Go to accompanying workbook 1

FAIR Process Framework – Factsheet 1

Step 1 Defining data intervention types

The FAIR Process Framework provides a series of bite-sized activities to take project leaders, and their partners, from concept, through planning and strategy and into implementation of a customized FAIR and responsible data plan.

There are six steps:

- Step 1: Discovery
- Step 2: Understanding
- Step 3: Planning
- Step 4: Co-developing
- Step 5: Strategy
- and Step 6: Implementing.

This factsheet has been designed as a companion to Workbook 1, offering additional context to the approaches considered in the workbook and providing examples of real-world applications.

Go to accompanying workbook 1

About

Step 1 lays the groundwork for a successful, data-driven project. It helps you clearly define your problem and goals, identify key data activities, anticipate challenges, and document solutions that ensure effective, sustainable, and impactful FAIR data practices.

Approaches used to develop the content

This sheet offers additional context to the approaches considered in this step and provides examples of real-world applications. Read this document if you are interested in understanding the underlying approaches that the resources in Step 1 are built on.

The following approaches were used:

- **Human-Centered Design (HCD)** and **Design Thinking** under which problem and intention statements were developed
- **Systems Thinking, DCEC Framework, Leverage Points** under which data interventions, levers and blockers were developed.

Human-Centered Design and Design Thinking approach: Problem and intention statements

In Step 1, the user is asked to develop **problem** and **intention statements** for the investment at hand, which has been inspired by approaches from HCD and Design Thinking. IDEO views HCD as "*a creative approach to problem solving…It's a process that starts with the people you're designing with and ends with new solutions that are purpose-built to suit their needs.*" Design Thinking considers these vital aspects from HCD while also considering elements of '*feasibility*' and '*viability*'. At the core of both these approaches lies empathy.

Go to accompanying workbook 1

Problem statements

Crafting a problem statement requires deep empathy and understanding of the users, which is a core principle of HCD. Through methods like observation, interviews, and empathy mapping, one can gather insights into users' experiences and challenges. This empathy-driven approach ensures that the problem statement accurately reflects the users' true needs and sets the stage for developing meaningful interventions.

Prioritizing empathy and understanding of users' needs ensures that solutions are not only relevant, but also responsive to the unique circumstances faced by end users,[1] which in this case includes farmers and agricultural workers. This human-centered approach fosters innovation by encouraging cross-disciplinary collaboration and iterative problem-solving, enabling exploration of a wide range of potential solutions and experimenting with new ideas. These approaches empower stakeholders to actively participate in the design and implementation process, creating a sense of ownership and commitment to project outcomes.[2]

Framework applications

Below are AgDev-related examples of the application of **problem-solving** within the framework of design thinking. While these instances may not explicitly label the identification of 'problem statements' in their process, they demonstrate the identification of challenges and the innovative application of design thinking to develop solutions.

- **IDEO**: IDEO, a renowned global design firm, partnered with organizations like the Bill & Melinda Gates Foundation and the Acumen Fund to pioneer creative solutions for smallholder farmers in Africa.[3] In one notable collaboration, titled 'Redesigning How Ethiopian Farmers Plant Their Most Important Crop', IDEO and partners identified the 'problem' that traditional methods of cultivation cause seeds to fight for sunlight, water and nutrients. They then engaged farmers, local engineers and agricultural experts to reimagine the cultivation of teff. This collaborative effort resulted in the development of a new agricultural tool: a hand-pulled planter capable of efficiently sowing teff seeds and distributing fertilizer in precise rows.[4]

[1] Dam, Rikke Friis & Siang, Teo Yu. (2024). What Is Empathy and Why Is It So Important in Design Thinking?. Interaction Design Foundation. https://www.interaction-design.org/literature/article/design-thinking-getting-started-with-empathy

[2] Liedtka, Jeanne. (2018). Why Design Thinking Works. Harvard Business Review. https://hbr.org/2018/09/why-design-thinking-works

[3] IDEO.org. (n.d.). Designing for Equity. https://www.ideo.org/

[4] IDEO.org (n.n). Redesigning How Ethiopian Farmers Plant Their Most Important Crop. https://www.ideo.org/project/new-life-for-an-ancient-grain

- **AgriUP**: AgriUP, an initiative sponsored by the World Food Programme Innovation Accelerator, exemplifies the application of design thinking in the AgDev sector. Recognizing the potential for smartphones to significantly improve the productivity and livelihoods of smallholder farmers in Guatemala, the project identified a clear problem to address:

  "*In Guatemala, smallholder farmers represent approximately a third of the country's population, with many vulnerable to hunger and constrained by limited farming knowledge and low levels of literacy.*"

  Within the constraints of the country's digital ecosystem, AgriUP is developing an innovative solution: a low-bandwidth smartphone application which acts as 'Foursquare for Farmers'. This app aims to equip farmers with location-specific information, including weather alerts, agricultural advice and nutrition tips, tailored to their needs and circumstances.[5]

Intention statements

In this step, it builds on the design thinking framework with the inclusion of **intention statements** following the formulation of the **problem statement.** This can be viewed as an agreed statement of what your investment wants to achieve (with a focus on data) to bring out the desired change within the system[6]. Creating your intention statement will help focus your future data requirements around only the most crucial strategic objectives of the investment. It can also help align and communicate the project's goals to end users, project partners, and other stakeholders.

[5] World Food Programme. (2024). AgriUp Project Overview. World Food Programme Innovation Accelerator. https://innovation.wfp.org/project/agriup

[6] https://www.thinknpc.org/wp-content/uploads/2018/07/Creating-your-theory-of-change1.pdf

Framework applications

The following are AgDev-related examples illustrating the application of **intention articulation**. While these instances may not explicitly label their process as 'intention statements', they effectively demonstrate a clear messaging strategy that defines the objectives of the work they are undertaking.

- **SAI Platform**: The Sustainable Agriculture Initiative (SAI) Platform clearly articulates its mission, vision and objectives. This includes a **mission statement:** to promote the development and implementation of sustainable agricultural practices worldwide by fostering collaboration among stakeholders in the agricultural sector; **vision:** a future where agriculture contributes to sustainable development, conserves natural resources, enhances biodiversity, and improves the livelihoods of farmers and rural communities; and **objectives:** promoting sustainable farming practices, facilitating knowledge-sharing and capacity-building, driving innovation, and advocating for policies that support sustainability in the sector.[7]

Systems thinking

Systems thinking, or adopting a **holistic approach** to understanding an issue as interconnected components of a unified whole,[8] is especially relevant in the context of AgDev and its associated data. Agriculture itself operates as a complex system, involving diverse stakeholders such as farmers, governments and the private sector, each of which have legitimate concerns ranging from income generation to food security and environmental sustainability. When developing this step, the need to find an **accessible framework** for understanding the systemic nature of AgDev data became apparent.

Additionally, to understand how AgDev data could be made FAIR, we realized that a broader perspective on data and its implications for users was essential.

A) DCEC Framework

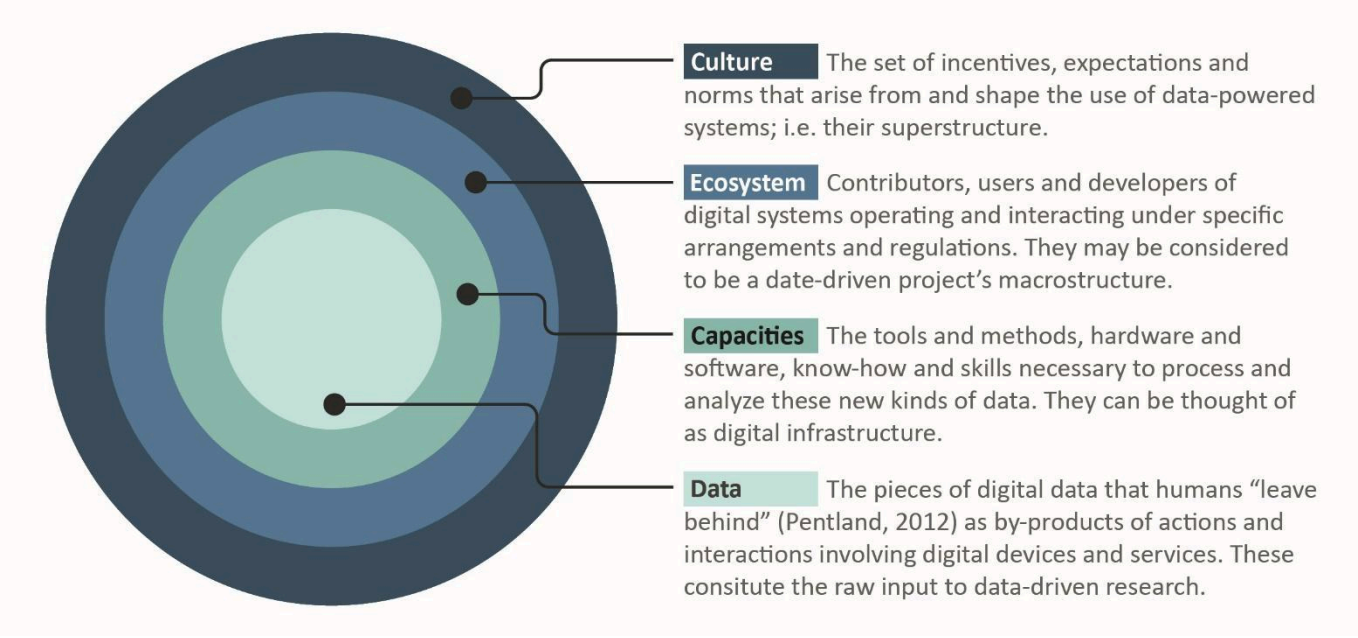
The DCEC framework is composed of **Data**, **Capacities**, **Ecosystem**, and **Culture**. This framework enables us to categorize the distinct yet interconnected aspects of data flows, collection and utilization. Each is defined below:

[7] SAI Platform. (n.d.)
[8] Ross D. Arnold, Jon P. Wade. (2015). A Definition of Systems Thinking: A Systems Approach. https://www.sciencedirect.com/science/article/pii/S1877050915002860

Go to accompanying workbook 1

- **Data:** The pieces of digital data that humans 'leave behind' as by-products of actions and interactions involving digital devices and services. These constitute the raw input to data-driven research.[9]
- **Capacities:** The tools and methods, hardware and software, know-how and skills necessary to process and analyze these new kinds of data. They can be thought of as digital infrastructure.
- **Ecosystem:** Contributors, users and developers of digital systems operating and interacting under specific arrangements and regulations. They may be considered to be a data-driven project's macrostructure.
- **Culture:** The set of incentives, expectations and norms that arise from, and shape the use of, data-powered systems: i.e., their superstructure.

The figure below illustrates the DCEC through four concentric circles, indicating how they interconnect to illustrate a 'system thinking' approach to data.



[9] Pentland, Alex "Sandy." Reinventing Society in the Wake of Big Data: A Conversation with Alex (Sandy) Pentland. Interview by Edge.org. Edge.org, August 30, 2012. https://www.edge.org/conversation/alex_sandy_pentland-reinventing-society-in-the-wake-of-big-data.

Framework applications

The 4Cs framework on which DCEC is based was designed to be highly adaptable and flexible. This methodology has been taught in the UN System Staff College (UNSSC) and UN Economic Commission for Latin America and the Caribbean (UN ECLAC)-funded training series 'Leveraging Big Data for Development' training course.

In their chapter contribution to UNESCO's 'Missing Links in AI Governance' (2023), titled 'AI For the SDGs—And Beyond? Towards a Human AI Culture for Development and Democracy'[10], Emmanuel Letouzé (Data-Pop Alliance), Nuria Oliver (ELLIS Alicante), Bruno Lepri (Fondazione Bruno Kessler), and Patrick Vinck (Harvard Medical School and Harvard T.H. Chan School of Public Health/Data-Pop Alliance) highlight the 4Cs as a way to conceptualize AI. In an article published by the Inter-American Development Bank, author Nathalie Alvardo highlights the utility of both Pentland's 'bread crumbs' theory and the 4Cs as a means to harness Big Data to fight crime in Colombia[11]. The framework has been applied to the use of Big Data to monitor and advance the SDGs, as evidenced by Shalini S. Gopalkrishnan in her article, 'Examining the Role of Big Data for Strengthening Multi-stakeholder Partnerships in the SDGs'[12]. These diverse applications indicate the versatility of the framework in various data-driven contexts, which further supported our decision to apply it to AgDev data.

B) Leverage Points: Data interventions, blockers, and levers

Another facet of systems thinking underpinning this step is the concept of '**leverage points**', where small changes can cause significant outcome shifts in the entire system. The idea of leverage points within systems thinking is explored in depth in Donella Meadows' paper, 'Leverage Points: Places to Intervene in a System.' In the paper, Meadows emphasizes the importance of understanding systems as interconnected entities and advocates for analyzing the entire system and its feedback loops, rather than 'parts' in isolation.

[10] Letouzé, E., Oliver, N., Lepri, B., & Vinck, P. (2023). AI for the SDGs—And beyond? Towards a human AI culture for development and democracy. In B. Prud'homme, C. Régis, & G. Farnadi (Eds.), *Missing Links in AI Governance*. United Nations Educational, Scientific and Cultural Organization (UNESCO). https://unesdoc.unesco.org/ark:/48223/pf0000384787

[11] Alvarado, Nathalie. (2017).Using Big Data to fight crime: 6 Colombian cities will show us how. Inter-American Development Bank. https://blogs.iadb.org/seguridad-ciudadana/en/using-big-data-to-stop-crime-six-colombian-cities-will-show-us-how/

[12] Gopalkrishnan, S.S. (2021). Examining the Role of Big Data for Strengthening Multi-stakeholder Partnerships in the SDGs. Encyclopedia of the UN Sustainable Development Goals. Examining the Role of Big Data for Strengthening Multi-stakeholder Partnerships in the SDGs | SpringerLink

In the context of the step, **data interventions**, which are defined as data-related activities, such as data collection, access, use, and sharing, are not considered **leverage points**. Although these interventions do not directly influence system change, understanding them allows for the identification of the leverage points; **data blockers** and **data levers**.[13]

Identifying these leverage points is instrumental in enabling the implementation of the FAIR Principles. **Data blockers** represent obstacles that 'block' data and stop it being FAIR, while **data levers** are tools, techniques or solutions to overcome these barriers. The accompanying workbook further underscores a systems-thinking approach by emphasizing that levers often reside within complex systems, where even minor adjustments can yield significant impacts on outcomes. By adopting this perspective, stakeholders can strategically navigate challenges and capitalize on opportunities to enhance data accessibility, usability, and fairness.

Framework applications

Leverage points to address climate change risk in destinations

This article highlights how system thinking, and the use of leverage points, has the potential to bring about transformational change to the existing tourism system in Vanuatu. Seven leverage points are identified to intervene in the system to help reduce climate change risk and to achieve favorable systemic level change.

[13]Meadows, D. (1997). Places to Intervene in a System. The Donella Meadows Project: Academy for Systems Change. https://donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system/