Digital Lifeline: Internet Utilization and Entrepreneurial Activity in Pandemic Times

Case Study of Indonesia

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Context

Entrepreneurial Landscape

- 6 million business units (**99% MSMEs**)
- Contribute **60.5% to GDP** and employ **124 million workers**
- Vulnerabilities during crises, especially **COVID-19's impact**

The Role of Digitalization

- **Internet as a lifeline** during the pandemic.
- **Support** for communication, marketing, and transactions.

Research Objective

Main Goal:

Investigate how digitalization impacts entrepreneurial resilience during COVID-19 pandemic.

Objectives:

1. Assess the effect of internet use on reducing entrepreneurs' risk of:
    - Decreased earnings.
    - Reduced working hours
2. Identify the impact by:
    - Communication
    - Marketing
    - Transactions

Related Literature

Impact of Crises on Entrepreneurs:

- Entrepreneurs are vulnerable during crises like COVID-19 (Meahjohn & Persad, 2020; Engidaw, 2022)
- In Indonesia, MSMEs face reduced income and productivity (Coordinating Ministry for Economic Affairs, 2022; Ridhwan et al 2021, Meahjohn & Pershad, 2020)

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Role of Digitalization:

- Digitalization enhances adaptive capacity of entrepeneurs (Manolova et al., 2023)
- Internet usage as part of digitalization (Nambisan, 2017)
- Purpose of using internet:communication (social network, information, knowledge acquisition), marketing (reaching consumers), and transactions (Connected Commerce Council, 2021; Meurer et al., 2022; Modgil et al., 2022; Asrofi, Pratomo & Pangestuty, 2023; Ratten, 2023; Santos, Liguori, and Garvey, 2023)

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Previous Research:

- Transition from formal to informal entrepreneurs during the pandemic (Tasmilah, Pratomo, and Syafitri, 2023)
- Impact of internet on female entrepreneur during the pandemic (Asrofi, Pratomo, and Pangestuti, 2023)

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Hypothesis

Effects on Earnings

Entrepreneurs utilizing the internet for work-related activities (communication, marketing, transactions) face a lower risk of decreased earnings during the pandemic than those who do not.

Effects on Working Hours

Entrepreneurs engaging in work-related internet activities (communication, marketing, transactions) experience a lower risk of reduced working hours compared to non-users.

Data

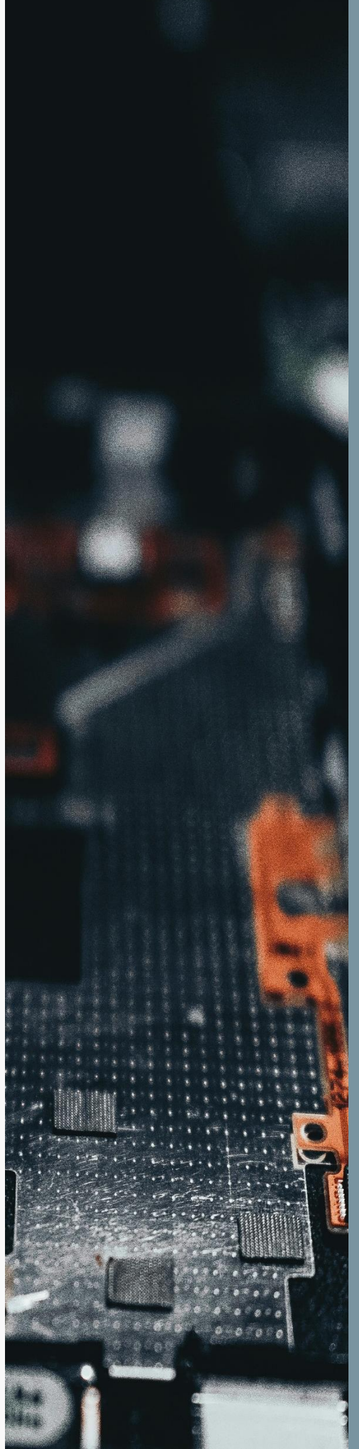
Data Source: National Labor Force Survey (SAKERNAS)

- **Data conducted by BPS:** Captures labor force characteristics across 514 districts in Indonesia.

- **We use data in SAKERNAS 2020, Adjusted for COVID-19:**
  - Includes pandemic-specific questions, e.g., changes in:
    - **Average income/earnings.**
    - **Working hours**.

- **Entrepreneur:**
  - Defined as individuals who:
    - Are **self-employed**.
    - Are **assisted** by **non-permanent/unpaid/family workers**, or
    - Are **assisted** by **permanent workers**.

- **Sample Size:** 191,841 observations of entrepreneurs.



Method: Propensity Score Matching

Why Propensity Score Matching (PSM)?

- **Challenge:** Randomized Control Trials (RCTs) are ideal but impractical for social and economic research due to constraints.
- **Solution:** PSM addresses selection bias by pairing subjects in treatment and control groups with similar baseline characteristics.

Steps in PSM

- **Calculate Propensity Scores**
  - Logistic regression predicts the probability of treatment (e.g., internet usage for communication, marketing, or transactions).
- **Matching**
  - Uses **Generalized Full Matching**.
- **Outcome Analysis**
  - Compare treated vs control groups.

Key Variables

- **Treatments:** Internet use for communication, marketing, transactions.
- **Outcomes:** Risk of reduced earnings and working hours.
- **Covariates:** Education, age, sex, sector, training, skill, location of residence, experience and sector.

Descriptive Statistics

1. Economic Hardship

- **94.4%** reported decreased earnings.
- **88.8%** faced reduced working hours.

2. Effects on Working Hours

- Communication: **16.7%**
- Marketing: **9.3%**
- Transactions: **6.8%**

3. Demographics

- Gender: **64.7% male**
- Education: **69.8% with basic education**
- Rural entrepreneurs: **64%**

4. Sector Distribution

- Agriculture: **45.9%**
- Trade: **24.1%**
- Manufacturing: **10.9%**

Determinant of Internet Use (1)

	Internet Utilization Purpose		
	Communication	**Marketing**	**Transaction**
(Intercept)	-2.534***	-3.296***	-4.022***
	(0.040)	(0.055)	(0.063)
Education – Primary as base category			
Secondary	0.867***	0.992***	1.022***
	(0.016)	(0.020)	(0.024)
Tertiary	1.663***	1.721***	1.884***
	(0.027)	(0.030)	(0.033)
Age	-0.036***	-0.040***	-0.033***
	(0.001)	(0.001)	(0.001)
Male	0.301***	-0.010	0.180***
	(0.016)	(0.019)	(0.022)
Training	0.628***	0.626***	0.485***
	(0.021)	(0.024)	(0.026)

Determinant of Internet Use (2)

	Internet Utilization Purpose		
	Communication	Marketing	Transaction
Urban	0.711***	0.700***	0.803***
	(0.015)	(0.019)	(0.022)
Skilled	0.218***	0.160***	0.094**
	(0.022)	(0.026)	(0.030)
Experience	-0.011***	-0.023***	-0.018***
	(0.001)	(0.001)	(0.001)

Determinant of Internet Use (3)

	Internet Utilization Purpose		
	Communication	**Marketing**	**Transaction**
Sector – Agriculture as base category			
Manufacture	1.870***	2.423***	1.964***
	(0.027)	(0.042)	(0.049)
Trade	2.049***	2.425***	2.273***
	(0.030)	(0.045)	(0.050)
Transport & Warehouse	2.122***	1.893***	2.585***
	(0.038)	(0.056)	(0.058)
Accommodation, Food & Drink	1.633***	2.181***	1.447***
	(0.036)	(0.050)	(0.060)
Education	2.106***	1.155***	0.733***
	(0.086)	(0.114)	(0.141)
Service	2.332***	2.542***	2.225***
	(0.030)	(0.045)	(0.050)

Impact of Internet of Entrepreneurs' Resilience

Average Treatment Effect of the Treated (ATT) of using internet on entrepreneurs' resilience

Outcome	ATT	S.E.	*p*-Value
Treatment: Communication			
Decreased earnings	-0.012	0.004	<0.001***
Decreased hours	-0.007	0.005	0.132
Treatment: Marketing			
Decreased earnings	-0.017	0.004	<0.001***
Decreased hours	0.003	0.005	0.530
Treatment: Transaction			
Decreased earnings	-0.022	0.005	<0.001***
Decreased hours	-0.014	0.006	0.014*

Note: Level of significance + p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Sensitivity and Robustness Check

Balance Assessment

Standardized Mean Differences (SMD) show good balance post-matching.

Sensitivity Analysis

Low sensitivity to unobserved confounders, indicating reliable findings.

Robustness Check

Consistent results with unmatched data and simulation methods.

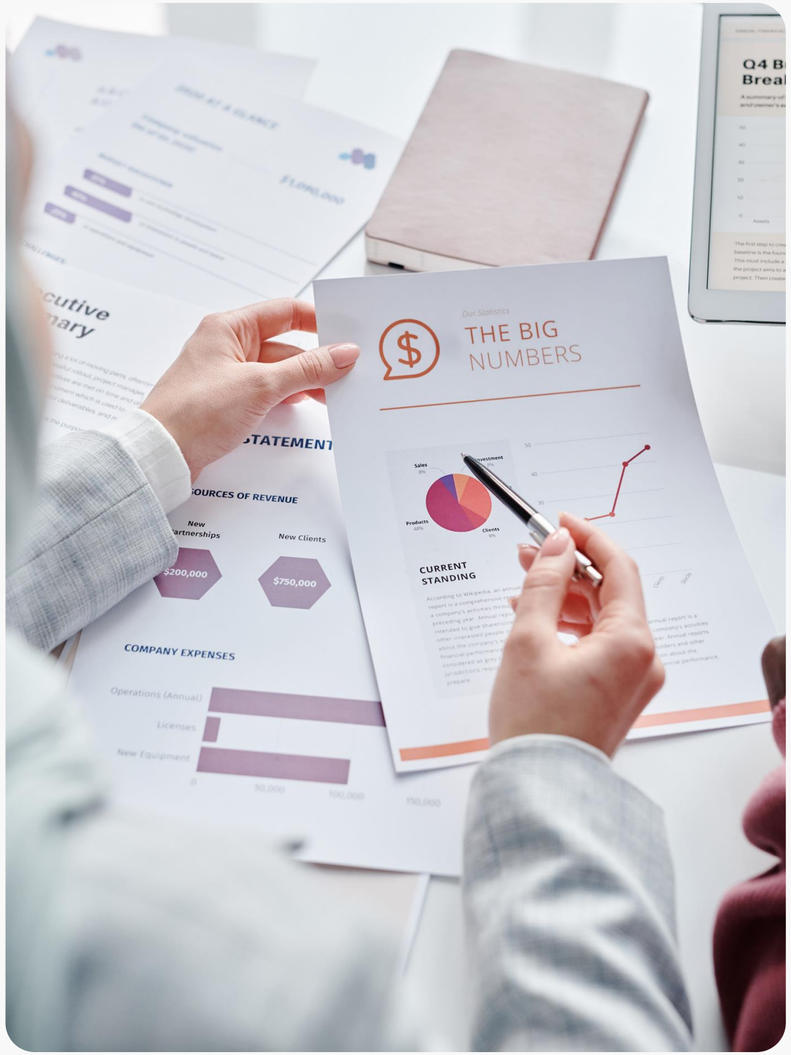
Heterogeneity Analysis

Heterogeneous effect of internet usage on entrepreneurs' resilience across formal and informal entrepreneurs

Outcome	Formal			Informal		
	ATT	S.E.	*p*-Value	ATT	S.E.	*p*-Value
Treatment:						
Communication						
Decreased earnings	-0.012	0.003	<0.001***	-0.012	0.004	<0.001***
Decreased hours	-0.007	0.005	0.128	-0.007	0.005	0.133
Treatment: Marketing						
Decreased earnings	-0.017	0.004	<0.001***	-0.018	0.004	<0.001***
Decreased hours	0.003	0.005	0.530	0.004	0.006	0.530
Treatment: Transaction						
Decreased earnings	-0.021	0.005	<0.001***	-0.023	0.004	<0.001***
Decreased hours	-0.014	0.006	0.015**	-0.014	0.006	0.014**

Note: Level of significance + p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Policy Implications



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Internet Inclusivity and Literacy

Improve access and digital skills training for MSMEs

2

Support for E-commerce Development

Streamline regulations and provide incentives

3

Encourage Technological Adoption

Partnerships with tech firms for MSME-targeted solutions

Conclusion

- **Digitalization is critical**: Internet use (especially for transactions) reduces risks of decreased earnings and working hours for entrepreneurs during the pandemic.
- **Informal entrepreneurs benefit more**, highlighting the importance of supporting MSMEs in digital adoption

Limitation and Future Direction

- **Time-bound data:** Focuses on August 2020, providing a snapshot of the pandemic's early effects.
- **Unmeasured factors:** Use instrumental variables (IV) to mitigate endogeneity and address omitted variable bias.
- **Longitudinal analysis:** Track resilience over time post-pandemic.

Thank you