REFRAMING FINANCIAL HEALTH: FROM CANARY IN A COAL MINE TO A THERMOSTAT FOR ACTION

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Section 1: Financial Health Measurement as a Diagnostic Tool

Over the past decade, financial health has emerged as a key outcome metric for gauging the efficacy and effectiveness of financial inclusion strategies. The measurement of financial health is often motivated by the premise that inclusion in formal finance *ought to* engender positive financial outcomes for the target segments. Good financial health, broadly defined as an individual/household's ability to meet current needs, plan for the future, and withstand shocks, has steadily come to be regarded as *the* positive financial outcome that financial inclusion policy should aspire to.

Most approaches to impact measurement in financial inclusion map the determinants of financial health, their influencing factors and their preconditions, with the intent to identify whether positive outcomes fail to materialise or adverse outcomes persist. This is akin to the role of a canary in a coal mine. Just as miners of the 20th century would use canaries to detect the presence of dangerous gases, financial health measurement is deployed to detect early warning signals of distress. The typical approach to financial health measurement, therefore, only paints a general picture of financial health outcomes in the population targeted by financial inclusion efforts. In this paper, we argue that using financial health metrics as a warning signal is useful, but not inherently actionable, since it is difficult to know where the failure has occurred and what appropriate corrective measures may look like.

Our submission in this paper is that impact measurement in financial inclusion, i.e., financial health measurement *can*, and *ought* to, play a more diagnostic role in financial inclusion strategy. This is the conceptual departure that the title of the paper describes as the shift 'from a canary in a coalmine to a thermostat'. The Financial Health Survey (FHS) proposes, quite differently from most other financial health measurement efforts, that such measurement should be able to detect the current state of financial health *and* indicate potential corrective mechanisms. In a sense, the FHS acts like a thermostat. Similar to how a thermostat indicates whether the room is hot or cold and regulates the temperature by activating heating or cooling systems, the FHS takes stock of customer financial health and provides some indication regarding what to do about it. The FHS is built upon the "-Input-Output-Outcome-Context-" (-I-O-O-C-)[1] model, which is an alternate theory of change (ToC) that can explain financial health outcomes. It enables cross-referential readings of data on input (access), output (usage), and outcome (financial health), mediated and coloured by measurable contextual factors. This allows us to identify where the pathway from access to usage to impact may be breaking down and failing to contribute to positive financial health for specific customer cohorts. Thus, the true value of the FHS lies in its ability to segment financial health outcomes by various contextual factors. Particularly, our approach is cognizant that financial health is a composite of a complex set of factors, only some of which are readily amenable to interventions by policymakers or Financial Service Providers (FSPs). FHS directs focus to aspects of context that are within the sphere of influence of FSPs and policymakers, as laid out in Section 2. This narrowing of focus paradoxically expands the field of possibility for stakeholders in financial inclusion, by giving them truly actionable insights that help them intervene more meaningfully in those areas where they are able to create the best impact. That is, by

[1] The -I-O-O-C- model is stylistically presented as such to indicate that, by measuring context, a feedback loop is created which can enhance the design of the products and services (input/access). This is further elaborated in Section 5.

measuring and reading impact alongside financial product access, their usage and the context of target users, the FHS can offer operationally feasible insights for both business and policy strategy.

Overall, the FHS offers policymakers and financial service providers (FSPs) some degree of adaptive capacity to incrementally orient themselves to customers' actual experiences of financial products and policies. It contributes towards much-needed alignment between the financial health of low-income customers and the financial system at large.

This paper is structured as follows. Section 2 provides a functional representation of financial health and clarifies the boundaries and parameters that constitute it. Section 3 summarises the theories of change (ToCs) underlying other approaches to impact measurement in financial inclusion and identifies their shortcomings. Section 4 describes the conceptual model underlying the FHS, titled the Input-Output-Outcome-Context (-I-O-O-C-) model and explains how it improves upon the existing approaches described in the preceding section. Section 5 outlines some key characteristics of the -I-O-O-C- model, followed by an explanation of the FHS' diagnostic capability in Section 6. Section 7 provides concluding remarks and a brief summary of the ideas presented in the paper.

Section 2: Financial Health – Our Functional Representation

Many ToCs about financial inclusion recognise that financial health, broadly construed as a household's ability to meet its current obligations, plan for the future, and absorb financial shocks with confidence, is not the outcome of any single factor or intervention. Rather, it results from a complex interaction among multiple variables that operate at different levels, viz., individual (like individual risk appetites), household (like household wealth endowments), community (such as social capital), market (such as access to financial services), and institutional (such as nature and quality of financial infrastructure). That is, financial health is overdetermined and has more potential causes than any extant framework can track, and the relative weight of those causes varies across contexts, segments, and time horizons. These variables influence one another in ways that are neither linear nor predictable. Some of these variables may be amenable to influence exerted by (say) financial services or policies, while others may be more resistant.

A useful way to make this overdetermination tractable, and to begin identifying which levers are actually within reach, is to represent financial health as a function of its principal determinants, and then to differentiate those determinants by the degree to which they are amenable to influence by FSPs or policymakers. We propose the following functional representation:

Figure 1: A functional representation of financial health

Financial Health = Function of (

****Financial Awareness, *Financial Access, *Financial Product Usage, $Occupation, $Wealth Endowment, $Household-level Factors, $Individual Factors, $Social Capital***

)

$ - Variables that cannot be immediately influenced
** - Variables that can be influenced significantly and measurably*

This representation is not a regression equation, and it makes no claim about the precise causal relationship or the relative magnitudes of each term. Its purpose is functional insofar as it attempts to make visible the distinction between the factors that are amenable to change in the short to medium term through the efforts of policymakers and/or FSPs and those that are not.

Factors amenable to change: The three variables marked with an asterisk — financial awareness, financial access, and financial product usage — are those over which FSPs can exercise direct and measurable influence.

Financial awareness refers to a household's knowledge of formal financial products and processes. Awareness is a necessary precondition for access, and FSPs influence it through product marketing, financial education, and agent engagement. It is pertinent to note, however, that awareness is more difficult to attribute to any single provider (compared to access or usage), because it is typically diffused, competitively contested, and shaped by marketing efforts across

multiple providers, policy makers and informal channels. This limits its utility as a reliable impact metric for any given provider, though it remains operationally relevant for this representation as a diagnostic indicator of the gap between potential and realised access.

Financial access refers to the actual take-up or ownership of a suite of formal financial products that serve distinct financial functions, such as savings for asset accumulation and insurance for risk management. While access is sometimes interpreted as availability of or proximity to financial touchpoints, our definition is somewhat narrower. It considers access to be fulfilled only through the ownership of financial products – since it is only at the point of ownership that a product can possibly begin to influence financial health through its' usage. An FSP or policymakers' most direct contribution to financial health, in the short term, is the extension of ownership to households that previously lacked it, making access metrics a legitimate, albeit incomplete, starting point for impact measurement.

Financial product usage refers to the nature and frequency of engagement with products that a household owns. A household may own a savings account and yet transact through it rarely or may hold an insurance policy and yet be unable to renew it or activate a claim. Usage is the dimension where the difference between nominal and meaningful financial inclusion becomes apparent. Active, regular, and purposeful engagement with a product is primarily evidence of its suitability for the customer's context. Further, it also represents the mechanism through which improvements to financial health could be effected. FSPs influence usage through product design, pricing, touchpoint availability, and the quality of the customer relationship, all of which are within their operational control.

Factors not amenable to change: The five variables marked with a dollar sign — occupation, wealth endowment, household-level factors, individual factors, and social capital — are those that operate largely outside the FSP's sphere of direct and immediate influence. These are contextual factors, which are fixed in the short to medium term.

Occupation determines the quantum, regularity, seasonality, and reliability of a household's income, and thereby describes the underlying livelihood architecture within which all product access and usage decisions are made. A seasonal agricultural labourer and a salaried urban employee may own identical savings products, but usage of that product might have radically different implications on financial health. The labourer must manage lumpy, irregular inflows against continuous expenditure obligations, while the employee can plan around predictable monthly receipts. Occupation cannot directly be changed by mere access to finance in the short or medium term. A micro-enterprise loan may enable a nano-entrepreneur to grow her business, but it does not change her occupation category, or the inherent income patterns that shape her financial life.

Wealth endowment refers to the initial level of asset ownership, such as land, house, livestock, durable goods, and gold. These function as minimum safety nets in times of distress. Initial wealth endowment is largely independent of financial inclusion interventions, particularly in the short term. It shapes a household's baseline financial resilience and its capacity to absorb shocks without resorting to distress borrowing or asset liquidation. Two households with identical product access portfolios may have very different resilience outcomes if one owns land that can be leveraged in financial decisions, while the other does not.

Household-level factors refer to the structural characteristics of the household as a unit, like its size, the number of earning members relative to dependents, the stability and composition of its income streams, and the degree of cohesion and cooperation among its members. These factors determine

how financial resources are pooled, allocated, and managed within the household, and they are arguably among the most consequential determinants of financial health outcomes. A household with multiple earning members and few dependents has a very different risk profile and very different financial health prospects compared to a single-earner household supporting a large number of dependents, even at the same gross income level.

Individual factors refer to the personality traits, risk appetites, attitudes toward finance, and individual motivations of household members that shape their financial behaviours. These traits are idiosyncratic as they may be unevenly distributed even among members of the same household. Furthermore, they are not readily amenable to change through product access or financial education. A person with a high tolerance for financial risk and a disposition toward investment will engage differently with the same set of financial products than one who is risk-averse and has a cautionary orientation. Recognising this heterogeneity within and across segments is important for understanding why the same intervention can produce very different outcomes for very similar-looking households.

Social capital denotes the reputational and relational value that a household, collectively, and its members individually, have accumulated within their social network over time. In low-income contexts, social capital is itself a financial resource influencing the ability to call on friends, neighbours, and extended family for informal (and sometimes interest-free) loans, or labour in times of need (Dvara Research, 2024). It constitutes a form of financial resilience that operates entirely outside the formal financial system. Social capital also shapes the willingness to engage with formal financial institutions. Households with strong social networks and functioning informal financial arrangements may see less need to formalise their financial lives, while those with weaker networks may be more motivated to seek formal channels.

It is worth making explicit that, of all the determinant factors of financial health, some are individually expressed, i.e., they are idiosyncratic and unevenly distributed among members within any given group or segment. Individual factors and initial wealth endowment fall into this category. They vary from person to person and household to household in ways that resist aggregation[2]. Therefore, it is difficult to predict the distribution of these individually expressed factors within a group from just group-level data. Other factors are group-expressed, i.e., they are common to populations of people who are similarly placed by occupation, geography, or social position. The nature of agricultural income seasonality, the informal financial infrastructure available in a particular region, and the degree of market penetration of formal financial products are all group-expressed traits that shape the financial lives of everyone in that group, regardless of individual variation. Both kinds of variation matter for financial health to manifest and scale at the population level, and both must be held in view when interpreting the relationship between access and financial health. In interpreting the results of the Financial Health Survey, we treat idiosyncratic individual factors as given (discussed in Section 5) and interpret the results at the appropriate group level to understand group-expressed factors and their influence on financial health across segments. For some aspects of financial health, the household is the appropriate group for analysis, whereas for others, the occupation category, the region of residence, or some other group-defining characteristic becomes the appropriate group for understanding the observed variations in financial health.

[2] Individual factors, like risk appetite or savings preference, are individually expressed traits. Factors like wealth endowments might be very similar across a group (say, cab drivers) but sufficiently different to be considered as individually expressed.

The functional representation in Figure 1 is also an explicit acknowledgement that financial health cannot be manifested by any single stakeholder acting alone. At best, individual stakeholders can exert limited influence over specific determinants of financial health (because financial health is overdetermined, as we have already pointed out). Such influencing may be more effective when these points of intervention are correctly identified, and the factors beyond their scope are treated as constraints rather than problems to be addressed simultaneously.

This shapes the two anchoring propositions of this paper: (i) that financial health is overdetermined, and that a measurement framework which does not distinguish between what FSPs can and cannot influence will systematically produce misleading signals about both the impact of financial inclusion and the appropriate corrective response when that impact falls short of what is desired, and (ii) the context in which financial health is pursued, in the short to medium term, is more or less fixed. It is therefore a constraint to be optimised for rather than a variable to be solved.

Now that we have made the case for using financial health (as delineated above) as the outcome metric, we will direct our attention to different ToCs that currently underpin impact measurement. A comparative understanding of these different ToCs and the gaps therein would help understand the best way to utilise financial health as an outcome in impact measurement.

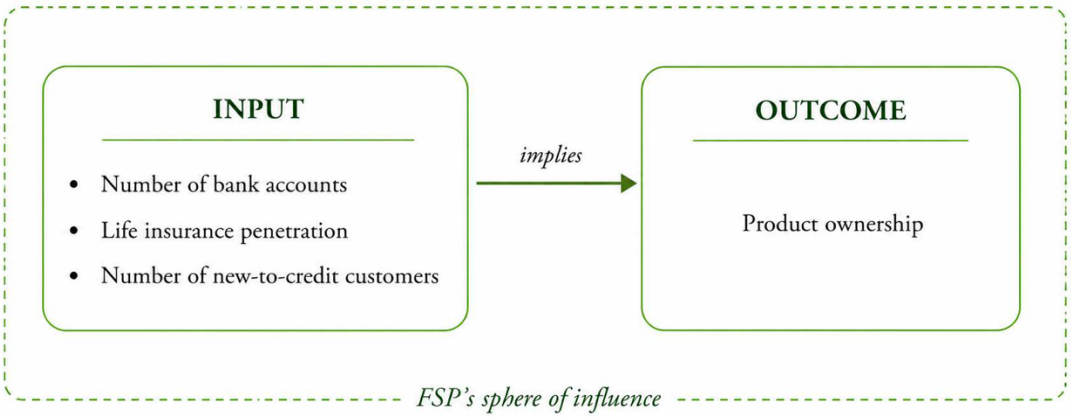
Section 3: Reviewing Theories of Change in Financial Inclusion Impact Measurement

The ToCs associated with the impact of financial inclusion have evolved considerably over time, and understanding this evolution is important to understanding why various organisations measure certain metrics. It is pertinent to note that not all ToCs are explicitly laid out in detail. Some, like the OECD G20 Policy Note on Financial Well-Being or i2i's Measurement Framework Concept Note, lay out a detailed causal logic. Others, such as those in the UNCDF's Working Paper on Financial Health or CFSI's Policy Brief on Financial Health, make the case for certain metrics, like financial health[3], to be measured without spelling out the causal architecture fully. Still other efforts at impact measurement such as the NABARD NAFIS, 60 Decibels MFI Index, or Global Findex, undertake impact measurement without an explicitly stated ToC. Notwithstanding these differences, it is possible to reconstruct the implicit causal logic embedded in each approach by examining what it treats as an **input**, what it treats as an **output/outcome**, where it draws the boundary of FSP influence (indicated by the dotted line in the figures below), and what assumptions it makes about the pathway connecting inputs and outcomes. The causal logic followed by a ToC is referred to as a "model" in the following discussion to denote the mechanistic pathway that each ToC follows from input to outcome. These models are also represented in the form of flowcharts in Figures 2-5 in this section.

This section lays out the underlying assumptions and limitations of each prevailing ToC. As discussed below, there are predictable consequences to the different boundaries of inquiry drawn by each ToC. That is, there is variation in what each ToC does and does not count as the determinants of financial health.

(i) Access as the end – A Provider-Centric Model:

Figure 2: Provider-centric model



[3] The literature on financial inclusion impact also refers to other outcome metrics such as financial strain, financial resilience, financial well-being, and financial capability. This paper considers financial health to be the preferred outcome metric for our ToC. We find the other outcomes (listed above) to be *unneutral*, insofar as they anchor themselves to some positive/negative outcome. For example, metrics like financial strain and resilience seek to avoid negative outcomes while metrics like well-being and capability aspire for positive outcomes. In comparison, financial health, as a term and as per definition, anchors to the present while still being progressivist from a neutral stance.

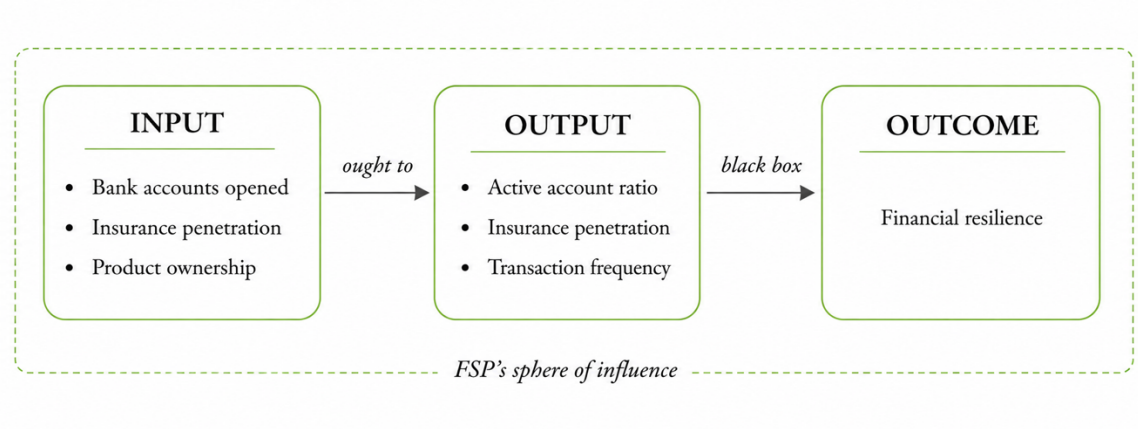
This model, depicted in Figure 2, follows the causal logic that access, i.e., the extension of formal financial products and services to previously underserved populations, over time, will generate positive outcomes. This causal logic motivates the measurement of access metrics, such as the number of bank accounts opened, life insurance penetration, the count of new-to-credit customers, etc. Such ownership of different product categories is assumed to lead to improvements in financial health. In this model, access is the **input**, and positive financial outcomes implied from product ownership are the **outcome**. Underlying this assumption is the unstated premise that formal financial products are uniformly and universally better than informal financial products for all customers, i.e., access is construed as a sufficient condition for impact. It is the oldest and still the most prevalent ToC among FSPs and national policymakers. The NABARD NAFIS survey, the MIS systems of most FSPs, and the policy tracking under Jan Dhan-Aadhar-Mobile follow a similar logic.

However, there are some limitations to using this approach for measuring the impact of financial inclusion. First, access is measured as ownership of a particular product, often offered by a specific provider. Such access metrics neither capture the customer's usage of these products, nor their engagement with other products. Customers might use different products offered by other providers within the same product category to fulfil a specific need. For example, a smallholder farmer may be using informal credit in addition to microfinance to finance seasonal capital requirements, but access metrics as construed here will not capture the same.

Further, this is a provider-centric model, which only includes those aspects of access and impact that are within the immediate influence of the FSPs, as depicted by the dotted line in the figure. While this focus on metrics that FSPs can influence is valid, this model fails to account for the other contextual factors that co-determine financial outcomes, such as households' endowment levels, risk appetites, etc (See Section 2). The ToC treats improvement in the access metric of a particular chosen product as sufficient evidence of impact on financial outcomes, which may not be the case, and is practically unhelpful since it is bound to underestimate or overestimate the influence of product access (i.e., input) on outcome. The FSPs' sphere of influence and the impact endpoints are treated as the same, making measurement easy but attribution almost meaningless conceptually.

(ii) Access with usage as proxies for impact – The Financial Inclusion Scorecard Model:

Figure 3: Financial inclusion scorecard model

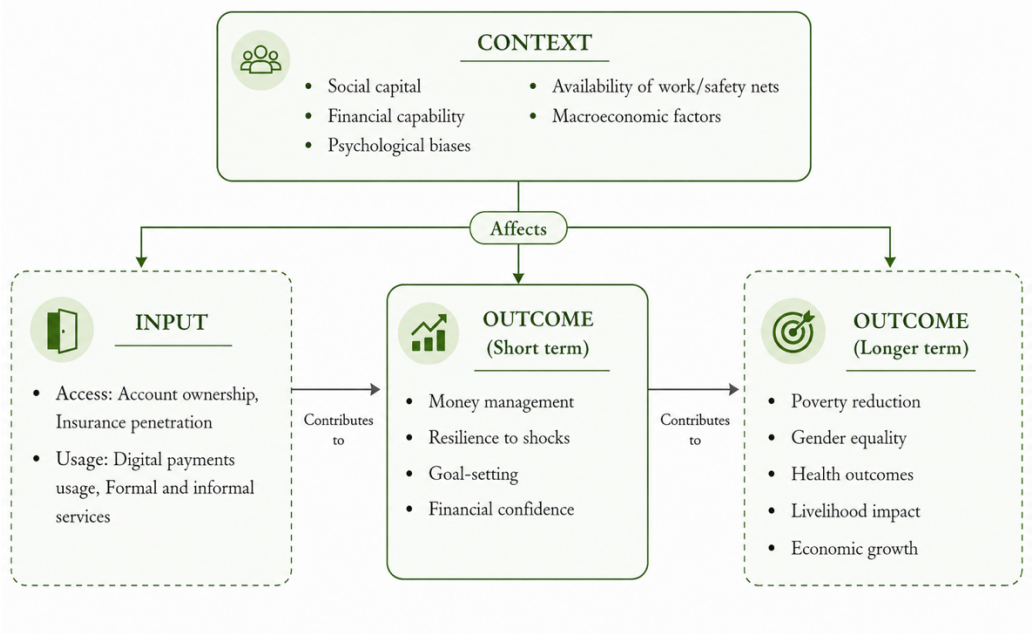


This ToC expands on the earlier theory by accounting for usage. It is also further nuanced by the recognition that access does not always lead to usage, i.e., it treats access as a necessary but not a sufficient condition for impact. As depicted by the dotted line in Figure 3, the FSP is thought to be able to influence access, usage and impact as per this ToC. Here, the causal chain is that access, when coupled with active usage, leads to improved financial resilience. In the scorecard model, access is the **input**, usage is the **output**, and financial resilience is the **outcome**. The underlying presumption that access to formal financial products is unequivocally desirable remains, but it is qualified by the requirement that those who have access need to start using these products for impact to manifest. The model includes usage metrics such as active account ratios, insurance persistency, loan uptake, etc., that capture aspects of usage. It also includes facets of financial health, particularly resilience, to capture impact. The Global Findex survey, the 60 Decibels MFI Index and many national financial inclusion strategies currently follow this model. This model is also becoming increasingly prevalent in provider-led impact measurement in the microfinance sector.

This ToC presents conceptual refinement over the first since it measures the spectrum, from access to usage to impact, and begins to register the gap between nominal and meaningful inclusion. However, the pathway from access to usage to impact, in this model, remains essentially a black box. It measures the nodes of the chain but does not enable the user to comprehend the links connecting them because it does not account for context in a meaningful way.

(iii) Financial health as the north star – The Financial Bridge Model:

Figure 4: Financial Bridge Model



This is a more recent and increasingly influential ToC is exemplified in the UNCDF's Financial Health Working Paper (2022), the G20 policy note on financial well-being published by the OECD (2024), and other publications by these two organisations. The ToC positions financial health as a bridge between financial inclusion measures and broader development outcomes like the SDGs (see Figure 4). It defines financial health as a multi-dimensional state encompassing day-to-day money management, resilience, goal-setting, and financial confidence. This model addresses a crucial limitation of the earlier ToCs by appreciating the influence of contextual factors such as

social capital, psychological biases, and macroeconomic factors (among many others) in determining financial health outcomes. In the financial bridge model, access and usage are both **inputs**, which can lead to the **short-to-medium term outcome** of financial health, which in turn enables the realisation of **longer-term outcomes** of development (such as the SDGs).

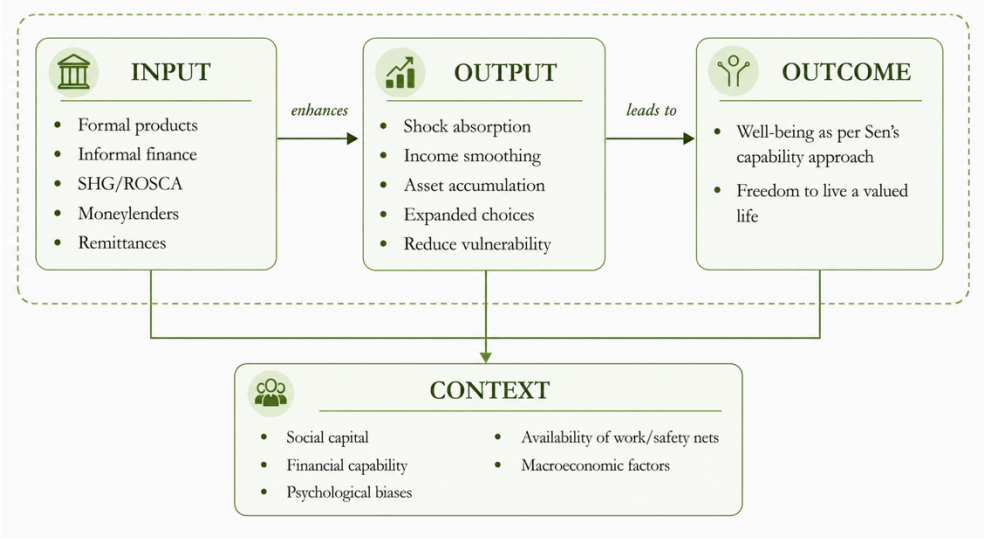
The key departure of this ToC from earlier ones is that it affirms that financial inclusion does not automatically produce high financial health. It therefore does not see financial inclusion as an exercise in building capability or creating ultimate development impact. Instead, it views financial inclusion as one more ingredient that may aid financial health, which can then help achieve other developmental goals. Therefore, the model places central importance on the measurement of financial health for its own sake rather than as an outcome of financial inclusion. Financial health, therefore, acts as the "north star" for development actors who believe that good financial health outcomes could be the bridge to long-term development impact.

The limitation of the Financial Bridge Model, however, is that the appreciation of context does not motivate its proper measurement, or an understanding of how those contextual factors may also interface with access to formal finance. Further, by measuring financial health independently of the inclusion pathway (which includes context), it severs the diagnostic connection between the two. It can tell us that a given population is experiencing poor financial health; it cannot tell us which aspect of the access-and-usage chain is failing to translate into better outcomes, or what a specific stakeholder should do differently. It produces a signal without describing the circuit.

Another limitation of this ToC is that it still implicitly anchors itself to the pre-determined ends of development goals. But in the context of financial inclusion, where outcomes (financial health) are overdetermined, such anchoring may be limiting. It narrows the scope of the measurement methodology oriented to those developmental ends in terms of what it may or may not measure.

(iv) Financial well-being as the intermediate metric – The Capabilities Model:

Figure 5: The Capabilities Model



Exemplified primarily in the work of CGAP, this model (depicted in Figure 5) accounts for the various contextual factors such as life events, individual factors (like education, skills, age), household factors (like cultural values, household resources), and national factors (like macroeconomic stability, social stability, etc.) that impact financial health and recognises that these

are often beyond the scope of the financial sector (CGAP, 2025). Furthermore, the causal logic is more nuanced, where financial services (of any kind, including informal finance) are deemed to build intermediate outcomes in the form of resilience and opportunity, which in turn are expected to lead to well-being (CGAP, 2019). Well-being is construed using Sen's capability approach and is described as the freedom to live the life that one values (CGAP, 2018). Finally, the model explicitly acknowledges that these contextual factors mediate the effect of financial products and policies on broader development outcomes (such as poverty reduction, women's economic empowerment, and economic growth), making it difficult to measure their impact on these outcomes. This places its causal logic squarely within context in two ways: (i) it recognises that financial services do different things for different people depending on the circumstances, product type and other contextual factors, and (ii) what one values could itself be contextual. It therefore calls for impact measurement to account for individual and contextual heterogeneity. To summarise, the capabilities model construes access to finance (formal and informal) as **input,** considers financial health as an **intermediate output,** while the ultimate **outcome** is overall well-being.

There are two limitations to this ToC. First, while it acknowledges the difficulty in establishing causal links between financial inclusion efforts and SDG-derived development outcomes, it still presumes that the former can support the latter, albeit under ideal contextual circumstances and possibly in tandem with other policy efforts.[4] As mentioned earlier, such an anchoring may be limiting in nature. While this anchoring may be necessary to coordinate efforts with the broader international development ecosystem, it may overestimate (or underestimate) what financial inclusion can realistically achieve. More crucially, in doing so, it may miss out on different types of emergent outcomes that may not be amenable to measurement.

Another limitation pertains to the fact that this ToC lacks diagnostic capability. Despite an insistence that individual and contextual heterogeneity matters, it does not resolve into a measurement instrument that can guide an FSP's product or pricing decisions, a regulator's consumer protection framework, or a policymaker's programme design. It describes the shape of the problem with considerable accuracy but does not offer the tools to act on that description within the constraints that practitioners actually face. Therefore, its limitation lies not in its conceptual framing but in its operational relevance.

Overall, the four ToCs presented in this section have some limitations that prevent financial inclusion impact measurement from being a meaningful diagnostic exercise. Some of these limitations are due to underlying assumptions about how financial inclusion ought to be achieved, how financial health ought to be manifested, or how to practically simplify the measurement exercise. These are summarised below:

> ✅ **ToCs often conflate what can and cannot be influenced by a financial product or policy.** Typically, this means that the ToC fails to acknowledge various contextual factors and their mediating effect on financial health outcomes (this is seen in the provider-centric and scorecard ToCs). Such ToCs do not appreciate that financial health is an outcome of multi-variate factors and has more potential causes than any single framework can meaningfully track. This leads to epistemic spuriousness in the measurement exercise, since financial products or policies are assumed to directly lead to improved end outcomes. The honest starting point for impact measurement in financial inclusion, then, is an acknowledgement that financial health is overdetermined.

[4] This assumption is demonstrable in CGAP's Impact Pathfinder Tool.

- ✅ **In most cases, context is ignored.** Even where context is explicitly acknowledged, such acknowledgement does not resolve into tangible measurement and interpretation frameworks that can explain outcome metrics. A direct consequence of failing to meaningfully use contextual factors in measurement and analysis is the overstating of the service provider's sphere of influence, assuming that service providers can directly influence financial health outcomes. Measurement exercises built upon such theories will fail to provide real value since they assume any intervention indicated by the measurement exercise will impact financial health outcomes. Delineating those levers that are within reach for an FSP or policymaker is a useful heuristic that will reflect the complex reality of financial systems more accurately.
- ✅ **The first two ToCs are product-driven**, i.e., they seek to measure the impact of a given product or product category on financial health outcomes. Neither the provider-centric nor the scorecard models admit the conceptual possibility for a user's specific financial management needs to be met through the use of other products (possibly within the same product category but offered by other providers, or through other product categories, or even through informal channels of finance). Such ToCs often tend to point back to the customers, framing their actions as impediments to their own financial health using the language of behaviours and biases. This entirely misses the possibility of product misfit for customers.
- ✅ **ToCs often operate on the predetermined and sometimes unwritten assumption that financial inclusion will lead to favourable development outcomes.** This commitment to achieving broad-based long-term outcomes through financial inclusion influences impact measurement such that it directs focus away from specific short-to-medium-term impacts.
- ✅ **ToCs are not diagnostic.** Following from all of the above points, is the matter that none of the ToCs described above allow one to diagnose where exactly the ToC breaks down in contributing to financial health. Therefore, none of these ToCs can theorise actionable pathways for FSPs and policymakers to rectify or modify financial inclusion efforts.

Importantly, many of the limitations of the existing ToCs in financial inclusion impact measurement pertain to their inability to capture the subjective reality of LIHs financial lives' through objective measurement frameworks. There is a need for a certain degree of neutrality to balance out the subjective nature of this measurement exercise, to ensure that it is not coloured by presumptions regarding impact pathways, outreach channels, and optimal breadth of impact. The FHS is built on a conceptual model of reality that is inherently neutral in nature, unlike some of the ToCs discussed above. The next section describes this model, which we refer to as the -I-O-O-C- model, in detail and explains how it addresses the limitations of the other models.

Section 4: A Stronger ToC for Financial Inclusion: The -I-O-O-C- Model

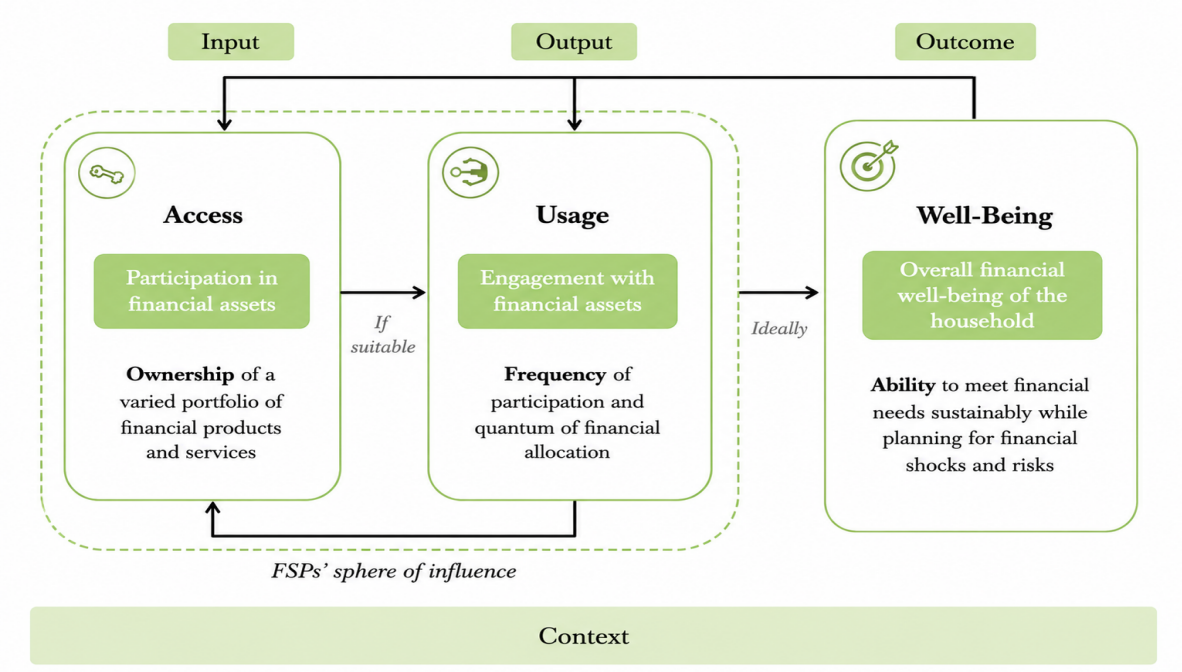
The -I-O-O-C- Model addresses the limitations of existing ToCs as described in Section 3. Most crucially, it delineates the sphere of influence of FSPs and policymakers through product and policy design, while treating other contextual factors as given. That is, it asks the question: 'all other things being equal, how is access to financial products and their usage influencing customers' financial health?'

Further, the model envisions financial health as a long-term outcome in itself. We expect there to be a significant time lag between access and meaningful gains in financial health. Therefore, other longer-term developmental outcomes like economic growth, gender equality, livelihood improvement, etc., which are contingent upon other contextual factors, are not featured in our model. There are two reasons for this: (a) the causal links from financial health to those development outcomes are not well-established and unilateral (as assumed by the Financial Bridge Model), and (b) financial health might not activate the capability to achieve those goals, since other non-financial capabilities may also be implicated (contrary to the assumptions of the Capabilities Model).

Finally, the model (and its diagnostic capability) is not tied to products or product categories as they are currently designed and offered. While the impact metric is decidedly fixed, i.e., the different parameters of financial health are considered a legitimate end in themselves, the means to that end are not so fixed. That is, the different categories of products that constitute access (such as savings, insurance, investments, etc.) and their use are not considered the only pathways to the intended impact.

The -I-O-O-C- model considers access as the **input**, usage as the **output**, and financial health as the **outcome**, with context as an underlying mediator at each node of the model. The ToC we present follows a similar impact path from access to usage to impact as the ones described above, but with key qualifications at each node.

Figure 6: The -I-O-O-C- Model



Access to financial products and services will engender usage *if and only if* it is found to be suitable for the context. Usage, in turn, will bring about financial health only in the *ideal contextual situation* where all factors align positively. This qualification of suitability and ideal multi-dimensional alignment of factors stitches context into the ToC making it a mediating conduit for impact. Thus, context becomes a primary determinant of product suitability and its resulting development impact. This is different from other ToCs, which treat context either as an explanation of outcomes or a factor influencing outcomes. In this framing, frequent and continuous engagement with financial products affirms the suitability of those products for the customer. Furthermore, positive financial health metrics that are product-agnostic affirm something deeper than suitability. They signal that the products work to engender good financial outcomes in the context of the customer and are therefore *meaningfully relevant* in enhancing their financial health.

The qualification of the impact pathway at each node of this model has implications for its conceptual frame. Most ToCs in financial inclusion are linear pipeline models where a causal sequence runs uninterrupted from intervention (input) to impact (outcome). In such models, impact measurement is undertaken to simply confirm that the pipeline is flowing. Our ToC, by insisting that the flow at each node is conditional on contextual suitability, cannot be linear in a similar sense. Rather, it becomes a non-linear dynamic model in which the relationship among access, usage, and financial health is iterative and contingent rather than sequential and guaranteed.

Overall, the -I-O-O-C- model is cross-referencing and not linear. The three nodes of the -I-O-O-C- model go on to act as three primary metrics in the Financial Health Survey (FHS)[5]. Here, inputs explain outputs, outputs explain outcomes, and context explains the variation in all three.

Access metrics represent the inputs (I) to financial inclusion: The FHS captures an input score representing the breadth of formal financial product ownership across select product categories that FSPs can meaningfully influence. Savings account, risky assets like mutual funds and equities, risk-free assets like fixed and recurring deposits, old age savings like pension funds, and three kinds of insurance (life, health and asset) are included in this metric. Importantly, the access metric does not include credit. Credit, as a product, is considered a contextual feature of the household (whether the household has access to formal credit or not), but not a financial input, despite its potential contribution to financial health. This is because other financial instruments, such as savings, impose an immediate cost for a future benefit. Credit, on the other hand, is different in that it pays the benefit forward and imposes future costs. This makes for a complicated trade-off between present and future consumption. Furthermore, while the product category has been central to financial inclusion efforts, take-up is not limited by consumer preferences as much. Rather, it is providers' preferences around creditworthiness that contribute to limitations in access and usage[6]. Therefore, while we do capture access and usage of credit, they do not feature directly as an input in our model.

Usage metrics constitute the outputs (O) of financial inclusion: The second metric generated by the FHS is an output score, which captures the quantum[7] and frequency of engagement with the products to which a household has access. This is the dimension where the access-to-usage

[5] The financial inclusion measurement survey, co-developed by Dvara Research and XKDR Forum, offers an input-output-outcome framework for capturing all three categories of metrics in an informative, cross-referencing, and consistent manner. Dvara Research, in partnership with PwC, has refined this framework further to include contextual variables to its ToC centrally.

[6] See: D'cruze, N., Ghosh, I., Palta, G., Sharma, M., & Thomas, S. (2023, February 10). *Measuring financial inclusion: A project report*. Dvara Research. https://dvararesearch.com/measuring-financial-inclusion-a-project-report/

[7] Ticket sizes capture the quantum of investment into the various financial products

gap becomes visible. A household may own a savings account and yet transact with it rarely or hold an insurance policy and yet be unable to stick to its premium payments. Here, it is important to note that usage, in this model, is not construed as a behavioural trait of customers. Rather, it acts as a signal of product suitability. Frequent and sustained engagement with a financial product in any given context is evidence that the product is meaningfully suited to the financial lives of that household. Conversely, low usage signals a mismatch between product design and customer context that the input score alone cannot reveal. The output score, therefore, acts as an intermediate diagnostic by telling us not just what a household owns, but whether ownership is translating into active financial participation.

Financial health constitutes the outcome (O) of financial inclusion. The outcome score of the FHS captures financial health across five key dimensions derived from the household's own account of its financial life: day-to-day money management, borrowing behaviour, resilience in the face of shocks, forward planning, and financial confidence. These dimensions span the financial life of a low-income household (from the immediate to the aspirational) and yet fall within the range of what product access and active usage can plausibly influence over the short to medium term. As discussed earlier, longer-term developmental outcomes are explicitly excluded, not because they are unimportant, but because the causal pathway from financial inclusion to those outcomes is neither sufficiently short nor direct to support impact attribution.

Context (C) serves as the interpretive layer that helps to make meaning of the other three metrics. Context, the fourth element of the model, is captured in the FHS through four categories of household-level information: socio-demographic characteristics (household size, dependency ratio, occupation category, income and its regularity), physical asset ownership (land, dwelling, livestock, durable goods), informal money management practices (rotating savings groups, moneylender borrowing, remittance patterns), and the availability of financial service infrastructure (proximity to bank branches, agent banking points, mobile connectivity). Here, it is pertinent to note that the variables on context do not enter the scoring but become the lens through which the input, output and outcomes scores are interpreted. For example, the same score could mean very different things for a salaried urban worker and a seasonal agricultural labourer. Context is the constraint that the model takes as given, and the lens through which all three scores are read and interpreted. Thus, it provides the standard by which the suitability of financial products and the significance of observed impact across varied households and circumstances is adjudicated.

Each node generates a composite score, ranging between 0 and 1, constructed from a standard subset of survey questions. The choice of a normalised score, rather than raw counts or percentages, serves two purposes. First, it enables intuitive comparison across segments, geographies, and time periods without requiring the reader to hold in mind the different denominators and baselines that raw numbers demand. Second, it makes the position of any household or cohort on their financial health journey legible at a glance, so that the distance between the input score and the outcome score can be seen and inquired into, rather than inferred.

Overall, financial health in the FHS (which is built upon the -I-O-O-C- model) presents two important and distinct characteristics:

(i) It is product-agnostic, i.e., it asks about the financial experience and condition of the household without presupposing which products ought to have produced that experience.

(ii) It is a bounded outcome, i.e., it confines itself to dimensions of financial health that plausibly lie within the sphere of influence of FSPs over the short to medium term.

Section 5: Key Characteristics of the -I-O-O-C- Model

As mentioned earlier, the -I-O-O-C- model is designed to be sufficiently neutral and flexible to capture the reality of complex financial systems in emerging, low-income contexts. The -I-O-O-C- model is dynamic (as opposed to linear) and iterative (as opposed to direct impact), which endows it with some important characteristics discussed in this section. The FHS, built on the -I-O-O-C- model, draws on the characteristics detailed in this section to become a diagnostic tool that acts as a thermostat for financial inclusion efforts (See Section 6).

Fields of Emergence

In a linear pipeline model, the gaps between access, usage, and impact are problems to be fixed. Such models assume that more access will produce more usage, and more usage will produce more impact, and the primary imperative for measurement is to identify which node is underperforming so as to push harder at it. Our ToC reads these gaps differently.

The gap between the products a household owns (access) and the products it actively and meaningfully engages with (usage), is not deemed to be merely a sign of poor uptake or financial illiteracy. It is a site of information that can reveal where the formal financial system's current offerings are misaligned with the financial rhythms, risk profiles, and decision-making structures of the households it serves. Similarly, the gap between active product engagement (usage) and meaningful improvement in financial outcome (financial health) is not only a sign of insufficient coverage. It can signal that usage is not translating into the outcomes it was designed to produce, and that something in the design, pricing, or delivery of the product is not working for that context.

We call these gaps the fields of emergence. In complex adaptive systems, emergence refers to properties and patterns that arise from the interaction of multiple components and that cannot be predicted from the behaviour of any single component in isolation. Financial health in a low-income household is precisely such an emergent property. It arises from the interaction of various factors in ways that no single product or policy intervention can fully anticipate or control. The field of emergence, then, is the space between what formal financial inclusion has delivered and what financially healthy lives for these households would require in their context. It is in this space that the most important (and grossly neglected) information about the financial lives of low-income populations resides.

There is a popular adage that says, "You don't need a 2 mm drill; you need a 2 mm hole." This highlights how the need for a hole precedes the need for a tool (a drill) to get it. In the context of financial inclusion, this means that a customer does not want a savings product or an insurance policy as such. What they want is the financial security, liquidity management, or risk mitigation that these products are meant to deliver. But the analogy, when pushed further, reveals something deeper. If the house in question is not a brick or timber structure but a mud dwelling, the conventional drill may be entirely the wrong tool. The dweller still wants to hang something on the wall, but because of the material properties of mud walls, they will require a different solution altogether. A ledge, alcove or a shelf, fitted differently, may do what a hole cannot. This analogy highlights that a standard tool that has been designed for a different context might not serve a customer in the way he/she needs, which calls for our attention. The fields of emergence are those spaces between standard tool, the sites of their usage, and the actual needs of the customer. We direct our focus to these spaces and use them as feedback for information and intervention.

Feedback Loops

In linear pipeline models of impact, causality flows in one direction - from input to output to outcome. As stated earlier, existing measurements confirm or disconfirm this flow. Our ToC situates feedback loops at each transition site by directing our attention to the fields of emergence described earlier. It is for this reason that the model is stylistically represented as "-I-O-O-C-", with the first and last hyphens indicating the possibility for context to feed back into the input. The ToC does not treat the current design of products as the assumed vehicle of impact. If access is only productive when it is contextually suitable, and if usage is only productive when it translates into genuine financial health outcomes, then measurement of the gaps must feed back into the choice and design of the products. This way, feedback is woven into the constitutional frame of the ToC right at the outset and not as an afterthought. A financial inclusion intervention that does not incorporate feedback from usage and impact data into its product and distribution decisions is, in the terms of our ToC, not completing its causal circuit.

The first feedback loop operates between the usage gap and the design of access. It helps discern whether product terms, channels, pricing structures, etc., are compatible with the actual financial practices of the households that own the product. The usage gap is evidence that the product, as currently designed, is (or is not) meeting the household where it is. The feedback loop from the usage gap to product design reads findings to answer certain hypotheses for intervention:

> ➔ What would a savings product look like if it were designed around the lumpy, irregular income flows of a seasonal agricultural household rather than around the monthly payroll cycle of a salaried employee?
>
> ➔ What would insurance look like if it were indexed to the risk events that low-income households actually face, rather than the risk categories that formal actuarial tables have historically emphasised?

The second feedback loop operates between the financial health impact gap and products already accessed and used by the customer. When active product usage is not translating into financial health improvements, the feedback is not merely a product redesign signal. It reflects that the current product suite, even when used as intended, is insufficient to shift the financial health of this household in its context. This may mean that the product category itself is not the right instrument for this household's needs given its context. This inquiry gives rise to another set of hypotheses:

> ➔ Does the household not need a better savings product but a credit product with different terms, or a combination of products that the current ecosystem does not offer, or a non-financial support structure that formal financial inclusion does not yet provide?

These are the types of findings that are made possible by focusing on the feedback loop from the impact gap.

The third and most important feedback loop is more systemic rather than product specific. While a single household's usage gap or impact gap is a data point, patterns of such gaps across large and diverse samples of households are likely to emerge and can be read through the contextual lenses of occupation, income type, asset position, and informal financial participation.

➔ How are different categories of households faring in their journey to financial health and what other product types might help engender better financial health for these varied segments?

Such patterns are valuable maps of where the formal financial system's current offerings are systematically failing to serve the populations they seek to include and serve.

Household as the primary unit of analysis

Most impact measurement in financial inclusion is conducted at the level of the individual product-holder or the FSP client. This is a natural consequence of the most prevalent provider-centric model that questions whether a particular product is being used and whether its users are better off for having it. To answer this question, the relevant unit of measurement is the individual who holds the product and can report on its effects. The -I-O-O-C- model requires a different unit of enquiry, for reasons that are both conceptual and practical.

Conceptually, financial health in the low-income context is a household-level phenomenon rather than an individual one. This is not simply a sociological observation about the prevalence of multi-member households in India (compared to single or even dual-person households) or about the importance of family networks in financial decision-making, though both of these are empirically significant. It is a more fundamental point about the structure of financial life in conditions of scarcity. When income is irregular and pooled across multiple earners of different kinds, when expenditure decisions about health, education, and housing are made collectively, when borrowing from one family member is a substitute for borrowing from a formal institution, and when the management of risk across household members is itself a financial strategy, the individual is not the appropriate unit at which financial health can be observed or influenced. A salaried household member who appears financially included by individual metrics may, in fact, be the sole formal financial participant in a household whose overall financial health is severely constrained by the informal debt and expenditure obligations of other members. Simultaneously, a seasonal agricultural labourer who appears financially excluded by individual metrics may belong to a household that owns livestock assets and has strong social capital, enabling them to raise funds when required. Measuring at the individual level misses this entirely. An individual-level survey of formal product ownership tells us almost nothing about this rich infrastructural embedding.

A household-level enquiry that asks how the household manages day-to-day money, where it turns to in the event of a shock, how it saves, and how it plans for contingencies and aspirations, can capture the full financial landscape within which formal products operate. It therefore helps identify where formal products are genuinely adding value and where they are being substituted, avoided, or used in ways their designers did not intend.

At a subtler level, this household-level orientation also changes the nature of what the survey poses as questions and what it finds as answers. A product-centred, individual-level survey is essentially asking whether its subjects are using the formal financial system *correctly or appropriately*. A household-level, product-agnostic survey is asking how the household is managing its financial life, and whether the formal financial system meets it where it currently is. These are not the same questions. The first question tends to generate findings that explain low uptake as a function of low financial literacy or low trust in institutions, which makes customers the site of the intervention. The second question tends to generate findings that explain low uptake as a function of product misfit, which points to the design and distribution choices of providers as the site of

the intervention. For a measurement framework that aims to generate actionable insights rather than confirming existing assumptions, the second question is the more appropriate one to ask.

Another reason for the relevance of a household-level enquiry lies in the specific context of the low-income and Bharat customer segments that the FHS primarily addresses. These households are not homogeneous in their needs, aspirations, or financial management practices, even when they are grouped together by income bracket or geography. A nano-entrepreneur in a semi-urban market town, a smallholder farmer in a rain-fed agricultural district, a migrant construction worker whose family remains in a rural village, and a woman who manages a household with no regular formal income but has significant informal earnings may all fall within the same financial inclusion target population. But their financial lives, their relationships with formal and informal finance, and the products that would meaningfully serve them are significantly and measurably different. Household-level enquiry, enriched by contextual data on occupation, income regularity, asset ownership, and informal financial participation, can distinguish between these profiles in ways that individual-level product surveys cannot.

Section 6: Diagnostic Capacity of Impact Measurement: FHS as a Thermostat

The FHS, as discussed in Section 5, collects data on three key indicators: access metrics (number of products owned by a household), usage metrics (frequency of usage and product ticket size), and outcome metrics (along five dimensions of financial health[8]). These indicators are condensed into input, output, and outcome scores, respectively.

The diagnostic power of the FHS is derived from the cross-referencing between the outcome score and the input and output scores. Consider a household that presents a high input score by owning a suite of formal financial products but a low resilience sub-score within the outcome dimension. This might lead an FSP or policymaker to conclude that the household's financial products are failing to produce the expected resilience outcomes. Perhaps, they may go on to recommend additional product coverage. The FHS can nuance this finding further. It looks at the household's output score to validate suitability. In the event that it finds its insurance usage score to be low, meaning the household holds a policy but is not using it optimally, then the resilience gap we see in financial health outcome is not a product-coverage problem. It presents itself as a product-suitability problem, pointing toward a mismatch between the design of the insurance product and the household's contextual profile.

This is the conceptual departure that the title of the paper describes as the shift from a canary to a thermostat. A canary detects the presence of danger; it signals that something has gone wrong. Most ToCs reviewed in Section 4 are, in this sense, canary instruments: financial health, as used in those models, functions as a warning signal. When financial health scores are low, we know that the promise of financial inclusion has not been realised for this population. This is useful information, but it is not actionable by itself. It tells an FSP or a policymaker that something is wrong, but it does not provide them further information on where the failure has occurred in the access-to-usage-to-impact chain that could help initiate appropriate corrective measures.

A thermostat, by contrast, both detects the current state and identifies (at least to some degree) the corrective mechanism, if not the exact measure. The cross-referential reading of input, output, and outcome scores in the FHS, mediated and coloured by context, is the thermostat mechanism. In the earlier example, the -I-O-O-C- model detects a gap between a high insurance input score and a low resilience outcome score, and the output score indicates low claims frequency and low product knowledge. Adding the context layer reveals that the household's income is seasonal and its expenditure profile is dominated by irregular, lumpy events. This finding does not simply signal a problem. It surfaces a solution hypothesis that insurance products structured around monthly premium cycles are possibly poorly suited to the financial rhythms of a household whose income arrives in two or three large tranches per year, and whose shock events are agricultural rather than medical. That solution hypothesis points to possible design interventions, say a crop-cycle-indexed insurance product, or a flexible premium structure.

Notwithstanding the utility of the FHS as a diagnostic tool, it is important to state that it *does not establish or presume* causality in the same way other models do. On the contrary, the FHS does something more modest but immediately useful by identifying the most probable sites and links

[8] Day-to-day money management, borrowing behaviour, resilience in the face of shocks, forward planning, and financial confidence.

of failure. The cross-referential reading of input, output, and outcome scores alongside context then makes it possible to *hypothesise solutions*. These hypotheses would require further investigation, through longitudinal tracking of the same cohorts over time, to be confirmed. The FHS, like a thermostat, does not tell you why the room is cold or what is wrong with the boiler. Rather, it indicates that the temperature is below the set point and identifies which circuit to activate. The diagnosis of causality may (or may not) happen later, but it is not made transparent by the -I-O-O-C- model itself.

Thus, the -I-O-O-C- model, and the Financial Health Survey built upon it, offer a means to monitor the market for product gaps, recognise true value-additions, and prune product misfits on a dynamic basis. This is particularly important for the Bharat segment, which is new to formal finance, straddling between the formal and informal sides of the economy and is, in some ways, cajoled into transitioning to formal financial products by a combination of government measures and market imperatives. Being predominantly low-income, their money management practices also tend to be distinctly different from those of established customers who have been integrated into the formal economy for years and are well-schooled in the workings of the financial system. Timely and accurate recognition of the needs, pain points, and preferences of this segment can help ease their transition by meeting the customers at whatever point they are on their journey.

Section 7: Conclusion

This paper presents two anchoring positions for impact measurement: (i) financial health is overdetermined, shaped by a complex web of interacting factors no single stakeholder can fully command; and (ii) the context in which any given household pursues financial health is, in the short to medium term, more or less fixed and presents as a constraint to be optimised for rather than a variable to be solved. These two propositions are not merely observations about the complexity of development outcomes. They are the conceptual premises for a different kind of measurement framework that takes the overdetermination and the contextual constraint as given and identifies the levers available and how they can be moved.

The Financial Health Survey thus offers unique and valuable insights by being cognizant of complexity and still being useful to those who must act within that complexity. It recognises that financial health is overdetermined and that the context is fixed. Yet, the contention is that neither of those facts precludes action. Instead, they require that the levers within reach be identified with precision, that the mechanisms through which they work be made visible, and that the gap between what products promise and what households experience be treated not as an inconvenient residual but as the most important thing the measurement can identify.

The implications of transitioning to the FHS for impact measurement in financial inclusion are different for each of the principal stakeholders in the financial inclusion ecosystem. For FSPs, the most immediate implication is that impact measurement need not be a reporting exercise conducted at arm's length from business decisions. It can instead directly inform product design and delivery. For impact investors, the FHS offers a more granular and realistic account of what their capital is achieving. An FSP whose customers report high satisfaction but display persistent gaps between usage and financial health outcomes is not delivering the impact that its access metrics suggest. This moves the conversation about impact investment in financial inclusion from a compliance frame to a learning frame, which is more useful for investors and more honest about the limits of what any single intervention can achieve. For policymakers and regulators, the product-agnostic character of the outcome measurement offers a population-level view of unmet and under-met financial needs that is not pre-structured by the products currently on offer. That can inform regulatory policy, consumer protection frameworks, and public program design in ways that access and usage metrics, on their own, cannot. This, we believe, would help enable good outcomes for all stakeholders – optimal financial health for customers, product-market fit for FSPs, good social outcomes for impact investors and democratic and sustained growth for the government.

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