

Using GIS and Activity Space Approaches to Understand the Space-Time Constraints Experienced by Indonesian Female Domestic Workers in Hong Kong

Fikriyah Winata, Department of Geography & Geographic Information Science, University of Illinois at Urbana-Champaign

INTRODUCTION

Female domestic workers as vulnerable population

- Female domestic workers → highly **vulnerable group** (Wang et al., 2018; Hall, Garabiles, and Latkin, 2019):
 - Intensive work responsibilities** → limit women's mobility within space and time constraints (Mendoza et al., 2017)
 - Demanding daily tasks** → restrict domestic workers' social interactions outside their employers' home (Chen et al., 2017)

Co-locations between a 'place of life' and a 'place of work'

- Place of life (employer's home) = 'place of employment' (Yeoh and Huang, 1998)
- Co-location sharply limits **personal freedom** and **sense of privacy** (Yeoh and Huang, 1998; Hall, Garabiles, and Latkin, 2019).

RESEARCH QUESTIONS

- How do space-time constraints influence the mobility of Indonesian female domestic workers?
- How different domestic workers' activity spaces during working and rest days?

HYPOTHESES

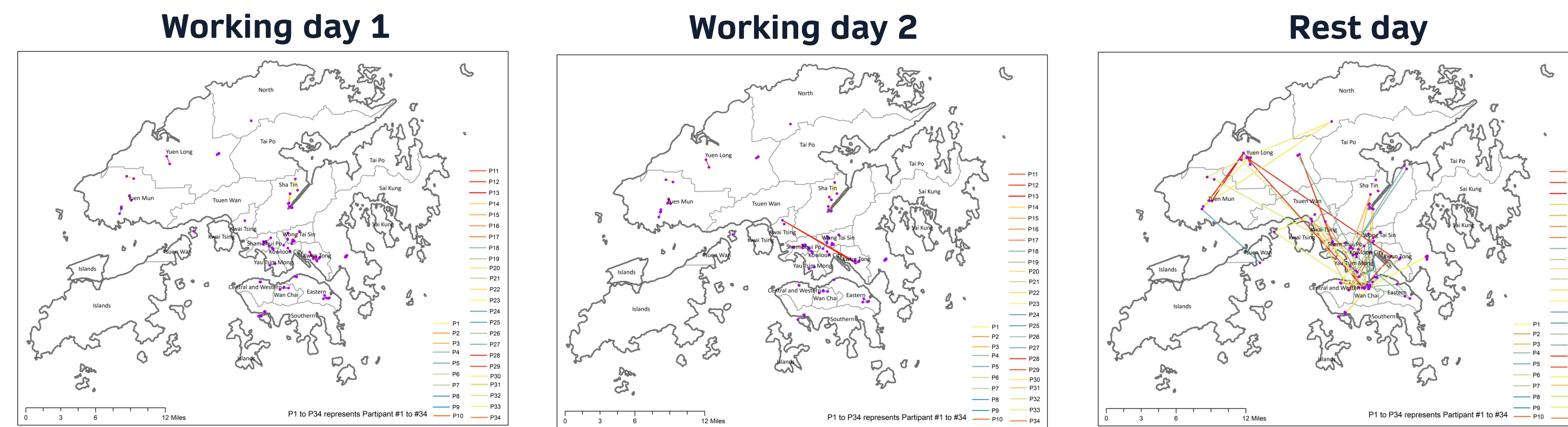
- Female domestic workers' daily activities and mobilities are predominantly fixed and dependent on their tasks.
- Their mobilities and activities (within space and time) differ between working and rest days.

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RESULTS

2D Activity Path of Domestic Workers



Domestic workers' activity spaces – that determined by the number of places visited, total hours being outside, and the size of the convex hull – were **significantly dependent** on which day they experienced, whether **working days** or **rest day**.

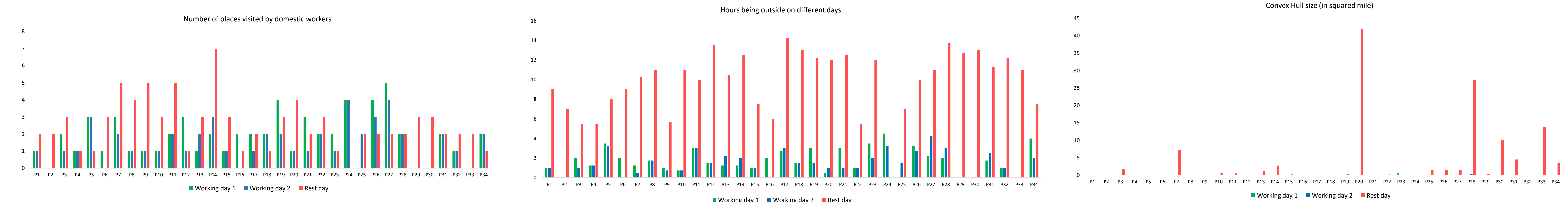
One-way MANOVA Analysis Significant Univariate Effects for Day

| Dependent variable | df | df error | F value | P-value | Day | Means |
|------------------------------------|----|----------|---------|-----------|---------------|-------|
| Number of places | 2 | 99 | 6.098 | 0.003* | Working day 1 | 1.79 |
| | | | | | Working day 2 | 1.47 |
| | | | | | Rest day | 2.35 |
| Hours being outside | 2 | 99 | 175.51 | <0.001*** | Working day 1 | 1.72 |
| | | | | | Working day 2 | 1.51 |
| | | | | | Rest day | 9.27 |
| Convex Hull size (in squared mile) | 2 | 99 | 5.644 | 0.004** | Working day 1 | 0.024 |
| | | | | | Working day 2 | 0.021 |
| | | | | | Rest day | 3.542 |

Multivariate Tests for Day

| Effect | Value | F | Hypothesis df | Error df | P-value | |
|--------|--------------------|-------|---------------|----------|---------|-----------|
| Day | Wilks' Lambda | 0.208 | 38.485 | 6 | 194 | <0.001*** |
| | Pillai Trace | 0.799 | 21.772 | 6 | 196 | <0.001*** |
| | Hotelling's Trace | 3.757 | 60.116 | 6 | 192 | <0.001*** |
| | Roy's Largest Root | 3.746 | 122.39 | 6 | 98 | <0.001*** |

Comparison of Activity Space Measures: number of places, hours being outside, and size of Convex Hull



DATA COLLECTION & METHODS

Participants & Data Collection:

- Participants were recruited through a non-profit organization that provides social, religious, and education for Indonesian domestic workers in Hong Kong, *Dompot Dhuafa*.
- 34 participants** collected **activity diaries** for a **three-day** period (two working days & one rest day).
- Activity diaries were collected virtually through Qualtrics survey form from **September 1st to November 5th, 2020**.
- Institutional Review Board (IRB) was obtained from the University of Illinois Office of the Protection of Research Subjects **#21059**.

GIS, Spatial Analysis, and Statistical Methods:

- Each activity diary on each day was geocoded and mapped in ArcMap.
- 2-D activity path for each day was created and visualized in ArcScene & ArcMap.
- One-way Multivariate analysis of variate (MANOVA) was run in R using the `manova()` function.

CONCLUSIONS

- During working days, domestic workers had limited mobilities. Their space-time activities were primarily dictated by their works and what their employers asked them to do.
- Domestic workers had a limited number of places their visited and few hours being outside on working days. Their activity spaces were only around their employers' homes.
- Rest day allowed domestic workers to travel to many places across Hong Kong and have the freedom to do what they wanted, e.g., attending social & religious activities.
- Domestic workers had more flexibility to travel within space and time during the rest day. Their activity spaces were significantly larger on the rest day compared to working days.

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