

THESIS DEFENCE

# Thesis Defence — Extended Deck

Every chapter of the thesis, ready for questions

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PRESENTED BY  
**Presenter Name**

MODULES  
**6**

EDITION  
**2026**

# Course map

**01**

**Deep Learning for Early Detection  
of Diabetic Retinopathy**

**02**

**Microplastics in Urban Lakes:  
Sources and Seasonal Trends**

**03**

**Consumer Trust in Digital  
Payments in Tier-2 Cities**

**04**

**Low-Cost IoT Air Quality  
Monitoring Network**

**05**

**Social Media Use and  
Academic Performance**

**06**

**Impact of Digital Payments  
on Small Retailers**

01

**DEEP LEARNING FOR EARLY  
DETECTION OF DIABETIC  
RETINOPATHY**

KEY IDEA

# PhD Thesis Defence

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Chapter 1 · Deep Learning for Early Detection of Diabetic Retinopathy

# Background and motivation

- Diabetic retinopathy is a leading cause of preventable blindness
- Screening needs specialists who are scarce outside cities
- Automated screening could reach far more patients

## RESEARCH GAP

**Few models are validated on low-cost camera images from rural clinics.**

# Research questions

1

## RQ1

Can a lightweight model match specialist grading?

2

## RQ2

How robust is it to low-quality images?

3

## RQ3

Does it help clinicians in real screening camps?

# Related work

| Theme   | Key findings                  | What is missing           |
|---------|-------------------------------|---------------------------|
| Theme A | Established baseline methods  | Limited to lab settings   |
| Theme B | Recent data-driven approaches | Small, narrow datasets    |
| Theme C | Field studies                 | No comparative evaluation |

*Summarise your literature here.*

# Research design

**01**

## **Collect**

Images from partner clinics

**02**

## **Label**

Graded by two specialists

**03**

## **Train**

Compact CNN with  
augmentation

**04**

## **Validate**

Field trial in screening  
camps

# Data and sample

**18,000**

retinal images

**6**

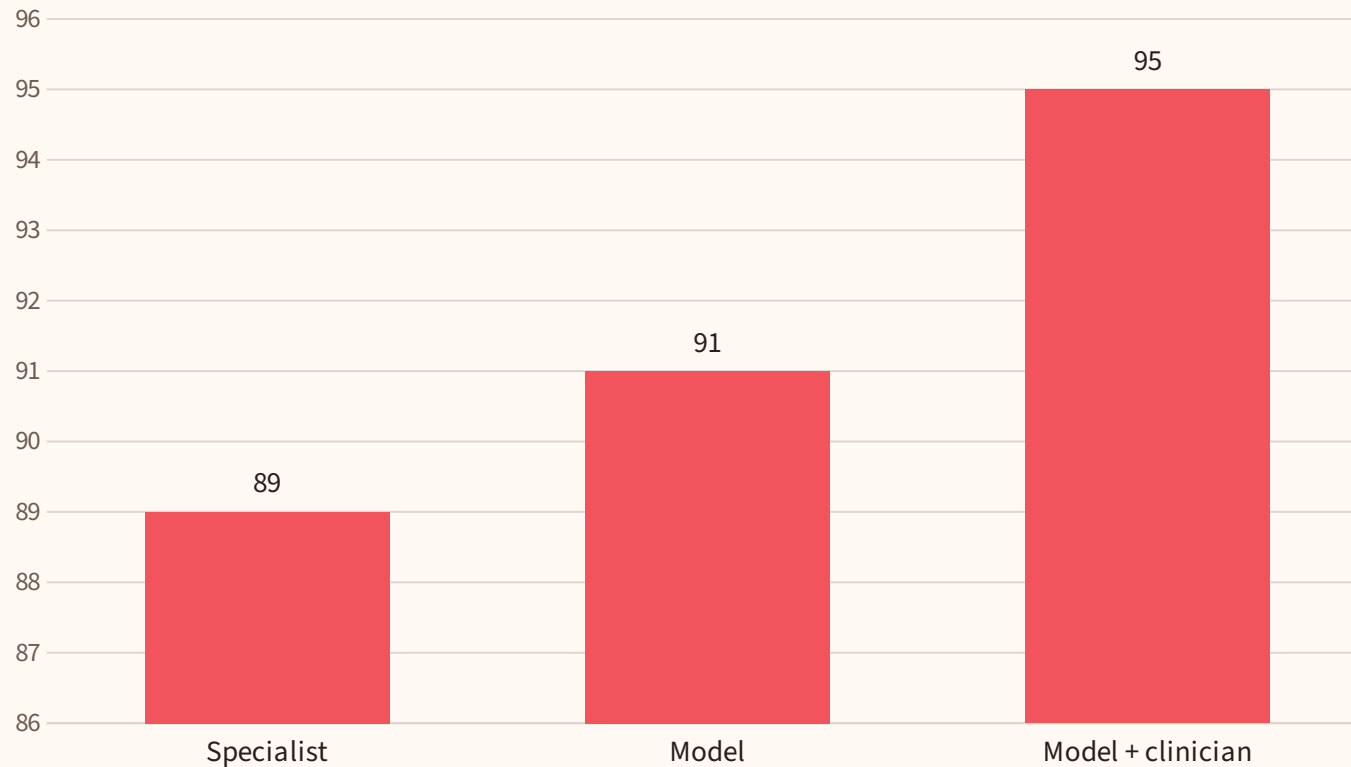
partner clinics

**3**

field camps

*Describe your own dataset.*

# Key result



The model matched specialists, and the combination performed best (sample data).

*Sample data for illustration — replace with your own figures.*

# Findings vs hypotheses

## Hypotheses

- Model reaches specialist level
- Works on low-cost cameras
- Clinicians trust it

vs

## What we found

- Matched specialists overall
- Needs image-quality check
- Trust grew with explanations

# Contributions

1

## Dataset

A labelled rural-clinic image set.

2

## Model

A compact, accurate classifier.

3

## Evidence

Field validation in real camps.

# Limitations and future work

- Single region; needs wider validation
- Image quality varies across devices
- Long-term outcome tracking is future work

# Publications

- Paper 1 — journal name, year (published)
- Paper 2 — conference name, year (accepted)
- Paper 3 — journal name (under review)

02

**MICROPLASTICS IN URBAN  
LAKES: SOURCES AND  
SEASONAL TRENDS**

KEY IDEA

# M.Sc. Dissertation Viva

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Chapter 2 · Microplastics in Urban Lakes: Sources and Seasonal Trends

# Background and motivation

- Microplastics are now found in most freshwater bodies
- Urban lakes receive runoff and untreated wastewater
- Local data on concentrations is scarce

## RESEARCH GAP

**No seasonal study exists for lakes in our city.**

# Research questions

1

## RQ1

What are the concentrations across seasons?

2

## RQ2

Which sources contribute most?

3

## RQ3

Do concentrations differ by lake use?

# Related work

| Theme   | Key findings                  | What is missing           |
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# Research design

**01**

## **Sample**

Monthly water and sediment  
samples

**02**

## **Extract**

Density separation and  
filtration

**03**

## **Identify**

Microscopy and  
spectroscopy

**04**

## **Analyse**

Statistics by season and site

# Data and sample

4

lakes studied

144

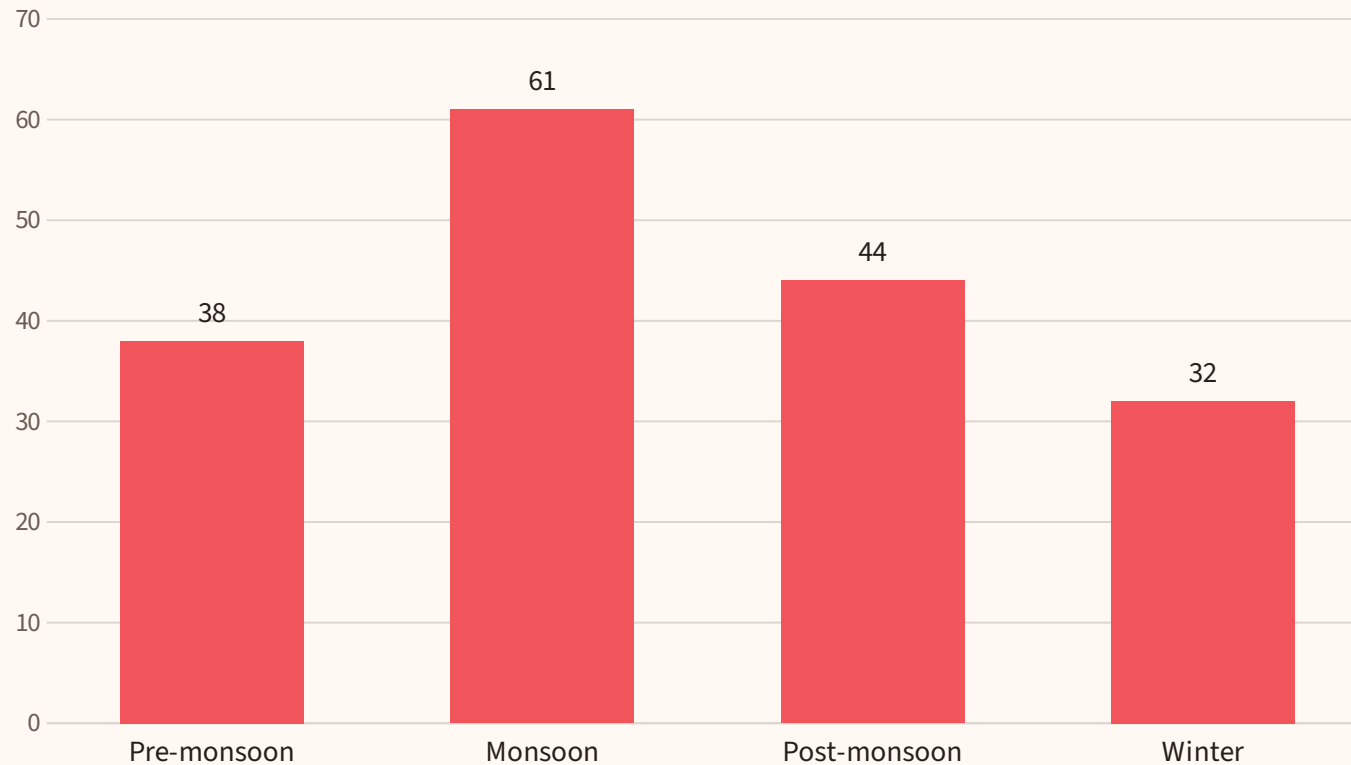
samples

12

months

*Describe your own dataset.*

# Key result



Concentrations peaked in the monsoon as runoff increased (sample data).

*Sample data for illustration — replace with your own figures.*

# Findings vs hypotheses

## Hypotheses

- Monsoon raises counts
- Fibres dominate
- Recreational lakes worse

vs

## What we found

- Confirmed monsoon peak
- Fibres and fragments equal
- Inlet sites worst

# Contributions

1

## Baseline

First seasonal baseline for the city.

2

## Method

Low-cost lab protocol.

3

## Policy

Evidence for drain screening.

# Limitations and future work

- One year of data
- Limited particle-size range
- Source tracing is indicative

# Publications

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03

**CONSUMER TRUST IN  
DIGITAL PAYMENTS IN  
TIER-2 CITIES**

KEY IDEA

# MBA Research Project

## Viva

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Chapter 3 • Consumer Trust in Digital Payments in Tier-2 Cities

# Background and motivation

- Digital payments have grown rapidly across India
- Adoption in tier-2 cities still lags metros
- Trust and fraud concerns are often cited

## RESEARCH GAP

**Little research separates trust factors from convenience factors.**

# Research questions

1

## RQ1

Which factors drive trust in digital payments?

2

## RQ2

How does fraud experience change usage?

3

## RQ3

What would increase adoption?

# Related work

| Theme   | Key findings                  | What is missing           |
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*Summarise your literature here.*

# Research design

**01**

## **Survey**

Structured questionnaire

**02**

## **Sample**

Stratified across 4 cities

**03**

## **Model**

Structural equation  
modelling

**04**

## **Interview**

Follow-up with merchants

# Data and sample

620

respondents

4

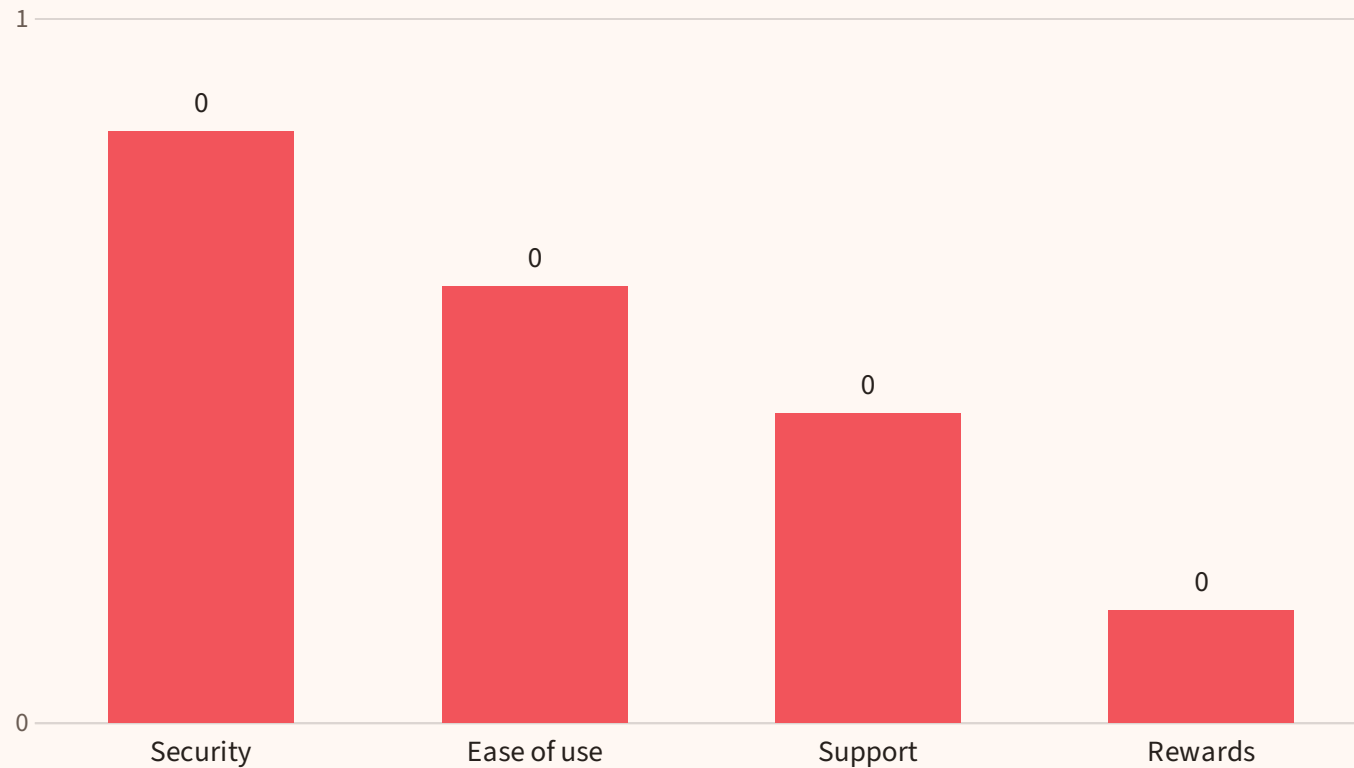
cities

32

merchant interviews

*Describe your own dataset.*

# Key result



Perceived security is the strongest driver of trust (sample data).

*Sample data for illustration — replace with your own figures.*

# Findings vs hypotheses

## Hypotheses

- Security drives trust
- Rewards drive usage
- Fraud reduces usage

vs

## What we found

- Security strongest
- Rewards weak
- Fraud halves usage for a year

# Contributions

1

## Model

Validated trust model for tier-2 users.

2

## Insight

Security messaging beats cashback.

3

## Practice

Merchant support recommendations.

# Limitations and future work

- Self-reported data
- Four cities only
- Cross-sectional design

# Publications

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**04**

**LOW-COST IOT AIR  
QUALITY MONITORING  
NETWORK**

KEY IDEA

# M.Tech Thesis Defence

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Chapter 4 • Low-Cost IoT Air Quality Monitoring Network

# Background and motivation

- Urban air quality varies street by street
- Official monitors are few and costly
- Low-cost sensors could fill the gaps

## RESEARCH GAP

**Low-cost sensors drift and need calibration before city-scale use.**

# Research questions

1

## RQ1

How accurate are calibrated low-cost sensors?

2

## RQ2

Can a mesh network cover a campus?

3

## RQ3

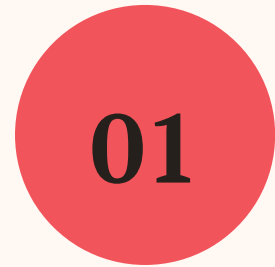
Which calibration model works best?

# Related work

| Theme   | Key findings                  | What is missing           |
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*Summarise your literature here.*

# Research design



## Build

12 sensor nodes



## Co-locate

Next to a reference monitor



## Calibrate

Regression and ML models



## Deploy

Campus-wide network

# Data and sample

12

sensor nodes

6

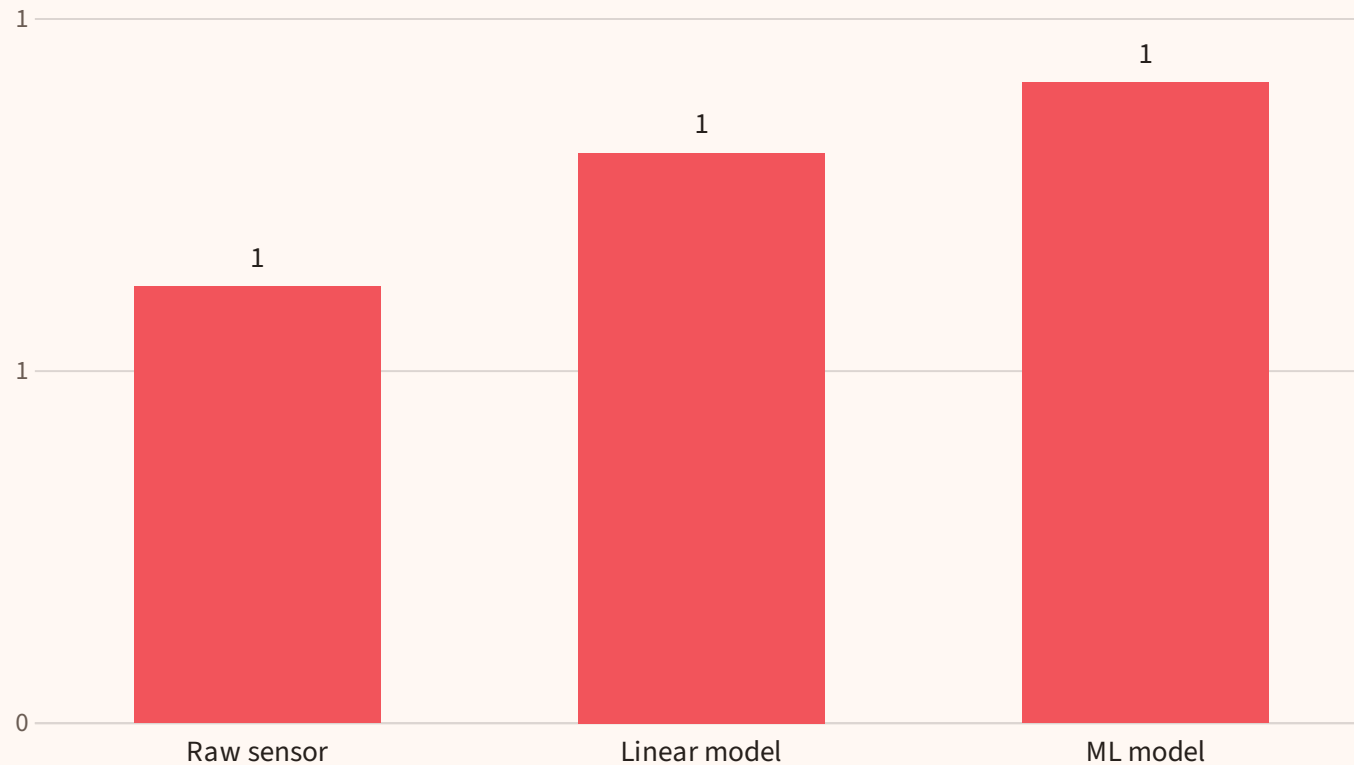
months of data

1

reference station

*Describe your own dataset.*

# Key result



Agreement with the reference monitor (sample data).

*Sample data for illustration — replace with your own figures.*

# Findings vs hypotheses

## Hypotheses

- Calibration improves accuracy
- Mesh covers the campus
- ML beats linear models

vs

## What we found

- $R^2$  rose to 0.91
- 95% data delivery
- ML model performed best

# Contributions

1

## Hardware

Open low-cost node design.

2

## Method

Calibration pipeline.

3

## Data

Campus air map.

# Limitations and future work

- One season only
- Single campus
- Sensor ageing not studied

# Publications

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**05**

**SOCIAL MEDIA USE AND  
ACADEMIC  
PERFORMANCE**

KEY IDEA

# M.A. Psychology Viva

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Chapter 5 • Social Media Use and Academic Performance

# Background and motivation

- Students spend hours daily on social media
- Effects on study habits are debated
- Evidence from Indian colleges is limited

## RESEARCH GAP

**Few studies  
separate active use  
from passive  
scrolling among  
Indian students.**

# Research questions

1

## RQ1

Is daily use linked to grades?

2

## RQ2

Does passive scrolling matter more?

3

## RQ3

Do study habits mediate the effect?

# Related work

| Theme   | Key findings                  | What is missing           |
|---------|-------------------------------|---------------------------|
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*Summarise your literature here.*

# Research design



## Sample

400 undergraduates



## Measure

Usage logs and survey



## Model

Regression and mediation



## Interview

Focus groups

# Data and sample

400

students

5

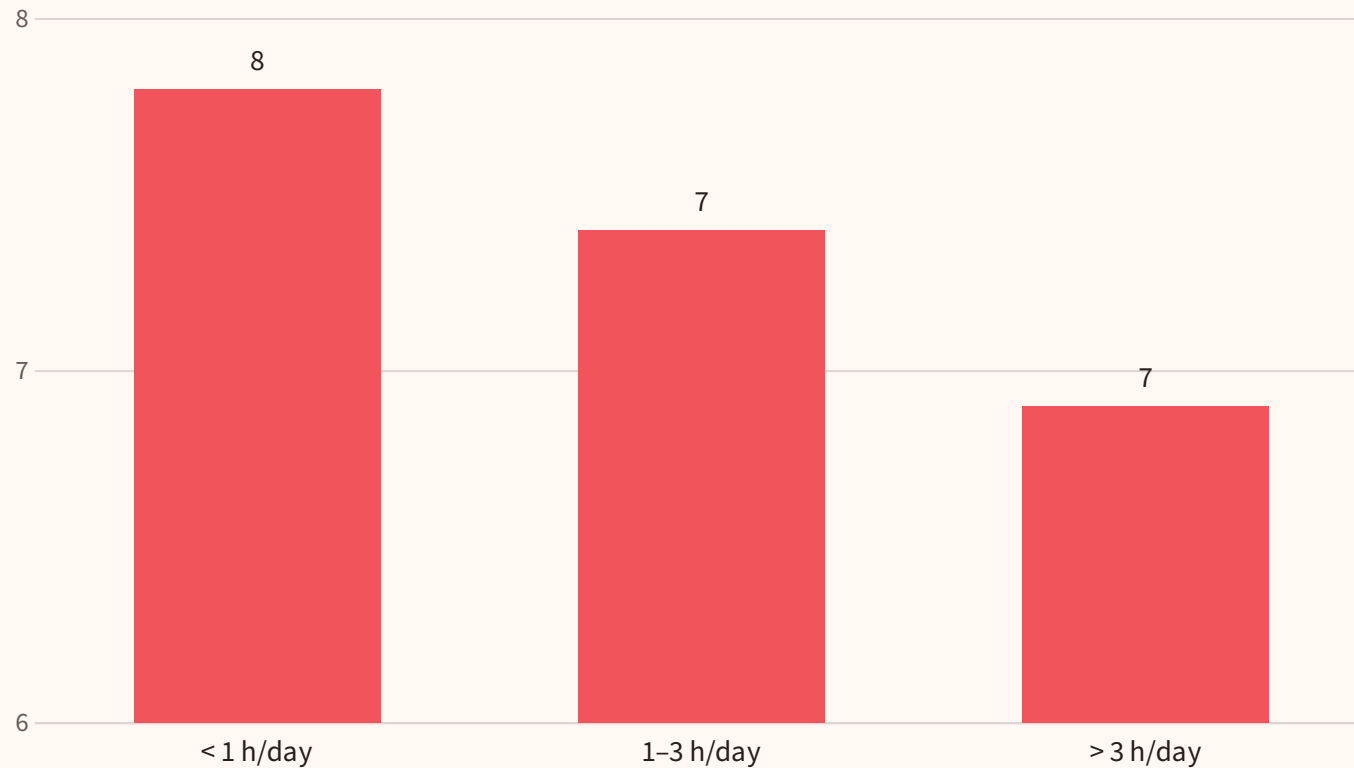
colleges

2

semesters

*Describe your own dataset.*

# Key result



Average grades by daily use  
(sample data).

*Sample data for illustration — replace with your own figures.*

# Findings vs hypotheses

## Hypotheses

- More use, lower grades
- Passive use matters most
- Habits mediate the link

vs

## What we found

- Small negative link
- Passive scrolling strongest
- Planning habits buffer effect

# Contributions

1

## Evidence

Indian college data.

2

## Model

Mediation pathway.

3

## Practice

Study-skills guidance.

# Limitations and future work

- Self-reported data
- Correlational design
- Urban colleges only

# Publications

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06

**IMPACT OF DIGITAL  
PAYMENTS ON SMALL  
RETAILERS**

KEY IDEA

# M.Com Dissertation Defence

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Chapter 6 • Impact of Digital Payments on Small Retailers

# Background and motivation

- Digital payments have grown rapidly in India
- Small retailers adopted UPI at different speeds
- Little evidence exists on their sales and costs

## RESEARCH GAP

**Few studies measure the effect of UPI on small-shop revenue and credit.**

# Research questions

1

## RQ1

Did UPI adoption change monthly sales?

2

## RQ2

How did cash-handling costs change?

3

## RQ3

What barriers remain for non-adopters?

# Related work

| Theme   | Key findings                  | What is missing           |
|---------|-------------------------------|---------------------------|
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*Summarise your literature here.*

# Research design



## Survey

240 retailers in two cities



## Interview

20 in-depth shop owners



## Analyse

Before-after comparison



## Validate

Triangulate with bank data

# Data and sample

240

retailers surveyed

2

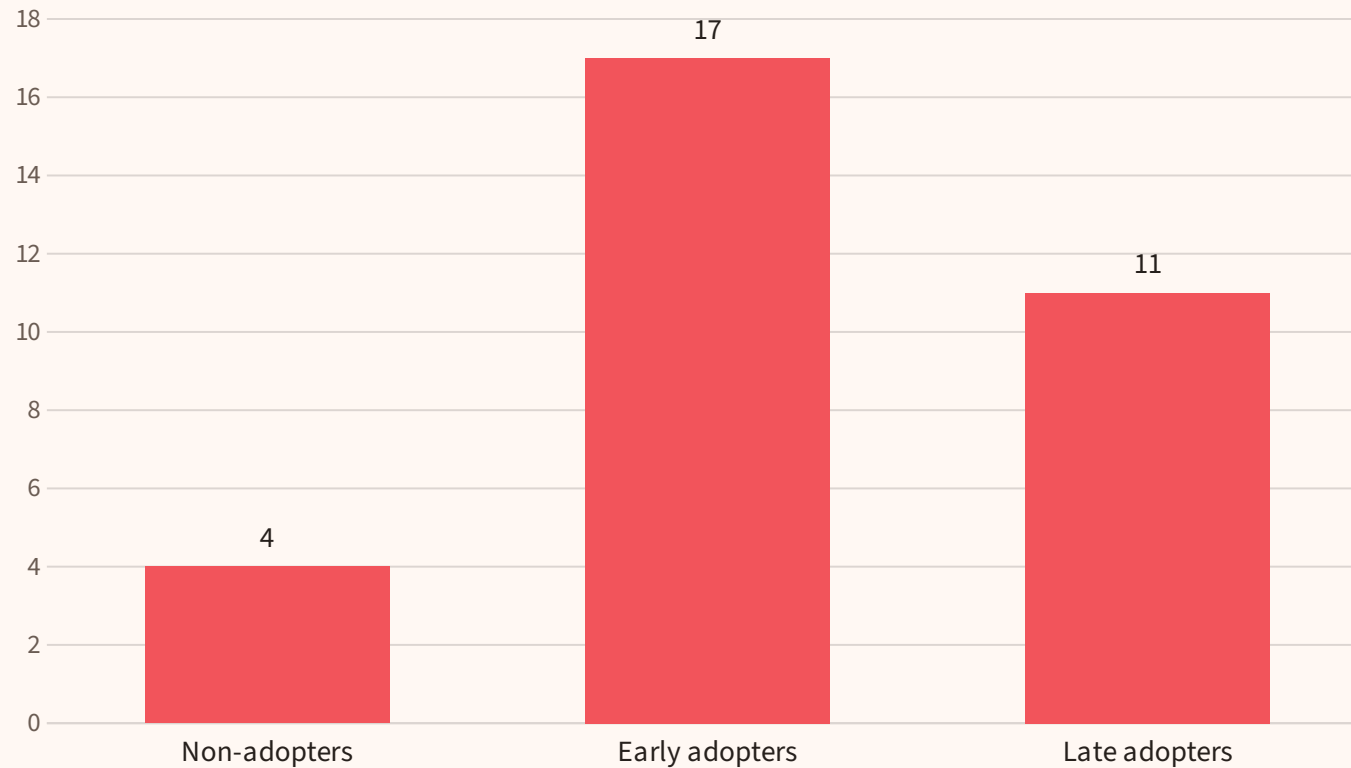
cities

18

months of data

*Describe your own dataset.*

# Key result



Growth in monthly sales over 18 months (sample data).

*Sample data for illustration — replace with your own figures.*

# Findings vs hypotheses

## Hypotheses

- UPI raises sales
- Costs of cash fall
- Trust is the main barrier

vs

## What we found

- Sales rose for adopters
- Cash costs fell modestly
- Fear of fraud slowed adoption

# Contributions

1

## Evidence

Shop-level panel data.

2

## Framework

Adoption barriers model.

3

## Policy

Ideas for retailer training.

# Limitations and future work

- Two cities only
- Self-reported sales
- Short time window

# Publications

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- Paper 2 — conference name, year (accepted)
- Paper 3 — journal name (under review)

# Thank you

Questions and discussion.

Presenter Name

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