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Digital credit scoring for affordable housing finance: Syntellect and Reall in urban India

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Abstract: *A promising field of housing finance innovation is digital approaches to assessing the creditworthiness of low-income borrowers, based on the application of machine learning and artificial intelligence to 'alternative' customer data. These reduce the risk of lending to underserved customers, many of whom work in the informal sector and lack formal credit histories. This article introduces and explores the emerging application of digital credit scoring technologies to affordable housing in India, through the practitioner lens of Syntellect – a Mumbai-based fintech firm – and their investor Reall, an innovator in climate-smart affordable housing. Syntellect has developed proprietary software called RightProfile – a unique customer profiler that caters to the unbanked, new to banking, and new to credit segment with a focus on informal micro-entrepreneurs. The article shares Syntellect and Reall's experience to date, situating these within broader affordable housing trends and reflecting on the transferability of RightProfile outside India.*

Keywords: housing, finance, credit assessment, fintech, India

Introduction

Sustained urbanization combined with inadequate urban planning has resulted in massive housing deficits in many parts of the world. This challenge is especially acute in rapidly urbanizing South Asia and sub-Saharan Africa, which demonstrate cumulative housing shortages of at least 80 million and 60 million homes, respectively (Reall, 2021). The scale of the challenge has heightened awareness of housing as a developmental and infrastructural issue, and several Asian and African governments have implemented new affordable housing policy initiatives and committed to ambitious mass housing delivery targets, often through an 'enabling markets' approach (Zhang and Ball, 2016).

Despite growing recognition of affordable housing, delivery at scale is constrained by market bottlenecks throughout Africa and Asia. An endemic lack of affordable long-term housing finance for low-income customers is particularly inhibiting, as formal lenders have viewed the segment as high-risk and declined to cater to it. This pushes quality housing out of reach for most of society (Jones and Stead, 2020). A promising field of innovation to shift these perceptions is the emergence of digital approaches to assessing the creditworthiness of low-income borrowers, based on the application of machine learning and artificial intelligence to customer data. These technologies harness increasing computing power and

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digitizing trends to resolve information asymmetries. This can reduce the risk and cost of lending to underserved customers, many of whom work in the informal sector and lack a formal credit history.

This article introduces and explores this emerging field of alternative credit scoring technologies to meet the needs of affordable housing, with a focus on India – a thriving site of financial technology ('fintech') innovation with an increasingly amenable environment for affordable housing interventions. It does so through the practitioner lens of Syntellect – a Mumbai-based fintech firm developing innovative credit assessment software – and its investor Reall, an innovator in climate-smart affordable housing for the bottom 40 per cent of the income pyramid in urban Africa and Asia.

Syntellect has developed proprietary software called RightProfile, an innovative customer profiler that can be utilized by housing finance providers to cater more effectively to the unbanked, new to banking, and new to credit customer segment. RightProfile focuses on self-employed individuals and micro-entrepreneurs in the informal sector, who typically lack formal credit histories and adequate documentation. RightProfile is used by loan officers to collect and analyse data on such underserved customers – applying machine learning, artificial intelligence, and stochastic modelling technologies to enable more informed and 'objective' credit assessment and underwriting.

The housing finance challenge

Tackling the growing housing backlogs in many middle- and low-income countries will not be possible without substantial capital investment to enable land acquisition and housing construction (McKinsey, 2014). However, the problem is not solely one of mobilizing capital. In many of these geographies, systemic barriers constrain the supply of affordable, decent housing. On the supply side, delivery is often hindered by a lack of land, insecure title, ineffective regulations, and insufficient incentives for private developers to move downmarket (McKinsey, 2014; Bah et al., 2018).

Effective demand for housing is also frequently constrained by the inaccessibility of affordable long-term finance and mortgages. While housing finance penetration is very high in many high-income economies, and making inroads in several middle-income countries, housing finance systems are typically restrictive and underdeveloped in the majority of emerging markets. This absence is particularly apparent in sub-Saharan Africa and South Asia, where the need for affordable housing is most acute (Chiquier and Lea, 2009). This lack of housing finance can be quantified in national mortgage-to-GDP ratio statistics – with a low value signifying dysfunctional or immature financial sectors (Table 1).

In African and Asian countries with low levels of housing finance penetration, standard mortgage terms are characterized by large deposits, high interest rates and charges, inaccessible income thresholds, and limited availability. People at the bottom of the income pyramid are pushed towards informal settlements and compelled to incrementally self-build housing using informal credit and

Table 1 Mortgage-to-GDP ratio for selected countries

United Kingdom	80%
United States	76%
Sweden	70%
Thailand	23.9%
South Africa	16.2%
India	9.6%
Nepal	6.5%
Bangladesh	3.1%
Kenya	2.21%
Pakistan	0.23%
Nigeria	0.17%
Uganda	0.0013%

Source: Data acquired primarily from the Centre for Affordable Housing Finance (CAHF, 2020) and the Housing Finance Information Network (HOFINET, 2021).

micro-loans at exorbitant rates (Ferguson et al., 2014). This is particularly acute for people in informal employment (the majority of working adults in Africa and Asia), who are more susceptible to short-term economic shocks and generally lack documentation (Badev et al., 2014). Within the informal segment, women and marginalized communities are disproportionately impacted (Becker, 2004; Medina et al., 2017).

Despite the risk-adverse attitude of formal housing finance providers, there exists compelling global evidence that customers on low incomes represent a viable market opportunity. The base of the global income pyramid spends over US$330 bn annually on shelter (Habitat for Humanity, 2016). Housing micro-finance products have boomed in recent years, and financial institutions that venture into housing microfinance have experienced rapid client uptake and high-quality portfolios. Habitat for Humanity International's MicroBuild fund has notably crowded substantial new investment and engagement into this space (Habitat for Humanity, 2021).

Reall's affordable housing developer partners in urban Africa and Asia have also documented the capacity of people in the bottom 40 per cent of the income pyramid to successfully repay loans and acquire housing assets, including informally employed borrowers. This has often been in the form of five-year 'micro-mortgages', intended to fill gaps between housing microfinance and commercial housing products. In a recent evaluation of Reall-financed housing projects in four countries (India, Kenya, Nepal, Pakistan), over 80 per cent of surveyed low-income homeowners considered their housing finance repayments to be 'affordable' (Reall, 2020). Reall's experiences also suggest that the longer terms associated with formal mortgages would be more beneficial for low-income groups if implemented with favourable terms and administered efficiently (Jones and Stead, 2020).

Affordable housing and housing finance in India

India embodies many of the complexities and contradictions of international development. As one of the largest economies in the world, India has experienced sustained growth – fostering a booming information technology sector and rising middle class. As the second most populated country in the world, India is also home to more desperately poor people than all the nations of sub-Saharan Africa combined (World Bank, 2021). This enduring inequality is reflected in a national urban housing shortage of at least 10 million homes. In the context of sustained urbanization, a further 25 million affordable urban units will be required by 2030 (Zia et al., 2019). This represents both a substantial socio-economic challenge and an enormous opportunity for the private sector.

Affordable housing has been the focus of successive governments at the federal and state levels in India and the sector has massive growth potential. The incumbent Bharatiya Janata Party (BJP) government declared in 2015 that by 2022 – the 75th anniversary of independence – every Indian would have a brick and cement house with gas, water, electricity, and a toilet (*Economic Times*, 2015). The official programme through which this has been delivered is the ambitious Pradhan Mantri Awas Yojana (PMAY) scheme. PMAY provides subsidies to facilitate 20 million low-cost, serviced homes in urban and rural areas by 2022 (D'Souza, 2019). PMAY has also been accompanied by a range of regulatory interventions and subsidy initiatives intended to enhance affordability and stimulate growth in the sector.

While affordable housing has emerged as a key policy priority in India, systemic barriers are prevalent throughout the value chain – limiting the potential for private developers to scale up and demonstrate sustainable business models. Housing finance is a key obstacle, as many low-income households are constrained as much by a lack of financial services as strict housing affordability. Recent research suggests that families in the official lower-income group demographic could afford and qualify for privately built housing at a cost of between INR 400,000 and 2 m (approximately $6,000–30,000), if institutional housing finance is rendered more accessible and affordable to them (Bhanot et al., 2020).

The Indian housing finance sector primarily comprises scheduled commercial banks (SCBs), housing finance companies (HFCs), non-banking finance companies (NBFCs), cooperative societies, and microfinance providers. Despite a plurality of providers, few Indians utilize formal finance and housing finance penetration remains low in India – as reflected in a mortgage-to-GDP ratio of less than 10 per cent (Table 1). Commercial banks and HFCs have largely preferred not to serve low-income Indians, and their lending processes and credit assessment methods are typically inadequate or inappropriate for this customer segment. Individual housing finance lenders will clearly benefit from new innovations and technologies that deepen their understanding of underserved customers and enable more accurate assessments of creditworthiness and risk profile.

Fintech and new solutions to creditworthiness in India

Historically a large percentage of Indians have not possessed a bank account or utilized formal financial services, instead accessing credit from local, informal lenders. While microfinance institutions have made significant contributions towards addressing credit needs, financial exclusion has been a significant hindrance to poverty reduction and inclusive growth (Prabhakar, 2020).

Successive Indian governments have emphasized widening access to the banking system, with digitization of services a priority. The current government has opened bank accounts for the majority of citizens under the Pradhan Mantri Jan-Dhan Yojana scheme and used these as the default channel for delivering government payments. In parallel, the state has enrolled more than 1.2 billion Indians in Aadhaar, a national biometric digital identity programme. Through these technologies and the concurrent rise of mobile phone and internet coverage, the aim has been to leapfrog more traditional models of financial access (USAID, 2019). The financial deepening effects have been impressive – between 2014 and 2018, the proportion of Indian adults with a bank account rose from 53 per cent to 80 per cent (World Bank, 2018).

These developments have fostered a fertile landscape for rapid digitization across most sectors of the economy, unlocking productivity and creating millions of new jobs while displacing or transforming many others (McKinsey, 2019). India is one of the largest and fastest-growing markets for digital consumers, reflected in a remarkable leap in the total number of internet users from 239 million in 2014, to 755 million in 2020. As this number is relatively low as a percentage of the national population (approximately 55 per cent), there remains substantial room for further expansion (TRAI, 2020). The number of smartphone users is increasing at a similar pace (McKinsey, 2019).

Digitization poses significant disruption and growth potential for the entire financial sector. India is an emerging big player in the global fintech movement, and three Indian cities (Bengaluru, Delhi, Mumbai) were recognized among the 'Top 20 Global Fintech Hubs' in 2020 (Findexable, 2019). In this conducive environment, digital lending and financial services have boomed and diversified rapidly. New lending platforms are transforming credit evaluation and loan origination, often targeting borrowers who are otherwise unlikely to benefit from formal finance (PwC India, 2019).

A burgeoning sector of Indian fintech start-ups is capitalizing on this opportunity through the development of proprietary artificial intelligence techniques and machine learning algorithms, to sift and sort masses of data points on underserved consumers and generate credit scores to underwrite loans to them. Many commercial banks have also entered this space, often in partnership with tech start-ups.

Alternative credit assessment tools offer a range of potential benefits – enabling a more informed and impartial view of an applicant's creditworthiness, while streamlining underwriting and lending processes through real-time data and automated processing. Costs are reduced through shortening processing times for assessment and underwriting, and the associated savings can be passed on to

the consumer. These new technologies do also pose complex challenges relating to regulatory oversight and data protection that policymakers and practitioners continue to grapple with (Prabhakar, 2020). This includes issues related to fraud, cybercrime, safeguarding, and personal data management.

As a historically exclusionary and conservative industry, formal housing finance in India is ripe for the disruption posed by fintech innovators. New solutions to credit assessment and underwriting have a potentially vital role to play in reshaping the affordable housing market and enabling long-term growth and delivery at scale in India and beyond.

Syntellect's RightProfile: digital credit assessment in practice

The potential for Indian fintech firms to deploy innovative alternative credit scoring models to affordable housing challenges is demonstrated through a case study of Syntellect – an IT start-up based in Mumbai. Syntellect has been active in the housing finance arena since its creation in 2010, under the leadership of CEO Sumedha Naik – one of the few female entrepreneurs in the Indian fintech space (*Business World*, 2019). Since 2017, Syntellect has developed its proprietary RightProfile software – an innovative customer profiler catered to the unbanked, new to banking, and new to credit customer segment, with a focus on the informal micro-entrepreneur. Syntellect directly responds to the market gap where such clients are misunderstood or excluded by housing finance lenders, and the challenge of the sub-optimal established loan seeking and approval processes.

RightProfile is a digital tool designed for use by lenders and financial institutions. RightProfile collects targeted data points on potential low-income and informally employed customers across three main areas – demographics, business, and financials (Table 2). This data is typically collected by loan officers when vetting and engaging clients and is inputted directly into the RightProfile software interface for analysis. RightProfile aims to improve the decision-making of loan officers through a more sophisticated and objective assessment of creditworthiness, while speeding up the entire lending process from end to end through digitization and automation.

Once this data has been inputted, RightProfile applies machine learning, artificial intelligence, and stochastic modelling to produce detailed customer profile reports.

Table 2 Illustrative examples of data collected on potential customers by RightProfile

Data area	*Illustrative examples*
Demographics	Age Qualifications Type of dwelling unit
Business	Type of business Area of operations
Financials	Sales Expenses Overheads

RightProfile is specifically designed for long-term mortgage finance lending, which represents a different risk profile and different set of data points than short-term credit and microfinance. Syntellect is also developing the technology to predict incomes for particular business profiles (currently in beta testing).

As RightProfile is deployed by financial institutions when assessing clients, it is always customized and tailored to the particular risk appetite, risk posturing, and credit policies of individual lenders. Specific data points can be added or removed from the RightProfile user interface as needed, ensuring a degree of flexibility and contextual adaptation. A slimmed down version of the software (RightProfile Lite) can be used by affordable housing developers to assess their target customers.

When a lender contracts Syntellect to use RightProfile, the software is installed and deployed on the lender's own server infrastructure. This ensures that all individual client data continues to reside with the lender and is governed according to the lender's own security protocols and policies – ensuring compliance with regulations for data protection, cybercrime, fraud, client consent, and safeguarding.

RightProfile has been piloted by the Housing Development Finance Corporation (HDFC) in Mumbai, one of the largest housing finance companies in India with an aspiration to better reach underserved customers and widen homeownership (Desai, 2014). HDFC has used RightProfile to approve over 14,000 housing loans for informally employed clients and initial data indicates these loans are performing better than sector norms for delinquency rates. HDFC's turnaround time for loan sanctioning was also reduced by at least 40 per cent due to RightProfile's digitization and automation of processing (Jones et al., 2020). As the typical turnaround time for lower-income customers in India is between 20 and 30 days and based on manually processed forms, this digitization represents a significant improvement in efficiency and cost optimization.

Further data from HDFC is not available on the performance and behaviour of these loans at this time, although Syntellect learned through this partnership to strengthen lender obligations to share loan performance data in all subsequent contracts and assignments. As RightProfile is designed to automatically capture loan delinquency data and build that intelligence back into the algorithm, its accuracy should improve over time and with consistent usage.

Syntellect and Reall: partnerships to unlock affordable housing markets

Syntellect's innovative fintech solution attracted the interest of Reall – a market innovator and impact investor in climate-smart affordable housing for the bottom 40 per cent of the income pyramid in urban Africa and Asia. With over 30 years' experience, Reall makes strategic investments in affordable housing developers in several Asian and African geographies – primarily in five priority countries (India, Kenya, Nigeria, Pakistan, Uganda). Initial interest and due diligence in 2019 led to a formalized partnership between the two parties in 2020, paving the way for Reall to make a substantial equity investment in Syntellect.

Reall's engagement with Syntellect stems from a need to efficiently understand the risk profile of low-income and informally employed individuals and households. Reall's housing developer partners have generated substantive information on the income, demographics, and repayment habits of Reall's target market. However, more data is required to triangulate Reall's evidence base and resolve information asymmetries. Reall invests in Syntellect's development to address this imbalance – including RightProfile's potential transferability into Reall's other priority countries (Jones et al., 2020).

Reall capital has accelerated the integration of RightProfile's credit-scoring platform within the operations of selected lenders and developers. This includes an ongoing assignment with Altum Credo – an Indian housing finance company eager to engage with a more diverse customer base. Since 2020, Syntellect has evaluated Altum Credo's systems, optimized their processes, and integrated the RightProfile software into their lending infrastructure. This integration process has proceeded patiently and incrementally – gradually reshaping Altum Credo's operations through real-time digital information and big data analytics.

Altum Credo will evolve its portfolio towards a larger proportion of informal micro-entrepreneurs through the use of RightProfile. Entering further into this space is a risk for financial institutions, and Syntellect's engagement illustrates that any move 'downmarket' by established lenders is necessarily a gradual and iterative process – underpinned by strategic vision, a healthy risk appetite, and digital enablers. Syntellect has further commercial agreements with Indian housing finance institutions in the pipeline, which serve to grow their business while generating primary evidence and data that Reall can leverage to influence market change.

Syntellect has also recently extended operations to Pakistan, working with key public and private stakeholders to formulate agreed standards and data points for informal income credit assessment in the affordable housing space. This market capacity development initiative will contribute towards widening access to housing finance for low-income and informally employed customers in Pakistan – a comparatively immature market.

Conclusion: digital innovation for scale and replication? Syntellect and Reall in Africa

The customizable nature of RightProfile enables it to be used by a diverse range of potential lenders and housing finance institutions. Because of this, the opportunity is readily apparent for the software to be adapted to new geographies outside India. Syntellect and Reall share a vision to adapt RightProfile to rapidly urbanizing sub-Saharan Africa, where the housing need is vast and housing finance sectors are comparatively underdeveloped. Africa is also the epicentre of mobile money development – surpassing half a billion accounts on the continent in 2020 (GSMA, 2020).

East Africa leads the way in this regard, with Kenya in particular pioneering financial inclusion and digital financial services through widespread mobile money adoption (FSD Kenya, 2019). Reall and Syntellect have therefore identified

Kenya as the first African market to introduce RightProfile, beginning in 2020 with primary research, market scoping, and stakeholder engagement. Despite Nairobi's emergence as a global hub for financial innovation and technology, the Kenyan housing finance system is restrictive and exclusionary – with only 26,500 outstanding mortgages for a country of over 50 million people (CAHF, 2020). Housing finance lenders have been slow to embrace alternative data and credit assessment technologies, and no Kenyan equivalent to RightProfile has been identified. This may reflect a tendency within the Kenyan financial sector for short-term credit solutions and conservative attitudes towards risk by Kenyan mortgage providers.

Adapting financial technology from South Asia to sub-Saharan Africa presents complex challenges and a thorough understanding of the target market and landscape is critical. Differences will be encountered in business regulations, tax structures, and reporting requirements. Regulation in particular is a potential pitfall, as fintech sits at the intersection of regulatory, technology, and consumer sectors – fostering a sense of policy uncertainty. Syntellect benefits from Reall's practical expertise and established stakeholder networks in key African and Asian geographies, underpinned by a track record of affordable housing delivery and accompanying market interventions.

Adaptation and deployment of RightProfile will also require proper targeting and user segmentation to succeed. RightProfile cannot function effectively without a foundation of credible data on low-income borrowers and micro-entrepreneurs, as this data is used to generate risk profiles. In India this evidence has been steadily acquired and refined over time, whereas in Kenya and other African markets this dataset must be built from the ground up, through partnerships with lenders and the manual collection of new data on specific customer groups. The latter step is labour-intensive and must comply with all data protection laws.

While these challenges are significant, the opportunities are enormous – for tangible returns on investment and, more fundamentally, for catalysing innovation among mainstream housing finance providers. The rise of digital and financial innovation is a new frontier for affordable housing in emerging markets. New technologies hold potential to overturn established conventions and better reach the chronically underserved, while generating learnings and case studies for the wider market to emulate.

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