



Revisiting the building blocks: Getting the basics of financial inclusion demand-side surveys right

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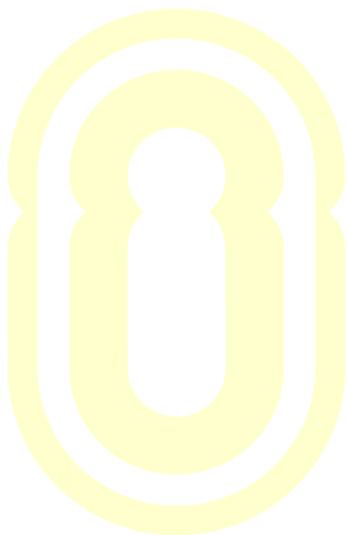
Advancing Financial Inclusion

Revisiting the building blocks: Getting the basics of financial inclusion demand-side surveys right

An overview of innovations and best practice in data collection, sample and survey design for financial inclusion demand-side surveys

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About insight2impact

Insight2impact | i2i is a resource centre that aims to catalyse the provision and use of data by private and public sector actors to improve financial inclusion through evidence-based, data-driven policies and client-centric product design.

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1. Introduction

The emphasis on using data for decision-making in financial inclusion has resulted in rapid growth in the number of demand-side surveys implemented globally. Demand-side surveys are particularly popular in developing and emerging markets, where data is not currently available on a large portion of the adult population. This information plays a critical role in informing and measuring financial inclusion strategies, which aims to bring previously excluded adults into the formal financial system.

Purpose: The aim of this report is to provide organisations and individuals interested in implementing financial inclusion demand-side surveys, with an overview of the current trends in data collection, sample design and survey design. It seeks to enable these individuals and organisations to understand the trade-offs between time, cost and quality in order to maximise the return stakeholders get from investing in these surveys.

Methodology: This report draws on a number of published sources to highlight the recent trends in data collection, survey sampling and survey design.

Structure: The remainder of this report is structured as follows:

- **Section 2** looks at the innovations taking place in **data collection**, aimed at reducing the cost and time of the process, whilst still maintaining the level of quality needed to inform and measure policies.
- **Section 3** reviews the current best practice and innovations in survey **sample design**.
- **Section 4** examines the ways to improve the quality of existing surveys through best practices in **survey design**.
- **Section 5** assesses the applicability of these trends in developing countries, given that the discussed innovations and best practices were carried out in high-income countries.

Throughout this note we will be referencing a number of terms by their acronyms. This key provides context to the following terms:

Terminology Key

DSS:	Demand-side survey
PAPI:	Pen and paper interview
CAPI:	Computer-assisted personal interview
CATI:	Computer-assisted telephone interview
FI:	Financial inclusion



2. Data collection

PAPI is a long-standing approach to collecting survey data. Most often it is conducted in-person with an interviewer administering the questionnaire to a respondent. This is especially true for longer and more complex questionnaires, such as financial inclusion DSS.

However, advances in technology are enhancing traditional pen and paper survey methods with computer-assisted survey methods. In some cases, surveys are administered directly to respondents via the internet or mobile phone, with no need for face-to-face interviews. In other cases, different methods are combined. These methods have many benefits, including improved data accuracy, increased response rates and shortened interview duration. Over the long term, they are expected to reduce the cost of fieldwork and bring down the cost of data collection.

This section focuses on the trends in data collection and their trade-offs with cost, timing and quality. Given the high cost and timing of data collection, the majority of trends deal with the application of technology in data collection methodology.

Computer-assisted personal interview (CAPI)

CAPI¹, like PAPI, is a face-to-face approach where the interviewer records responses while they are interviewing the respondent. The difference is that the interviewer captures the data directly onto a portable electronic device instead of paper. CAPI is now widely accepted and has been used in a number of financial inclusion DSS, including in Nigeria (A2F 2014 survey), FinScope Zambia 2015 and FinScope South Africa 2015.

CAPI is well proven to work in the developing country context and will become the norm in the near future. In 2012, De Weerd et al. (2012) conducted an experiment in Tanzania, which assessed the differences between PAPI and CAPI. They compared detail errors, interview times, respondent perception, interviewer effects and cost. The following are some of their findings, starting with the effect of CAPI on reducing errors and increasing data quality.

- **Guided routing is optimal.** Guided routing is the method by which respondents are presented with different questions depending on answers to previous questions (Katz 1999). CAPI automatically follows the correct routing through questionnaires. This reduces the risk of inapplicable or missing questions. It also reduces the burden on the fieldworker.
- **Advanced quality checks can be performed in field.** CAPI can warn the interviewer if they have missed a question or if answers contradict each other. This allows the interviewer to clarify with the respondent in the original visit and reduces the need to go back for a follow-up visit. CAPI can also perform more checks in less time over a larger number of respondents and questions than can be expected of a field supervisor. This improves the quality of data collection and reduces the fieldwork burden – a win-win.
- **Matching response options.** In more advanced applications of CAPI, response options can be narrowed to make it more applicable to the specific question. For example, on paper, food consumption modules typically record the units consumed of different items in one column. The codes for the different types of units (litres, kilograms, buckets, bags, etc.) are given at the top. In some cases, quantities of food items may be captured in incorrect units, i.e. litres of bananas or sacks of cooking oil. These item-unit combinations could lead to a decision to omit observations completely when it is difficult to verify responses. This loss of information

¹ CAPI here is specifically referring to the use of tablets or smart phones.



reduces the quality of data. CAPI overcomes this by ensuring that the list of units are specific to the food item and thus increases data quality.

- **Use of pictures to clarify size or complicated concepts.** Similarly to the example above, in food consumption modules it is often difficult to capture differences in sizes of fish or bunches of bananas. Even small, medium and large can have different meanings to different respondents. To assist, pictures can be used to show a small, medium or large fish or bunches of bananas next to other items, to help respondents provide a more accurate response.
- **Office quality control can start earlier,** and thus put behavioural corrections into effect while the teams are still in the field. Usually CAPI involves sending the collected data to head office at regular intervals before all the field work is completed. This allows the head office to do additional quality control measures and to pick up if there are any additional errors that field teams should be on the lookout for.

Despite all the benefits, there are a number of potential **logistical challenges** to implementing a CAPI system.

- **There is a significant investment required in hardware and software.** Whilst these costs are decreasing in real terms and more options are becoming available, it continues to be a significant investment. CAPI does eliminate some of the variable cost components such as printing questionnaires and subsequent data capture, but also carries a larger fixed cost component, which might make it unaffordable for smaller surveys.
- **Additional time invested in software upfront negates some of the time saved during fieldwork.** After the questionnaire has been finalised, it has to be coded into the software. The programme also has to be thoroughly tested to ensure it is working correctly before field teams can be trained and deployed. This part of the project can be more time consuming than expected and should be explicitly planned for.
- **Field teams require electricity to charge their devices on a regular basis.** Data collection in areas without easy access to electricity can be more challenging, however, the battery life of devices can be extended through external battery packs and the use of portable solar panel chargers.
- **Existing field teams might not be familiar with technology.** This challenge is decreasing as mobile phones become more pervasive and the majority of adults become familiar with them. However, additional training may be needed, which can also help field teams improve their use of technology.

Finally, the experiment in Tanzania found no significant differences in respondent's perception of CAPI and PAPI that would impact upon their response. This was based on the degree of intimidation, perception of confidentiality, and reliability of the results.

Computer-assisted telephone interview (CATI)

Responses received in CATI interviews may differ from those received in PAPI or CAPI interviews as the interview is not conducted in person. As with CAPI, CATI makes use of technology (telephone and computers), but the interviewer is no longer face-to-face with the respondent. With this method the interviewer conducts the interview over the telephone and follows a script provided by a software application. As a result, some responses may differ between PAPI and CATI as results of mode effects.



For example:

- Respondents are more likely to provide affirmative answers to questions regardless of their content (known as the “acquiescence effect²”) with PAPI rather than CATI (Garlick et al., 2015). Results in this study also show that respondents tend to over-report household expenditure with PAPI compared to CATI.
- Further, while CATI shares many of the benefits of CAPI, it cannot use pictures to specify responses which can potentially reduce accuracy.

Costs and time required are reduced with CATI interviews. Although CATI does reduce some of the accuracy of responses compared to CAPI and PAPI, Garlick et al. (2015) found that it was more cost effective and made up of for this loss in quality in other areas. For example, teams do not need to travel to visit respondents, significantly reducing the cost of data collection. In addition, data is either already stored at head office or can easily be sent to the head office if call centres are not located there.

Capturing respondents that are inaccessible. In many cases eligible respondents are not available when surveys are administered because they are at work or live in communities inaccessible to survey administrators. This results in under-coverage. With CATI, respondents that are difficult to reach on a face-to-face basis can be covered.

In order to draw a nationally representative sample for CATI, a complete list of telephone numbers is required. Samples drawn from a telephone or mobile phone directory tend to result in selection bias, which also contributes to under-coverage. These directories or lists omit individuals who no longer use landlines (or do not have landlines) or those without mobile phones. This is especially a concern when the objective is a nationally representative sample (Rocco et al., 2004; De Vithis & Righi, 2011). Even if a complete list of numbers existed, many people have multiple sim cards and thus multiple numbers (emphasising the need to conduct thorough screening of potential respondents which would have time and cost implications). See **Box 1** for an example of how CATI can result in selection bias.

Box 1: Example of how CATI can contribute to selection bias

Cecatti et al. (2011) conducted a study that evaluated the feasibility of using CATI as a method for obtaining information on reproductive health in Brazil. This study was carried out in a teaching hospital in São Paulo State, south-east of Brazil, with women who had been admitted to the maternity ward. The sample of the study was compiled using a representative patient list obtained from the hospital information system. The telephone contact information (household phone, mobile phone, work phone, message phone) was obtained from the medical records.

The study found that the response rate was highest for women with multiple contact numbers and with less than one year gap between the time of hospitalisation and interview. It highlights that recall and interest in the survey are heightened when hospitalisation was fairly recent. This shows that although telephone surveys have been used to explore information on health in developed settings for several years, CATI can interfere in response rates and account for selection bias in public health research.

Source: Cecatti et al., 2011

² Acquiescence bias describes the general tendency of a person to provide affirmative answers to items of a questionnaire, regardless of the content of the items (Messick, 1966).



Web-based surveys

Web-based surveys are different from CAPI and CATI as surveys are self-administered. This requires a population familiar with technology. Web-based surveys share the following benefits with CAPI and CATI:

- **Cost reduction.** The cost of having a field team is no longer applicable.
- **Increased responses.** It can be used to capture respondents that are at work or live in communities inaccessible to survey administrators. However, the scale at which response rates are increased depends on their access to the internet, which is often lower in developing countries and rural areas.
- **Elimination of data capturing phase (as required in PAPI).** Since responses are directly stored in a database, data capturing as an isolated activity is no longer required.

Self-administration of web-based surveys encourages respondents to provide perceived sensitive information. Web-based surveys leverage advanced technology to provide multiple-question formats and guaranteed confidentiality which can lead to an improvement in the reliability of the data (Jansen et al., 2007). Guaranteed confidentiality could be of benefit to DSS specifically, as this could lead to improved income data and more accurate reports on perceived negative uses of financial instruments, such as credit.

Web-based surveys place a bigger burden on the respondent in terms of literacy and internet-connectivity. Web-based surveys are self-administered without the need for a third party (usually a human) to act as an intermediary between the respondent and the instrument. The respondent accesses the survey instrument via a web browser and the survey instrument physically resides on a network server (Stanton, 1998). Web-based surveys are only a practicality in environments where there is a relatively high level of literacy, internet connectivity and access to web-enabled devices are widespread, and when potential respondents are comfortable interacting with electronic media.

Similar to CATI, it is very difficult to determine a nationally representative sample to whom to administer a web-based survey. Limited access to the internet through the mobile phone or via the computer acts as an absolute barrier for web-based surveys. Further, even for adults that can access it, literacy levels and familiarity with technology often acts as a barrier to participating. As a result, it is very difficult to get a nationally representative sample for demand-side surveys through web-based surveys, particularly in developing countries.

Mobile data collection

Mobile data collection via Short Message Services (SMS) is another approach to self-administered surveys. However, unlike with those administered over the internet, it has discrete cost implications for respondents in terms of perceived cost of receiving surveys and sending replies and electricity to charge their phone.

The following are some of the benefits of SMS-based mobile data collection:

- As with web-based surveys, there is no interviewer involved, which in some cases can lead to improved quality of data in terms of reliability of responses to sensitive subjects, such as income.
- It is also useful to achieve more coverage and is relatively less costly than CAPI and CATI since it does not require an interviewer.



The following are some of the disadvantages of SMS-based mobile data collection:

- Text messages have limited characters, which could impact both the clarity of the question and the accuracy of the response.
- Questionnaire design that entails multiple response questions in SMS-based mobile surveys results in less accurate responses compared to single response questions. In addition, there is a tendency to have fewer selected responses.
- The perceived cost (buying airtime), especially for low-income respondents, can lead to a higher incidence of non-responses in comparison to face-to-face data collection methods.
- It is critical to conduct a pre-survey screening of respondents to ascertain the eligibility of the recipient, for example, their geographical location, which can be a time intensive process. It is possible for mobile databases to include geographic locations of respondents but verifying this detail would be more time consuming as opposed to a face to face data collection method.
- The survey could be deemed as SPAM and result in non-response due to recipients' unfamiliarity with the sender of the survey or a perception of personal intrusion
- Recipients might not be literate enough to understand or respond to the questions. Furthermore, the sample is limited to only those who have mobile phones is likely to result in under coverage, especially in developing countries.

In addition to the drawbacks listed above, SMS-based mobile data collection brings with it another consideration regarding the representation of the sample. According to Jeffreys (2015), respondents who are most likely to participate in mobile surveys are also more likely to be technologically savvy, such as individuals who actively participate in social media, extroverted and those who take part in other activities such as social or volunteer activities.

An example of SMS-based mobile data collection is shown in **Box 2**.

Box 2: Example of SMS-based data collection

The Friends of the Wissahickon (FOW) is a non-profit organisation overseeing the well-being of a local park in Philadelphia. They partnered with the Institute for Survey Research (ISR) at Temple University to survey nearby residents of Philadelphia, Pennsylvania, United States of America (USA) to better understand their use of the park and their awareness of the organisation (Hoe and Grunwald 2015). The study provided an opportunity to test whether automated SMS text messages can be used as a primary mode of data collection, and specifically, whether survey takers will respond to a "cold text" to participate in a short survey in a regional setting. The study team acquired a random sample of 1 000 mobile numbers associated with the six zip codes that surround the park. Data collection involved a process of reaching out to the respondents to seek their interest in participating in the survey coupled with a follow-up strategy.

The results showed that of the 1 000 cold text survey invitations, 70 (7%) began the survey, 36 (~4%) completed it and 450 (45%) indicated that they lived outside of the sample area. These findings highlight the limitations of SMS-based data collection in terms of low response rate, high drop-out rate and a relatively high incidence of selection bias.

Source: Hoe and Grunwald 2015



Linking admin data

Integrating data can improve data quality, but also introduce selection bias. Administrative data are typically government records that you can link with survey data to form an integrated dataset. Examples of administrative data include tax, health or employment records. This data is often more reliable as it is regularly collected and can reduce the burden on the respondent because they do not have to report sensitive data (e.g. income) or remember historical health or employment events. (Sakshaug & Kreuter, 2012). However there are some trade-offs:

- In most cases the respondent needs to provide consent for linking their data which can give rise to selection bias (i.e. only those who provide consent will be included). Therefore, it is important to understand the traits of respondents that are likely to demonstrate non-consent.
- The ability to link data requires good personal identifiers that are verifiable across different government institutions. This is a major challenge in countries without a credible national identification data system.
- If administrative data requires cleaning and standardising before it can be linked, then this presents an extra time implication (Dusetzina et al., 2014).

Mixed-modes

Mixed-modes make it possible to harness the benefits of different data collection methods to minimise error and bias in data collection. A mixed mode survey is where different survey methods are used to collect data from the same group of respondents. The researcher typically decides on the response mode based on initial screening of a respondent's demographic characteristics. In some cases, different sampling techniques could be required to execute a mixed-mode approach. Mixed-mode approaches to data collection can also occur across different phases of a survey. For example, PAPI can be used to pre-test the questionnaire, then a CAPI to administer questionnaires, whilst telephone interviews are used to confirm responses in the context of quality control measures.

The benefits of mixed-mode data collection techniques are:

- **Cost reduction.** The most efficient modes are used to capture relevant target sample data.
- **Increased response rate.** Using different modes (e.g. CAPI and web-based) can improve response rates, as respondents that might not be accessible using a given mode are captured via another.
- **Increased data quality.** This can be achieved by tailoring modes to the preferences of respondents.

Despite the benefits listed, comparability of different modes is a challenge in mixed-mode methods. This is exacerbated by survey mode inherent measurement errors which makes comparability even more problematic. See **Box 3** for more detail.



Box 3: Example of mixed-mode surveys

In Switzerland, Roberts et al. (2016) compared single-mode surveys with sequential mixed-mode surveys (web plus CATI/CAPI) with respect to response rates and the representativeness of the responding sample. The objective of the study was to assess the costs and benefits of different ways of conducting surveys in Switzerland, with a view to developing recommendations about optimal survey designs for the future (including the possibility of tailoring fieldwork methods for different population subgroups). The study provided an opportunity to assess the problem of under-coverage posed by the non-availability of unlisted telephone and mobile numbers, and to investigate which mode, or combination of modes, would provide the optimal way of surveying inaccessible respondents by telephone.

The findings show that response rates for the mixed-mode web and CATI surveys were higher than for the single-mode survey, confirming that mixing modes sequentially can help to boost responses. In addition, the experiment provided evidence that mixing modes can improve response rates, and reduce overall selection bias. However, respondents are said to be susceptible to providing different answers based on different modes (mode effects) which could compromise the comparability of survey modes.

Source: Roberts et al. (2016)

Response mode preferences

Respondents are more likely to participate and give higher quality answers if they are given the option to complete the survey in their preferred way. Mixed-mode data collection has an established track record. Through careful analysis of the respondent's preferences, the mixed-mode methodology can be customised to the respondent's requirements. In an effort to improve response rates, there has been a body of research focused on the efficacy of allowing the response mode preference of the respondent. See **Box 4** for more detail.

Box 4: Possible cognitive effects of response mode preference

Smyth et al. (2014) examined whether answering a survey in a preferred mode influences how respondents process the content and design of a questionnaire. The purpose of their study was to develop a framework that identifies factors which could be related to mode preference.

The experiment found that those that answered in a non-preferred mode would resort to satisficing³ depending on the question formats, in an effort to reduce cognitive burden. On the other hand, those that answered in their preferred mode would mentally apply themselves regardless of question format. Mode preference is also said to have some influence on survey participation (increased response rate) but this is not applicable to all modes. However, the study found that there is weak evidence that mode preference will lead to quicker interviews. A limitation of the study is that the sample consisted of respondents that had previously been surveyed implying a cooperative sample.

Source: Smyth, J.D.(2014)

³ Satisficing is defined as the act when respondents do just enough to satisfy the survey request without any additional reasoning. It also occurs when a respondent provides a satisfactory answer because the satisfactory answer is familiar, hassle-free, and secure (Kronsick 2000).



Relevance for financial inclusion

Table 1 summarises the key trade-offs between cost, time and quality when using new innovative approaches to data collection. In most cases, the trade-offs will depend on the context. For example, with CAPI and CATI, the cost depends on whether or not the organisation implementing the survey already has the requisite hardware. For self-administered surveys, such as mobile-based surveys, the quality of data will depend on the number of respondents that have access to the technology and are literate enough to use it; a distinctive challenge in developing country contexts. These are highlighted in amber.

Whilst most of the innovations are ultimately good for data collection – highlighted in green – **Table 1** shows that there are exceptions, where new approaches will reduce quality or increase the time it takes to collect data. Those exceptions are highlighted in red.

Innovations / Best practices	Cost	Time	Quality
CAPI	Depends	Decreases	Increases
CATI	Depends	Decreases	Increases
Web-based surveys	Decreases	Decreases	Decreases
Mobile data collection (SMS-based)	Decreases	Decreases	Depends
Linked admin data	Decreases	Decreases	Increases
Mixed-modes	Decreases	Increases	Depends

Table 1: Trade-offs between cost, time and quality in different data collection innovations

Source: Author's own

The following provides further detail on how these different approaches can be used in financial inclusion:

- CATI can play a valuable role in FI DSS if it is used as part of a mixed-mode survey, where the sampling of eligible respondents is identified before the survey is administered. The mixed-mode methodology has been used by the World Bank Findex surveys, where a mixture of face-to-face (i.e. CAPI and PAPI) and CATI is used. However, this approach was mostly conducted in high-income countries, such as Belgium (landline telephone and mobile phone) and China (landline telephone and face-to-face). To ensure efficiencies in cost, time and data quality improvement, mixed-mode approaches can be piloted to assess the ideal combination of modes and their limitations.
- Web-based surveys can be applicable to FI DSS if the necessary enablers are in place. Literacy, access to the internet, and mobile and computer penetration are key considerations into the efficacy of web-based surveys. In the absence of these enablers, data quality can be significantly reduced (as indicated in **Table 1**).
- SMS or mobile-based data collection is possible for non-random FI DSS used to confirm previous survey findings, assess trends, and inform questionnaire design. The SMS-based survey mode would have to be shorter in length compared to other methods. Therefore, the



design features should ensure that question phrasing and response options are effectively communicated given the limitations of characters in an SMS format.

- Mode preference is usually determined by multiple interviews with respondents. This is usually not the case for FI DSS, which often collect data from first-time respondents. However, more research can be done to predict mode preferences based on the characteristics of respondents. This will allow researchers in FI to customise their collection methodology for optimal response rates and higher quality data.

3. Sample design

Data collection is the process by which responses are recorded from a subset of respondents. **Sample design** is the process by which the subset of respondents is determined. Given that sample size is a big driver of cost for surveys, sample design is a critical component of survey methodology to improve quality and manage time and cost.

Currently, most FI DSS use probability proportional to size⁴ to design their sample. Probability proportional to size is used to ensure representativeness of sub-sample units or clusters (especially states or provinces), based on their absolute proportions. Furthermore, sampling is done in three stages since the sample unit in FI DSS is the individual as opposed to the household. Firstly the area is selected through random selection, then households are selected within the area, and finally a respondent is selected from within each household.

With the evolution of data collection methodologies highlighted in **Section 2**, there is a need to revisit the set of selection criteria for sample design. In this section, we discuss two relatively new sampling methodologies: sample size optimisation using precision resolutions; and dual-frame sampling.

Sample size optimisation using precision resolutions

Sample size optimisation using precision resolutions can greatly improve the accuracy of the survey results, whilst keeping costs down. Sample size optimisation is the process in sample design that aims to ensure adequate coverage and eligibility requirements. It involves being able to predict possible variations in estimated samples, in addition to having realistic estimates for response rates and eligibility.

Hulliger et al. (2011) used the Swiss Population Survey and the European Social Survey to test measures that can optimise sample size for random sampling within a population made up of many small population sub-groups. The study aimed to determine a recommended minimum threshold and level of variability for sample sizes. It assessed the variability of sample outputs compared to the population, based on variations in previous surveys. The minimum threshold for sample sizes is called the *size resolution* of the sample, and the lowest level of variability is described as *difference resolution*. Hulliger et al. (2011) introduces the technique of “*precision resolution*”, which combines size and difference resolutions for sample size optimisation.

Whilst precision resolution is a useful technique for sample size optimisation, it is limited to countries that have previous surveys to draw upon. In FI DSS, where demographic trends are important to stakeholders, using previous surveys to determine sample sizes and sub-population proportions could

⁴ Probability proportional to size is a sampling procedure under which the probability of a unit being selected is proportional to the size of the unit (OECD 2002).



be difficult. This can be more apparent when national statistical offices already have existing weights that inform sample sizes and variability within a population.

Dual-frame sampling

Dual-frame sampling provides flexibility with the aim of achieving higher coverage of the target sample. Dual-frame sampling occurs when independent samples are drawn from two different sources to reflect the total population in a given sample (Lohr 2011). The benefits of dual-frame sampling are:

- Increased coverage;
- Increased response rates; and
- Reduced need for call-backs (i.e. having to call back the respondent one or two times to secure or complete an interview) to provide unbiased estimators of a population (Beimer 1984; Currivan and Row 2004; Brick et al. 2006).

Despite the benefits, Lohr (2011) found that dual-frame sampling could have the following challenges:

- Weight adjustments to an overlapping sample that is misclassified leads to biased estimates of the total population.
- Mode effects, referring to the errors inherent in a data collection mode (mobile phone or landline), might be difficult to isolate.
- Different non-response rates in the samples from the two frames can result in biased estimates of the total population.

See **Box 5** for an additional example of dual-frame sampling.

Box 5: An example of dual-frame sampling

Elkasabi (2015) assessed the Egyptian Current Issues Survey (CIS) 2014, having transitioned from a single frame (landline) to a double frame (landline and mobile phones). The survey measures the Egyptian public opinion toward political, social, and economic issues in Egypt. The specific areas of review included the dual-frame sampling design and the weighting procedures; a comparison between the demographic distributions of respondents from the two samples; and the demographic weighted distribution of respondents from the dual-frame sample.

The CIS 2014 adopted an overlapping design rather than screening design for the dual-frame sampling. A screening design is used to distinguish mobile phone users from landline users from those that use both. It can only be carried out during or after the data collection. An overlapping sample design uses three samples: those with landlines, those mobile phones and dual users. In the study, the landline sample was stratified based on Egyptian administrative areas selected proportionally to the number of landline phones in each administrative area, which were drawn from the list landline frame and includes all the landline telephones numbers in Egypt. The pseudo-RDD⁵ mobile phone sample was an equal-allocation stratified sample provided by cell phone service providers.

⁵ Due to the emergence of mobile phones and the decline in the use of landlines, there has been a body of research in the area of dual-frame sampling involving directory listed landlines and random digit dialling (RDD) to mobile phones. Landlines have the disadvantage of not necessarily being ubiquitous in some settings and the emergence of mobile phones is leading to a decrease in landline usage.



The classification of weighting included calculating the design weights, adjusting for multiplicity, adjusting for within-household selection and adjusting for the non-response. The adjustment for the dual frame multiplicity step combined estimates of both samples and produced an unbiased dual frame estimators. This demonstrated the potential of the dual-frame approach to reducing issues associated with under-coverage.

Source: Elkasabi, M. A. (2015)

4. Survey design

In DSS, the primary tool for data collection is the quantitative questionnaire. These questionnaires should be designed to minimise omissions and obtain the most accurate and relevant responses possible. Some of the innovations and best practices to achieve this in survey design are described below.

Cognitive interviews

Cognitive interviews help the researcher to design better questions. Cognitive interviews are used to evaluate sources of response errors which could either be due to questionnaire design, the survey administration process or respondents' misinterpretation of questions and response options. The aim of cognitive interviews is to improve data quality by understanding the respondents' cognitive response process. The cognitive response process identifies the steps that respondents move through in order to respond to a data request (Willis, 1999). Typically those steps are:

- Comprehension of the question content and meaning of terms.
- Recall of relevant information and recall strategy.
- Decision process in terms of motivation and sensitivity to questions.
- Response process in terms of matching internally generated answers to the response categories in the questionnaire.

Cognitive interviews are critical when translating surveys or using existing surveys in different contexts. Forsyth et al. (2009) conducted cognitive interviews in the USA to test the Spanish translation of the National Health Interview Survey (NHIS) Cancer Control Supplement Dietary questionnaire with 36 Spanish-speaking and nine English-speaking participants. The findings from this study highlights some of the typical issues that are brought to light during a cognitive interview process:

- **Translation issues.** Words did not convey their intended meaning when translated from English to Spanish.
- **Cultural issues.** Answers to questions that involved knowledge, behaviour or concepts that differ between cultures or nationalities.
- **General design issues.** Questions that presented difficulties to respondents that appeared independent of culture or language (such as question wording).

See **Box 6** for an example of the application of cognitive interviews.



Box 6: Example of cognitive interviews

Cognitive interviews were used to examine the “face validity” of two different single-item scales to assess the pain that patients experienced at the Moi Teaching and Referral Hospital in Kenya. Face validity measures whether a question is valid from the perspective of the respondent (Brinkman, 2009). The scale used was the Numerical Rating Scale (NRS) and the Faces Pain Scale-Revisited (FPS-R) (Huang et al. 2012). The sample was drawn from a population of patients in the medical, surgical and paediatric wards.

The pain scales are used by physicians to assess and diagnose treatment for patients with different pain intensity. The NRS is a scale based on a sequence of numbers from a low to a high value. The FPS-R scale is a pictorial depiction of facial expressions sequenced from a happy face to a grimace or facial expressions indicative of being pain-stricken.

The two pain scales were administered to patients in the sample. Cognitive interviewing was then used to examine how participants understood, processed, and responded to the pain scales. The findings showed that respondents had an understanding of both the NRS and the FPS-R and showed rational decision-making processes in choosing their responses. However, while participants felt that both scales were easy to use, they preferred the pictorial one (FPS-R) to the numerical one (NRS).

Source: Huang et al.(2012)

Modular design approach

Modular design can make data collection more convenient for the respondent, but additional effort is needed in collating the responses. A modular design approach breaks the interview process into discrete modules that can be administered to respondents at different times and via different data collection methods. According to Johnson et al. (2013), the benefits of a modular design include a reduced cognitive burden on respondents, as well as better management of short attention spans or aversion of respondents to long interviews, through the allowance for breaks in telephone-based or web-based interviews. In addition, modular design outputs benefit from limited recall bias and the ability to leverage multiple data collection methods, where relevant (e.g. via the mobile phone).

However, a short-coming of the modular design approach is that it could be time inefficient given that interviewers would have to wait until it is convenient for respondents to complete questionnaire modules. The implication is that interviewer costs would increase since interviewers would have to spend relatively more time per respondent, resulting in a higher cost-per-interview. Other trade-offs to using a modular design are mode effects of the data collection methods used. Furthermore, there will be coverage bias if the modular design is based on SMS-based data collection, since people without mobile phones will be excluded from the survey.

Question phrasing and response structures

Questions can be pre-tested to determine optimal question phrasing and response options to minimise errors and respondent burden. The choice of words and phrases in a question is important in communicating the meaning and intent of the question to a respondent. Some words or questions may result in different interpretations by respondents and differ from the underlying construct that should be measured (known as “specification error”⁶). A number of studies have been conducted to

⁶ A specification error occurs when the concept implied by the question is different from the underlying construct that should be measured (Banda 2003).



understand how the wording and phrasing of questions can mitigate against this. Some of these studies are discussed below:

- ***The importance of testing for acquiescence.*** To ensure data quality and the reliability of responses, it is important to test whether respondents are more likely to answer questions affirmatively based on the way the questions are phrased (known as “acquiescence bias”). Kamoen et al. (2013) investigated this across twelve studies to see if any generalisations could be made. The studies look at the effect of question polarity (e.g. a ‘yes’ or ‘no’ question) and dissimilar adjectives (e.g. favourable/unfavourable). The study found that respondents’ opinions were more favourable in a positively-worded question, than other questions, indicative of acquiescence bias⁷.

However the study’s findings have limitations. The acquiescence bias could be driven by other factors such as the number of scale points in the answer options, the position of the question in the survey questionnaire, and the response option type (scales vs. item specific response options). Additional factors such as age, education and social status were also found to be key factors affecting how respondents interpret questions which would influence their responses (Campostrini and McQueen, 1993).

- ***Specificity in structuring responses outweighs agree/disagree scales.*** With regards to responses, Krosnick et al. (2010) compared the quality of responses to questions with agree/disagree ratings scales and those with item specific response options. An example of item specific question is, “How would you rate your health? – excellent, very good, good, fair, or bad?” while an agree/disagree scale question could be depicted as – “To what extent do you agree that your health is excellent? – agree completely, agree somewhat, neither agree nor disagree, disagree somewhat, or disagree completely”.

Their findings show that questions with item specific response options limits acquiescence and minimises the cognitive burden (in relation to the process of understanding the question and opting for a response) on the respondents. Difficulty in generating answers to questions with agree/disagree scales is likely to enhance respondent fatigue, which may affect the quality of individual responses later in a questionnaire, resulting in an overall low quality interview. In cases where agree/disagree scales are used, Krosnick et al. (2014) argued that researchers should offer five answer categories rather than seven or 11, because the latter results in data of lower quality. However, further research is required to discern what the optimal number of response categories should be for agree/disagree scales.

- ***Numeric literacy considerations could render responses with vague quantifiers better than numeric responses.*** Baghal (2014) compared vague quantifiers (e.g. very often, often, not often) to numeric responses (e.g. once a week, twice a week, ten times a week) to see which performed better in terms of predicting actual outcomes/trends from a question. Using the American National Survey of Student Engagement (NSSE), the analysis of respondents’ answers focused on the predictive validity of the different responses in regards to variables relating to the academic outcomes and perception of educational experience. To achieve comparability, all analyses include only cases where respondents gave answers to both measures, vague and numeric. The findings show that vague quantifiers may have performed

⁷ Example of a negative question is respondents having agree or disagree to a questionnaire item worded as “this weather is favourable”. Example of a positive question is respondents having to agree or disagree to a questionnaire item worded as “this weather is unfavourable”. Example of a bipolar question is respondents having to provide a rating based on a scale ranging from negative (bad) to positive (good) to a questionnaire item worded as “this weather is ___”).



better in terms of predictive validity compared to numeric responses. This is due to the idea that people might not always think in numeric terms and that the components of the vague quantifiers are more easily understandable in explaining behaviour. A limitation of the study is that all respondents were college students, therefore the sample limits potential generalisability.

Relevance for financial inclusion

Table 2 summarises the key trade-offs between cost, time and quality identified when implementing best practice in survey design. It uses a colour combination of green (good), amber (neutral) and red (bad) to highlight their impact. For example, whilst cognitive interviews increase the cost of DSS, they result in less time during the actual survey (due to reduced respondent fatigue) and higher quality data (less response bias and more answers completed). Similarly, whilst testing and improving question phrasing and responses may take more time upfront and add on time whilst the survey is implemented, the quality of data is increased.

Innovations / Best practices	Cost	Time	Quality
Cognitive interviews	Increases	Decreases	Increases
Modular design	Increases	Increases	Depends
Testing for acquiescence	Increases	Depends	Increases
Item specific responses	Depends	Depends	Increases
Vague quantifiers	Depends	Depends	Increases

Table 2: Trade-offs between cost, time and quality in different data collection innovations

Source: Author's own

The following provides further detail to how these different approaches can be used in financial inclusion:

- FI DSS often investigate complicated subject matter that can have many interpretations. Cognitive interviews can help determine if appropriate wording and terminology is being used so that respondents understand the questions asked. In addition, FI DSS are often translated into multiple languages and cognitive interviewing can confirm if the core meaning of the question has remained the same in the process of translation. Cognitive interviewing should be applied whenever a new question or module is added to a questionnaire, and before data collection commences, as part of a pilot.
- A modular approach might not be ideal for FI DSS, as a stand-alone data collection approach. For instance, inviting respondents to choose the most convenient data collection method could have cost and time implications for FI DSS. In addition, SMS-based modular design would result in coverage bias in the context of a FI DSS in the developing world, where mobile phones are relatively less ubiquitous compared to developed countries.
- There are a number of best practices in question and response rephrasing that need to be consistently incorporated in FI DSS to improve the quality of data. Furthermore, pre-tests should be carried out to ensure that questions and response categories are designed



appropriately to minimise item non-response or inaccurate responses, as well as reduce the respondent burden. All leading to improvements in the quality of the data.

5. Conclusion

This report provides an overview of some of the key innovations and best practices in data collection, sample design and survey design, to assist organisations and individuals in selecting the approach that best speaks to their needs and context.

For example, in developing countries, face-to-face personal interviewing will still be necessary for FI DSS in the short-term to ensure that the trade-off between data quality and cost and time efficiencies is balanced. Technological advancements such as CAPI, SMS-based mobile data collection and linked admin data may not currently be feasible in developing countries, but the time and cost efficiencies, as well as the improvements in data quality they offer, could be useful for driving financial inclusion in the future. A mixed-mode approach could be one solution to balancing these innovations with the realities of the developing world.

Innovations in survey sampling, such as dual-frame sampling, should be explored, but come with its own limitations. Dual-frame sampling has the potential to count respondents more than once which can impact weighting, particularly where mobile phone penetration is high and there are more individuals that have multiple numbers. Planning how to optimise a sample, especially in a widely diverse environment, could be improved by striving for precision in capturing the right mix of eligible respondents, without compromising on coverage. In countries where demand-side surveys have been carried out in the past, it is recommended that empirical measurements from previous waves are used to inform aspects such as variability and coverage.

In many FI DSS, there is still scope to apply best practices in survey design. The reduction of cognitive burden on respondents can lead to improved data quality with varying effects on time and costs. For example, responses that are presented in a pictorial form, especially for questions looking to capture household consumption items such as food, can provide better responses than those in numerical form. Further pre-testing of question phrasing and structuring upfront can minimise non-response or inaccurate responses, as well as reduce the respondent burden.

Although this report provides insights into possible ways to improve DSS, the list of innovations and best practices is constantly evolving. The intention is that highlighting these areas of improvement will lead to further research, as well as have a positive impact on FI DSS design.



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