



Nagoya University
Transport and
Environment Dynamics

2022年9月25日(日)

行動モデル夏の学校2022成果報告会

豊洲周辺の交通手段選択モデルの推定

Estimation of a transportation mode choice around Toyosu area

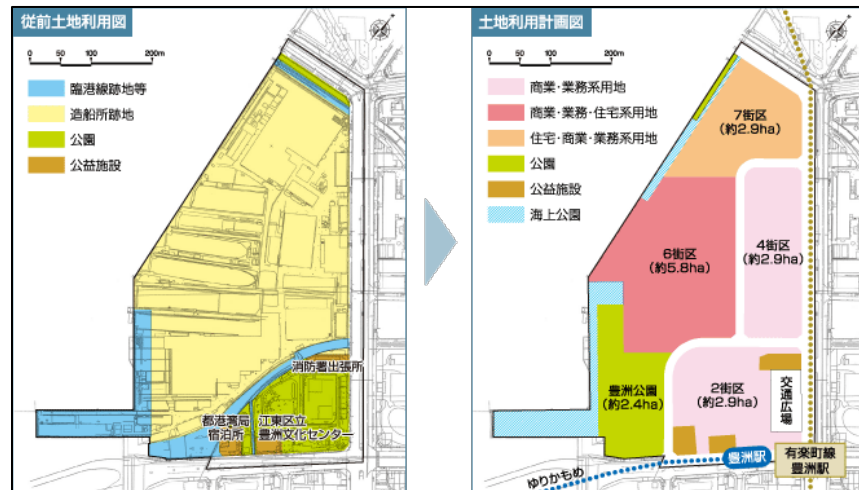
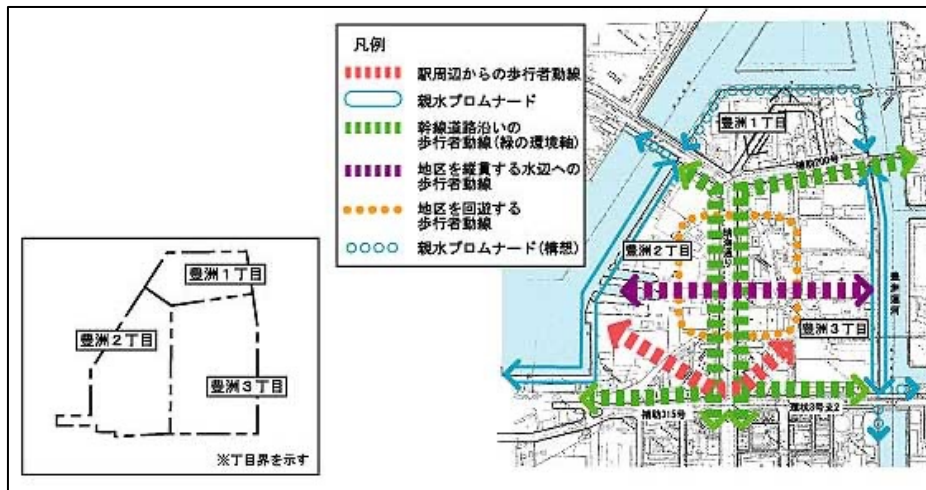
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豊洲駅周辺では、歩行者・自転車ネットワークの整備、施設等開発が進展

Development of pedestrian and bicycle networks and facilities in the vicinity of **Toyosu Station** is progressing.



公園や潮風の散歩道等の水辺と緑を活かした**ウォーカブルな空間の創出**により、**にぎわいや回遊性のある拠点形成が目標**

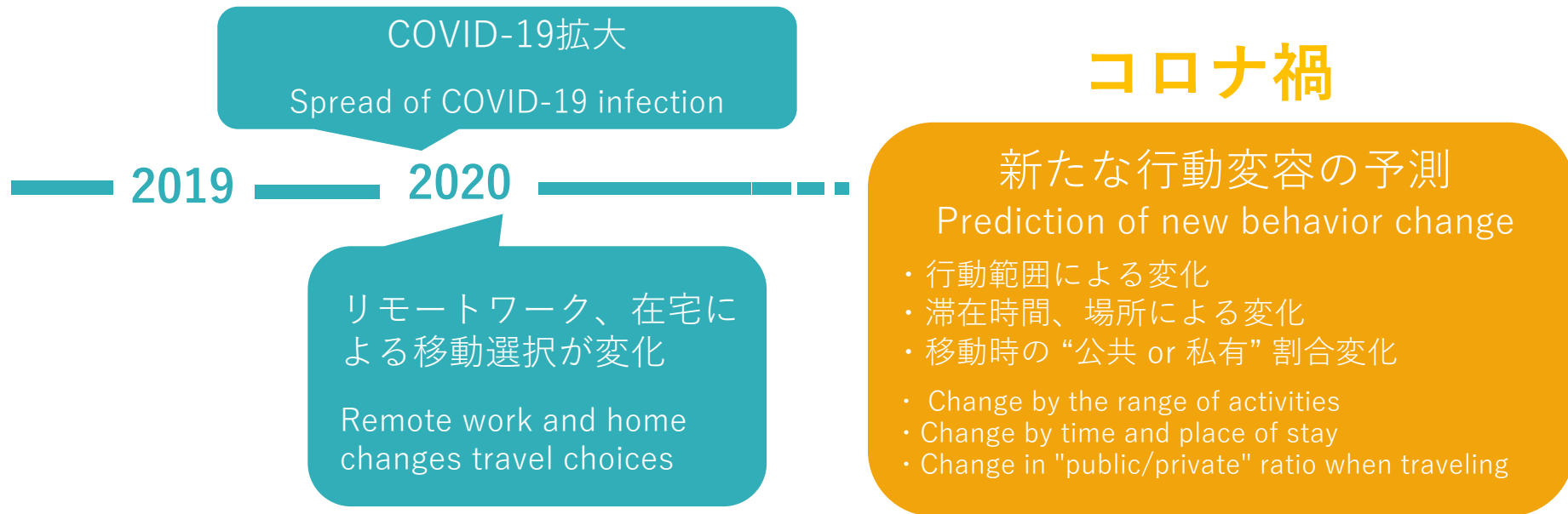
The goal is to create walkable spaces utilizing the waterfront and greenery, such as parks and sea breeze walkways, to create a bustling, circulating center.

1. 背景

Background

コロナ禍では行動選択が変容し、新たな行動が予測される

"COVID-19 pandemic" alters behavioral choices and predicts new behaviors

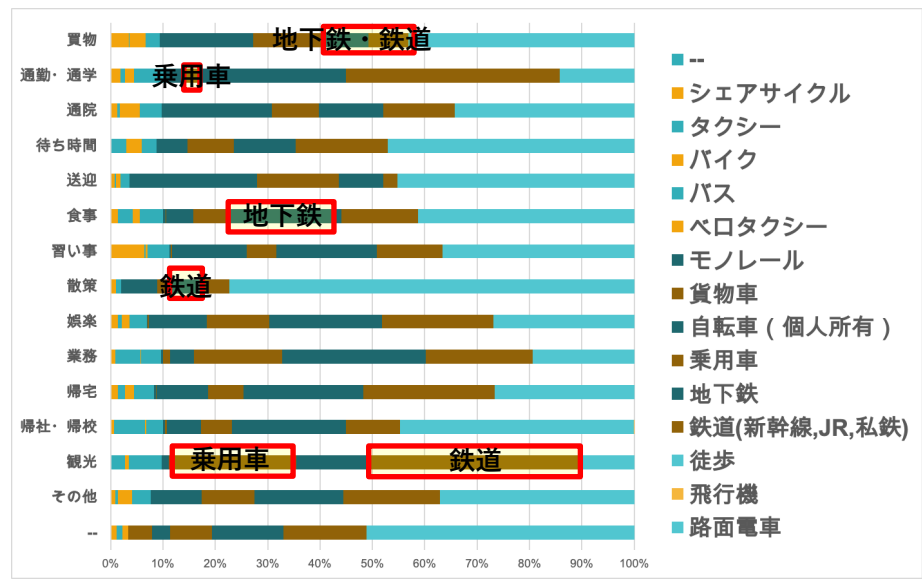


◎ コロナ発生前後の2019年・2020年を比較

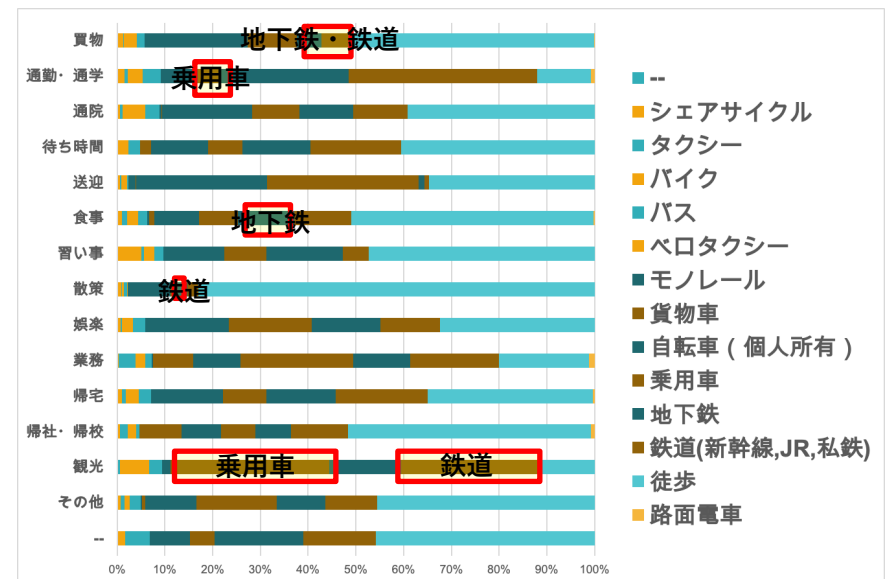
Compare 2019 and 2020 before and after the COVID-19 outbreak

2. 基礎分析① Basic Analysis①

■ 目的別交通手段割合 Percentage of transportation by purpose



2019

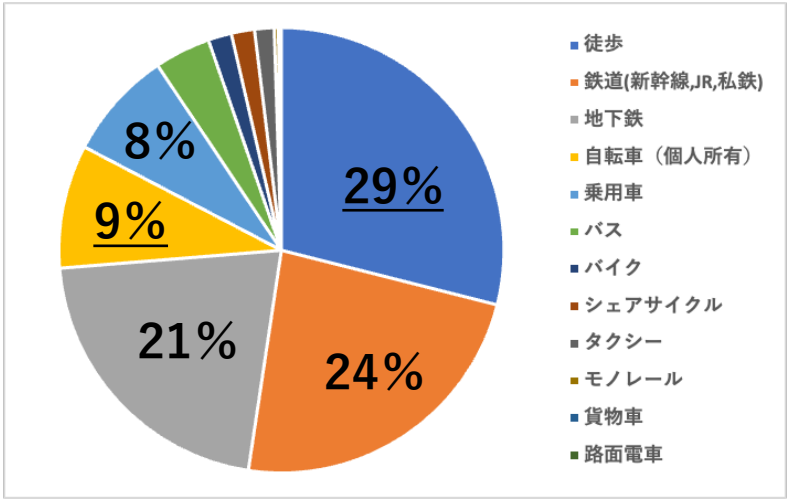


2020

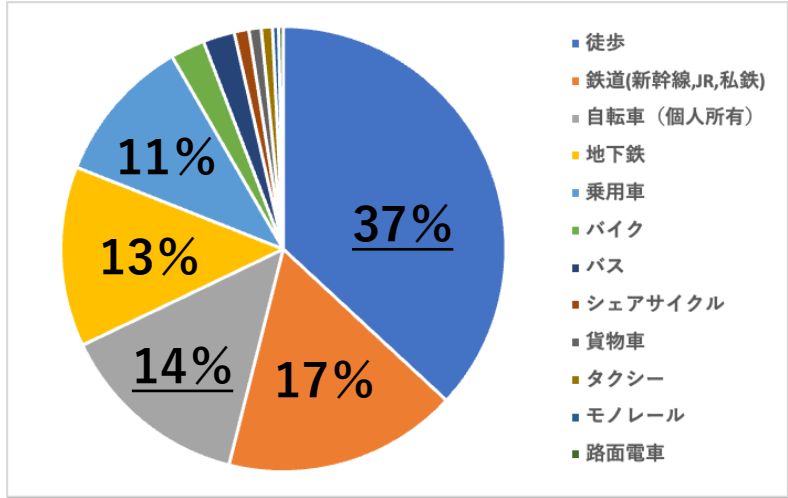
主要目的において、“徒歩・乗用車”：増加 “地下鉄・鉄道”：減少
 Walking and passenger cars: increase Subway and trains: decrease

2. 基礎分析② Basic Analysis②

■ 移動時交通手段割合 Percentage of transportation by mode of travel



2019

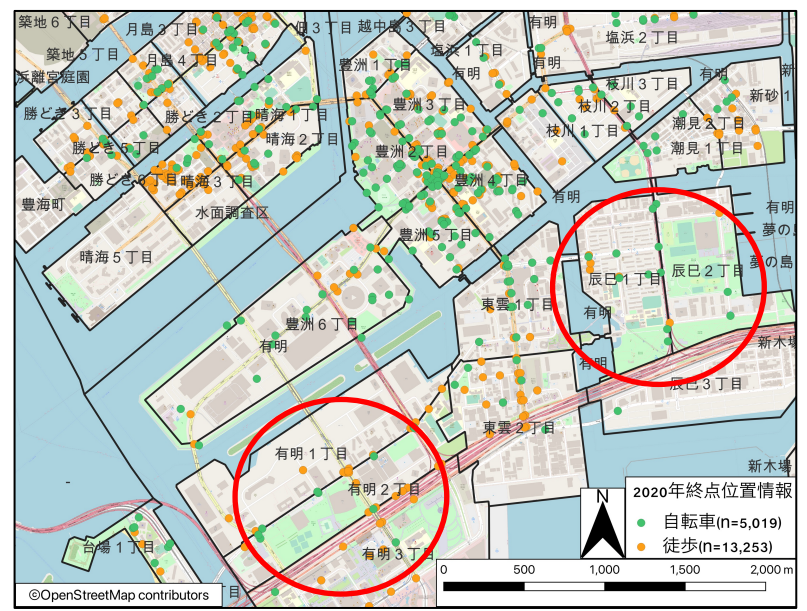


2020

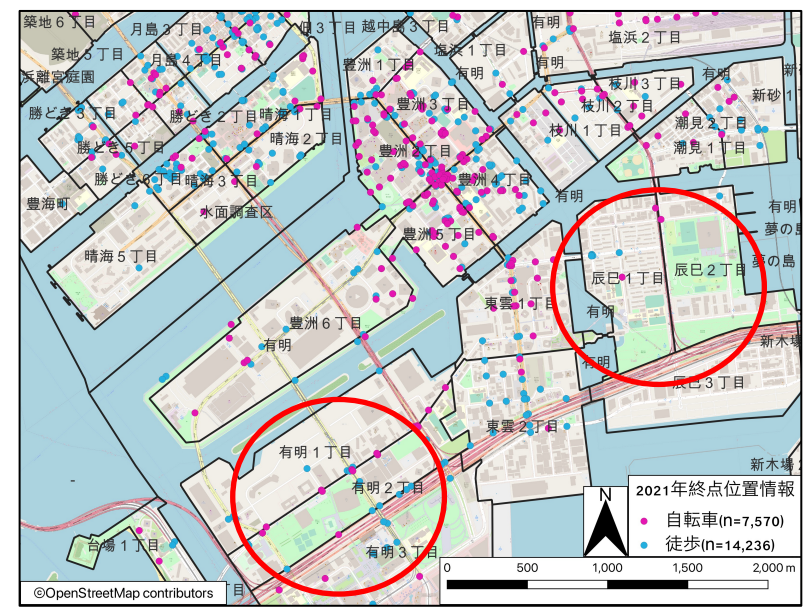
“徒歩” : 29%→37%増加 “自転車” : 9%→14%増加
Walking: 29% → 37% increase Bicycling: 9% → 14% increase

2. 基礎分析③ Basic Analysis③

■ 終点位置情報 Location of the end point



2020



2021

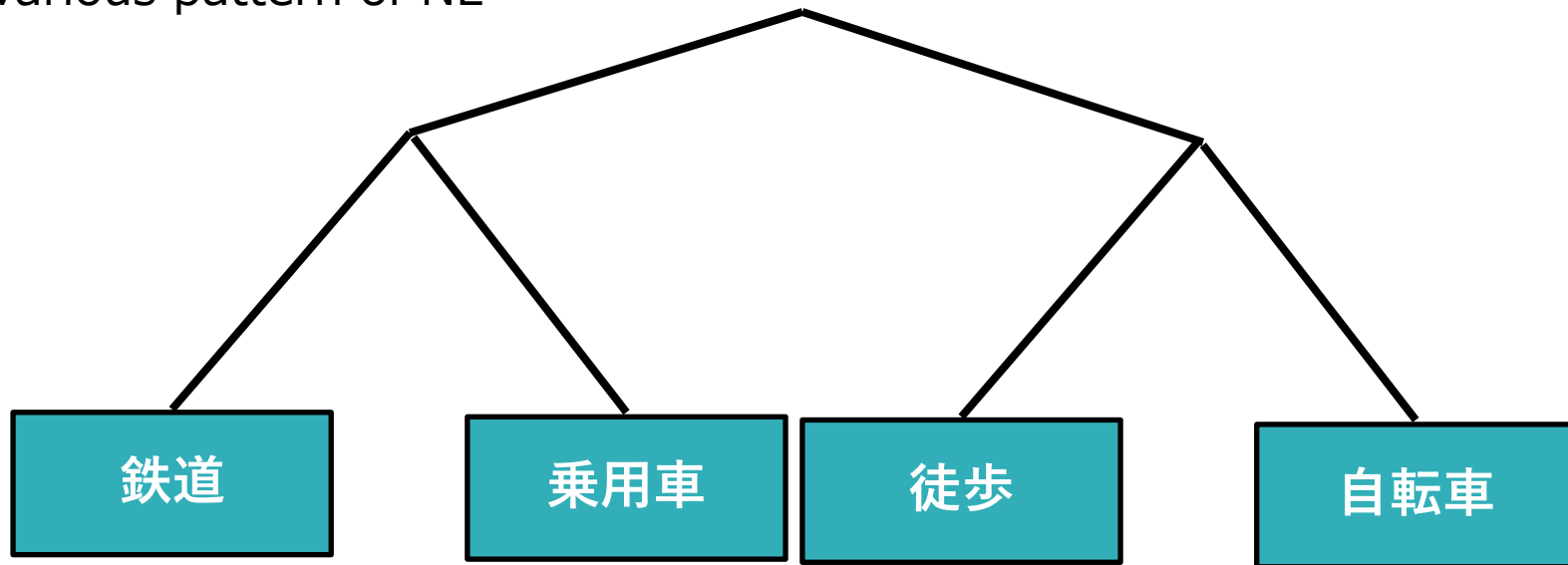
**コロナ禍において、歩行者・自転者の終着点が
駅周辺や主要道路にとどまり、公園等の施設への移動は少ない**

"COVID-19 pandemic", the terminus for **pedestrians and bicyclists** is limited to the station area and major roads, and less at parks and other facilities.

3. モデル推定 Model Estimation

様々なパターンをNLを実行

Do various pattern of NL



推定したモデルの1例

An example of an estimated model

効用関数

Utility function

Ttrain

$$= \text{train} * \exp(d1 * \text{traintraveltime} + f1 * \text{traintraveldistance} + b1 + b2(0) * \text{shopping} + b3(0) * \text{meal} + b4(0) * \text{schoolwork} + b5(0) * \text{gohome})$$

Tbicycle

$$= \text{bicycle} * \exp(d1 * \text{bicycletraveltime} + f1 * \text{walktraveldistance} + b6 * \text{shopping} + b7 * \text{meal} + b8 * \text{schoolwork} + b9 * \text{gohome})$$

Twalk

$$= \text{walk} * \exp(d1 * \text{walktraveltime} + f1 * \text{walktraveldistance} + b10 + b11 * \text{shopping} + b12 * \text{meal} + b13 * \text{schoolwork} + b14 * \text{gohome})$$

Tcar

$$= \text{car} * \exp(d1 * \text{cartraveltime} + f1 * \text{cartraveldistance} + b15 + b16 * \text{shopping} + b17 * \text{meal} + b18 * \text{schoolwork} + b19 * \text{gohome})$$

4. 推定結果

Estimated Result

推定結果

Estimation result

2019

2019	b1	b2	b3	b4	b5
Parameter	-0.416	-0.185	0.604	-1.827	0.801
t-value	-0.290	-0.080	0.086	-1.271	0.186
	b6	b7	b8	b9	b10
Parameter	-0.273	-0.365	-0.086	0.994	3.415
t-value	-6.940	-2.100	-0.570	7.344	6.421
	b11	b12	b13	b14	b15
Parameter	-0.462	-1.279	-1.087	-0.299	-0.013
t-value	-0.639	-2.039	-1.645	-0.412	-0.116
	b16	b17	b18	b19	
Parameter	-0.749	-1.164	0.000	-0.840	
t-value	-5.406	-6.952	0.001	-6.522	
	d1	f1	Scale Parameter		
Parameter	-0.309	2.811	2.047		
t-value	-0.059	8.180	NaN		

2020

2020	b1	b2	b3	b4	b5
Parameter	-0.200	-1.166	-0.809	-0.138	-0.384
t-value	-0.091	-0.516	-0.337	-0.045	-0.167
	b6	b7	b8	b9	b10
Parameter	0.300	-0.697	-0.410	-0.238	3.949
t-value	5.649	-7.666	-4.604	-6.659	1.322
	b11	b12	b13	b14	b15
Parameter	-0.340	0.127	-0.909	-0.067	-0.182
t-value	-0.097	0.018	-0.255	-0.017	-3.247
	b16	b17	b18	b19	
Parameter	-0.907	-1.120	-0.783	-0.408	
t-value	-11.538	-7.942	-3.779	-4.678	
	d1	f1	Scale Parameter		
Parameter	0.633	2.440	2.808		
t-value	0.149	6.835	NaN		

5. まとめ&感想 Summary & Comments

- 基礎分析で把握した内容を行動モデルに適応させるが困難だった
- It was difficult to adapt what was understood in the basic analysis to the behavioral model.
- プログラミング（R）の経験者がほとんどいないため、NLモデル構築に時間がかかった
- It took a long time to build the NL model because few people had programming (R) experience.
- 対面と遠隔での連携が難しかった
- Collaboration between face-to-face and remotely was difficult.

< 参考文献 >

<https://www.toyosu.org/deve/plan>

http://library.jsce.or.jp/jsce/open/00039/200911_no40/pdf/304.pdf

ご清聴ありがとうございました

Thank you for your attention