

Appraisal Model: A Key Supporting Tool for the Appraisal Verification of Housing Collateral by the Government Housing Bank (GHBank, Thailand)

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01

Agenda

Introduction

Role of GHB in housing finance for low- and middle-income groups.

02

Literature Review

Digital transformation to enhance efficiency and transparency
Importance of property appraisal in the credit process

03

Research Methodology

Present theoretical and practical frameworks of GHB Appraisal Model.

04

Discussion and Conclusion

GHB Digital Appraisal & GHB D-App = Process Innovation
Merges valuation science with digital transformation
Strengthens mission of “Housing for All” through transparency, efficiency, and sustainability



Introduction



Vision

ธนาคารที่ดีที่สุด
สำหรับการมี “บ้าน”

The Best Housing
Solution Bank

Mission



Enabling more Thai
people to have their own
homes



GHB is a Specialized Financial Institution (SFI), Ministry of Finance (MOF)



Established with the commitment to provide financial support for Thai citizens to have suitable housing enacted by Government Housing Bank Act, 1953 (72+ years)



Outsourcing 18 independent appraisers the supervision of GHB's Collateral Appraisal Department



#1st Market share housing loan (1/3 of Housing Loan system -40%)



Staff 5,010 Branches 193



Asset \$50 billion / Profit \$139 million

Source : GHBank's Annual Report 2024

Theoretical Framework

The value of a property is determined by four fundamental elements



Utility

refers to the usefulness or ability of a property to satisfy a human need or want.



Scarcity

refers to the limited availability of a property or type of property compared to the demand for it..



Desire

refers to the willingness of people to own or use a property because it satisfies their needs, wants, or preferences-



Purchasing Power

refers to the ability of buyers to pay for a property, based on their income, credit, savings, and access to financing



Factors

Physical factors / Floor Area Ratio— FAR
Locational factors
Socioeconomic factors
Legal and planning factors



Globally recognized valuation approaches include



Market Comparison Approach

also known as the Sales Comparison Approach — is one of the main methods used to estimate the value of a property by comparing it to other similar properties that have recently been sold in the same area.



Cost Approach

is a property valuation method that estimates the value of a property based on how much it would cost to build or replace it, minus depreciation, plus the land value. It is based on the idea that a buyer would not pay more for an existing property than the cost to build a similar one.



Income Approach

also called the Income Capitalization Approach — is a property valuation method used mainly for income-producing properties, such as apartments, offices, shopping centers, or hotels.



Residual Value Approach

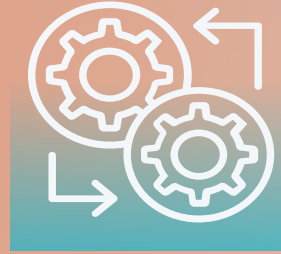
also called the Residual Method or Land Residual Approach — is a property valuation technique often used for development sites or projects under construction.

Statistic Techniques for Model



Regression

a statistical method used to examine the relationship between one dependent variable (the outcome you want to explain or predict) and one or more independent variables (the factors that might influence it)



Hedonic Pricing Model

an economic valuation method used to estimate the price or value of a good — especially real estate — by breaking it down into the individual attributes (or characteristics) that contribute to its overall price



Multiple Regression

Multiple regression is a statistical analysis technique used to examine the relationship between one dependent variable (the outcome you want to predict) and two or more independent variables (the predictors)



Geographically Weighted Regression (GWR)

an advanced spatial statistical technique used to explore and model how the relationship between variables changes across different geographic locations

Evolution of Appraisal Practices of GHBank

Established Government
Housing Bank Act, 1953

**“Staff
Appraisers”
at the beginning**



1986



**“Independent Appraisers”
started with appraisal fees**

Associated with VAT

Geographical Information
System : GIS
launched



2009-2011



**2009- Data Audit
Program (DAP)
for price verification**

**2011-Provision Program
for loan loss reserves**

GHBank launched the
GHBank Digital Appraisal
(code-named “Dek Dern Ploy”)



**Machine Learning and
Big Data Analytics to
automatically forecast
property values**



2023



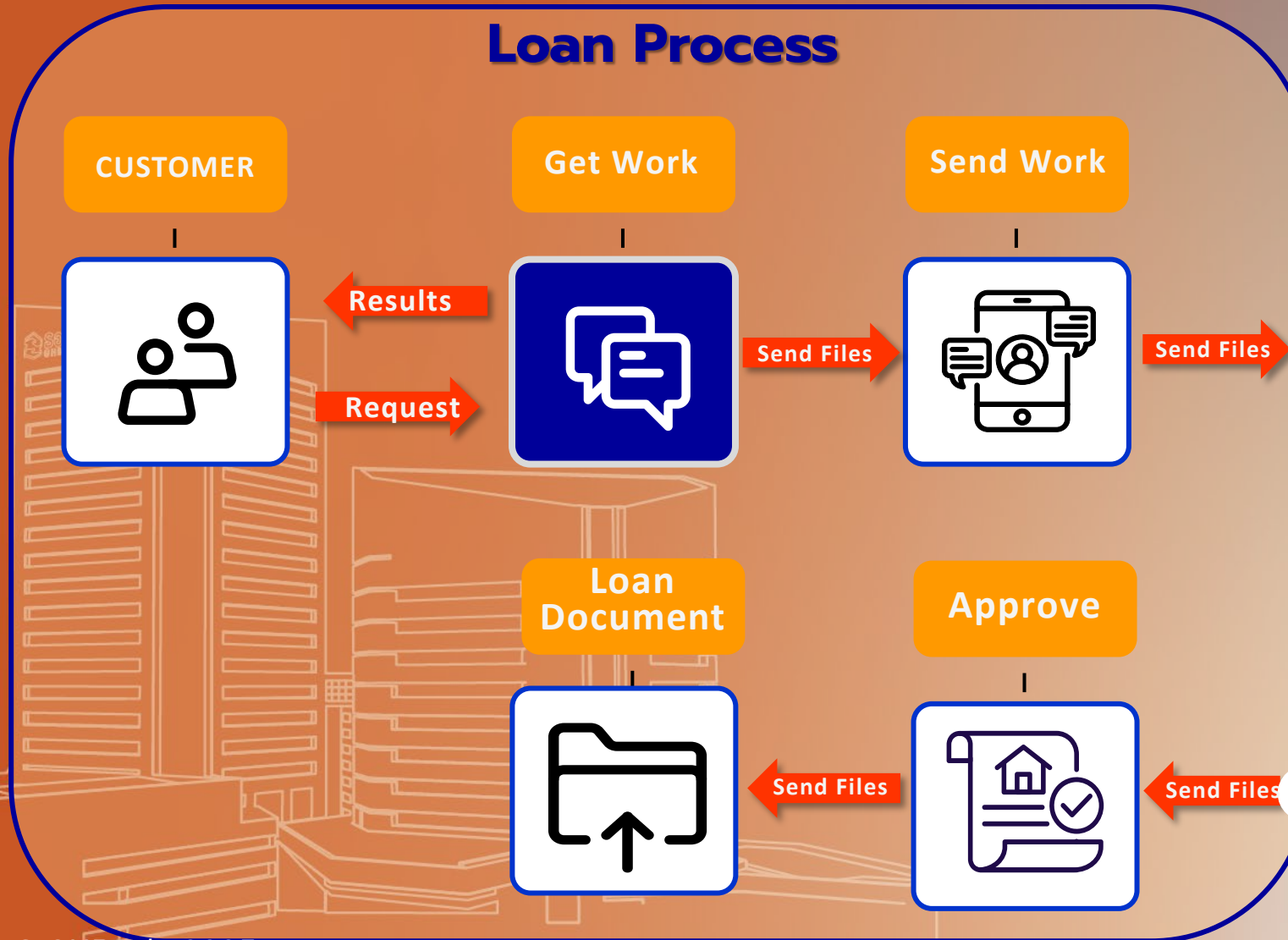
**GHBank launched GHBank D-
App in 2023
Appraisal System**

“Journey Loan – Appraisal”



Outsource
Send Report

Loan Process



Appraisal Process

Key Supporting Tool for the Appraisal
Verification of Housing Collateral

Workflow
for Appraisal
System
(D-App)



Location Base
Information
System
(GIS / DAP)

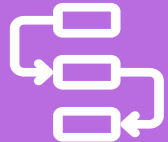


Algorithm
GHB Digital Appraisal

GHB Digital Appraisal (2022) ↔ “Dek Dern Ploy”



**Integration of Machine Learning
& Big Data**



**KNN for dense areas
XGBoost for sparse areas**



- **Model for Market Approach**
- **Hybrid Model for cost Approach
(land + building)**



**MAPE \approx 13%
(accuracy validation)**

**Machine Learning and Big Data Analytics
to automatically forecast property values.**



“the child who walks with
gemstones.”

A “Dek Dern Ploy” (literally gem-walking messenger) refers to a person who carries a gem owner’s stones to offer for sale to buyers waiting at the gem market. The messenger earns a commission fee based on the sale price as agreed. Sometimes, the Dek Dern Ploy may not have in-depth knowledge about gemstones themselves.

By comparison, in the loan business, this is similar to loan agents or brokers who bring in loan clients directly to the bank but may lack professional knowledge in property valuation.

Model & Validation

କାର୍ଯ୍ୟକାରୀତା ପ୍ରମାଣ

- Quarterly Back testing with deviation thresholds (MAPE 15%)
- **Model recalibration: parameter tuning and data validation**
- **Framework aligned with Appraisal Valuation Oversight Committee**

ଆବୃତ୍ତିକ ମାପ - ପ୍ରମାଣ (MAPE)



GHB D-App (2023)



Appraisal System
support a comprehensive
digital valuation process



Valuation Data
Repository for
AI
development



Real-time
valuation
integration
with loan
system



Paperless,
transparent,
and faster
process



Digital end-to-
end appraisal
platform

Key Findings



Quantitative:

- Reduced valuation deviation
- Faster turnaround time for loan approvals
- Improved accuracy in provisioning

Qualitative:

- Enhanced transparency and trust
- Increased customer and stakeholder satisfaction
- Elevated national valuation standards





Strategic Impact



Data-driven decision-making
for housing loan services



- Create a national data ecosystem for collateral valuation
- supports the development of Machine Learning models capable of learning from real-time data



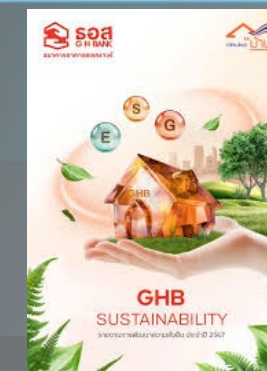
Integration with

- Land Department
- Treasury
- GISTDA*
- ETC (Future)



Supports ESG and
Sustainable Development

- Governance
- Social
- Environment



eco



CO₂

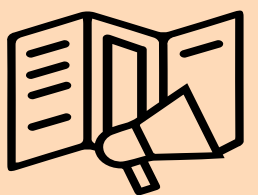
Future Directions



Real-time AI learning for valuation models



Ethical governance in AI-based appraisal



Expansion toward National Collateral Valuation Platform



Conclusion



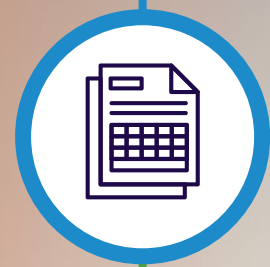
Process Innovation



Enabling more Thai people to have their own homes



Transparency



Efficiency



Sustainability



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Thank You

