant, or another person in the health ministry to help carry out this task.
- [ ] If multiple staff are securing new datasets, provide professional capacity training focused on the data collection and verification of new datasets.
- [ ] Make sure the person securing new datasets is knowledegable about, and follows the ministry's/department's formal procedures in collecting data.

RESOURCES

Technological Environment

Understand the available resources that ensure a successful development and the long term sustainability of the tool.

What hardware and/or software will you the digital tool use?

- [ ] Test your hardware and/or software with the new tool (or tool prototype) to ensure they cooperate.
- [ ] Check to see if existing hardware and/or software will need updates or new licensing.
- [ ] If new software is needed, include the funding needed to do so in the digital tool budget.
- [ ] Ensure your hardware has up-to-date security software to protect the tool and the data.

What database management systems (DBMSs) are or will be used in the new digital tool?

- [ ]

- [ ] Research, test, and list different **DBMSs** that will cooperate with the new tool.
- [ ] Check with other ministries/departments to see what DBMSs they use.
- [ ] If using a new DMBS, make sure everyone on the digital tool team knows how to use and interact with it; if not, set up a workshop discussing this.
- [ ] Make sure whichever DBMS currently used is up-to-date; and if not, retrieve the necessary updates and licensing to do so.

Are there any strict technology environment regulations?

- [ ] If planning to use a 3rd party consultant, follow the ministry's/department's exclusivity contract (if there is one).
- [ ] If the ministry/department uses a specific hardware and/or software program, make sure the digital tool will cooperate with it.
- [ ] Research, list, draft, and share the ministry's/department's technology environment regulations to remind the digital tool team as they are developing and maintaining the digital tool.
- [ ] Make sure the tool follows the ministry's/department's technology environment regulations, especially if it shares sensitive data.

Personnel

Who will be involved in the project?

- [ ] When choosing the **digital tool team**, select people who are knowledgeable in both public health and data/IT.
- [ ] To maintain good staff morale, ensure ministry/department staff brought onboard to the digital tool team are not already overwhelmed with other responsibilities.
- [ ] If the digital tool team is too busy to develop a new digital tool, look into third-party consultants who will develop the tool.
- [ ] If the digital tool team is not receiving any additional pay for their work developing the tool, come up with some incentives to keep them motivated.

Considering the existing capacity and skills, will there be any additional training needed? If yes, what additional training specifically?

- [ ] Before developing the digital tool, analyze the digital tool team's existing skills and knowledge capacities, especially in data and IT.
- [ ] If additional trainings are needed, make sure to include funding in the overall budget for these trainings.
- [ ] If additional trainings are needed and funding is low, check with other ministries/departments to see if they will be running relevant trainings.
- [ ] If the digital tool team needs considerable training, or if funding is low, look into third-party consultants to develop the tool.

Budget

What will be the financial investment for this project?

- [ ] Before starting the development of the new digital tool, check if the digital tool team will receive government funding (and how much).
- [ ] If the digital tool team will not receive enough government funding, reach out to reputable

external organizations, companies, and/or other entities to obtain the funding.

- [ ] If there is not enough funding for the new digital tool, do market research on when would be the next best time to develop the tool.
- [ ] If there is limited government or external funding, make sure to research the lowest-costing options when developing the tool.

Will hardware of software purchases be needed? How will ongoing maintenance costs be covered (if any)?

- [ ] If there is limited government or external funding, make sure the digital tool's hardware and/or software will have minimal initial, renewal, and/or licensing fees.
- [ ] If there is government or external funding, consider how much of that funding will go into the tool's development vs. its maintenance.
- [ ] To avoid costly maintenance costs, make sure the hardware and/or software for your new tool is up-to-date, and does not have to be replaced with new hardware and/or software.
- [ ] If there is not enough government or external funding, reach out to other ministries/departments for potential partnerships in creating and using the new tool.
- [ ] If there is limited government or external funding, make sure its hardware and/or software will have minimal initial, renewal, and/or licensing fees.

To learn more about the Data and Resources factors for a new digital tool, please review the Data and Resources tabs above.

Next: The various User & Use, Data, and Resource priorities of the digital tool planned out can now be summarized into a formal document (**project charter**) for approval.

Template for a Project Charter (Milestone #3)

STEP 1 PROJECT CHARTER

A **project charter** is a short statement or document detailing the objectives, tasks, constraints, timeline, budget, and key **stakeholders** who will be participating in the digital tool development process.

How to use:

To provide a formal document detailing the plan to develop the new digital tool.

When to use:

Step 1 (Specify Parameters)/ Agree on parameters for the tool development project.

The following link provides a Word template to develop a project charter to download. A sample table of contents is listed below.

Project Charter Template (Vital Strategies).docx 2MB
Binary

Project Charter Contents

The tabs below describe the different elements that should be included when drafting a project charter.

SUMMARY

Project Summary

- Give background info on the project.
- State the project's objectives.

Personnel

Project Name	NAME
Project Sponsor	NAME & POSITION
Project Manager	NAME & POSITION
Key Stakeholders	NAME, POSITION, EMPLOYER
Issue Date (Date project charter released)	DATE
Start Date (Date project officially starts)	DATE

SCOPE

Project Scope

- **Primary Users**
  - Who is the target audience of the digital tool, and what are their needs?
  - How will the tool benefit its users?
- **Project Deliverables**
  - What are the intended results of the project?
- **Risks**
  - What are the potential risks that might jeopardize the development and/or use of the digital tool?

DATA

Data

- **Sources**
  - What **data sources** will be used, and how many?
- **Metrics**
  - What type and category of indicators will be used?
  - What level of detail is expected?
  - What is the time period for the metrics?
- **Analytics**

- How will the data be portrayed? How interactive will the digital tool be? What data comparisons or trends will you highlight?

RESOURCES

Technical Environment

- **Hardware and Software**
  - What are the preferred platforms to use for development?
- **Management and Governance**
  - What are the policies and restrictions around data storage, sharing, and using certain platforms?

Budget

- **Launch resources**
  - Estimated funds available to develop and maintain the digital tool.
- **Development**
  - Estimated cost for development of the tool.
- **Maintenance** (5-year aim)
  - Estimated cost for maintaining the tool for 5 years.

Timeline

- What is each important stage of the tool's development?
- State the expected date to complete each stage.

Project Charter Template External Resources

- **A Quick Guide to Project Charters**
- **Google Images "Project Charter Example"**
- **Writing A Project Charter: How-To Guide, Examples, & Template**
- **What is a Project Charter?**

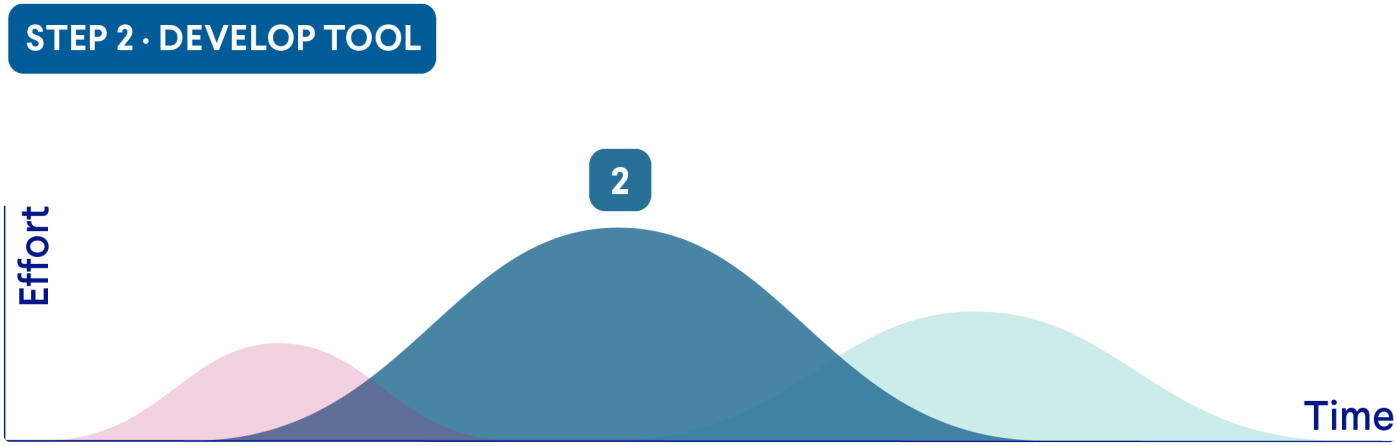
Next: By formalizing its tool development planning, the digital tool team can now start working on the tool implementation by developing uses cases and mock-ups (**use cases**).

Step 2 - DEVELOP TOOL

Step 2 - Overview

This section describes the project stage during which the digital tool is actually created.

An effective digital tool translates essential characteristics into **well-designed features** (visualizations, analytics, and interactive elements), **identifies and structures data** that satisfy user needs, and establishes an **efficient technical environment** that connects both elements.



The approach to tool development should be highly iterative. To effectively align user expectations with development activities developers, technical experts, and users should engage in agile continuous feedback to define, design, and deploy digital tools.

Step 2 Activities, Tasks and Milestones

STEP 2 ACTIVITIES, TASKS AND MILESTONES

Develop Tool involves three activities that should take up to 8 months (project months 3 to 10) to complete.

ACTIVITY 1

Activity 1: Define detailed scenarios that identify the specific content and functionality required to meet user needs.

- **Create detailed scenarios** (ie. "use cases") of how a potential tool could help specific actors produce better decisions about public health policies and programs.

Key Tasks

- [ ] Solicit input on scenarios/**use cases** from a diverse range of user viewpoints.
- [ ] Identify features (visualizations; interactivity, analytics) and metrics (data needs) to address situations raised in the **use cases**.
- [ ] Assess currently available data and determine how it could be processed and structured to support required features (adapting requirements if necessary).

Milestone 4

- **Mock-Up** completed showing main tool features and metrics.
- *Target*: End Month 4

ACTIVITY 2

Activity 2: Design and integrate tool components that effectively meet requirements

- **Develop tool** by connecting application features to a data repository in a stable technical environment.

Key Tasks

- [ ] Establish required technical environments for digital tool development/testing and data access.
- [ ] Provide sample **datasets** from source data in a structure that can be used by the tool's visualization, analytic, and interactive features.
- [ ] Rapidly iterate designs of tool features ("**agile development**") using sample datasets.
- [ ] Produce a fully-functioning prototype of a tool that is connected to complete, real datasets.
- [ ] Train test users on tool navigation and evaluate **tool prototype.**
- [ ] Gain access to the data and data source needed to include real data into the tool's datasets, and **data visualizations & analytics**.

Milestone 5

- Provides the **Application Developer** specific information, decisions, and tasks on how to build the **tool prototype** and **initial deployment tool**.
- *Target*: End Month 5

Milestone 6

- Working prototype of tool (with real data).

- *Target*: End Month 7

Milestone 7

- Obtaining access to data & data sources needed for tool's data components.
- *Target*: End Month 9

ACTIVITY 3

Activity 3: Deploy tool (after acceptance testing) to an initial cohort of users

- Release digital tool for actual use by an initial cohort of users.

Key Tasks

- [ ] Establish the required technical environment for tool hosting.
- [ ] Produce a fully-functioning tool with real **datasets**, data structure, **data visualizations & analytics**, and hardware & software.
- [ ] Complete **user acceptance testing (UAT)** on the **initial deployment tool**.
- [ ] Revise tool and data structure based on **UAT** feedback.
- [ ] Train initial cohort of users on tool navigation.

Milestone 8

- Tool deployed for use among initial cohort of users.
- *Target*: End Month 10

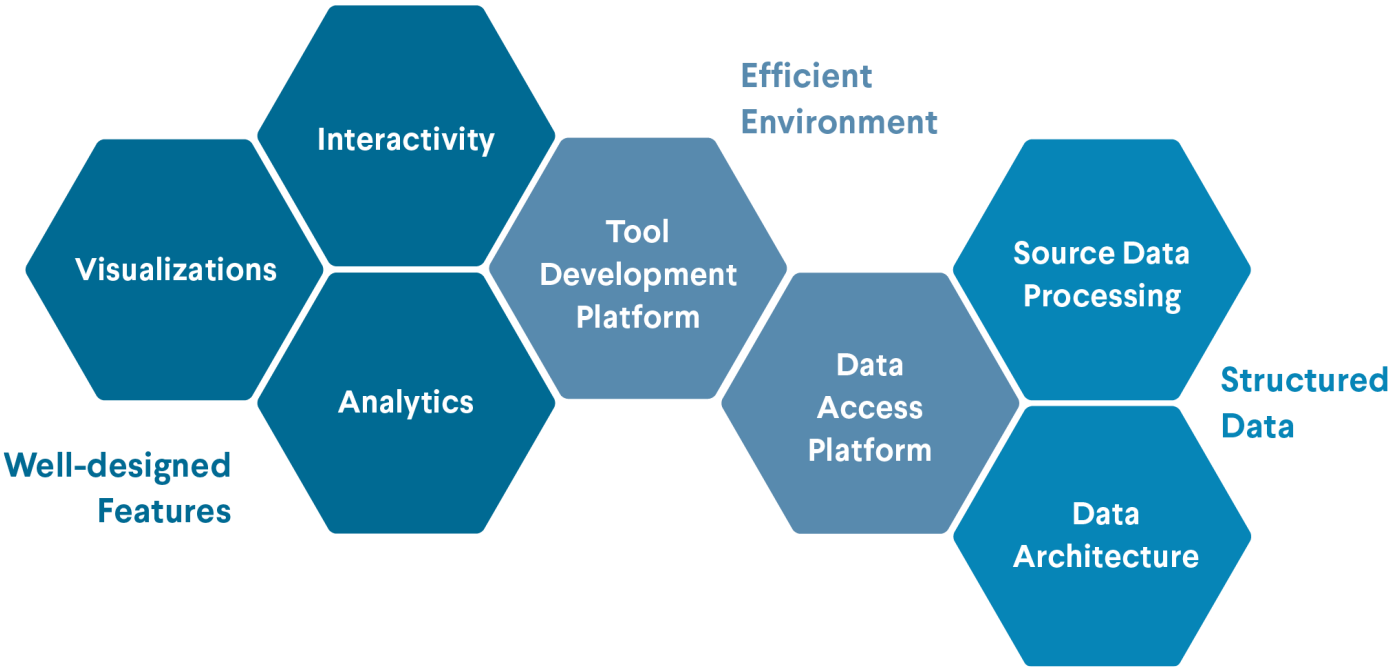
To learn more about Milestones 5-8 of Step 2, please continue reading the Activity 2 & 3 tabs above.

Tool Features, Environment and Data

STEP 2 TOOL FEATURES, ENVIRONMENT AND DATA

This page summarizes the critical factors and resources needed in order to adequately develop, revise, and deploy a digital tool. It should serve as guidance in how to effectively include these elements in the tool, and how they determine if users will or will not use the tool.

Digital Tool Features, Environment, and Data Factors



The definitions included here are general guidelines for understanding the different pieces involved in developing a digital tool. They should serve as a starting point to understanding and actively participating in the development, revision, and deployment of the tool.

Well-Designed Features	Efficient Environment (IT)	Structured Data
Interactivity	Tool Development Platform	Source Data Processing
Visualizations	Data Access Platform	Data Architecture
Analytics		

WELL-DESIGNED FEATURES

Interactivity

The **interactivity** of a digital tool measures the ability of **users** to alter, distort, export, or work with the tool's features to satisfy their needs. Common features boosting tool interactivity include alternative paths (**use cases**), filtering, grouping, data exporting, printing, highlighting, trending, and more. The more interactive a tool is, the more ways users will be able to obtain the information or analyses they need. To learn more about tool interactivity, **please visit the Step 2 Use Case Development page here**.

> Always consider user interactivity in tool development, as users prefer tools that can provide them more information and analyses; and more interactivity can increase a tool's users.

Visualizations

Visualizations in a digital tool present users with visual representations of the data. They describe the data and display any trends or patterns the data may have. Common visualizations used in tools are bar graphs, line graphs, charts, geographical maps, and more. Users prefer tools with more data visualizations, as they can easily interpret and obtain the information they need to satisfy their demands. To learn more about visualizations in a digital tool, **please visit the Step 2 Users' tab of the Design Specifications page here**.

> When placing visualizations in the tool, make sure to include data definitions to help its users fully understand the corresponding visualizations.

Analytics

Analytics is the process of collecting, interpreting, and communicating patterns and trends in data. Common analytics in a digital tool include filtering, grouping, data extracting, visual graphs, charts, and more. Users prefer when tools have many analytics, as they are able to navigate, identify, and interact with patterns, trends, and more to obtain the information they need. To learn more about analytics in a digital tool, **please visit the Step 2 Users' tab of the Design Specifications page here**.

> When obtaining user feedback during the **tool mock-up**, prototype, and **initial deployment** stages, always make sure the digital tool's analytics satisfy users' needs.

EFFICIENT ENVIRONMENT (IT)

Tool Development Platform

A **Tool Development Platform** is the technical environment used to develop the digital tool. This includes the hardware & software used to create the tool, **data sharing policies** and

practices, and other technical components contributing to digital tool development. When developing the tool, ensure everyone on the ministry/department staff can easily access and use the hardware & software to create the tool,and are knowledgeable about ministry/department data sharing policies and practices. To learn more about a Tool Development Platform, **please visit the IT Environment here**.

> When choosing the hardware & software for the Tool Development Platform, make sure it has up-to-date security to protect the data and ministry/department.

Data Access Platform

A **Data Access Platform** is a technological platform that stores, updates, and **shares** data with approved **users**. This includes the data repositories & storage, hardware & software holding data and operating the digital tool, as well as other features that interact with data aspects of the tool. Users indirectly interact with the Data Access Platform by interacting with data that is held or stored by the platform. To learn more about a Data Access Platform, **please visit the IT Environment here**.

> Similar to the Tool Development Platform, when choosing hardware & software for the Data Access Platform, confirm it has up-to-date data **security** to protect the data and its users.

STRUCTURED DATA

Source Data Processing

Source Data Processing is a series of actions related to interacting with and processing data from the digital tool. This includes ensuring the data is updated at an adequate rate, checking visualizations and **analytics** portray the data correctly, ensuring **data sources** are linked with the tool's analytics, having an adequate **time series** (meeting the needs of users), and more. The more accurate and quicker source data is processed, the more **users** will trust and continue to use the tool to satisfy their needs. To learn more about Source Data Processing, **please visit the Step 3 Data Structure tab of the Data Flow Systems page here**.

> When linking external **data sources** to the tool's analytics, make sure it has already been or will be verified by the ministry/department.

Data Architecture

Data Architecture is a framework displaying how the data is organized in a ministry/department or organization. This includes presenting where data is stored, how it can be accessed, and if it can be shared. One of the most important components of **Data Architecture** is the **Database Management System (DBMS)**, which stores, shares, and secures the data from any **malware** or unauthorized users. To learn more about Data Architecture, **please visit the IT Environment here**.

> When developing the digital tool, routinely check that the tool is able to **extract, transform, and load (ETL)** data from the **DBMS** into its data visualizations and analytics without any technical or security issues.

To learn more about the Efficient Environment and Structured Data features of a digital tool, please review the Efficient Environment and Structured Data tabs above.

Step 2 - Resources

STEP 2 · DEVELOP TOOL

List of Resources

Use: To provide guidance and advice on how to develop, map, and maintain use cases (meeting users' needs) for a digital tool.

Advice for Use Case Development

Use: To provide a core strategy for and guidance on evaluating and choosing which data sources to include in a digital tool.

Strategies for Data Mapping

Use: To provide the necessary information, personnel, and suggested process to develop a tool mock-up for a digital tool.

Guidelines for Developing a Tool Mock-Up (Milestone #4)

Use: To provide information on the specific info, decisions, and tasks that will be followed by the Application Developer to build the tool prototype and initial deployment tool.

Design Specifications Recommendations (Milestone #5)

Use: To provide the necessary information, personnel, and suggested process to develop a tool prototype for a digital tool.

Tool Prototype Guidelines (Milestone #6)

Use: To provide information and guidance on data sharing agreements, including how they are developed, and what should be included in them.

Checklist for Data Sharing Protocols (Milestone #7)

Use: To provide guidance on how to run **User Acceptance Testing** for a digital tool in the **Initial Deployment** stage.

Conducting User Acceptance Testing (UAT)

Use: To provide the necessary information personnel, and suggested process to develop an initial deployment tool, and fully deploy the tool to selected users.

Guidelines for Initial Deployment (Milestone #8)

Guidelines for Developing a Tool Mock-Up (Milestone #4)

STEP 2 TOOL MOCKUP

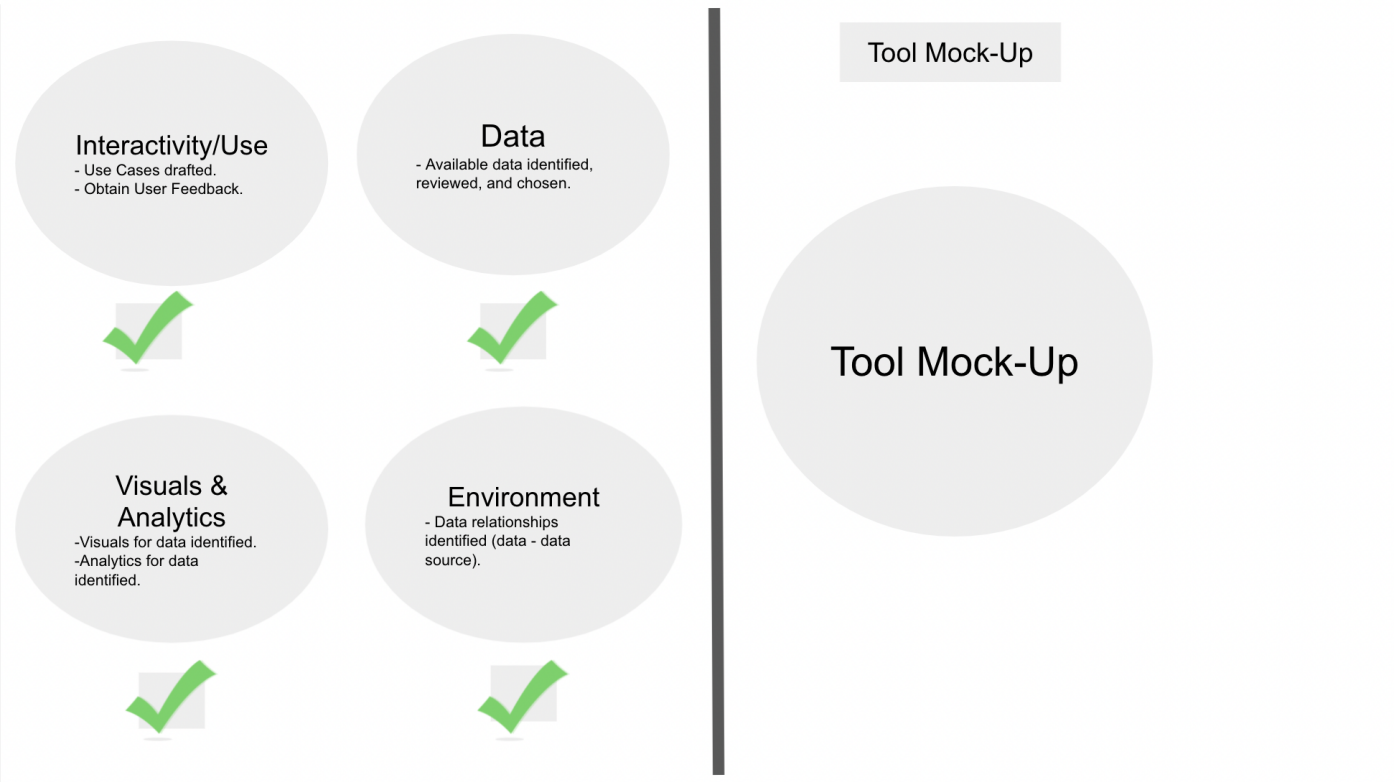
The goal of the **mock-up** is to **develop a static version of the digital tool** exemplifying its key features (**visualizations, interactivity, analytics**) and to inform users of the data expectations.

How to Use: To draft a static tool mock-up presenting the **use cases,** data visualizations, analytics, and interactive features that will be included in the digital tool.

When to use:

Step 2 (Develop Tool)/ Define detailed scenarios that identify the specific content and functionality required to meet user needs.

Tool Mock-Up



Below are recommendations for what makes a good mock-up, the tasks for which different roles are needed, and for the iterative development process.

Product	People	Process
What is a Tool Mock-Up?	Who is involved in a Tool Mock-Up?	Suggested Tool Mock-Up Development Process
Why Draft a Tool Mock-Up?		

PRODUCT

What is a Tool Mock-Up?

A tool mock-up is a static and simple representation of the organization and content that will be in the digital tool.

> Unlike a **tool prototype**, **a tool mock-up is a non-interactive and map-like image of the digital tool**. It includes key visual look specifications, but should not be expected to look like the final product.

Why Draft a Tool Mock-Up?

- A tool mock-up is informed by use cases (**interactivity**).
  - It reflects how the tool fulfills the **users'** data demands.
  - It describes the different ways users will be able to interact with the tool.
- A tool mock-up exemplifies how data will be presented and used (visualizations).
  - It indicates how the data will be visualized (ex. graphics, maps, tables) to meet the users' needs.
  - It provides users various ways to interact and manipulate data (analytics) in the tool.
  - It allows users to understand and analyze the data from different views.
- A tool mock-up guides how the data will need to be structured (**data architecture**).
  - It helps identify which data must be included for it to be a *good* tool for users.
  - It establishes what data relationships need to be developed.

PERSONNEL

Who is involved in a Tool Mock-Up?

- **Application Developer** (Leader)
  - Oversees the total tool mock-up process, and coordinates feedback between users and the digital tool team.
- **Users**
  - Engage with the tool mock-up, and provide clear and effective feedback to the digital tool team.
- **Subject Expert**
  - Gives input on which data should be included, and how it should be portrayed (ex. bar graphs, **Gantt charts**) to fulfill users' needs.
- **Data Expert**
  - Assesses and provides input on data limitations for the tool mock-up (ex. determining which data is available to use) to gauge which data and analytics can be used to satisfy users' demands.

PROCESS

Suggested Tool Mock-Up Development Process

> The **tool mock-up process should take approximately 1 month** to complete.

1. Focus on **decision-oriented** input, not detailed-oriented input.
   - Consider and list the needs of **users** and user interactivity with the digital tool.
   - Draft Use Cases.
     - Develop mock visuals and controls on what will be helpful to the user.
   - Share and obtain feedback from users on the use cases.
2. Review the existing data to discover its limitations.
   - Assess the current data you have available and determine how it could be processed and built to support the required features of the tool.
   - Review and discuss the available data and its capabilities (**data architecture**) with the digital tool team.
3. Include and describe the expected interactive control users will have in the digital tool.
   - Identify special features and metrics (ex. filters, groupings) to address the simulations in the use cases, and explain what each does.
   - Install these features, metrics, and data in the tool mock-up.
4. Review your tool mock-up with the digital tool team.
5. Start the "**Design Specifications**" stage.

> **Next**: A tool mock-up that accurately represent the use cases and features expected in the tool leads to an action plan to develop the tool prototype (**Design Specifications**).

Design Specifications Recommendations (Milestone #5)

STEP 2 DESIGN SPECIFICATIONS

Design Specifications mark the point when there are **specific information, decisions, and tasks to build a functional digital tool** serving as clear instructions for the **Application Developer** to develop the digital **tool prototype** and **initial tool**. It essentially is a more updated and detailed **project launch**.

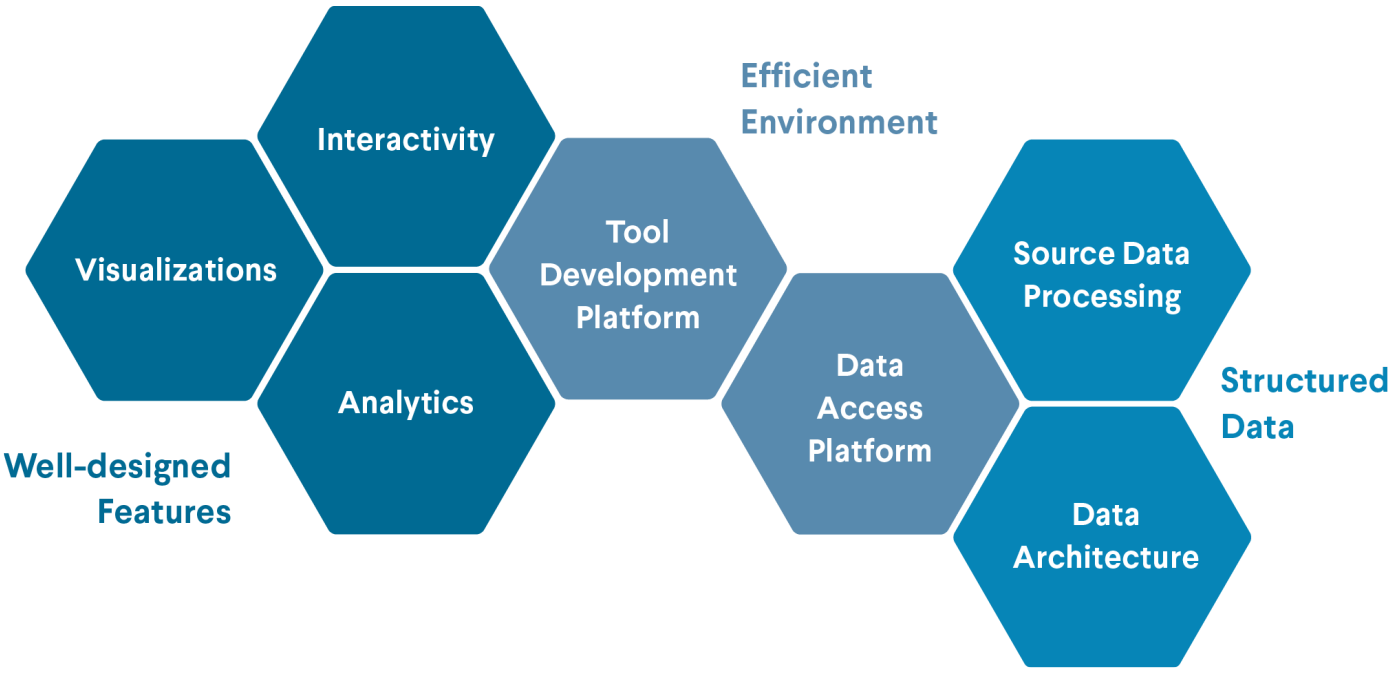
How to use:

To provide information on the specific info, decisions, and tasks that will inform the Application Developer how to build the tool prototype and initial deployment tool.

When to use:

Step 2 (Develop Tool)/ Design and integrate tool components that effectively meet requirements.

Design Specifications Categories



This milestone is achieved when the following information has been shared with relevant actors and all initial questions have been answered. There should be clarity for the actors to work independently before engaging in the tool prototype work more fully.

Well-Designed Features	Efficient Environment (IT)	Structured Data
Interactivity	Tool Development Platform	Source Data Processing
Visualizations	Data Access Platform	Data Architecture
Analytics		

WELL-DESIGNED FEATURES

Interactivity

- [ ] Ensure users are able to interact with the digital tool to fulfill their needs.
- [ ] Confirm the tool will meet its **primary users'** main needs.
- [ ] Create several alternative paths (depending on users), allowing users to interact with the tool in different ways.
- [ ] Make revisions to the tool based off on feedback from the **Tool Mock-Up**; this will ensure users will enjoy interacting with the tool.

Visualizations

- [ ] Depending on users' backgrounds, provide explanations under each **data visualization** describing the data and its context.
- [ ] Confirm the data visualizations will provide users the information, analyses, or trends to satisfy their needs.
- [ ] Provide (real or mock) data in the digital tool, as well as data visualizations correcting analyzing, and displaying the data.
- [ ] Check data visualizations drawing data from a **Database Management System (DBMS)** are interpreting the data correctly, and have access to the DBMS for the long term.

Analytics

- [ ] Allow for users to extract or share the (real or mock) data from the digital tool if needed or requested.
- [ ] Provide users the ability to filter through the tool's indicators to retrieve any specific (real or mock) data they need.
- [ ] Provide users access to analytic features, allowing them to navigate and identify the patterns, trends, or other information they need.
- [ ] Make revisions to the tool's analytics (ex. filtering, grouping) based on user feedback from the **Tool Mock-Up**; this will ensure the tool provides the specific analytics users want.

EFFICIENT ENVIRONMENT (IT)

Tool Development Platform

- [ ] Ensure the hardware & software used to develop the digital tool are up-to-date (ex. licensing, upgrades, industrial installations).
- [ ] Develop the tool with widely-used hardware & software, allowing the digital tool team to easily access, interact, and edit the tool.
- [ ] Confirm the hardware & software has up-to-date **security** to protect the data and the ministry/department.
- [ ] Affirm everyone the **digital tool team** is knowledgeable about and applies the

ministry's/department's **data-sharing policies** to the digital tool.

Data Access Platform

- [ ] Make sure the hardware & software users commonly use are compatible with the digital tool.
- [ ] Allow the data from the tool to be easily exportable to different hardware & software (**data sharing policies**).
- [ ] Require the hardware & software of the data access platform have up-to-date **data security** to protect the data and its users.
- [ ] Inform users if there are any common hardware and/or software that is not compatible with the tool.

STRUCTURED DATA

Source Data Processing

- [ ] Provide **users** the ability to interact with various indicators and **time series** that will help them obtain the information they need.
- [ ] Supply users with the most up-to-date data when they access the digital tool (weekly, monthly, bi-annually).
- [ ] Verify the credibility of the tool's external **data sources**; this will help improve the tool's credibility among its users.
- [ ] Use mock data as a placeholder in the tool (if the **data source** will not be available until later tool development stages).

Data Architecture

- [ ] Confirm the digital tool is able to **extract, transform, and load (ETL)** data from its **Database Management System (DBMS)** without any technical or security issues.
- [ ] Have the DBMS follow the ministry's/department's **data security** procedures to prevent malware or unauthorized users from illegally accessing the data.
- [ ] If the tool is drawing from various DBMSs, reach out and confirm with their data authorities that the tool will continue to have access to the DBMSs for the long term.
- [ ] Use mock data as a placeholder in the DBMS (if the **data source** will not be available until later tool development stages).

To learn more about the IT and Data components of a digital tool, please review the "Efficient Environment" and "Structured Data" tabs above.

Next: After identifying the various information, decisions, and tasks to develop the digital tool, the Application Developer can start building the **tool prototype**.

Tool Prototype Guidelines (Milestone #6)

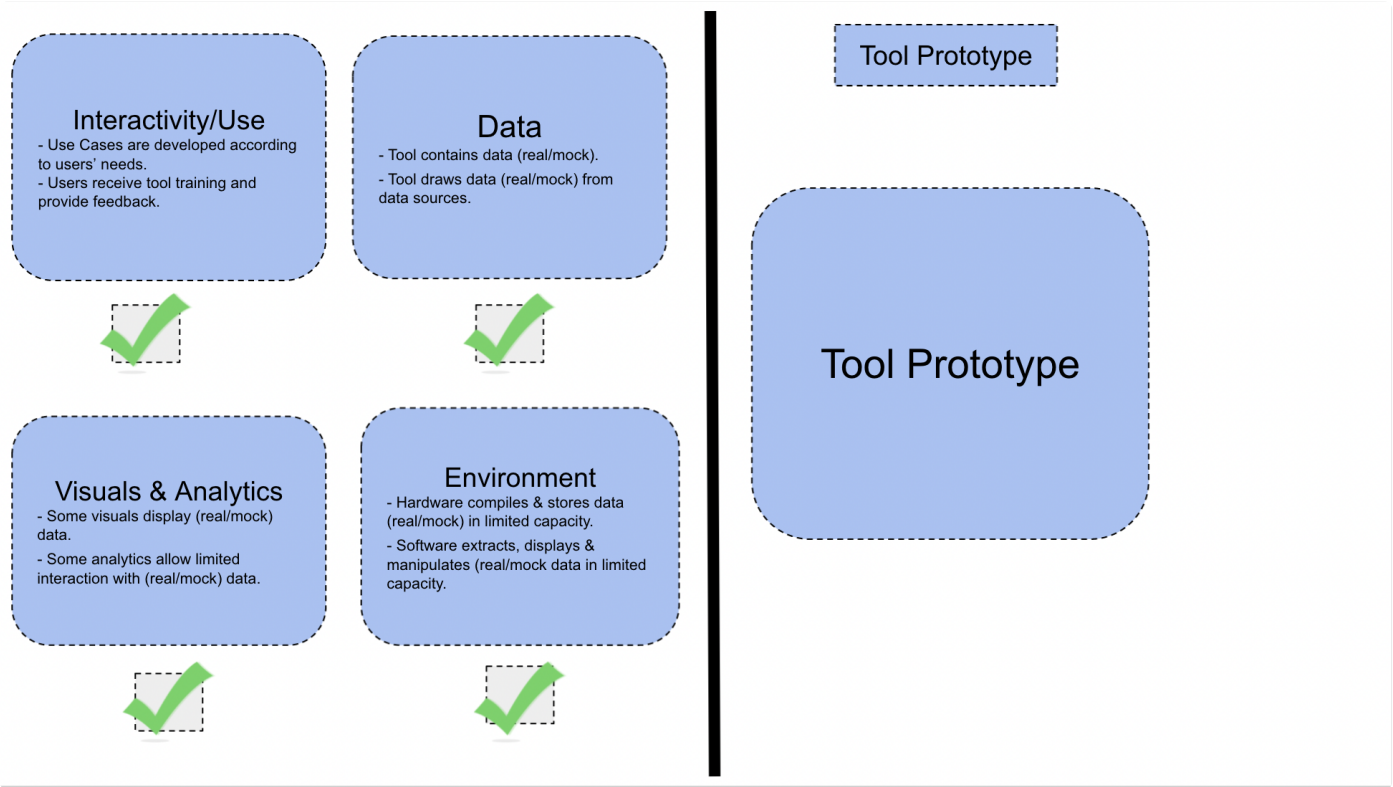
STEP 2 TOOL PROTOTYPE

The goal of the **tool prototype** is to **create an interactive version of the digital tool**, demonstrating the tool's visualizations, functionalities, data displays, navigation, and hardware & software.

> **How to use**:
>
> To test, present, receive user feedback, and revise the digital tool's use cases, **data visualizations, analytics**, and structure, as well as its hardware & software.

> **When to use**:
>
> Step 2 (Develop Tool)/ Design and integrate tool components that effectively meet requirements.

Tool Prototype



Below are recommendations for what makes a good prototype, the tasks for which different roles are needed, and for the iterative development process.

Product	People	Process
What is a Tool Prototype?	Who is involved in a Tool Prototype?	Suggested Tool Prototype Development Process
What makes a functional Tool Prototype?		

PRODUCT

What is a Tool Prototype?

A digital tool prototype is an interactive prototype or replica of the digital tool, providing its users insight into the tool's data visualizations and structures, functionalities, general navigation, and hardware & software.

> A tool prototype is very interactive, fully functional, and behaves in almost the exact way of the digital tool. It is not yet exactly like the digital tool. Instead, the **prototype should be flexible to critical user feedback, major alterations, and other editing** that may change its layout.

What makes a functional Tool Prototype?

- A functional tool prototype uses data to provide its user a glimpse of what information will be used and stored in the digital tool.
  - The prototype uses real or mock **datasets** in its data visualizations or structures to present users' information on a specific subject or indicator.
  - The prototype draws from a data source(s) containing (real or mock) data.
- A functional tool prototype provides limited visuals and interactivity to show its users how the tool can fulfill their needs.
  - The prototype's data visualizations present some patterns, trends, and other analyses the user can use to gain the information they need.
  - The prototype's data structure (ex. filters, groupings, exports) gives users insight into how they can interact with the tool and export the specific data they need.
- A functional tool prototype has a location where users are able to share their feedback with the digital tool team.
  - The digital tool team will provide an in-person or digital training to select **representative users**, giving them general guidance on how to use the tool and share their feedback.
- A functional prototype has hardware & software that help it operate at a limited capacity.
  - The prototype uses hardware that collects, compiles, and stores (real or mock) data for the tool prototype in a reduced capacity.
  - The prototype draws from software that extracts, displays, and/or manipulates (real or mock) data in a limited capacity.

PERSONNEL

Who is involved in a Tool Prototype?

- **Application Developer**
  - Oversees the entire digital tool prototype process, including building the tool prototype hardware/software and **datasets**, testing the tool prototype, and coordinating

communications between users and the digital tool team.

- **User**
  - Receives tool navigation guidance from (application developer) and provides effective feedback to the digital tool team.
- **Subject Expert**
  - Gives input on which data should be included, and how it should be portrayed (ex. visualizations, filters) in the tool prototype.
- **Data Expert**
  - Identifies, extracts, and/or connects datasets from the **data source** into the prototype of the tool.
- **IT Professionals**
  - Identify, set up, operate, and maintain the hardware & software used for and by the tool prototype.

PROCESS

Suggested Tool Prototype Development Process

> ⓘ Serving as the **halfway point of the digital tool** development project, **a tool prototype should take approximately 2 months** to complete (after Design Specifications).

1. Focus on **decision-oriented** input, not detailed-oriented input.
   - After completing the "**Design Specifications**" stage, clearly list out user needs again with the digital tool team.
2. Review, identify, and acquire or build the tool components the users liked from the "**Tool Mock-Up**" and the "**Design Specifications**" stages.
   - Research, identify, analyze, and acquire the hardware and software needed to build the tool prototype.
   - Identify, evaluate, and gain access to the **data source**(s) needed for the tool prototype.
   - Identify, evaluate, and export specific data from the **data source**(s) into their respective tool prototype **data visualizations** and structures.
3. Test the interactable components of the tool prototype for tool **functionality** and user likeability.
   - Rapidly test the data with different data visualizations and structures to find which best portray the information needed to satisfy user demands.
   - Compare, identify, and place specific data visualizations and structures (fulfilling user needs) into the tool prototype.
4. Produce a functional prototype.
5. Share, interact with, and obtain feedback from **representative users** on the tool prototype.
   - Hold a training with representative users to give them general guidance on navigating

the tool prototype.
- Discuss feedback from users with the digital tool team.

6. Repeat steps 1-5 for other tool prototypes.
7. Start the "**Initial Deployment**" stage.
    - Review the tool prototype with the digital tool team before moving on to this stage.

To learn more about the people involved in developing and process of the tool prototype, please review the "Personnel" and "Process" tabs above.

Tool Prototype vs. Tool Mock-Up?

- **A tool prototype is interactive**, containing tool content, structure, and data, while a **tool mock-up is a static blueprint** of the digital tool.
- A tool prototype takes into account user feedback, while a tool mock-up does not.
- While there are multiple versions of a tool prototype, there should only be one tool mock-up.
- Unless currently unavailable, a tool prototype will contain real data, while a tool mock-up will contain zero or mock data.

Next: After developing and altering the digital tool prototype according to user feedback, which includes its interactive **use cases**, data visualizations, analytics, and structure, as well as its hardware & software, move onto the **initial deployment** stage.

Checklist for Data Sharing Protocols (Milestone #7)

STEP 2 DATA SHARING PROTOCOLS

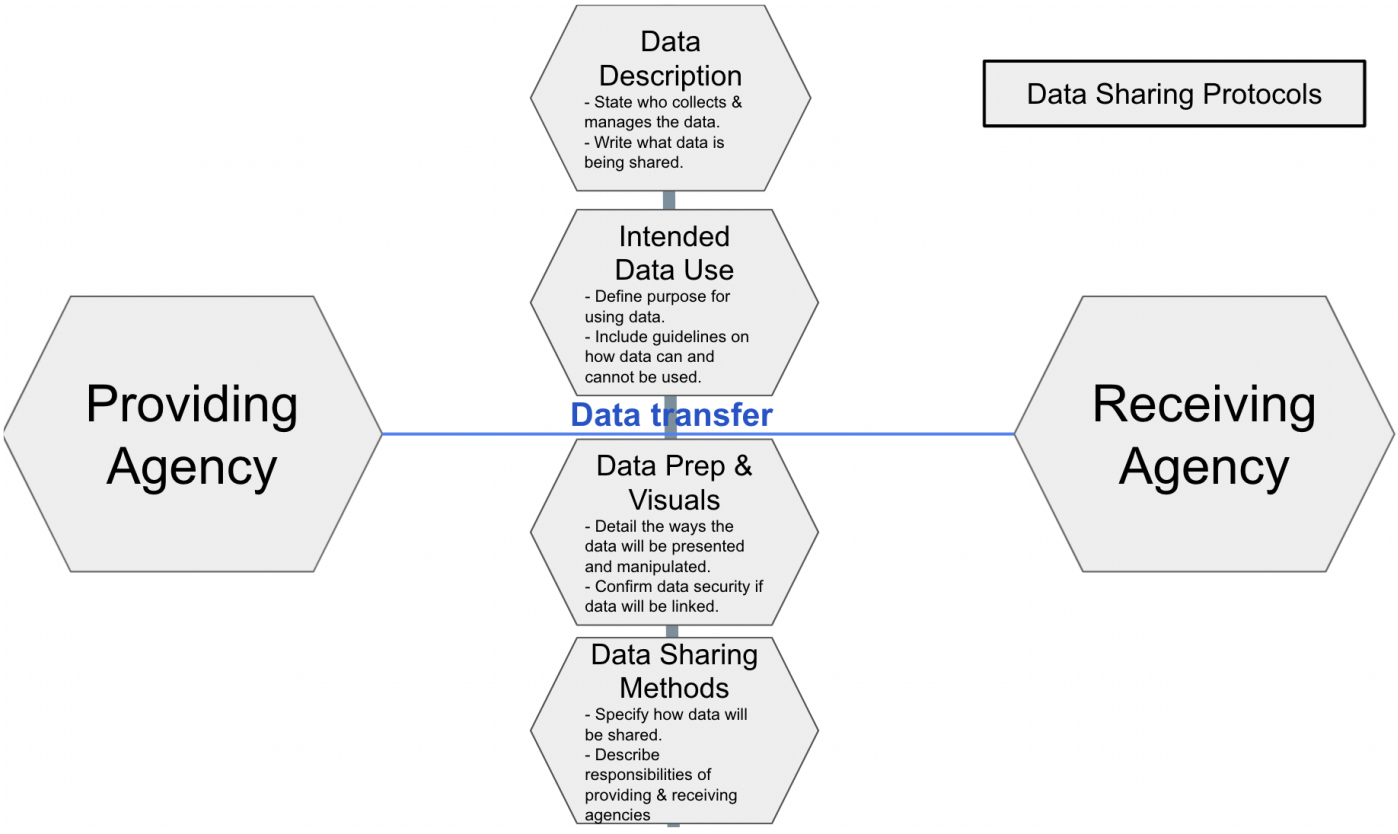
The Data Sharing Protocols specify the conditions under which data is shared. A common way to share data (especially data from data sources) is through data sharing agreements, which include what data will be shared, how it will be used, the procedures to safeguard the data, and the methods for sharing the data.

How to use:

To explain the benefits of and components that must be included in a data sharing agreement.

When to use:

Step 2 (Develop Tool)/ Design and integrate tool components that effectively meet requirements.



Why Establish a Data Sharing Agreement?

The two main goals of a data sharing agreement are to:

- Protect the data from misuse or breaches.
-

Provide a shared understanding of how to use, share, display, and protect the data.

Other benefits of a data sharing agreement include:

- Being formally given access to data that can be used for the digital tool.
- Tracking who has, will have, or will not have access to the data.
- Prevent any misunderstandings or miscommunications between the data **provider & receiver** on how to use, share, display, and protect the data.
- A release of responsibility relieving the data provider if the data is breached.

The tabs below describe the different elements that must be included in a data sharing agreement.

DATA DESCRIPTION

Data Description

Specify the data that is the subject of the agreement. Provide a description of the data to be shared.

Who owns, collects, and manages the data?

- [ ] State the **stakeholder** (person, ministry/department, organization) that owns, collects, and/or manages the data.
- [ ] Briefly explain the background of the stakeholder that owns, collects, and/or manages the data.
- [ ] Find out if they have limited or full authority over the data.
- [ ] Ensure the stakeholder is comfortable with sharing the data with the ministry/department and/or other parties.

Which data elements or variables are needed?

- [ ] State the data variables needed.
- [ ] Define why these specific data variables are needed.
- [ ] Specify the time series needed for these data variables.
- [ ] Consider what other data variables are needed for the tool.

Documentation & Data Definitions

- [ ] Provide documentation describing the data that will be collected.
- [ ] Draft the documentation in a language that is easily comprehensible for the stakeholder or others included in the agreement.
- [ ] Ensure the documentation does not leave any data variables up to interpretation.
- [ ] Present any other documentation that will provide stakeholders or others included in the agreement with more information on the data variables and/or definitions.

INTENDED USE

Intended Use of the Data

State how the **receiving agency** will use the data, list any restrictions of the data, and describe the **data security** and privacy requirements.

What is the main purpose of the data?

- [ ] State clearly the main purpose of the data for the digital tool.
- [ ] List other potential secondary purposes of the data.
- [ ] As a receiving agency, provide a description of the digital tool and how their data will interact with the tool.
- [ ] As a **providing agency**, consider how the receiving agency's digital tool will reflect on the

providing agency's work, ministry/department, and mission.

What are the security guidelines?

- [ ] List who is the **Data Authority** (person managing all of the data).
- [ ] Both providing and receiving agencies must come to an agreement on the **data security** methods they plan to use to protect the data.
- [ ] As a providing agency, consider and ask who at the receiving agency will have access to the data.
- [ ] If the shared data is sensitive, both providing and receiving agencies need to agree on regulations that prevent this data from becoming public.

Reporting Guidelines & Limitations

- [ ] As a providing agency, list the restrictions on how the data can be used and/or shared.
- [ ] As a receiving agency, consider different ways to use the data without breaching any of the restrictions.
- [ ] As a providing agency, state the data sharing period (how long the agency can use the data for), and what will happen to the data after the data sharing period has expired.
- [ ] Consider documenting how the providing agency will share or receiving agencies will use the data to provide proof of following regulations and limitations.

DATA PREP & VISUALS

Data Preparations & Visualizations

Describe any transformations the data needs to go through before it is suitable for sharing.

Is enough data being shared?

- [ ] As a **providing agency**, consider what is the minimum amount of data that needs to be shared (and what other data does not need to be shared).
- [ ] As a **receiving agency**, confirm there is enough data to create effective **data visualizations** for the digital tool.
- [ ] As a providing agency, contemplate if the data shared will be used effectively towards an issue that affects or relates to the providing ministry/department.
- [ ] As a receiving agency, check there is enough data to create effective data analytics (features allowing user interactivity with data).

Will there be any data linking (multiple sources, tables)?

- [ ] As a receiving agency, confirm the data link does not breach the data sharing agreement or the **security** of the providing agency.
- [ ] As a providing agency, ask the receiving agency if and/or how they plan to link the data.
- [ ] As a receiving agency, state why the data is being linked to the providing agency.
- [ ] As a providing agency, ask about the other data that will be linked to their **data sources**.

How will the data be formatted?

- [ ] State the different visualizations that will be used to transform the data.

- [ ] As a receiving agency, state the different **data analytics** users will use when interacting with data in the digital tool.
- [ ] As a receiving agency, explain why the data will be formatted in its specific style.
- [ ] As a providing agency, confirm the data visualizations and analytics used by the receiving agency will not allow sensitive data to be identifiable (users cannot identify data participants).

DATA SHARING METHODS

Methods of Data-Sharing

Identify the way in which the data will be transferred from the ministry to the **receiving agency**.

What are the roles & responsibilities of the providing and receiving agencies?

- [ ] Providing and receiving agencies must both abide by the data security regulations they agreed upon to protect the data.
- [ ] **Providing agencies** must provide the exact data agreed upon in the data sharing agreement.
- [ ] Receiving agencies must use the data in the exact way(s) detailed in the data sharing agreement, and avoid breaching any restrictions.
- [ ] State in the data agreement who is responsible for covering data sharing expenses (providing or receiving agency).

What IT tools will be used?

- [ ] State the different hardware/software that will be used to collect, manage, transfer, and transform the data.
- [ ] Determine if the hardware/software that will be used has enough security to prevent the data from being breached or accessed by unauthorized users.
- [ ] As a receiving agency, briefly explain why that specific hardware/software is used for the data in the digital tool.
- [ ] As a receiving agency, determine if the hardware/software used to transfer the data is compatible with the tool.

How will the data be shared (Timeline, Updates, Formats)?

- [ ] Describe the timeline for how long data will be sent from the providing ministry/department to the receiving agency.
- [ ] State how often new data will be sent from the providing ministry/department to the receiving agency.
- [ ] Explain what format the new data will be sent in by the providing ministry/department.
- [ ] Provide brief explanations (if needed) as to why the data will be shared in the aforementioned ways above.

To learn more about the Data Use, Visuals, Security, and Sharing Methods included in a Data Sharing Agreement, please review the "Intended Use", "Data Prep & Visuals", and "Data Sharing Methods" tabs above.

Data Sharing Agreement External Resources

- **Creating Data Sharing Agreements**
- **Data Sharing Agreements**
- **Data Sharing: A Code of Practice**
- **Data Sharing Checklists**
- **Designing Data Sharing Agreements: A Checklist**

Next: After establishing the data sharing agreement, transfer the data from the providing agency's data source into the digital tool **prototype** or **initial deployment**.

Guidelines for Initial Deployment (Milestone #8)

STEP 2 INITIAL DEPLOYMENT

The goal of the initial deployment is **to finalize and deploy a fully developed digital tool** that will be shared with an initial cohort of users.

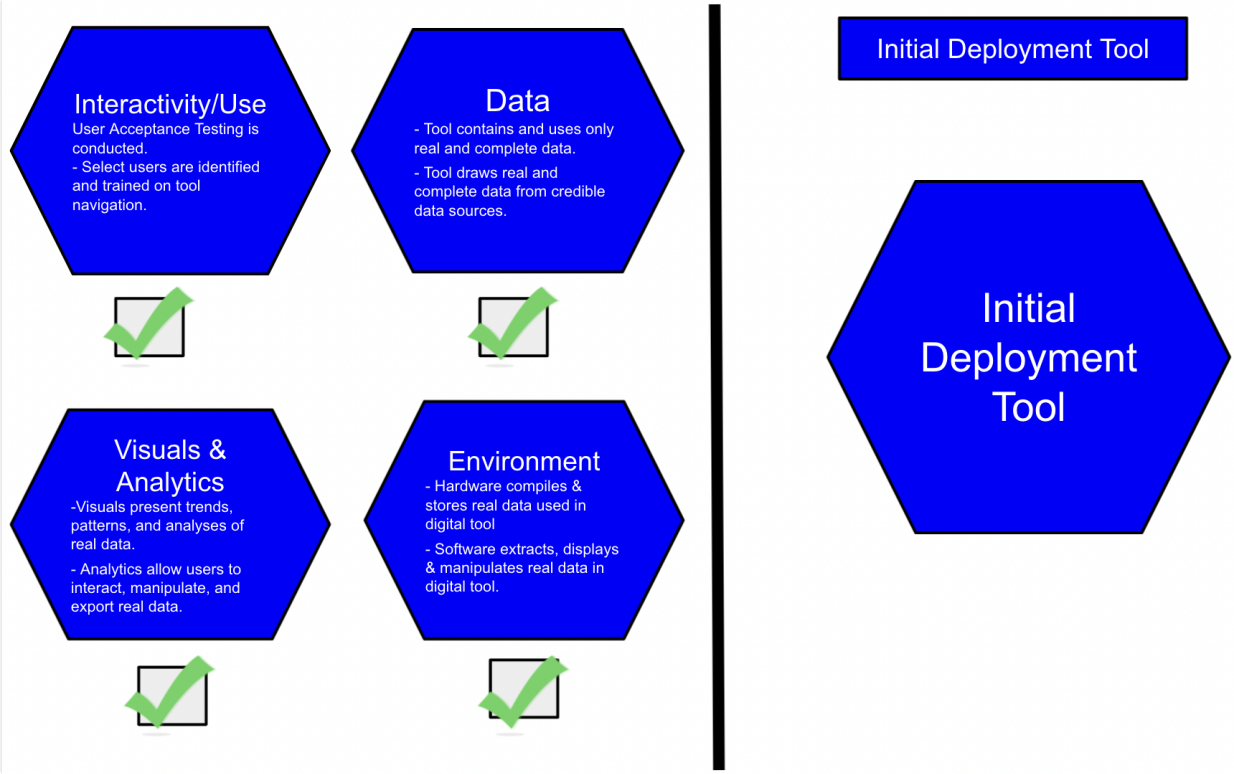
When to use:

To develop a fully-functioning digital tool that, after going through UAT, can be deployed to selected representative users.

How to use:

Step 2 (Develop Tool)/ Deploy tool (after acceptance testing) to an initial cohort of users.

Initial Deployment Mockup and Process



Below are recommendations for what makes a good initial deployment, the tasks for which different roles are needed, and the iterative development process.

Product	People	Process

Product	People	Process
What is Initial Deployment?	Who is involved in Initial Deployment?	Suggested Initial Deployment Process
What comprises a good Initial Deployment?		

PRODUCT

What is Initial Deployment?

Initial deployment (last stage of digital tool development) is the first version of the fully developed digital tool. This stage **includes both the development of the digital tool and the deployment of the digital tool to select users**.

> Unlike the tool prototype, the tool must **be 100% complete** at this stage, including the use of real data, all necessary data visualizations and structures, and hardware & software should be in place.

What comprises a good Initial Deployment?

- A good Initial Deployment allows users to interact, manipulate, and/or extract real data from the digital tool.
  - The tool has **data visualizations** with real data that present different patterns, trends, and other analyzes that fully satisfy users' needs.
  - The tool allows users to interact with all the different features of the tool, helping users manipulate the data to their needs.
  - Unlike the **tool mock-up** and **tool prototype**, the Initial Deployment tool contains real data only.
- A good Initial Deployment allows users to fully access and use the tool's hardware & software to achieve their end goals.
  - The tool has functional hardware that collects, compiles, and stores real data.
  - The tool uses software extracting, displaying, and/or manipulating real data at the request of its users.
- A good Initial Deployment runs and obtains effective feedback from **User Acceptance Testing (UAT)**, and provides navigation training to **representative users**.
  - The tool is evaluated by representative users, who will test its functionality, basic and alternative paths, and resources, and provide feedback on these components of the tool.
  - The digital tool team after UAT provides formal and more detailed training to representative users on how to navigate and interact with the tool to fulfill their needs.

PERSONNEL

Who is involved in Initial Deployment?

- **Application Developer**
  - Oversees the entire Initial Deployment process, especially in running **User Acceptance Tests (UATs)**, managing communications between select users and the digital tool team, and training select users on tool navigation.
- **User**
  - Participates in **UATs** and Initial Deployment navigation trainings, as well as gives effective feedback to the digital tool team.

- **Subject Expert**
  - Provides input on the data, **data visualizations**, and **data structures** included in the Initial Deployment tool.
- **Data Expert**
  - Identifies, extracts, and/or connects **data source**(s) to data visualizations and structures in the Initial Deployment tool.
- **IT Professionals**
  - Research, identify, evaluate, and install hardware & software needed to develop, operate, and maintain the Initial Deployment tool.
- **Project Manager**
  - Reviews and gives final approval for the Initial Deployment tool to be shared with select users.

PROCESS

Suggested Initial Deployment Process

> With it being the last stage of the digital tool development process, the **Initial Deployment stage should take about 3 months**.

1. Focus on **decision-oriented** input, not detailed-oriented input.
   - Consider and list **users**' needs again with the digital tool team.
2. Review, identify, and acquire or build the tool components the users liked from the "**Tool Prototype**" stage.
   - Identify, acquire (if needed), and set up the hardware & software that worked best in the "**Tool Prototype**" stage in the Initial Deployment tool.
3. Run a holistic **User Acceptance Tests (UAT)** and obtain feedback from representative users.
4. Based on **UAT** feedback, revise the tool and **data structures**.
   - This includes:
     - Making revisions to hardware & software (ex. updates, licensing).
     - Identifying and exporting data into other **data visualizations**.
     - Revising data structures (ex. filters, groupings) to manipulate data according to users' needs and feedback.
   - Review UAT feedback revisions with the digital tool team.
5. Identify, reach out to, and train the initial cohort of users on Initial Deployment tool navigation.

To learn more about the personnel involved with and process of Initial Deployment, please review the

"Personnel" and "Process" above.

Initial Deployment vs. Tool Prototype?

- Data in the Initial Deployment tool should be fully complete and real; while data in a Tool Prototype can be partial and real or mock.
- Initial Deployment involves more formal and detailed user testing (**User Acceptance Testing**) and detailed user feedback, while the **Tool Prototype**'s user testing is informal and provides select users general guidance.
- While there should be enough flexibility for major edits in the Tool Prototype, there should only be minor flexibility for edits in the Initial Deployment tool.

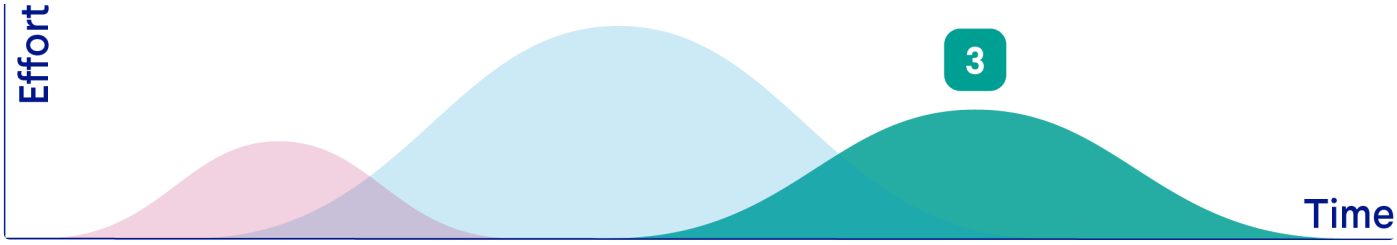
Next: After the fully-functioning digital tool has been deployed to a selected initial cohort of users, move onto the **Expanded Deployment** stage.

Step 3 - OPTIMIZE USE

Step 3 - Overview

A digital tool provides sustained value when the **competencies** of those who use and maintain it are strengthened to meet the new demands of the tool, and when the processes that support the tool have **explicitly defined protocols.**

STEP 3 · OPTIMIZE USE



A well-designed digital tool will not-by-itself-produce better data-driven decisions. A purposeful approach to expanding and stabilizing the tool's deployment and to planning for its long-term sustainability is essential for ensuring that any digital tool achieves its ultimate goal: to support improved public health policies and programs.

Step 3 Activities, Tasks and Milestones

STEP 3 ACTIVITIES, TASKS AND MILESTONES

Optimize use involves two activities that should take up to 3 months (project months 10 to 12) to complete.

ACTIVITY 1

Activity 1: Expand and stabilize tool deployment among a large number of users

- **Widen the circle** of trained tool users and strengthen institutional support for tool maintenance.

Key Tasks

- [ ] Engage additional users (beyond the initial cohort) to introduce the tool and its intended use.
- [ ] Draft materials (user handbooks, job aids, etc.) that support effective tool functioning.
- [ ] Expand training to:
  - new users on navigating tool features to access data that will meet their needs.
  - IT staff and application designers on using tool development and data access platforms to maintain and upgrade the tool and its associated data.
  - program staff on how to process source data and upload so the tool provides access to the most current information.
- [ ] Develop protocols (in consultation with users, technical experts and data experts) to routinize tool **maintenance/upgrade** and **data flow**.
- [ ] Support implementing minor additional features and developed protocols during **expanded tool deployment**.

Milestone 9

- After its inspection and minor additions, the tool is fully deployed and staff fully trained.
- *Target*: Mid-Month 11

ACTIVITY 2

Activity 2: Develop sustainability plan that promotes the tool's long-term use

- Create **action strategy** to derive immediate and longer-term tool impacts.

Key Tasks

- [ ] Propose additional features for the next version of the tool that would increase its usefulness.
- [ ] Propose new (but related) applications for which the tool could serve as a model.
- [ ] Propose opportunities for redesigning internal processes that could leverage the tool's communication and decision support potential more fully.
- [ ] Propose other datasets that might be processed for use in the tool's next version.

Milestone 10

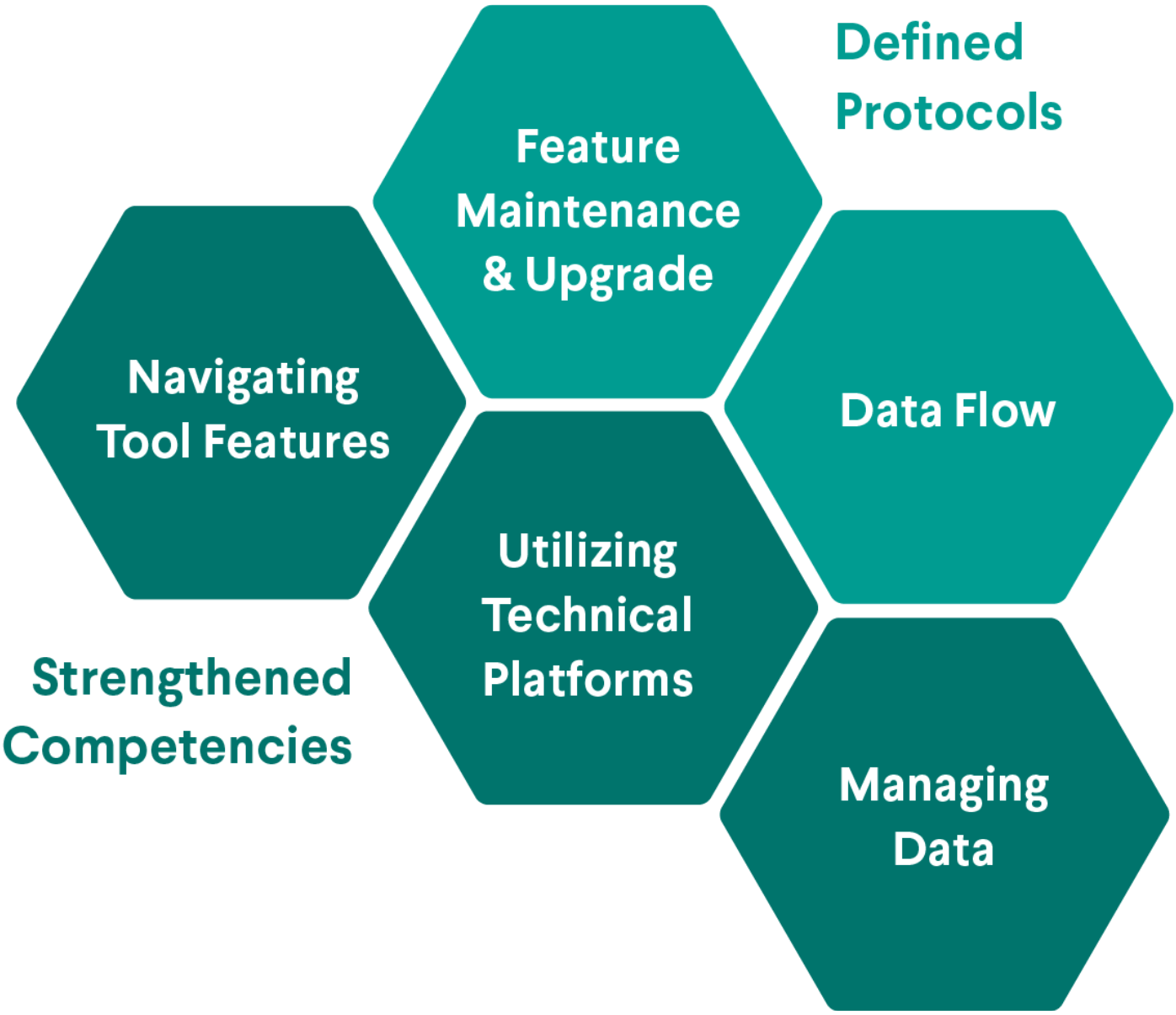
- Project development ends, and project sustainability begins.
- *Target*: End Month 12

What is Optimal Use?

STEP 3 OPTIMAL USE

Optimal Use refers to the ability of digital tool **users** to interact and retrieve the information they need from the digital tool in a smooth and effective manner.

Optimal Use of a Digital Tool



A Digital Tool with Optimal Use

Optimal Use, the ideal status of a digital tool, allows its users to easily interact and obtain the data, analyses, and visualizations they need to fulfill their needs. To develop and maintain a digital tool with "Optimal Use", use a "user-first" approach. Prioritize the needs of the tool's users, making the tool adequately functional and effective for them; instead of focusing on visually appealing visuals, popular & complex dashboards, and/or the preferred tool features of the digital tool staff. Furthermore, digital tools with "Optimal Use" assist their various users with their different needs; while these tools help **internal users** (ex. ministry/department staff) with decision-making and communications, they [digital tools with Optimal Use] help **external users** (ex. public officials, researchers) with policy and research development, advocacy, and accountability. For a digital tool to reach "Optimal Use", the tool must be technically available (**Maintenance Protocols**), have quality and updated data (**Data Flow Systems**), and be able to adapt to its users' shifting needs (**Long Term Strategy**).

The tabs below detail the required maintenance and processes needed for a digital tool to be optimally used.

USERS & USE

Navigating Tool Features

Navigating Tool Features of a digital tool focuses on monitoring and maintaining users' usage of the tool, especially in how they interact with the tool's **analytics** and visualizations. This includes ensuring the tool's **use cases**, analytics (ex. filters, groupings), **data visualizations** (bar graphs, line graphs), and data content help users' obtain the information and analyses they need. This is an important element of a digital tool, because if the tool's use cases, analytics, visuals, or data content do not match with users' needs, then the users will stop using the tool, and the tool itself will lose its purpose. To learn more about Navigating Tool Features, **please visit the Step 3 Users & Use section of the Maintenance Protocols page here**.

> Routinely review user feedback on the digital tool and add alternative flows (as necessary) to ensure the digital tool satisfies users' needs.

Utilizing Technical Platforms

Utilizing Technical Platforms on a digital tool focuses on ensuring users understand how to navigate the digital tool to obtain the information they need. This includes providing data content and definitions for data visualizations and analytics, providing educational materials and/or trainings for users on tool navigation, ensuring users' hardware & software cooperate with the tool, and more. This is a critical component of the tool because it helps inform users how to use the tool to satisfy their needs. To learn more about Utilizing Technical Platforms, **please visit the Step 3 Resources section of the Maintenance Protocols page here**.

> Utilizing Technical Platforms focuses more on ensuring users know how to navigate the digital tool, while Navigating Tool Features concentrates on whether the digital tool fits users' needs.

DATA

Managing Data

Managing Data in a digital tool involves managing the collection and organization of the tool's data for the long term. This includes ensuring the digital tool's data sources and databases are providing the tool the right data, continuing to protect the data from malware or unauthorized users, and regulating who has and does not have access to the data of the tool. **Data Management** is a very important part of the tool, as it ensures the tool will be able to store, produce, and protect its data for the long term. To learn more about Managing Data, **please visit the Step 3 Data Environment tab of the Sustaining Data Flow Systems page here**.

> Unlike Data Flow, Managing Data focuses on the collection, organization, and collection of the digital tool data, rather than its content or analysis.

Data Flow

Data Flow is a set of guidelines and regulations focused on maintaining the data, data content, and data analytics of a digital tool for the long term. This includes keeping the data up-to-date, ensuring users receive the right information when interacting with the data analytics, ensuring **data visualizations** and **analytics** accurately represent the data, and more. Data Flow is extremely important in a tool, because if the data or data analytics do not meet users' needs, the tool will decrease in users and usage. To learn more about Data Flow, **please visit the Step 3 Data Structure & Content tab of the Sustaining Data Flow Systems page here**.

> Unlike Managing Data, Data Flow's main goal is to continue providing users of the digital tool access to the right data, data visualizations, and data analytics to meet their needs.

RESOURCES

Feature Maintenance & Upgrade

Feature Maintenance and Upgrade describes the guidelines and regulations for maintaining the resource and technical aspects of the digital tool. This includes maintaining and updating the tool's data servers and hardware & software, troubleshooting and checking any technical issues and glitches, and securing the funds to maintain the technical components of the tool. Feature Maintenance & Upgrade is a vital part of a tool, as by maintaining the operations and technical aspects of the digital tool, it essentially keeps the tool operating and competent for its users for the long term. To learn more about Feature Maintenance & Upgrade, **please visit the Step 3 Resources section of the Maintenance Protocols page here**.

> As **personnel** falls under Feature Maintenance & Upgrade, ensure when assigning responsibilities to the digital tool team, that they will not be overburdened with both their current work and digital tool maintenance work.

To learn more about the Data and Resources factors in developing a digital tool with Optimal Use, please review the "Data" and "Resources" tabs above.

Step 3 - Resources

STEP 3 · OPTIMIZE USE

List of Resources:

Use: To provide guidance on fully onboarding the User & Use, Data, & Resources aspects of the digital tool.

Expanded Deployment Guidelines (Milestone #9)

Use: To provide guidance on how to maintain the User & Use and Resources aspects of the digital tool (ex. use cases, hardware & software, personnel, funding) for the long term.

Maintenance Protocols Development

Use: To provide guidance on how to regulate and maintain the data aspects of the digital tool (ex. data quality, servers, sources, storage) for the long term.

Sustaining Data Flow Systems

Use: To provide guidance on creating a list of future activities for developing and adding new upgrades, installations, and other components to the digital tool(s).

Long-term Strategy Recommendations (Milestone #10)

Expanded Deployment Guidelines (Milestone #9)

STEP 3 EXPANDED DEPLOYMENT

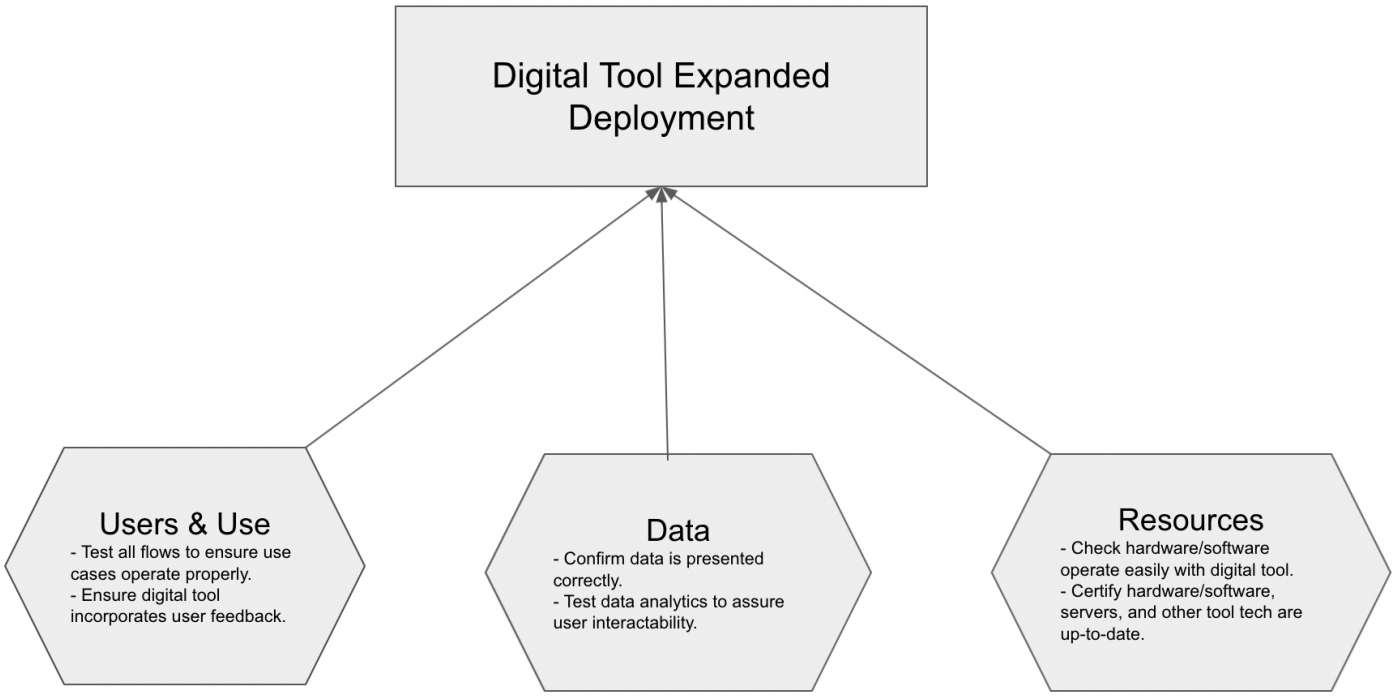
The goal of the Expanded Deployment milestone is to inspect and fully onboard the first complete version of the digital tool.

How to use:

To inspect, add minor features to, and fully onboard all user & use, data, and technical components of the digital tool to users.

When to use:

Step 3 (Optimize Use)/ Expand and stabilize tool deployment among a large number of users.



The tabs below list the different questions and statements that need to be fulfilled in order to launch the first complete version of the digital tool.

USERS & USE

Users & Use

Users should be able to understand, interact with, and navigate the digital tool easily.

Does the digital tool satisfy its primary users' needs?

- [ ] Confirm the data content and indicators directly match the needs of the tool's primary users.
- [ ] List all of the **primary users'** needs and state how each of them is met by the tool.
- [ ] Consider if there are any other minor features or analytics that might make it easier for users to integrate the tool into their work.
- [ ] Review primary user feedback from previous feedback sessions, and compare them to the most recent version of the tool.

Can users easily navigate the digital tool?

- [ ] Test all of the **use cases** to ensure each normal and alternative flow(s) leads the user to the corresponding output.
- [ ] Brainstorm any other minor normal or alternative paths that could be added to use cases in the tool.
- [ ] Confirm users received comprehensive training sessions and/or educational materials teaching them how to navigate the tool.
- [ ] Consider installing a feedback or contact box in the tool, allowing users to provide feedback to the digital tool team about any glitches, technical issues, or questions.

Does the digital tool look credible to users?

- [ ] Confirm the **data sources** the tool draws from are accredited or backed by reputable entities.
- [ ] Inspect the tool for any typos, mistakes, gaps, or other human-related errors.
- [ ] Affirm the **data visualizations** look visually accurate and appealing to the digital tool's users.
- [ ] Test if the tool can tolerate high user traffic without glitching or slowing down in connectivity.

DATA

Data

The data should be presented, updated, and interacted with, correctly without any errors or glitches.

Is the data being presented correctly?

- [ ] Confirm the **data visualizations** accurately display the data.
- [ ] Make sure there is enough data content in the digital tool for its users to fully understand the data.
- [ ] Certify the **time series** of the data presented in the digital tool is correct.
- [ ] Ensure the tool has all of the necessary **data analytics** users need to fulfill their needs.

Is the data updating correctly?

- [ ] Confirm the digital tool is precisely transferring data from the **data source** to the tool.
- [ ] Check all of the **data sources** linked to the tool are accessible and functional.
- [ ] Ensure the data visualizations correctly adjust to new data from the data source.
- [ ] Inspect the updated data in the data visualizations and data source for any data errors, duplicates, or gaps.

Are users able to interact with the data?

- [ ] Test the data analytics (ex. filtering, grouping) to confirm users will be able to interact fully with the digital tool.
- [ ] Test the export feature of the tool to certify that the data can be accurately exported by its users.
- [ ] Ensure that data analytics do not permanently affect data in the tool or the corresponding data source.
- [ ] Consider if there are any other data analytics (users might find helpful) that can be quickly added to the tool.

RESOURCES

Resources

The hardware/software, data servers, **data security policies**, and **personnel** should be able to operate, maintain, and protect the digital tool and its data.

Do the users' hardware/software collaborate with the digital tool?

- [ ] Confirm the hardware/software of the tool is compatible with the hardware/software of the tool's users.
- [ ] If there are any glitches or errors with the tool's hardware/software, collaborate with the IT staff to fix the issue.
- [ ] Provide hardware/software educational materials or trainings if some of the tool's users are not skilled in the tool's hardware/software.
- [ ] Confirm the hardware/software has the necessary security to protect the data and the tool.

Are all of the hardware/software, data servers, and other technological components up-to-date?

- [ ] Renew the licensing and update the hardware/software operating the digital tool.
- [ ] If there have a **cloud server** holding the data, make sure to pay the renewal and other fees.
- [ ] If using a manually operated or independent **data server**, update all of the data, including its time series, indicators, analytics, format, and more.
- [ ] Consider organizing a calendar listing all of the dates when hardware/software, data servers, and all other technological components operating the digital tool must be renewed or updated.

Does the digital tool follow the ministry/department's data sharing & security regulations?

Does the digital tool follow the ministry/department's data sharing & security regulations?

- [ ] If the digital tool allows users to export data, confirm the data being shared follows the ministry's/department's **data governance** guidelines.
- [ ] Confirm all of the digital tool's users are approved by the ministry's/department's **data governance** policies to have access to the data in the tool.
- [ ] Confirm with the **Data Director (Data Authority)** all of the **data sources** the tool draws from are not confidential or restricted by data governance policies.
- [ ] If access to a data source is needed for the tool, reach out to the **Data Director (Data Authority)** to obtain access.

Is the digital tool team prepared to maintain the tool for the long term?

- [ ] Draft, edit, and finalize an agenda (listing all of the different tasks needed to be done) for maintaining the tool for the long term.
- [ ] Communicate with the digital tool team to confirm they know their responsibilities and roles in maintaining the tool for the long term.
- [ ] Plan and execute any professional development trainings that will better help the digital tool team better understand and maintain the tool.
- [ ] Speak with the digital tool team to make sure they do not feel overburdened with their responsibilities of maintaining the tool and doing their regular work at the same time.

To learn more about the Data and Resources factors of Expanded Deployment, please review the "Data" and "Resources" tabs above.

Next: After inspecting, adding all minor features and fully onboarding the fully-functioning digital tool to all users, move onto the **Long-Term Strategy** stage.

Long-term Strategy Recommendations (Milestone #10)

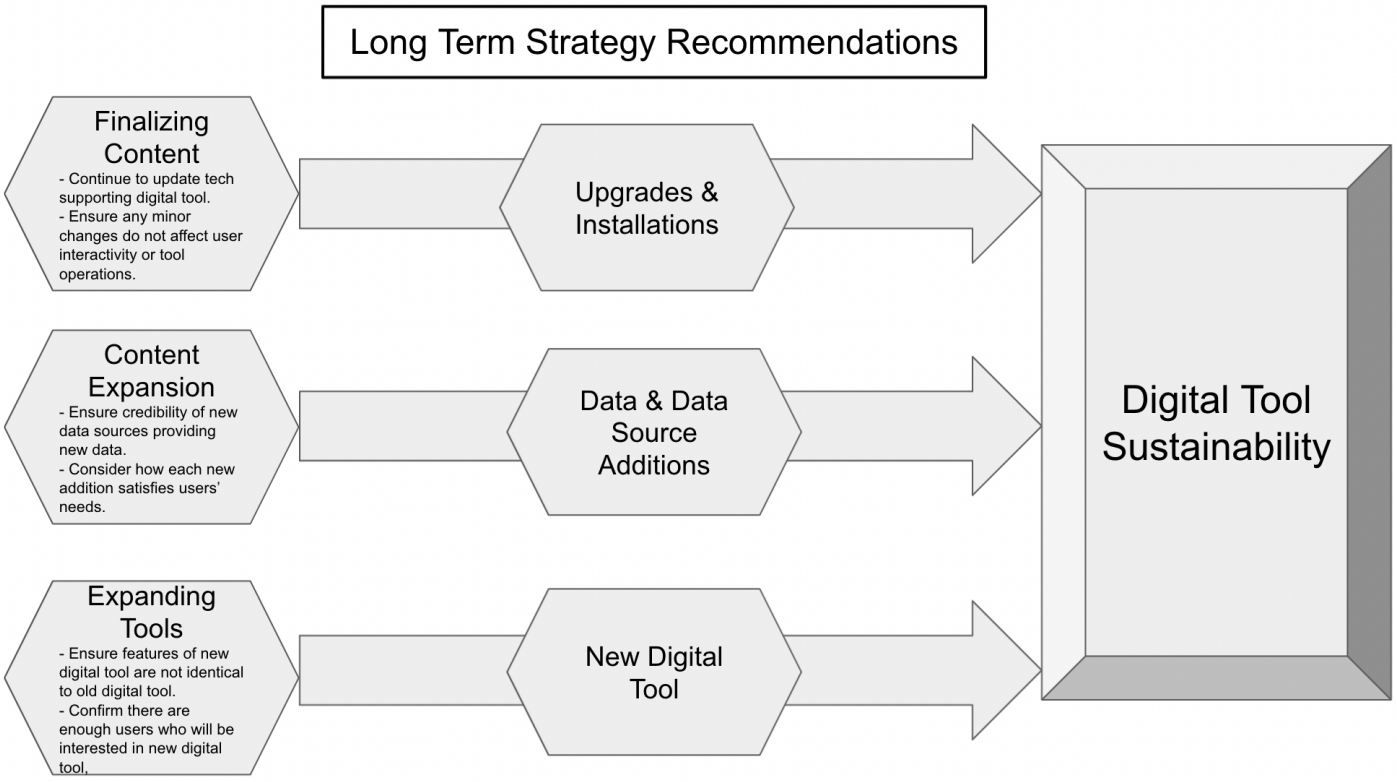
STEP 3 LONG TERM STRATEGY

The **Long-term Strategy Recommendations** lists follow-up tasks and additions that were not added to the first digital tool. When these tasks are completed, they can be added to the first digital tool as upgrades and installations; or they can be included in a second version of the digital tool, or a new digital tool entirely.

Use: To develop a sustainability plan that will promote the tool's long-term use, including upgrades, installations, and templates for new digital tools.

When to use:

Step 3 (Optimize Tool)/ Develop a sustainability plan that promotes the tool's long-term use.



The tabs below list the various activities and tasks that can be done when adding new data, features, upgrades, and/or functions to the original digital tool.

FINALIZING CONTENT

Finalizing Content

Minor features not included in the digital tool development process that can be added to the digital tool.

- This includes altering **data visualizations**, changing filter names, editing grouping and highlighting features, sharing data explanations with users, and more.

Tasks to Consider When Finalizing Content

1. When sharing the digital tool with new users, provide explanations of the data to help users fully understand and interact with the tool.
2. Make sure the data visualization adapts to the new data when uploaded into the tool.
3. If considering replacing one data visualization for another (ex. line graph for bar graph), assure users can receive better information or analysis from the new data visualization.
4. Before altering any tool features, obtain input from the tool's **primary users** through surveys or other feedback-related tools.
5. When altering any tool features (ex. data visualizations, charts), always confirm users still have high **interactivity** with the digital tool at all times.
6. Continue to pay licensing fees for hardware, software, and other resources used to operate the digital tool.
7. If managing a **data server**, routinely update the data and related elements to keep the data up-to-date.
8. If the data is managed by a **Cloud Server**, make sure to pay the necessary renewal fees and check that the data is being updated and managed correctly.
9. When changing the background, color, font, or other minor visual layouts of the digital tool, confirm the tool's **functionality** after each change.
10. If users report any bugs, glitches, or other technical issues, mark those as the highest priority and solve them immediately.

CONTENT EXPANSION

Content Expansion

Major additions to the digital tool that require extensive work or changes.

- This includes adding new data and resources, switching the tool's **users** from external to internal, adding password protection to the tool, and more.

Tasks to Consider for Content Expansion

1. Before adding new data to the digital tool, consider if the new data will satisfy users' needs.
2. If **acquiring new data sources**, have **IT, Data, and other technical staff** verify the validity of the **data source** before integrating it into the tool.

3. If expanding the data **time series** of the tool, confirm there is enough data from the **data sources** to cover the entirety of the time series.
4. If adding sensitive data to the tool, ensure the tool's indicators do not allow for its users to identify those who contributed to the data.
5. Before adding new and/or altering current alternative paths (**use case**), conduct research on which normal and alternative paths tool users use the most and least.
6. If deleting or adding new **data visualizations** or **analytics** (ex. filtering) to the tool, ensure it does not decrease the tool's **interactivity** or **functionality**.
7. Before making any large changes to tool access (ex. switching from external to **internal users**), consider how the rate of tool usage will be affected, and if the new users' needs justify the existence of the tool.
8. Before onboarding an external **Application Developer** for a new project, confirm the ministry/department has the funding from the budget to do so.
9. If adding or replacing a new hardware/software operating the digital tool, test if it cooperates with the tool and the users' technology.
10. If the hardware/software for the digital tool does not allow for larger content expansion, do a market analysis on new hardware/software that will support content expansion.

EXPANDING TOOLS

Expanding Tools

Actions using major components of one digital tool to develop other digital tools.

- Example: using the format of a COVID-19 dashboard for a General Morbidity dashboard.

Tasks to Consider for Expanding Tools

1. To transfer any components of a shared digital tool to another tool, let its **stakeholders** know, and follow the **data sharing agreement** guidelines.
2. To use identical **data visualizations** for one tool from another tool, make sure the data visualizations will present the data in the new tool effectively.
3. If users of the previous digital tool might take an interest in the new digital tool, provide a link in the previous tool to the new tool to garner more **users**.
4. If the previous tool had certain navigational or technical issues that were too extensive to fix, solve those issues in the new tool.
5. When creating a new digital tool based on a previous tool, ensure its data's content (ex. structures, indicators, analytics) is vastly different from the previous tool, especially when marketing it to new users.
6. If you find that your finished tool is too vague, general, or broad, conduct user research and determine if it would be more feasible to have two similar tools than one broad tool.
7. If you are using the same **use case** structure of one tool for another tool, test and confirm the use case structure will bring users to the corresponding data in the new tool.
8. If you want to use the **data server** of one tool for another tool, confirm the **data server** can

accurately manage and store data for the other tool without interfering with other data and/or tools.

9. If using the same hardware/software of one tool for another tool, check if you need to pay for more licensing and renewal fees.
10. If your ministry/department has a limited budget for a new tool, use the same data structure, analytics, server, hardware/software, and other major components to lower foreseen expenses.

To learn more about planning long-term strategies for content and tool expansion, please read the "Content Expansion" and "Expanding Tools" tabs above.

Next: After developing a sustainability plan for the digital tool, implement the sustainability plan on all aspects of the digital tool for the long term, or until the digital tool's specific expiry date has been reached.

DRAFT DOCUMENTS

DRAFT RESOURCE – NO

The content for this resource is be

Once it is ready for use it will be moved

Step 2 Additional Resources

DRAFT RESOURCE – NO

The content for this resource is be

Once it is ready for use it will be moved

Advice for Use Case Development

STEP 2 USE CASE DEVELOPMENT

Use Cases are one of the most important components of a digital tool, as they control how users interact with the tool to obtain the information and/or analyses they need. In this way, use cases dictate users' experiences navigating the digital tool. The tabs below further explain use cases, how they are developed, and provides a helpful outline.

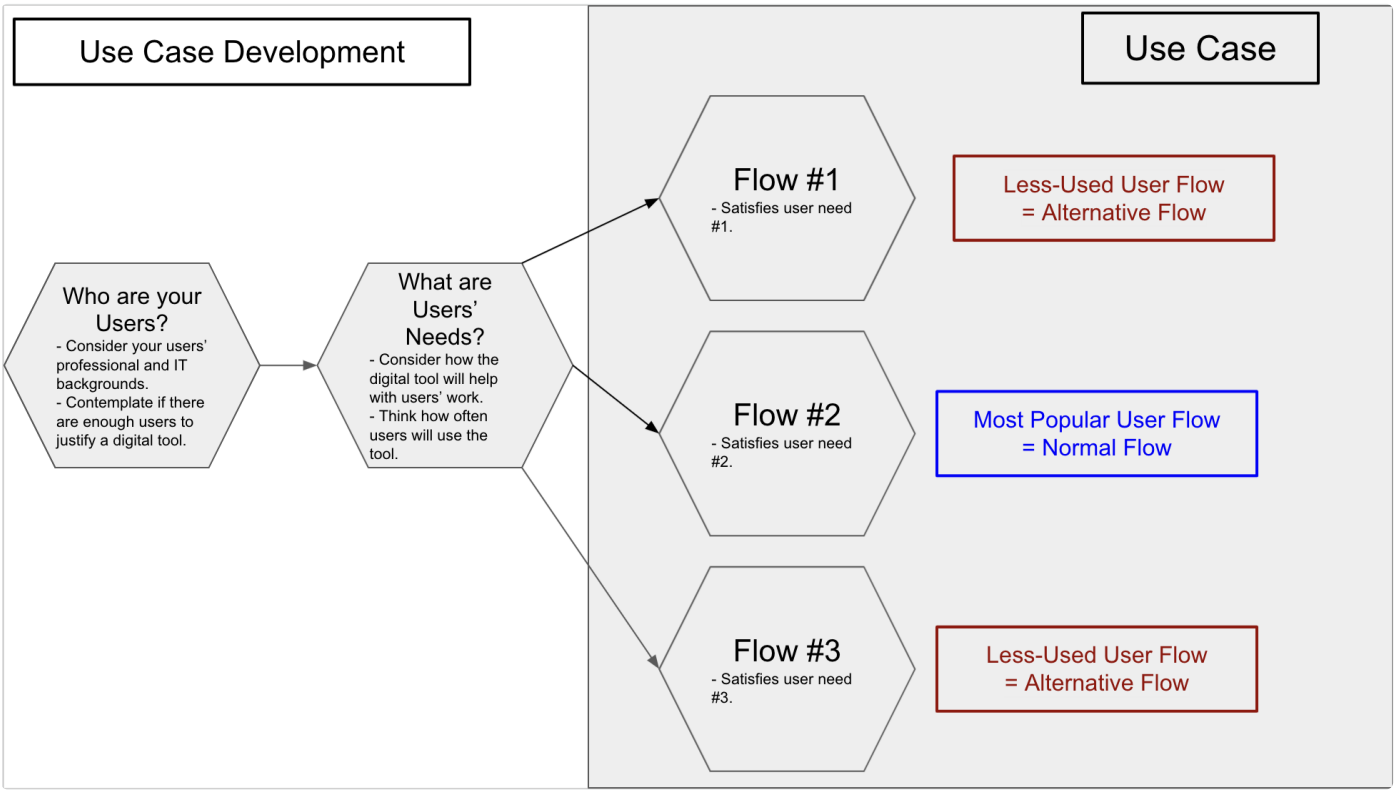
How to use:

To develop, map, and maintain use cases (meeting users' needs) for a digital tool.

When to use:

Step 2 (Develop Tool)/ Define detailed scenarios that identify the specific content and functionality required to meet user needs.

Use Case Process



What is a Use Case?	How to Write a Use Case?	Outline of a Use Case
Purpose of Use Cases	How to Write a Use Case	Use Case Template
Elements of Use Cases		

WHAT IS A USE CASE?

What is a Use Case?

A **use case** is a description of all the ways a user could use a system or tool. It serves as an outline for how a system will respond to a user's request, with the use case beginning with a user's goal, and ending when the user's goal is fulfilled.

Purpose of Use Cases

To develop digital tools, **Project Managers** and analysts create use cases to define their project scope, including:

- Gathering, understanding, and editing user needs.
- Handling user exceptions and special circumstances.
- Effectively communicating tool functionality with users.
- Defining, testing, and editing tool actions and messages.

Elements of Use Cases

Depending on the tool, use cases usually have the following elements:

- *Actor*: Any person or thing that uses the system to accomplish a goal or action.
- ***Stakeholder***: Someone who has a vested interest in how the system responds to the actor.
- *Preconditions*: Things that must happen before the use case runs.
- *Postconditions*: Things that must happen after the use case runs.
- *Triggers*: The event causing the use case to start.
- *Main success scenario (Basic Flow)*: Use case where nothing goes wrong.
- *Alternative paths (Alternative Flow)*: These paths vary from the main success scenario, as they are exceptions to what happens when the system fails.

HOW TO WRITE A USE CASE

How to Write a Use Case

1. Identify the **users** that will use the digital tool.
2. Pick a user (ex. primary user) to run the use case.
3. Define what the user wants from the tool.
4. For each **use case** (or action the user might take on the tool), decide on the consequential actions they will take using the tool.
5. Describe the normal path (basic flow) a user would take when using the tool to obtain their goal.
    - Describe this in the terms of the user doing an action, then the system responding to their action.

6. After describing the normal path (basic flow), consider and list other alternative paths (alternative flows) they might take instead; then add these to expand the use case.
7. After describing all of the use cases, find those that have commonalities, and label them as "common course" use cases.
8. Repeat this process (steps 1-7) for other users.

OUTLINE OF A USE CASE

Outline of a Use Case

Use Case Template (Vital Strategies).docx 2MB
Binary

Use Case Fill-In Template

Use Case Example #1: Director of Epidemiology wants to use a digital tool to retrieve data on birth and mortality rates in South Asia during the COVID pandemic (from December 2019 - August 2021).

Actor: Jane Doe, Director of Epidemiology (Health Ministry of Bangladesh)

Trigger: Jane's boss on Monday requests she draft and present a presentation on Friday.

Precondition 1: Due to work overflow, Jane could not start the presentation draft until Wednesday.

Precondition 2: The WiFi that week has been slightly unstable due to monsoon season.

Basic Flow: Retrieve data on birth and mortality rates in South Asia from December 2019 - August 2021.

1. Jane clicks on the digital tool link on her computer.
2. Jane enters the tool's general webpage.
3. Jane logs into and gains access to the tool.
4. Jane filters data on birth rates between December 2019 - August 2021 in South Asia.
5. Jane converts data into visuals using the tool.
6. Jane filters the death rates between December 2019 - August 2021 in South Asia.
7. Jane converts data into a visual using the tool.
8. Jane exports the data and visuals to her presentation.
9. Jane logs out of the tool.

Alternative Flow: Jane does not have access to the tool.

1. Jane clicks on the tool link on her computer.
2. Jane enters the tool general web page.
3. Jane fails to log in to the tool.
4. Jane contacts IT support.
5. Jane gets access to the tool.

6. Jane performs steps 4-9 of Basic Flow above.

Alternative Flow: WiFi goes out for a few hours due to monsoon season.

1. Jane cannot access WiFi on her computer.
2. Jane waits a couple of hours until the WiFi comes back on.
3. Jane performs steps 1-9 of Basic Flow above.

Alternative Flow: The tool does not convert raw data into visualizations.

1. Jane clicks on the tool link on her computer.
2. Jane enters the tool general webpage.
3. Jane logs into and gains access to the tool.
4. Jane filters data on birth rates between December 2019 - August 2021 in South Asia.
5. Jane exports data into an excel spreadsheet.
6. Jane converts raw data into various bar, line, and pie graphs on excel.
7. Jane filters data on mortality rates between December 2019 - August 2021 in South Asia.
8. Jane exports data into an excel spreadsheet.
9. Jane converts raw data into various bar, line, and pie graphs on excel.
10. Jane exports visuals to her presentation.
11. Jane logs out of the tool.

Postcondition: Jane gives her presentation to the Health ministry staff on Friday.

To learn how to write a use case, please visit the "How To Write A Use Case" and "Outline of a Use Case" tabs above.

Use Case Development External Sources

- **Use Cases**
- **Use cases: what every project manager should know**
- **How to Write a Use Case**

Next: After establishing the use cases and identifying data needs, start locating, verifying, and mapping out the tool's **data sources**.

Strategies for Data Mapping

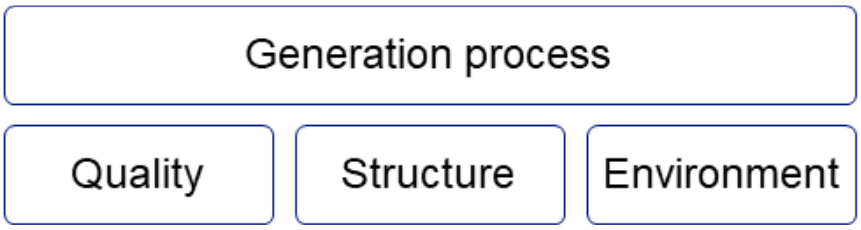
STEP 2 DATA MAPPING

Gathering information on the availability and limitations of data sources is a necessary step to inform the suitability and constraints of data for decision-making and digital tools. A core data mapping strategy consists of four activities.

How to use: To define a core strategy and use it to identify, evaluate, and choose which data sources to include in the digital tool.

When to use: (Step 2 (Develop Tool)/ Define detailed scenarios that identify the specific content and functionality required to meet user needs.

Data Mapping Strategy



1. **Data generation process**: General description of what, where, when, and by whom, are data sources collected.
2. **Data quality**: Assessment of the data sources according to core dimensions of data quality such as completeness and timeliness.
3. **Data structure**: Description of the content of the data sources, including available indicators, level of detail, and format.
4. **Data environment**: Description of the technical environment in which the data sources reside, including **data management** and **data governance**.

These activities can be achieved in different ways, but commonly one may want to:

- Review existing metadata and other existing data source descriptions.
- Conduct interviews with **subject and data experts**, and **IT staff.**
- Access the data directly.

Below are examples of what to consider in each of the four activities of data mapping.

DATA GENERATION

Data Generation

Brief narrative of how each **data source** is collected. Consider:

- What type of data is being collected?
- Where is the information captured? Who is the primary source of the information?
- When is the data being collected? How often does the process occur?
- Who is involved across the generation process?

e.g., Data on the use of maternal services is reported via DHIS 2 by public health facilities monthly. Data is directly captured by each facility, reviewed by the regional director, and approved for use at the central level

DATA QUALITY

Data Quality

Assessment of different dimensions of data quality can be measured, consider the following as core descriptors for each data source:

- Completeness/Coverage: Is any data missing? What is the coverage of the data?
- Uniqueness: Are there duplicates in the data? Can observations be uniquely identified?
- Timeliness: What is the delay between collection and reporting?
- Validity: Does the data input match the type of data?

DATA STRUCTURE

Data Structure

Description of the contents of the **data source** and their organization. Consider:

- What indicators are available?
- What data definitions are needed to understand the data?
- What are the available levels of detail for different dimensions are breakdowns?
  - Time
  - Demographics
  - Geography

DATA ENVIRONMENT

Data Environment

Description of the data management and data governance policies and procedures surrounding the **data sources**. Consider:

- Data Management
  - What are existing storage solutions and repositories?
  - In what formats are the data stored?
  - Are there any data transformation processes?
- Data Governance
  - Who owns the data and how can it be accessed?
  - What security and sharing policies exist?
  - How is data currently disseminated?

Next: Now knowing what users expect and the data available, move onto developing a **tool mock-up**.

Conducting User Acceptance Testing (UAT)

Description and resources on User Acceptance Testing (UAT).

STEP 2 USER ACCEPTANCE TESTING

User Acceptance Testing (UAT) Goal: To verify all components of the digital tool will be used, interacted with, and liked by its users.

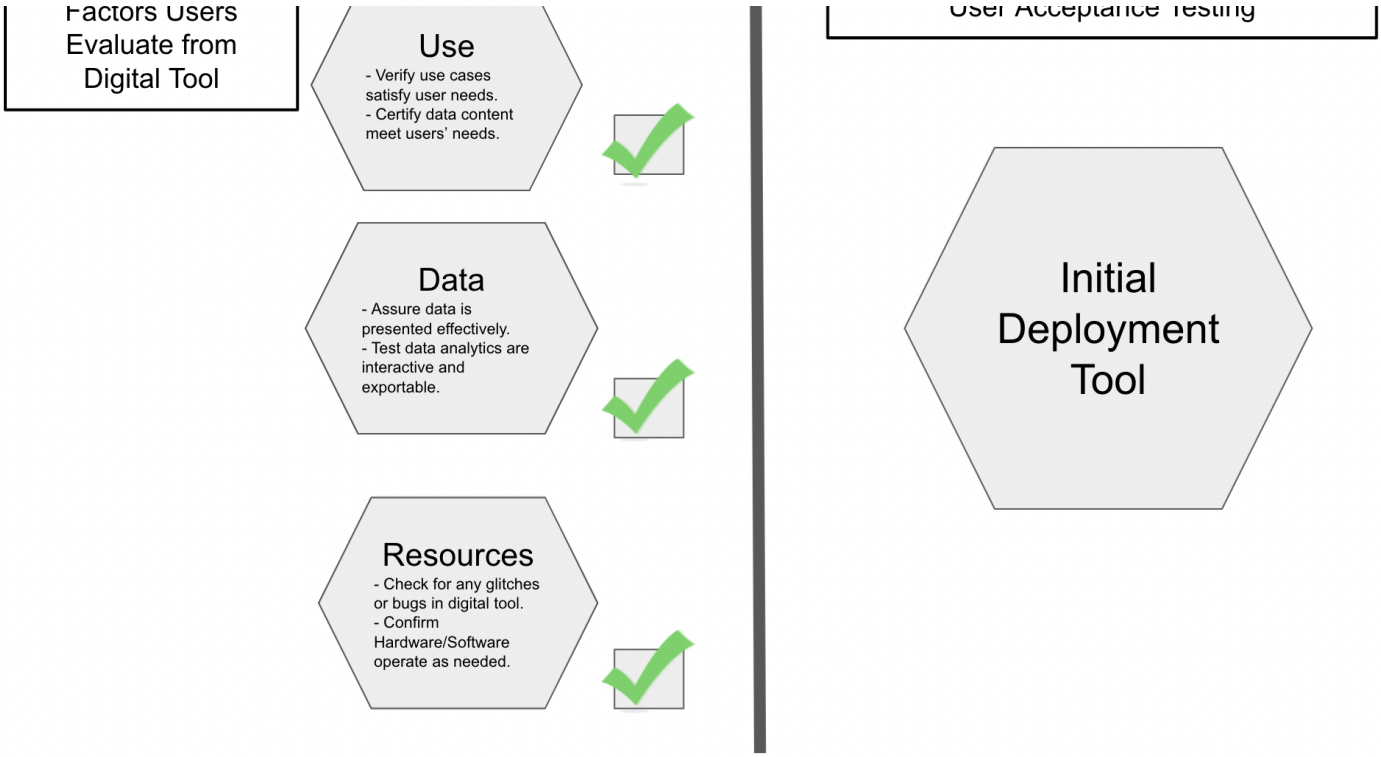
How to use:

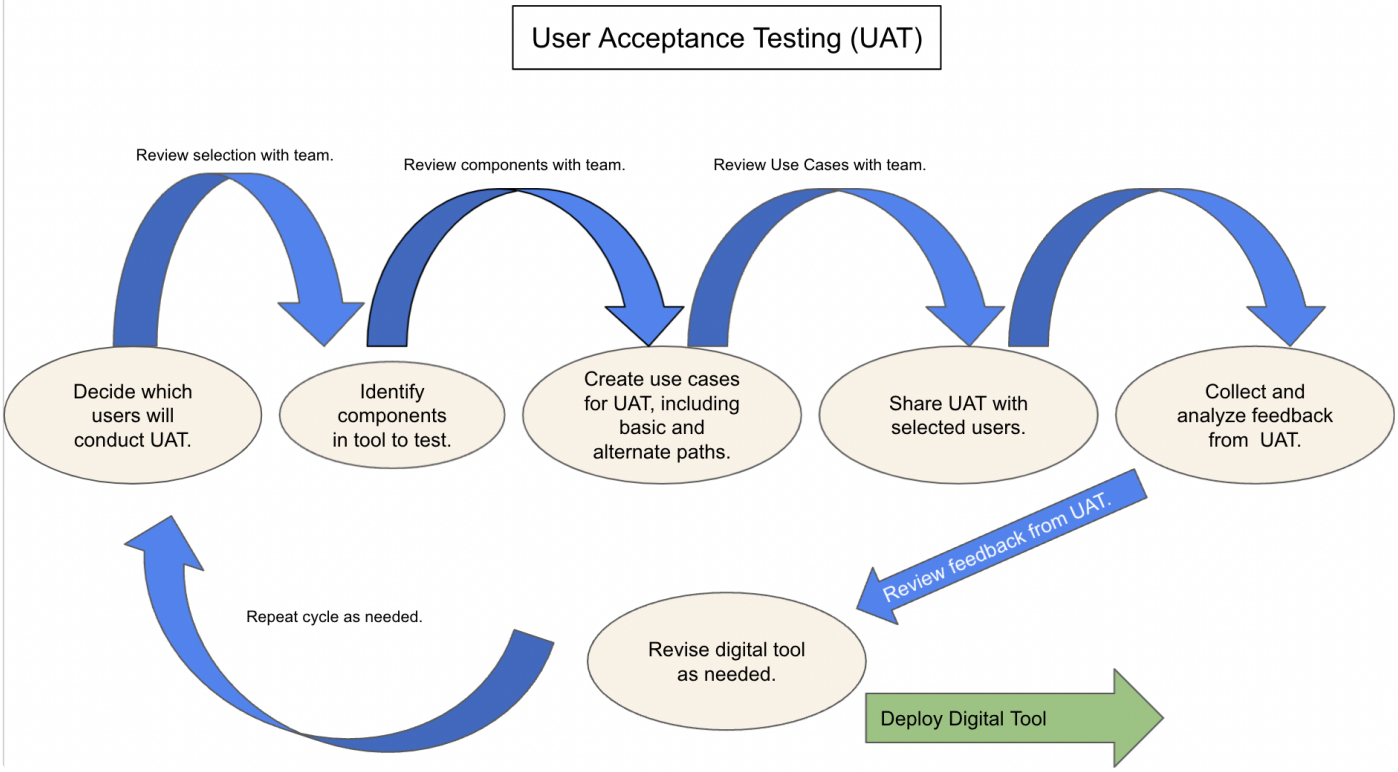
To test whether the complete version of the digital tool satisfies the needs of its users; this includes testing for glitches, additional use case flows, operations, likeability, and more.

When to use:

Step 2 (Develop Tool)/ Deploy tool (after acceptance testing) to an initial cohort of users.

User Acceptance Testing (UAT) Process





UAT	People	Process
What is UAT?	Who is involved in UAT?	When does one do UAT?
Why run UATs?		Suggested UAT Process
Types of UATs		

UAT

What is UAT?

UAT, also known as Application, Beta, or End-user Testing, is one of the last phases of the Digital Tool Development process, where selected **primary users** interact with the digital tool to test whether it can help them fulfill their needs. UATs commonly are tested on the **Initially Deployed tool**, since it is the most complete and realistic version of the digital tool.

Why run UATs?

- UATs identify any glitches or bugs in the digital tool.
- UATs help the digital tool team consider other common & alternate scenarios **(use cases)** and interactions tool users might follow while using the digital tool.
- UATs provide the digital tool team information on data, **data visualizations**, data structures, and related data functionalities users like, dislike, or want to see more of.
- UATs test the feasibility of the tool in common day-to-day operations.
- UATs check what users like or dislike about the digital tool.

Types of UATs

- Alpha & Beta Testing
  - Alpha Testing: Internal staff (usually) test the tool in the development environment, giving feedback on the tool's glitches and usability.
  - Beta Testing: **External users** (ex. selected Ministry of Health staff) test the tool in the customer environment, giving feedback on tool bugs and usability.
- Contract Acceptance Testing: The developed tool is tested against certain criteria and guidelines set and agreed to in a contract.
- Regulation Acceptance Testing: The tool is tested to ensure it follows certain regulations (ex. **data security**).
- Operational Acceptance Testing: The work flow of the tool is tested, including its backup plans, user trainings, **maintenance processes**, and security.
- Black Box Testing: The tool is tested by users who only see the input and output (result) of the tool. Essentially, while they are able to use the tool to gain the information they need, they are not able to see how it works.
  - Ex. Input - Black Box - Output

PERSONNEL

Who is involved in UAT?

- **Application Developer**
  - Oversees the UAT process, including deciding which criteria should be included in UAT, and choosing, communicating to, and relaying feedback from UAT users to the digital tool team.
- **Users**

- **Users**
  - Test the digital tool in UAT, as well as provide effective feedback on the digital tool to the digital tool team.
- **Subject Expert**
  - Provides input on which data should be included, and how it should be portrayed in the tool for UAT.
- **Data Expert**
  - Assesses and provides input on data limitations and features to include in the tool for UAT.
- **IT Professionals**
  - Identify and set up hardware & software to develop the tool for UAT.

PROCESS

When does one do UAT?

Conduct UAT on the digital tool if the tool has done the following:

- Passed the "**Design Specifications**" stage.
- Move onto the **Initial Deployment** stage.
- The tool has no major glitches or system issues.
- The tool does not need any major editing or structure changes.
- The tool has passed functional testing to ensure all of its features, data, and hardware & software function.
- Are looking for cosmetic or minor changes to the tool.

Suggested UAT Process

1. Decide which users will be participating in UAT.
   - Review user selection with the digital tool team.
2. Identify and gather the components and criteria of the tool needed to test.
   - Review these components and criteria with the digital tool team.
3. Create or gather the **use cases** for UAT, including both basic and alternative paths.
   - Review the use cases before sending them to users for UAT.
4. Share UAT with the tool's **users**.
5. Collect and analyze the feedback the tool's users gave in their UAT.
   - Review this feedback with the digital tool team.
6. Revise the tool according to feedback from the UATs.
   - Review the tool with the digital tool team, and discuss if UAT is needed again.
7. Repeat steps 1-6 until test users are satisfied with the tool.
8. Start the "**Initial Deployment"** deploying tool stage.

To learn about the personnel involved in and the process of UAT, please review the "Personnel" and "Process" tabs above.

User Acceptance Testing (UAT) External Resources

- **User Acceptance Testing - How To Do It Right!**
- **5 Types of User Acceptance Testing**
- **What is User Acceptance Testing (UAT): A Complete Guide**
- **What is UAT Testing?**
- **What is User Acceptance Testing (UAT?) with Examples**

Next: After conducting UAT and revising any technical, structural, content, interactive, or other minor issues affecting the digital tool, move into the deployment phase of the **Initial Deployment** stage.

DRAFT RESOURCE – NO

The content for this resource is be

Once it is ready for use it will be moved

Step 3 Additional Resources

DRAFT RESOURCE – NO

The content for this resource is be

Once it is ready for use it will be moved

Maintenance Protocols Development

STEP 3 MAINTENANCE PROTOCOLS

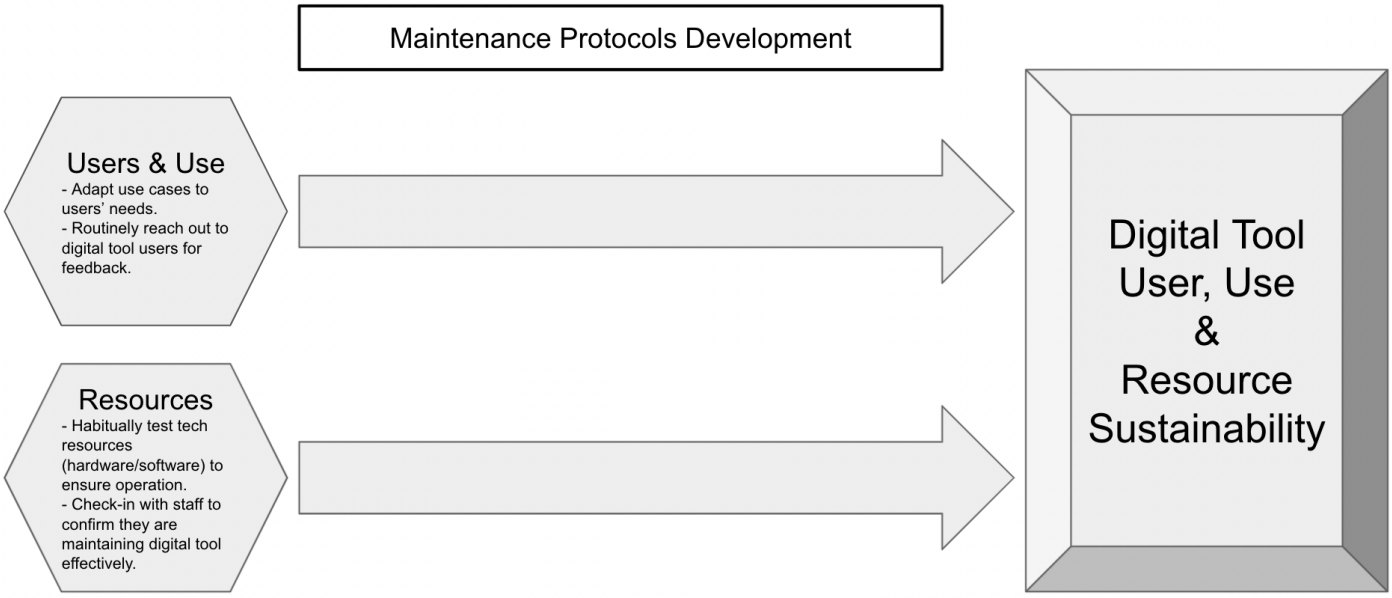
The maintenance protocols are regulations and guidelines providing guidance as to how to sustain digital tools in the long term.

How to use:

To draft regulations regarding and sustainably maintain the User & Use and technical components of the digital tool for the long term.

When to use:

Step 3 (Optimize User)/ Expand and stabilize tool deployment among a large number of users.



The tabs below describe the different **Users, Use**, and Resource Protocols needed to maintain a digital tool for the long term. To learn more about data maintenance protocols (**data flow systems**), **please visit the Step 3 Data Flow Systems page here**.

User & Use

Regulations and guidelines detailing how to maintain the user and use aspects of the digital tool. This includes the integration of the tool into users' work, **use cases**, **interactivity**, and more.

PROTOCOLS

Protocols

- The User & Use features ensure the needs of **users** are continually met by the digital tool for the long term.
  - Reach out habitually to the tool's **primary users** for feedback; or leave a feedback box in the tool to systematically obtain user comments.
  - Hold meetings with the **digital tool team** staff occasionally to discuss, update, and adapt the tool's **use cases** to fit users' constantly changing needs.
- If the tool becomes outdated, or does not adapt to the shifting needs of users, the tool's usage and overall sustainability will decrease quickly.
  - Continue to update the data according to users' needs and their frequency of using the tool (ex. Updating data monthly for monthly users).
  - Confirm periodically the **data visualizations** are changing at the same rate the new data is updating.
  - Check infrequently how long it takes for the new data from the **data source** to update in the digital tool.
- User & Use features allow for users to interact easily with the digital tool, and even integrate the digital tool into their daily work operations or projects.
  - Review habitually the digital tool's indicators and analytics (ex. filters, groupings) to ensure these features continue to meet users' needs.
  - Confirm with users habitually that they are using hardware/software that is compatible with the tool.

PERSONNEL

Personnel Tasks/Responsibilities

Project Manager

- Serves as the digital tool checkpoint (monitors digital tool use), gathers feedback from users on the state and usage of the tool, and communicates this feedback to the digital tool team.

IT Professional

- Monitors and updates the **technical components** (ex. hardware, software) of the digital tool supporting user **interactivity** and navigation, and troubleshoots any technical issues users have with the tool.

Subject Expert

- Assesses and provides input on user interactivity components (**use cases**, data content, hardware/software), and how they will affect the presentation of information of their specific subject area to users.

Data Expert

- Assesses and provides input on user interactivity components involving data, **data analytics**, and **data visualizations**.

Application Developer (*only when adding major changes to digital tool*)

- Oversees the User & Use adjustment process, obtains feedback from users on the digital tool, and communicates this feedback to the digital tool team.
- The person in this role can also serve as the Project Manager or another role related to the digital tool's development.

SUGGESTED ACTIVITIES

Suggested Activities

1. Make the necessary adjustments to ensure user interactivity with the digital tool remains easy and unrestrained.
   - This includes routinely renewing and keeping up with the technological updates of hardware and software used to operate the tool's navigation and **analytics**.
   - Test occasionally the interactivity of the tool when the data updates; this ensures any changes in the tool do not limit or distort user interactivity.
2. Monitor and adapt the digital tool's **use cases** according to users' needs.
   - By tracking, collecting, and analyzing the user frequency of normal and alternative flows, find what flows are the least and most used.
     - Using this research from the tool's use cases will help adapt the normal and alternative flows according to user needs, and in turn, continue to satisfy users.
3. Reach out habitually to primary users for feedback on the digital tool.
   - Common feedback methods include conducting feedback sessions with select **primary users**, and installing a feedback section with the tool.
   - Researching other public health digital tools online will also provide insight into what present users' needs are, and the types of interactive and navigational features they prefer.
4. Continue to allocate a certain amount of funding towards the User & Use maintenance areas of the tool.
   - If there is limited government funding, research the lowest-costing upgrades or alterations to improve the digital tool for users.
   - If there is not enough government funding for this in the long term, reach out to external agencies (ex. foundations, organizations) for funding.

To learn more about the personnel and suggested activities for Users & Use-related maintenance, please review the "Personnel" and "Suggested Activities" tabs above.

Resources

Regulations and guidelines detailing how to maintain the resources of the digital tool. This includes hardware & software, servers, personnel, and more.

PROTOCOLS

Protocols

- Planning and executing resource maintenance of the digital tool will keep it operational, manageable, and affordable for the long term.
  - Hold a meeting occasionally with the ministry/department staff to discuss resource maintenance responsibilities, confirming they are not overburdened with both their work and digital tool responsibilities.
  - Research periodically for new and lower-costing hardware/software to save digital tool funding and increase its **long-term sustainability**.
- When resource maintenance is not performed correctly or sustained (at least in the short term), the tool will become outdated, inoperable, and fruitless to its users and original purpose.
  - Have **IT staff** routinely check and test the tool for any glitches, errors, or slow connectivity (especially during high user traffic days).
  - Hold infrequent professional development meetings with **digital tool team** to help them both advance their skills and more effectively maintain the tool.
- Resource maintenance must be executed precisely, routinely, and in an organized manner to effectively keep the tool operational at all times.
  - Test habitually the **data servers** to ensure they are accurately and quickly transferring new data into the tool.
  - Continue to test the tool's hardware/software against the tool's data **analytics** and visualizations to confirm they are operating adequately.

PERSONNEL

Personnel Tasks/Responsibilities

Project Manager

- Leads the planning and execution of resource maintenance, including hardware/software, **data servers**, and other **technical components** needing maintenance for the digital tool to operate effectively.
- Manages, researches, analyzes, and obtains funding for new resources to support the tool, including hardware/software, **data servers**, and other resource-related components.

IT Professional

- Performs and pays for the updates, upgrades, renewals, and other fees that will keep the hardware/software, servers, and other technical components of the digital tool fully operable.
- Troubleshoots any issues regarding the hardware/software, servers, and/or other technical components of the tool.

Data Expert

- Assesses and provides input on the data organization, structure, and content of the data servers.

Subject Expert

- Assesses and provides input on how the hardware/software, servers, and other technical components affect and display the content in the digital tool.

Application Developer (*only when adding major changes to digital tool*)

- Oversees the entire Resources Maintenance process, including the planning and execution of maintaining the hardware/software, servers, and other technical components.
- The person in this role can also serve as the Project Manager or another role related to the tool's development.

SUGGESTED ACTIVITIES

Suggested Activities

1. Plan out with the digital tool team how digital tool resources will be maintained in the long term.
   - Ensure that everyone assigned to the digital tool team is knowledgeable about and can perform the necessary job functions to maintain these two components of the tool.
   - To keep the maintenance processed organized, keep an agenda or calendar reminding the digital tool team when to update the hardware/software, servers, and other **technical components** of the tool.
2. Execute resources maintenance of the tool.
   - When executing resources maintenance, check-in with the rest of the resources maintenance team to ensure tasks are being completed and issues are being resolved.
3. Maintain routinely your **data servers**.
   - If using **cloud server**, remember to pay their renewal fees, as well as check if the server is organizing your data in a satisfactory manner.
   - If manually operating or managing an independent **data server**, be aware of the necessity to update many more features compared to a cloud server.
4. Continue to allocate a certain amount of funding towards the resource components of the digital tool.
   - If the ministry/department is not allocated enough government funding, reach out to external entities (ex. international and civil organizations) for funding and partnerships.
   - If the digital tool's features are too costly for long-term maintenance, conduct price comparisons to find which resource or technical components can be removed from the tool.

To learn more about the personnel and suggested activities for Resources, please review the "Personnel" and "Suggested Activities" tabs above.

Next: After drafting regulations and sustainably maintaining the User & Use and technical components of the digital tool, continue to do so for the long term, or until the digital tool's specific expiry date has been reached.

Sustaining Data Flow Systems

STEP 3 SUSTAINING DATA FLOW

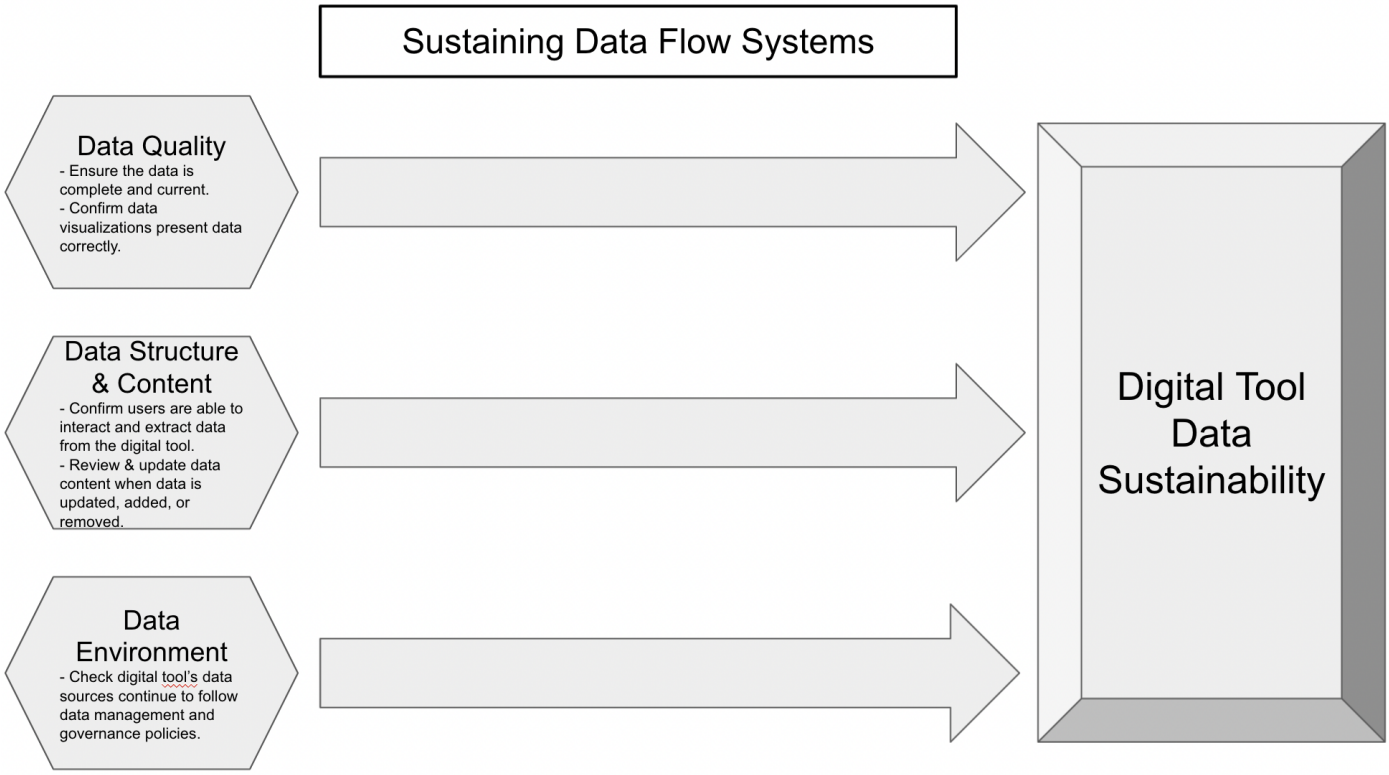
A data flow system is a set of regulations and guidelines providing guidance as to how to sustain the **data**, data structure, **data visualizations**, and **data analytics** of a digital tool in the long term.

How to use:

To draft regulations regarding and sustainably maintain the data, data structure, and data visualizations & analytics of the digital tool for the long term.

When to use:

Step 3 (Optimize Tool)/ Expand and stabilize tool deployment among a large number of users.



The tabs below describe the various regulations and guidelines that keep the data in the digital tool functional, accurate, and interactive in the long term. If interested in User & Use, or the Resource Protocols, **please visit the Step 3 Maintenance Protocols page here**.

DATA QUALITY

Data Quality

The assessment of data used in the digital tool, determining whether the data accurately represents or misrepresents the specified content.

Protocols

- Data Quality determines whether or not the data in the digital tool is usable.
  - Meet periodically with the **digital tool team** to discuss the shifting needs of the tool's **users**, and how the digital tool's data can be adapted to fit them.
    - Debate in these meetings if there is any new data that could appease users' needs and/or expand the tool's users.
- Data quality is used to determine if the data is up-to-date.
  - Check the data visualizations when the data updates to ensure they include the most recent data.
  - Monitor the **data servers** to determine how quickly data is transferred from the server to the tool's data visualizations.
- Data Quality measures the completeness of the data.
  - Check the data in the tool to ensure there are not any **time gaps**, duplication, typos, or blanks.
  - If there are any errors in the tool's data, refer to the **data source** to find and correct the error(s).
- Data Quality is used by users to determine if they should use a specific digital tool.
  - Filter through user feedback to see if users had any issues or questions regarding the data quality of the tool.
  - Research seldomly the credibility of the tool's data sources, in case there are any factors or organizations that might make users doubt the tool's data quality.

Personnel Tasks/Responsibilities

- **Project Manager**
  - Manages the data quality work, including obtaining data quality feedback from users, and organizing technical reviews of the digital tool.
- **Data Expert**
  - Assesses and provides input on the quality of data; as well as provides guidance as to what data to use and how to best display it.
- **Subject Expert**
  - Assesses and provides input as to whether the data accurately displays the content it is representing.
- **IT Professional**
  - Inputs the data in and reviews the digital tool; establishes links between the data source and tool for automatic data updates.
  - Troubleshoots any errors, duplication, or gaps seen by IT staff or users of the digital tool.

- **Application Developer** (*only when adding major changes to digital tool*)
  - Oversees all data quality work; reviews the data to see if it accurately depicts the content it is representing.
  - The person in this role can also serve as the Project Manager or another role related to the tool's development.

Suggested Activities

1. When acquiring data from a new data source, review all of the data briefly for completeness and accuracy.
   - Confirm there are not any **time gaps** in the **data source**, as this would distort the visualizations in the digital tool.
   - Check if there are any data duplication; if yes, determine if that is a mistake or if the data simply reported the same results.
   - Locate in the data source how often this data is updated.
2. After inputting the data into the tool, check the data again for accuracy and format.
   - Ensure the data was placed in the tool without any errors, typos, or duplication.
   - Confirm the data is entered into the tool in the right format.
3. Assess the data visualizations in the tool for errors or incorrect patterns and trends.
   - Investigate the data in any data visualizations that look inaccurate or wrong; this is a sign the data was input incorrectly.
   - If the data is incorrect, change the data visualization to better display the data.
4. Routinely check and update the data in the tool.
   - If possible, establish a link between the tool and data source, allowing the data to update automatically.
   - Monitor occasionally the data visualizations to confirm the data is updated correctly.

DATA STRUCTURE & CONTENT

Data Structure & Content

The organization and content of a data source (*used for the digital tool*).

Protocols

- A **data source**'s data structure presents the data in a way its **user** understands.
  - Check occasionally the **data source**'s indicators, color-coded keys, and/or maps are functional, especially when the data is updated.
  - Confirm the data source's various indicator levels, details, and other related specifics are not distorted or corrupted when the data is updated.
- A data source's data structure allows for its users to easily analyze and export the data to fulfill their needs.
  - Test routinely the filtering, highlighting, grouping, and related data analytics that allow users to interact and satisfy their needs from the data.
  -

Check habitually the digital tool's export feature to ensure its users are able to export the data they need.

- Data content in a data source provides its users context needed to understand the data.
  - Review routinely the feedback from the tool's **primary users** to ensure there are not any issues understanding the data content.
  - Reread and adapt the data definitions, keys, and related data content when new data, indicators, analytics, or other features are added to the tool.

Personnel Tasks/Responsibilities

- **Project Manager**
  - Manages the data source structures and content, including how the data is formatted, defined, presented, and exported.
  - They also obtain and communicate user feedback related to the data source structure and content to the digital tool team.
- **Data Expert**
  - Assesses, analyzes, and provides input on the data structure and data content in the data source.
- **Subject Expert**
  - Assesses, analyzes, and provides input on the data content in the data source.
- **IT Professional**
  - Exports and inputs data from the data source into the digital tool.
- **Application Developer** (*only when adding major changes to digital tool*)
  - Oversees entire data structure & content process; reviews the data source's data structure and content, and data exportation.
  - The person in this role can also serve as the Project Manager or another role related to the digital tool's development.

Suggested Activities

1. When opening the data source, observe the organization of the data.
   - Read the different indicators and other labels located in the rows and columns.
   - Observe the different levels of data and indicators provided by the data source (ex. Country > Region > City > Neighborhood).
2. Locate the data source's data content (definitions, titles, keys) to understand the meaning and context of the data.
   - Read the data definitions thoroughly and compare the terms used in the data and indicators.
   - Compare the data content in the data key with the data to better understand the data.
3. Analyze the data source by interacting with its analytics.
   - Interact with various indicators using filtering, grouping, and related organizing.
   - Use the **analytics** to gather the data needed to satisfy the digital tool's needs.
4. Export the data needed for the tool from the data source.
   - Provide data definitions, keys, and other data content when exporting data to the tool.
   -

Confirm the right data is exported from the data source's indicators and analytics.

DATA ENVIRONMENT

Data Environment

Data management & governance policies and procedures regarding **data sources**.

Protocols

- **Data Management** policies organize data sources in a way that allows their data to be found and transported easily.
  - Check routinely the **data sources** to ensure they follow the ministry's/department's Data Management policies and regulations, especially when these policies are recently updated.
  - Confirm the digital tool's data sources link its users to the entities corresponding Data Management policies, explaining how to transform the data into various visualizations and analytics for their tool(s).
- Data Management policies help evaluate a ministry's/department's data sources and **data storage**.
  - Review the tool's data storage and repositories to affirm they follow the entity's Data Management policies, especially when these policies are recently updated.
- Data Governance policies protect data sources from being infiltrated by **malware** or unauthorized users.
  - Compare occasionally the tool's data sources with the **Data Governance** policies to make sure they are shared only with approved or authorized users and software.
  - Create and continually update a list of common malware and unauthorized users to remind the ministry/department staff about who should and should not have access to the entity's data sources.
- Data Governance policies regulate how data is shared, and who it can be shared with.
  - Periodically review the tool's **data sharing agreement**(s) to confirm it follow the entity's corresponding Data Governance policies, especially when these policies are recently updated.
  - Review periodically the tool's primary users to ensure only those approved have access to the tool and its data source(s).

Personnel Tasks/Responsibilities

- **Project Manager**
  - Manages the data sharing, security, and policy application (Management & Governance) of the digital tool and its data sources.
- **IT Professional**
  - **Data Director**
    - The person who has authority over the Data Management & Governance policies, and data sources.
  - **IT Staff**

    - Manages the data sources, as well as carries out the Data Management & Governance, including ensuring only certain users have access to certain data sources.
- **Data Expert**
    - Assesses and provides guidance to the data located in the data sources, as well as how to protect this data from security breaches.
- **Subject Expert**
    - Assesses and provides input on data being exported from the data sources into the digital tool.
- **Application Developer** *(only when adding major changes to digital tool)*
    - Oversees the exportation of data from the data source into the digital tool.
    - The person in this role can also serve as the Project Manager or another role related to the tool's development.

Suggested Activities

1. When browsing through the ministry's/department's data sources, research and read the official data management and governance policies.
    - Reading through the ministry's/department's data management and governance policies might help with selecting data sources for the digital tool.
    - While synthesizing through these data sources, keep in mind the data that can and cannot use in the tool (according to data security policies).
2. If specific access to a data source is needed, reach out to the Data Director (**Data Authority**) to be approved.
    - Due to data security policies, they are the person dictating who and who does not have access to the data source and its data.
    - Be aware of the data governance policies of data sources the tool is using; they might restrict data sharing to only certain audiences or formats.
3. When considering transforming the data in the data source, be aware of the data transformation processes and policies.
    - When transforming the data in the data source, be careful to not distort any of the other data.
4. Before exporting data from the data source to the tool, review the data governance policies again to ensure that these policies are not breached.
    - This is especially true when exporting data into externally-facing tools (tools designed for the public).

To learn how to maintain the new digital tool's data structure, content, and environment, please review the "Data Structure & Content" and "Data Environment" tabs above.

While data collection is also an important part of a **data flow system**, it is a long-term project requiring major overhaul, and should be treated separately.

- Ex. Collecting data on paper and implementing it into a digital tool.

Next: After drafting regulations regarding and sustainably maintaining the data, data structure, and data visualizations & analytics of the digital tool, continue to do so for the long-term, or until the digital tool's specific expiry date has been reached.

Appendices

DRAFT RESOURCE – NO

The content for this resource is be

Once it is ready for use it will be moved

Step 2: Developing Tools Summary Table

The Step 2: Developing Tools Summary Table compiles and compares all of the important digital tool information and functions of the Tool Mock-Up, Tool Prototype, and Initial Deployment stages of Step 2, into a concise visual for its users. This includes defining each of these stages and identifying their key features (Product), describing the roles and responsibilities of the staff involved (Personnel), and stating the necessary functions that must happen in these stages to make them complete (Tool Functions).

To view the Step 2: Developing Tools Summary table, **please click the Box link here**.

To learn more in-depth about the Tool Mock-Up, Tool Prototype, and/or Initial Deployment stages, please visit the links below.

Step 2 Developing Tool Links:

- **Milestone 4: Guidelines for Developing a Tool Mock-Up**
- **Milestone 6: Tool Prototype Guidelines**
- **Milestone 8: Guidelines for Initial Deployment**

IT Environment

What is an IT Environment?

An IT environment (or a Technological/Technical Environment) is a variety of technical components of a digital tool that should satisfy the user and owner's needs. The following areas below are major components that make up the IT environment of a digital tool.

Data/Hosting Infrastructure

Data/Hosting Infrastructure is a system that stores data from a digital tool.

- Server: A hardware or software holding application programs that store the data of the tool.
- Network: A technical web that allows for various systems and servers to connect to and have access to one another.

Data Management

Data Management is a system, person, or storage that manages the collection and analysis of data (for a digital tool).

- Data repository: A storage entity where data can be stored; they are also known as data warehouses, data marts, and data lakes.
- Data Model: A visual diagram of which data is needed (for a tool), as well as how the data should be organized in a database management system (DBMS).

Hardware & Software

Hardware & software are technical resources that interact directly with the data. For reference, hardware refers to computers, monitors, and other tangible resources interacting with data. Software is made up of intangible application programs (ex. Microsoft, Adobe, Oracle) that interact with data virtually.

- Integration
  - *With Infrastructure*: Ensure the digital tool is compatible with the existing hardware and network.
  - *With Data*: Make sure the tool can access the data and other related connections

- *With Data*: Make sure the tool can access the data and other related connections.

- Ease of Use
  - *For maintainers*: Check the tool is easy to install, configure, and/or manage.
  - *For Users*: Make sure the tool is easy for users to interact with (without specialized IT knowledge).
- Flexibility
  - *Deployment*: Check the different ways to see how the tool could be launched.
  - *Maintenance*: Check to see if upgrades or different packages could be added to the tool (or its software).
- Pricing
  - *Deployment*: Be cognizant of any licensing or maintenance fees the software of the tool may require.
  - *Maintenance*: Check there is enough funding for the long-term maintenance of the tool.

Environmental/Data Governance

Environmental/Data Governance is managing who has access to the data, what data can and cannot be shared, as well as who is responsible for deciding these data accessibility and sharing responsibilities.

- Access: Confirm the source data can be retrieved from different platforms (or systems), and transfer it over to a specific data repository for the digital tool.
  - Look into how data access from software and hosting programs can be regulated.
- Security & Policies: Ensure there are technical standards regulating who has access to the data (both internal and external).
- Roles: Designate a team member to be responsible for coordinating data from programmatic areas, and maintaining the hosting/data infrastructure and hardware & software.
  - Common positions for this role include Data Director and Data Authority.

DRAFT RESOURCE – NO

The content for this resource is be

Once it is ready for use it will be moved

Terminology

Along the resources included in the handbook, one will find new or familiar concepts applied in the context of a digital tool development project. Here are brief descriptions of the most common terms used through the handbook.

Key Terms

Key Terms

Terms	Description
Data Sharing Agreement	The seventh milestone of the process, the conditions under which data will b Specifically, these agreements include will be shared, how it will be used, the to safeguard the data, and the method the data. To learn more about Data Sh Agreements, **please visit the Step 2 I Protocols page here**.
Decision-Oriented	A perspective prioritizing the needs ar expectations for decision-making of us other factors, such as current practices especially important in the developme tool, because if the tool does not addr needs, then it will be rarely used. To le about being Decision-Oriented, **pleas Step 1 Project Launch page here**.
Design Specifications	The fifth milestone of the process, it de moment in which there are clear and s information, decisions, and tasks defir the key parameters of the tool to build version of it. To learn more about Desi Specifications, **please visit the Step 2 Specifications page here**.
Expanded Deployment	The ninth milestone, it is the process o and fully onboarding the first complete the digital tool. To learn more about th Deployment, **please visit the Step 3 I Deployment page here**.
Initial Deployment	The eighth milestone of the process a stage of step 2, it produces the first ve developed digital tool. This stage inclu development of the digital tool and the of the digital tool to select users. • Tool Development: Initial Deploym contains all real data, visualizatior analytics, and hardware & softwar • Tool Deployment: Process of runn

	Acceptance Testing (UAT), and & training an initial cohort of users navigate the digital tool. To learn more about Initial Deploymen **visit the Step 2 Initial Deployment p**
Long Term Strategy Recommendations	The tenth milestone of the process, it l tasks and additions that were not adde digital tool. To learn more about the Lo Strategy Recommendations, **please v 3 Long Term Strategy page here**.
Maintenance Protocols	Regulations and procedures to follow tool and its various features are up to d includes updating and maintaining the (hardware & software, licensing) and t the tool (data, adding new visualizatio analytics). To learn more about Mainte Protocols, **please visit the Step 3 Ma Protocols page here**.
Optimal Use	The third step of the digital tool proces on expanding the deployment of the d among its intended users, and creatin sustainable plan for the tool in the lon learn more about Optimal Use, **please Step 3 Optimal Use page here**.
Project Charter	The third milestone of the process and stage of step 1, it is a short statement d detailing the objectives, tasks, constra budget, and key stakeholders who wil participating in the digital tool develop process. To learn more about a Projec **please visit the Step 1 Project Chart here**.
Project Launch	The second milestone of the process, outputs that must be reached during ir interactions between the digital tool te stakeholders to develop a digital tool. major components integral to this list i Users & Uses, Data, and Resources. about a Project Launch, **please visit t Project Launch page here**.
Tool Mock-Up	The fourth milestone of the process, it and simple representation of the organ content that will be in the digital tool. A up is non-interactive, serving as a map

	describing the features and what the d most likely look like. To learn more ab Mock-Up, **please visit the Step 2 Mo here**.
Tool Prototype	The sixth milestone of the process, it i interactive version of the digital tool, p users insight into the tool's data visual structures, functionalities, general nav use of hardware & software. A tool pro flexible enough for critical user feedba alterations, and other editing that may digital tool layout. To learn more about Prototype, **please visit the Step 2 To page here**.
User	People who interact with the digital to guide the definition, scope, content, a functionality of the digital tool. • Primary User: Target group the dig developed and maintained for. • Representative User: Select users represent the primary audience of tool. These users often participate feedback sessions and UAT. • Internal User: Government staff or who would not be classified to be "external entity". • External User: A person who wou classified as being a part of an "ex such as those working for externa organizations, companies. To learn more about the role of a User **the Roles & Responsibilities page h**

All Terms

All Terms

Terms	Definition
Agile Development	Various practices and frameworks tha self-organization, collaboration, users and testing to develop solutions. To le

	about Agile Development, **please clic external link here**.
Analytics	The process of collecting, interpreting communicating patterns and trends in Common analytics include visual grap charts, filters and grouping, data extra more. To learn more about Analytics, **p the Well-Designed Features tab of t Design Specifications page here**.
Application Developer	A technical person with expertise in th platform for digital tool development. T the tool mockup and prototype develo well as coordinates activities and feed users, IT staff, and subject and data e learn more about an Application Deve **visit the Roles & Responsibilities pa**
Data	Information collected from and analyz helping guide program, operation, and decision-making. • Mock Data: Fake data used for toc and prototypes. • Real Data: Data collected and use tools, visualizations, and other ana To learn more about Data, **please visi Project Launch page here**.
Data Authority	The person commonly in charge of ma data servers and storage, as well as o Management & Governance policies f ministry/department. To learn more ab Authority, **please visit the IT Environ here**.
Database Management System (DBMS)	A software system that stores, shares, data. To learn more about a DBMS, **pl the IT Environment page here**.
Dataset	A collection or group of specific data. I often are grouped together by an indic as age, gender, location, and more. To about a Dataset, **please visit the Step page here**.
Data Access Platform	A technological platform that stores, u shares data with approved users. To le about a Data Access Platform, **please**

	Efficient Environment Tab of the St Specifications page here
Data Acquisition	The process of identifying and gatheri data sources. To learn more about Dat Acquisition, **please visit the Data tab 1 Project Launch page here**.
Data Architecture	A framework displaying how data is or ministry, department, or organization. presenting where data is stored, how i accessed, and if it can be shared. To l about Data Architecture, **please visit t Structured Data tab of the Step 2 De Specifications page here**.
Data Expert	A technical person who has deep kno experience in data availability and qua problems with it. They are also involve extraction and transformation of data r digital tool. To learn more about a data **please visit the Roles & Responsibi here**.
Data Flow System	A set of regulations and guidelines pro guidance as to how to sustain the data structure, data visualizations, and data a digital tool in the long term. To learn Data Flow System, **please visit the S Sustaining Data Flow Systems page**
Data Governance	Procedures and policies explaining w access to the data, what data can and shared, and who is responsible for de accessibility and sharing responsibilit more about Data Governance, **please Environment page here**.
Data Management	A system, person, or storage that man collection and analysis of data (for a d learn more about Data Management, **p the IT Environment page here**.
Data Source	A source or hub where data can be ret Reputable sources to extract data fron national and sub-national government international organizations and non-pr scholarly works & journals. To learn m Data Source, **please visit the Step 2 for Data Mapping page here**.
Digital Tool Team	The team in charge of developing and

	the digital tool. To learn more about th roles and responsibilities of a Digital T **please visit the Roles & Responsibi here**.
Efficient Environment	The environment needed to support th functions of the digital tool. This includ tool development (ex. hardware, softw access platforms (DBMS, data storage more about an Efficient Environment f tool, **please visit the Efficient Enviro the Step 2 Design Specifications pa**
Extract, Transform, & Load Process (ETL)	A common process of copying and tra from one data platform to another data First, extract the data from the original platform. Second, transform or alter the tool's needs (ex. using only certain se data). Lastly, load the data into the dat learn more about the Extract, Transfor (ETL) Process, **please visit the Data Step 1 Project Launch page here**.
Functionality	An important factor in the digital tool, e digital tool works correctly. This includ inspecting hardware and software, rev case scenarios, testing data filtering a checking data visualizations are displ data correctly, and more. A common w digital tool's functionality is through **Us Acceptance Testing (UAT)**. To learn UAT, **please visit the Step 2 User Ac Testing page here**.
Interactivity (of a Digital Tool)	A factor focusing on the different ways use, navigate, and work with a digital t digital tool has different use cases, tab groupings, and other interactive analy has high interactivity. When a digital to and has limited use cases and analyti interactivity. To learn more about Intera **please visit the Well-Designed Featu the Step 2 Design Specifications pa**
IT Background (for a Digital Tool)	A person's technical background in wo computer hardware and software used tools. If a person has experience colle analyzing, and transferring data (data then they have an advanced IT backg person works on a computer rarely or

	comfortable working with a computer, limited or novice IT background. To lea about IT, **please visit the IT Environn here**.
IT Environment	Also known as a Technological or Tec Environment, it contains a variety of te components of a digital tool that shoul user and owner's needs. These techn components include data/hosting infra data management, hardware & softwa environmental/data governance. To le about an IT Environment, **please visit Environment page here**.

IT Professionals	Staff providing technical support to pro play a key part in developing and mai digital tools. When working on a digita main goal is to ensure users can use t providing the best solution for users in IT environment and digital data systen
	• Digital Tool IT Areas
	  • Installation: IT staff supporting development and deployment tool
	  • Maintenance: IT staff maintain updating the digital tool, and p support to its users when usin platform.
	To learn more about IT Professionals, **the Roles & Responsibilities page h**

Key Stakeholder (of Digital Tool)	People and ministries/departments/or (outside of the digital tool developmen are working on, or have a vested inter development of the digital tool. Key sta are identified in the digital tool's **Proje** To learn more about key stakeholders **the Step 1 Project Charter page her**
Malware	A software application that damages a network, servers, hardware, software, learn more about malware, **please Ste Sustaining Data Flow Systems page IT Environment page to prevent ma**
Metrics (for a Digital Tool)	The different ways to measure and gro digital tool. More commonly known as common examples of data metrics in p

	digital tools include: age, gender, loca educational background, and more. To about metrics, **please visit the Step 1 Charter page here**.
Project Manager	This person coordinates communicati various teams and ministries/departme the development project. They also ac troubleshoot projects as they appear, a certain issues to the Project Sponsor t resolved. To learn more about the Proj role, **please Roles & Responsibilitie**
Project Sponsor	A Project Sponsor initiates, ensures, a establishes key aspects of the project general guidance on the vision of the They champion the successful develo use of the tool within the ministry or de learn more about the Project Sponsor **visit the Roles & Responsibilities pa**
Providing Agency	In a **Data Sharing Agreement**, this ag providing the data to the receiving age more about the providing agency and the Data Sharing Agreement process, **the Step 2 Data Sharing Protocols p**
Receiving Agency	In a **Data Sharing Agreement**, this ag receiving the data from the providing a learn more about the receiving agency role in the Data Sharing Agreement pr **please visit the Step 2 Data Sharing page here**.
Source Processing Data	A series of actions related to interactin processing data from the digital tool. T ensuring the data is updated at an ade checking visualizations and analytics correctly, having an adequate time ser needs of users), and more. To learn m Source Data Processing, **please visit Structured Data tab of the Step 2 De Specifications page here**.
Structured Data	A vital component of a digital tool whe be both processed and organized corr includes having proper Source Proces and Data Architecture. To learn more a Structured data, **please visit the Stru**

	tab of the Step 2 Design Specificati here
Subject Expert	This person has detailed knowledge a with the information required for the di They act as a consultant(s) for the digi project, providing insight and recomm the limitations and information users n digital tool. To learn more about the Su role, **please visit the Roles & Respo page here**.
Time Series	The time period the data covers. For e users want to track birth and mortality the COVID-19 epidemic, the time serie of data) should be between October 2(January 2022. To learn more about a T **please visit the Step 1 Project Laun here**.
Time Gap	A period of time where no data is reco learn more about time gaps, **please vi Quality tab of the Step 3 Sustaining Systems page here**.
Tool Development Platform	The technical environment used to de digital tool. This includes the hardware used to create the tool, data-sharing p practices, and other technical compon contributing to digital tool developmen more about the Tool Development Pla **visit the Efficient Environment tab o Design Specifications page here**.
User Acceptance Testing (UAT)	Also known as Application, Beta, or E Testing, UAT is one of the last phases Tool Development process, where sel users (ex. representative users) intera digital tool to test whether it can help t their needs. To learn more about UAT, **the Step 2 User Acceptance Testing**
Visualization	Visual interpretations of the data; they data and display any trends or pattern may have. Common visualizations use tools are bar graphs, line graphs, char geographical maps, and more. • **Gantt Chart**: A chart used for visu the progress of large projects.

Well-Designed Features	The main features needed to have an functioning digital tool. These features interactivity, visualizations, and analyt more about Well-Designed Features, **the Well-Designed Features tab of t Design Specifications page here**