Exploring carriers' perception about city logistics initiatives

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Outline

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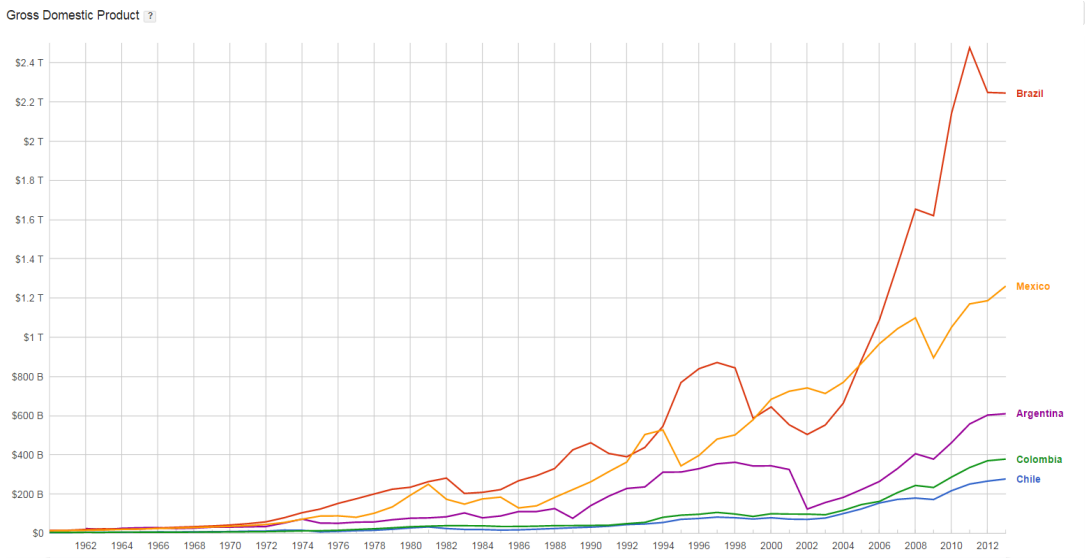
Background

Background

- Brazil: 5th largest country (190M), 84% urban, 8th largest economy, and rapid growth
- Brasilia, the Federal District: 2,570,160 inhab., 4th largest in Brazil, 430 inhabitants/km^2, highest income in Brazil
  - Increase in income produced increase in passenger traffic (in 1950's, transit use: 85%, now 51%) and in freight traffic



Source: Google Public Data- World bank

Source: http://www.maiscomunidade.com/conteudo/2008-05-19/brasilia

Source: http://g1.globo.com/Noticias/Brasil

Source: http://transitonodfies.blogspot.se/

Source: http://www.atribunarj.com.br/

Source: http://bsbnossa.blogspot.se

Source: Costa, C.D. and Viana, L. S (2014)

Freight responsible for 61% of NOx, 65% of particulate matter and 48% of CO_2 in Brazil

Initiatives for urban freight

- Not much has been done in Brazil to improve urban freight traffic conditions
  - 70% of public initiatives in Brazil are access restrictions for trucks
- These access restrictions can exacerbate the problem:
  - Sao Paulo: +20% fleet for 65% of carriers (Gatti Junior, 2011)
- Need to consider other initiatives and undertake more comprehensive studies (talk to stakeholders)

Objectives

Objectives

- Understand problems related to urban freight distribution
- Understand carriers operational characteristics
- Study carriers' perception about city logistics initiatives (CLI)
- Analyze key obstacles for the implementation of CLI

Methods

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Methods

- Study state-of-the-art of CLI
- Consult transportation specialists and carriers managers to identify common challenges for urban freight distribution and CLI with potential
- Conduct semi-structured interviews with carrier managers to inquire about their operational characteristics and opinions
- Analyze the responses using Spearman tests and Mann-Whitney-Wilcoxon correlation analyses and draw conclusions

Data collection

Data collection approach

- *In loco* semi-structured interviews
  - Operational characteristics: market segment, # of deliveries, fleet size, operations time, etc.
  - Attitudinal study:
    - Opinion towards urban distribution problems
    - Opinion towards city logistics initiatives

City Logistics Initiatives

Off-hour deliveries	• shift the time when the goods are picked-up/ delivered to the off-hours (e.g., between 7pm and 6am)
Local pick-up points	• local collection points where end-consumers travel to pick-up goods typically ordered through the internet
Unassisted deliveries	• foster freight delivery without requiring the presence of staff or resident at home
Joint staging areas	• depots located close to congested areas where trucks deliver goods during night and electric vehicles, bikes, or motorcycles deliver to final destinations next day
Joint delivery systems	• cooperative program that allows carriers to consolidate cargo, i.e., they reallocate customers to each other to minimize the overlap of each delivery area
Vehicle parking reservation	• improve allocation of trucks parking spaces using intelligent transportation and communication systems

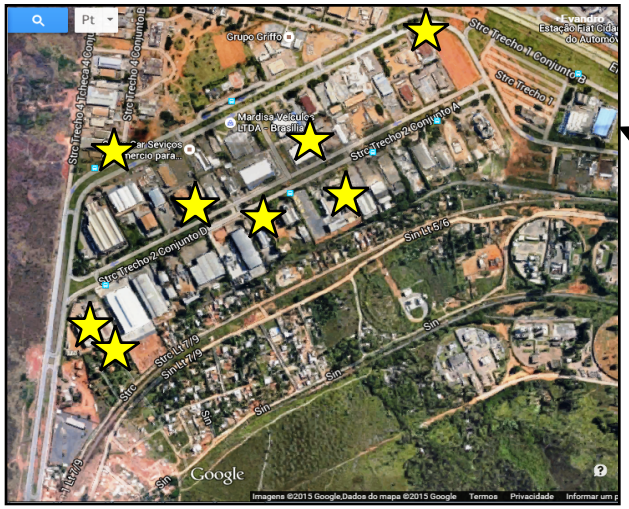
Factors affecting CLI

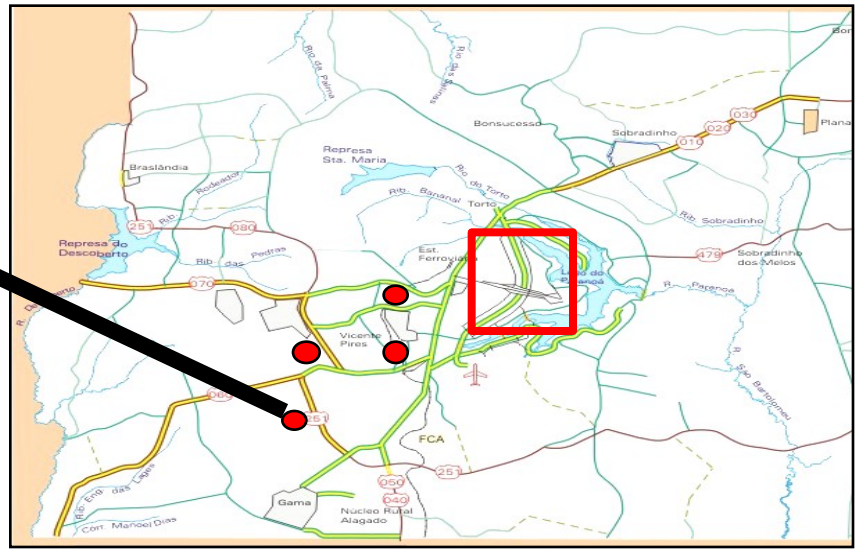
- To make possible a structured analysis we identified and consolidated key factors:

Cost reduction	• decrease in last mile operational costs thanks to the initiative

Respondents

- 23 less-than-truckload carriers distributing goods in Brasilia:
  - delivery non-perishable goods
  - own distribution centers- located 15km southwest of Brasilia
  - 390 trucks make together 12,600 deliveries per day

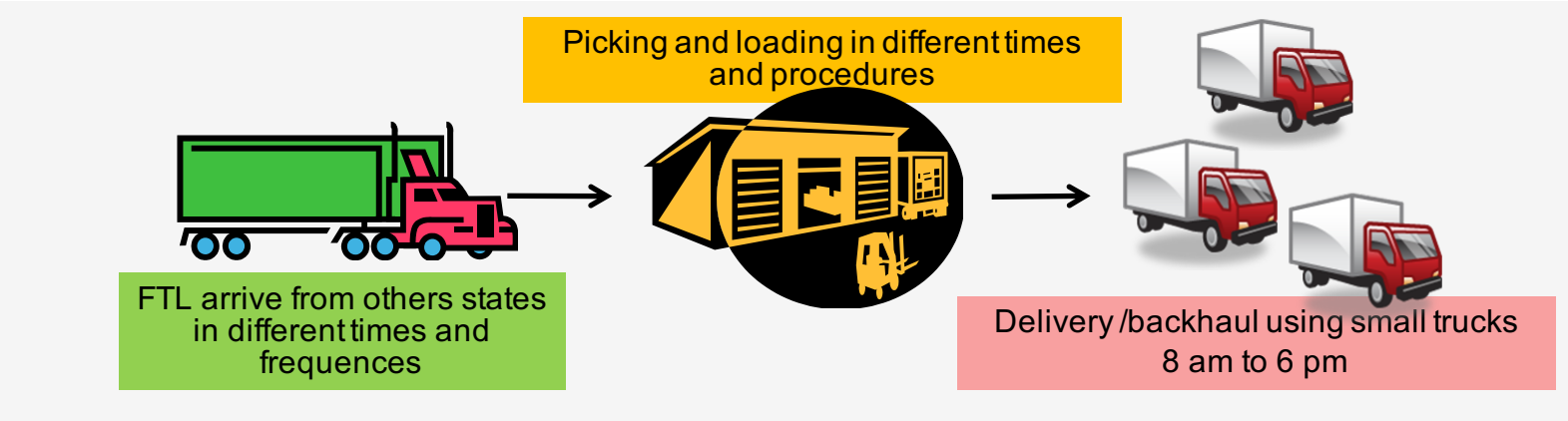




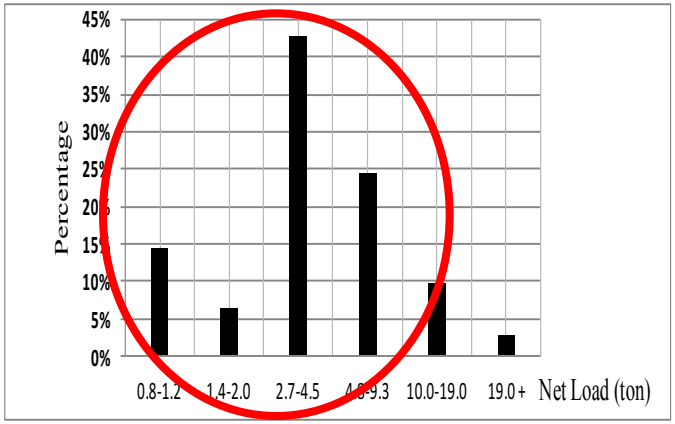
Results

Respondents attributes

- Typical operation:

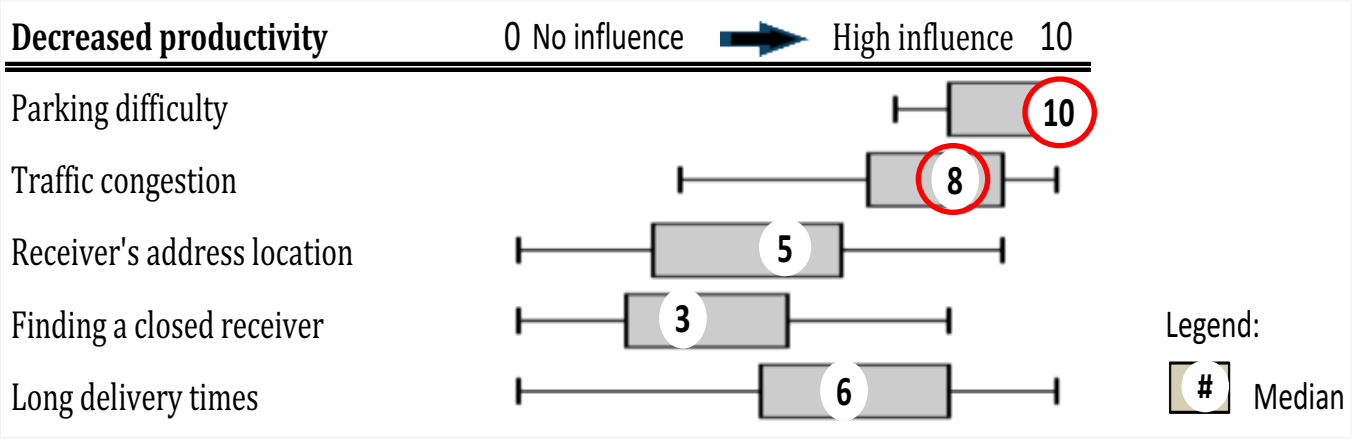


- Characteristics:
  - Fleet size: 2-60 trucks
  - Deliveries: 40- 4,100
  - Distance: 38-170 kms/ tour
  - Home deliveries: 5-20%
  - 17% of trucks see payload limited by volume, 18% by weight, **65% by time**



Urban delivery problems

- Opinions towards urban delivery problems



- Parking is perceived as a problem for all truck sizes
- Traffic congestion bigger problem for trucks with high payload
- Carriers serving wholesalers and supermarkets find long delivery times as an issue
- Several comments about access restrictions affecting productivity

City Logistics Initiatives

Initiatives	Factors	Influence (No Influence 0 — Strong Influence 10)	Will: Yes	Will: No	Carrier operational attributes: % Delivery Individuals	%Fractionated Load	Load Stop	Load Size/Weight	# Delivery / Day	# Deliv ery /Day/Vehicle	Fleet
Off-Hour Delivery (OHD)	Law	8	23	0							
	Cost Reduction	7					(-)				
	Receiver Willingness	8					(-)	(+)			
	Compet Initiate Proj.	7									
	Infrastructure	2									
	Govern Suport	9									
Local Pickup Point (LPP)	Law	1	16	7	(+)						
	Cost Reduction	6				(-)		(+)			
	Receiver Willingness	8			(+)			(+)			
	Compet Initiate Proj.	7							(+)		(+)
	Infrastructure	8			(+)						
	Govern Suport	0									

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City Logistics Initiatives

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Unassisted Delivery (UD)	Law	3	20	3				(+)			
	Cost Reduction	7									
	Receiver Willingness	9									
	Compet Initiate Proj.	7									
	Infrastructure	9									
	Govern Suport	7									(-)
Joint Stage Area (JSA)	Law	8	21	2							
	Cost Reduction	7									
	Receiver Willingness	1									(-)
	Compet Initiate Proj.	7							(+)		
	Infrastructure	9									
	Govern Suport	8									

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City Logistics Initiatives

Initiatives	Factors	Influence (No Influence 0 — Strong Influence 10)	Will: Yes	Will: No	Carrier operational attributes: % Delivery Individuals	%Fractionated Load	Load Stop	Load Size/Weight	# Delivery / Day	# Deliv ery /Day/Vehicle	Fleet
Joint Delivery System (JDS)	Law	7	21	2							
	Cost Reduction	8									
	Receiver Willingness	6									
	Compet Initiate Proj.	8								(+)	
	Infrastructure	9								(+)	
	Govern Suport	0			(+)						
Vehicle Park. Res. System (VPRS)	Law	10	23	0							
	Cost Reduction	9						(-)	(-)		(-)
	Receiver Willingness	1									
	Compet Initiate Proj.	1							(+)		(+)
	Infrastructure	10									
	Govern Suport	10						(+)			

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Results

- Potential costs savings on the last mile:

Project	OHD	Ppo	Ude	JDS	JSA	VPR
Mean	**27%**	21%	22%	24%	23%	**15%**
Median	24%	12%	30%	30%	20%	10%
Std	13%	15%	15%	13%	13%	14%
# Answers	22	7	7	9	11	7

  - Carriers expect the highest savings from OHD, with a 27% cost reduction in average
  - JDS, JSA, UD, and LPP: a little more than 20% cost reduction in average
  - VPRS is expected to produce the lower amount of savings 15%

Conclusions

Conclusions

- This study focuses on carriers: implementing CLI requires study of different stakeholders (receivers, shippers, PS) perspectives
- Imposing CLI to all carriers can induce unexpected results
- It is important to know about carriers characteristics and needs
  - Parking is the main problem for distribution
  - OHD/UD - carriers serving small stablishments
  - LPP/ JSA/JDS – larger carriers, higher number of home deliveries, ITS
  - VPRS – interest of all carriers
- CLI could decrease costs for carriers and bring benefits from society, but there are several challenges to overcome

Thanks!

Questions?

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