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data use

an overview of conceptual
and practical approaches

report

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Introduction

Development Initiatives (DI)'s thematic work on data use focuses on breaking down barriers to data use, improving data availability and usability, and helping people use data effectively to end poverty and build resilience. DI's projects aim to understand and tackle the technical, institutional and cultural challenges connected with data and information use in international development.

In the framework of its [strategy](#), DI works to advance data use at two levels. Firstly, through its work on poverty and resources, DI provides analysis on people in poverty and the resources that can help address their needs. In both thematic areas, DI also assesses the quality of underlying data, advocates for its improvement and better accessibility, and contributes to making data more transparent and usable (e.g. through its work with the International Aid Transparency Initiative/IATI). Secondly, through its work on data use, DI advances work to help different actors use data in their work, support the uptake of analysis, and address technical and institutional barriers to data access and use.

To support learning from these efforts, robust and practical frameworks for project development, implementation and learning are needed. This paper aims to set out, in brief terms, the theoretical underpinnings of our data use work. Based on a literature review, it highlights key concepts and current approaches aimed at increasing data use. It is intended to be read and used in conjunction with DI's strategy and Data Use Learning Framework.

Research and practice on data use

While the term 'data use' is a more recent coining, academics and practitioners from a wide range of disciplines have been exploring the topic of data, evidence and/or information use for at least the last three decades.

Some of the main fields of study and practice have been **evidence-informed policy** (in the international development sector), **information behaviour research** (in library sciences) and **practitioner literature** across a wide array of issues from poverty reduction to commercial scenarios (e.g. user experience research in the web-design context).

Researchers and practitioners largely agree on the factors constraining data use and the need to think beyond simplistic linear models for evidence use in decision-making. However, there is no single way of enabling or promoting data use and each operational setting requires a tailored approach.

The analytical lenses applied to these issues range from technical assessments to political economy analysis, behavioural research and social anthropology. Recent literature emphasises the need to combine these in multidimensional approaches.

The available literature can be broadly categorised as **studies**, **conceptual frameworks** or descriptions of **practical approaches** to increasing data use. Several recent studies, which will be explored in the following sections, are AidData's report [*Decoding data use: How do leaders source data and use it to accelerate development?*](#) (Masaki et al., 2017), the literature review [*How can capacity development promote evidence-informed policy making?*](#) (Punton, 2016) and Results for Development's [*Evidence Translators' Role in Evidence-Informed Policymaking*](#) (Poirrier, et al., 2018). Some of the emerging conceptual frameworks include Data2X's [*Data Value Chain*](#) (Open Data Watch, 2018) and Amazon Web Services which conceptualise the sweet spot for users between raw data and highly refined data products. There are also practical approaches such as Global Integrity's (2018) [*Treasure Hunts*](#) tool, Open Contracting's work on user engagement and Sunlight Foundation's (2016) work on [*open data use at municipal level*](#). Finally, we draw on ongoing conversations with various friends and partners, such as the [*Follow the Money*](#) network.

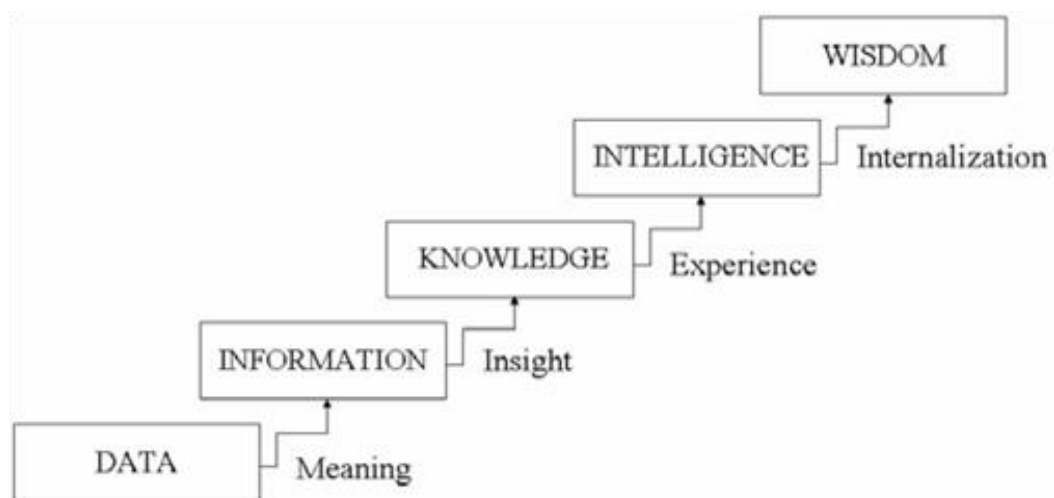
Definitions

Data, information and knowledge

An important distinction needs to be made between **data**, **information** and **knowledge**.

InfoPower (2017) suggests distinguishing these concepts through the data-information-knowledge-wisdom hierarchy used in information science (Figure 1). In that logic, **data** can be understood as ‘raw’ material, “static text, numbers, code or other marks or signals” without a particular meaning, while **information** has “meaning, purpose and value for its receiver” (Vuori, 2006). Most of the time, information is what people actually use in decision-making or accountability settings. When this information is complemented by insight and values it becomes **knowledge**, which by adding personal experience is then turned into **intelligence**¹ and internalised as **wisdom** (Vuori, 2006).

Figure 1: Hierarchy of information types



Source: Vuori, 2006

In the context of decision-making, the most relevant classifications of knowledge are: **tacit**, **explicit** and **implicit** (Pollard and Court, 2005), as well as **practice-based**, **participatory/citizen** and **research-based** (Jones et al., 2013). **Tacit** is the intuitive and unconscious knowledge helping people make decisions without having to refer to formal

¹ 'Intelligence' is an additional link to the classical data-information-knowledge-wisdom model.

rules or procedures. **Explicit** knowledge is clearly articulated and accessible to everyone; **implicit** refers to shared beliefs, values and expectations that help people know what is socially and culturally acceptable. In the second categorisation, **practice-based** knowledge is gained through hands-on experience and tends to be tacit, while **participatory** knowledge is of a place's culture, people and difficulties, and can be hard to access by outsiders.

Finally, non-expert stakeholders can find the use of **research-based** knowledge in decision-making challenging due to its technical character. Policymakers should not rely on a single type of knowledge, but balance these to create evidence-based policies that are sensitive to what has worked in the past, innovative, citizen-inclusive, but not populist (Jones et al., 2013).

Evidence-based versus evidence-informed policy

Policymakers can use evidence in different ways, but typically their decisions are *informed* rather than *based* on evidence, as there are multiple other factors influencing the process.

The *Oxford English Dictionary* defines evidence as “the available body of facts or information indicating whether a belief or proposition is true or valid”. This suggests the purpose to this evidence use is to verify a position or idea and is the preferred term in policymaking. The ways evidence is used can vary depending on the policymaker's objectives and context. Mutshewa (2010) suggests the use can be **instrumental**, when evidence is directly applied in decision-making; **conceptual**, which is more indirect and broadens the person's general understanding of a subject area; and **symbolic**, legitimising the pre-existing beliefs of the user. In many cases symbolic use can create the illusion of being instrumental, so it is important to consider the element of subjectivity in policymaking. In an extreme variation, this can also be described as ‘policy-based evidence’, resulting from accountability pressures (funders, regulations) or the need for ideologically-coherent or rapid decisions (Jerven, 2015; Cairney, 2016).

Classical models such as the ‘policy cycle’ assume that evidence enters as a neutral input at each point from agenda setting to policy formulation, decision-making, policy implementation and policy evaluation (Pollard and Court, 2005). As the Building Capacity to Use Research Evidence (BCURE) programme's evaluation report (Punton, 2016) suggests, such linear models do not sufficiently consider important external factors that influence policy decisions, such as power, politics and culture. Newer models integrate these factors: For example, the ‘policy streams’ model describes windows of opportunity for evidence to influence discussions and solutions; and the ‘policy spaces’ model describes settings in which policies can be influenced depending on the level of involvement of external actors (Punton, 2016).

There has also been a terminological shift from ‘evidence-based policy’ to ‘evidence-informed policy’. The latter suggests that evidence is just one of the factors that inform decisions, rather than being what they are grounded in. As Davies (2005) outlines, policymaking is also influenced by experience and expertise, judgement, habits and

traditions, values and policy context, and moreover by resources available, pragmatics and contingencies, lobbyists and pressure groups.

In practical terms, Head (2015) identifies that the policy areas where evidence use tends to be most engrained are public health programmes, technology and innovation policy, economic growth and stabilisation, environment and natural resource management, education and training, and social and criminal justice.

Demand and supply

Market-inspired analogies of data demand and supply are often used to illustrate the challenges of evidence-informed policy. The concepts of 'evidence pipeline' and 'evidence ecosystem' (Shepherd, 2014) are used to describe the flow of evidence from producers to users, where there is a 'product push' and 'demand pull'. Although this is useful for categorising the different barriers and enablers of data/information use, this linear trajectory is an oversimplification. Among others, it does not capture the nuanced roles of different actors who can and should be simultaneously data users and producers (Dufief et al., 2017); the misbalance between data supply and demand; the absence of clear price signals for public data production; or rights-based perspectives on access to information. While it is certainly important to ensure use of existing data and information, this is unlikely to be purely a marketing challenge. Conversely, investments into data production and access do not necessarily have to be justified by an existing demand. Potentially, it could be useful to distinguish between need, demand and supply. For example, having in place a robust civil registration and vital statistics system could be described as a core need for the functioning of public administrations, whereas demand for and supply of data and analysis derived from the system will be specific to multiple different audiences.

Barriers, enablers and intermediaries

Barriers to data use

Keeping in mind the limitations of the supply-demand model, it is useful to apply it to understanding key challenges to data use faced by users and providers.

Supply-related

There is a large pool of literature discussing the characteristics of evidence that are essential for its use in policymaking. The Overseas Development Institute (Pollard and Court, 2005) summarises these as **availability** (of “good evidence”), **credibility** (quality of the research approach, source objectiveness, etc.), **generalisability**, **rootedness** (in real life contexts), **relevance** (both topical and operational) and **accessibility** (in a useful format). Limitations to or lack of one or more of these features creates barriers for the data and/or information’s use in policymaking.

AidData (Masaki et al., 2017) introduces the four C framework of ‘content’, ‘channel’ and ‘choice’ leading to ‘change’ based on its country studies of evidence use. **Content**-related difficulties are: **granularity**, as the data is insufficiently disaggregated by sector, geography and demography; **accuracy**, since the data sources are often viewed as incomplete or out of date; and lack of **integration** and **interoperability** of disconnected data initiatives. Obstacles at the **channel** level include: **legal restrictions** to access; **connectivity** restraints when, for example, development data is provided exclusively online; and **lack of awareness** by prospective users that such information is publicly available. For example, a recent study by the Economist Intelligence Unit (2017) on the use of open government data by citizens in 10 countries, found that 50% of the respondents’ lack awareness about open government data and its potential uses or benefits.

Some of the challenges associated with information use are: information sources, especially domestic ones, failing to provide concrete and clear policy recommendations or new insights; and sources not being specific enough or not reflecting the local context (Masaki et al., 2017).

While the overall amount of data and information for development has increased in recent years, the supply of quality, accessible data remains a key challenge in many areas: average government budget transparency, for example, decreased in 2017 compared with previous years (International Budget Partnership, 2017). Data on people in poverty remains extremely limited.

Demand-related

The demand-related obstacles to data use are not only technical, but also behavioural, cultural, political and systemic in nature, revealing the true complexity of the issue. AidData (Masaki et al., 2017) describes the **choice**-related limitations as: lack of data **credibility**; the **informality** of sourcing practices as an engrained norm; and competing **incentives** in policymaking.² The BCURE (Punton, 2016) report summarises the barriers as a lack of capacity among decision-makers to access, apply and appraise research; an absence of supportive organisational systems and incentives for decision-makers to use evidence (including a lack of time to read and use research); poor engagement between researchers and policymakers; and poor communication of research. The Department for International Development (DFID)'s (2014) literature review on the impact of research on international development emphasises the lack of motivation for evidence use by decision-makers and the absence of an institutionalised culture of evidence use. As Harvard's Fisher-Pinkert (2018) finds, even when the needed data is available, policymakers often lack the statistical training to use it, which reinforces their behavioural biases.

A study in Nepal concludes that at all levels of government, the management culture does not stimulate decision-making based on evidence (Homer and Abdel-Fattah, 2014). Others conceptualise the lack of motivation as low levels of perception of information need or lack of "information consciousness" (Venegas, 1991).

As outlined earlier, political and other considerations can often dominate over evidence in policymaking. AidData (Masaki et al., 2017) provides the example of budget and strategy formulation in Senegal, which is described as based primarily on political calculations, rather than development data. This is by no means a developing country phenomenon alone as recent developments on immigration, trade and climate change politics in Europe and the US show.

The call for politically informed approaches to development is now widely present. However, it is less clear that data-focused initiatives take the implications fully into account yet. Meanwhile, others, such as the climate movement, are increasingly moving to explicitly political approaches in their work, recognising that even widely accepted evidence does not lead to action unless countervailing interests are overcome. In this context, it is important to caution against linear models of good evidence leading to good policy.

Facilitating data/information use

Most of the literature's technical recommendations for enabling the uptake of development data resonate with DI's work on data use. DFID's (2014) review shows, however, that interventions aimed at dealing solely with the supply-side issues have

² The last C – 'change' – is the consequence of the policy implementation and is therefore excluded from this analysis.

mixed results. Initiatives aimed primarily at increasing the availability and communication of data, such as publishing data bases online and hiring in-house evidence brokers, have not demonstrably increased evidence use in decision-making. The consensus among academics and practitioners is that interventions should focus on the users' information needs and their capacity and motivation to use data in decision-making. As one of the critical interventions, capacity-building should not be seen as educational outreach, but as a process strengthening the self-reliance of researchers, data producers and decision-makers (Ward et al., 2009).

Table 1 shows a few illustrative examples of projects aiming to increase the use of data and/or evidence among particular user groups.

Table 1: Practical approaches to increasing data use

Project	Approach
<p>Treasure Hunts (Global Integrity, 2018)</p> <p>Supporting governments and/or civil society to use the method to address issues</p>	<p>Treasure hunts are an “Adaptable tool which can be tailored to support the needs of country-level partners working to use fiscal data to address locally relevant challenges that hinder progress towards development results”. Steps in this process comprise:</p> <ol style="list-style-type: none"> 1. Problem definition and preparation 2. User-led assessment 3. Validation and reporting 4. Planning and strategising
<p>Equitable and Complete Neighborhoods in Madison, Wisconsin (Sunlight Foundation, 2016)</p>	<p>This initiative builds on and supports the City of Madison’s Open Data programme, by connecting data supply with citizens’/communities’ information needs. These are key steps in this process:</p> <ul style="list-style-type: none"> • Identifying a focus area, building on existing channels for public communication and surfacing shared priorities • User research: refining use cases and user personas <ul style="list-style-type: none"> ○ Research design, supported by Reboot ○ Key informant interviews ○ User interviews ○ Documentation and synthesis ○ Constructing personas and journeys • Designing a plan: together with city officials, this helped identify opportunities for local grants programmes to require data-based applications • Implementation: supporting civil society organisations through toolkits to bring open data into their applications. • User support
<p>How to make sure open contracting data gets used: A guide to defining the use case (Marchessault, 2016)</p> <p>Multiple audiences</p>	<p>A toolkit setting out key steps to promoting open contracting data use:</p> <ul style="list-style-type: none"> • Identifying stakeholders • Understanding their information needs (and underlying motivations) • Documenting user requirements • Mapping demand to supply and making a plan • Documenting use and impact for adaptive learning

J-PAL’s Government Partnership Initiative
(Carter et al., 2018)

Supporting governments of Brazil, Chile, Colombia, Peru and others to use data and evidence in policymaking

Insights about what’s working in the partner governments:

- Make it someone’s job to use evidence
- Help governments make better use of the data they already collect
- Invest in long-term partnerships
- Take on quick wins that can build trust and demand for evidence
- Dedicate a small sum of money to evidence use – this can ease large constraints

Data Utilization and Evidence-Based Decision Making in the Health Sector (World Bank, 2009)

Focused on health sector policymaking at different levels of the Indian government

This work identified the following as critical components:

- Setting clear and widely-known performance indicators to promote transparency and accountability
- Improving incentives and promoting accountability through performance assessments
- Developing skills and building capacity

The role of intermediaries

Since the early 2000s numerous ‘bridging’ strategies were developed to facilitate the communication between researchers and decision-makers. In these, ‘intermediaries’ are seen to play a key role, helping build mutual understanding between policy professionals, researchers and decision-makers to ensure knowledge-coproduction where actors work together to define and deliver information needed for decision-making (Head, 2015; Hanger et al., 2013).

Intermediaries can acquire different roles. In the simplest evidence ecosystem model, they can be ‘**knowledge translators**’ that synthesise, consolidate and “pump” the evidence in accessible and usable formats to those in a position to capitalise on it (Shepherd, 2014). A more advanced concept is ‘**knowledge brokering**’, through which research and practice become more accessible to each other. Successful strategies of ‘**knowledge management**’ have been: packaging, translating, spreading and commissioning research, whereby decision-makers’ issues are translated into clear research questions. If focusing instead on building a positive relationship between researchers and policymakers, the **linkage and exchange** model is more applicable. Ward et.al. (2009) find that knowledge brokers can enhance partner interactions, but need excellent communication skills and a clear understanding of both the policy issues and research evidence. Another related concept is ‘**knowledge enlightenment**’, where research is used to change people’s beliefs or the way they see the world in broad terms. This can be especially important in the development sector, as for example research on chronic poverty is considered to have

Some of the intermediary roles played by DI:

Producing analysis for decision-makers and advocates based on official and other data.

Examples are DI’s [Investments to End Poverty](#) reports, [P20](#) and national budget analysis work in [Kenya](#) and [Uganda](#).

Increasing transparency and making data more usable through DI’s work with [IATI](#), the [Joined-up Data Standards](#) project, and the [Development Data Hub](#).

Supporting others to find and use data and evidence, for example through DI’s Data Helpdesks in Kenya and Uganda.

Connecting users, producers and other intermediaries, for instance through DI’s contribution to national data revolution processes, and the Nepal Data for Development programme.

raised the issue in the global policy agenda and influenced perceptions on social protection (DFID, 2014).

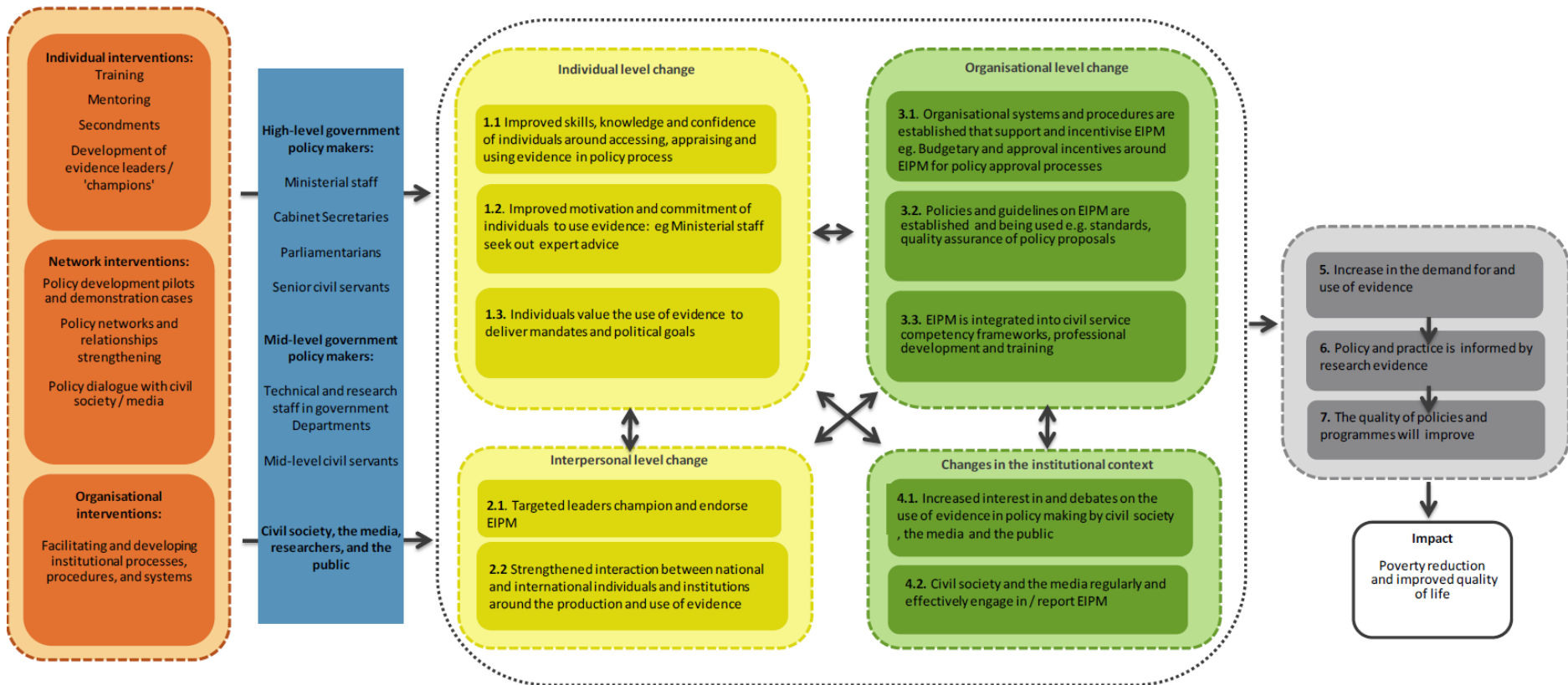
Recent work by Results for Development (Poirrier, et al., 2018) pointed again to the importance of 'translation' for the uptake of evidence in policy. Importantly, political savvy and credibility with the audience were found to be critical qualities of effective intermediaries (while technical skills such as data analysis and communication appeared to matter less).

Theories of change and operational models

International development practitioners adopt varying approaches to increase the uptake of data and information in policymaking and describe the essential steps in doing so differently. In this section, a selection of conceptual approaches to promoting data and evidence use is introduced. This is very much an emerging field. Even a recent evaluation of the World Bank's data work (IEG, 2017) found that efforts to promote data use have a long way to go, and that suitable operational frameworks need to be developed. Nonetheless, a critical cross-cutting element in most approaches is the focus on user needs.

The BCURE programme (DFID, 2014; Itad, 2018) has a clear demand-side focus: "Developing the capacity of decision-makers to use research evidence (through building knowledge, skills, commitment, relationships and systems at individual, interpersonal, organisational and institutional levels) will allow them to access, appraise and apply good quality evidence more effectively when forming policy. This will improve the quality of policies, ultimately benefitting more poor people." This statement and Figure 2 show that the programme tackles challenges on different levels and dimensions.

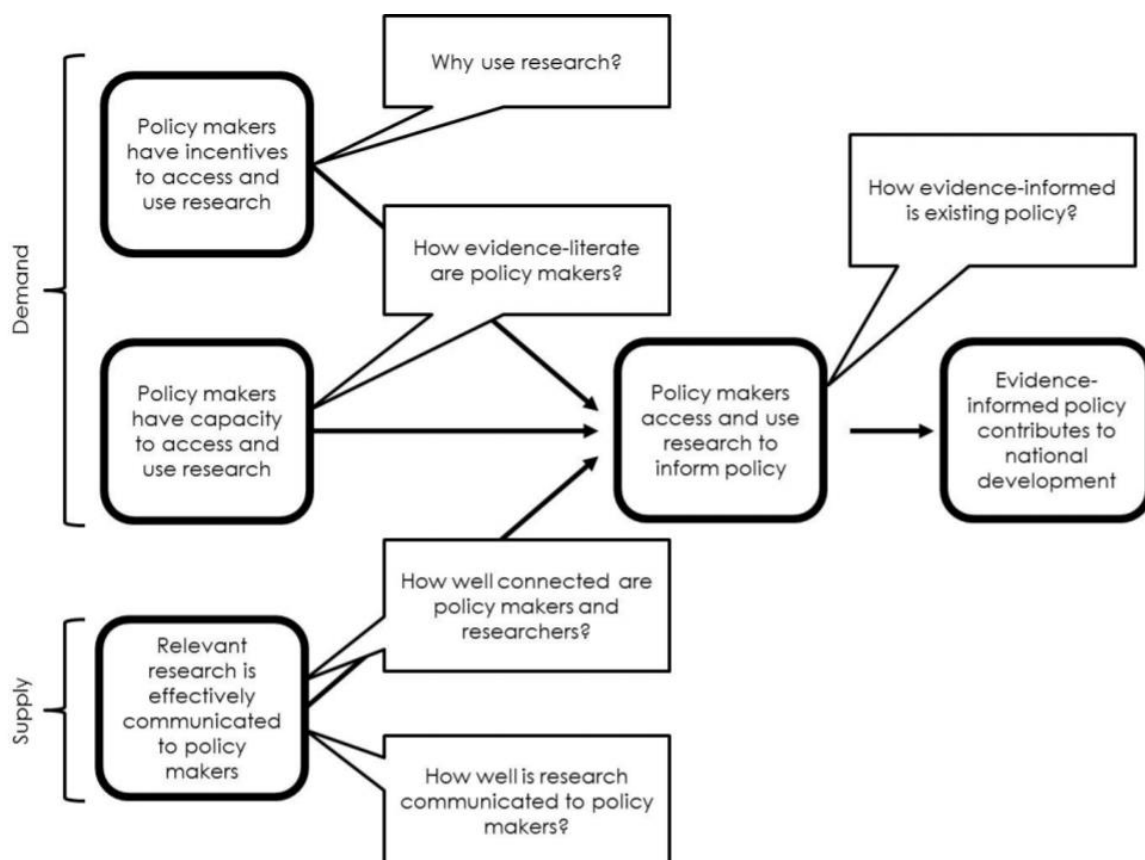
Figure 2: BCURE theory of change



Source: DFID, 2014; Itad, 2018

The theory of change shown in Figure 3, from the 2012 International Conference on Evidence Informed Policymaking in Nigeria, highlights the importance of assessing the incentives, capacity, relationship between researchers and decision-makers, and the effectiveness of how research is communicated to policymakers:

Figure 3: INASP framework



Source: Newman et al., 2013

Open Data Watch's data value chain framework (2018), presented through the lens of increasing value and impact of data, is a useful systematisation of the interventions at each step and the major production and use challenges.

DATA VALUE CHAIN

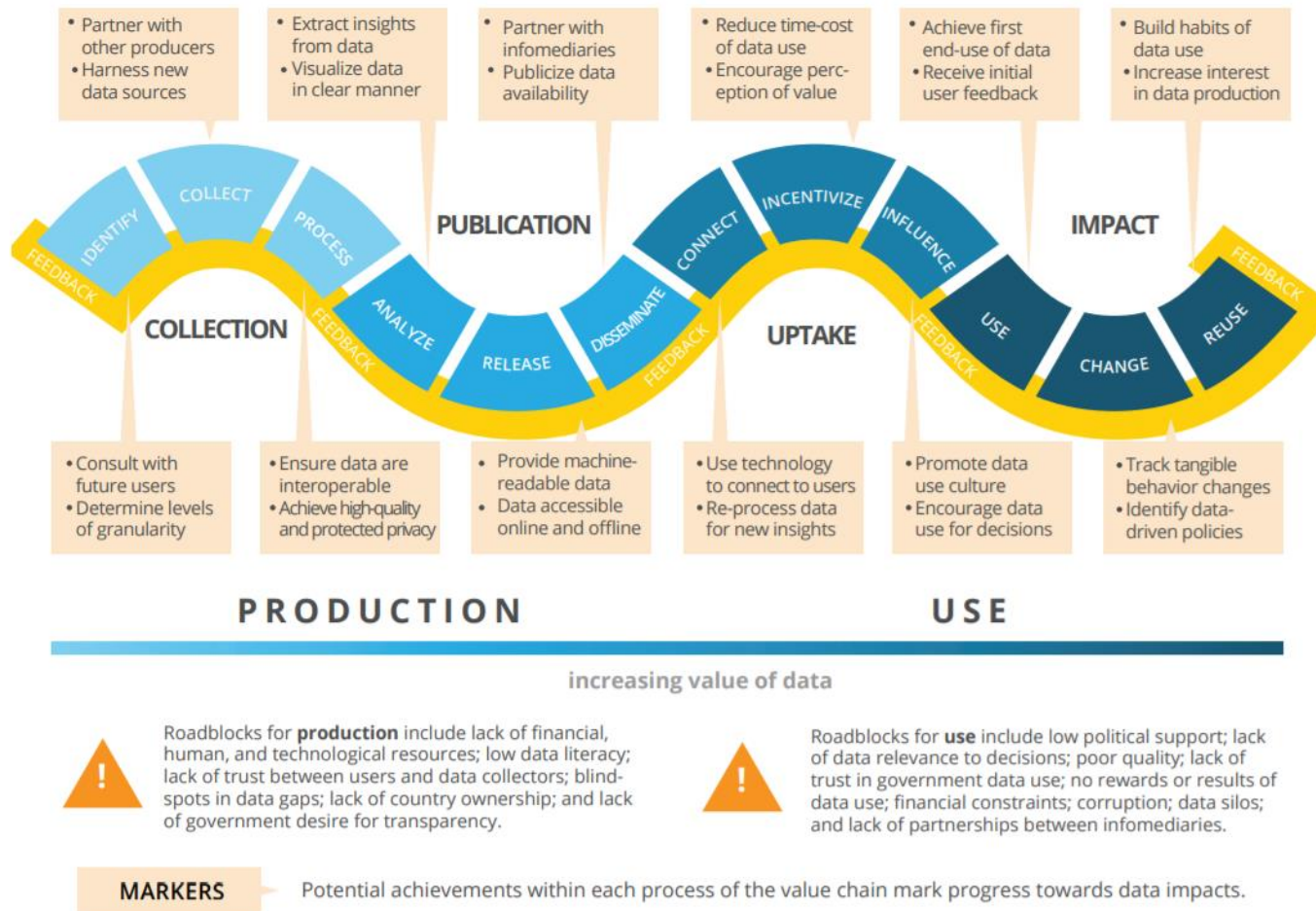


Figure 4: Open Data Watch's data value chain

Source: Open Data Watch, 2018

Amazon Web Services recently presented a visualisation of its approach to data use (Figure 5). The horizontal axis shows the investment to producing a highly refined end product and the vertical axis indicates the size of the audience that will likely be using the information product.

Figure 5: Amazon Web Service's approach to data use



Source: Adapted from a presentation at the Data for Development Festival by Jed Sundwall of AWS (2018)

This is a useful framing to understand where a particular data or information initiative is located and what level of uptake it should realistically aim for. For uptake by large audiences, information initiatives need to find a sweet spot where analytical products are reasonably standardised to be able to deliver them and meet diverse needs. Providing raw, open data or developing highly refined information products on the other hand is likely to meet the needs of much narrower audiences. But lowering the cost of accessing raw data is critical to enabling innovation and learning and providing highly refined analysis is labour intensive but can potentially create significant impact, too.

Global Integrity (Hudson, 2017) suggests the following set of questions as part of the Treasure Hunt (2018) tool, used to assess the role of data in the specific context and the project's contribution to solving the challenges identified:

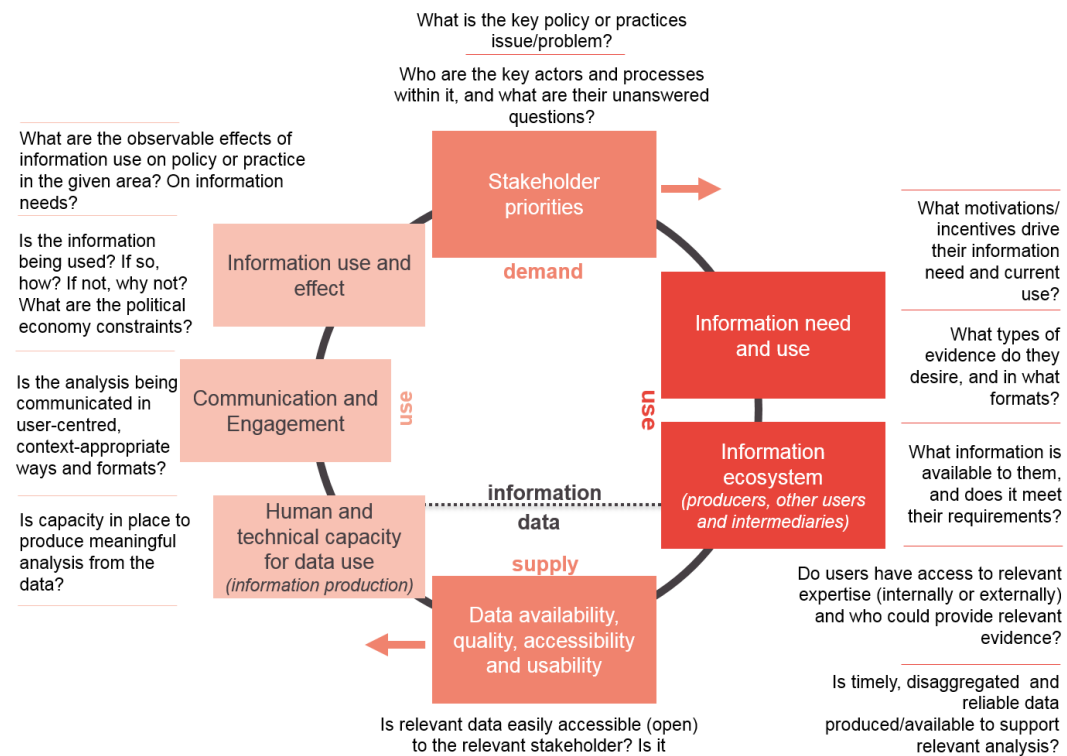
- What problem are you focused on?
- What impact are you aiming to have?
- What are the political dynamics and incentives around the problem?
- What processes are you supporting to address those dynamics and incentives?
- What role does data (and data about what) play in those processes?
- Who do you see as the users and what do you see as the uses of the data?
- How have potential users' been consulted about what data they would find useful?
- What's your approach to assessing impact?

Overall, there is no single best practice model for structuring data use interventions. InfoPower (2017) emphasises that information-related tactics aiming to empower particular users may not be effective across all contexts or even within the same context over time. Therefore, “long-term commitment, regular re-appraisal, and ongoing tactical adjustment” are necessary to maintain the relevance and effectiveness of projects”.

DI's data use operational framework

The operational framework introduced in Figure 6 translates the theory of change as articulated in DI's strategy into a practical guide for research, learning and project implementation. Addressing questions on both data and information use across the whole production–impact spectrum, the model allows for development and positioning of DI projects at particular points in the cycle. It is intended for use in research (to understand information needs and how they can be met) and projects (to increase information use in certain areas), and to guide evaluation and learning. Any DI intervention may cover one or more elements of this cycle. For example, recent DI research [on aid information needs in Nepal](#) explored the first half of the cycle. The [Uganda](#) and Kenya Development Data Audit efforts investigated in particular the 'Information Ecosystems' and 'Data Availability' questions and the 'Data Desks' aim to provide support along the whole chain (based on specific user requests).

Figure 6: DI Learning Framework for Data Use



Source: DI

Based on the literature reviewed here, the framework appears to have a good balance between supply and demand constraints. It incorporates technical factors as well as contextual ones such as political economy and behavioural constraints.

A key change we have made while developing this paper is to incorporate the evaluation of the relationship between decision-makers and other intermediaries in the particular country or institutional setting, to understand our position better and decide on the type and level of engagement we are looking to have.

Less emphasis is currently put in DI's framework, compared with others, on the behavioural, institutional and relationship aspects of specific policymaking processes. An evaluation of these constraints, along with a broader assessment of the factors affecting decision-making in the particular context (e.g. culture and values) could add an important dimension.

Finally, the framework should be continuously updated and improved to reflect the lessons learned from DI's project work and the changing data use landscape.

Conclusion

There is a clear consensus among researchers and practitioners on the importance of investigating a wide range of contextual, human and technical factors when analysing and implementing interventions aimed at increasing the use of evidence in decision-making.

As this is a growing area of research and experimentation, learning from the practical use of the operational model across different data use projects will be important both internally and together with partners.

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