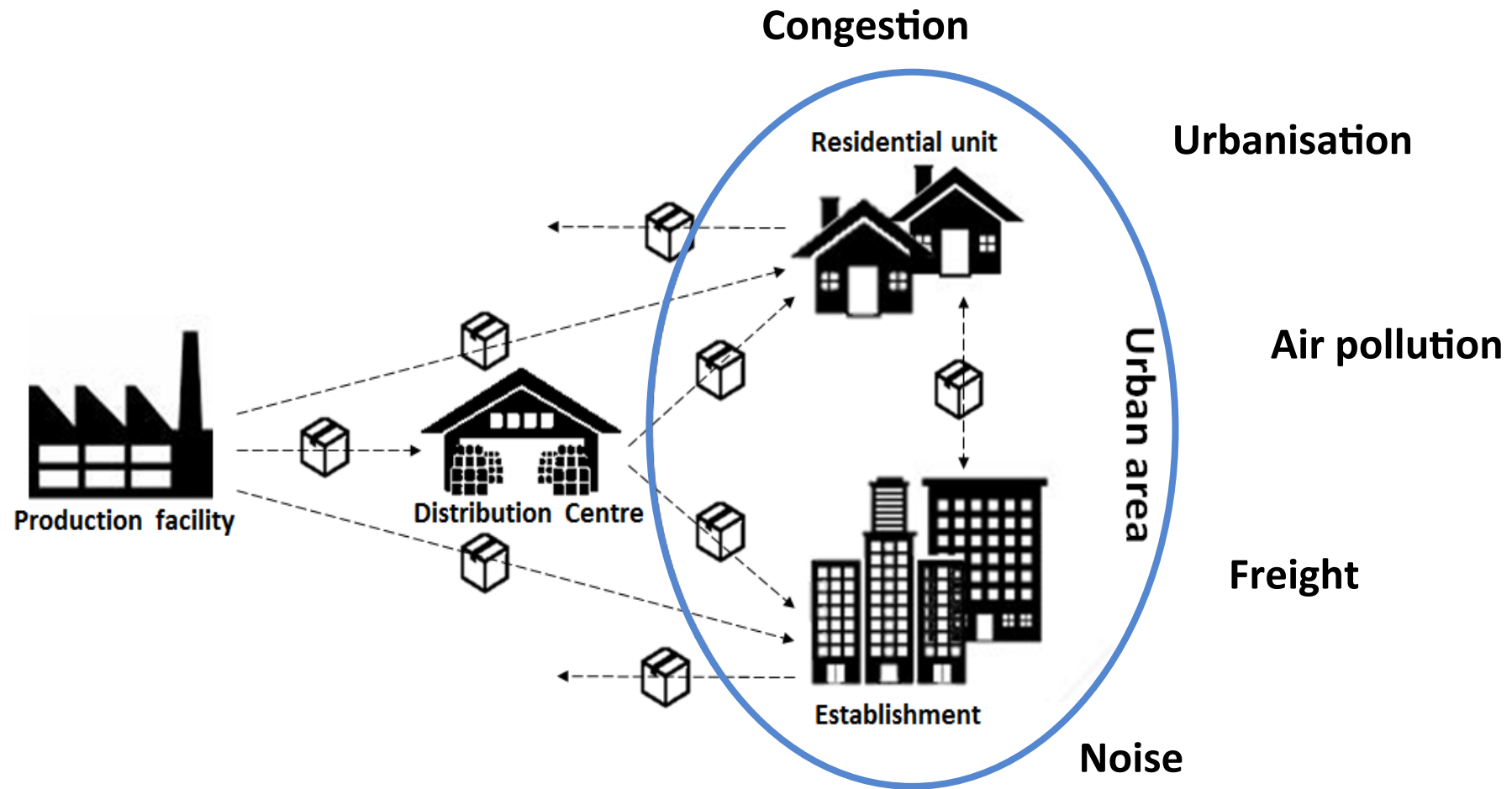


An Impact Analysis of Urban Activity in terms of Goods Transport Operations

Sofia Guldbrand
Linda Johansson
Lovisa Westblom

In Sweden, 90% lives in urban areas and freight transport is essential to serve the people living there



Different methods are applied to achieve the aim of this thesis



Establishments

Aim of thesis

- Find significant variables that determine the amount of FA and FTA an establishment attracts
- Create models that predict the amount of FA and FTA that is attracted to an establishment
- Create models to predict amount of FA and FTA that is attracted to an establishment, early in planning processes

Methodology

- Literature review
- Case studies
- Questionnaire
- Linear regression
- Apply models to an early planning phase



Residential unit

- Describe the current e-commerce business
- Analyse implications of freight deliveries from the e-commerce business

- Literature review
- Interviews

Introduction

Significant variables

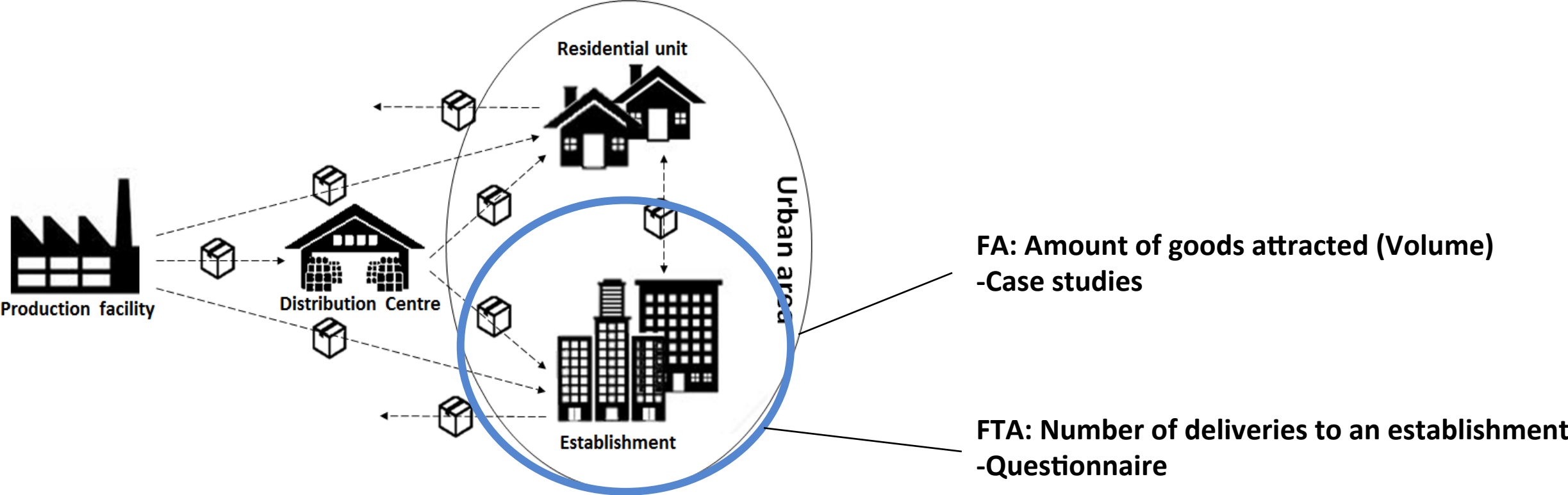
Modelling results

Application to Frihamnen

E-commerce

Concluding remarks

FA and FTA are studied separately because they are driven by different variables

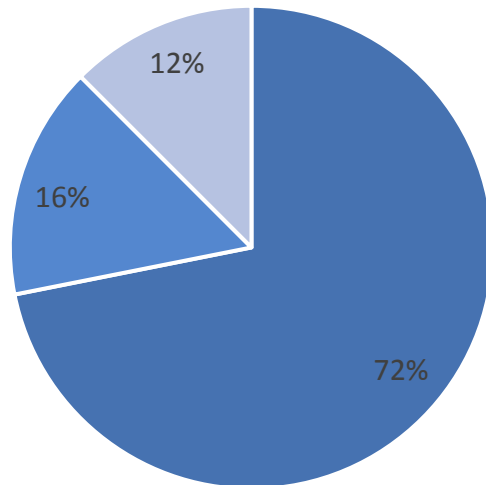


Establishments mostly likely found in an inner city were divided into five groups

- Retail perishable
 - Retail non-perishable
 - Accommodation, food and beverage
 - Offices
 - Education, healthcare and public security
- Case studies
- Questionnaire
-

Business size and number of employees affects volumes delivered to retailers of perishable products

Freight Volumes



■ 1-10 cubic meters ■ 11-100 cubic meters ■ 101-1000 cubic meters

Significant explanatory variables for volume

- Establishment size (m²)
- Number of employees working per day

Volume (m ³)	
Average	73
Median	5

Introduction

Significant variables

Modelling results

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Concluding remarks

Several different variables can be used to explain the number of deliveries taking place to an establishment

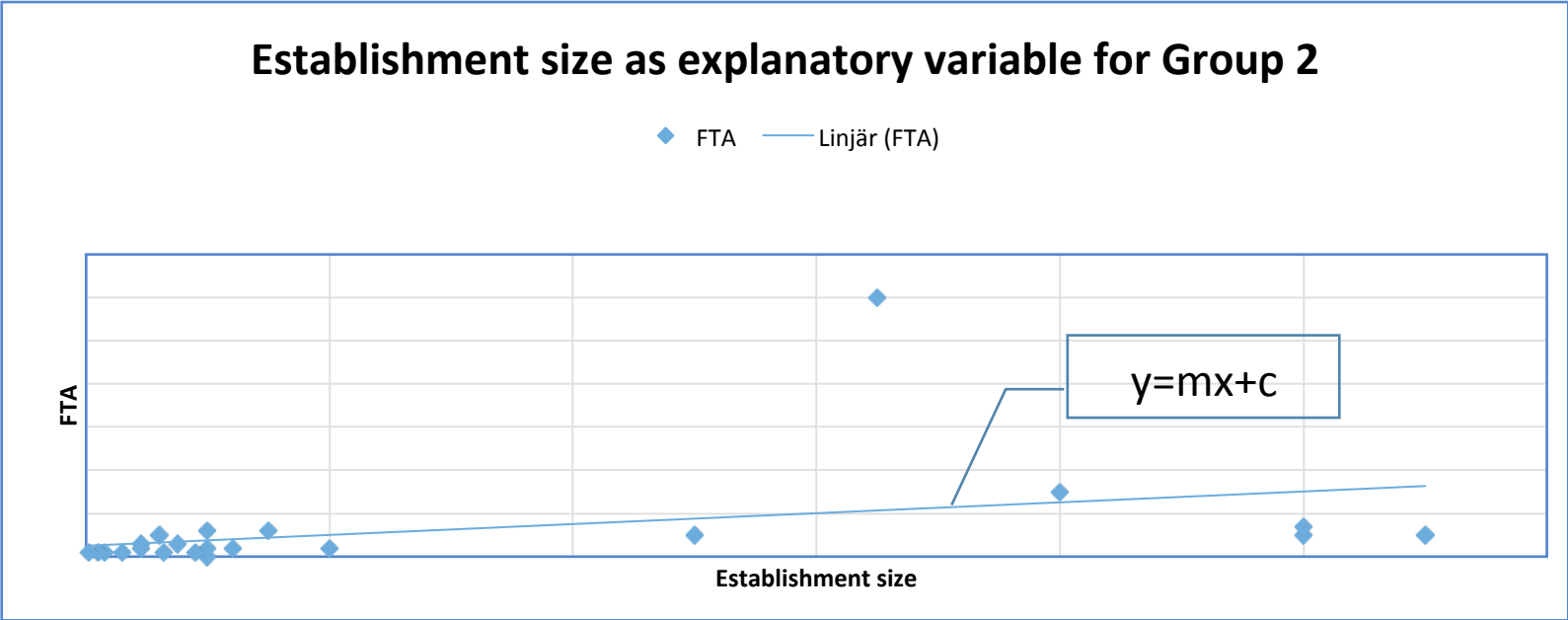
Type of Establishment (group)	Significant explanatory variable
1 - Retail Perishable	<ul style="list-style-type: none">• Number of suppliers• Number of carriers• Stockholding area• Establishment size
2 - Retail Non - Perishable	<ul style="list-style-type: none">• Number of employees• Number of suppliers• Number of carriers• Establishment size
3 - Accommodation, food and beverage	<ul style="list-style-type: none">• Number of employees• Number of suppliers
4 - Offices	<ul style="list-style-type: none">• Stockholding area
5 - Education, healthcare and public security	<ul style="list-style-type: none">• Number of employees• Number of suppliers• Number of carriers• Establishment size

Different variables have the strongest explanatory power for the different groups



Group	Explanatory models (variables)	Forecasting models (variables)
FTA		
1 - Retail Perishable	Stockholding area	Establishment size
2 - Retail Non - Perishable	Establishment size	Establishment size
3 - Accommodation, food and beverage	Number of suppliers	Number of employees
4 - Offices	Stockholding area	-
5 - Education, healthcare and public security	Establishment size/Number of suppliers	Establishment size
FA		
1 - Retail Perishable	Number of employees	Number of Employees

Collected data can be used to create models that enables the prediction of FA/FTA by explanatory variables



$y=mx+c$	Example
$Y = FA/FTA$	$y = FTA$
$m = \text{Coefficient}$	$m = 0,02119$
$x = \text{Explanatory variable}$	$x = \text{Size of establishment}$
$c = \text{intercept}$	$c = 0$

Model:
 $y=0,021x$

The vision of Frihamnen is a sustainable city with multi-social resident, restrictions on personal car transportation and high requirements on sustainable living.



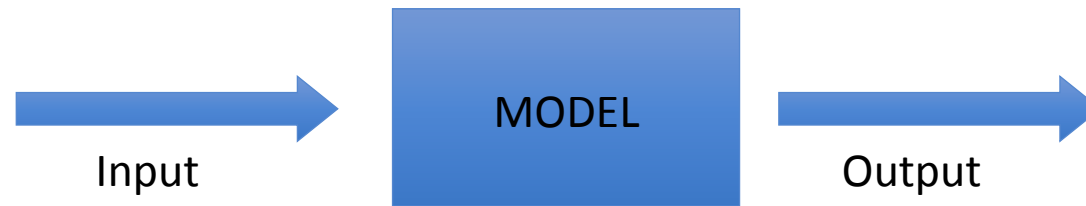
General facts

- Situated in Gothenburg on the northern side of the river, on the island Hisingen
- 9000 residential units
- 15000 workplaces

Distribution of properties

- 60 % residential units
- 40 % workplaces
 - 60% private establishments
 - 25% public establishments, schools etc.
 - 10% strategic buildings (museums, pools)
 - 5% non-profit organisations

It is predicted that 12 000 deliveries will be performed every week in Frihamnen, which is three times as many deliveries as to Nordstan



510 000 m² establishment area
15 000 employees/work places
3 651 establishments

11 914 deliveries/week
4 386 m³ perishable goods/
week



The E-commerce business will most likely increase in the future and change goods delivery patterns in urban areas

Today



- Inefficient home deliveries
- Low volumes

Future



- Higher volumes
- Products will to a larger extent be delivered to residential units instead of establishments
- Smaller packaging units

Introduction

Significant variables

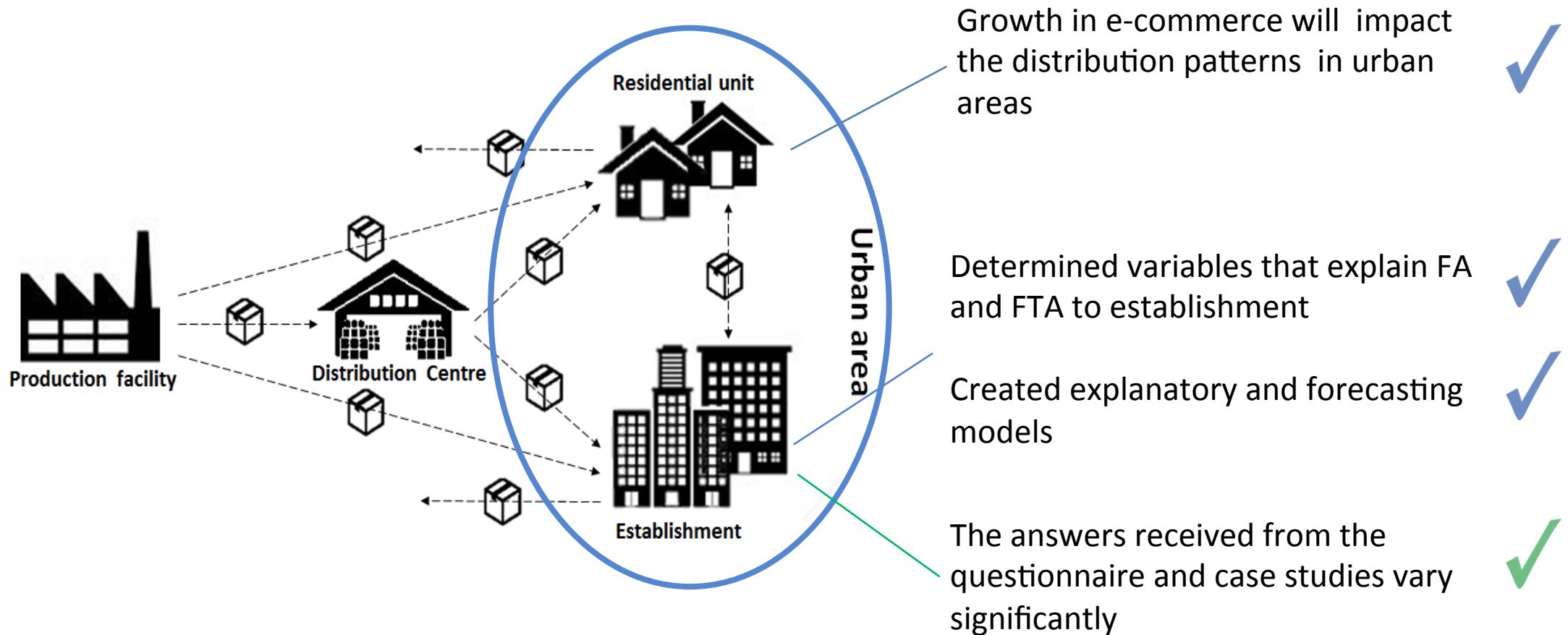
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An additional finding from this thesis is that there is a statistical difference in the data collected using the different methods



Thank you!

Framtagning av siffror för Frihamnen

- Input - Antal verksamheter

Grupp	Haga, Eriksberg and Avenyen	Frihamnen
1. Detaljhandel inkl. färskvaror	37	84
2. Detaljhandel exkl. färskvaror	127	289
3. Logi, restauranf och café	126	287
4. Kontor	1097	2498
5. Skola, vård, omsorg, skydd och säkerhet	216	492

Områden	Invånare
Frihamnen	18000
Haga, eriksberg, Avenyen	7904
Ratio	2,3

- Input - Verksamhetsstorlek

FRIHAMNENS GRUPPERING	Total storlek kvm
PRIVAT	360000 kvm
-HANDEL 15%	54000 kvm
-RESTAURANGER 5%	18000 kvm
-KONTOR 80%	288000 kvm
OFFENTLIG SERVICE	150000 kvm

ÖVERSÄTTING TILL VÅRAN GRUPPERING	Total storlek kvm
1. Detaljhandel inkl. färskvaror	17939 kvm
2. Detaljhandel exkl. färskvaror	36061 kvm
3. Logi, restauranf och café	18000 kvm
4. Kontor	288000 kvm
5. Skola, vård, omsorg, skydd och säkerhet	150000 kvm

