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# Ministerial Programme

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# #MWC24MP

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# Private Networks Fashion: Spectrum for Industries

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# Welcome Remarks

Luciana Camargos
Head of Spectrum
GSMA

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# Moderator

Carol Sosa Leguizamón
Spectrum Policy Director
GSMA

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# Private networks do not equal private spectrum

Ross Bateson
Spectrum Special Advisor
GSMA

# AT&T to Bring Elevated Wireless Experience to DFW Airport

**We're modernizing and expanding DFW Airport network to support airport operations and provide reliable, high-capacity connectivity.**

share

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# Port of Hamburg is ready for 5G

## Operators and ecosystem players are vying to address private 5G opportunity

June 19, 2023

The debate over whether or not enterprises should have access to dedicated spectrum in Indi has been heated.

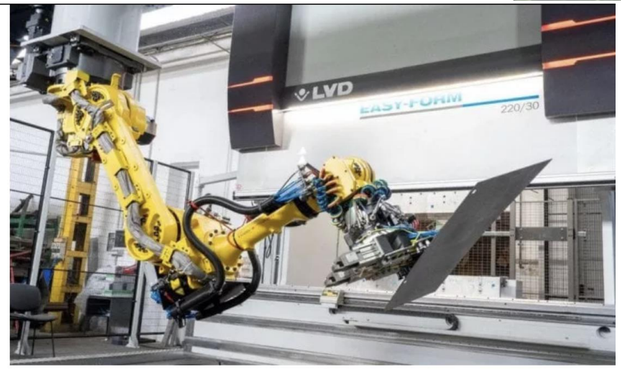
# Airtel partners Tech Mahindra to deploy captive private network at Mahindra's Chakan Facility

## Puerto Bahía digitalizará su terminal portuaria con soluciones de Claro y Nokia

Sharon Durán — May 10, 2023

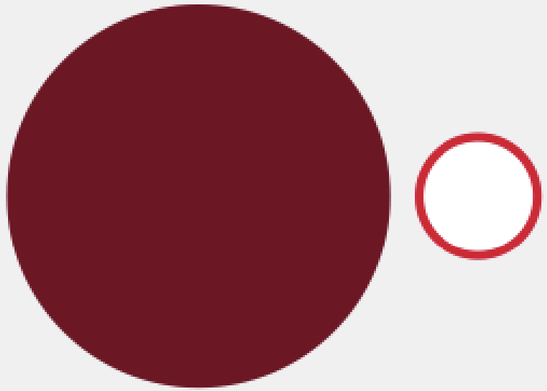
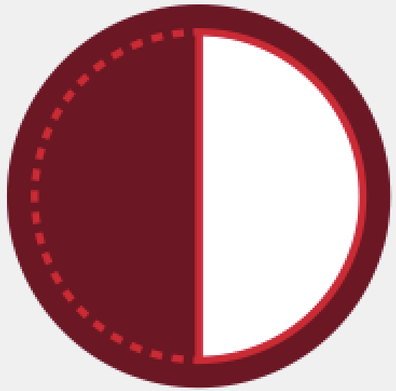
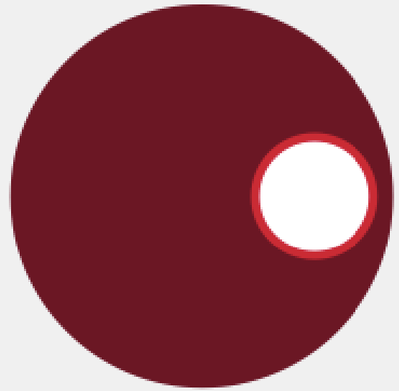
CLARO COLOMBIA | COLOMBIA | NOKIA

# Reti private 5G di Tim, l'azienda salentina Ilmea tra le prime in Italia a dotarsene




*Da due anni, l'impresa con sede nel piccolo villaggio di Boncore, frazione di Nardò, investe in sistemi di efficientamento della produzione in ottica Industria 4.0*

# Spectrum Methodologies

| Set aside spectrum | Spectrum sharing framework | Licence conditions for public mobile operators |
|---|---|---|
|  |  |  |
| Assigning a range of spectrum to be exclusively licenced to industry users | Enabling several users to access spectrum simultaneously | Enabling or requiring public mobile operators to deploy private networks or lease spectrum |

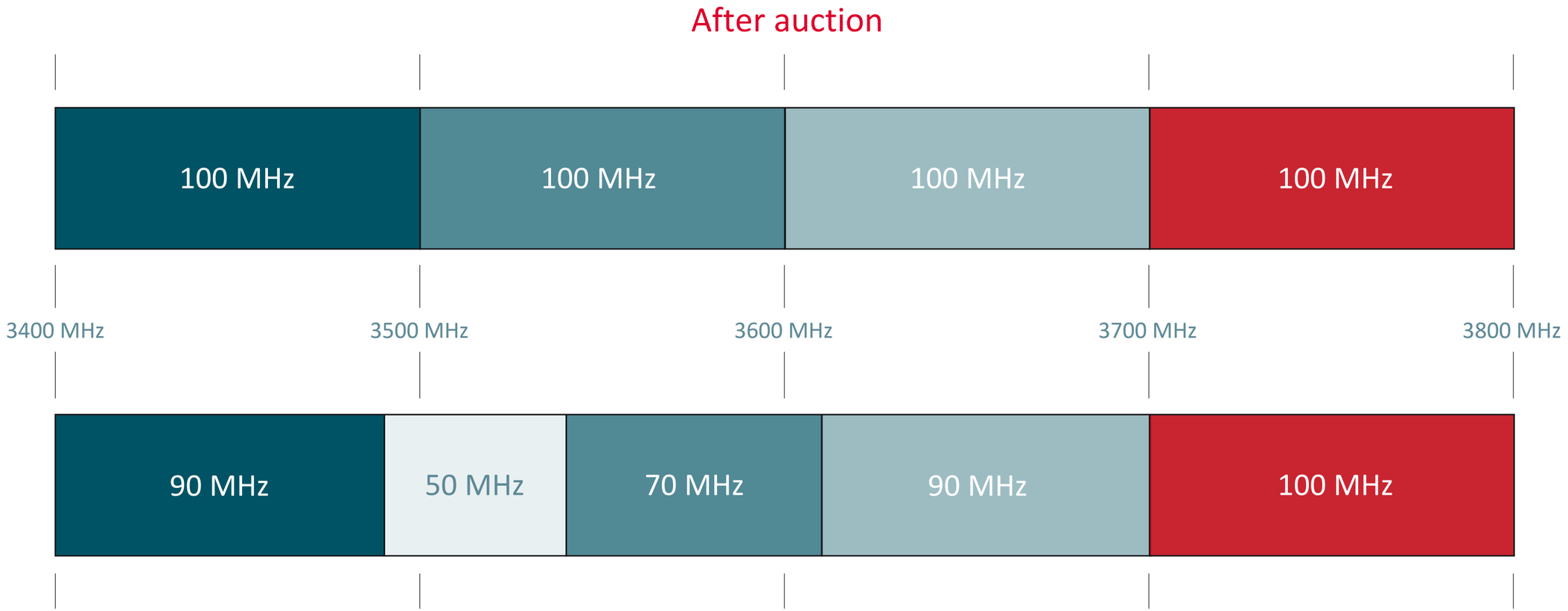
# Impact of Carve-Outs


100 MHz channels possible for three existing MNOs

Balanced competition through equal bandwidth

Unknown efficiency of carve-out

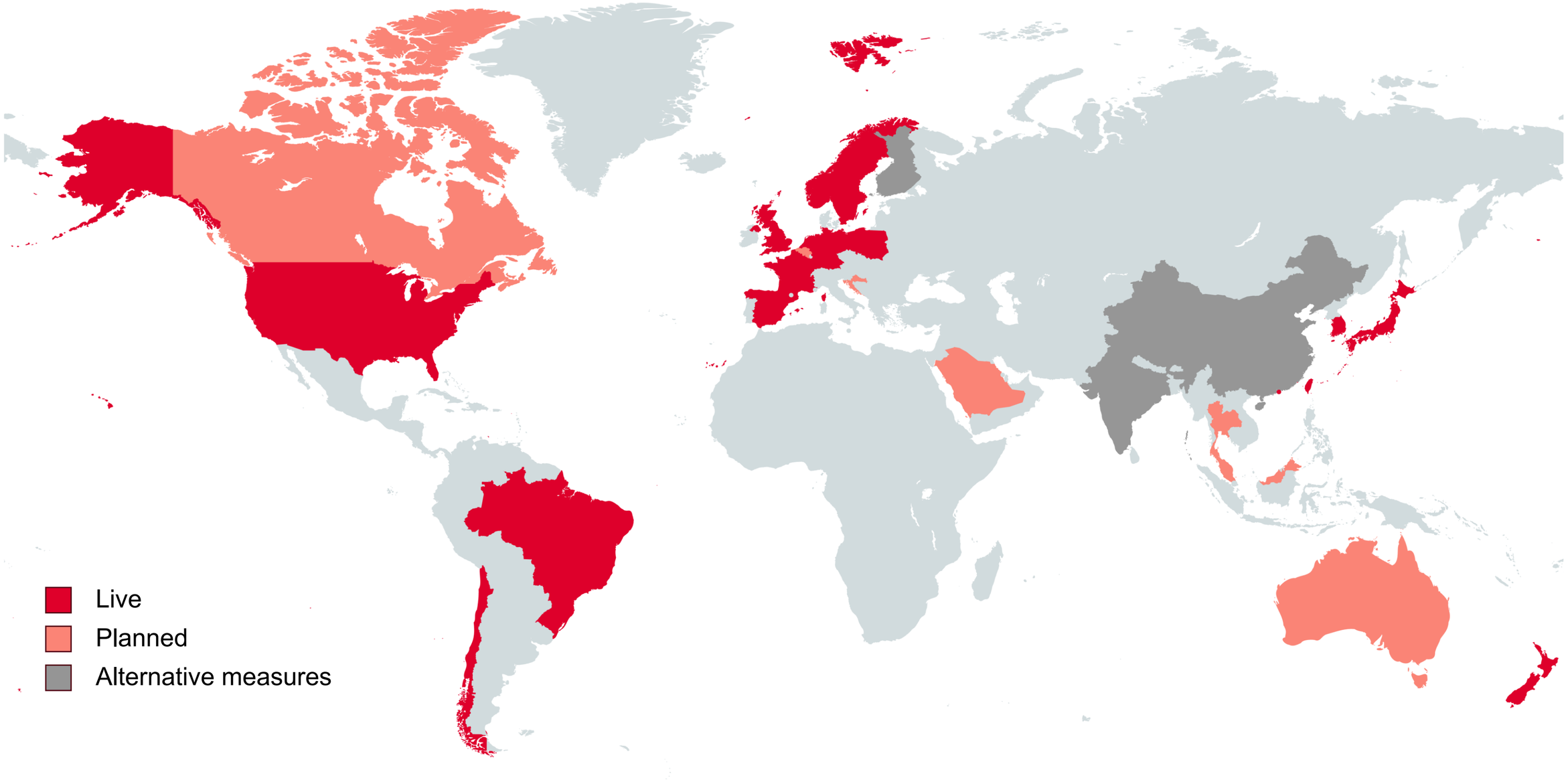
# Spectrum Scarcity




- A fourth operator joins and carve-out creates spectrum scarcity
- High prices paid at auction
- Imbalanced 3.5 GHz assets harm competition

# Set-Asides Regulation

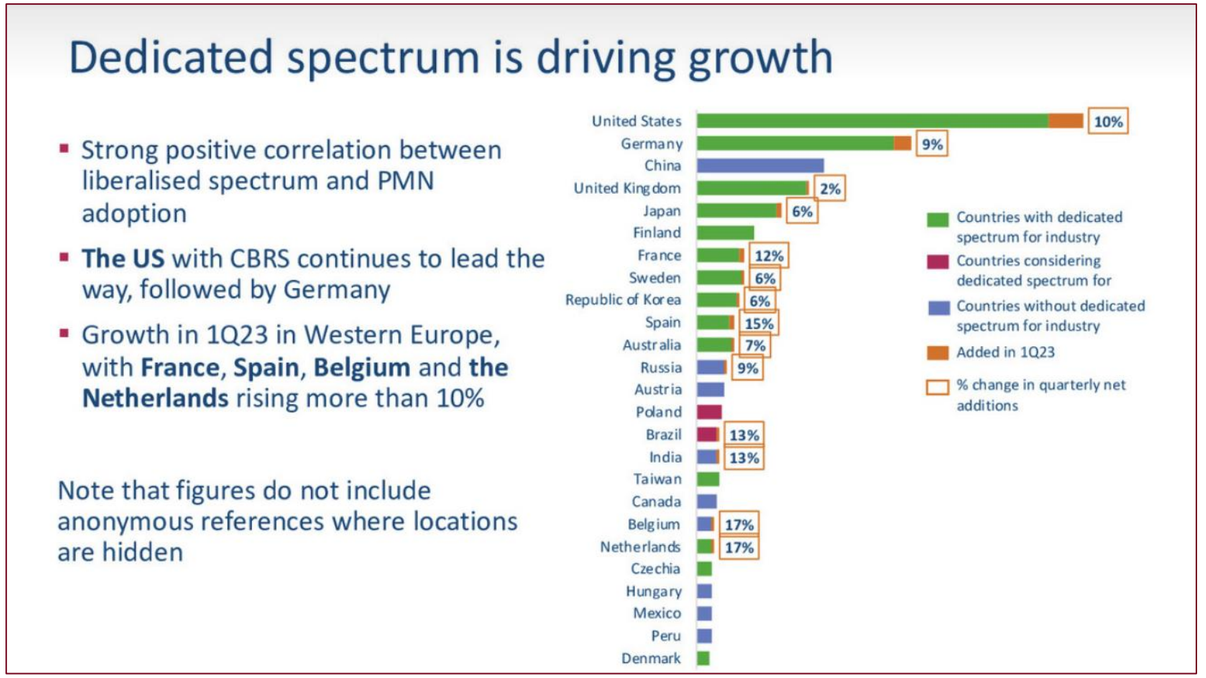
February 2024



# Correlation Claims

**Spectrum continues to be the one single element essential for the existence of a private network market.**

– The most active countries are those where spectrum is available for industries and enterprises. The US (43% of all announcements) and Germany (8% of announcements) were the countries with the highest number of recorded announcements as of the end of 2020.




- Ongoing information vacuum leading to incorrect assumptions
- New GSMA Intelligence analysis

# Digital Industry without Downside

**China is first out of the gate to Industry 4.0**

The race towards the 5G-powered Fourth Industrial Revolution is on and China has a decisive head start

## 5G as a Catalyst of China's Economic and Social Development

The number of virtual private 5G networks for enterprises and vertical industries is over 16,000. The progress is leading global 5G development and has boosted China's digital economic development.

**Finland**

Incentivising innovation without set-asides through licence conditions and cooperation

"Finland met the spectrum needs of nationwide and private networks without a set-aside in any core bands. In doing so, the authorities created an efficient compromise that has preserved spectrum usability and created incentives to invest in mobile connectivity."

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# Private Networks

≠

# Private Spectrum

GSMA Set-Asides Page

**SPECTRUM** for the benefit of billions

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# Cost-benefit analysis of spectrum carve-outs

Jakub Zagdanski
Senior Economist
GSMAi

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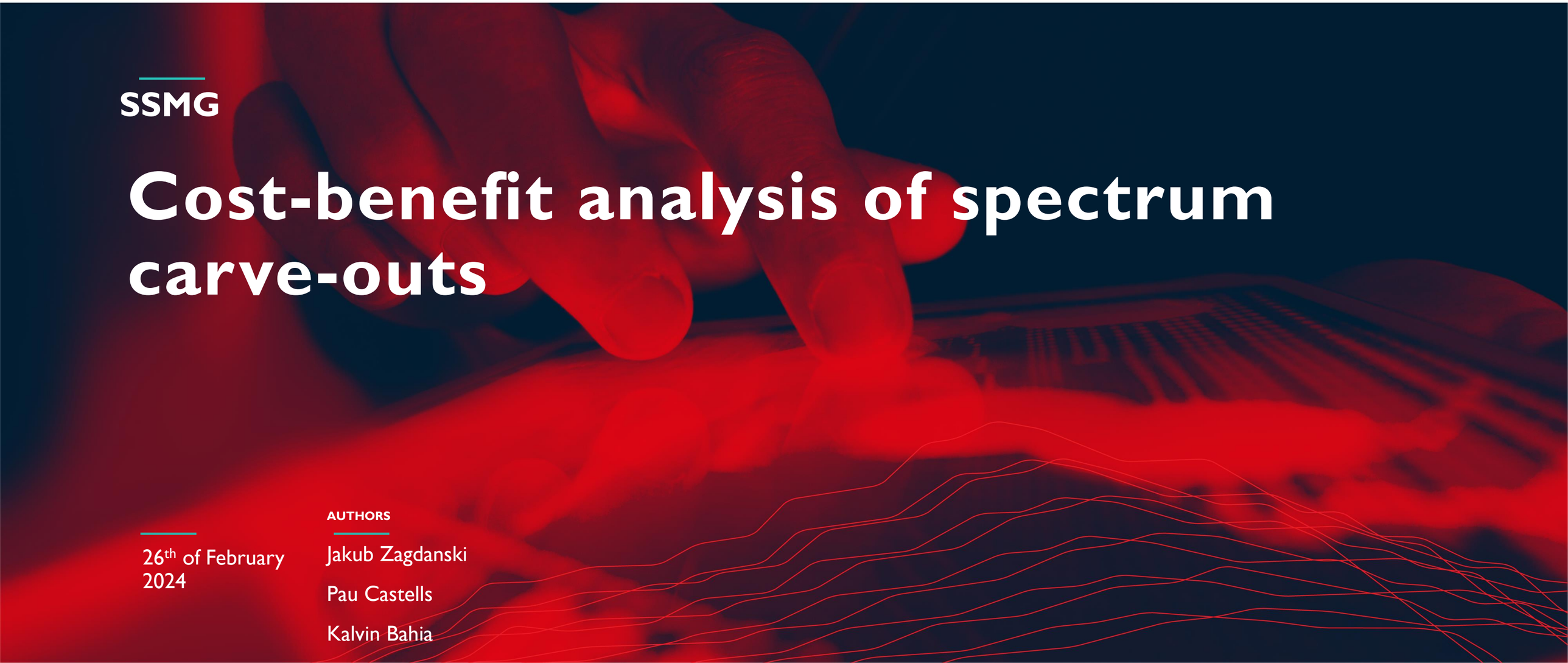
gsmaintelligence.com @GSMAi



SSMG

# Cost-benefit analysis of spectrum carve-outs

26th of February 2024


AUTHORS

Jakub Zagdanski

Pau Castells

Kalvin Bahia

# Set-asides as a spectrum licensing option:

**Impact on industry users:**

- \+ Geographic (local) licensing
- \+ Certainty of access and tenure
- ? Interference management

**Impact on consumers:**

- — Reduced spectrum availability
- — Inefficiency of spectrum use
- — Associated economic cost

GSMA (2023)

# Are set-asides worth it?

**Part 1 (The benefit):**

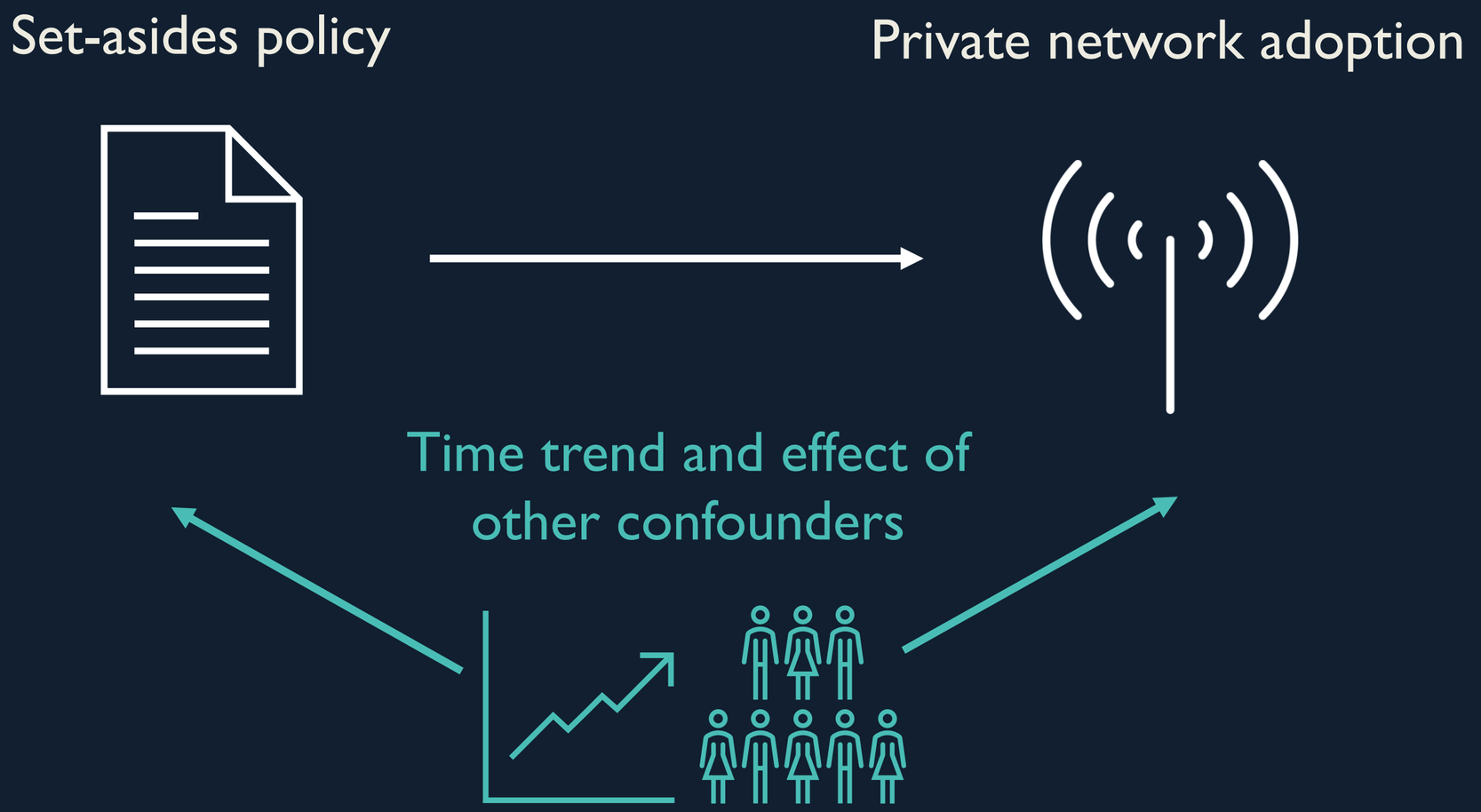
Is there evidence of an impact on adoption of private networks (and enterprise digitalization more generally) beyond loose associations?

**Part 2 (The cost):**

What is the magnitude of the negative impact on public networks quality?

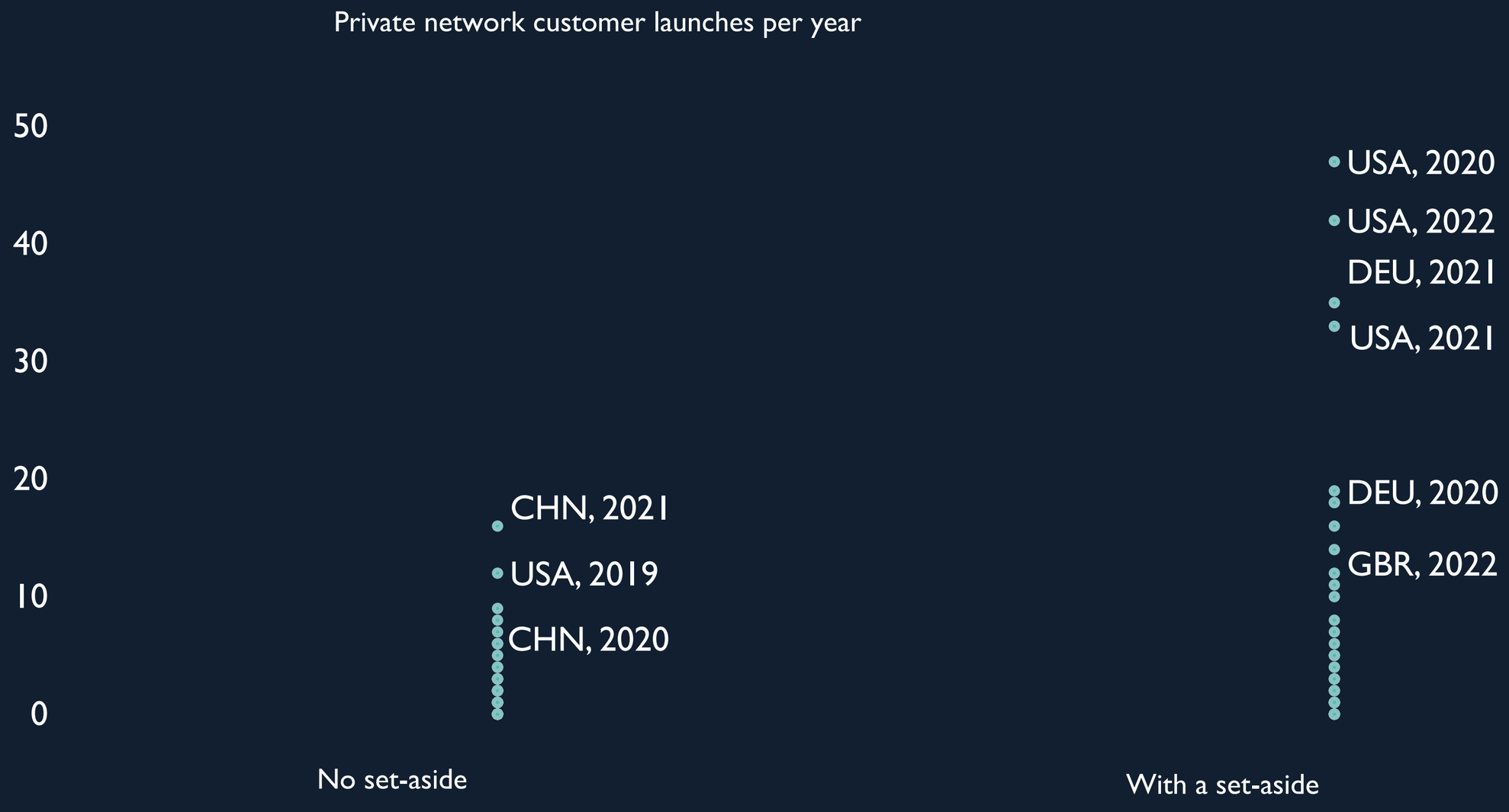

Credit: Z z

# Correlation does not mean causation

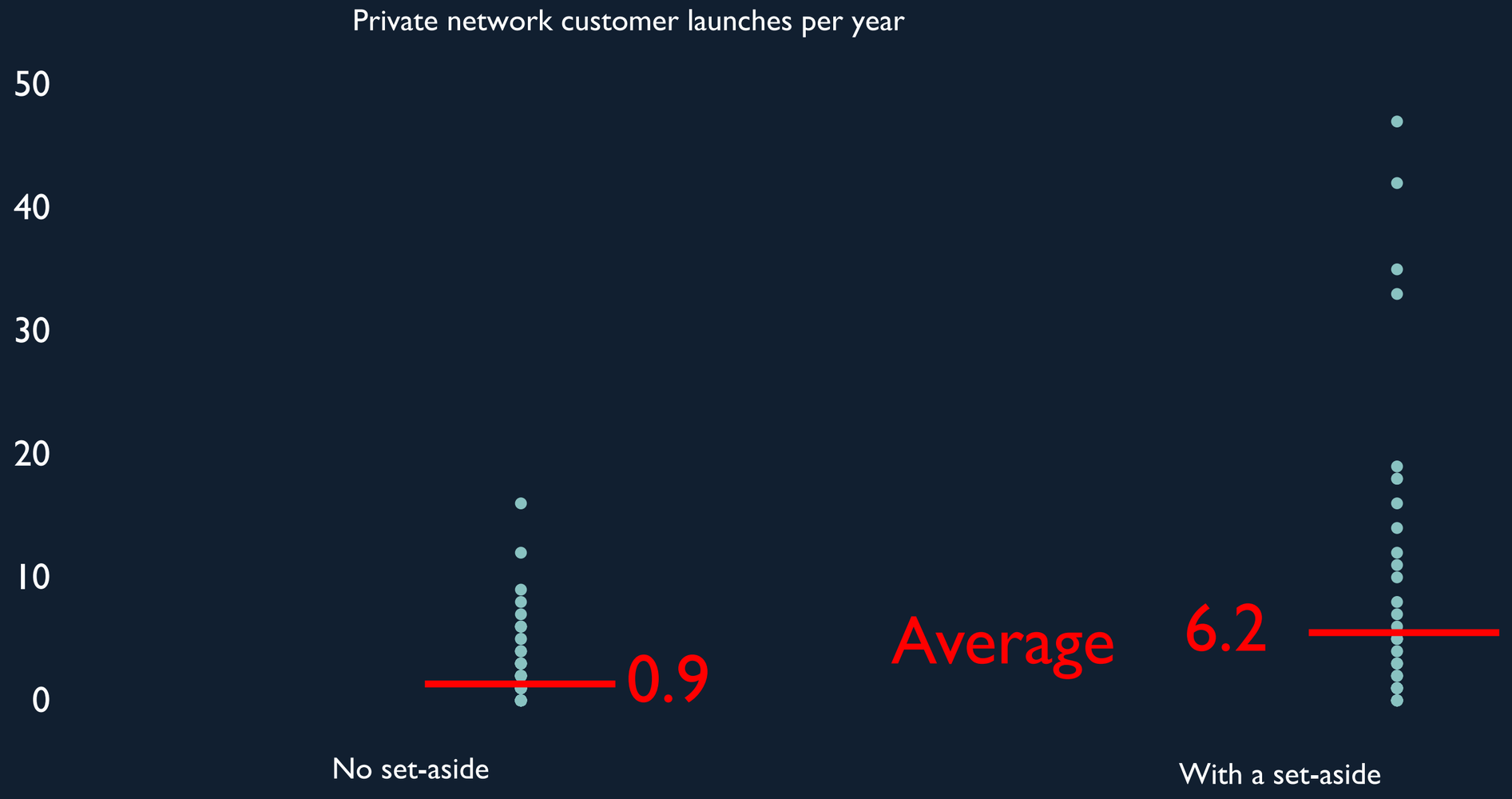



Private networks would invariably grow over time as 5G is rolled out, regardless of set-asides: naïve comparison could be capturing just that

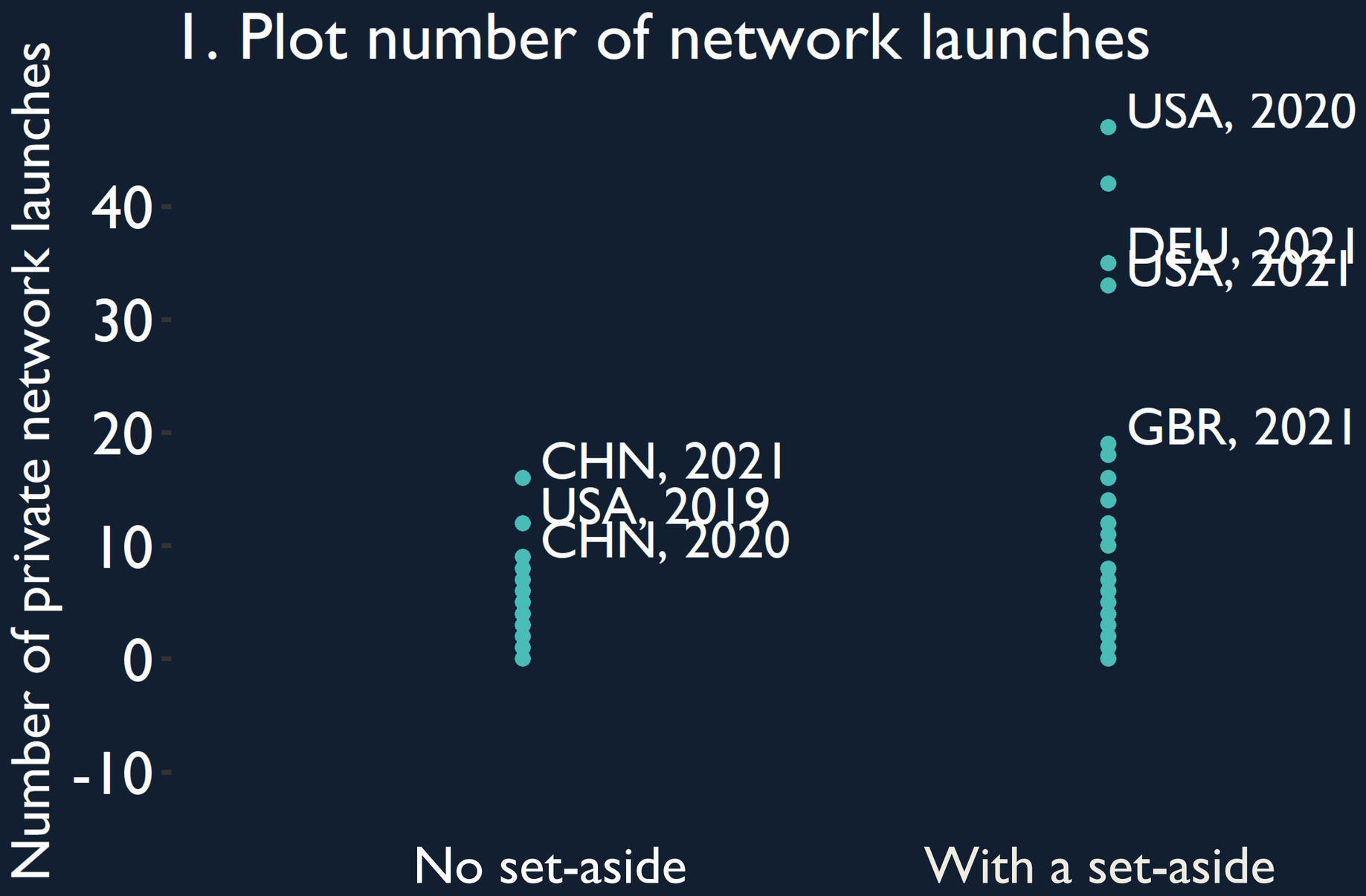
# Examining raw correlations



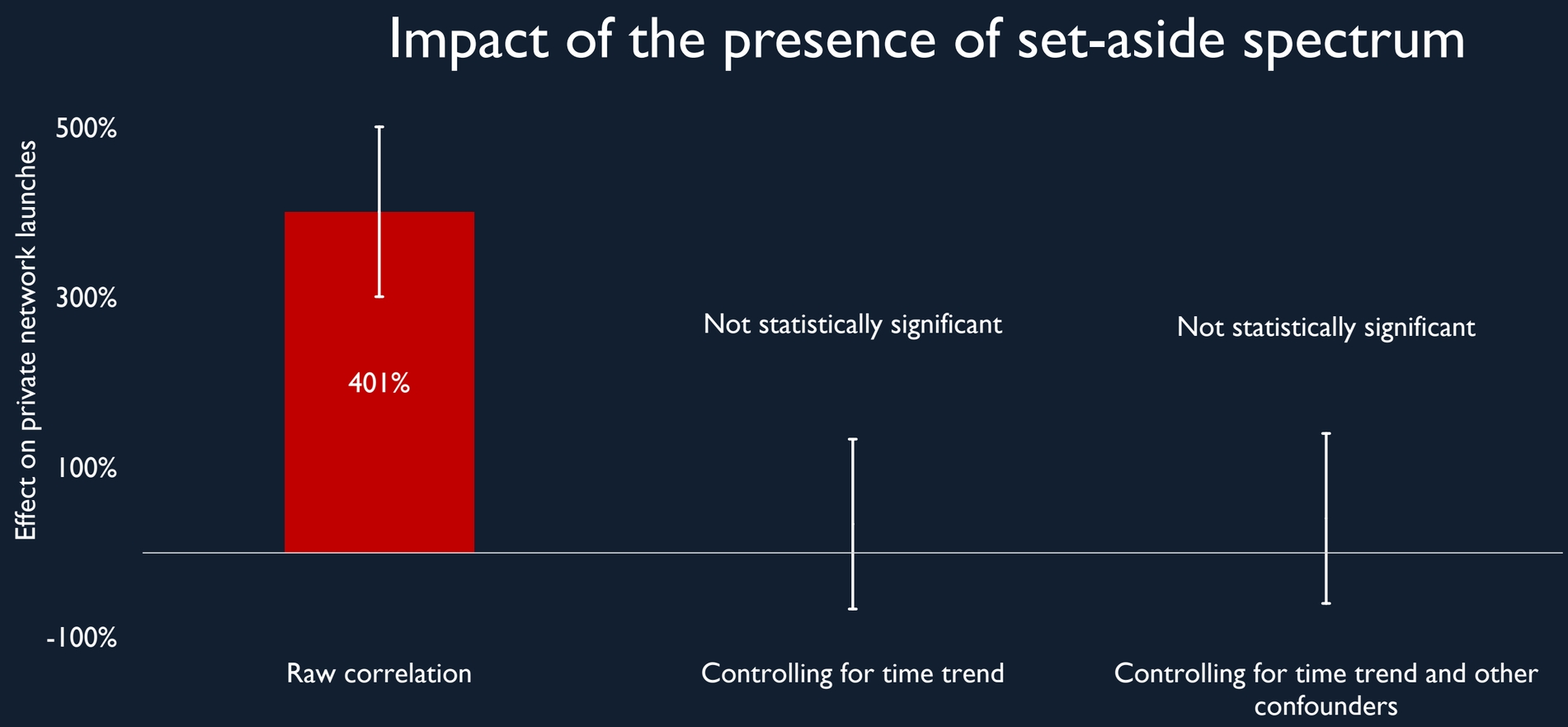
# Naively, spectrum set-asides are associated with five times greater number of launches



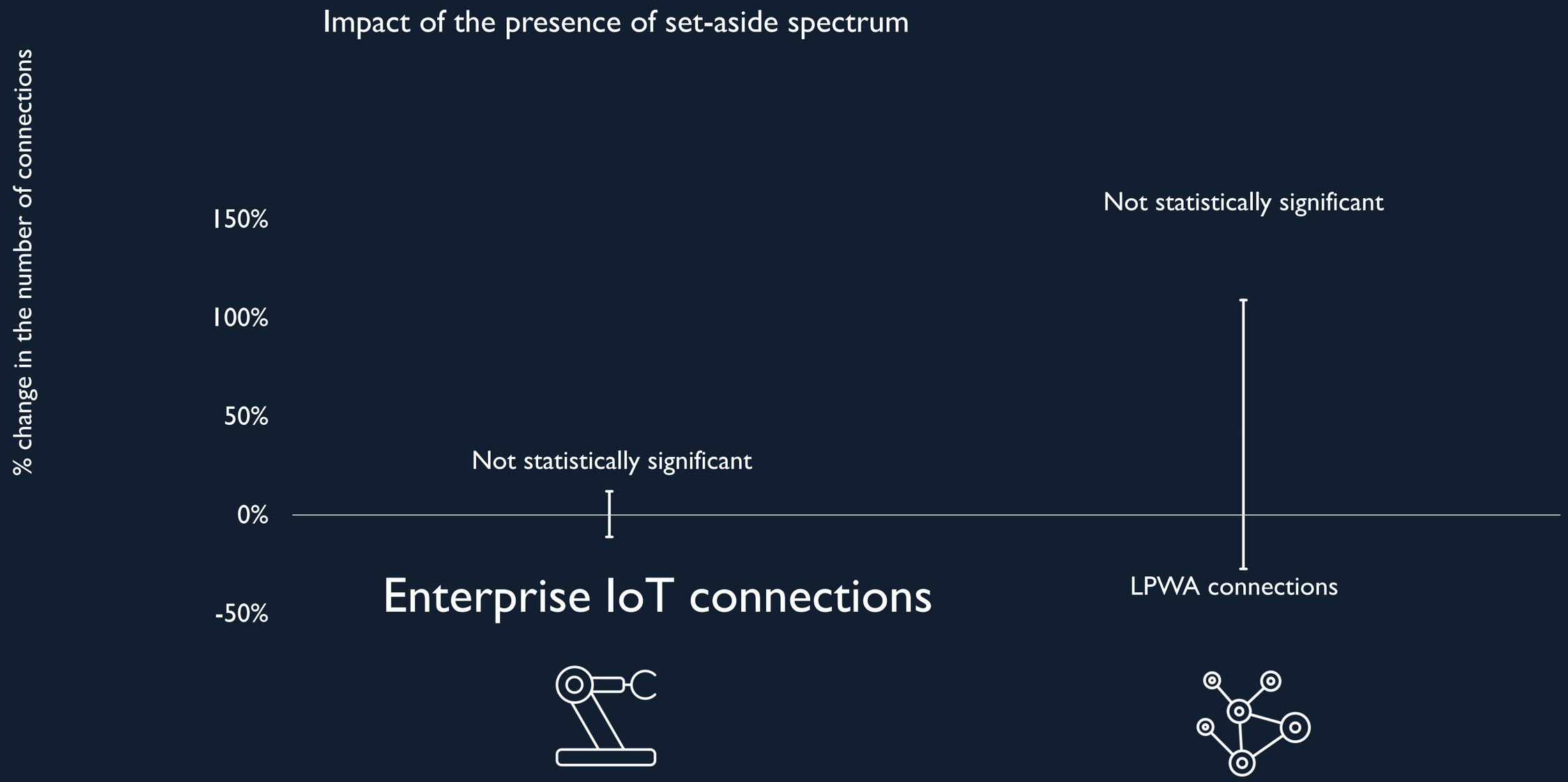
# Impact vanishes once we control for time trends



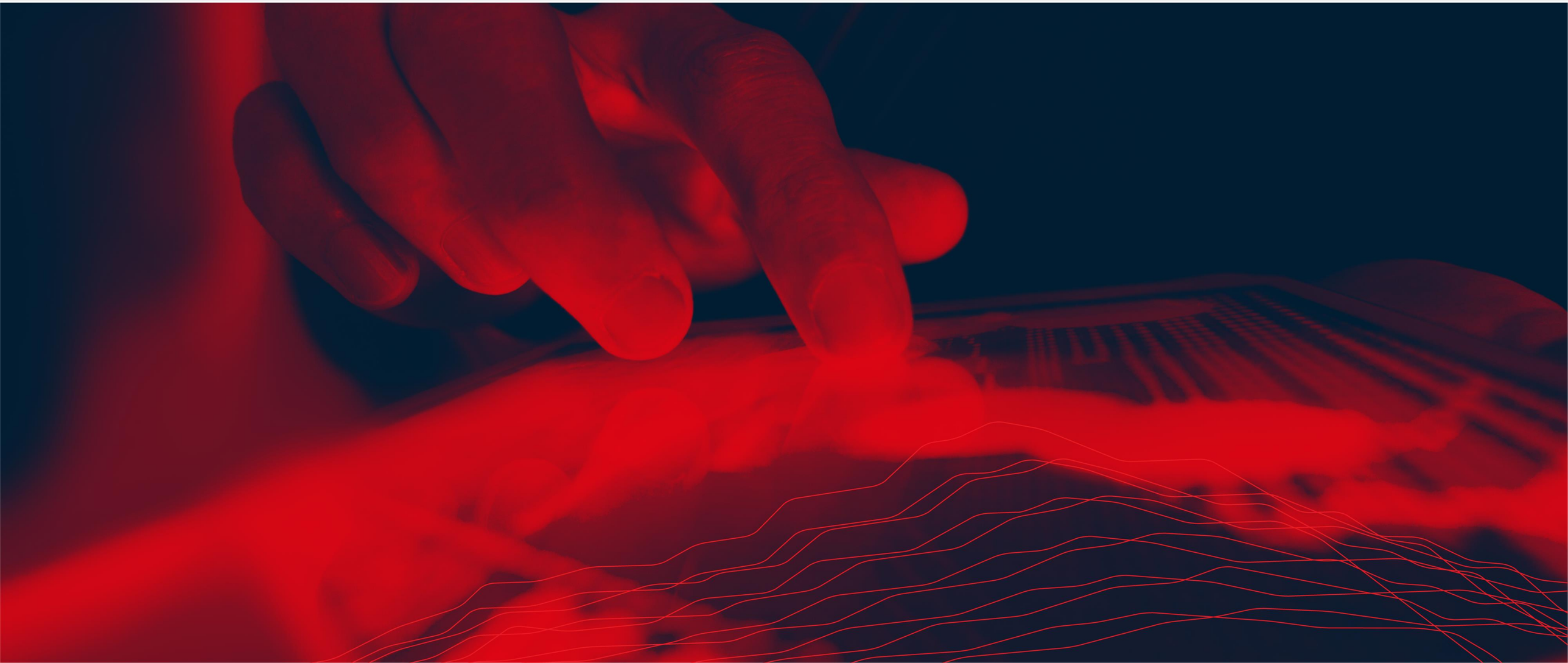
# Impact of set-aside spectrum vanishes once controlling for time trends and other confounders



# Alternatively, digitalization of enterprises can be measured by the number of IoT connections:

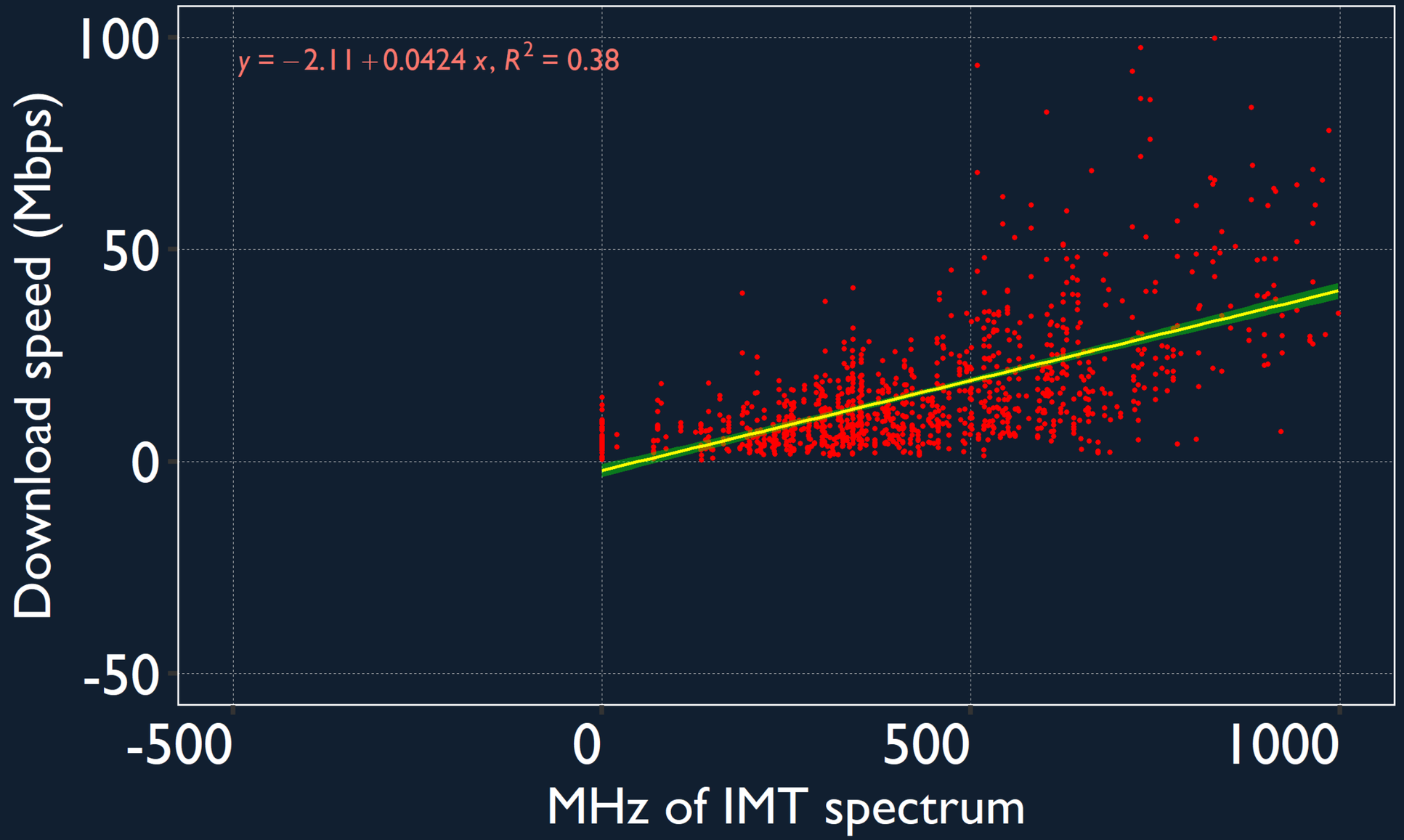


# Part 2 (The cost): Impact of spectrum availability on public network speeds

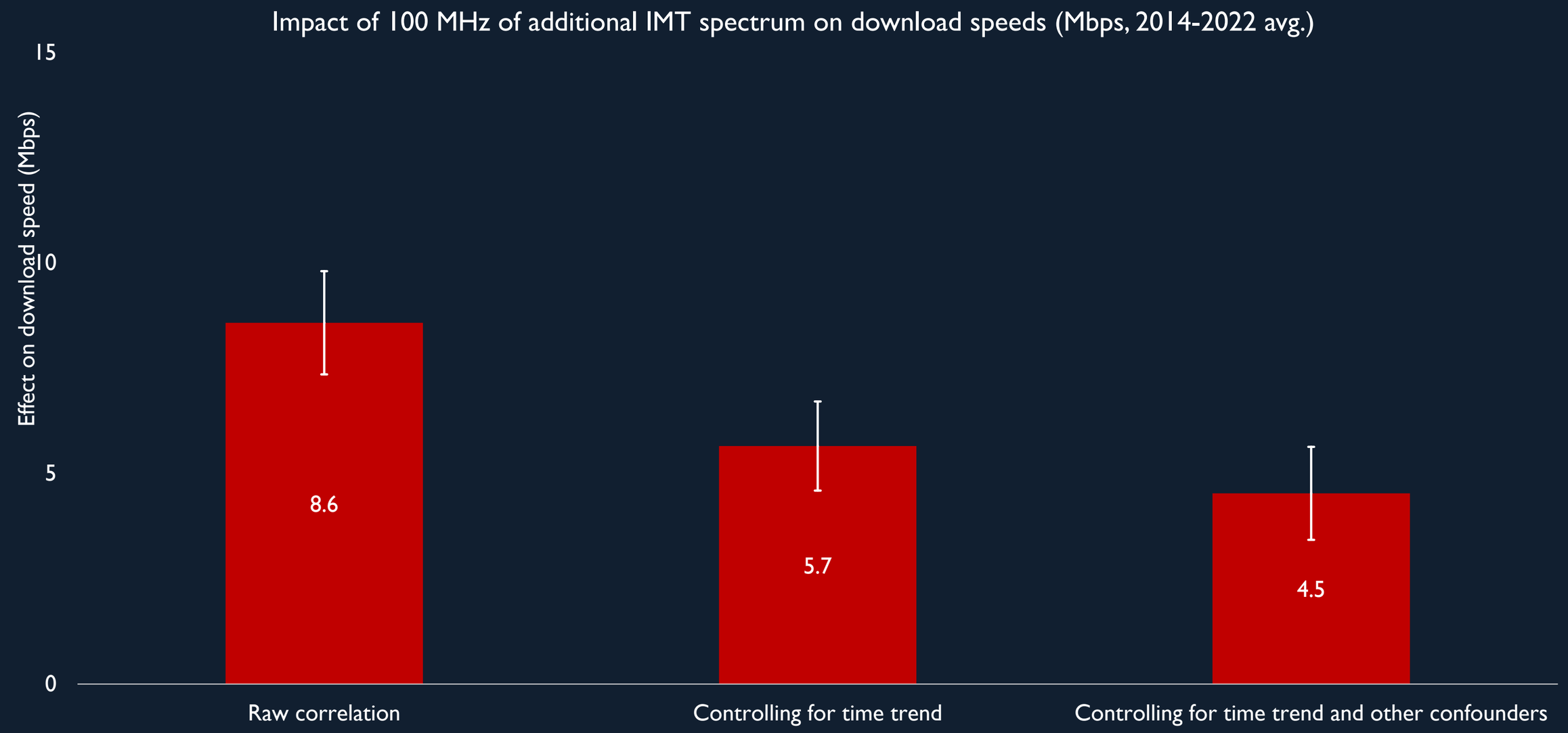


# Impact of spectrum remains once controlling for confounders

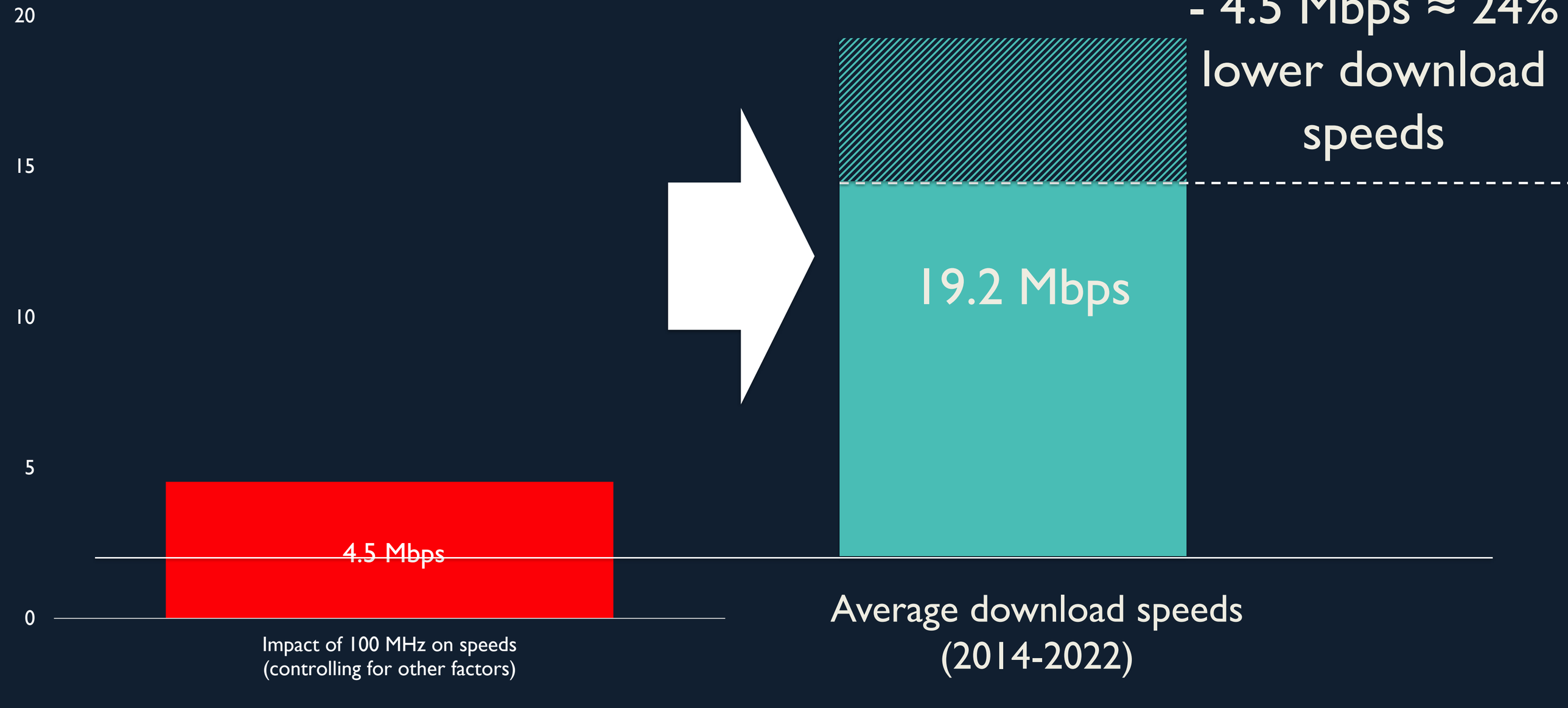
## 1: Plot speed against spectrum



# More spectrum means faster public mobile networks



# A typical set aside amount (100 MHz) would mean speeds 24% lower

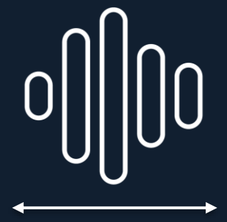


# Bottom line:

- Data do not support the arguments that setting aside spectrum boosts adoption of private networks or promotes a faster digitisation of enterprises
- However, the trade-off is clear: Additional 100 MHz of spectrum was associated with 4.5 Mbps (or about 24%) higher public network download speeds
- Policymakers **should not** base their decisions on naïve comparisons

Median set aside:

100 MHz of spectrum



Uncertain impact on private network adoption or digitalisation of enterprises

24% greater public network download speeds

GSMA Intelligence

GSMA™
# Intelligence

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## The full study report will be published in April

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# Use case example: 5G deployments

Hai Thoo Cheong,
Vice President Mobile Engineering
Singtel

# Private Networks Fashion: Spectrum for Industries

Use case example: 5G deployment

Cheong Hai Thoo

Vice President, Mobile Voice & Engineering

# Singapore focus to drive technology adoption in manufacturing and smart nation

### Industry 4.0

- 5G as key enabler for significant investments in the manufacturing sector to drive technology adoption
- Apply robotics and automation in manufacturing processes



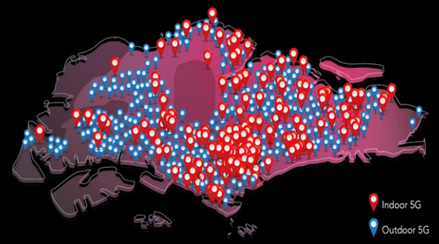
### Smart Nation

- Aims to be the global front-runner in secured, resilient, innovative 5G application and services
- Aggressively launching initiatives that incorporate 5G to digitise and enhance public services

# Singtel has been building up its 5G SA capabilities to support consumer's different traffic demands

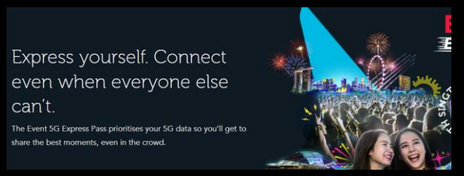

NSA LAUNCH

SA LAUNCH


WORLD'S FIRST NATIONWIDE 5G SA

NETWORK SLICING WITH PRIORITY ACCESS




MONETIZATION ON NETWORK SLICING

| 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|

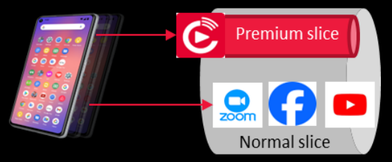
5G MARKET TRIAL



NEW 5G PLANS, GAME PACKS, AR CONTENTS, DATA PASSES WITH QoS UPLIFTS

WORLD'S FIRST COMMERCIAL NETWORK SLICE

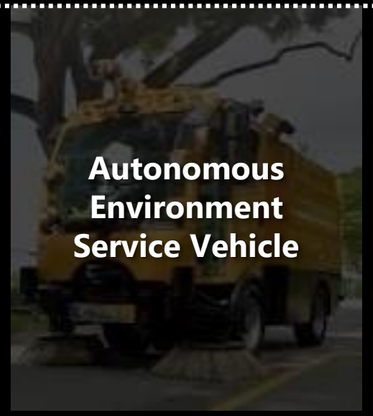
PIONEER SECURITY AS A SLICE (SECAAS)

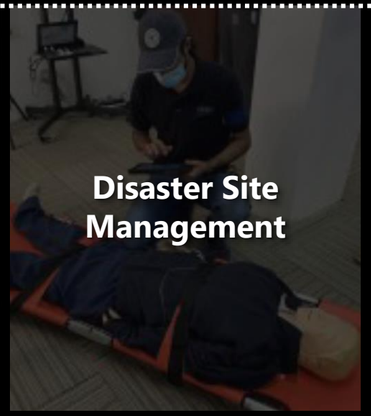




CONTINUE TO DEVELOP NEW NETWORK SLICING

# Enterprise's mission critical operations require 5G network slicing with guarantee QoS

## Government

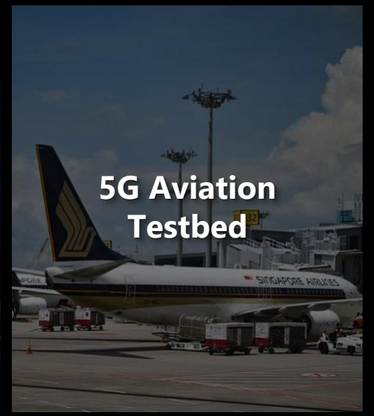





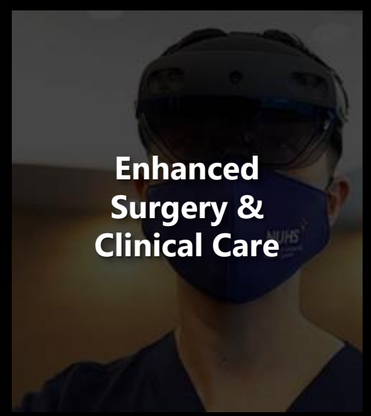
5G@SENTOSA

## Security


## Transport

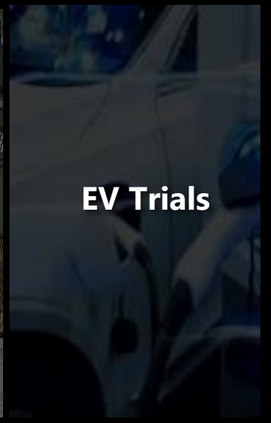


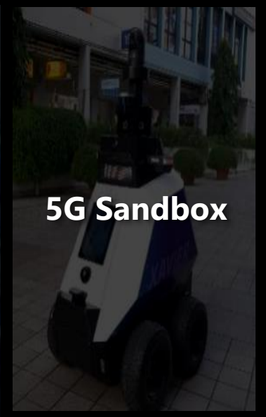

## Medical




## Industries 4.0






## Smart Retail


## Innovations & Partnerships

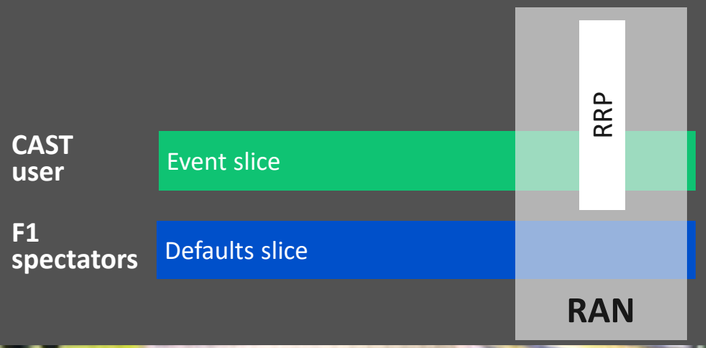


# 5G network slicing is a key enabler for ‘private network’ coexistence with public network

- Private networks provide on-premise enhanced security, control, and performance with designated coverage. However, they present challenges such as long deployment time, high initial costs, expertise needs and regulatory policies.
- Spectrum are finite and scarce resource
- 5G network slicing enables CSP to provide ‘private network’ like deployment to meet specific enterprise requirements
- 5G network slicing accelerate Enterprise GTM with CSP ready infrastructure

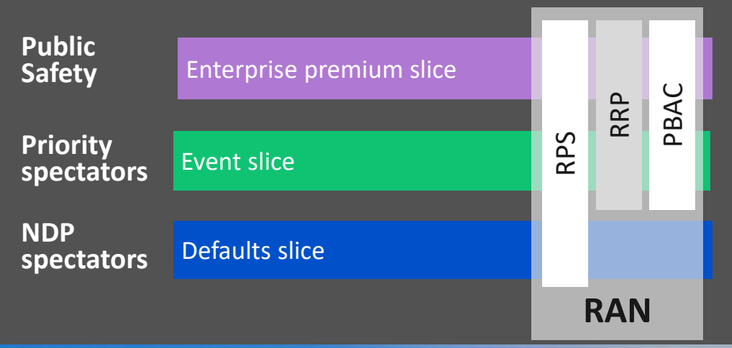
# Singtel leading the commercialization of network slicing

## 1 F1 slicing and radio resource partitioning



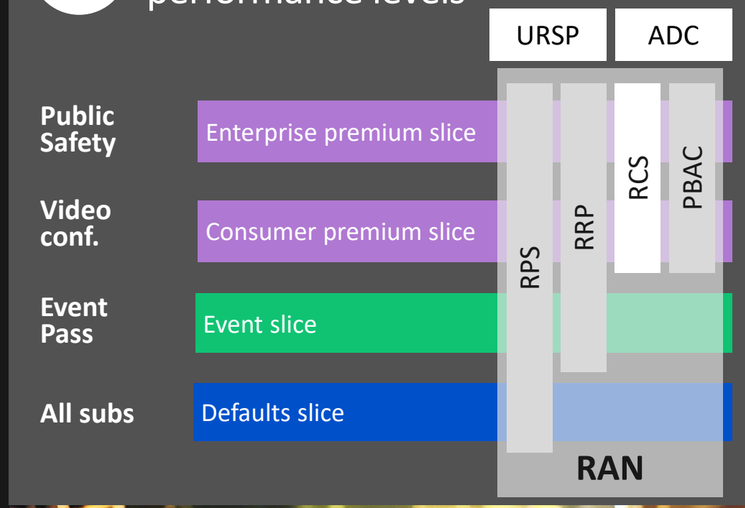


## 2 Slicing with priority-based admission control for National Day Parade





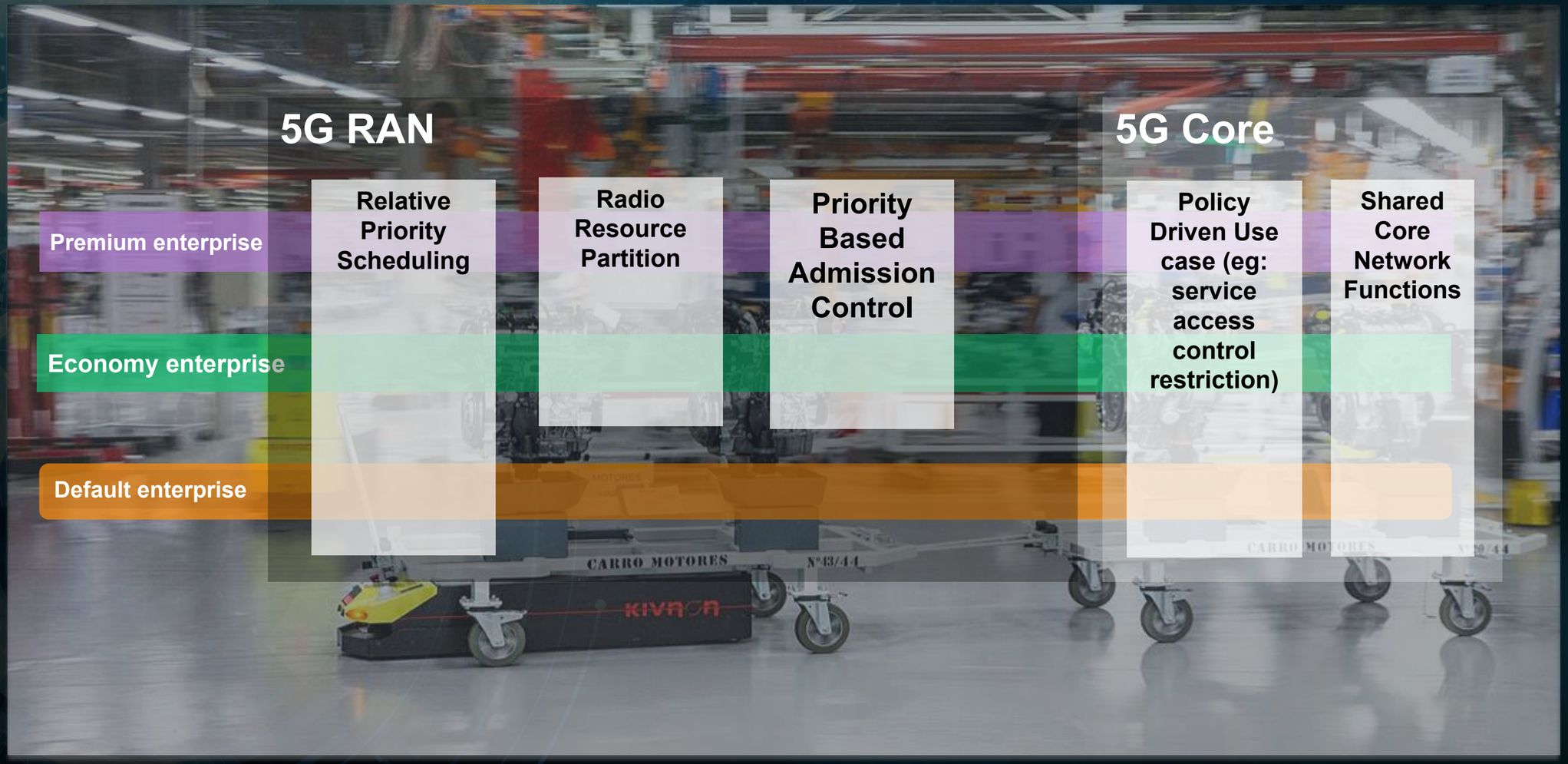
## 3 Multiple applications and performance levels




# Singtel leverages on network slicing as ‘private network’ to deliver enterprise use case

## Use cases

*Mission critical, airport, manufacturing, port, campus network*




*Enterprise and Consumer sharing the same network and logically separated*

# Singtel offers Network Slicing to different categories of enterprise use cases

| Nationwide offering | Localised offering | Localised offering with geofenced dedicated connect |
| --- | --- | --- |
| Subscription connected to a slice with certain characteristics and SLA of different triers<br><br>Eg: Bus, EV charger, drones etc | Off-the-shelf solution, including a pre-configured slice for more horizontal standard solutions like security and surveillance use cases | Reserved  prioritized and dedicated slice with SLA for the campus area. Can be permanent or scheduled<br><br>Eg: manufacturing factories |

# Thank You

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# Roundtable

Moderator: Carol Sosa Leguizamón
Spectrum Policy Director
GSMA

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# Closing Remarks

Carol Sosa Leguizamón
Spectrum Policy Director
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