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EICMA Motor Show

## **Global disruptions and growing complexity are raising the bar for two-wheeler industry**

New centers of gravity create challenges but also opportunities

Gianluca Di Loreto  
Partner

November 7<sup>th</sup>, 2023 - Milano

**BAIN & COMPANY** 

## A SHIFTING CENTER OF GRAVITY

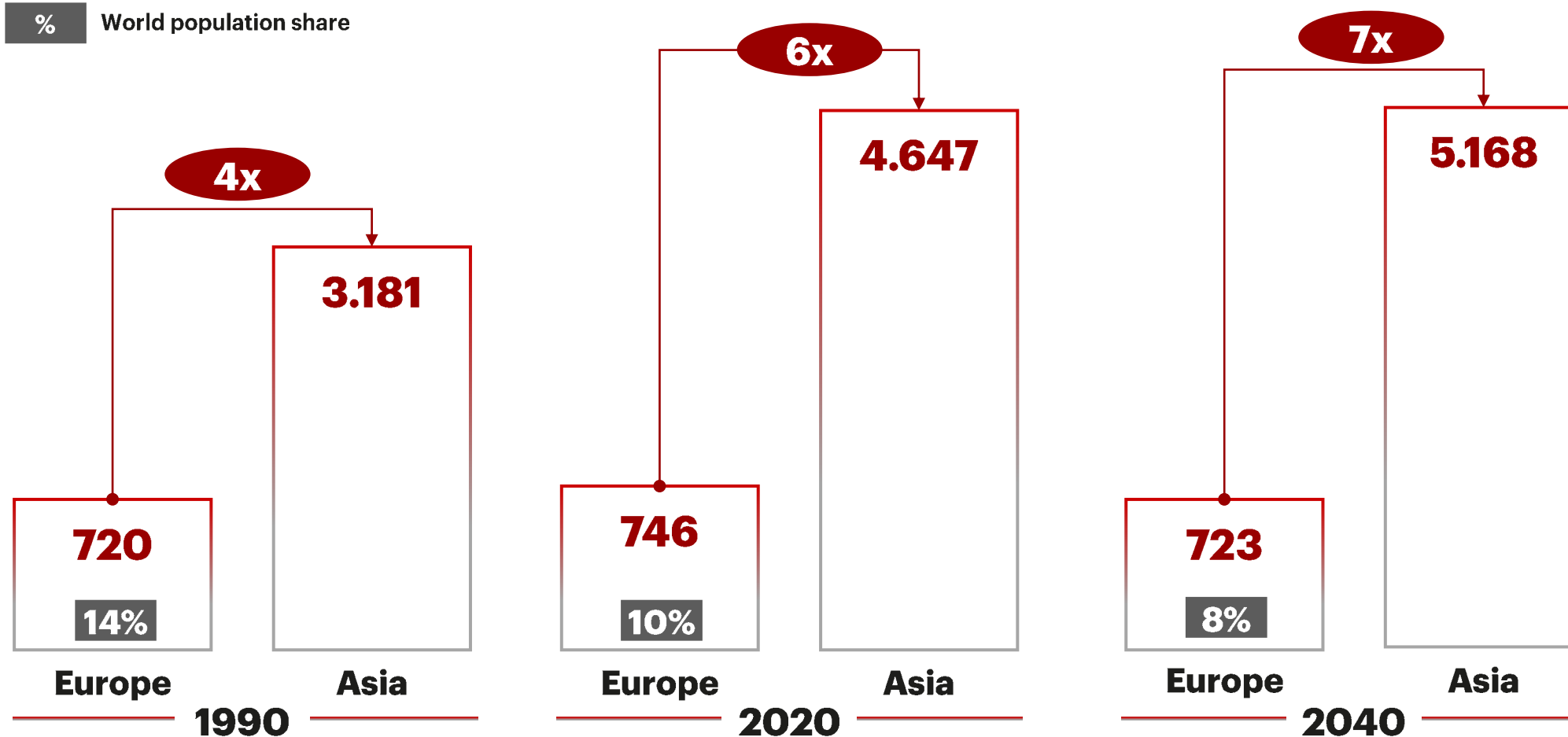
The world's center of gravity is shifting eastward: two-wheeled Europe is playing defense and mainly defending high-value niches

1



# A demographic decline has long been looming in Europe: the world's population is shifting to Asia, already 6 times more populated than Europe

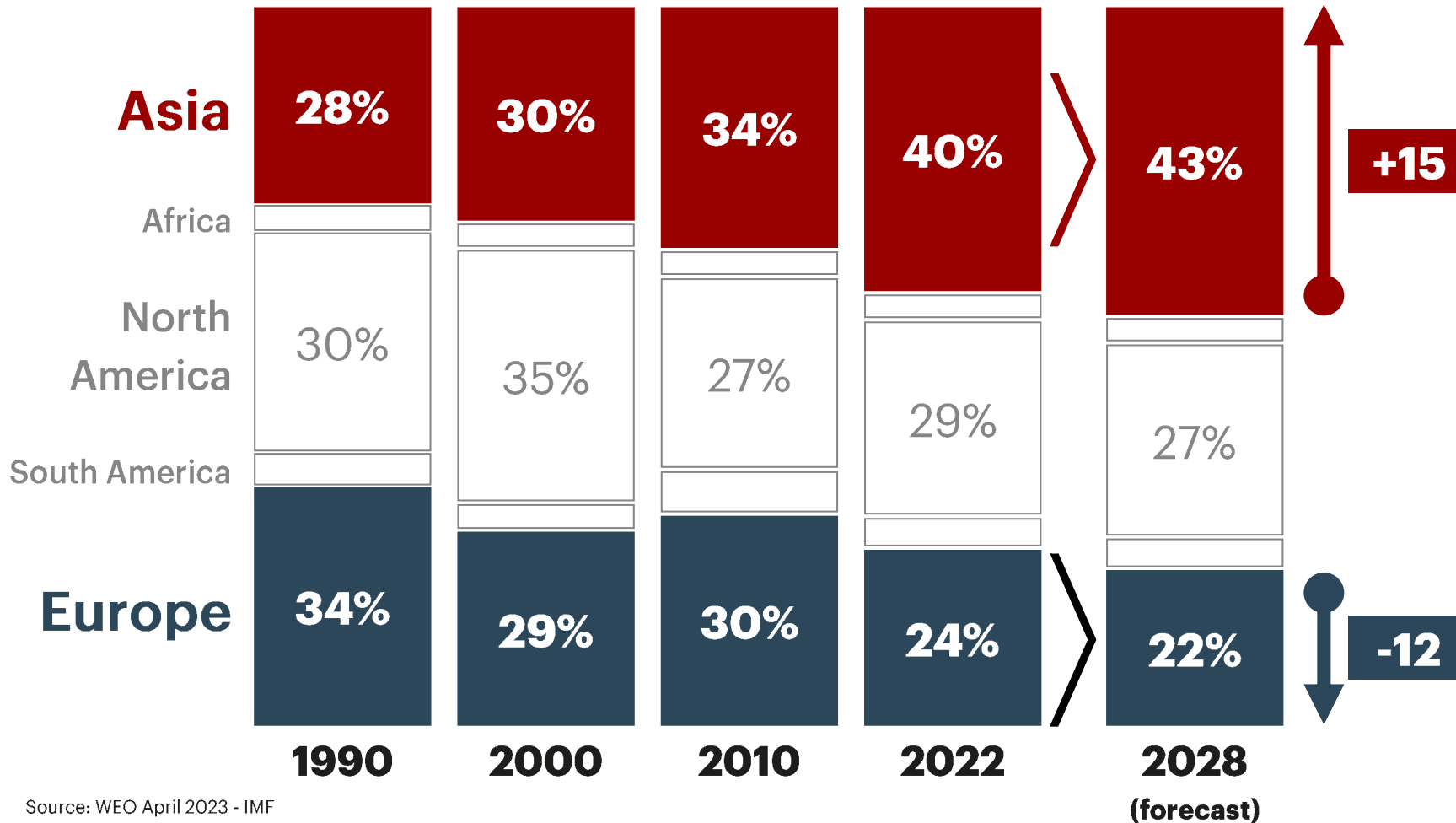
## Population by geographic area (Millions of people)



Notes: Asia includes Afghanistan; Saudi Arabia; Armenia; Azerbaijan; Bahrain; Bangladesh; Bhutan; Brunei; Cambodia; China; Cyprus; North Korea; Philippines; Georgia; Japan; Jordan; Hong Kong; India; Indonesia; Iran; Iraq; Israel; Kazakhstan; South Korea; Kuwait; Kyrgyzstan; Laos; Lebanon; Macau; Maldives; Malaysia; Mongolia; Myanmar; Nepal; Oman; Pakistan; Palestine; Qatar; Singapore; Syria; Sri Lanka; Thailand; Taiwan; Tajikistan; Timor-Leste; Turkey; Turkmenistan; UAE; Uzbekistan; Vietnam; Yemen  
Source: UN Department of Economic and Social Affairs, Population Division

The shift in center of gravity is even more evident when looking at GDP, which for Asia has risen from 28% to 40% of the total (Europe from 34% to 25%)

Distribution of GDP by geographical area (%)



### Wealth goes to Asia

**China:** rose from 6% of Asian GDP in '90 to 45% in 2022. Despite an expected slowdown, the Chinese economy will continue to grow by ~4% annually through 2028.

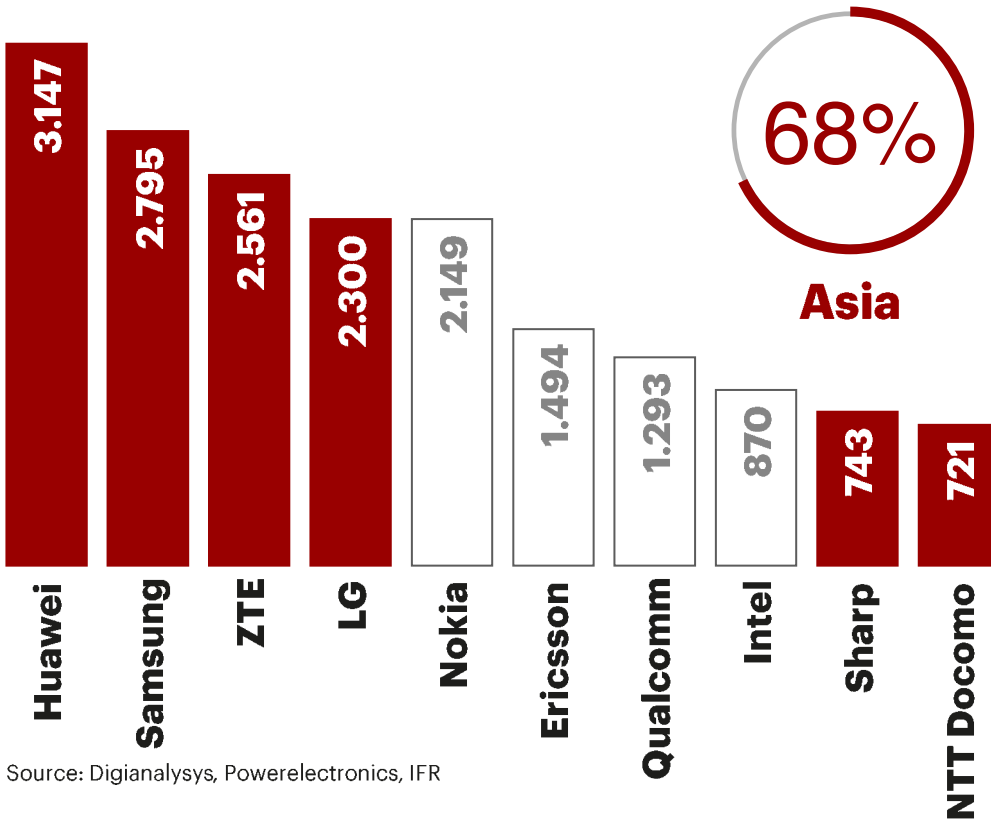
**Europe:** weight in world GDP remained almost stable until 2010, then began a gradual decline to 24% in 2022, estimated at 22% in 2028.

**Italy:** weight in European GDP declined from 15% in 1990, to 8% in 2022, benefiting Eastern Europe. GDP growth to 2028 remains weak (around 0.9%).

Source: WEO April 2023 - IMF

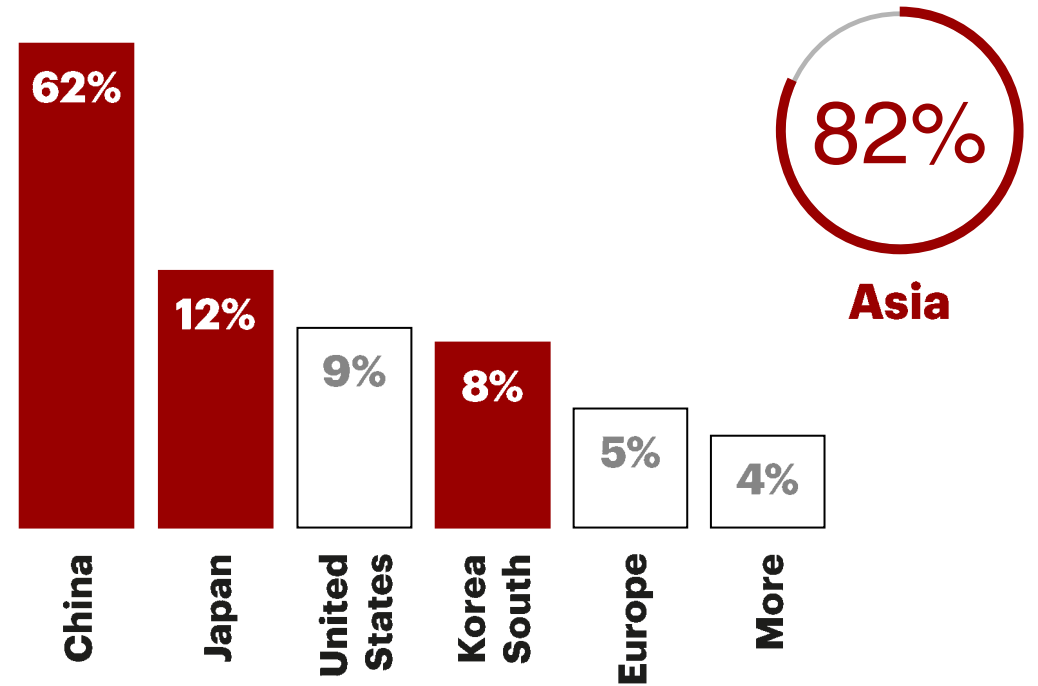
# Also driving Asia's GDP growth is technology, which now comes from the East: Asian players dominate the new technology market

## Patents for 5G (Number, September 2021)



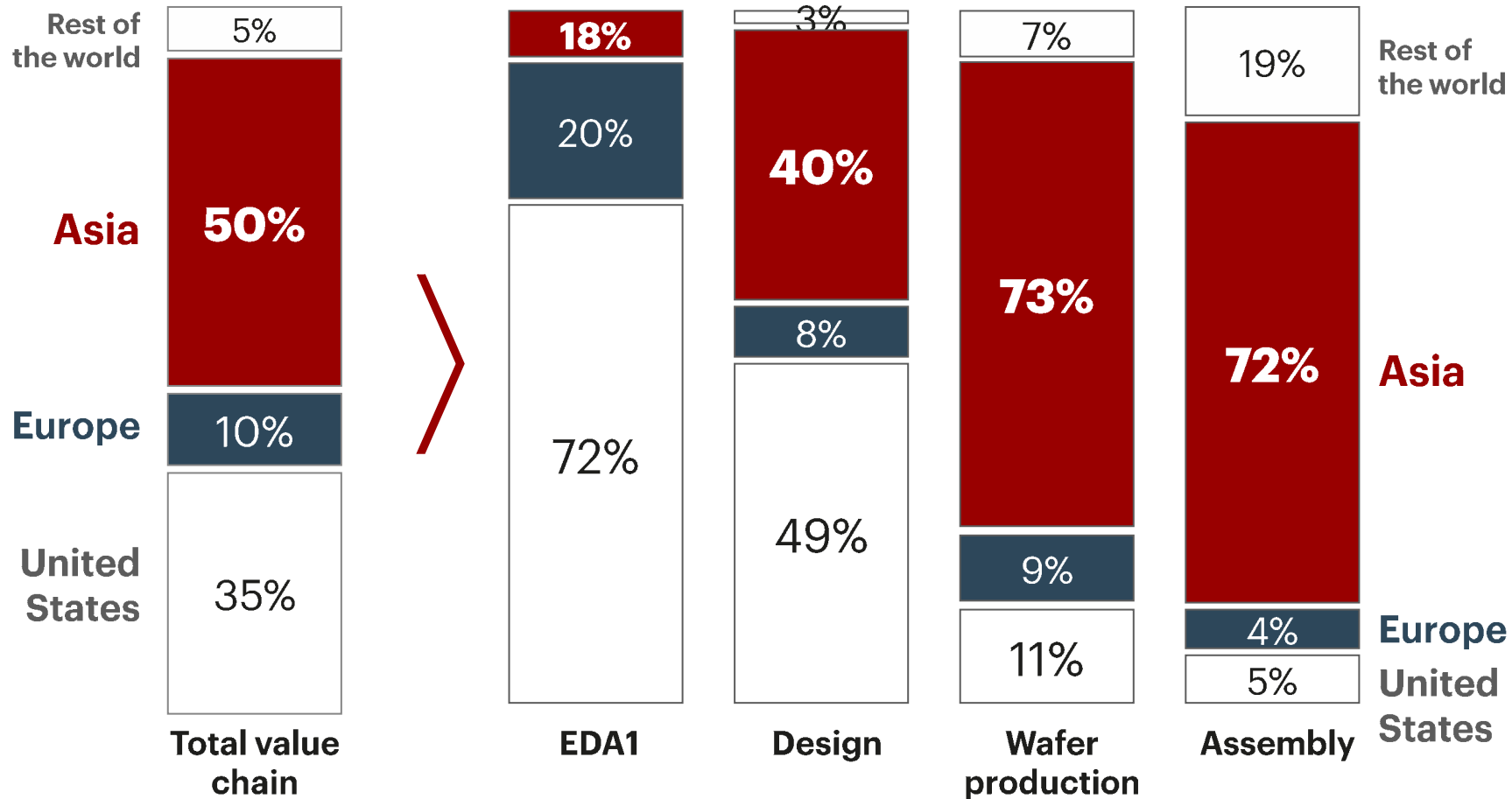
Source: Digianalysis, Powerelectronics, IFR

## Patents for Solid State Batteries (Distribution, 2022)



# Semiconductors do not escape this trend: Asia controls half of the Semicon market and more than two-thirds of the final assembly business

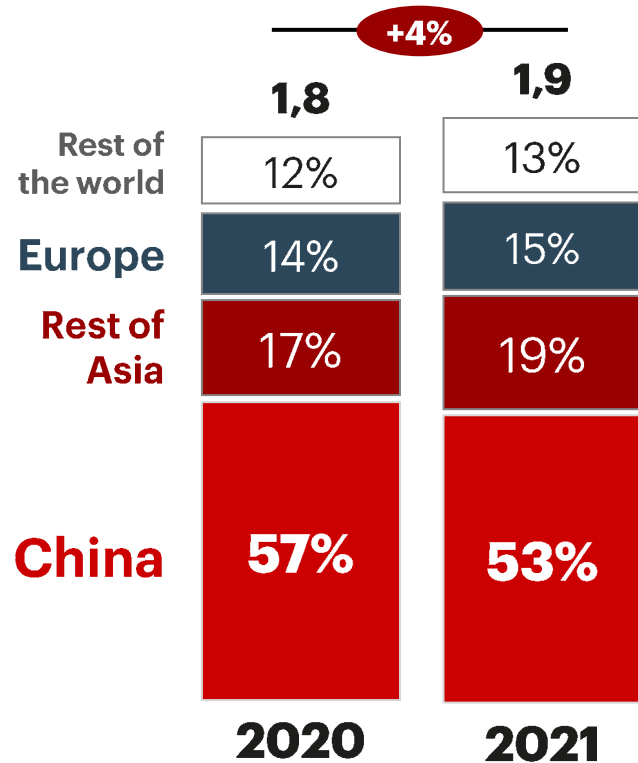
## Semiconductor value chain



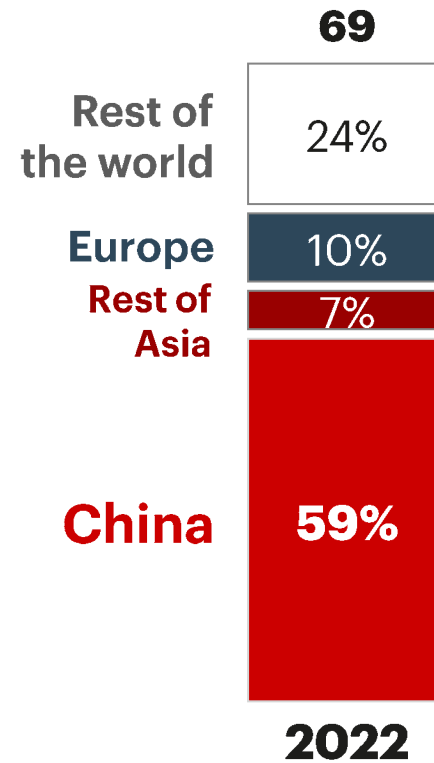
Notes: 1) EDA: Electronic design automation (software processes that help design electronic systems)  
 Source: Semiconductor Industry Association (SIA)

# Steel and aluminum productions, critical for 2-wheelers, are largely in China, while carbon fiber still sees America first but closely followed by Asia

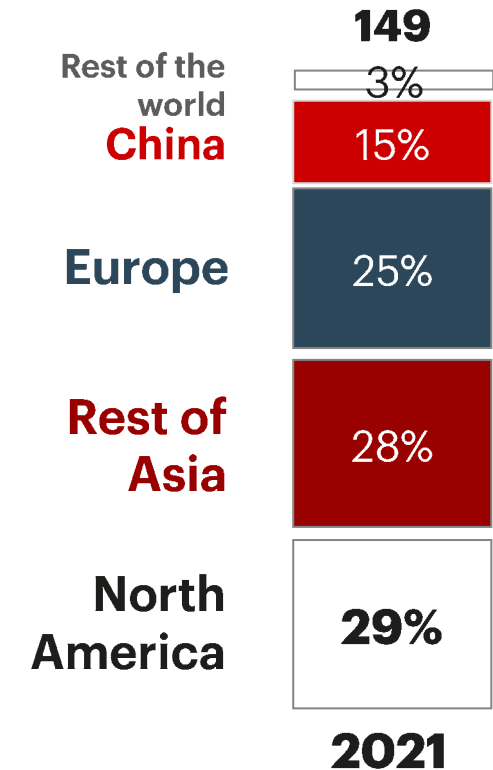
## Steel Production (Bn tons)



## Aluminum Production (Mln tons)



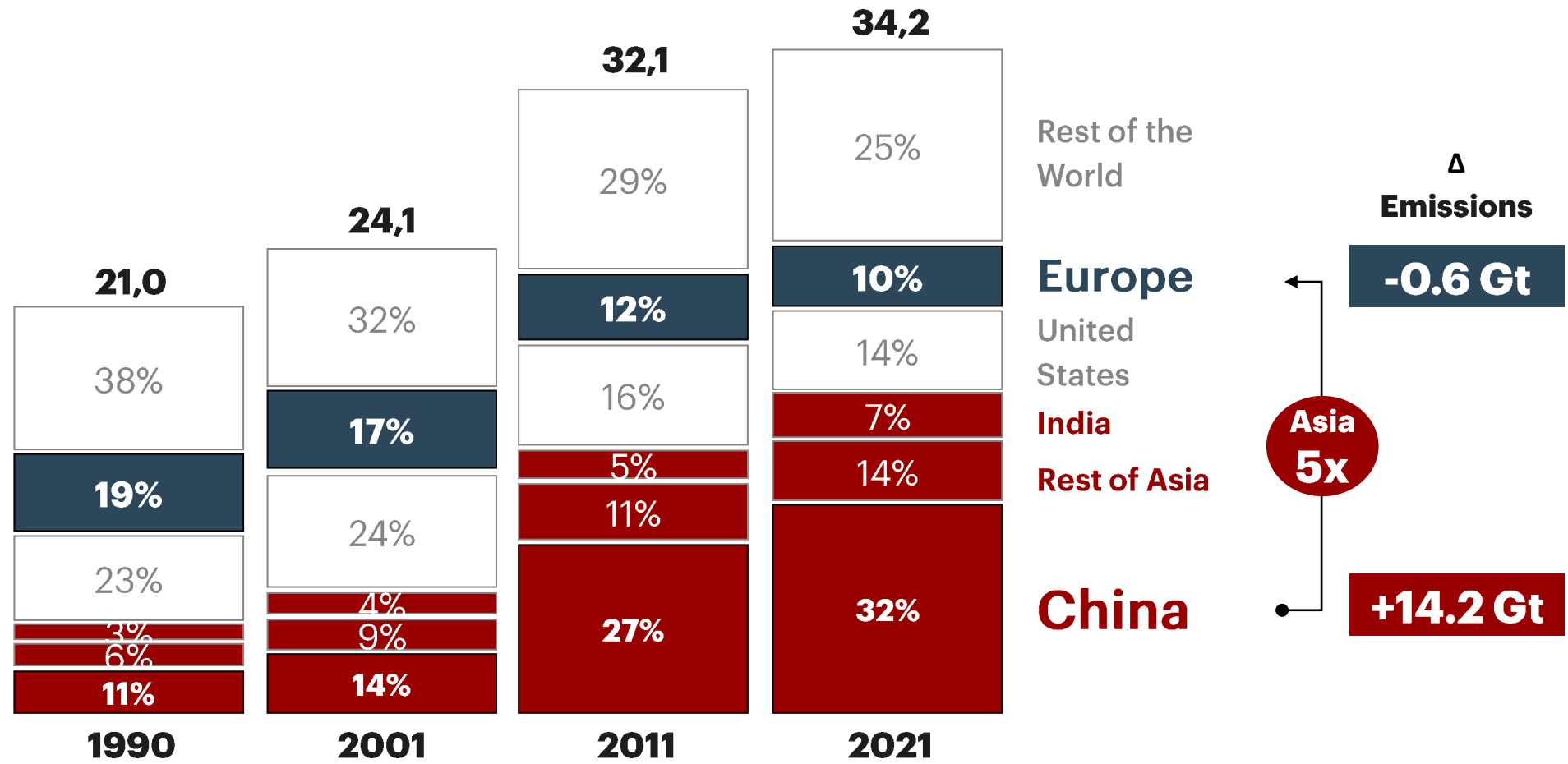
## Carbon fiber production (K tons)



Source: World Steel Association, International Aluminum Institute, Statista; IHS Markit

# The consequence of Asia's growing weight is reflected in annual GHG emissions: Asia alone emits 5x Europe, which has been declining for years...

## GHG emissions from fuel combustion (Gton CO<sub>2</sub>eq)



Source: IEA; GHG = Greenhouse Gas Emissions



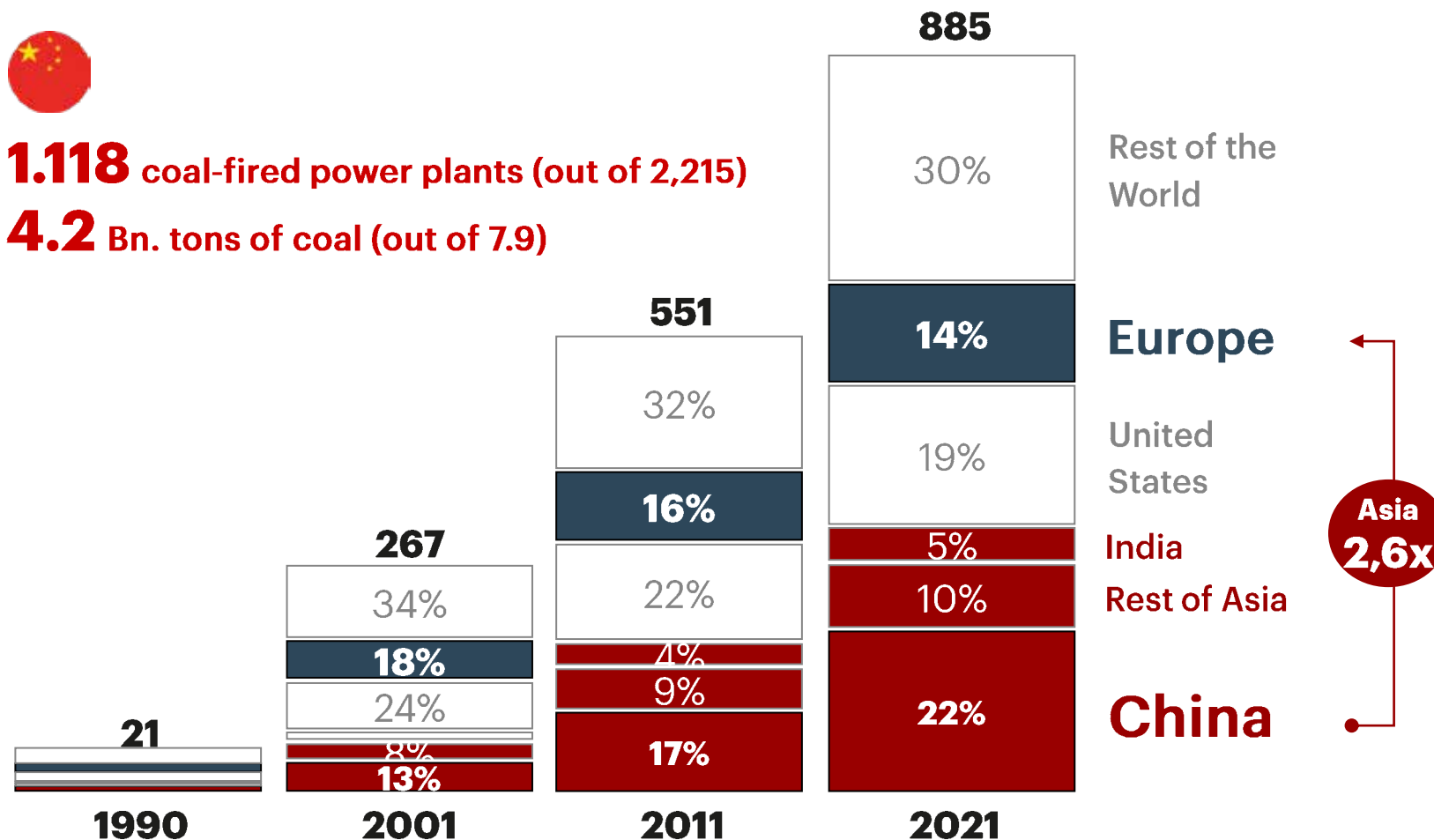
...and which now weighs relatively even on cumulative emissions since the end of the last century (Asia 2.6x vs. Europe)

**GHG emissions from fuel combustion - Cumulated <sup>1</sup>(Gton CO2eq)**



**1.118** coal-fired power plants (out of 2,215)

**4.2** Bn. tons of coal (out of 7.9)

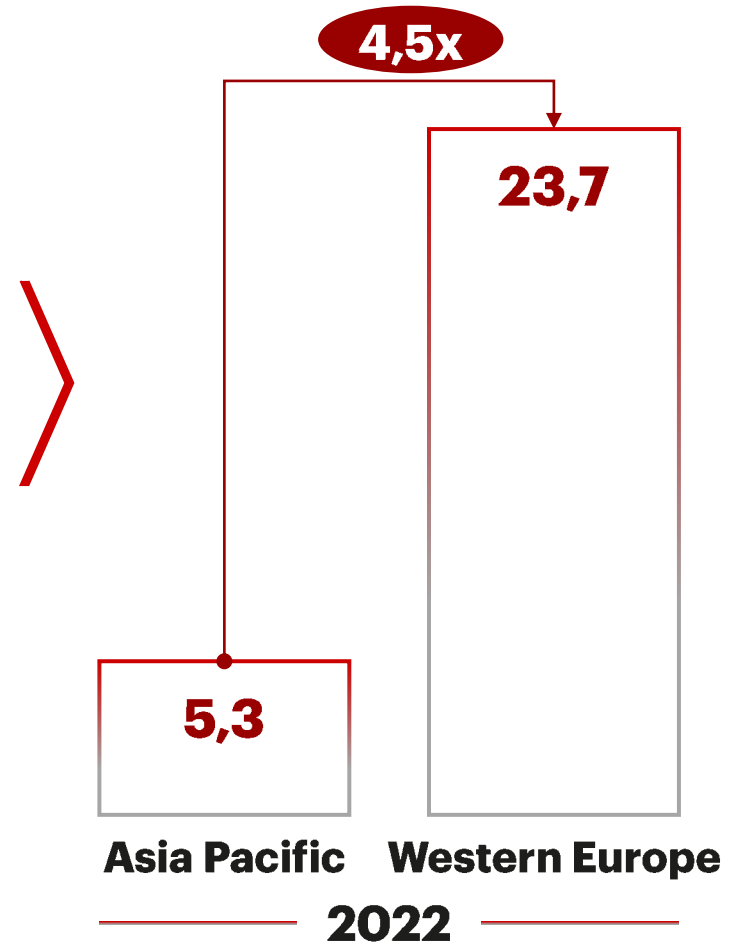
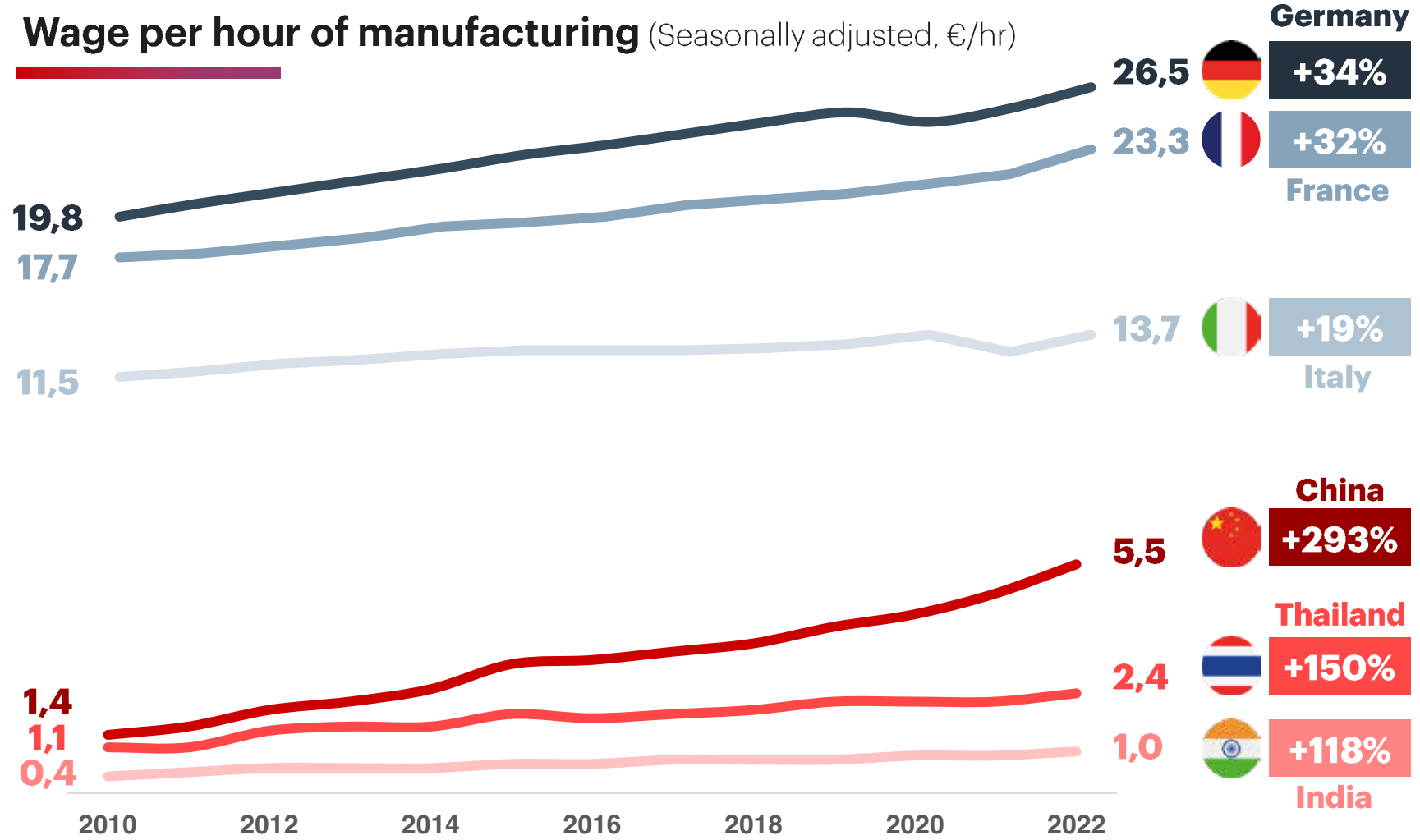


Notes: 1) Cumulative emissions calculated from 1990

Source: IEA Critical Minerals and Clean Energy Summit, Fairbank center for Chinese studies, Bloomberg, ScientificAmerican, Global Energy Monitor

# A relevant consequence of this Asian growth is the dizzying growth of labor cost, increased by triple digit but still quite far from the European thresholds

**Wage per hour of manufacturing** (Seasonally adjusted, €/hr)



Source: Euromonitor International from International Labour Organisation (ILO), Eurostat, national statistics



## **RECENT DISRUPTIONS IMPACTED 2-WHEELERS SUPPLY CHAIN**

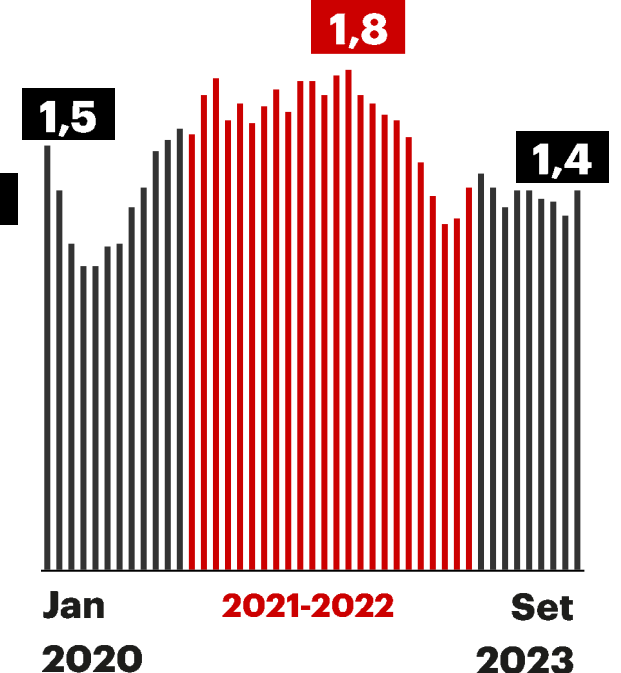
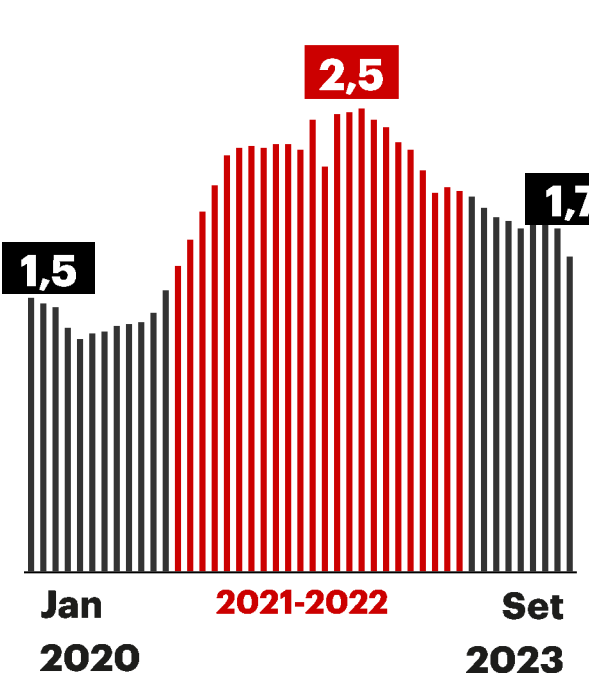
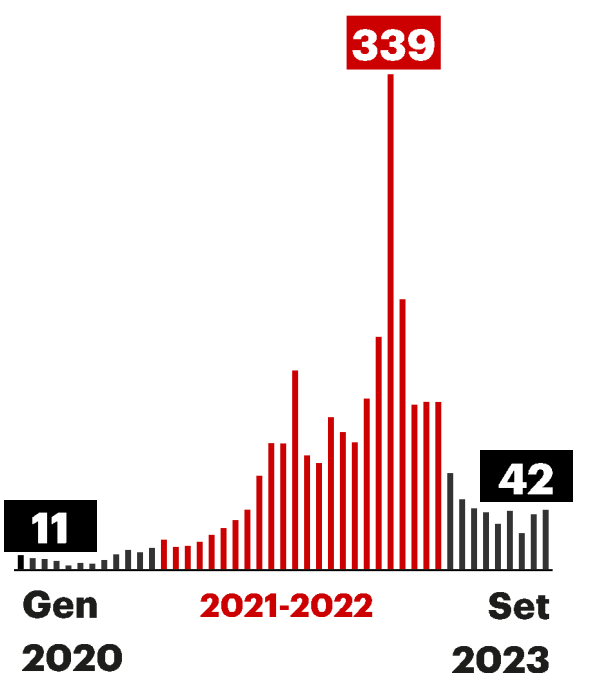
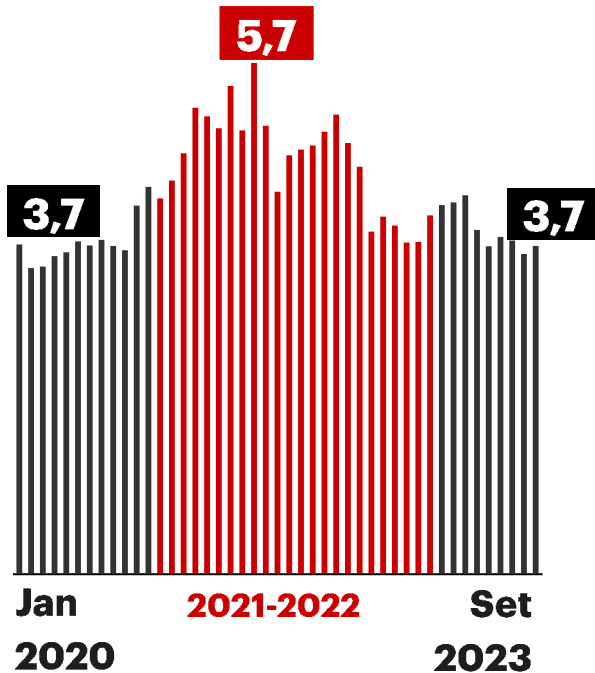
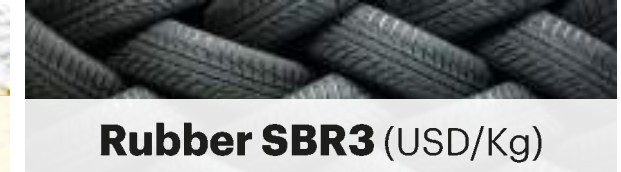
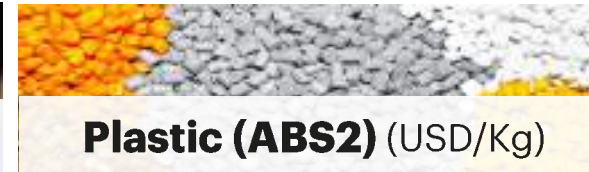
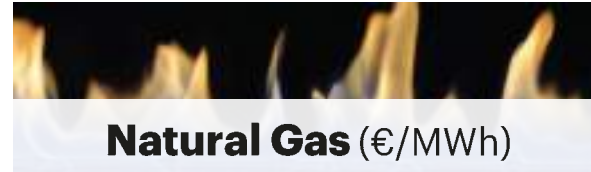
Rising prices and logistics costs are less critical and have reawakened reshoring, but supply chains remain firmly in the East and electrification... makes matters worse

**2**



# Prices of commodities that impact two-wheelers have left behind the spike of the past few months, settling down to more usual levels

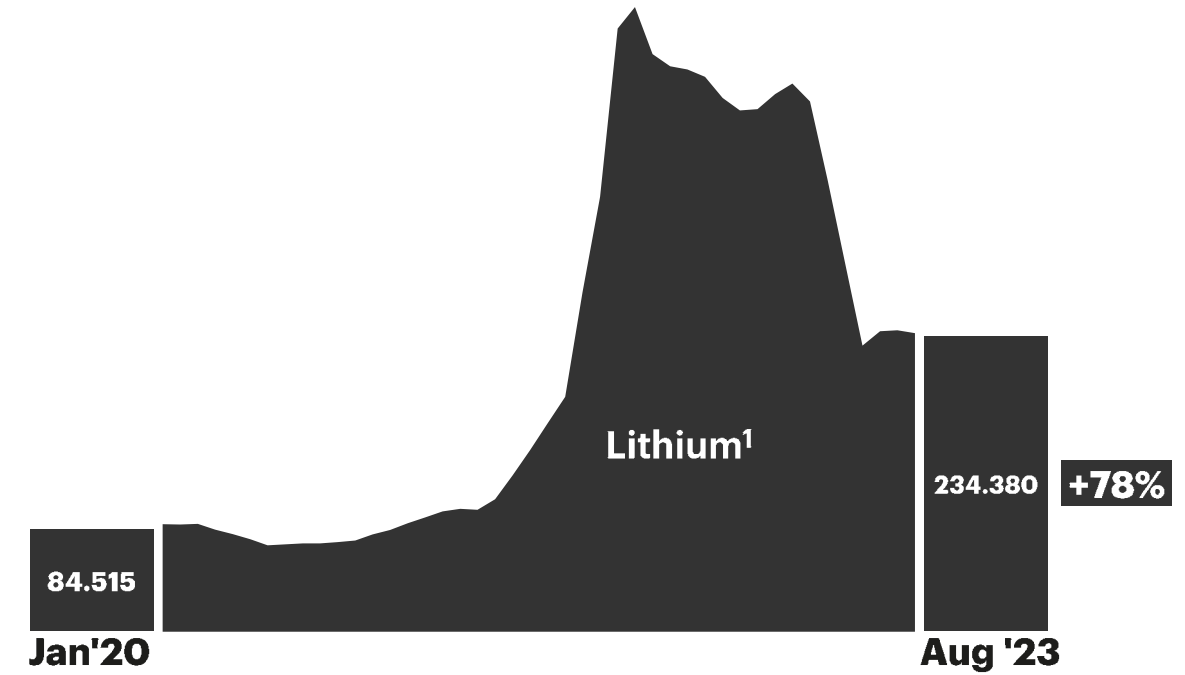
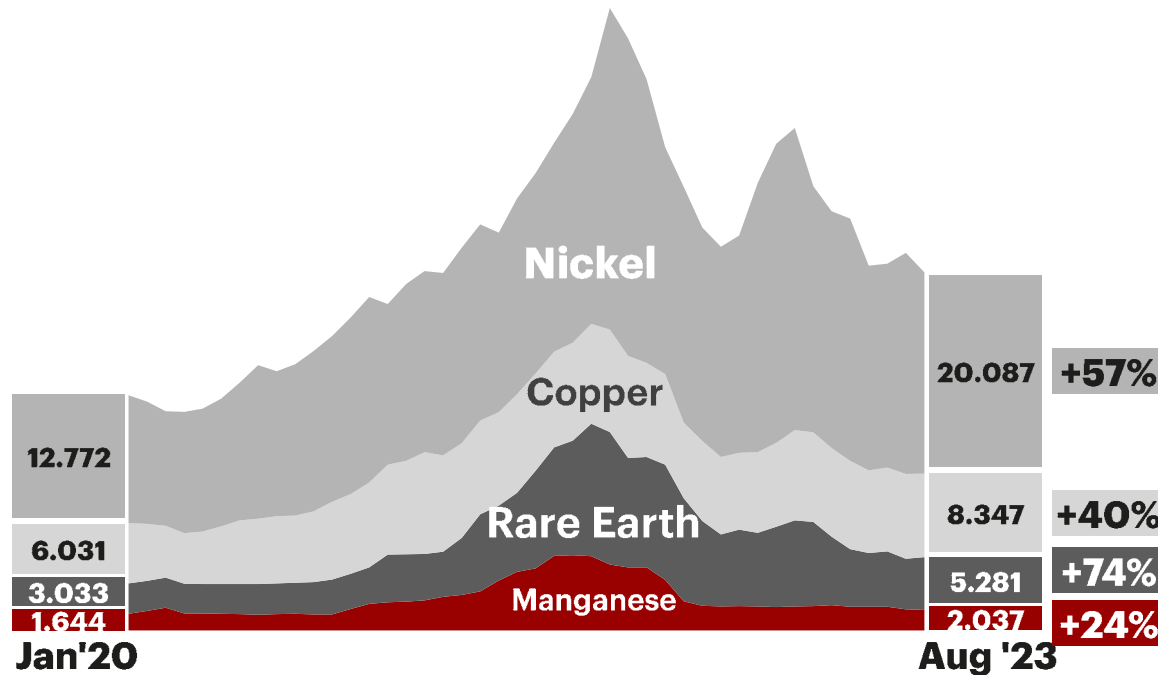
## Cost of raw materials



Notes: 1) Steel bars; 2) ABS: Acrylonitrile-butadiene-styrene, thermoplastic material, Styrene Butadiene Rubber - Source: Tradingeconomics, Businessanalytiq

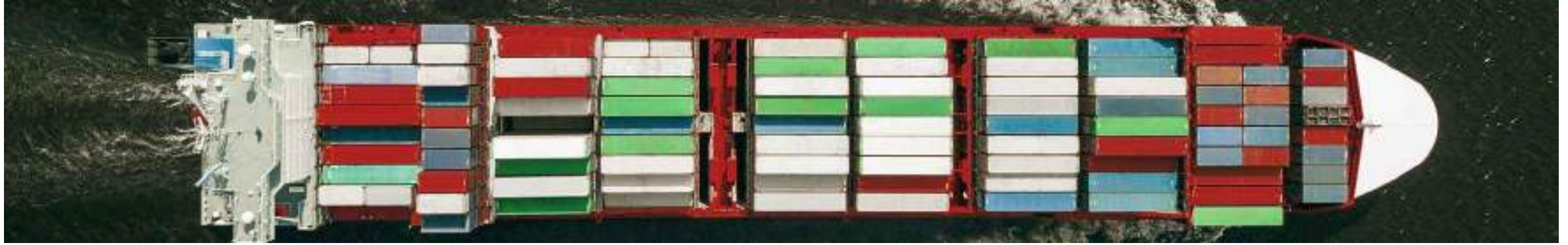
Some commodities, on the other hand, show unstoppable growth: copper, lithium, manganese and rare earths are growing due to increasing demand

### Cost of raw materials (USD/ton)

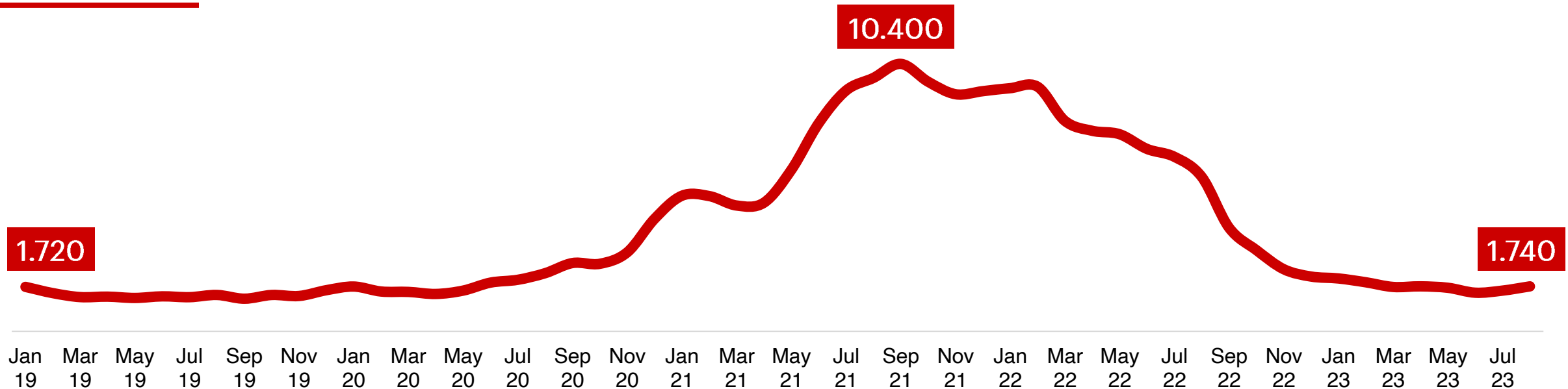


Note: 1) Metal - battery grade  
Source: International Monetary Fund, CIQ

The sharp rise in logistics costs led to the initiation of some reshoring processes, but by now the alarm has receded, easing the pressure on the industry



Average transportation cost per container (\$ / FEU\*)



Source: Statista \* Forty-foot Equivalent Unit

# However, in the meantime some bicycle operators have revised their footprints to avoid future risks on supply chains (and leverage anti-dumping norms)

MAXCOM

PIERER Mobility AG

**Joint venture between Pierer and Maxcom for eBike production in Bulgaria:** €40M investment in 130,000 sq m factory with a capacity of 350,000 units/year

BUHEL

Component manufacturer invests **~€20M** to expand **production capacity in Europe**

GIANT

Asian bicycle giant **increases production capacity in** Hungary to 300,000 units/year

DECATHLON

Many plants in **France, Portugal, Poland and Italy**, producing bikes and eBikes to serve the growing market

BOSCH

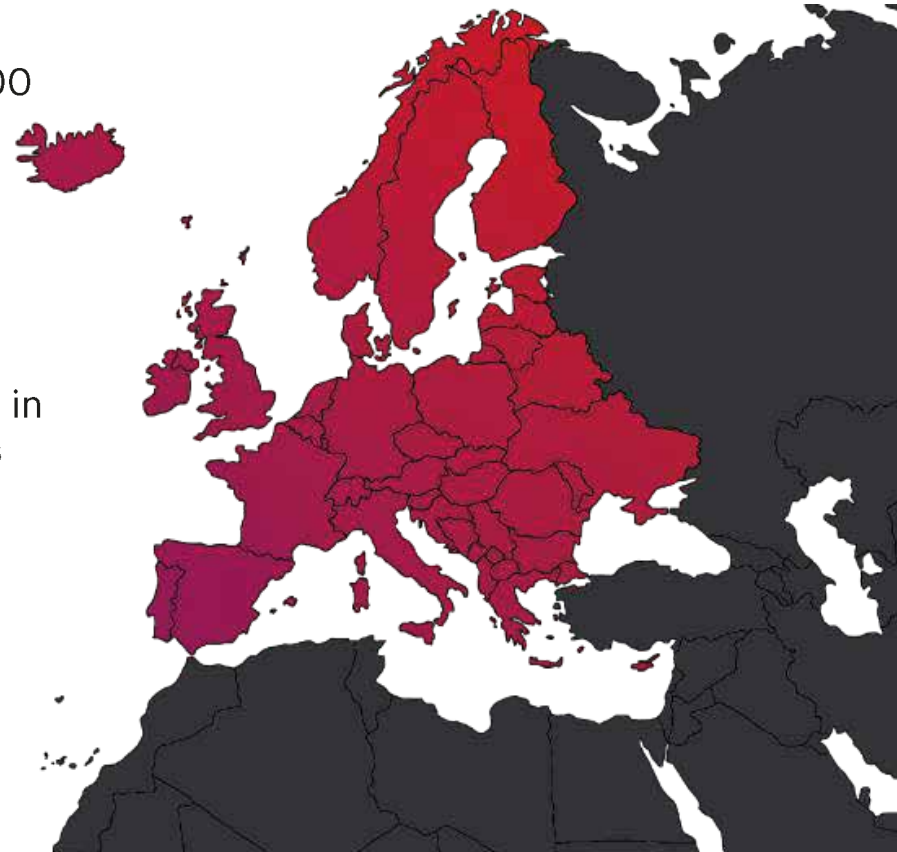
New recent production of **eBikes components** in the Italian plant located in Bari, and huge investments made in European plants for bike components

MONDRAKER

Spanish MTB manufacturer has opened a **new production site in Spain**

XENER ATEX

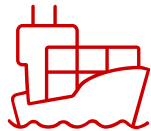
Italian battery **manufacturer is increasing local production**



Others, for example in the auto industry, have instead organized directly with their own ships or by acquiring shipyards



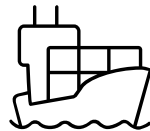
**+8 cargo ships**



Total cost of 700 million euros  
Each ship up to 7,700 cars



**+2 shipyards**



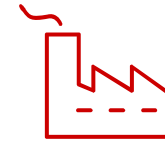
The Chinese state-owned giant has just bought a second construction site

**+1 Bus plant**



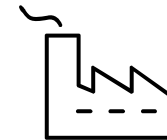
Electric bus factory built in Hungary and already operational

**+1 Auto plant**



Opening of electric car factory in EU announced

**+1 Auto plant**



Possible opening of a factory in Turkey

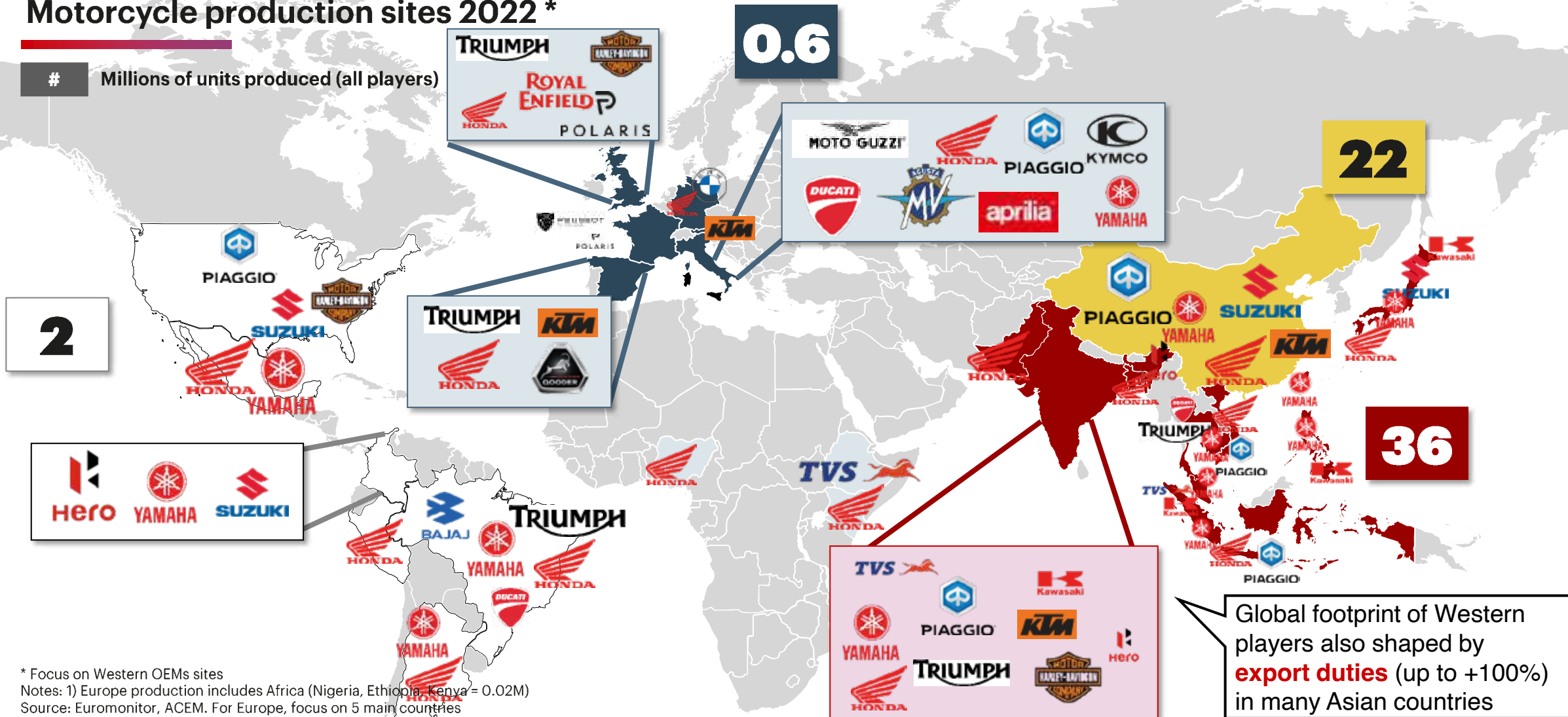




# In any case, the global center of gravity of 2-wheelers remains firmly in the East, where more than 90% of the world's motorcycle production is located

## Motorcycle production sites 2022 \*

# Millions of units produced (all players)

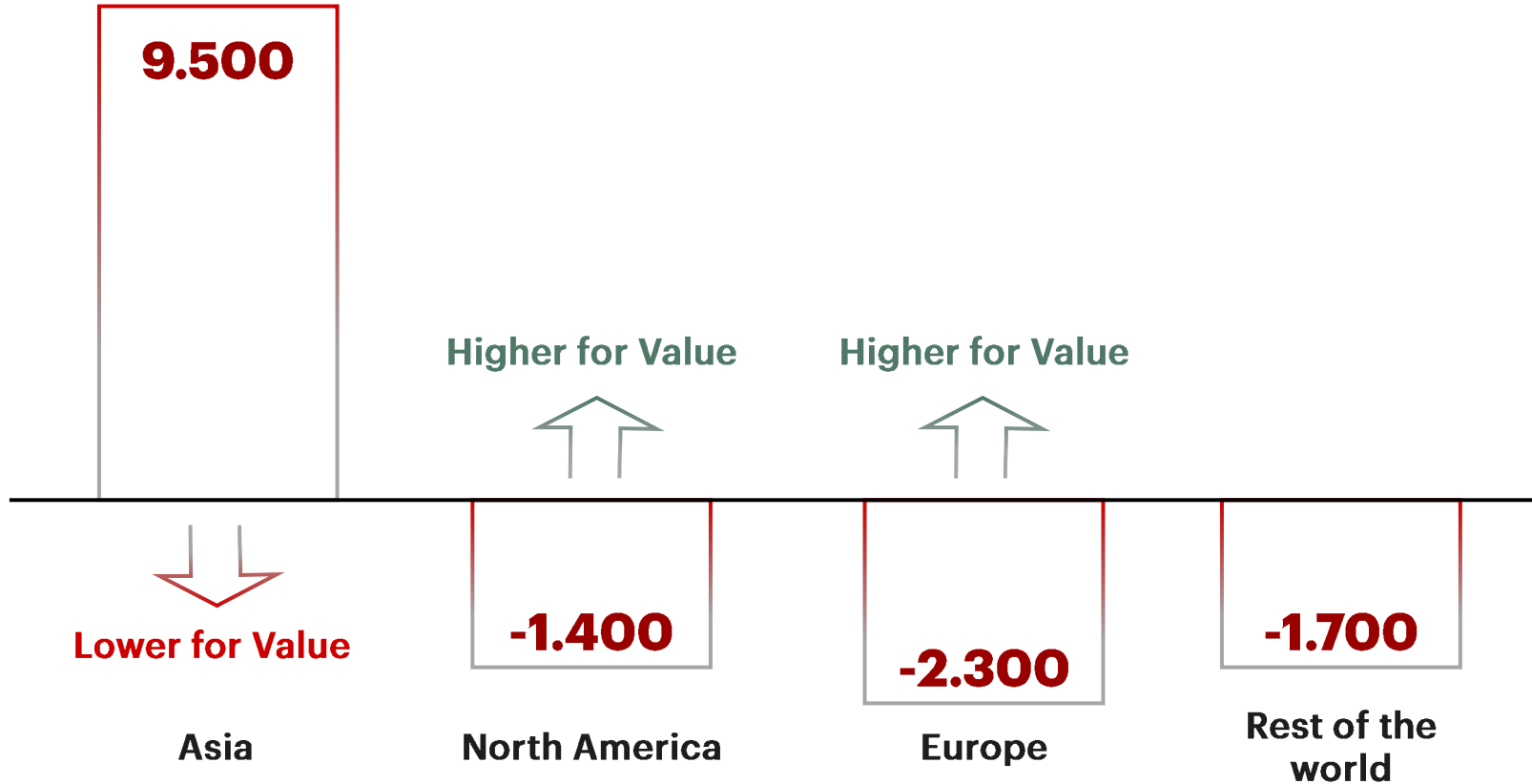


\* Focus on Western OEMs sites  
 Notes: 1) Europe production includes Africa (Nigeria, Ethiopia, Kenya = 0.02M)  
 Source: Euromonitor, ACEM. For Europe, focus on 5 main countries

Global footprint of Western players also shaped by **export duties** (up to +100%) in many Asian countries

# Asia is hence the only net exporter of motorcycles, firmly in place for volumes; Europe is a net importer but the picture is softer when value is considered

## Net balance between production and sales of motorcycles (thousands of units)

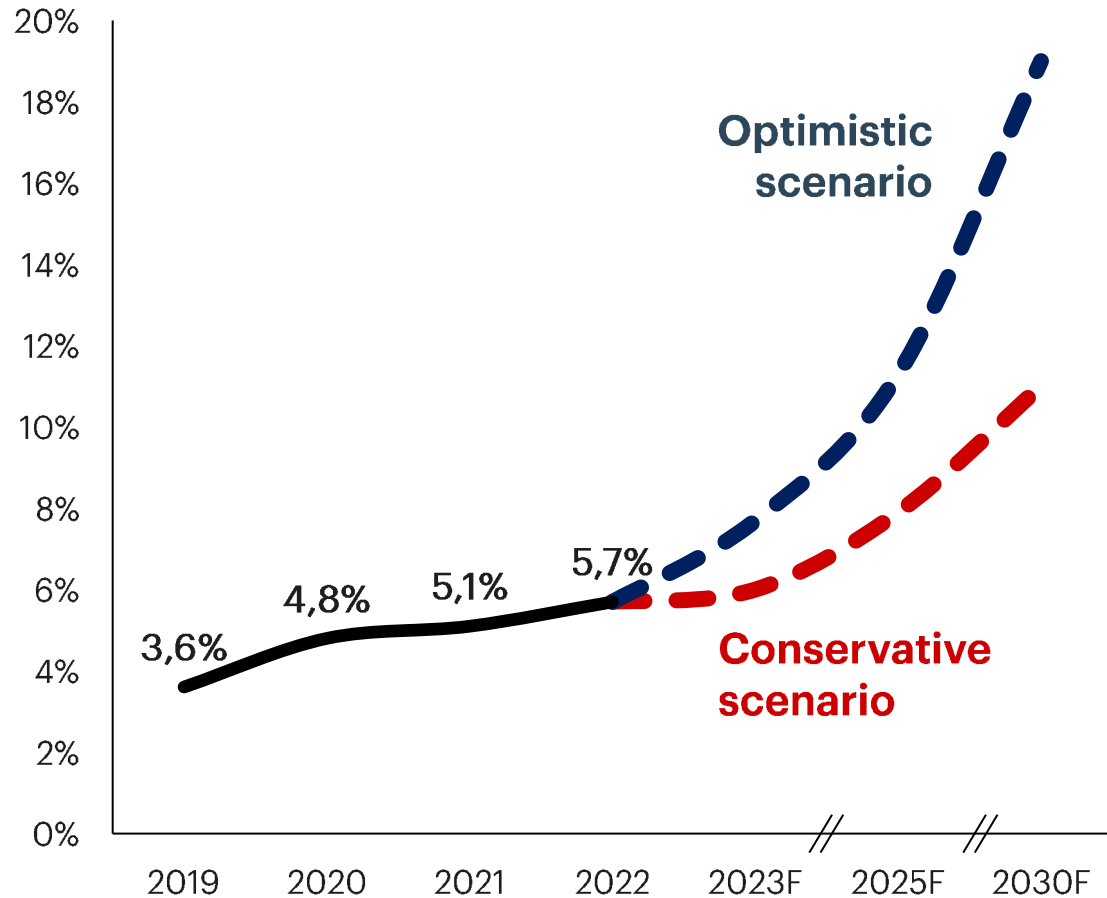


Source: Bain analysis of Euromonitor data;

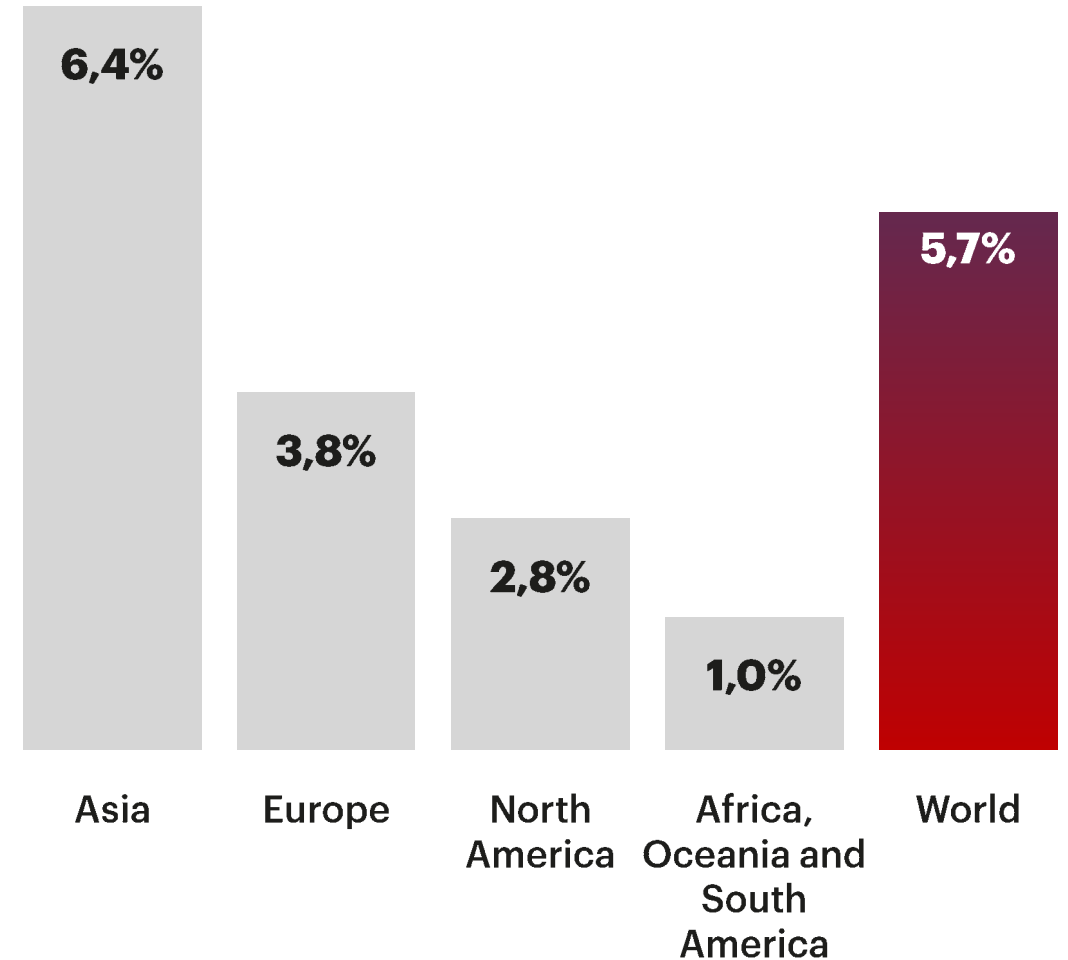
Asia includes Bahrain, Bangladesh, China, French Polynesia, Hong Kong, India, Indonesia, Japan, Macau, China, Malaysia, Maldives, Nepal, Oman, Pakistan, Philippines, Qatar, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam; Europe includes: Andorra, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Gibraltar, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK; North America includes: Canada, Mexico, USA; rest of the world includes: Algeria, Argentina, Australia, Botswana, Brazil, Brunei Darussalam, Colombia, Dominican Republic, Ecuador, Egypt, Fiji, Guyana, Israel, Jamaica, Kenya, Lebanon, Malawi, Mali, Mauritius, Morocco, New Zealand, Niger, Seychelles, South Africa, St. Lucia, Uganda, Zimbabwe

# On top of the standard routines, the transition to electric motorcycles is also faster in East countries; the European market still marks minimum levels

## Penetration of electric motorcycles (% of demand)



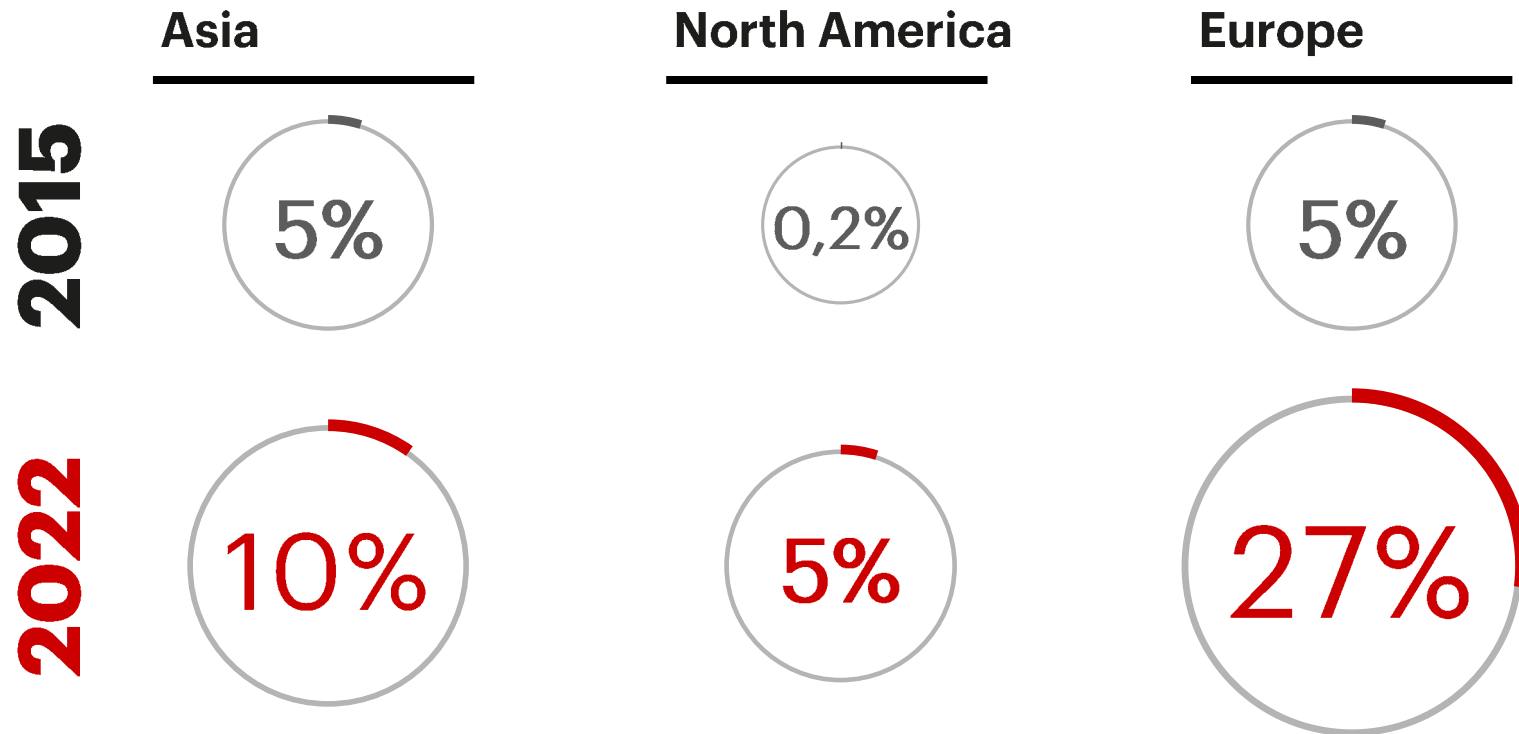
## Penetration of electric motorcycles (% of demand)



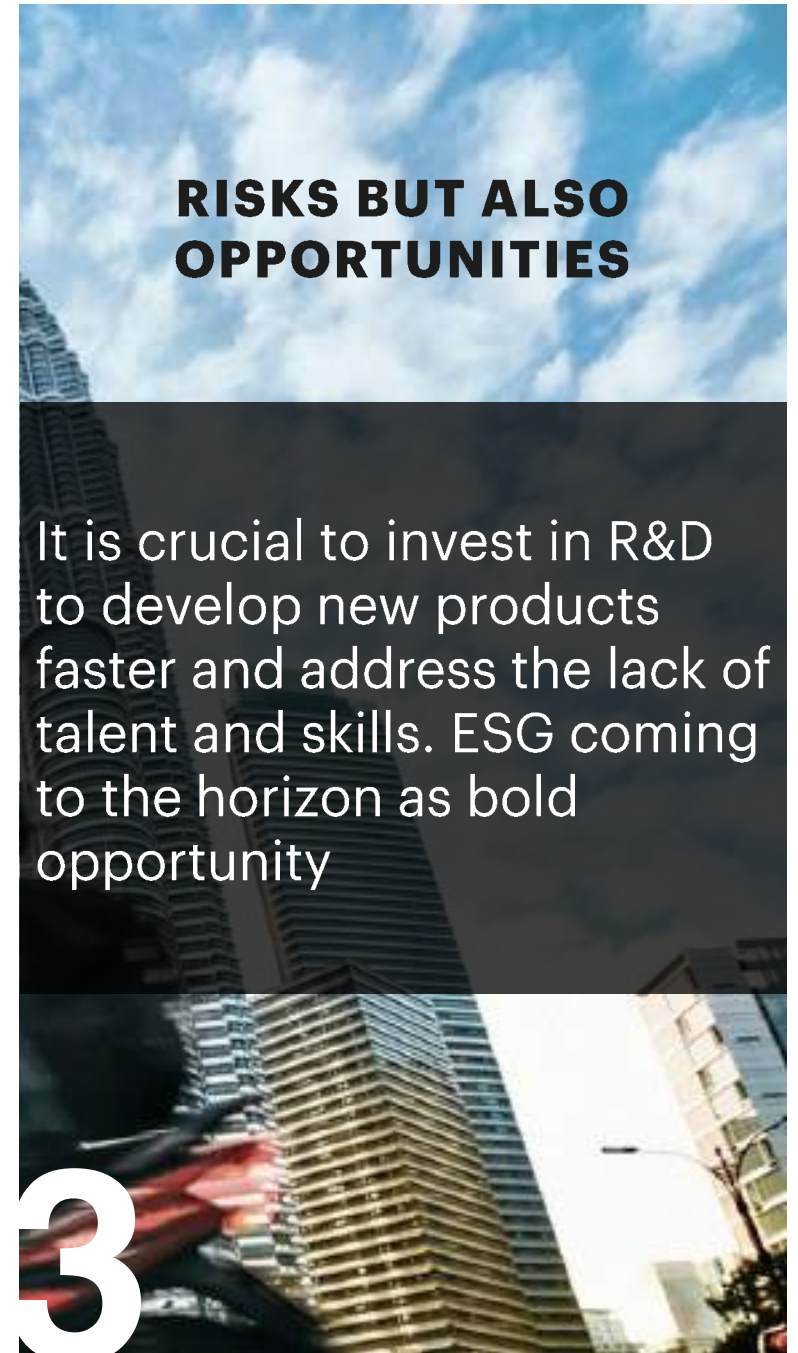
Source: Yano Research Institute, Bain analysis of Statista data

For bikes it is instead almost the opposite: electric models are growing very fast in all European geographies, less so in North America and Asia

Electric bike sales out of total



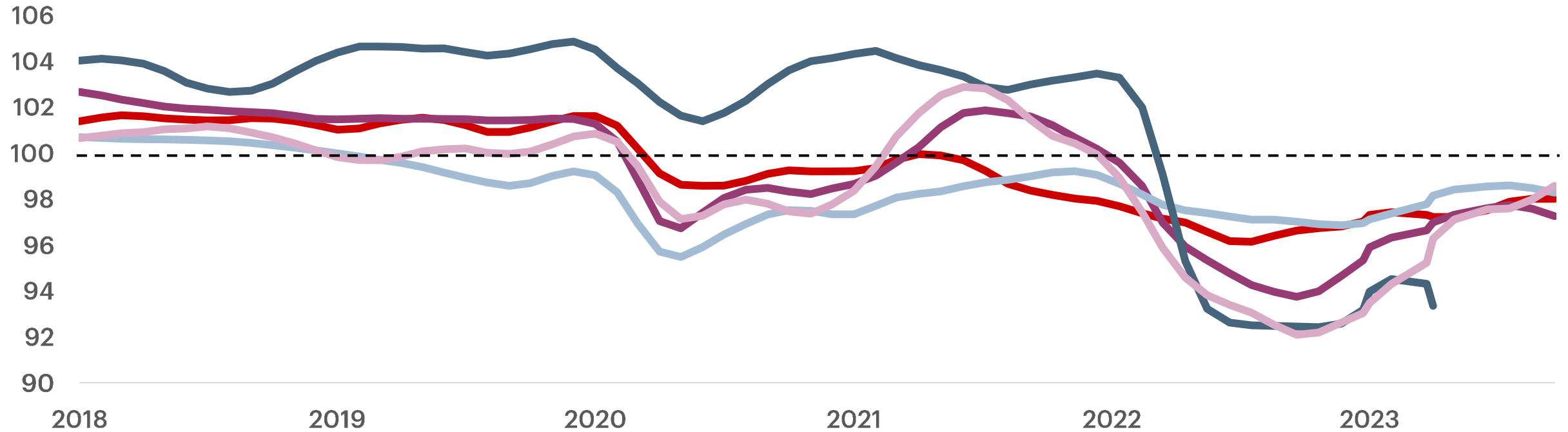
**Growth fueled also by no need of charging infrastructure for e-bikes**



# After quarters of decline, consumer confidence finally registers growth in all geographic areas, but is still below long-term average (and China is falling)

## CONSUMER CONFIDENCE INDEX

Seasonally adjusted, monthly (100 = long-term average)



MOST RECENT DATA

**98**

US (SEP)

**97**

EUROPE (SEP)

**99**

UK (SEP)

**98**

JAPAN (SEP)

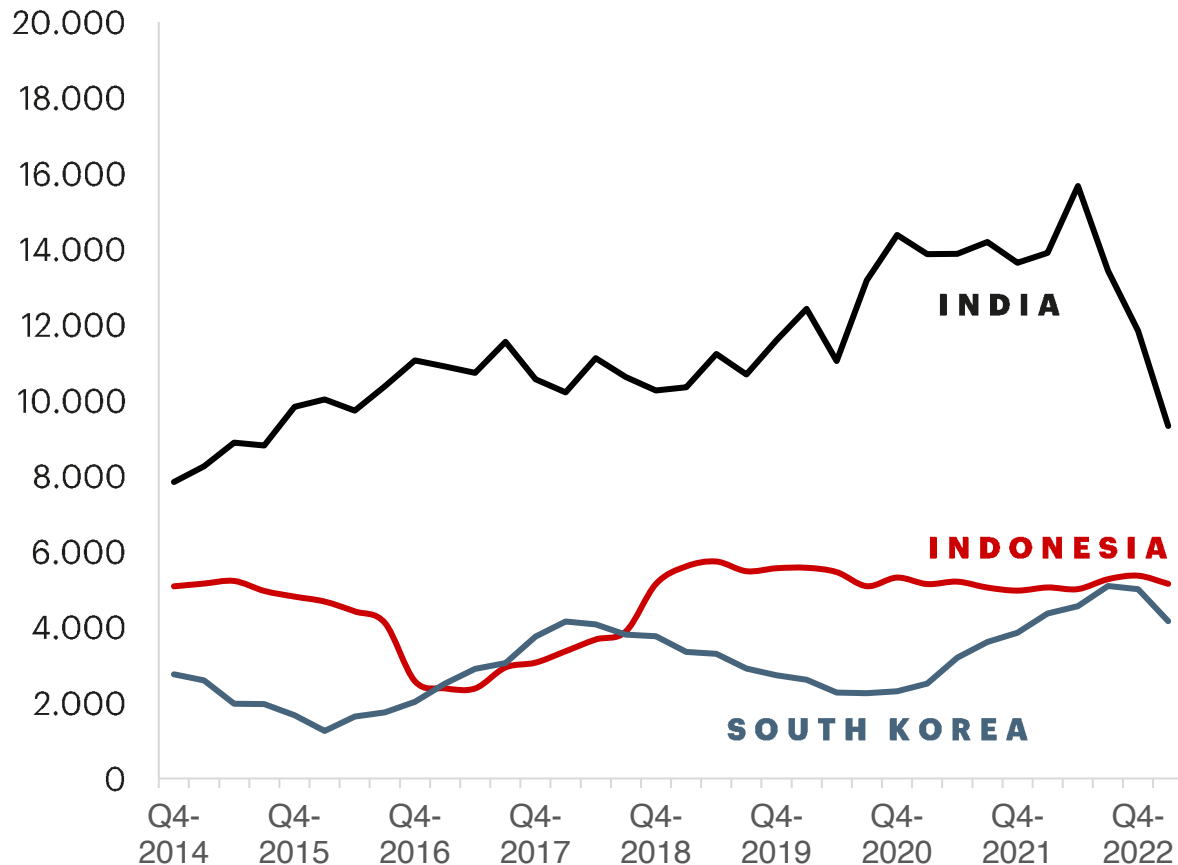
**93**

CHINA (APR)

Source: OECD (from Macrobond)

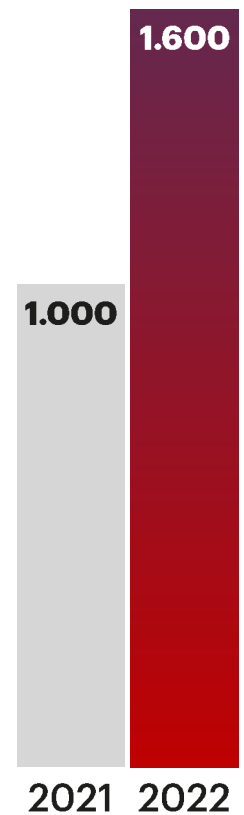
# In Asian region, Indonesia so far struggled in attracting foreign investments, but it almost ready now to leverage its Nickel production and play a role in EVs

**Foreign Direct Investments inflows (M USD)**

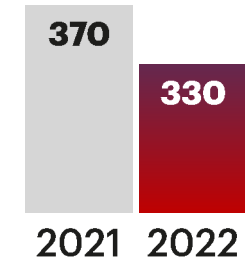


**Major Nickel producers (K Metric Tons)**

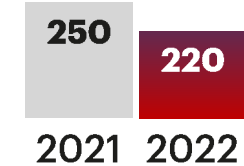
**INDONESIA**



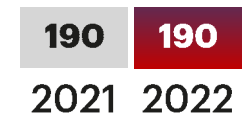
**PHILIPPINES**



**RUSSIA**



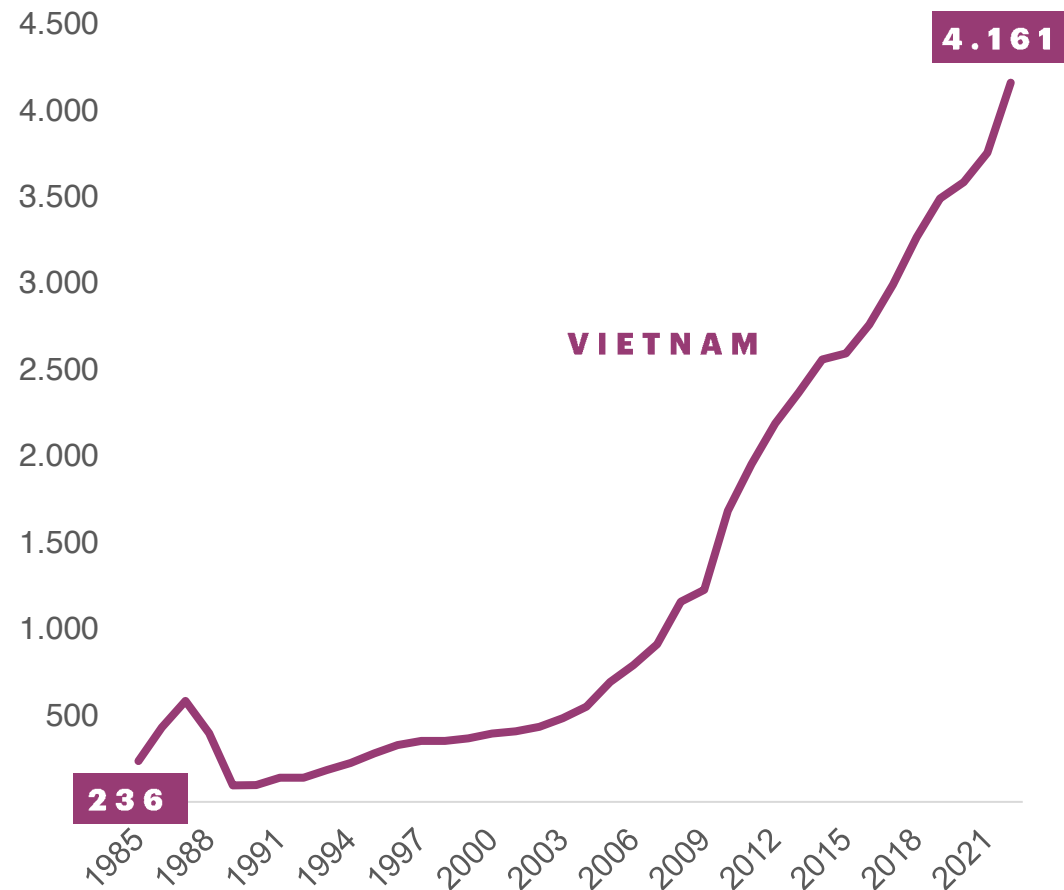
**NEW CALEDONIA**



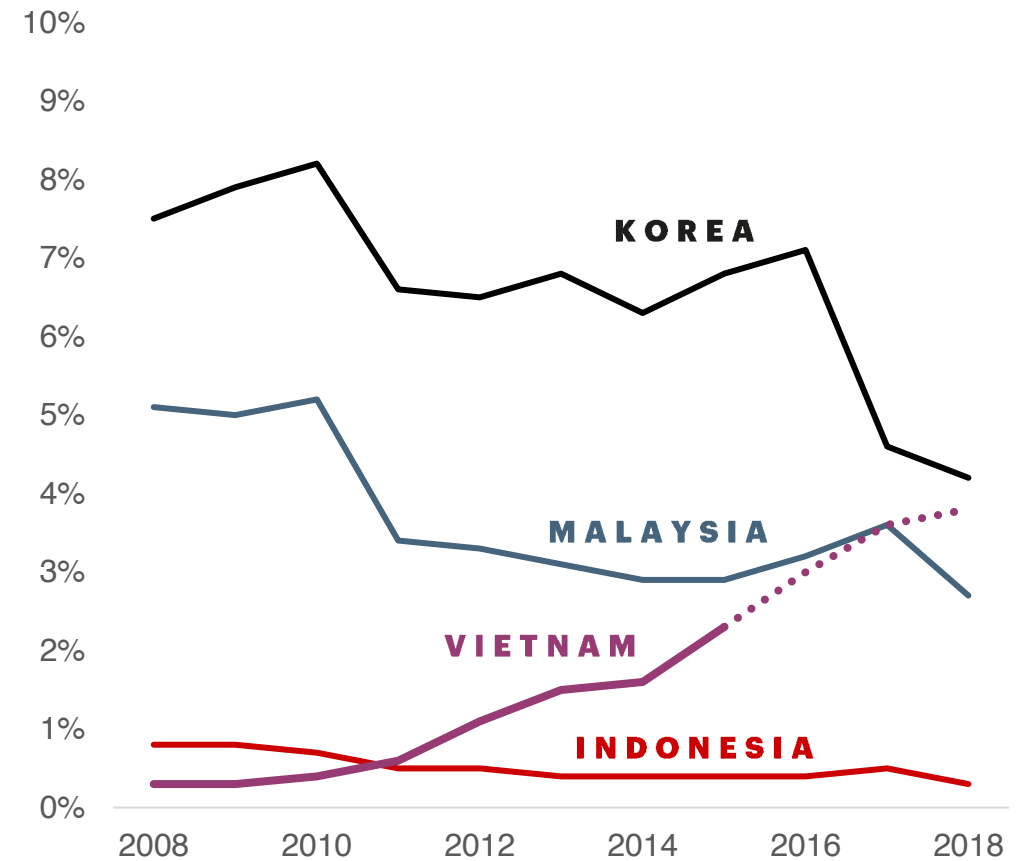
Source: Channel news Asia, Investing news

# Also Vietnam, after years of reforms and investments, is increasing its wealth (GDP per capita) and share on Electronics exports (in a stable Asian share)

## GDP Per Capita (USD)



## Share of exports in Electronics (% on value)



Source: Macrotrends, OEC World



# Indeed, there are still numerous economic and geopolitical risks in the world's major economies, risks to which the industry must pay attention

## In all economies

GDP, inflation, exchange rates, central bank actions, consumer confidence indexes, ..



### UNITED STATES

- Real estate market
- Banking system

### EUROPE

- Energy prices
- German / Italian spread

### CHINA

- Real estate market
- Finance government agencies

### Key economic drivers

### Domestic and geopolitical risks

- Debt and budget approval
- Tensions over trade with China

- Tensions over energy prices and debt levels
- Russia-Ukraine War
- Tensions within the Union

- Tensions over trade with the United States and Europe
- Tensions with Taiwan

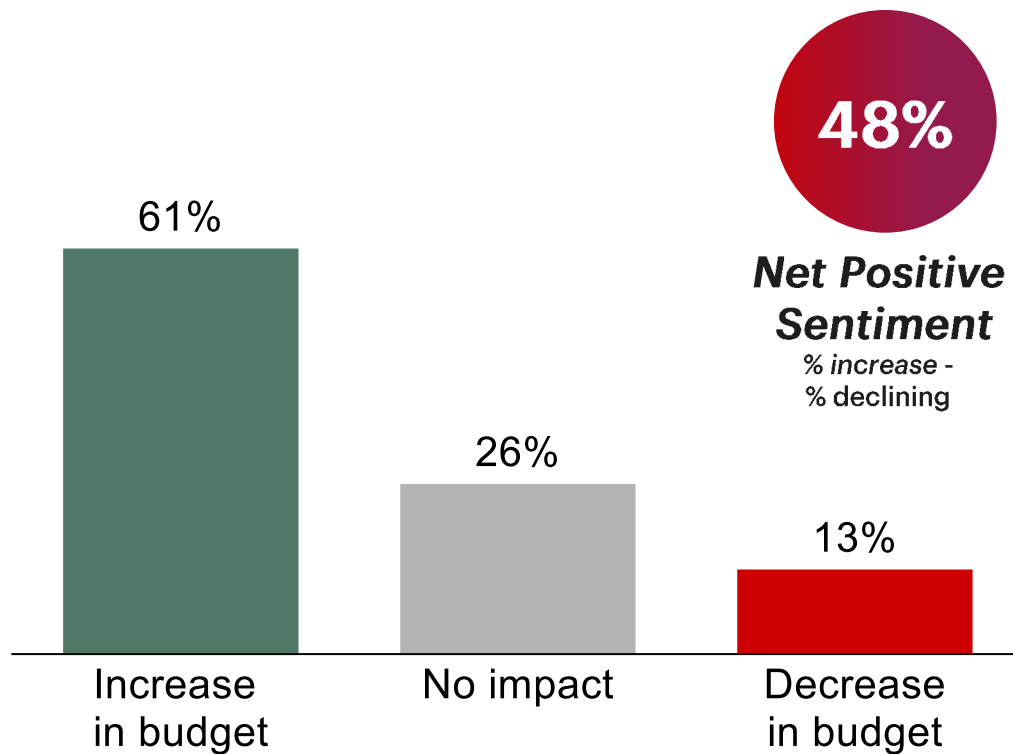
# Current trends are further slowing the economy, with predictable and substantial effects on the industrial sector as well



# In this context, the whole industry is investing in R&D to develop distinctive in-house skills and cope with *disruption*

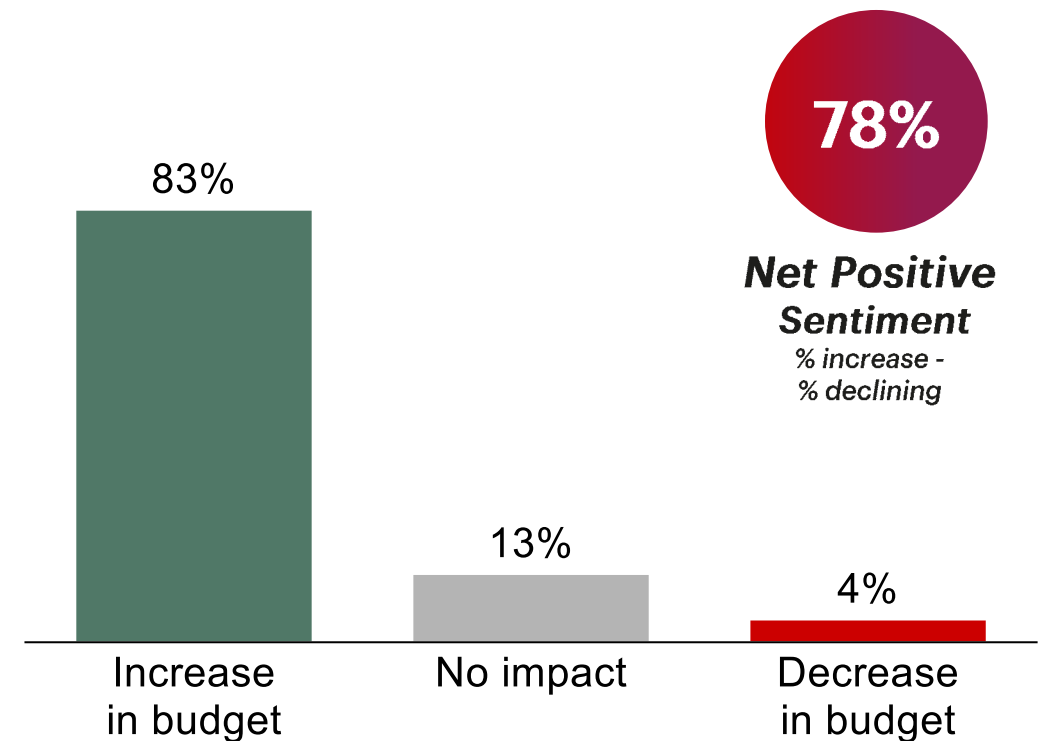
## EXPECTED INCREASE IN R&D SPENDING

How do you think the economic crisis and inflation will impact R&D and engineering budgets?



## EXPECTED INCREASE IN OUTSOURCING

In your company, how do you think the share of outsourced R&D and engineering services will change in the next 3 years?

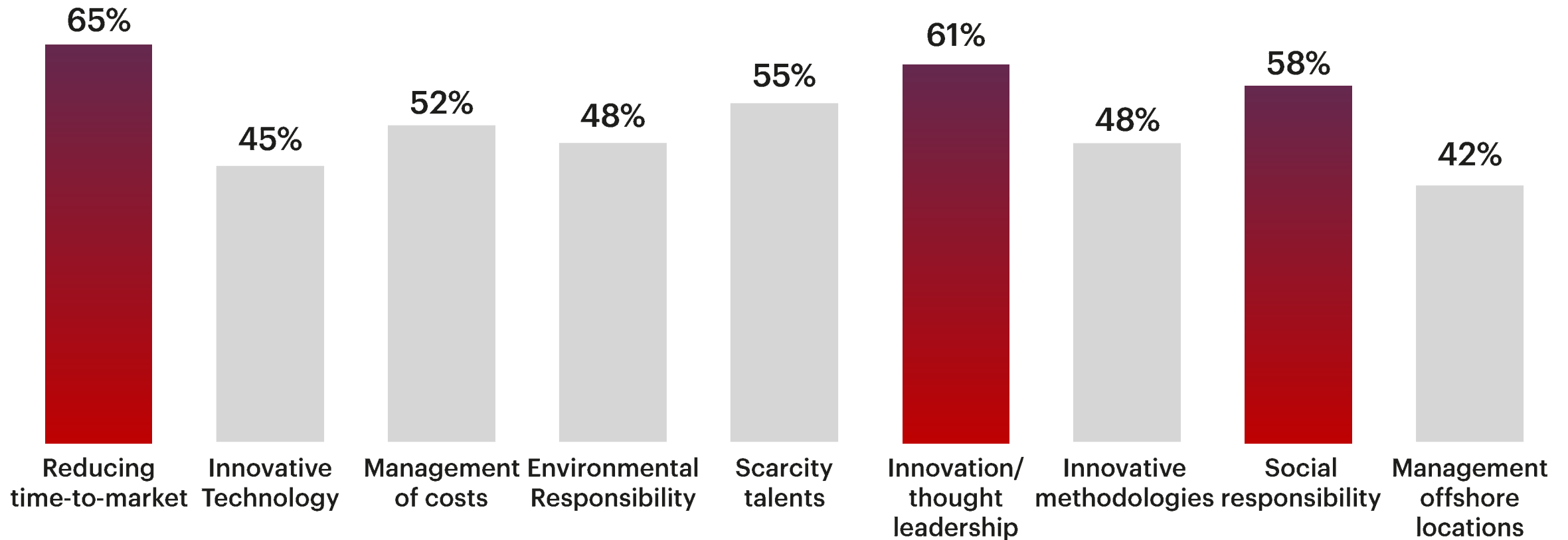


Note: Net Positive Sentiment = (# rising - # falling) / total responses; excluding "Other" and "Don't know"  
Source: Bain & Company Engineering and R&D survey (N = 505)

# Industrial companies' priorities are reducing time-to-market and being recognized leaders in innovation and social responsibility



Which of the following priorities in R&D/engineering are the most critical for your company?

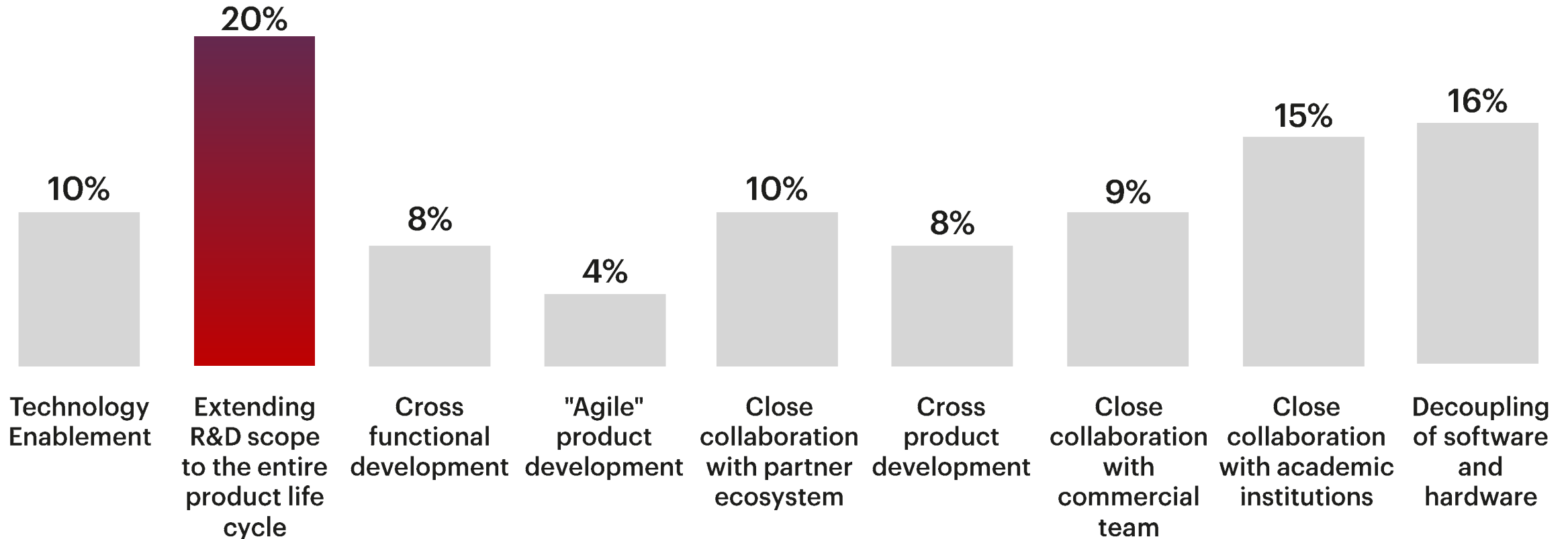


Source: Bain & Company Engineering and R&D survey (N = 505)

# Research investments now require expanding activities over the entire product life cycle, also to better manage the upstream / downstream product emissions



What approaches do you expect will be most impactful and disruptive (in terms of value creation) in engineering and R&D over the next 10 years?



Source: Bain & Company Engineering and R&D survey (N = 505)

# In fact, despite motorcycles accounting for less than 1% of total CO<sub>2</sub> emissions, they can potentially be put under pressure by media and regulatory constraints

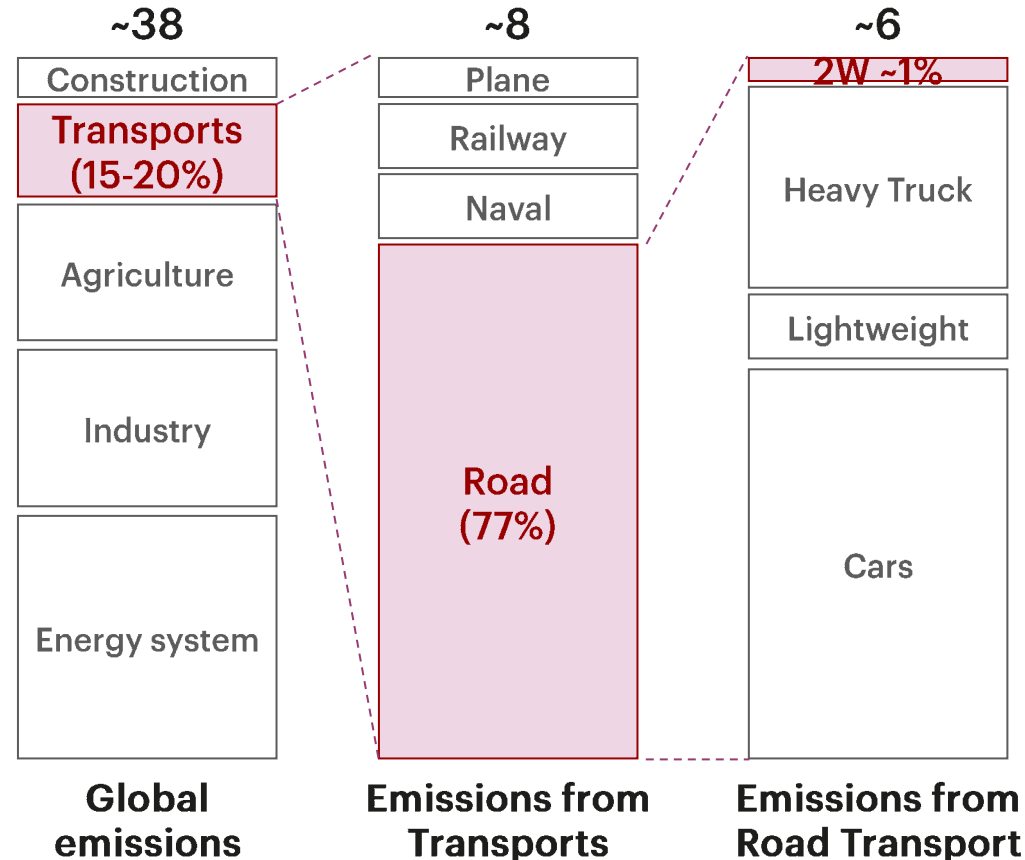
## Rising emissions.

Increased demand and lack of adjustment of the circulating fleet have contributed to the increase in CO<sub>2</sub> emissions from road transport.

In Europe, emission reductions in major sectors have been offset by the +7% increase in transport emissions between 1990 and 2020.

## GLOBAL CO<sub>2</sub> EMISSIONS















Gt of CO<sub>2</sub> equivalent



Notes: Global GHG emissions and transport emission breakdown 2022 based on World Emission Clock Data Lab; Strale transport emission breakdown in EU in 2019 based on European Environment Agency  
 Source: European Environment Agency; World Emission Clock Data Laboratory

For this reason, many PTW OEMs have already begun their rating journey, differentiating themselves in the market by ambition and achievement...

Motorcycles and bicycles (non-exhaustive list)

									
	AAA (2022)	AA (2022)	AA (2022)	AA (2023)	AAA (2023)	BB (2023)	AA (2023)	BB (2023)	BB (2023)
	68 (E: 64) (2022)	65 (E: 73) (2022)	76 (E: 70) (2022)	37 (E:39) (2023)	26 (E: 29) (2022)	25 (E: 29) (2022)	15 (E: 5) (2022)	20 (E: 21) (2022)	27 (E: 29) (2022)
	13.3 (2023)	39.5 (2023)	28.7 (2023)	12.1 (2023)	15 (2022)	12.9 (2022)	21.1 (2023)	15.2 (2023)	16 (2023)
	⊗	⊙	⊗	⊙	⊗	⊗	⊗	⊗	⊗
	A- (2022)	A (2022)	B (2022)	B (2022)		B- (2022)		F (2022)	

Comparison of scores: ■ Leader ■ Superior ■ Medium ■ Low ■ N/A

Note: For S&P, the values represent the Global ESG and the numbers in parentheses the Environment rating;  
 Scoring scale for ESG ratings (from best to worst): MSCI : AAA, AA, A, BBB, BB, B, CCC; S&P Global ESG score: 100 - 0; Sustainalytics: 0 - 100; CDP Climate: A, A-, B, B-, C, D, F; EcoVadis with no score, tick means it has been rated Sources: MSCI, CDP Climate Change 2021, EcoVadis, S&P Global, Sustainalytics, Bain Analysis



## HOW IS THE WORLD EVOLVING

...also because employee recruitment is a key motivator for climate action



**>75%** of 18 to 34 year-olds in the US **expect their employers to take a stand on climate change**



**~65%** of UK survey respondents said **they were more likely to work for a company with strong envir. policies**



**~40%** of millennials have **chosen a job because of company ESG**



**1** New centers of gravity for two-wheelers industry,..

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**2** ...with China and Asia playing in attack

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**3** Many issues on supply are now almost solved

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**4** It's time to invest in R&D to innovate faster...

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**5** ...in order to grow in size, be ready for ESG...

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**6** ...and have a chance to win the global «war of talents»

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# Thank you



**Gianluca Di Loreto**

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**BAIN & COMPANY** 

With the collaboration of:

**Vittorio Melli**

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