



Ministerie van Infrastructuur
en Waterstaat

Choosing the e-bike and effects on travel behaviour

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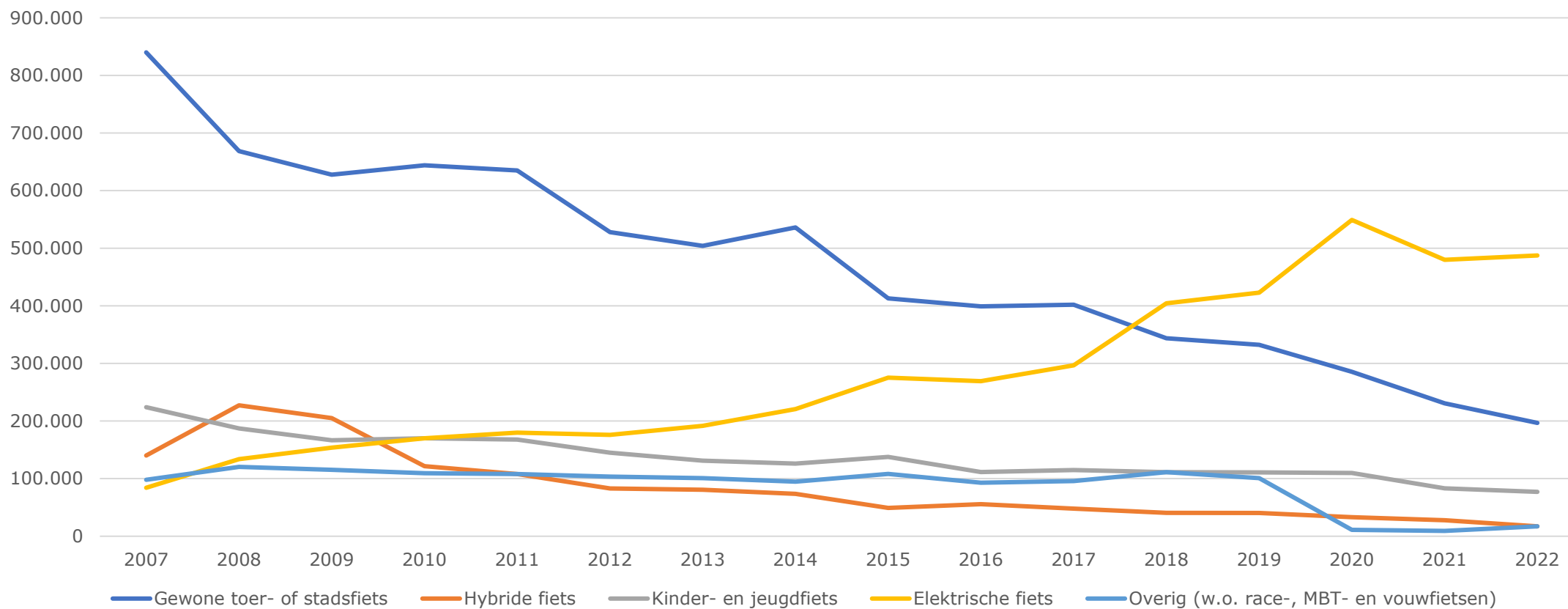
Kennisinstituut voor Mobiliteitsbeleid (KiM)



Background

- › E-bike ownership rising (sharply) in recent years

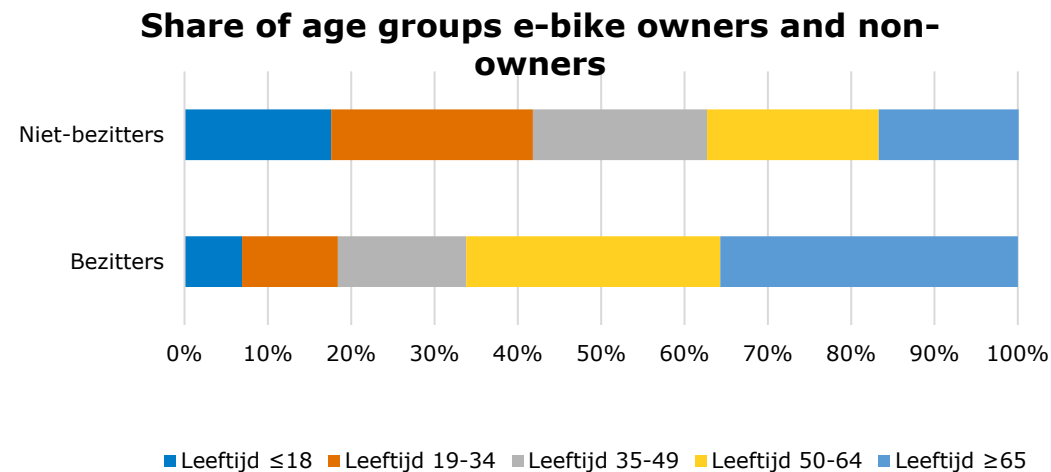
New bicycles sold 2007 - 2022



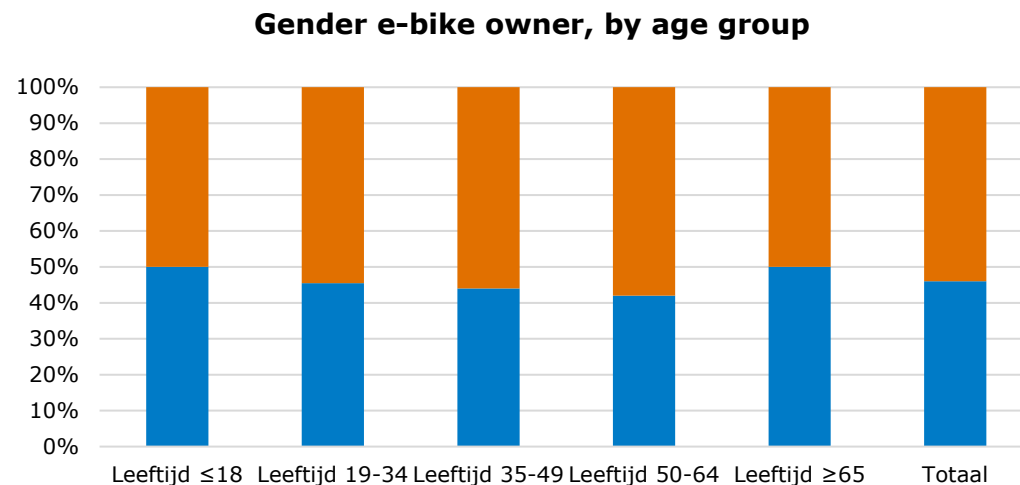


E-bike ownership

- > E-bike owners are, on average, older than non-owners
- > ±67% of owners is 50+
- > Men are 'catching up'
- > ±55% of e-bike owners is female



Bron: ODin 2020



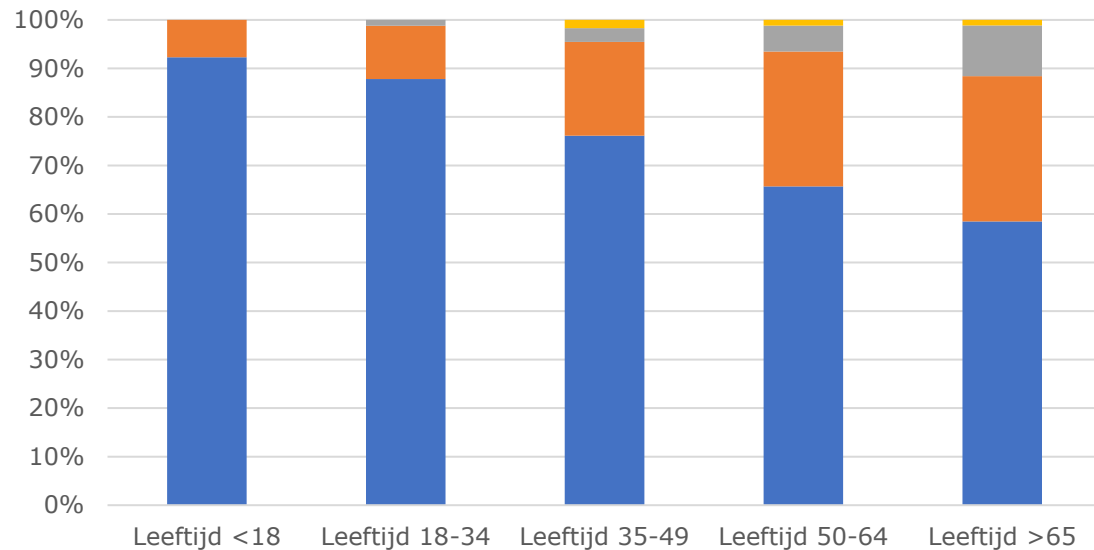
Bron: ODin 2020

■ Vrouw ■ Man



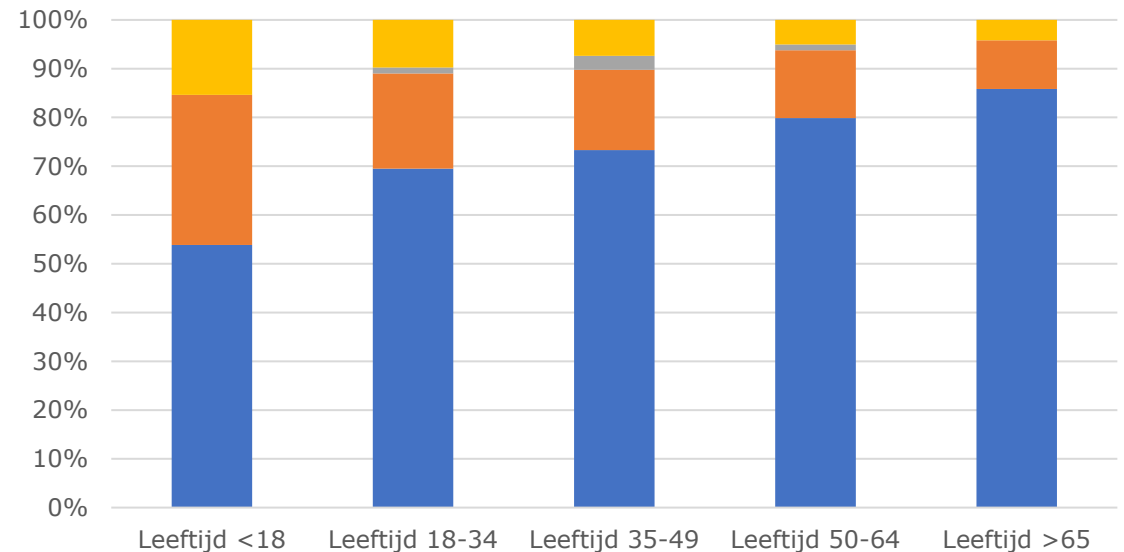
E-bike characteristics

- > Older e-bike owners often already own a second or third e-bike



- Ik heb hiervoor al meer dan twee e-fietsen gehad
- Dit is mijn derde e-fiets
- Dit is mijn tweede e-fiets
- Dit is mijn eerste e-fiets

- > Younger e-bike owners are more likely to have a second-hand e-bike, or have been given the e-bike

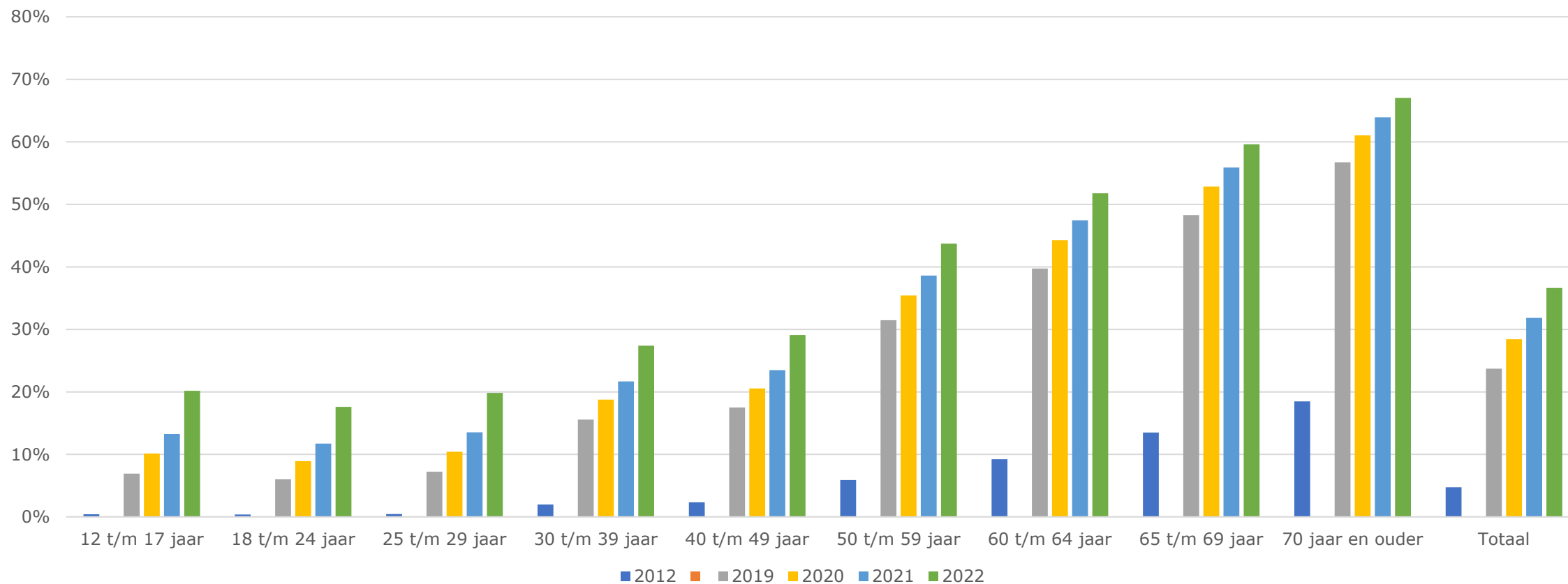


- Nieuw gekocht
- Tweedehands gekocht
- Ik heb een leasefiets
- Ik heb de e-fiets gekregen



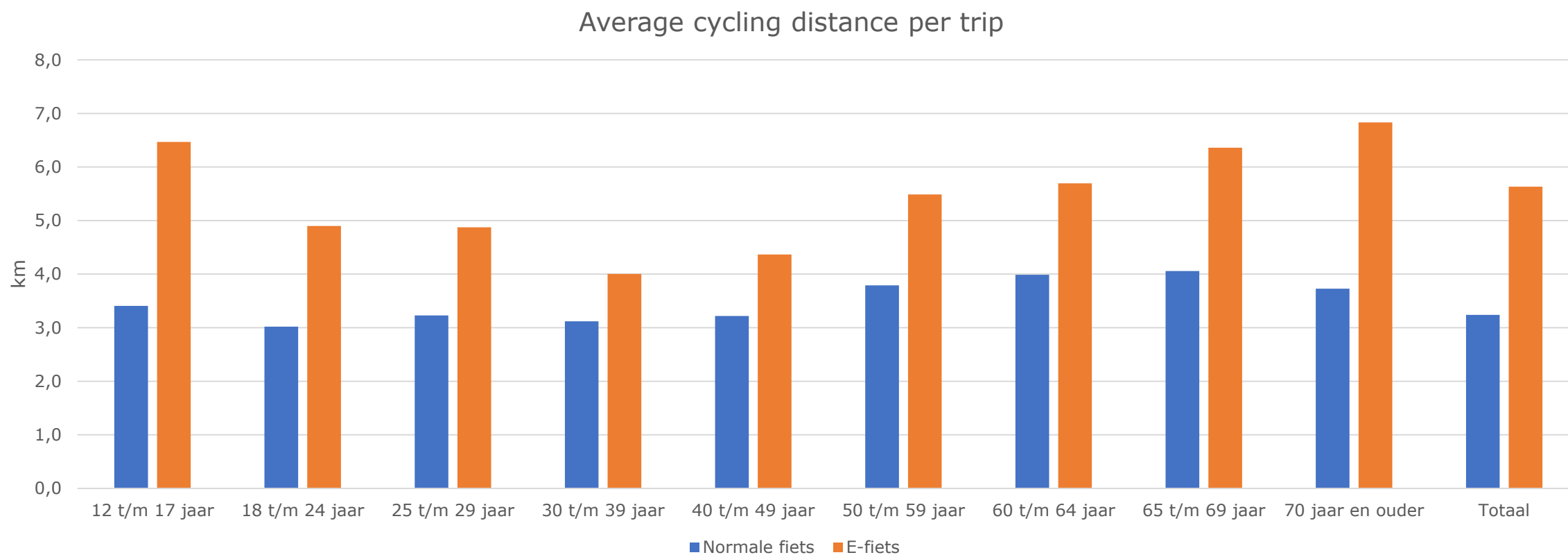
The e-bike is not just for the elderly anymore

Share of e-bike in total cycling distance, by age





Distances with e-bike substantially higher than with normal bicycle





Research focus:

1. Reasons for buying (or not buying) an e-bike
2. Acceptable distances and travel times with the e-bike
3. Effects of the e-bike on travel behaviour



Methods

- › Reasons for buying an e-bike + acceptable distances:
 - Focus groups with respondents of the MPN → input for the questionnaire
 - Additional questionnaire MPN → e-bike owners (1.000) and non-owners (1.500)
- › Effects of the e-bike on travel behaviour:
 - Longitudinal analyses with the MPN 2013-2018



Reasons to purchase an e-bike (1)

- › Distinction between owners...
 - Why did they buy an e-bike?
- › ...and non-owners who intend to buy an e-bike
 - Why do they want to buy an e-bike??
- › Of all non-owners in 2021 (± 12.5 million in 2021, 6+):
 - 22% plan on buying an e-bike within 5 years (± 2.8 million)
 - 17% plan to buy an e-bike in more than 5 years ($\pm 2,1$ million)



Reasons to purchase an e-bike (2)

> **Owners:**

1. Move faster and with less effort (61%) →
2. Physical (40%) and mental (28%) health →
3. Health limits use of normal bicycle (25%):
 - If these people did not have an e-bike:
 - 52% would cycle less
 - 43% would not cycle at all
 - 5% would cycle just as much
4. Wants to use the car less often (23%) →
5. To travel to and from work (21%) →

> **Non-owners** (with intention to purchase):

1. Move faster and with less effort (65%)
2. Physical (24%) and mental (18%) health
3. Because normal bicycle needs replacing (23%)
4. Wants to use car the less often (23%)
5. To travel to and from work (22%)



Barriers to purchase

> Owners (reason for doubting about purchasing an e-bike):

0. Had no doubt (40%)
1. Price (40%)
2. Risk of theft (23%)
3. Battery life (20%)
4. Range (11%)
5. Normal bike is healthier (10%)

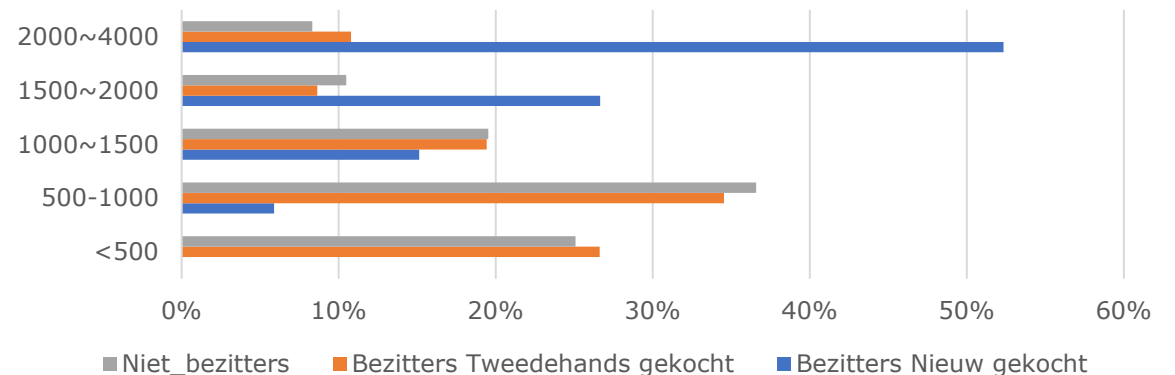
> Non-owners (**without** intention to purchase):

1. Normal bicycle suffices (51%)
2. Normal bicycle is healthier (35%)
3. Price (33%)
4. Health limits cycling ability (17%)
5. Does not like cycling (15%)

> Non-owners (**with** intention to purchase):

1. Price (61%)
2. Normal bike is not yet due for replacement (38%)
3. Normal bike is healthier (37%)
4. Risk of theft (19%)
5. Battery life (16%)

Price of the e-bike / willingness to pay





Acceptable distance and travel time

- > Large variation in what is considered acceptable
- > Combining acceptable distance and travel time results in unrealistic speed in many cases
 - →People overestimate travel speed?
 - E.g., for commuting, the combination results in 24 to 28 km/h (respectively owners and non-owners)
- > Acceptable travel time is therefore likely to be more reliable

| | Woon-werk | Onder-wijs | Vrijetijd (toeren) | Vrijetijd (niet toeren) | Win-kelen | Bood-schappen doen |
|-----------------------------|-----------|------------|--------------------|-------------------------|-----------|--------------------|
| Bezitters (min) | 34 | 34 | 132* | 84* | 34* | 25* |
| Niet-bezitters (min) | 32 | 32 | 110* | 64* | 27* | 19* |

* Significant verschil tussen bezitters en niet-bezitters

| | Woon-werk | Onder-wijs | Vrijetijd (toeren) | Vrijetijd (niet toeren) | Winkelen/Boodschappen doen** |
|-----------------------------------|-----------|------------|--------------------|-------------------------|------------------------------|
| Gemiddelde snelheid (km/u) | 17 | 17,1 | 9,9 | 12,7 | 12,2 |
| Bezitters (km)* | 9,5 | 9,5 | 21,8 | 17,8 | 6,0 |
| Niet-bezitters (km)* | 9,5 | 9,5 | 18,1 | 13,6 | 4,6 |

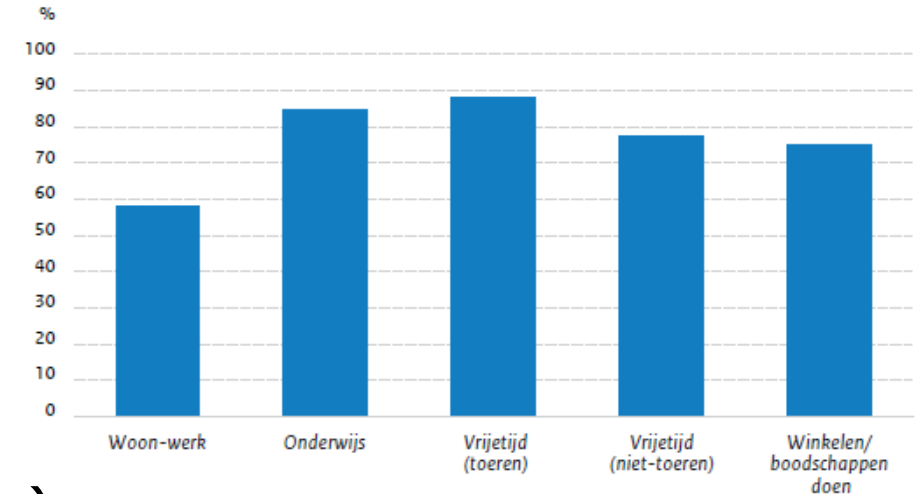
* Wanneer de acceptabele reistijd niet significant verschilt tussen bezitters en niet-bezitters, nemen we voor beide groepen het gemiddelde

** Winkelen en boodschappen doen vallen in ODiN onder hetzelfde motief; de acceptabele afstand is daarom het gemiddelde van winkelen en boodschappen doen in het MPN



What proportion of trips can theoretically be made by e-bike?

- > Large proportion of trips are within acceptable distance



- > Commuting (9.5 km acceptable distance):
 - ±58% of all commuting trips are ≤ 9.5 km
 - ±30% of those trips are by car (± 440 million trips, ± 2.2 billion km)
 - Can in theory be done by e-bike, but in practice does not apply to all trips, e.g:
 - Car needed to carry out activities
 - Activity chains: activities before or after work that require a car



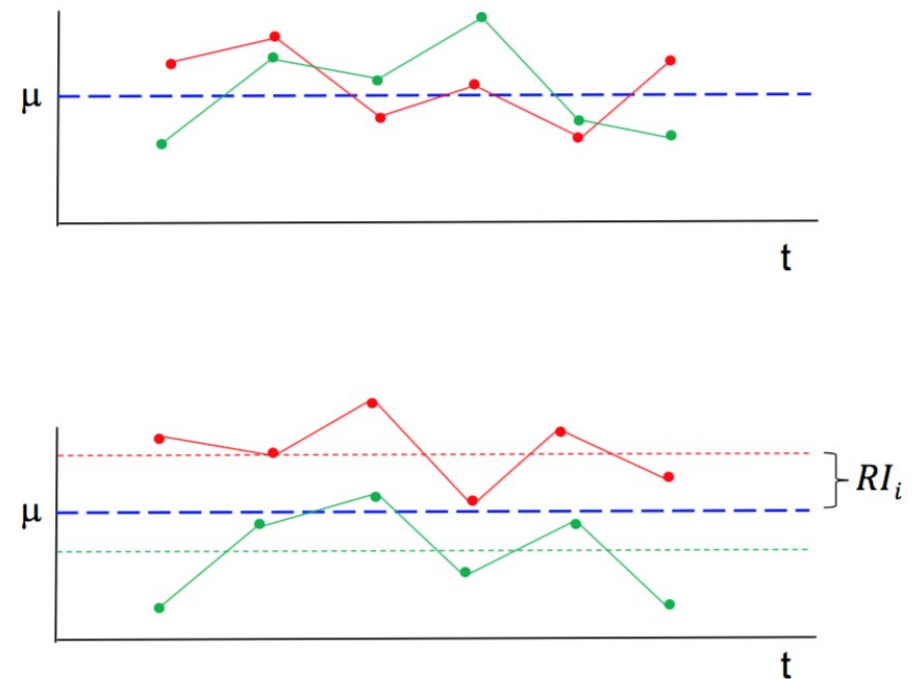
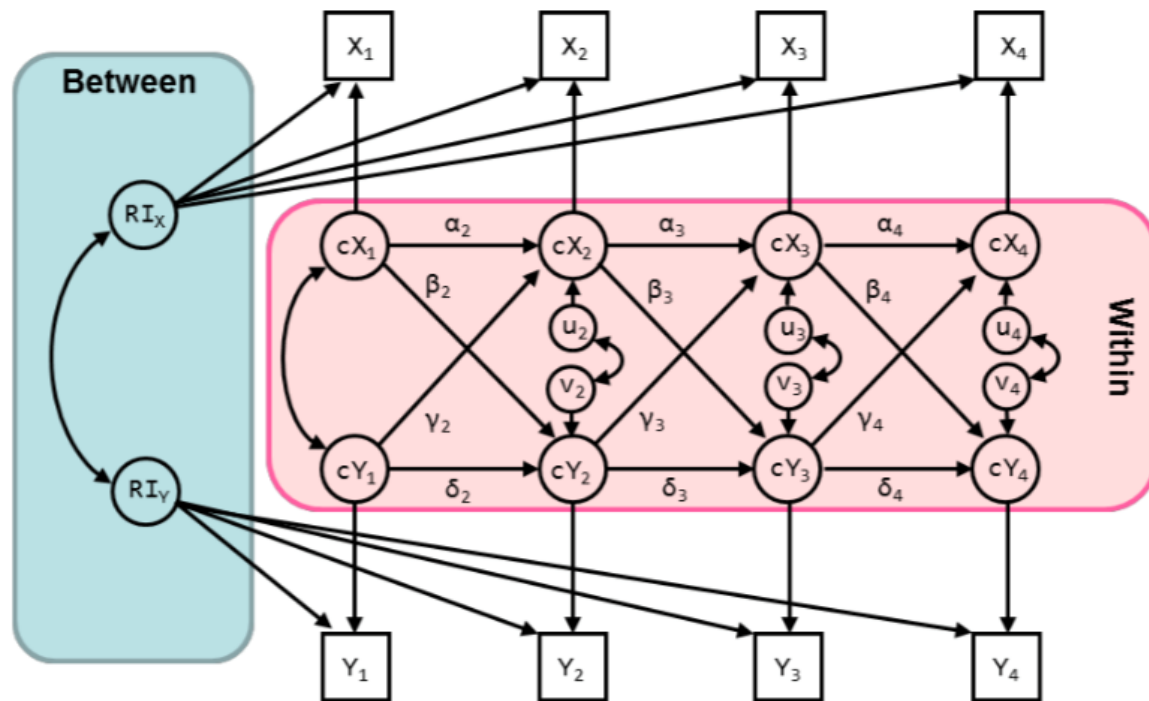
Effects of the e-bike on travel behaviour

- › Large proportion of trips falls within acceptable distance, also many car trips
 - Is the e-bike replacing the car?
- › Longitudinal analyses with the MPN: 2013-2018



Effects of using an e-bike

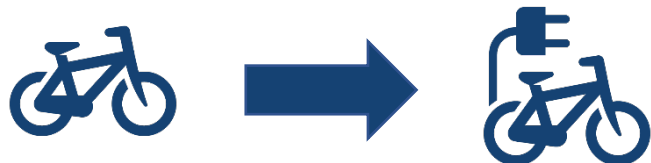
- Random Intercept Cross-Lagged Panel Model (RI-CLPM)



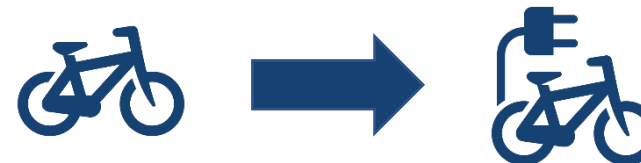


Effects of using an e-bike

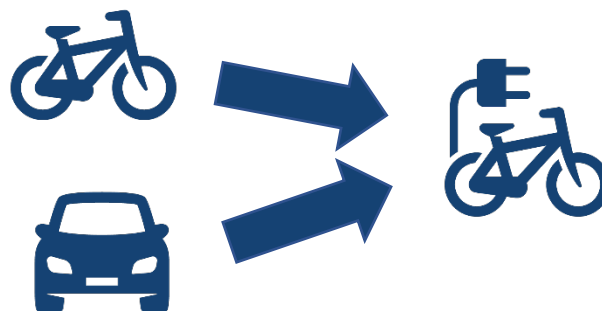
Shopping



Leisure



Commuting





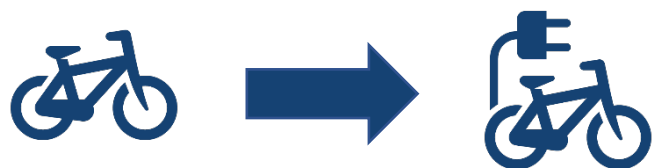
Conclusions

- › 1. Reasons to buy an e-bike:
 - Travel faster with fewer efforts
 - Physical and mental health
- › 2. Acceptable distance/travel time
 - Depends on trip motive
 - Commuting and education, approx. 30 minutes → just under 10 km
- › 3. Effects on travel behaviour
 - The e-bike mainly substitutes the normal bicycle
 - Only for commuting a significant substitution effect on the car
- › Barriers:
 - Price
 - Normal bicycle is considered healthier
 - Risk of theft

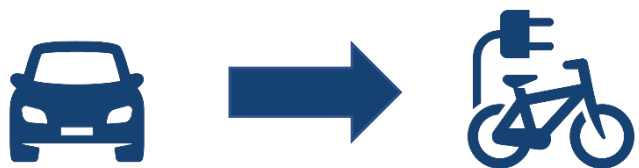


Policy options to encourage **ownership**?

- > Price is major barrier → purchase subsidy?
- > Creating awareness of opportunities/benefits of e-bike



– Not necessarily good for sustainability and health



– Good for sustainability and health!

- > Risk of theft is important barrier to purchase
 - Expand guarded bicycle parking facilities



Policy options to encourage **use of e-bikes?**

- › Based on acceptable distances, there seems to be room to stimulate the use of e-bikes among current owners
- › Theft sensitivity also barrier to use
 - Expand guarded bicycle parking facilities (stations, city centres, etc.)
- › Increased cost of car (16%) or public transport (4%) for part of owners reason to use e-bike more often
- › Encourage e-bike for commuting:
 - Use for commuting among owners is already high.
 - However, improving facilities at the workplace (changing rooms, safe parking facilities, etc.) might increase use



Time for questions!

