

Data Collection Protocol

Study Title: Enhancing Digital Financial Literacy and Digital Trust for Sustainable Online Loan Adoption among Micro-Entrepreneurs in Developing Economies

Ethical Approval: Certificate of Exemption, Ethics Committee for Human Research, Bangkok University, Thailand (Reference No. 416803099, approved October 10, 2025)

1. Study Design

Item	Description
Design	Cross-sectional survey research
Approach	Quantitative
Framework	Integrated Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB)
Analysis	Structural Equation Modeling (SEM) using DWLS estimator

2. Target Population

Criterion	Specification
Population	Micro-entrepreneurs in Thailand
Definition	Business owners with ≤ 5 employees and annual revenue ≤ 1.8 million THB (per OSMEP definition)
Geographic scope	Six metropolitan provinces in Thailand
Age requirement	18 years or older
Business status	Currently operating a registered or informal micro-enterprise
Digital access	Must have access to a smartphone or computer with internet connectivity

3. Sampling Strategy

3.1 Sampling Method

Multi-stage purposive sampling combined with convenience sampling

Stage 1: Selection of six metropolitan provinces representing geographic diversity

Stage 2: Identification of micro-entrepreneur clusters (markets, commercial districts, co-working spaces, online seller groups)

Stage 3: Purposive selection of participants meeting eligibility criteria

3.2 Sample Size Determination

Method	Calculation	Result
Kline (2016) recommendation	≥ 200 for SEM with 5+ latent variables	$N \geq 200$
Ratio of cases to parameters	10:1 ratio \times 24 observed variables	$N \geq 240$
Hair et al. (2019) recommendation	≥ 300 for models with ≥ 5 constructs	$N \geq 300$
Target sample size	Accounting for potential incomplete responses	N = 350
Final valid responses	After screening	N = 320

3.3 Inclusion Criteria

1. Aged 18 years or older
2. Currently operating a micro-enterprise (≤ 5 employees)
3. Located in one of the six target metropolitan provinces
4. Has access to digital devices (smartphone/computer) with internet
5. Willing to provide informed consent

3.4 Exclusion Criteria

1. Employees of financial institutions or FinTech companies
2. Individuals under 18 years of age
3. Non-business owners (e.g., salaried employees only)

4. Research Instrument

4.1 Questionnaire Structure

Section	Content	Items
Part 1	Demographic information	6 items
Part 2	Digital Financial Literacy (DFL)	4 items (DFL1–DFL4)
Part 3	Perceived Usefulness (PU)	4 items (PU1–PU4)
Part 4	Digital Trust (DT)	4 items (DT1–DT4)
Part 5	Online Loan Adoption Intention (OLAI)	3 items (OLAI1–OLAI3)
Part 6	Sustainable Online Loan Use (SOLU)	4 items (SOLU1–SOLU4)
Part 7	Digital Financial Capability (DFC)	5 items (DFC1–DFC5)
Total		30 items

4.2 Measurement Scale

- All construct items measured on a **5-point Likert scale**:
 - 1 = Strongly Disagree
 - 2 = Disagree
 - 3 = Neutral
 - 4 = Agree
 - 5 = Strongly Agree

4.3 Instrument Development and Validation

- Items adapted from established scales in the literature
- Content validity assessed by expert panel review
- Principal Investigator: Faculty of Communication Arts, Bangkok University
- Language: Thai (with English back-translation verification)

5. Data Collection Procedures

5.1 Timeline

Phase	Activity	Duration
Phase 1	Instrument development and expert validation	4 weeks
Phase 2	Pilot testing (n = 30)	2 weeks
Phase 3	Main data collection	6 weeks
Phase 4	Data cleaning and analysis	4 weeks

5.2 Administration Mode

- **Primary:** Online self-administered questionnaire (Google Forms)
- **Secondary:** Paper-based questionnaire for participants with limited digital access
- Both modes contained identical items and instructions

5.3 Collection Procedure (Step-by-Step)

1. **Approach:** Research assistants identified eligible micro-entrepreneurs at business locations, online seller communities, and entrepreneur networks
2. **Screening:** Eligibility verified through brief screening questions
3. **Consent:** Participants read the informed consent information and voluntarily agreed to participate
4. **Administration:** Questionnaire link provided (online) or paper form distributed (offline)
5. **Completion:** Average completion time: 10–15 minutes
6. **Collection:** Online responses recorded automatically; paper forms collected on-site
7. **Verification:** All responses checked for completeness before data entry

5.4 Quality Control Measures

Measure	Implementation
Training	Research assistants trained on ethical protocols and standardised administration
Monitoring	Daily review of incoming responses for quality and completeness
Duplicate prevention	One response per participant (IP tracking for online; ID check for offline)
Missing data	Incomplete responses flagged; follow-up attempted within 48 hours

Measure	Implementation
Data entry	Double-entry verification for paper-based responses

6. Ethical Considerations

6.1 Informed Consent

- All participants provided informed consent before completing the questionnaire
- Consent form explained: study purpose, voluntary participation, right to withdraw, confidentiality assurance, and data usage
- Participants could withdraw at any time without consequences

6.2 Anonymity and Confidentiality

- No personally identifiable information (names, addresses, ID numbers) collected
- Responses coded with numerical identifiers only
- Data stored on password-protected devices accessible only to the research team
- Results reported in aggregate form only

6.3 Data Protection

- Data stored in compliance with Thailand's Personal Data Protection Act (PDPA) B.E. 2562 (2019)
- Electronic data encrypted and backed up on secure university servers
- Retention period: 5 years after publication, then securely destroyed

7. Data Screening and Preparation

7.1 Software Used

- **SPSS 28.0** — Data screening, descriptive statistics, missing data analysis

7.2 Screening Procedures

Step	Procedure	Result
1	Missing value analysis (Little's MCAR test)	No missing values (N = 320)
2	Univariate outlier detection (z-scores > ±3.29)	No extreme outliers identified

Step	Procedure	Result
3	Multivariate outlier detection (Mahalanobis distance)	No cases removed
4	Distributional assessment (skewness/kurtosis)	Values within acceptable range
5	Multicollinearity check (VIF < 5.0)	No multicollinearity issues

7.3 Final Dataset

- **Valid responses:** N = 320
- **Response rate:** 91.4% (320 valid out of 350 distributed)
- **Missing data:** 0% (complete dataset)

8. Statistical Analysis Plan

8.1 Analysis Software

- **JASP 0.19.6** — Structural Equation Modeling (SEM module)
- Backend engine: lavaan package (Rosseel, 2012)

8.2 Estimation Method

- **Diagonally Weighted Least Squares (DWLS)** with robust standard errors
- Appropriate for ordered categorical (5-point Likert) data
- Does not assume multivariate normality

8.3 Two-Step SEM Approach (Anderson & Gerbing, 1988)

Step	Analysis	Purpose
Step 1	Confirmatory Factor Analysis (CFA)	Evaluate measurement model validity
Step 2	Structural Path Analysis	Test hypothesised relationships

8.4 Model Fit Criteria

Index	Threshold	Reference
CFI	> 0.95	Hu & Bentler (1999)

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TLI	> 0.95	Hu & Bentler (1999)
RMSEA	< 0.08	Hu & Bentler (1999)
SRMR	< 0.08	Hu & Bentler (1999)
χ^2/df	< 3.0	Kline (2016)

8.5 Validity Assessment

Type	Criterion	Threshold
Convergent validity	AVE	> 0.50
Convergent validity	CR	> 0.70
Discriminant validity	Fornell-Larcker criterion	$\sqrt{AVE} > \text{inter-construct correlations}$
Discriminant validity	HTMT	< 0.90

8.6 Mediation Analysis

- Product-of-coefficients approach with robust standard errors
- Specific indirect effects calculated for each mediation pathway
- 95% confidence intervals to assess significance

9. Participant Demographics Summary (N = 320)

Characteristic	Category	Frequency	Percentage
Gender	Male	142	44.4%
	Female	178	55.6%
Age	18-30 years	87	27.2%
	31-40 years	126	39.4%
	41-50 years	78	24.4%
	>50 years	29	9.1%
Education Level	High school or less	45	14.1%

	Vocational/Diploma	98	30.6%
	Bachelor's degree	142	44.4%
	Graduate degree	35	10.9%
Business Sector	Retail/E-commerce	112	35.0%
	Food & Beverage	89	27.8%
	Services	76	23.8%
	Manufacturing	43	13.4%
Business Age	<1 year	34	10.6%
	1-3 years	128	40.0%
	3-5 years	98	30.6%
	>5 years	60	18.8%
Annual Revenue (THB)	<300,000	89	27.8%
	300,000-900,000	143	44.7%
	900,001-1,800,000	88	27.5%
Prior Online Loan Experience	Yes	134	41.9%
	No	186	58.1%

10. References

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