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Working Paper 142

**Enablers, Barriers and Impacts of  
Digital Financial Services: Insights from  
an Evidence Gap Map and Implications for  
Taxation**

Philip Mader, Maren Duvendack and Adrienne Lees, with Aurelie Larquemin and Keir Macdonald

June 2022

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# **Enablers, Barriers and Impacts of Digital Financial Services: Insights from an Evidence Gap Map and Implications for Taxation**

Philip Mader, Maren Duvendack and Adrienne Lees, with Aurelie Larquemin and Keir Macdonald

## **Summary**

Digital financial services (DFS) have expanded rapidly over the last decade, particularly in sub-Saharan Africa. They have been accompanied by claims that they can alleviate poverty, empower women, help businesses grow, and improve macroeconomic outcomes and government effectiveness. As they have become more widespread, some controversy has arisen as governments have identified DFS revenues and profits as potential sources of tax revenue. Evidence-based policy in relation to taxing DFS requires an understanding of the enablers and barriers (preconditions) of DFS, as well as the impacts of DFS.

This report aims to present insights from an Evidence Gap Map (EGM) on the enablers and barriers, and subsequent impacts, of DFS, including any research related to taxation. An EGM serves to clearly identify the gaps in the evidence base in a visually intuitive way, allowing researchers to address these gaps. This can help to shape future research agendas.

Our EGM draws on elements from the systematic review methodology. We develop a transparent set of inclusion criteria and comprehensive search strategy to identify relevant studies, and assess the confidence we can place in their causal findings. An extensive search initially identified 389 studies, 205 of which met the inclusion criteria and were assessed based on criteria of cogency, transparency and credibility. We categorised 40 studies as high confidence, 97 as medium confidence, and 68 as low confidence.

We find that the evidence base is still relatively thin, but growing rapidly. The high-confidence evidence base is dominated by quantitative approaches, especially experimental study designs. The geographical focus of many studies is East Africa. The dominant DFS intervention studied is mobile money. The majority of studies focus on DFS usage for payments and transfers; fewer studies focus on savings, very few on credit, and none on insurance. The strongest evidence base on enablers and barriers relates to how user attributes and industry structure affect DFS. Little is known about how policy and politics, including taxation, and macroeconomic and social factors, affect DFS. The evidence base on impacts is strongest at the individual and household level, and partly covers the business level. The impact of DFS on the macroeconomy, and the meso level of industry and government, is very limited. We find no high-confidence evidence on the role of taxation.

We need more higher quality evidence on a variety of topics. This should particularly look at enablers, constraints and impacts, including the role of taxation, beyond the individual and household level. Research going forward should cover more geographic areas and a wider range of purposes DFS can serve (use cases), including savings, and particularly credit. More methodological variety should be encouraged – experiments can be useful, but are not the best method for all research questions.

**Keywords:** digital financial services; mobile money; taxation; evidence gap map; sub-Saharan Africa.

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## Acronyms

B2B	Business-to-business
B2P	Business-to-person
C2G	Citizen-to-government
DFS	Digital financial service(s)
EGM	Evidence gap map
EPPI-Centre	Evidence for Policy and Practice Information and Co-ordinating Centre
FSP	Financial service provider
G2C	Government-to-citizen
HIC	High-income country
KYC	Know-your-customer
LMIC	Low- and middle-income country
MSME	Micro-, small- or medium-sized enterprise
MTO	Money transfer operator
OTC	Over-the-counter
P2B	Person-to-business
P2P	Person-to-person
PI	Principal investigator
RA	Research assistant
RCT	Randomised controlled trial
ToC	Theory of Change



# 1 Background

## 1.1 Purpose and scope of the evidence gap map (EGM)

Digital financial services (DFS), including mobile money, have expanded rapidly in low- and middle-income countries (LMICs) over the past decade, particularly in sub-Saharan Africa. Development donors see DFS as a breakthrough technology for financial inclusion, with mobile phone-enabled services in particular offering ‘unprecedented opportunities to reduce the number of adults without an account and to help those who have one to use it more often’ (Demirgüç-Kunt et al. 2020: S4).

As DFS have become more widespread, governments, particularly in sub-Saharan Africa, have increasingly identified DFS payments and providers’ revenues and profits as potentially substantial sources of tax revenue (Mullins et al. 2020). Some taxation initiatives have proven politically controversial (Lees and Akol 2021), with critics raising concerns that they may undermine financial inclusion and its suggested benefits for poor people (Clifford 2020; Ndung’u 2019). These debates (which led to the creation of the DIGITAX programme, which supported this research) lend further urgency to understanding the impact of DFS and what enables them, including what role taxes may play as enablers or barriers to the access, uptake and usage of DFS.<sup>1</sup>

Given the rapid expansion of DFS and the hopes placed in them, there is a need to better understand what enables or constrains DFS usage, and the impact of DFS. As DFS have risen to the fore, research on enablers and barriers, as well as the subsequent impacts of DFS, has yielded a large volume of publications. While the potential of DFS to facilitate financial inclusion is not disputed, the claim that financial inclusion has transformative effects on people’s well-being can be harder to validate due to the contested evidence base (Duvendack and Mader 2019, 2020).

## 1.2 Why it is important to develop the EGM

It is timely to synthesise the evidence to better inform policy decision-making processes in relation to DFS and taxation. The number of new studies on DFS has approximately doubled every year since 2016, as shown in Figure 4. These studies are of varying quality and focus on different areas – different types of DFS (often focusing on mobile payments), target groups and geographical spaces. The full extent of the existing evidence base is not generally known to researchers, industry bodies or policymakers.

There is growing controversy about taxation of DFS. Evidence is needed on: (i) the role of taxation as an enabler or barrier to the uptake and usage of DFS; and (ii) the potential impacts that might be at risk. If increased taxation were to adversely affect uptake and use, understanding these factors would be critical for designing tax policy in a way that encourages better DFS to be brought to the market and taken up by users.

We adopt an evidence gap map (EGM) approach. This allows results found within the evidence base to be shown in a way that clarifies areas where there is stronger or weaker evidence, as well as where there are gaps in the evidence base. EGMs, systematic reviews and related synthesis products have become important tools for evidence-informed policymaking (Snilstveit et al. 2016). Mapping the evidence base is an important first step for

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<sup>1</sup> DIGITAX is a research programme at the International Centre for Tax and Development (ICTD), funded by the Bill and Melinda Gates Foundation, <https://www.ictd.ac/programme/digitax/>.

more in-depth synthesis, for instance via systematic review. Gough et al. summarise the value of an evidence map, highlighting its value as an orientation tool for more focused subsequent research:

The studies contained within a research field may be too numerous or heterogeneous for meaningful synthesis; it might be methodologically too difficult or just take too much time. The map provides an opportunity to select a sub-group of studies for synthesis. This can involve undertaking a single synthesis based on a narrowed review question and set of inclusion criteria; or undertaking a series of syntheses... Syntheses can also be restricted to studies employing specific research methods.  
(Gough et al. 2013: 16)

They further argue that maps are intrinsically useful: 'Systematic maps of research fields can also highlight gaps in research. [They] can be used to compare policy and practice on the ground with what has been studied in research; they may reveal that only a specific sub-set of policy and/or practice has been studied' (Gough et al. 2013). We explain our methodological approach in more depth in section 3.

### **1.3 Existing EGMs and/or relevant systematic reviews**

To our knowledge, there is only one EGM on digital financial services to date. This focuses mainly on the impact of mobile money and payments interventions on individuals, households or communities (Partnership for Finance in a Digital Africa (PFDA) 2017).<sup>2</sup> This EGM finds mixed results, suggesting the evidence base on DFS is still thin. In addition, no systematic review exists on the topic of DFS or mobile money, as indicated by the review of financial inclusion impacts published by Duvendack and Mader (2019, 2020). Our map goes further than the PFDA EGM. We include research on the impact of mobile money and mobile banking payments, as well as savings, insurance and credit products (the wider DFS landscape), and add a new layer by assessing the enablers of and/or barriers to DFS usage. We include research on what enables or constrains access, uptake and usage of the services that may generate subsequent impacts. Our EGM hopes to inform the policy debate on taxation of DFS – this will benefit from a clearer understanding of how taxes could enable or hinder DFS, and how taxes or tax revenues could potentially affect the impact of DFS.

### **1.4 Overview**

We provide a theoretical framework in section 2 – this clarifies the potential enablers, barriers and impacts of DFS, which provide the parameters for the EGMs. In section 3 we present our methodological approach, and explain how EGMs work as powerful and systematic tools for assessing a diverse evidence base. Section 4 describes the evidence base we found, including the publication trends over time, its geographical and methodological scope, and its quality. Finally, section 5 presents eight EGMs that reveal where evidence is stronger, weaker or absent for the different enablers and barriers of DFS, and the impact of DFS. Section 6 concludes with a summary of our findings on where there is evidence or gaps, notes potential findings from adjacent literature that was not part of the EGMs, and highlights implications for policy and research.

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<sup>2</sup> See <https://egm.financedigitalafrica.org/>.

## 2 Theoretical foundations

A full understanding of the potential enablers and barriers of DFS and their potential impacts, including the effect of taxation, requires understanding a set of causal linkages. The connections between an intervention, its enabling factors, and its ultimate outcomes are often mapped out in a Theory of Change (ToC). A ToC serves to clarify how ‘the intervention is expected to have its intended impact’ (White 2009: 274) by schematically explaining the cause-and-effect links in question. A good ToC also helps to distinguish more proximate immediate effects from more distal transformative effects. It does so theoretically, regardless of whether any evidence exists for particular causal connections, in order to inform a search for evidence.

We use an expanded ToC, in the sense that it includes the preconditions for the intervention itself – the enablers and barriers of DFS. We consider four sets of issues, shown in Figure 1:

1. The factors that act as enablers or barriers (preconditions) for people’s access, uptake and usage of DFS (including taxation as a factor).
2. The different types of DFS that users may have access to, take up, and use.
3. The different purposes these DFS can serve, or ‘use cases’.
4. The more proximate outcomes and more distal/transformative impacts that the use of DFS may have on users and the wider economy and society they live in (including taxation as an outcome).

These provide the parameters for the evidence maps that we present in section 5. Our aim is to collate the evidence on which factors enable or constrain DFS access/uptake/usage (1→2) and how this leads to different impacts (2→4). In doing so, where possible, we distinguish enablers/barriers of different use cases of DFS (1→3) and impacts of different use cases (3→4).

### 2.1 Enablers and barriers

A ToC classically maps out the expected impact of an intervention, and often identifies factors that could affect the likelihood or expected magnitude of impact. These factors are often referred to as enablers or barriers (of the impact). Our expanded ToC, however, looks at enablers and barriers in a different sense – as preconditions for DFS being accessed, taken up and subsequently used. These enablers and barriers are shown in column 1 in Figure 1.

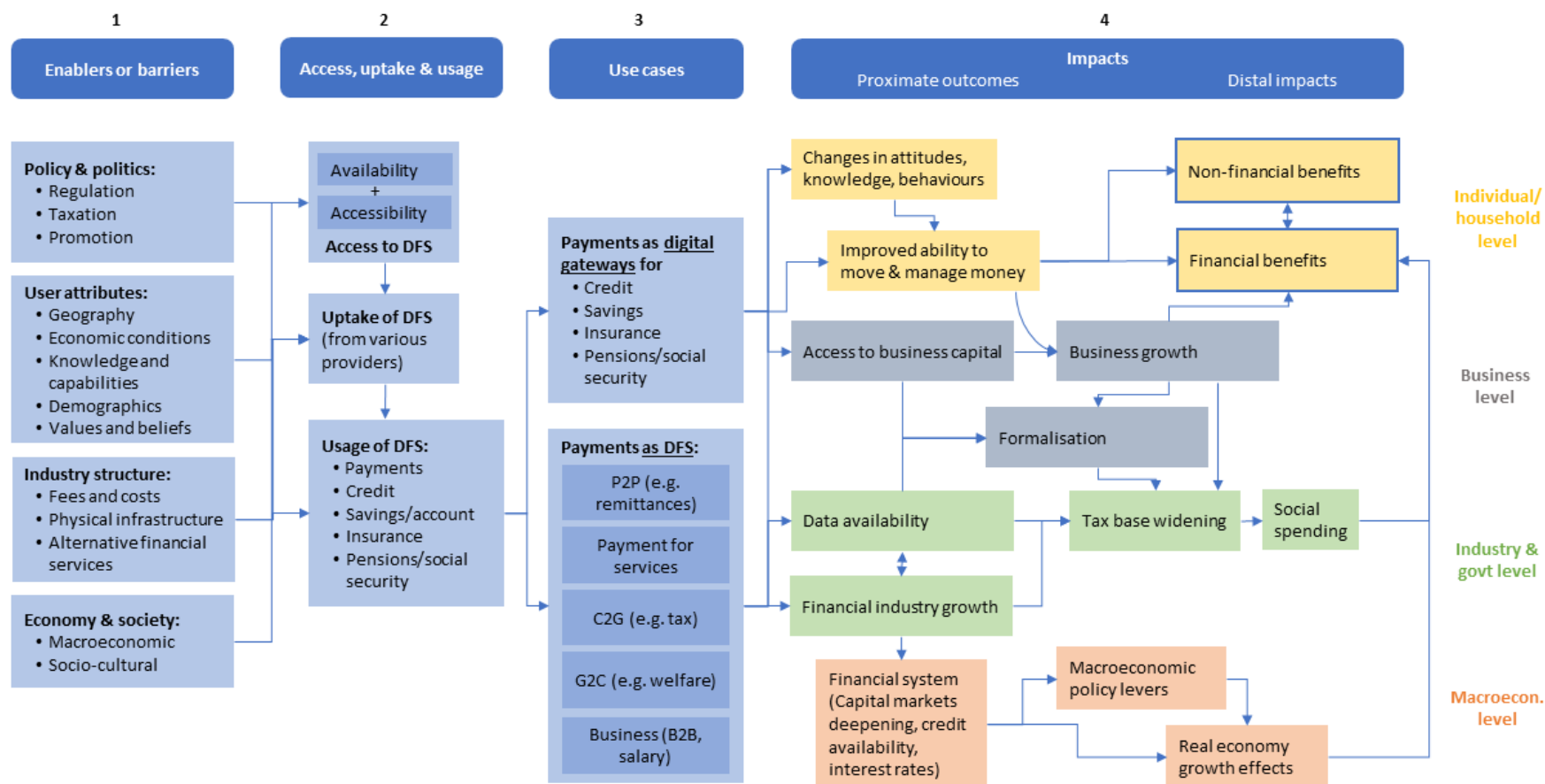
A variety of factors may shape when, where, by whom and for what DFS are accessed, taken up and used.<sup>3</sup> These range from relatively structural and exogenous (economic, political and cultural) conditions, to matters of policy design that may be influenced more directly. We distinguish four sets of factors that may theoretically enable or constrain DFS:

- policy/politics;
- user attributes;
- industry structure; and
- wider macro-structural factors.

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<sup>3</sup> A comprehensive list would be very extensive, including issues such as global investor confidence or the pace of technological innovation. Only more proximate supply-side factors, which may realistically determine provision in a single national jurisdiction, are considered in this ToC.

**Figure 1 Expanded Theory of Change, from enablers and barriers of DFS to subsequent impacts**



Note. This was partly inspired by the comprehensive Theory of Change for financial inclusion developed in Duvendack and Mader (2018, 2020), which was rooted in a broad review of literature on financial inclusion and development. The focus on DFS, however, means this Theory of Change is based on preliminary thinking, and ideally it will be tested by appropriate empirical work. P2P person-to-person; C2G citizen-to-government; G2C government-to-citizen, G2C government-to-citizen, B2B business-to-business.

These enablers and barriers form part of our inclusion criteria, which we discuss in section 3. If a publication meaningfully reports on how any of these enable or constrain DFS (as preconditions to access, uptake or usage), we include it in our pool of evidence.

### **2.1.1 Policy/politics**

The political system and policy choices of governmental bodies (and other policy-relevant actors, such as international organisations or sectoral bodies) can affect DFS usage via the regulation, taxation and promotion of DFS:

- How DFS actors are regulated may affect how many and what kind of providers are active and to whom they deliver services. Conditions, such as reporting requirements or particular licences, may act as barriers if they raise operating costs or introduce bias towards particular types of providers (Natile 2020).<sup>4</sup> Regulations may be enablers if they simplify processes and regulate proportionally to risk. Regulation can introduce uncertainty, or increase trust when it sets clear rules.
- Taxes on DFS can be raised in different ways (e.g. taxing transfer volumes, provider revenues, or profits), or on related services and inputs (e.g. airtime or handset imports). In most cases, a tax will raise the cost to the DFS provider, the user or both (Ndung'u 2019), though different providers and users may be taxed differently and may be more or less sensitive to the same tax. If comparable taxes are raised on related services (e.g. traditional banking services), it will affect whether there are distortions or substitution effects (Ndulu et al. 2021). Taxes can also shape perceptions and sentiments – for instance, if they portray the reason for DFS taxation more negatively, like a 'sin tax', or more positively, as financing rural inclusion.<sup>5</sup> Similarly, tax measures can affect the market development of DFS – a supportive tax policy might encourage greater private sector investment. Finally, concern about visibility to the tax authorities may affect willingness to adopt or use DFS – especially among small businesses concerned that more data on their purchase and sales history will adversely affect their tax situation.
- Governments and other policy actors can undertake various activities to promote DFS, potentially using funds raised through DFS taxation (Lashitew et al. 2019). They can promote connectivity and infrastructure, provide positive incentives or subsidies to would-be users, or undertake activities that advertise or endorse DFS. They can also push people to use DFS by making an account necessary for accessing services or benefits, requiring taxes to be paid digitally, or disincentivising other payment infrastructures, such as cash (BTCA 2015; Daya and Mader 2018).

### **2.1.2 User attributes**

There are three objective factors of the user population that may enable or constrain DFS usage (geography, users' economic conditions, users' knowledge and capabilities), one semi-subjective factor (demographics), and one subjective factor (users' values and beliefs):

- People living in rural and sparsely populated areas are less likely to be served by infrastructure, and more likely to spend more time and money accessing and using DFS. They may also have fewer opportunities/reasons to use DFS.
- Users' economic status, livelihood and household economic activities may predispose them to use or not use DFS (Dalton et al. 2018). For instance, a market trader or the dependants of an economic migrant are more likely to need payments services than a

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<sup>4</sup> This may include having to have a banking licence, or a licence to be an e-money issuer or a payment company.

<sup>5</sup> An example of this contrast is the Ugandan social media tax (Lees and Akol 2021), compared to the Ivorian rural connectivity surcharge (Clifford 2020).

self-reliant herder or an informal wage-earner. Potential users may also have or lack the economic resources that would allow them benefit from DFS, such as a mobile handset or enough money to make a savings account worth using. Users' economic conditions are also likely to affect how they respond to different forms of taxation.

- Users' knowledge and capabilities are sometimes, simplistically, reduced to 'financial literacy' (Aziz and Naima 2021). However, the main enablers or barriers here are the users' different levels of awareness of particular DFS and their capacity to use them effectively. Some users may lack the literacy and numeracy skills required to perform basic transactions via a digital interface.
- Demographic characteristics, including age, gender, ethnicity and other (intersecting) facets of identity, may objectively facilitate/prevent, as well as subjectively predispose/disincline users to/from using DFS (Lee et al. 2021; Murendo et al. 2018). For example, in some circumstances gender roles or ethnic identities may make it objectively more difficult for women or minority groups to access DFS, even when DFS are available. More subjectively, potential users may be more or less likely to take up DFS depending on social attitudes to DFS, for instance as 'something young people use' or 'for men'.
- Users, and potential users, as well as people around them, will have their own individual values and beliefs, such as more/less confidence and trust in technology or financial service providers (FSPs), or to like or dislike using cash (Cruces et al. 2020). People have perceptions of their own wealth and needs ('I'm not rich enough to need these products'), about the ease of using DFS, and about FSPs/DFS as aspirational (Allen et al. 2016).

### **2.1.3 Industry structure**

The way the financial sector, including the DFS industry, makes services available will help or constrain different users to access, take up and use DFS. Two factors concern DFS specifically (fees and costs, and physical infrastructure), and the relationship of DFS to the wider financial system (alternative financial services):

- The level and design of one-off and continuous costs of uptake and usage are important, as they may be barriers to uptake. Costs may include direct charges (e.g. transaction charges, opening fees, monthly fees, interest charges and penalties) or indirect ones (e.g. the cost of a compatible handset or data/airtime bundles). Minimum balance requirements or illiquidity provisions (e.g. savings lock-in periods) may also be seen as costs. Taxes that target DFS might discourage market development, and, when passed on to the user, raise prices and discourage use. When applied on DFS fees, which are usually structured to be proportionally more expensive for lower transaction values, taxes might have a regressive effect, imposing a disproportionate burden on lower-income groups.
- DFS (unlike cash) require mobile network and/or internet connectivity, as well as power supply for end-user devices. Proximity to a DFS agent/branch/point-of-service enables initial access and supports users in various transactions, including airtime purchases and cash-in/-out operations.
- Potential users already having access to other FSPs, like traditional banks, postal savings systems, financial co-operatives, or well-functioning community-managed FSPs, may become a barrier to DFS usage. Existing access to formal financial services may, however, also be an enabler, as users gain experience with financial services. Costs and other constraints to moving money between different DFS and other FSPs (interoperability) may hinder people adopting DFS.

### **2.1.4 Economy and society**

Two sets of macro-structural factors may enable or constrain DFS usage – macroeconomic and socio-cultural factors. These may become visible at the individual user level (as economic conditions, values and beliefs), but are analytically best seen as separate enablers or barriers, as to address them requires action at higher levels.

- The wider economy creates opportunities, risks and shocks that may enable or constrain DFS usage. Business or job opportunities may affect the demand for loans, payment or savings services; monetary stability (inflation, exchange rates) may affect savings patterns or remittance flows; past experiences of macroeconomic shocks may affect savings propensities or the uptake of particular types of insurance.
- Societal beliefs and cultural tendencies that go beyond individuals' values and perceptions – for instance, relative technophilia/technophobia, widespread customary monetary practices (e.g. saving in gold), or religious proscription of credit – are likely to enable or constrain uptake and usage of particular DFS. Societal discourses, such as positive narratives around mobile money being 'the future' or negative narratives like mobile phone usage 'corrupting the youth' (in Uganda, see Lees and Akol 2021), can also shape DFS usage.

## **2.2 Access, uptake and usage**

Conceptually, it is important to distinguish usage of DFS from what needs to come first. DFS must first be made available (provided) and be accessible (usable and understandable), in order for users to take up DFS and then continue to use them:

*availability + accessibility = access → uptake → usage.*

The distinction is important, because the factors that affect access, uptake and usage may be different. For instance, even when savings accounts are available and accessible (people have access), as with zero-fees accounts offered in countries like India, often many more accounts are opened than are subsequently used regularly.<sup>6</sup> The importance of costs may vary, as users may, for example, take up an initially free service, but may not continue if they find the costs of subsequent usage too high. Similarly, requirements for identification documents may constrain initial access and uptake more than subsequent usage (when the documents are no longer required).

Although these distinctions are important in theory and practice, research on DFS often does not always take them into account. Reflecting this, and for ease of reading, in the rest of this paper we only speak of usage unless the distinction is necessary.

## **2.3 Use cases**

There are different types of DFS, and they can be used for different things. Fundamentally all financial services involve payments, which can serve different purposes. We distinguish here between:

- i. where the movement of money between the user, DFS provider, and potentially a third party, is for a service like credit, savings, insurance or pensions/social security; and
- ii. where the movement of money (the payment itself) is the service.

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<sup>6</sup> Issues with extremely low balances and dormant accounts have surfaced in many publicly-sponsored financial inclusion interventions - see Daya and Mader (2018) for a discussion of India.

In the first scenario, a digitally-operating FSP may offer users access to credit, a savings account, insurance products (health, crop, asset or life insurance), or the ability to pay into pensions or social security schemes.<sup>7</sup> In these cases, loan disbursements and repayments, insurance premiums and payouts, or moving money into a pension fund and receiving a pension payment, are all payments that are essentially just part of another financial service. In these cases, we may think of the digital payment as a digital gateway to the service.

In the second scenario, the service is the payment itself – the movement of money. This type of service has become the mainstay of DFS expansion in LMICs.<sup>8</sup> Payments may be based on having an account (e.g. a mobile wallet, which allows money to be stored as well as sent digitally), or the service can be stand-alone – an over-the-counter (OTC), payment. The possible uses of payments-as-DFS are often categorised by who is making and receiving the payment:

- Person-to-person (P2P) digital payments between private individuals serve purposes as diverse as the users themselves. P2P payments from income-earners to physically distant dependents are called domestic (usually urban-to-rural) or international (usually higher- to lower-income country) remittances.
- Individual persons may pay businesses (P2B) – such as companies or public/private service-providers – for things such as domestic utilities, rent, school fees or goods delivered.
- In citizen-to-government (C2G) digital payments, individuals may use DFS to pay taxes to the government, or pay fees or charges for services, licences and fines.
- In turn, G2C digital payments are when governments pay citizens – using DFS, for instance, to deliver social payments, such as basic incomes and wage subsidies or tax reimbursements.
- Finally, businesses of various sizes may use DFS to pay digitally bills for goods or services from other businesses (B2B), or pay salaries or reimbursement for casual work (B2P).

In both scenarios, DFS can be provided by a range of different FSPs, including banks, mobile money operators (usually telecom firms), money transfer operators (MTOs, who usually focus on providing over-the-counter payments), fintech companies, or government-run platforms.

### **Mobile banking vs. mobile money**

We distinguish broadly between mobile banking and mobile money in our evidence base.

Mobile banking operates as an extension of traditional banking, requiring the user to have a bank account, but allowing account management and services via a banking app. A recent market development is banks without branches, where accounts are managed entirely online or through mobile apps. While these DFS providers are growing in popularity in high-income countries (HICs), they are less common in LMICs.

Mobile money does not require the user to have a traditional bank account. Partly as a result these services are usually more accessible, and have seen higher uptake among poorer

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<sup>7</sup> Relevant only in theory, and not likely in practice for low- and middle-income people in LMICs, are digitally-enabled investment services - e.g. access to equity capital for entrepreneurs, or the ability to buy shares or bonds as a form of savings.

<sup>8</sup> Although, notably, the first successful such service, M-PESA, was originally developed to facilitate loan repayments, and its usage as a person-to-person payment system was accidental (Hughes and Lonie 2007: 68).



people. A user can receive and make payments, deposit and withdraw cash, and store money solely using their mobile phone. Their mobile wallet is linked to their cell phone number.

## 2.4 Impacts of DFS usage

A primary reason for policymakers and non-commercial funders being very interested in DFS, and being concerned about the potential effects of taxation, is the expectation that DFS and financial services more broadly can have a positive effect of some economic or social significance (World Bank 2014), and may even have a transformative impact (Demirgüç-Kunt et al. 2018: 310). There are many possible effects on users and the wider economy and society that should be considered, with numerous channels of interaction and/or reinforcement. Some of the possible interactions are shown in Figure 1, and discussed by Duvendack and Mader (2018, 2019, 2020).

One way to break the effects down is by asking where, or at what level, they would be experienced and/or measured – the micro level of individuals/households, the micro level of individual businesses, the meso level of the financial industry and of government, and the macroeconomic level.

At the individual/household level, the effects could include:

- Changes in people's attitudes, financial knowledge and behaviour, including awareness of DFS, financial literacy, consumption pattern, planning, time preferences and other behaviour. All of these are lower-order, proximate outcomes (not particularly meaningful unless they lead to further outcomes).
- Improved ability to move and manage money – this refers to a person's ability to make or receive payments (e.g. paying for goods or receiving remittances), accumulate savings, or access loans and insurance cover. Improved money management might mean that people are better able to smooth their consumption over time, cope with financial and non-financial shocks, and have a higher household income in the short-term. One would want to see these lower-order outcomes translate into higher-order ones, such as improved health thanks to being able to pay for medical treatment, avoiding the emergency sale of assets, or enabling productive investments in education or income-generating activities.
- Various (higher-order) non-financial benefits, including improved employment (or self-employment) opportunities, improved access to services (health, education and other social services), and – for women – empowerment, through greater ability to leverage social networks, increased financial independence and enhanced intra-household bargaining power.
- Various (higher-order) financial benefits, including when DFS increase people's longer-term consumption capacity, their income over the longer-term (through labour or capital investment), and help them build assets. These benefits may also arise from growth in micro-, small- or medium-sized enterprises (MSMEs), through ownership/self-employment or wage labour. These financial benefits may translate into larger tax intake for the government.

At the business level the effects could include:

- Access for enterprises to business capital for investment, as well as other forms of moving money over time and space that an MSME might want to use.

- Improved business performance and growth, as a result of successful capital investment, access to a wider customer base (e.g. through online sales), and/or use of other forms of money movement. This may result in a larger tax intake.
- Business formalisation, including as a result of making business' financial flows more formal in order to obtain formal financial services, or due to business growth to a scale where formality makes business sense or cannot be avoided.

The industry and government/policy (meso) level is where the most tax-relevant impacts of DFS may be located.

DFS usage makes new digitally-collected data, especially payment data, available for analysis by industry and government:

- As DFS usage expands, the financial industry overall is likely to grow – and data collected may be used to accelerate its growth. Its growth can widen the tax base if governments tax FSPs.
- Data generated by DFS may be analysed by governments to expand the tax base (by using it directly to assess taxes), or used to push more MSMEs to formalise.<sup>9</sup>
- A larger tax intake may, in turn, be routed into social spending to bring benefits to households. The increased availability of data on citizens might also lead to more informed or better targeted social service provision.

At the level of the macroeconomy the effects may include:

- Deepening capital markets, if the resources of the financial industry are made available to borrowers. A deeper/larger financial sector can make credit more easily available in more sophisticated ways, and may charge lower interest. This might also have effects on the bond market and government borrowing.
- Macroeconomic policy levers being applied more effectively, particularly money supply, targeting inflation, and foreign exchange rates.
- Greater economic growth through more efficient capital allocation, risk allocation and more investment, which in turn could lead to financial benefits for individuals and households. It may, however, also lead to lower or more volatile economic growth, if larger financial sectors are more crisis-prone (Arcand et al. 2015).

## 3 Methods

### 3.1 Overall methodological approach

We adopt the EGM approach developed by 3ie (Snilstveit et al., 2016; 2017), which allows us to systematically search and screen relevant studies on taxing DFS. We map the studies meeting our inclusion criteria onto the framework of enablers and barriers, DFS product types, use cases, and potential impacts presented in section 2. We then present the results on where evidence on enablers and barriers of DFS or impacts of DFS is present/absent in the form of maps – graphical depictions of the evidence in a grid-like format. These are

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<sup>9</sup> Formalisation is often seen as crucial to widening the tax base, though the full effects of these policies have often shown disappointing and inequitable results (Gallien and Van den Boogaard 2021).

available online as interactive maps using the EPPI-Centre's EGM software.<sup>10</sup> Due to resource constraints, we focus on discussing the high-confidence evidence base, with only a cursory characterisation of the low- and medium-confidence evidence base. Ideally, we would have extracted more information on low- and medium-confidence studies to provide a more complete picture, as these studies may hold valuable information despite their confidence rating.

As for the limitations of the EGM approach itself – one could argue that distilling complex and specialised evidence into linear ToCs, drawing on narrow inclusion and exclusion criteria, favours evidence that falls within the positivist epistemological tradition. However, there is other evidence available that favours more interpretivist stances adopting largely qualitative methods (e.g. Neale 2021) to cover broader themes such as indebtedness and gender issues, which may be valuable areas of inquiry to better understand the enablers and or barriers of DFS (see Guérin 2014; Reboul et al. 2021). There is a risk that EGMs and related synthesis approaches become similar to randomised controlled trials (RCTs) in devaluing other forms of evidence that may turn out to be more appropriate to capture the full complexity of the enablers and barriers of DFS, and thus facilitate better policymaking (Mueller 2020). Having said that, EGMs are an invaluable tool for policymakers to obtain a thorough yet concise overview of a large and emerging evidence base.

### 3.2 Inclusion criteria

We follow Campbell Collaboration guidelines to define our inclusion and exclusion criteria adopting PICOS (Population – Intervention – Comparison – Outcomes – Study) designs. A study is included if it fulfils these criteria:

- Population. Our initial focus was on sub-Saharan Africa. Given the growing implementation of mobile money services in other developing regions, notably South Asia, we decided to include evidence from other regions. Therefore, the focus of this map is on studies of LMICs, using the World Bank's definition.<sup>11</sup>
- Intervention. We include studies that are relevant to DFS product types, including payments, savings, insurance or credit, whether they are offered through mobile money or mobile-enabled banking, if these studies present a causal argument about either the enablers/barriers of DFS usage or DFS impacts (or both), as laid out in the Theory of Change in section 2, specifically Figure 1.
- Comparison groups. We include all studies that meet our population and intervention criteria, irrespective of whether they used control or comparison groups as part of their study design.
- Outcomes. We include all studies that are relevant to the categories of our data extraction tool (see Appendix 2), based on the Theory of Change, irrespective of which outcomes they study. When in doubt, we are overly inclusive to capture any outcomes at the individual/household, business, industry and government/policy and macroeconomic level. Studies need to cover at least one of the DFS use cases (digitally enabled savings, insurance, credit or payments)<sup>12</sup>, and at least one of the causal linkages discussed in the theoretical foundations and depicted in Figure 1 (enablers/barriers or impacts) in order to be included.
- Study designs. We include quantitative, qualitative and mixed methods study designs.

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<sup>10</sup> For the high- and medium-confidence map see: [https://eppi.ioe.ac.uk/cms/Portals/35/Maps/IDS/EGM\\_both.html](https://eppi.ioe.ac.uk/cms/Portals/35/Maps/IDS/EGM_both.html). For the more detailed map on only high-confidence studies see: [https://eppi.ioe.ac.uk/cms/Portals/35/Maps/IDS/EGM\\_High\\_2.html](https://eppi.ioe.ac.uk/cms/Portals/35/Maps/IDS/EGM_High_2.html).

<sup>11</sup> World Bank country groups (<https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>), June 2021.

<sup>12</sup> Nothing was found on DFS for pensions and social security, and this was dropped from analysis.

Other criteria:

- We include articles from 2007 onwards, as this coincides with the inception of M-PESA in Kenya – this is widely noted as the first successful inclusive DFS in an LMIC. In the pilot stage of our search process, we discovered that the evidence base increased considerably from 2014 onwards. Kim et al. (2018) suggest that most articles on mobile financial services in developing countries (based on their definition of these terms) are after 2014. While piloting our search strategy we conducted a brief review of bibliographies from other relevant reviews, and confirmed that 2015 onwards yields the largest number of studies of mobile money and other digital financial inclusion tools (subsequently confirmed by our findings depicted in Figure 4). However, there are relevant studies prior to 2014 that may yield important insights, hence we include all studies from 2007 onwards.
- We include published and unpublished studies accessible through academic and institutional databases. These include refereed and non-refereed journal articles, conference papers, working papers, government, NGO and other technical reports, and policy briefs.<sup>13</sup> However, we exclude review articles and replication studies to avoid double-counting, as we capture the original studies (where they meet our inclusion criteria and are relevant) discussed in these articles. We also exclude Master's and PhD dissertations as well as conference proceedings, as these are often not available electronically as full texts. The financial and opportunity costs of obtaining hard copies of each of these publication types would be too high, and distract from the mapping of the other publication types.
- We only include studies published in English.

### 3.3 Search and screening strategy

The search process was inspired by guidance provided by the Campbell Collaboration. However, due to resource and time constraints, we could not search all the possible academic databases suggested by the Campbell Collaboration. The search was conducted in May 2021. Table 1 lists the databases searched. In addition to academic databases, we searched relevant institutional websites of key policy and promoter institutions related to financial inclusion. We developed a series of search terms unique to every database and website (see Appendix 1 for the generic search terms we adapted for each search engine), as was necessary because some search engines would only allow a limited number of Boolean operators. The search strings were piloted by checking if the search results would uncover a list of key studies previously identified as relevant.

The screening of the search results was conducted by our two research assistants (RAs) independently, with checking by the principal investigators (PIs) independently. Discrepancies were discussed and resolved by consensus. Results of the search and screening process are presented in the PRISMA diagram in section 4.1 (Figure 3).

To ensure that we captured all possible evidence in relation to our topic we cross-checked our list of screened studies with EconPapers, where we searched for the terms 'mobile money' and 'digital financial services' – restricting the search to publications from 2018 onwards to keep the search manageable.

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<sup>13</sup> We did not include newspaper or magazine articles, as their usefulness in literature reviews/EGMs/systematic reviews is disputed. These articles are usually written with a general audience in mind, and almost always involve a great deal of bias. Some newspapers are more reliable than others. It is not realistic to expect an EGM to trawl through newspaper articles, as there are thousands on the topic with limited value as evidence from a research perspective.

**Table 1 Databases and websites searched**

Academic	Institutional
Science Direct Web of Science Scopus	Accion Center for Financial Inclusion Consultative Group to Assist the Poor (CGAP) Center for Global Development Innovations for Poverty Action Abdul Latif Jameel Poverty Action Lab (J-PAL) Overseas Development Institute SEEP Network World Bank eLibrary Department for International Development (DFID) – Research4Development library 3ie Impact Evaluation repository and 3ie Registry for International Development Impact Evaluations World Bank Impact Evaluation Working Paper Series African Development Bank Asian Development Bank MIX Alliance for Financial Inclusion National Bureau for Economic Research Institute of Development Studies The Financial Access Initiative, New York University Wagner Institute for Money, Technology and Financial Inclusion (IMTFI)

### 3.4 Quality assessment

After completing the search and screening process, we assessed the quality of each study – the level of *confidence* we can have in the validity of a study in terms of its ability to make *causal* claims about DFS enablers/barriers or impacts in a way that is free from bias. If we classified a study as low confidence, this does not necessarily indicate it is low quality, but rather that we must have low confidence in any causal claims made by this study about DFS (e.g. it may be a primarily descriptive or normative publication, and hence has little to say about causality).

We used a process inspired by ITAD (2018) to assess study quality and arrive at a confidence grade. We adapted ITAD’s tool, and fleshed out our understanding of these criteria in relation to studies on DFS. The steps of the assessment process are shown graphically below in Figure 2 (the full assessment tool is in Appendix 3). We focused our assessment on three broad categories – cogency, transparency and credibility. A paper could be awarded an overall confidence grade of up to 6 (based on 2 points for cogency, 2 for transparency, and 2 for credibility):

A study would score 2 points for cogency if it met all three key dimensions:

- The study is causal: it reports on either what causes DFS to be used (the enablers/barriers), the impacts caused by DFS, or both.
- The study is theoretically grounded: the empirical relationship it examines is justified in the study with reference to theory.
- The study is convincing: the causal argument being made is clearly connected to the type of evidence and theory presented – it could logically follow.

If a study only partially met these dimensions, it would score 1 point. If the argument was not causal, or there were major gaps in the theoretical underpinning or logic of the argument, the study would score 0 points and not proceed to the next stage of quality assessment.

A study would score 2 points for transparency if it met all three key aspects in relation to how clearly and transparently it reported on:

- how data was collected;
- how the sampling was conducted; and
- how the data was analysed.

If only some methodological aspects were transparently described, the study would score 1 point. If a description of methodology was entirely missing, the study would score 0 points and not proceed to the next stage.

Credibility was the hardest criterion to assess, as it differs by study type (qualitative or quantitative). Our intention was to uncover where the literature found robust empirical evidence of the existence (or absence) of a particular enabler, barrier or impact, using a systematic and well-documented approach to data collection and analysis. We thus concentrate on studies that go beyond theorising or hypothesising about enablers, barriers or impacts. Our focus is on studies that test these theories, using strong (quantitative or qualitative) causal analysis, to confirm or reject a hypothesis.

For qualitative studies, we followed Lincoln and Guba (1985), as well as Guba and Lincoln (1989) as discussed by Nowell et al. (2017), and defined credibility across three dimensions. If all three dimensions were met, the study would score 2 points:

- transferability – the generalisability of findings, thanks to sufficient thick description to enable case-to-case transfer;
- dependability – a research process that is logical, traceable and clearly documented;
- confirmability – a clear description of how conclusions and interpretations were reached.

If these were only partially met, the study would score 1 point, and if none were met it would score 0 points.

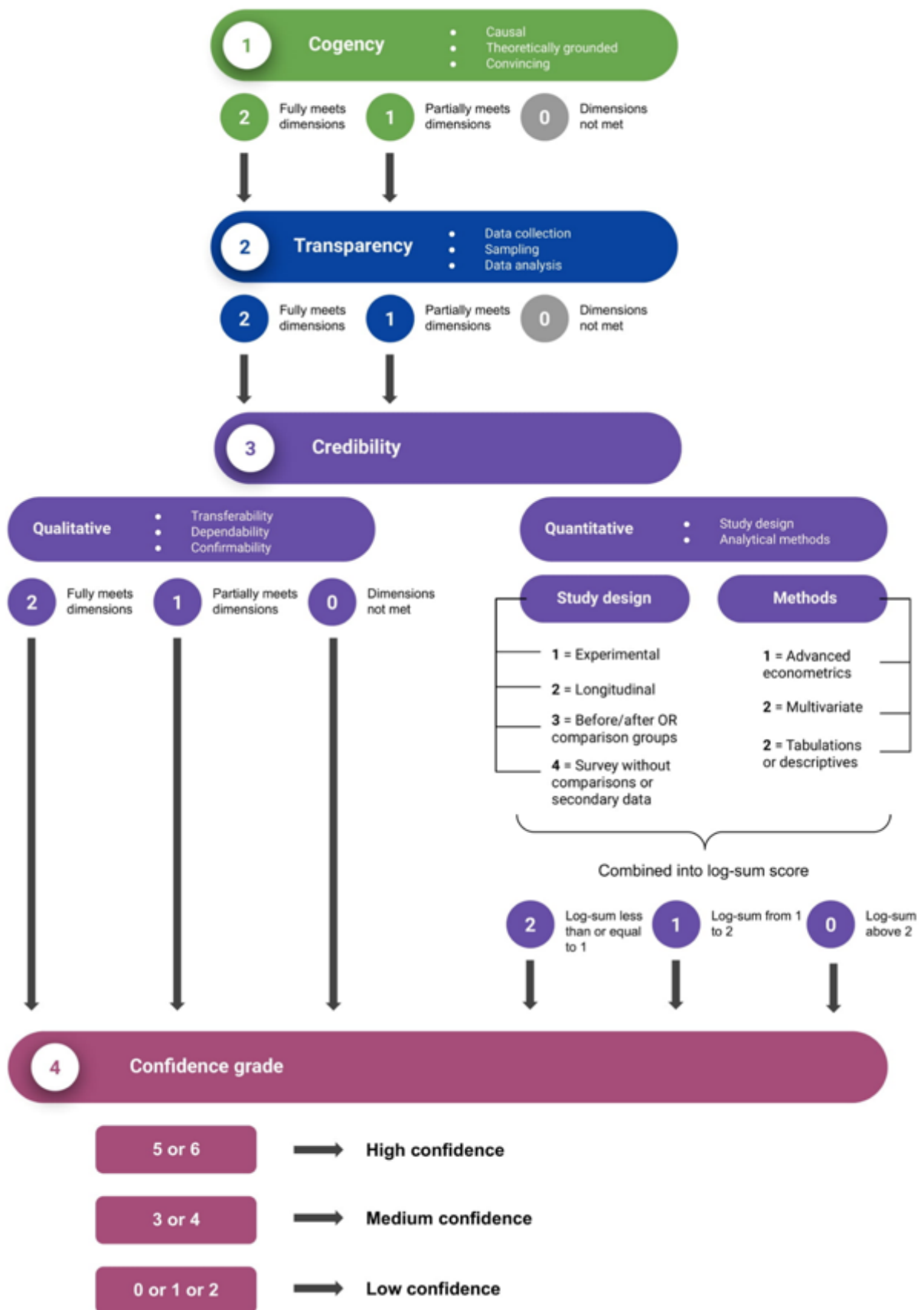
For quantitative studies, we used the tool developed by Duvendack et al. (2011), also used by Vaessen et al. (2014). Quantitative papers were evaluated on two metrics: study design and analytical methods. To combine these scores, we used a log-sum which, by construction, requires that 'better' methods score a lower number of points on each individual metric.

- In terms of study design, studies were rated 1 (the best possible score) if they use experimental methods (e.g. RCTs, lab-in-the-field experiments), 2 if they take a longitudinal approach (e.g. panel data or before-and-after using comparison groups), 3 if they use either before-and-after data or comparison groups, and 4 if they are based on surveys without comparison groups or on secondary data.
- In terms of analytical methods, studies were rated 1 (best) if they use advanced econometrics (instrumental variables, propensity score matching, difference-in-difference), 2 if they take a multivariate approach, and 3 if they rely on tabulations or simple descriptive statistics.

These ratings were then combined into a log-sum. We chose relatively arbitrary thresholds to generate an overall credibility score. Studies with a log-sum of 1 or below were given 2 points, studies with a log-sum between 1 and 2 were given 1 point, and studies with a log-sum higher than 2 were given 0 points.

Finally, the scores from the three criteria were combined into an overall confidence grade, where a study could be between 0 and maximum 6 (based on 2 for cogency, 2 for transparency, and 2 for credibility).

Figure 2 Quality assessment process



At this stage, we split the sample into three final confidence categories:

- papers graded 5 or 6 were labelled high confidence;
- papers graded 3 or 4 were labelled medium confidence; and
- papers graded 0, 1 or 2 were labelled low confidence.

All included studies were subjected to this appraisal process – this was led by our RAs, each screening a pre-allocated number of studies. Due to resource constraints we could not conduct this process independently, but introduced a quality checking procedure in the form of a flagging system. If one of the RAs was in doubt as to how to assess a study in relation to any of the three criteria this would be flagged, and one or both of the PIs would check the flagged study, discuss it and reach a consensus.

## 4 EGM findings

### 4.1 Search results

Figure 3 is a representation of the results of the search and screening process for the EGM. Academic and institutional repositories – grey literature – were searched, which led to the identification of 389 records. We excluded 69 records (including 4 duplicates) after rapid screening by the RAs, as they clearly did not meet the inclusion criteria of country/timeframe/relevance. When in doubt, studies remained in the study pool until the next screening stage.

This left us with 320 records. These were then screened double-blind by title and abstract by the PIs, using the inclusion criteria of country/timeframe/relevance. This led to the exclusion of a further 85 records, thus leaving us with a sample of 235 records meeting the inclusion criteria.

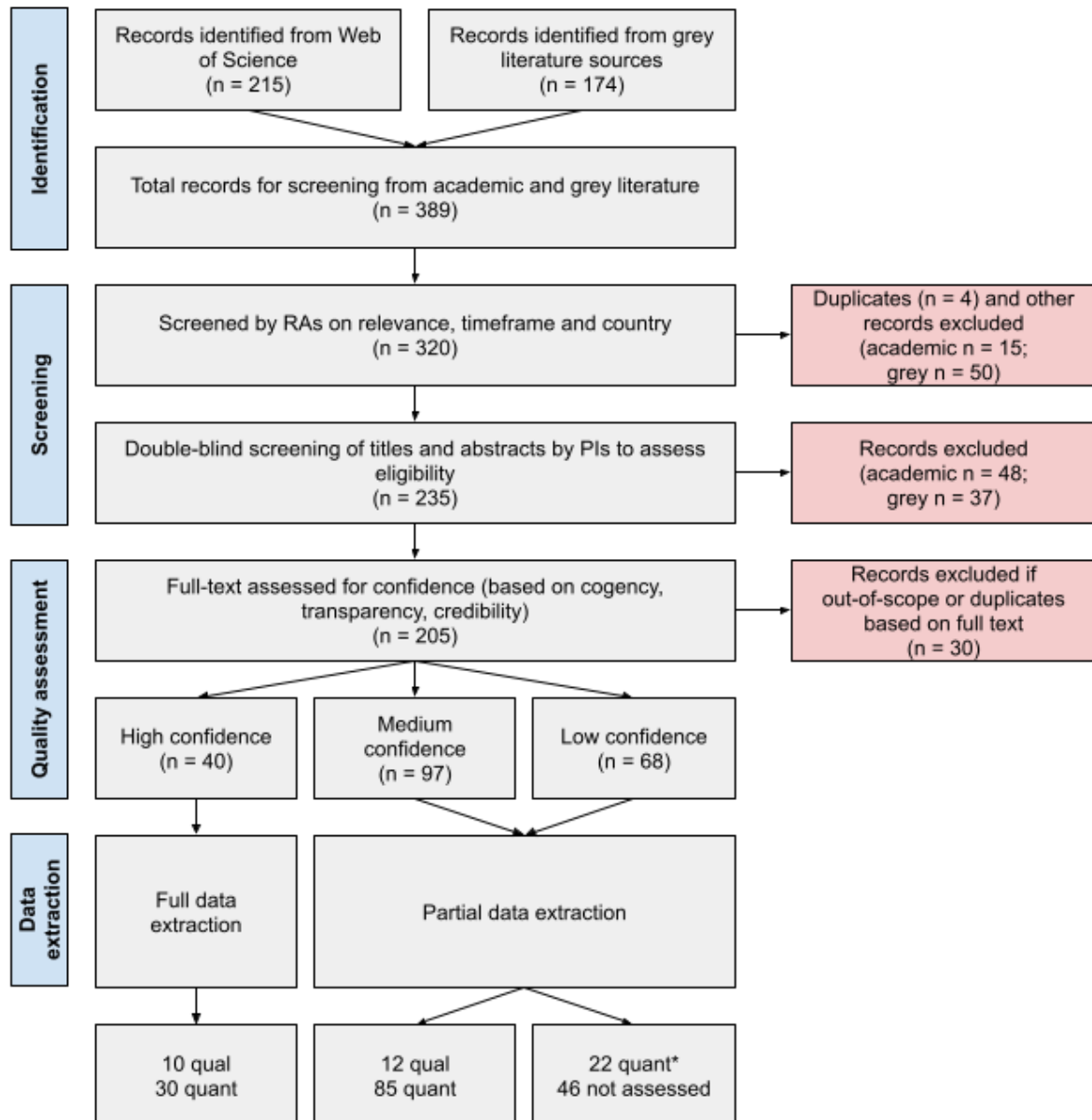
As a next step, all 235 records were screened to assess their quality. During the quality assessment, we uncovered a further 30 studies that were out of scope or duplicates, hence ultimately only 205 studies had to be screened for quality based on cogency, transparency and credibility (using the methods explained in section 3.4). Papers that passed both the cogency and transparency criteria were categorised as either quantitative or qualitative based on their main research methods, and subsequently assessed on the credibility criteria above.

As a result of this assessment, 40 studies were graded as high confidence (for which we extracted full, detailed data), 97 graded as medium confidence (for which we extracted basic data), and 68 graded as low confidence (for which we extracted only minimal data). Overall, we extracted data on 22 qualitative papers and 137 quantitative papers, as shown in the last stage of Figure 3.

The findings presented below focus on the sample of 40 high-confidence studies that were examined in depth. Brief descriptions of the medium and low-confidence studies are provided as appropriate.



**Figure 3 PRISMA flow diagram**



Note. Not all low-confidence studies were screened for methods. As described above, only studies that passed the cogency and transparency criteria were screened for credibility, which is the stage at which methods were assessed.

## 4.2 Characteristics of the evidence base

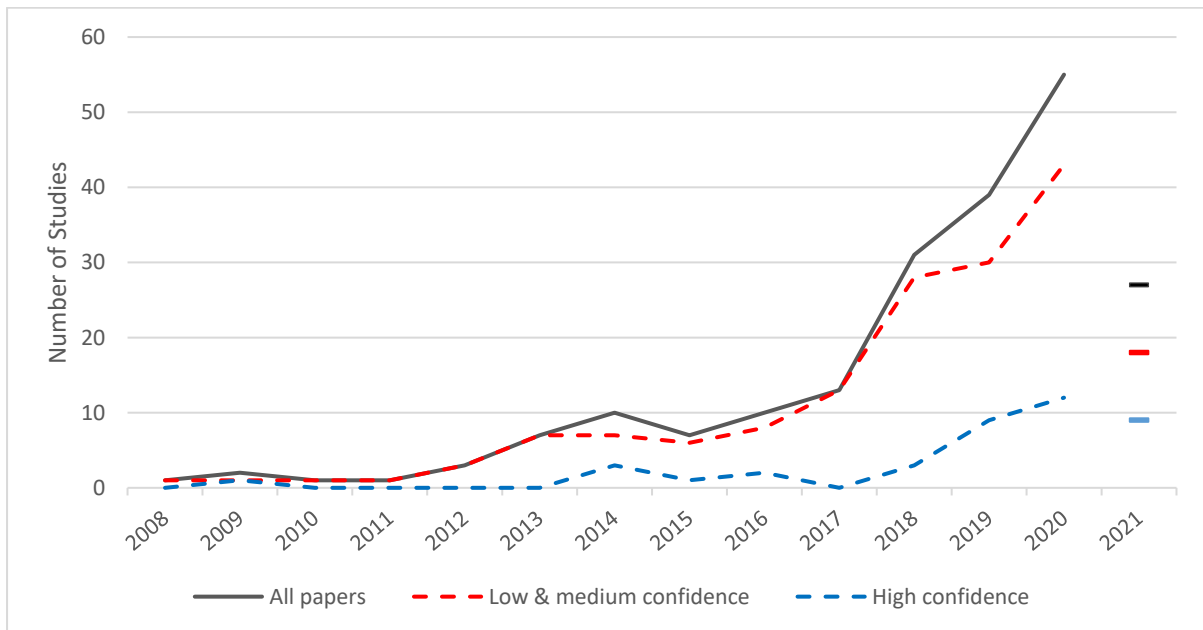
### 4.2.1 Publication trends over time

As outlined above, DFS have expanded rapidly over the last decade, and this is also clearly reflected in the growth of the evidence base. Figure 4 shows that the publication of DFS studies (across both academic and grey literature domains) has accelerated from 2016 onwards.

Notably, the number of studies categorised as low and medium confidence has grown faster than the number of high-confidence studies. One explanation for this could be that many of the high-confidence studies employ experimental designs (60 per cent, see Figure 8), which take time to implement, analyse and write up. The quantity of low- and medium-confidence research outputs in the rapidly growing pool of research outputs might make it harder for

policymakers and other stakeholders to discern the most relevant and meaningful evidence quickly.

**Figure 4 Number of DFS studies published by year**



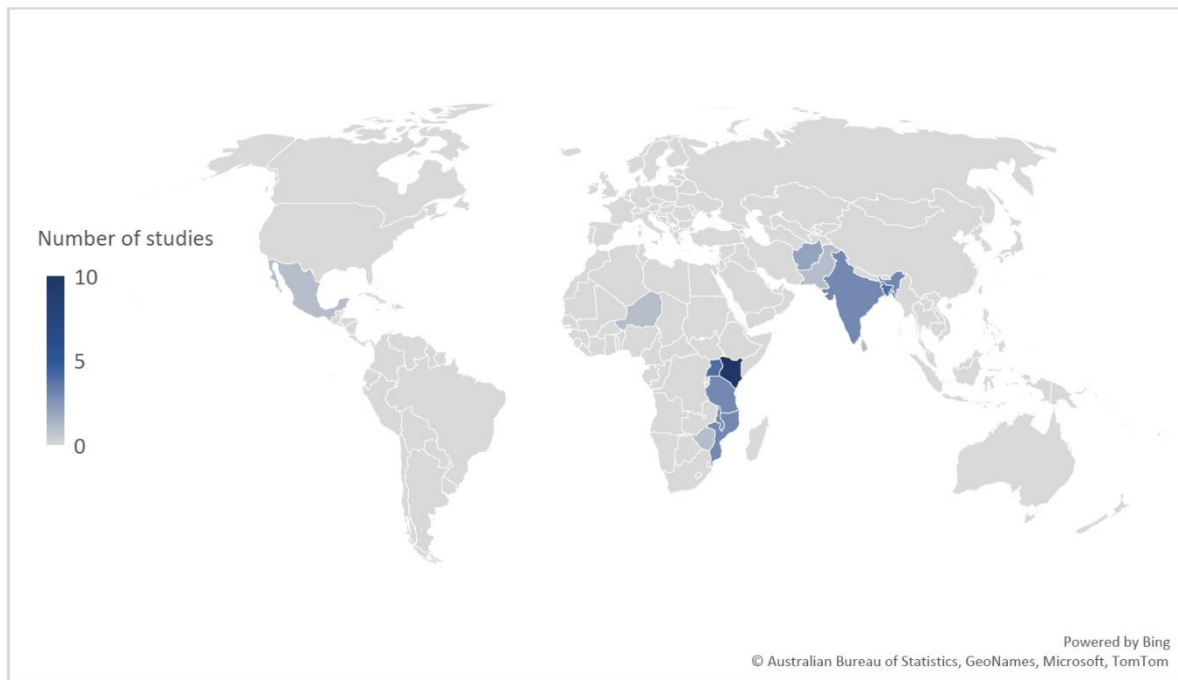
Note. The short horizontal lines for the year 2021 indicate the number of studies published in 2021 by the time we had completed our search in May 2021.

#### **4.2.2 Geographical scope of the evidence base**

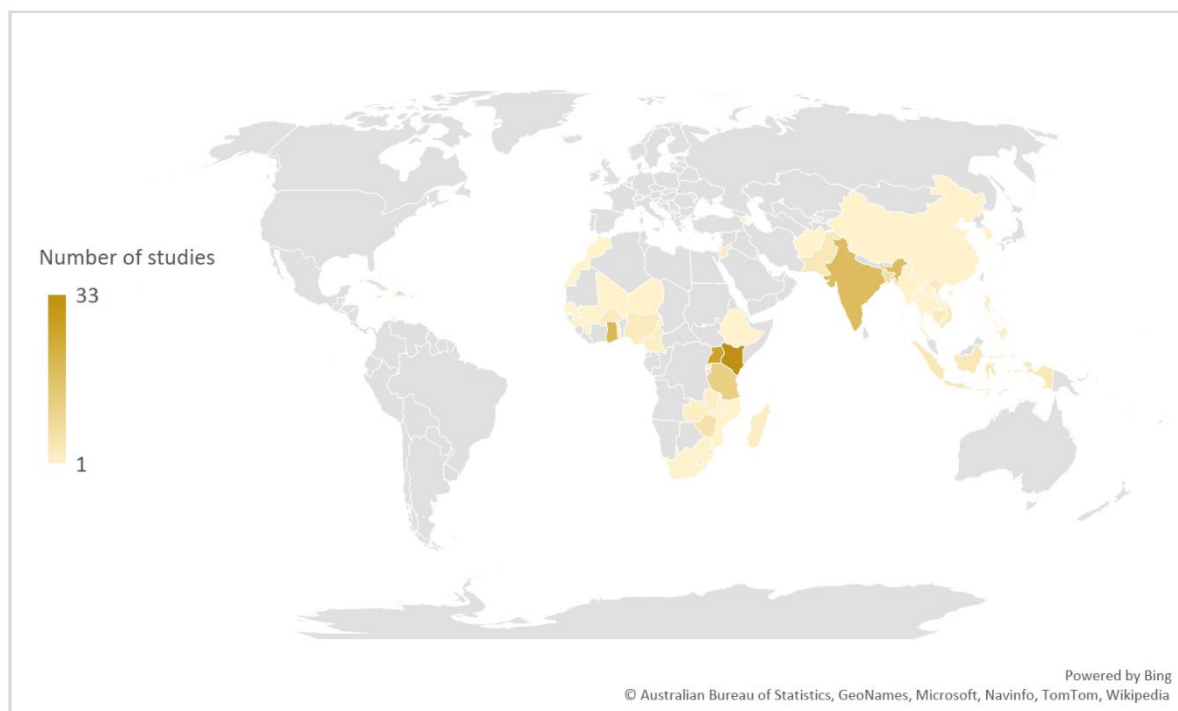
Not surprisingly, the evidence base is concentrated on sub-Saharan Africa. Figure 5 summarises the geographical scope of the high-confidence studies, showing their focus on East Africa. Most studies have focused on a few countries with high DFS penetration. Kenya was the subject of ten of the studies that had a geographical focus, and Uganda of four. Sub-Saharan Africa is closely followed by South Asia (Bangladesh four, India three studies).

The geographical spread among low- and medium-confidence studies is similar, as suggested by Figure 6. Kenya (33) and Uganda (26) again dominate in the 180 instances in which a geographical focus could be identified. This larger evidence base, unsurprisingly, covers a wider geographical range, both within sub-Saharan Africa (especially more countries in West Africa), and outside sub-Saharan Africa (covering some countries in South-East Asia).

**Figure 5 Geographical regions – high-confidence studies**



**Figure 6 Geographical regions – low- and medium-confidence studies**



#### **4.2.3 Methodological scope of the evidence base**

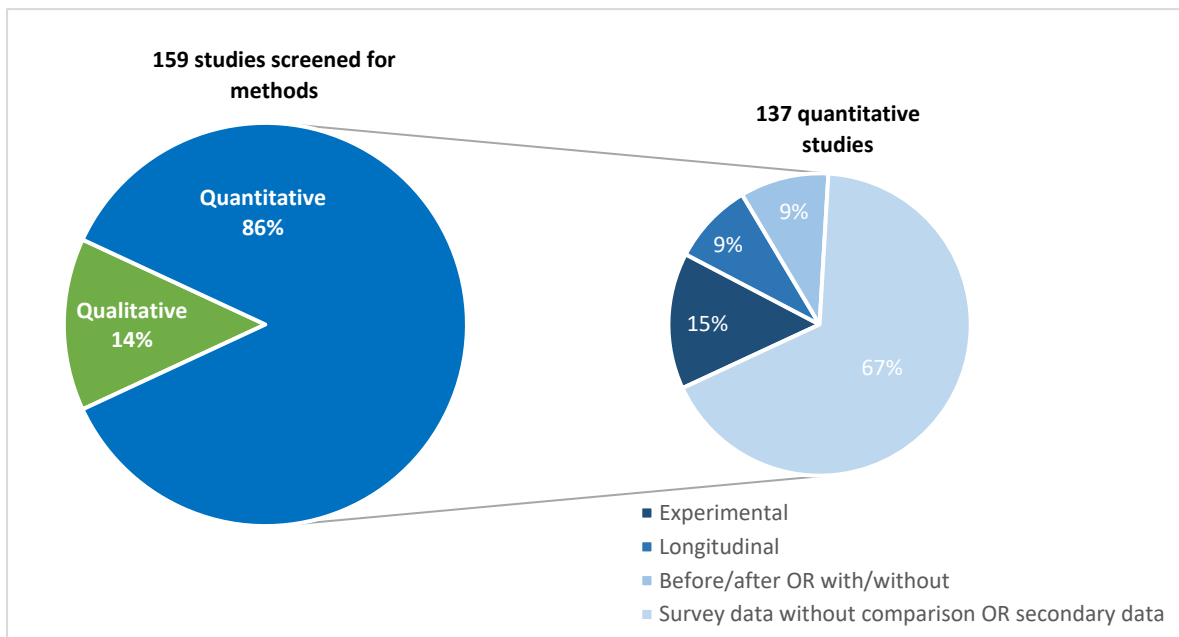
Examining the evidence base in terms of its methodology yields some interesting insights. Figure 7 indicates that 86 per cent of all studies which we assessed for credibility (after passing the hurdles of cogency and transparency) adopted quantitative methods. Only 14 per cent used qualitative methods.

Looking more closely at the quantitative evidence, we find:

- Only 15 per cent of the studies using quantitative methods adopted experimental designs, which in principle have the highest internal validity thanks to comparing the effects of an intervention on supposedly identical populations.
- 9 per cent of the quantitative studies employ longitudinal designs, which in principle may have relatively high internal validity thanks to comparing changes over time across populations with/without an intervention or service (access to a particular DFS), although the characteristics of those populations may differ in reality.
- A further 9 per cent make before-and-after comparisons or with-and-without comparisons (i.e. before DFS access or with/without DFS access).
- 67 per cent of quantitative studies use survey data without making any attempts to construct counter-factual scenarios in the form of with-and-without or before-and-after comparisons.

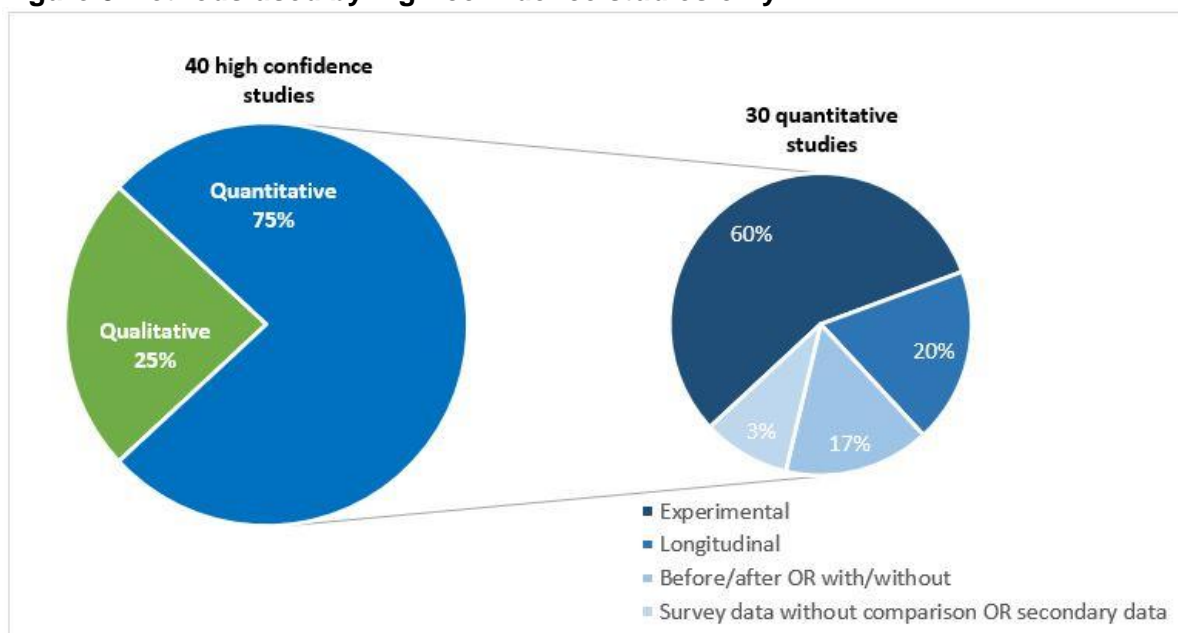
Looking at only the high-confidence studies shown in Figure 8, we find the split between quantitative and qualitative methods is not too dissimilar from the overall set of studies. However, among the high-confidence quantitative studies, the methods split is different. Experimental designs clearly dominate, with 60 per cent of quantitative studies conducting experiments, followed by 20 per cent adopting longitudinal designs, 17 per cent using before-and-after or with-and-without comparisons, and only one study (3 per cent) drawing on secondary data or survey data without any comparison group. This link between the chosen methodological approach and level of confidence placed in a study is not surprising, given that our ‘credibility’ criterion graded studies higher if they were experimental, in line with widespread claims about experimental studies being particularly rigorous (Banerjee and Duflo 2011; Duflo et al. 2007). Although we adopted this hierarchy in keeping with established practices, it is worth pointing out that claims about greater rigour are debatable, as convincingly argued by high-profile scholars such as Deaton (2010), Deaton and Cartwright (2018), Pearl (2018), Scriven (2008). It is not just the choice of method that matters but its implementation, as shown by Bédécarrats et al. (2019, 2020) examining various experimental studies in practice.

**Figure 7 Methods used by all studies across all confidence levels**



Note. This figure only shows the distribution of methods for 159 papers, of 205 which were entered into the screening process for quality. We did not extract data on whether the paper was quantitative or qualitative for papers which scored 0 on cogency or transparency and hence did not proceed to credibility assessment.

**Figure 8 Methods used by high-confidence studies only**

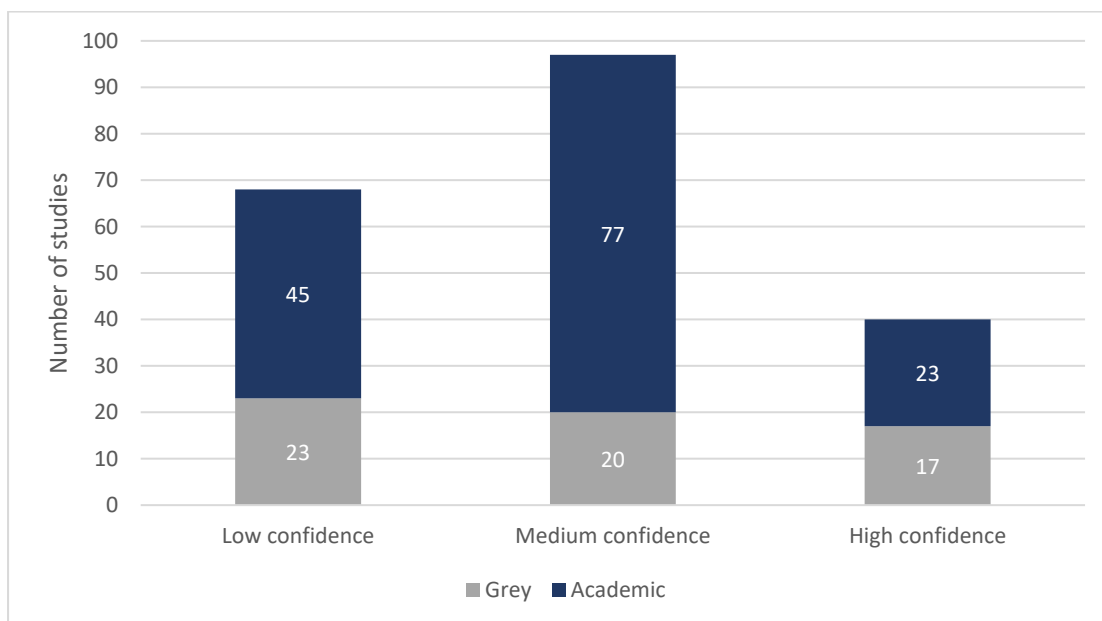


Note. Two studies identified as mixed methods are included in the count of quantitative studies.

Breaking down the evidence base by publication status (Figure 9) shows the vast majority of studies in our pool, across all three confidence categories, are academic – they have been published in scholarly journals. Notably, the studies we categorised as high confidence have the highest proportion of grey literature. A number of these studies have come out in the last two years, often in well-recognised working paper series, and may currently be undergoing rigorous peer review processes for publication in journals. The breakdown also shows that

publication in an academic journal is not a good predictor of the confidence we can place in a study. Some of the studies in the low- and medium-confidence categories were published in journals that claim to have rigorous peer review processes, but are managed by publishing companies whose review rigour and editorial practices have been labelled as unethical or fraudulent (compare with Oviedo-García 2021). Predatory, questionable or deceptive journals frequently publish poor-quality research in return for publication fees, capitalising on pressure to publish, often among scholars based in developing countries (Beall 2012; Frandtsen 2019). Alleviating the difficulty research users have in discerning between more or less reliable sources of evidence on DFS as a result of such publication practices, via our confidence assessment, is in itself a valuable output of our EGM.

**Figure 9 Breakdown of studies by publication status**



Summarising the characteristics of the evidence base so far, we find limited levels of heterogeneity, with the majority of the evidence base geographically clustered in East Africa and South Asia. Methodologically, we find that quantitative methods are more popular, and experimental designs dominate among the high-confidence studies.

## 5 Evidence gap maps

In this section, we present the results of the EGMs generated using the data extracted from the high-confidence studies. An interactive version of the EGM, which enables users to identify the exact individual studies in each ‘box’, is available online, hosted thanks to the EPPI-Mapper platform: a [high-level map for the medium- and high-confidence studies](#), and a more [detailed map for the high-confidence studies](#) only.

Here, we produce several maps, starting with high-level overview maps and then disaggregating these into more detailed maps that provide a more granular picture of the evidence base. Where we were able to easily extract basic data from medium-confidence studies (reflecting resource and time constraints, we did not attempt full data extraction), we offer maps for comparison.

We will start with a presentation of EGMs focusing on the relationships between enablers and barriers and different DFS, followed by maps looking at what is known about different DFS and their impacts. In reading the maps, it may be useful to refer back to the Theory of Change and explanation of the parameters offered in section 2. Because we found that most of the evidence base did not systematically distinguish between access, impact and usage of DFS, we treat all evidence as about usage.

The most complete overview we can give of the studies of all confidence grades, albeit at a very high level of abstraction, is shown in Appendix 4. It indicates that lower confidence studies are somewhat more likely to focus on enablers and barriers, while higher confidence studies are somewhat more likely to focus on the impacts of DFS. The evidence base at all confidence grades primarily focuses on mobile money for payments and transfers, rather than other types of DFS or use cases.

### **How to read the maps**

In each map, different DFS are on the vertical axis, and different enablers/barriers or impacts on the horizontal axis. Collectively, these maps indicate for which causal links in the Theory of Change (in Figure 1) – which enablers/barriers of DFS (1→2) and which impacts of DFS (2→4) – the studies contain a discussion of evidence.

A number 1 indicates that one study presents evidence on this link, 2 two studies, and so on. Darker colours indicate more studies. A single study can contain evidence on more than one link.

The presence of evidence does not imply that the evidence is positive or conclusive in any way. We did not capture data on the direction or magnitude of effects, as this would be the task of a more in-depth systematic review.

## **5.1 Evidence gaps maps – enablers and barriers**

Map 1a shows that, among those high-confidence studies that have studied enablers and barriers of DFS usage, the largest number of studies has looked at user attributes in relation to mobile money (17 studies), followed by studies that look at how the industry structure of the financial industry affects DFS (11 studies). Other enablers and barriers are less studied. The majority have studied enablers/barriers of mobile money (or both mobile money and mobile banking), while mobile banking on its own receives less attention. Map 1b shows that the picture is similar among studies graded medium confidence, with studies in this wider base of evidence again overwhelmingly focusing on mobile money, and specifically how user attributes and industry structure affect it.

**Map 1a Evidence on what enables or constrains DFS usage (high-confidence DFS studies by high-level DFS use case and high-level enablers and barriers)**

	Policy and politics	User attributes	Industry structure	Economy and society
Mobile money only	3	17	11	3
Mobile banking only	1	4	0	0
Both	0	2	3	1

**Map 1b Evidence on what enables or constrains DFS usage (medium-confidence DFS studies by high-level DFS use case and high-level enablers and barriers)**

	Policy and politics	User attributes	Industry structure	Economy and society
Mobile money only	3	25	21	10
Mobile banking only	0	1	2	2
Both	1	1	1	1

Digging deeper, we can unpack what type of user attributes the evidence in relation to mobile money focuses on in Map 2. We find that the mobile money evidence base is concentrated on better understanding specifically how the knowledge and capabilities of users (12 studies), as well as the economic conditions of users (10 studies) and geography (8 studies), affect usage of DFS. The studies looking at industry structure have mostly focused on alternative financial services (7 studies) and fees and costs (6 studies) as enablers and barriers of DFS usage. A number of gaps in the evidence become visible – most notably, under policy and politics there is a complete lack of evidence from high-confidence studies on the role taxation plays as an enabler or barrier. We did not extract data at this level of detail for low- or medium-confidence studies.

**Map 2 Evidence on what enables or constrains DFS usage (high-confidence DFS studies by high-level DFS use case and detail-level enablers and barriers)**

	Policy and politics			User attributes					Industry structure			Economy & society	
	Regulation	Taxation	Promotion	Geography	Economic Conditions	Knowledge and capabilities	Demographics	Values and beliefs	Fees and costs	Physical infrastructure	Alternative FS	Macroeconomy	Socio-cultural norms and acceptance
Mobile money only	0	0	3	8	10	12	7	7	6	2	7	2	1
Mobile banking only	1	0	1	2	0	4	4	1	0	0	0	0	0
Both	0	0	0	2	1	1	2	1	2	0	2	0	1

In the following maps we disaggregate the data by DFS use cases – whether services (mobile money or mobile banking) are used for payments, or for something else. Map 3a shows that the majority of evidence in high-confidence studies is on the usage of DFS for payments/transfers (27 papers), with a focus on user attributes (14 studies) and industry



structure (8 papers) as enablers/barriers. Overall, 16 high-confidence papers look at usage of DFS for savings, with 6 each looking at user attributes and industry structure. Only 5 high-confidence studies focus on credit as part of DFS, and none on insurance. The medium-confidence studies in Map 3b almost all focus on DFS as payments, with user attributes and industry structure dominating, as in Map 3a.

**Map 3a Evidence on what enables or constrains DFS usage (high-confidence DFS studies by DFS use case and high-level enablers and barriers)**

	Policy and politics	User attributes	Industry structure	Economy and society
Payments/transfers	3	14	8	2
Savings	2	6	6	2
Insurance	0	0	0	0
Credit	0	3	1	1
No specific use case	1	6	3	1

Note. Use case categories are not mutually exclusive — a study might look at payments and savings.

**Map 3b Evidence on what enables or constrains DFS usage (medium-confidence DFS studies by DFS use case and high-level enablers and barriers)**

	Policy and politics	User attributes	Industry structure	Economy and society
Payments/transfers	4	26	22	11
Savings	0	1	0	0
Insurance	0	0	0	0
Credit	0	0	0	0
No specific use case	1	3	3	2

In these maps, we do not attempt further distinctions between the different types of payments (P2P, P2B, P2G, etc). Although these distinctions are seen as important by the DFS industry and advocacy groups, the research literature often does not clearly distinguish them. In the implementation of our data extraction, we therefore grouped all papers that considered any type of payment.

#### Map 4 Evidence on what enables or constrains DFS usage (high-confidence DFS studies by DFS use case and detail-level enablers and barriers)

	Policy and politics			User attributes					Industry structure			Economy and society	
	Regulation	Taxation	Promotion	Geography	Economic conditions	Knowledge and capabilities	Demographics	Values and beliefs	Fees and costs	Physical infrastructure	Alternative FS	Macroeconomy	Socio-cultural norms and acceptance
Payments/transfers	0	0	3	7	6	9	7	4	5	1	5	2	0
Savings	0	0	2	4	3	3	5	2	4	1	4	1	0
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0
Credit	0	0	0	0	2	2	2	1	0	0	1	0	1
No specific use case	1	0	1	3	5	6	4	4	2	0	1	0	1

Map 4 further disaggregates this information for the high-confidence studies (we did not extract data at this level of detail for low- or medium-confidence studies). Comparing with Map 2, it becomes even clearer that the relatively large amount of research evidence on how user attributes and industry structure affect DFS usage is primarily focused on DFS-as-payments. What enables or hinders savings is a secondary area of interest. The evidence base for insurance (0 studies across all categories) and credit (9 studies cross all categories) is thin. As already indicated by Map 2, the evidence base does not cover taxation.

### 5.2 Evidence gaps maps – impacts

The next set of maps examines the evidence base in terms of what is known about different DFS and their impacts. Map 5a is noteworthy as it shows that the high-confidence study literature knows fairly little about the impacts of DFS beyond mobile money and beyond the individual/household level. The bulk of the evidence, again, is on mobile money. The focus of these studies has been on assessing impacts of mobile money interventions in relation to individuals and households (29 studies), while both mobile banking services and other areas of impact are not widely explored. The high-confidence literature says next to nothing about DFS impacts on businesses, industry and government, or the macroeconomy. The latter is particularly problematic, given claims, such as those made by World Bank researchers, that financial services (digital or analogue) are integral to inclusive growth and economic development, and deliver benefits for ‘society more broadly’ (Demirgüç-Kunt and Singer 2017: 2), but is in line with the absence of strong evidence revealed by Duvendack and Mader (2019, 2020). Map 5b clarifies that some more evidence exists on business and macroeconomy level impacts among medium-confidence studies, indicating potential for insights that could be gained from a deeper future analysis of some of this literature, or an improvement of study methods in this area.

**Map 5a Evidence on impacts of DFS usage (high-confidence studies by high-level DFS use case and high-level impacts)**

	Individual and household	Business	Industry and government	Macroeconomy
Mobile money only	29	3	0	0
Mobile banking only	6	1	0	0
Both	3	0	1	0

**Map 5b Evidence on impacts of DFS usage (medium-confidence studies by high-level DFS use case type and high-level impacts)**

	Individual and household	Business	Industry and government	Macroeconomy
Mobile money only	25	14	0	4
Mobile banking only	2	0	0	1
Both	2	1	1	0

Map 6 disaggregates the information presented in Map 5a, and finds that a large part of the high-confidence impact evidence has focused on examining the improved ability to move and manage money (total 29 studies), and attitude, knowledge and behaviour changes (total 21 studies) – which according to the Theory of Change in Figure 1 are lower-order, proximate outcomes. A total of 22 studies investigate non-financial benefits for households, and only 1 study investigates higher-order impacts such as changes in household incomes or assets.

**Map 6 Evidence on impacts of DFS usage (high-confidence DFS studies by high-level DFS use case and detail-level impacts)**

	Individual and/or household				Business				Industry and govt		Macroeconomy		
	Attitude, knowledge and behaviour	Improved ability to move and manage money	Non-financial benefits	Higher-order financial benefits	Access to capital or investment	Business performance	Wider customer base	Formalisation	Industry	Government	Financial sector	Macroeconomic policy	Real economy
Mobile money only	14	20	16	1	1	3	0	0	0	0	0	0	0
Mobile banking only	5	6	5	0	0	1	0	0	0	0	0	0	0
Both	2	3	1	0	0	0	0	0	0	1	0	0	0

Maps 5a, 5b and 6 have indicated some obvious evidence gaps in relation to the impacts of DFS. The focus has clearly been on mobile money and individual/household level impacts, and so far we know little about the other DFS product and impact categories. This picture does not look too different when examining different DFS use cases and impacts (Maps 7a, 7b and 8), where again it becomes clear that most evidence from high-confidence studies

(Map 7a) is on the impacts at individual/household level from DFS used for payments/transfers, followed by savings. The medium-confidence studies (Map 7b) indicate some evidence on how DFS-as-payments impact businesses and the macroeconomy.

**Map 7a Evidence on impacts of DFS usage (high-confidence DFS studies by DFS use case and high-level impacts)**

	Individual and household	Business	Industry and government	Macroeconomy
Payments/transfers	25	1	1	0
Savings	10	3	0	0
Insurance	0	0	0	0
Credit	3	1	0	0
No specific use case	4	0	0	0

Note. Use case categories are not mutually exclusive - a study might look at payments and savings.

**Map 7b Evidence on impacts of DFS usage (medium-confidence DFS studies by DFS use case and high-level impacts)**

	Individual and household	Business	Industry and government	Macroeconomy
Payments/transfers	25	13	0	5
Savings	5	1	0	0
Insurance	0	0	0	0
Credit	2	4	0	0
No specific use case	0	0	1	1

Map 8 disaggregates this information further. As with Map 6, we find the focus of the high-confidence evidence base so far has been on examining how payments impact on improved ability to move and manage money (21 studies) – which is an almost self-evident lower-order effect of using payments services – followed by investigating impacts at the levels of non-financial benefits (17 studies), and attitude, knowledge and behaviour (16 studies). There is a smaller but reasonably substantial evidence base on the same impacts from DFS as enablers of savings. Very little is known about any of the other impact categories, impacts at the level of government – such as DFS making more data available, broadening the tax base, or enabling better social spending.

**Map 8 Evidence on impacts of DFS usage (high-confidence DFS studies by DFS use case and detail-level impacts)**

	Individual and/or household				Business				Industry and govt		Macroeconomy		
	Attitude, knowledge and behaviour	Improved ability to move and manage money	Non-financial benefits	Higher-order financial benefits	Access to capital or investment	Business performance	Wider customer base	Formalisation	Industry	Government	Financial sector	Macroeconomic policy	Real economy
Payments/transfers	16	21	17	1	0	1	0	0	0	1	0	0	0
Savings	6	9	7	1	0	3	0	0	0	0	0	0	0
Insurance	0	0	0	0	0	0	0	0	0	0	0	0	0
Credit	1	2	3	0	1	1	0	0	0	1	0	0	0
No specific use case	2	3	1	0	0	0	0	0	0	0	0	0	0

## 6 Conclusions and implications

Prompted by claims about the potential developmental significance of DFS, the rapid growth of the pool of research on DFS, and the increase in attention paid to DFS as a source of tax revenue, this paper has undertaken and reported on the findings from a comprehensive evidence gap mapping exercise on the enablers, barriers and impacts of DFS, with a special interest in uncovering any evidence related to taxation. An interactive version of the EGM is available on the EPPI-Mapper platform: a [high-level map for the medium- and high-confidence studies](#), and a more [detailed map for the high-confidence studies](#) only.

We developed a generic Theory of Change for DFS that includes the factors that enable or constrain people’s access, uptake and usage of DFS, the different types of relevant DFS, the different use cases DFS can serve, and the proximate and transformative impacts usage of DFS may create. We based our systematic data extraction approach on this Theory of Change, and developed a transparent set of inclusion criteria and a comprehensive search strategy to identify relevant studies. We adopted a rigorous quality assessment process, which allowed us to distinguish and focus our attention on 40 high-confidence studies amid a final pool of 205 studies. The majority of all these studies, including the high-confidence studies, used quantitative methods, and among the high-confidence studies, experimental or longitudinal research designs dominated.

The results offer a variety of insights into the distribution of DFS research, revealing the presence of evidence, as well as gaps.

Where there is evidence:

- Spatially, it became clear that the majority of the evidence pertains to East Africa, where 24 (60 per cent) of the high-confidence studies are focused, including 10 on Kenya.
- The majority of high- and medium-confidence studies have a focus on the delivery of DFS via mobile money systems. Most focus on payments and money transfers as the use case, with a smaller number of studies focusing on savings.
- Where studies investigate enablers and barriers of DFS, the focus is on how user attributes and industry structure affect DFS usage. Specifically, among high-confidence studies, the strongest focus is on how users' knowledge and capabilities affect DFS usage, while users' demographic, geographical and economic conditions are also fairly well researched. Among high-confidence studies that cover industry structure, access to alternative financial services, and fees and costs, are the most studied enablers/barriers.
- Where studies investigate the impacts of DFS, the focus is on assessing impacts at the individual and household level, with only a limited pool of studies assessing business impacts. Specifically, among high-confidence studies examining DFS impacts, the strongest focus is on the improved ability of individuals and households to move and manage money, non-financial benefits, and attitude/knowledge/behaviour changes.

Where there are gaps:

- Despite the increasing global spread of DFS, there is limited geographical coverage outside of East Africa, particularly among high-confidence studies.
- Mobile banking is significantly less studied than mobile money, which may be related to the geographic bias of many studies towards a few countries where mobile money systems have taken off at scale. A potentially even larger gap lies in the fact that no studies examine insurance as part of DFS, and only very few examine digital credit. While the former could be due to the relatively small volume of such services in practice, digitally-delivered credit is known to be a significant feature of many DFS systems. Its impacts – both positive or negative (Bharadwaj et al. 2019; Bateman et al. 2019) – may be significant for many users.
- Little is known about how policy and politics, and macroeconomic and social factors, affect DFS usage, at least from the high-confidence studies. For our purposes, specifically, taxation stands out as a completely unstudied enabler or constraint, for which more research is needed. We find no studies in which we can place any confidence that would provide insights as to how best to tax DFS fairly and transparently.<sup>14</sup> This evidence gap sits alongside other gaps regarding the influence of regulation, macroeconomic factors and socio-cultural norms.
- The impacts of DFS usage beyond the individual/household level – and business level, apart from some medium-confidence literature – remain poorly understood. How DFS usage impacts the macroeconomic level (issues like growth, financial sector metrics or policy effectiveness), and the meso level of industry and government (issues like data availability, tax base widening or better service provision), are major gaps in the evidence base. These gaps are significant not least in light of widespread claims that financial service expansion can be expected to have effects at these levels (Demirgüç-Kunt and Singer 2017; World Bank 2014).

Findings in adjacent literature: the lack of evidence on impacts at the level of industry and government and the wider economy, particularly regarding DFS and taxation, prompted us to look beyond the literature found via our original search, using a further set of search strings.

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<sup>14</sup> One study in our pool focused on how transaction tax exemptions on DFS may affect uptake (Bongomin et al. 2019). However, this study was graded as low confidence for reasons of cogency and methodological credibility.

Using a range of terms to capture broader types of digital payments, we ran an additional search for literature from low- and middle-income countries since 2007 in SCOPUS, Web of Science and EconLit.<sup>15</sup> These searches returned a total of 74 hits. A brief scan of the article titles and abstracts by one author indicated that only a few studies might have met our inclusion criteria, although based on the abstracts these were unlikely to be screened into the high-confidence category. We are therefore fairly confident that our EGM captures most of the relevant (academic) literature in this area. It is also worth noting that in developing our inclusion criteria, we restricted the scope to cover mobile money and mobile banking, as these are mostly clearly *digital* financial services (as opposed to tools such as debit cards, which are enabled by technology but are arguably not fully digital services). Partly as a result, some adjacent literature may not have been picked up, if this literature concentrated on digital payments that are unrelated to or not based on mobile money or mobile banking.

Implications for DIGITAX: in this report, we digest the key characteristics of the included studies, but do not extract information on what findings they actually contain, in terms of magnitude and direction of effects. The present systematic mapping of the evidence base makes a start, allowing us to do more in terms of synthesising the results of included studies – for instance, in the form of rapid evidence reviews on particular topics, in line with emergent DIGITAX priority areas or developments in the policy-practice space. As an example, the results of studies looking at the enablers and barriers of DFS for payments and transfers – in terms of policy and politics, user attributes, industry structure and macroeconomy and society factors – could now be comprehensively reviewed more easily, to understand the relative importance of these factors and locate taxation-related policy levers among these factors. Specifically, we would recommend examining in more detail all the high- and medium-confidence studies that look at enablers and barriers related to ‘policy and politics’ and ‘economy and society’, and check more closely for directly or indirectly taxation-related evidence among this subset of the evidence. Furthermore, the findings contained in our evidence base may be helpful for shaping DIGITAX’s research agenda going forward – for instance, in terms of informing methodological choices or identifying particular countries to investigate in greater depth as case studies. As the DFS research landscape is rapidly growing, we suggest continuing to track the emergence of new literature via regular updates to this map.

Implications for wider research: in terms of research going forward, methodologically sound evidence on a wider range of DFS across a broader geographical spread, covering a wider range of enablers and barriers as well as the purported impacts of DFS, is needed. Studies should aim to address (and clearly distinguish) a wider range of DFS usages, including savings and credit. More studies that can inspire high confidence are particularly needed outside a few countries in East Africa. Greater geographic diversity is needed in DFS research, especially LMICs beyond a small number of countries in sub-Saharan Africa and South Asia, along with filling the large gaps regarding the political economy, macroeconomic and social factors underlying DFS, as well as the meso- and macro-level impacts of DFS. Studies on the enablers and barriers of DFS at the level of political economy, including tax policy, explicitly require coverage of a wider range of cases (more countries, more diverse geographical contexts and methodological options) to deliver meaningful findings. In undertaking this research, we urge the research community to distinguish more clearly between DFS access, uptake and usage, and to look more closely to the wider types of DFS (beyond payments and transfers).

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<sup>15</sup> Our search strings in November 2021 included merchant payments, e-payments, digital transfers, tax e-payments, digital tax payments and digital remittances.

## **Appendices**

### **Appendix 1 Search strings**

The search strings below are the generic categories that were adapted for each of the academic databases and grey literature sources that were searched.

Digital AND Banking  
Mobile AND Banking  
Digital AND Financial AND services  
Mobile AND Financial AND services  
Mobile AND money  
Digital AND money  
Digital AND Financial  
Mobile AND Financial  
Fintech  
Fin-tech



## Appendix 2 Data extraction tool

This data extraction tool has been used for all high-confidence studies. Elements of this data extraction tool, such as for some of the key categories – study detail, research design and DFS product type – have also been used for medium- and low-confidence studies. The categories below link to the categories presented in the main maps.

Key category	Sub-category 1	Sub-category 2
Study details		
	Title Author/s Year Published Geography Score from quality assessment	
Research design		
	Quantitative study	Study design Analytical methods
	Qualitative study	Focus group discussions Ethnographic study Key informant interviews Discourse/document analysis
DFS product type		
	Mobile money Mobile-enabled banking	
		Payments/transfers Savings Insurance Credit
DFS stage examined		
	Accessibility/availability Uptake Usage	
Enablers & barriers		
	Policy & politics	Regulation Taxation Promotion
	User attributes	Geography Economic conditions Knowledge & capabilities Demographics Values & beliefs
	Industry structure	Fees & costs DFS physical infrastructure Alternative financial services
	Macroeconomic & society factors	Macroeconomy Socio-cultural norms/acceptance
Impacts		
	Individual/household level	Attitude, knowledge & behaviour changes Improved ability to move & manage money Non-financial benefits High-order financial benefits
	Business-level impacts	Access to capital/business investment Better business performance Wider customer base Formalisation
	Industry & government level	Industry Government
	Macroeconomic level	Financial sector Macroeconomic policy Real economy

### Appendix 3 Quality assessment tool

Top-level criterion	1. Cogency			2. Transparency			Quant or qual?	3. Credibility					
Explanation	The report presents a convincing causal argument about enablers/barriers of DFS usage or impacts of DFS (or both).			The abstract or a quick full-text scan clearly reveals the methodology used to collect and analyse the data				The data collection method generates credible data. The methodology to collect results is not only transparent but also credible, thanks to a clear logic of inference (e.g. threats to, especially, internal validity appropriately dealt with).					
Aspects of criterion	Causal: the report is about (a) the enablers/barriers of DFS uptake/usage or (b) the impacts of DFS usage.  Note: This excludes, e.g.: reports about what causes DFS supply, how the sector should be governed (unless examining effects on uptake/usage /impacts)	Theoretically grounded: the empirical relationship being examined is justified theoretically.  Note: there may be a theory section, a theory of change, theoretical derivation of hypotheses, or a review of theory literature.	Convincing: the causal argument being made is clearly connected to the type of evidence and the theory presented. It could logically follow.  Note: e.g. an argument about the macro-economic impacts of DFS which presents no macro data is not convincing.	Data collection approach and/or sources	Sampling (intended and actual sample)	Data analysis methodology	Select appropriate category for the study (based on main type of analysis)	Qualitative:			Quantitative:		
								Transferability: generalisability of findings, thanks to sufficient thick description to enable case-to-case transfer	Dependability: research process is logical, traceable, and clearly documented	Confirmability: clear demonstration of how conclusions and interpretations were reached	Study design coding: - Experimental design (RCT, lab-in-the-field, pipeline) = 1; - longitudinal (panel, before/after AND with/without) = 2; - either before/after OR with/without = 3; - survey without comparison groups or secondary data = 4	Analytical method coding: - Advanced econometrics (IV, PSM, DiD, 2SLS) = 1; - Multivariate = 2; - Tabulation = 3	Study design and method of analysis codes combined into an index, threshold TBD
Grading	YES – the argument is causal, theoretically grounded and potentially convincing → grade '2', continue to 2. PARTIALLY – the argument is causal but there are some evident gaps in the theoretical justification or logic → grade '1', continue to 2 NO – the argument is not causal or there are obvious major gaps in theory or logic → grade '0', code as 'low quality'			YES – all three aspects are described in the document → grade '2', continue to 3. PARTIALLY – some methodological aspects are described → grade '1', continue to 3. NO – methodology is not described at all → grade '0', code as 'low quality'.			NB: Fill this column so that later formulas work (if proceeding to step 3)	YES – all three aspects are appropriately dealt with → grade '2' PARTIALLY – some of the aspects are appropriately dealt with, some not → grade '1' NO – none of the aspects are done appropriately dealt with → grade '0'			Grade according to study design and analytical method criteria above.  If a study has a score of below X, then it gets a grade of '2', if a score of above Y, then it gets a grade of '0' (thresholds TBD).		

## Appendix 4 Basic data extracted from all papers

### Map 9a Basic data extracted from studies of all confidence levels on whether they study enablers/barriers or impacts (by high-level DFS use case)

	Low confidence		Medium confidence		High confidence	
	Enablers/ barriers	Impacts	Enablers/ barriers	Impacts	Enablers/ barriers	Impacts
Mobile money only	43	10	49	43	21	25
Mobile banking only	9	6	3	3	5	6
Both	1	0	1	4	3	3

### Map 9b Basic data extracted from studies of all confidence levels on whether they study enablers/barriers or impacts (by DFS use case)

	Low confidence		Medium confidence		High confidence	
	Enablers/ barriers	Impacts	Enablers/ barriers	Impacts	Enablers/ barriers	Impacts
Payments/transfers	39	11	50	44	18	25
Savings	5	2	1	5	10	10
Insurance	1	0	0	0	0	0
Credit	5	0	0	5	3	3
No specific use case	8	3	6	2	7	4

## Appendix 5 References for studies included

### 40 high-confidence studies

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