MORA
HOUSING RESEARCH

FAPEMIG

EXECUTIVE SUMMARY

MINAS GERAIS RESEARCH SUPPORT FOUNDATION (FAPEMIG)

[ITSA] DIGITAL POE PLATFORM

Digital Platform for Social Housing Post-Occupancy Evaluation: Integrating Data and Artificial Intelligence to Enhance Construction Quality

TERRITORIAL INTEL	SOCIAL IMPACT	PUBLIC DATA	CITY MANAGEMENT
4 TERRITORIAL LEVELS	IISI INDEX	IBGE·DATASUS·INEP·SNIS	PLHIS SUPPORT

OVERVIEW

ITSA (Applied Territorial & Social Intelligence) is a digital platform that helps prioritise interventions in social housing, built on a multilevel structure for integrated social-impact estimation. Working across four territorial levels (household, development, census tract and municipality) it connects housing quality to measurable social outcomes in health, education and socioeconomic vulnerability. By integrating official public databases with field evaluation data, ITSA gives municipal managers an auditable, evidence-based decision tool to plan and target resilient housing improvements.

OBJECTIVES

01 Build a multilevel structure (household, development, census tract, municipality) for integrated social-impact estimation.

02 Develop the IQC (Construction Quality Subindex) from public data and field POE (APOHIS-IISI v1).

03 Operationalise the IISI via a multilevel statistical model linking housing quality to social outcomes.

04 Develop the ITSA City platform integrating federal public databases in an interactive cartographic environment.

05 Structure the ITSA portfolio (City · POE · Market) as a nationally replicable, multiproduct architecture.

THE RESEARCH GAP

Municipal housing decisions are often made without data-driven tools to estimate social impact and prioritise where social-housing interventions matter most. Post-Occupancy Evaluation findings and public databases are rarely integrated into accessible decision tools that managers can use across the territory. ITSA addresses this gap by linking housing quality to measurable social outcomes through a multilevel impact-estimation structure, delivered as a digital territorial-intelligence platform for evidence-based housing decisions.

KEY FACTS

FUNDING
Minas Gerais Research Support Foundation (FAPEMIG)

NATURE
Innovation Stimulus Project (R&D)

PARTNERS
UFU · FAPEMIG · Opção Empreendimentos · Xphere Tecnologia

ETHICS
To be submitted to the Research Ethics Committee (CEP)

FIELD
Pequis and Opção Housing Developments - Uberlândia/MG

METHODOLOGY — PROCESS

01 Structure — 4 territorial levels → **02** Build IQC — Public data + field POE → **03** Model IISI — Multilevel statistics → **04** Platform — ITSA Cidade → **05** Portfolio — Cidade·APO·Mercado·Atlas

RESEARCH TEAM

01 Coordination — Profa. Dra. Simone B. Villa

01 Post-doc — Lucianne C. Garcia

01 Partner Construction Company — Opção Empreendimentos

01 Research and Technology Partner — Xphere Tecnologia

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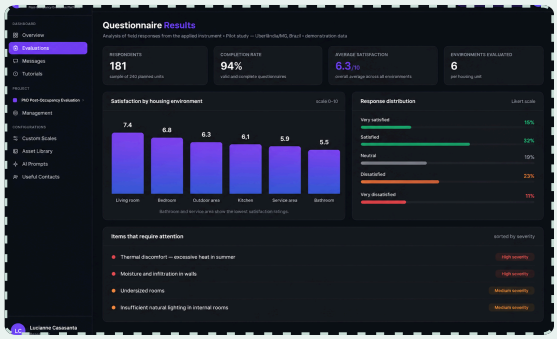
THE PRODUCTS

ITSA City

WEBAPP · PUBLIC MANAGEMENT

A territorial-intelligence platform for public managers. On a 2D/3D map, it shows every social-housing development in the municipality coloured by its IISI score; managers open the breakdown into health, education and vulnerability, simulate the impact gain of each intervention, and export a ranked prioritisation certificate — turning scattered public data into clear decisions on where to act first.

SCAN TO OPEN



ITSA POE

WEBAPP · FIELD DIAGNOSIS

A post-occupancy evaluation tool that goes to the field when ITSA City flags a development for deeper analysis. It builds and manages the instruments (questionnaires, interviews and technical inspections) collects primary field data and delivers a pathology diagnosis with prioritised guidance for improvements and ATHIS, setting a baseline to monitor IISI gains after each intervention.

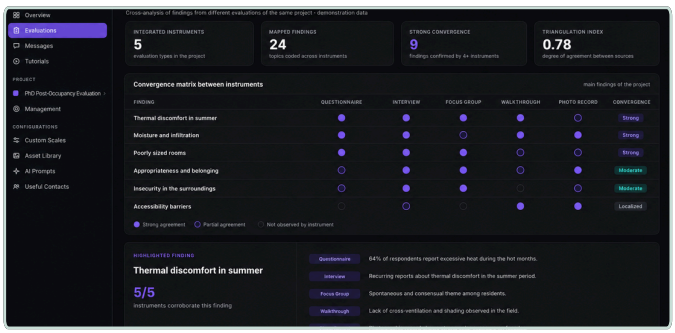
SCAN TO OPEN

METHOD & DATA ENGINE

IQC (Construction Quality Subindex) · IISI (Integrated Social Impact Index) · territorial multiplier — fed by Censo 2022 (IBGE), DATASUS (hospitalisations, infant mortality), INEP (IDEB), SNIS and FJP, combined with primary POE data.

MAIN RESULTS

Internal-testing demonstration of ITSA City's impact-prediction module: for a simulated development, it raises the Construction Quality Index (IQC) from 0.52 to 0.70 and estimates an Integrated Social Impact Index (IISI) of 63, projecting an 18% drop in primary-care-sensitive hospitalisations, lower age-grade distortion in nearby schools and fewer families in housing vulnerability. (Internal tests only · illustrative, fictional values.)



Internal-testing demonstration of ITSA POE's integrated analysis: it cross-references five instruments — questionnaire, interview, focus group, walkthrough and photo record — over 24 findings, flags 9 with strong convergence and computes a triangulation index of 0.78, surfacing robust issues such as thermal discomfort in summer, confirmed by all 5 instruments. (Internal tests only · demonstration data.)

TECHNICAL INFORMATION

DATA	IBGE·DATASUS·INEP·SNIS·FJP + field POE
FRONT-END	Next.js 14 + React (TypeScript)
BACK-END	Django 5.1 + Django Ninja (Python)
DATABASE	PostgreSQL 16
PROXY / HTTPS	Caddy

CONTRIBUTIONS

Social — Evidence-based prioritisation of HIS interventions.

Policy — Links housing quality to health & education outcomes.

Capacity — Interactive territorial-intelligence platform.

SUSTAINABLE DEVELOPMENT GOALS

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