

Minutes

Subject: OECD Foresight Workshop on the Future of the Automotive Value Chain and the Role of FDI-SME Ecosystems

Date: 26 September 2023, OECD LA MUETTE, 2 rue André Pascal, 75016 Paris

Participating organisations:

Name
5G Automotive Association
Stellantis
QSIT GmbH
Permanent Representation of the Republic of Lithuania to the OECD
Permanent Representation of Spain to the OECD
OECD Trade and Agriculture Directorate
OECD Directorate for Science, Technology and Innovation
OECD Directorate for Financial and Enterprise Affairs
OECD Directorate for Employment, Labour and Social Affairs
OECD Directorate for Education and Skills
OECD Centre for Entrepreneurship, SMEs, Regions and Cities
Ministry of Economy and Digital Transition, Portugal
International Transportation Forum
International Energy Agency
Institute for Innovation and Public Purpose
GERPISA
FRAENKISCHE
Federation of European Producers of Abrasives
European Commission/DG Regio
EACN
ACEA
CLEPA
Estonian Promotion Agency
Environment Directorate at the OECD
Ecole normale supérieure Paris-Saclay

Annexes

- Annex A: OECD-EU WS FDI - Workshop Agenda.pdf
- Annex B: Workshop presentation_FDI-SME automotive trends.pdf
- Annex C: OECD-EU WS FID - Foresight_Sessions.pdf
- Annex D: OECD-EU WS FDI – Supply Chain Scenario description.pdf

Preamble

The OECD is working, with the support of the European Commission, on a foresight report on FDI in SMEs in the automotive industry. *“Strategic foresight is a structured and systematic way of using ideas about the future to anticipate and better prepare for change. It is about exploring different plausible futures that could arise, and the opportunities and challenges they could present. We then use those ideas to make better decisions and act now. Foresight can support government policy making in the following main ways:*

- *Better anticipation: to better anticipate changes that could emerge in the future*
- *Policy innovation: to reveal options for experimentation with innovative approaches*
- *Future-proofing: to stress-test existing or proposed strategies and policies”* ([What is Strategic Foresight?](#))

Foresights try to describe future situations under given conditions, they are different from scenarios where possible tendencies are developed based on hypothesis. The OECD already did a preliminary analysis (see: [230926 Workshop presentation_FDI-SME automotive trends.pdf](#)). The present foresight workshop is part of the process to gather experience and insights from stakeholders from the automotive industry, that will contribute to the final reports (expected early 2024). All workshop participants will get the possibility to give their feedback prior to the official publication.

Introductions

[Nadim AHMAD, OECD](#)

Automotive industry is facing two big challenges: green transition and trade tensions. Especially SMEs need to improve productivity and get access to funding, where Foreign Direct Investments (FDI) may play a role.

[Cathrin Wendt, CE DG Regio](#)

Objectives of the EC are

- to create a positive investment environment
- to strengthen SME Ecosystems: R&D, digitalisation, IP, sustainable developments, skills... but no mention of clusters

OECD and EC developed a [Policy Toolkit for Strengthening FDI and SME Linkages](#).

EU focuses support to projects where long term structural changes are targeted, basis are the regional Smart Specialisation Strategies.

[Stratos Kamenis, OECD Directorate for Financial and Enterprise Affairs and Juan Rodrigo, OECD Centre for Entrepreneurship, SMEs, Regions and Cities](#)

⇒ see [230926 Workshop presentation_FDI-SME automotive trends.pdf](#)

Introduction to the OECD approach and publications including country related analysis

- [Policy Toolkit for Strengthening FDI and SME Linkages](#)
- [Strengthening FDI and SME Linkages in Portugal](#)
- [Strengthening FDI and SME Linkages in the Slovak Republic](#)

Further country related documents are under construction

Presentation of recent trends in FDI in SMEs in the automotive value chain:

- Automotive value chain is the longest value chain in industry
- Transformation of the automotive industry has a strong impact on value chains
- Value chain massively impacted through COVID, war in Ukraine, global tensions, with strong interdependency on FDI attractiveness

Panel discussion: Steering the road ahead for sustainable and resilient automotive value chains

Moderator: [Marco BIANCHINI](#), OECD Centre for Entrepreneurship, SMEs, Regions, and Cities

[Siobhan Dalton](#), General Counsel Circular Economy, Stellantis

Siobhan heads a team focusing on Circular Economy and including people from purchasing, R&D, technology, suppliers. She explains that large companies and start-ups have different scales (suppliers, production...) and constraints, but cooperation is necessary. Large companies are slow to launch, but then there is an economy of scale.

Green vs. connected cars: *"You can sell a non-green car, but you can't sell a non-connected car!"*. Siobhan also alerts on cooperation with Google (mentioned example, but probably same for other GAFAMs): *"The only thing they want is to bring their technology in 'whatever'"*.

"Green" cars need heavy investments, meaning targets should not be fixed too fast. Strong regulations lead to making companies early adopters, but all others must follow the same moment.

[Nils Poel](#), Head of Market Affairs, European Association of Automotive Suppliers (CLEPA)

Suppliers are subject to three mayor changes:

- Product: electric power trains
- Product development: software aided development changes supply chains with huge impacts especially on small suppliers
- Operating in a changing world: Regulations, resilience, not relying anymore on Global Value Chains

Suppliers are starting from a difficult situation after 3 years of crisis. But suppliers already invested 20 bn€ to adapt to electrification, the main questions are access to funding and access to data.

[Lorenza Monaco](#), Researcher, UCL Institute for Innovation and Public Purpose & University of Johannesburg / GERPISA

15 years of experience in research in the automotive industry, leading a working group on global value chains.

COVID only one disrupter beside US/China tensions, twin transition, emerging economies wanting to be part of the automotive economy. The global automotive value chain became very vulnerable, OEMs aim at diversifying suppliers and conduct strong risk assessments, and new products (EV) will increase need for new suppliers.

SMEs need to compete through new products and respect CSR and due diligence act. SMEs cannot do it alone; they need to cooperate.

[Joonas Väänto](#), Director, Estonian (EE) Investment Agency

The biggest challenge for Europe is to work together, the competitors are the US and China, not other European countries. EE is very active in autonomous vehicle developments and focuses on electric industry. EE's main challenge is to maintain knowledge and innovation in EE, thinking about licensing.

Workshops

[Beyond combustion: The green horizon of the automotive industry](#)

"The automotive industry has been facing growing pressure to improve the environmental sustainability of the production of motor vehicles. Participants will delve into the transformative landscape of electric vehicles with a focus on the challenges and opportunities for FDI-SME ecosystems."

Introduction to workshop in [230926 OECD-EU WS FID - Foresight Sessions.pdf](#).

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European Automotive Cluster Network

c/o Pôle Véhicule du Futur

Headquarter: 15 rue A. Japy 25460 Etupes / Secretariat: 40 rue Marc Seguin 68200 Mulhouse - France

Revolution or evolution: towards connected and autonomous vehicles

“New technologies are changing how vehicles are produced and used. Participants will discuss the opportunities and risks that emerge with connected and autonomous driving from a FDISME perspective.”

Introduction to workshop in [230926 OECD-EU WS FID - Foresight Sessions.pdf](#).

The future is (un)chained: upgrading pathways in the automotive value chain

“With raising trade tensions, supply chain disruptions and uncertain geopolitical landscape, what are the prospects for global value chains in the automotive sector? How will this affect FDI-SME ecosystems in Europe and beyond?”

Introduction to workshop in [230926 OECD-EU WS FID - Foresight Sessions.pdf](#).

The workshop was oriented around four possible future situations:



Discussion basis are the different situations that are further described in the [230925 OECD-EU WS FDI - Supply Chain Scenario description.pdf](#) document.

Final comment

The participation of EACN has been strongly appreciated, and EACN could bring a different point of view to the discussion, as most participants, at least in the supply chain workshop, represented large companies.

Good first contacts with interlocutors from the OECD.

Next steps




OECD will continue working on the final report on FDI in SMEs in the automotive industry. EACN will get a preliminary version to comment.

Annex A: OECD-EU WS FDI - Workshop Agenda.pdf



The future of the automotive value chain and the role of FDI-SME ecosystems

OECD Foresight Workshop

 25 September 2023
  10:00 – 16:45 CET (Paris time)
  OECD La Muette

The OECD, in collaboration and with the support of the European Commission's Directorate General for Regional and Urban Policy (DG REGIO), is organising a foresight workshop on the future of the automotive value chain and the role of foreign direct investments and small and medium-sized enterprises (FDI-SME ecosystems). The automotive industry is highly concentrated, with few countries and companies leading world production. Its value chain is increasingly complex and characterised by a growing number of players operating in different sectors and located in different geographical areas. The main objective of the workshop is to identify different trajectories FDI-SME ecosystems may follow as global value chains (GVCs) adjust to a post-COVID-19 environment and to assess the policy implications of these transformations.

SESSION 1 – Key trends in the automotive industry and the role of FDI-SME ecosystems	
OECD Conference Centre, CC20, Paris	
10:00 – 10:15	<p>Introduction and welcome remarks</p> <ul style="list-style-type: none"> Nadim Ahmad, Deputy Director, OECD Centre for Entrepreneurship, SMEs, Regions and Cities Catherine Wendt, Head of Unit for Smart and Sustainable Growth, DG Regional and Urban Policy, European Commission.
10:15 – 10:45	<p>FDI and SME trends in the automotive industry</p> <p>Presentation from the OECD Secretariat providing an overview of the current state and key trends in the automotive industry and the role that FDI and SMEs play in the sector</p> <ul style="list-style-type: none"> Stratos Kamenis, Economist and Project Manager, OECD Directorate for Financial and Enterprise Affairs Juan Rodrigo, Jr. Policy Analyst, OECD Centre for Entrepreneurship, SMEs, Regions and Cities
10:45- 11:00	<p>Coffee break</p>
11:00 – 12:00	<p>Panel discussion: Steering the road ahead for sustainable and resilient automotive value chains</p> <p>Moderator: Lucia Gusmano, Acting Head of SMEs and Entrepreneurship Division, OECD Centre for Entrepreneurship, SMEs, Regions, and Cities</p> <ul style="list-style-type: none"> Siobhan Dalton, General Counsel Circular Economy, Stellantis. Nils Poel, Head of Market Affairs, European Association of Automotive Suppliers (CLEPA) Lorenza Monaco, Researcher, UCL Institute for Innovation and Public Purpose & University of Johannesburg / GERPISA Joonas Vanto, Director, Estonian Investment Agency



12:00 – 13:30	Lunch break		
SESSION 2 – Breakout group discussions OECD Franqueville Building Bilat Rooms 1, 2, and 3			
13:30 – 15:30	<p>Beyond combustion: The green horizon of the automotive industry</p> <p>The automotive industry has been facing growing pressure to improve the environmental sustainability of the production of motor vehicles. Participants will delve into the transformative landscape of electric vehicles with a focus on the challenges and opportunities for FDI-SME ecosystems.</p>	<p>Revolution or evolution: towards connected and autonomous vehicles</p> <p>New technologies are changing how vehicles are produced and used. Participants will discuss the opportunities and risks that emerge with connected and autonomous driving from a FDI-SME perspective.</p>	<p>The future is (un)chained: upgrading pathways in the automotive value chain</p> <p>With raising trade tensions, supply chain disruptions and uncertain geopolitical landscape, what are the prospects for global value chains in the automotive sector? How will this affect FDI-SME ecosystems in Europe and beyond?</p>
15:30 – 16:00	Coffee break		
SESSION 3 – Driving change: Policies for navigating the transformation of GVCs in the automotive industry OECD Conference Centre, CC20, Paris			
16:00-16:45	<p>Roundtable and concluding remarks: Understanding the policy implications</p> <p>Moderator: Martin Wermelinger, Head of Investment Qualities and Incentives Unit, OECD Directorate for Financial and Enterprise Affairs</p> <p>Rapporteurs from the break-out sessions will present the outcomes of the group discussion. Participants will share reactions on these outcomes and views on key policy responses and the role of governments at supranational, national, and subnational levels to build more sustainable and resilient FDI-SME ecosystems in the automotive industry.</p>		
17:00 -18:00	Cocktail		

Annex B: Workshop presentation 'FDI-SME automotive trends'



FDI and SME trends in the automotive value chain

OECD – European Commission Foresight Workshop on the Future of the Automotive Value Chain and the Role of FDI-SME Ecosystems

25 September 2023, OECD Conference Centre

Stratos D. Kamenis, Economist and Project Manager, OECD Investment Division
Juan Rodrigo, Jr. Policy Analyst, OECD Entrepreneurship, SMEs & Tourism Division





Outline

- ❑ **Strengthening FDI and SME Linkages for productivity and innovation: the OECD approach**
 - Conceptual framework and OECD tools
 - Case studies on strategic value chains

- ❑ **FDI and SME trends in the automotive industry**
 - Importance of the automotive industry for OECD and EU economies
 - FDI trends and impacts of greenfield FDI
 - SME supplier capacities in the automotive value chain

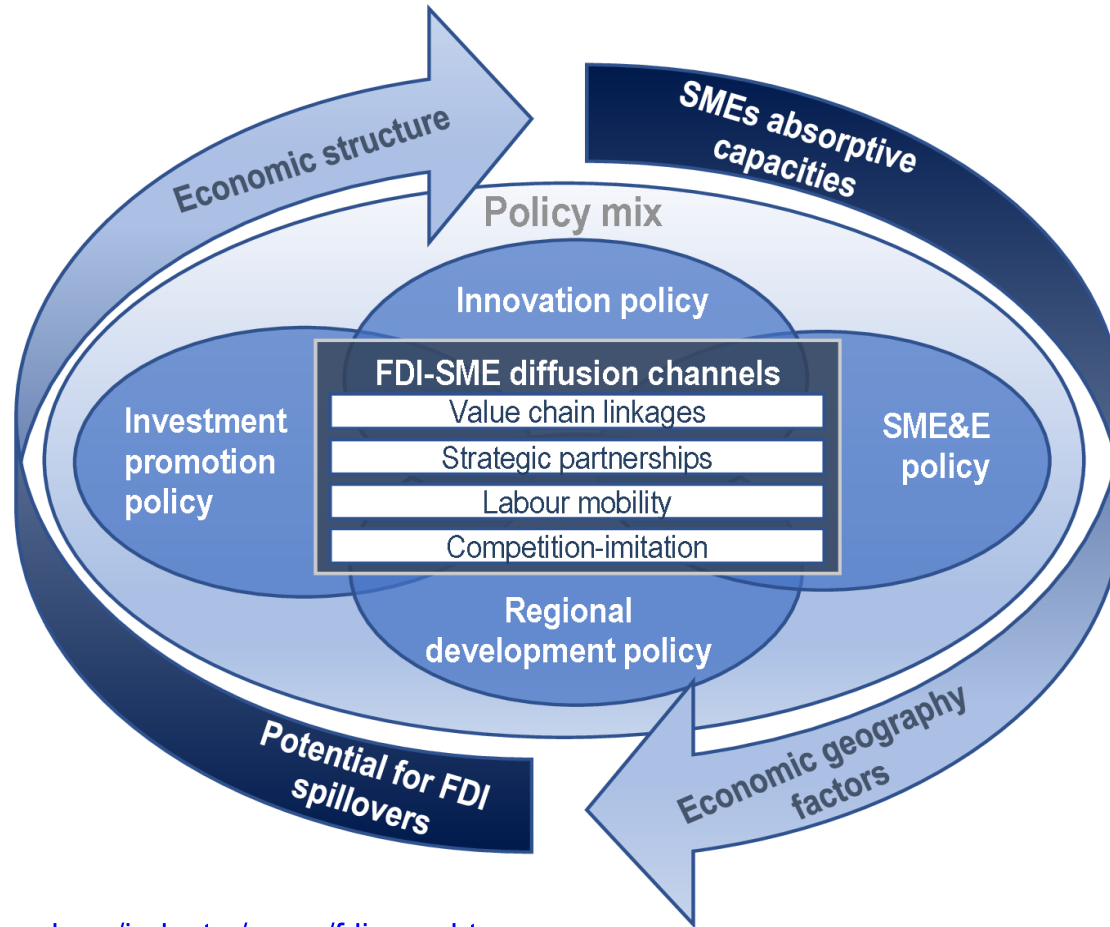
- ❑ **Understanding the transformations at play in the automotive value chain**
 - Resilience and sustainability
 - The twin green and digital transitions
 - The reconfiguration of GVCs in a post-Covid19 environment



STRENGTHENING FDI AND SME LINKAGES
FOR PRODUCTIVITY AND INNOVATION:
THE OECD APPROACH



Strengthening FDI and SME Linkages



Check out our website: www.oecd.org/industry/smes/fdi-sme.htm



Towards a Policy Toolkit

The Toolkit provides governments with the necessary tools to strengthen **FDI and SME linkages** and their contribution to **productivity and innovation**:



Conceptual framework based on existing literature and empirical evidence



Economic and policy indicators to compare and benchmark countries/regions' performance



Checklist of guiding questions for policymakers



Repository of policy practices and institutional settings from the 27 EU Member States



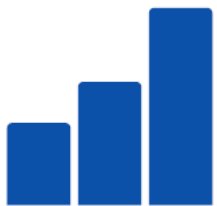


FDI Qualities Initiative: OECD tools on sustainable investment



The **FDI Qualities Initiative** provides governments with the tools to encourage **sustainable investment**

FDI Qualities Indicators



Measure impact and outcomes across countries and SDGs

FDI Qualities Policy Toolkit



Identify the right policy mix and institutional setting

FDI Qualities Network



Engage with national and global stakeholders

OECD Council Recommendation on FDI Qualities

- ✓ Commitment to using policy and institutions to increase sustainable investment and deliver on the 2030 SDGs
- ✓ First government-backed agreement to help policy makers to leverage FDI to finance the SDGs and optimise the strength and quality of the recovery

Check out our website: [OECD FDI Qualities Initiative](#)

SME and entrepreneurship performance: OECD tools

Flagship publications:

- ❖ SME&E Outlook

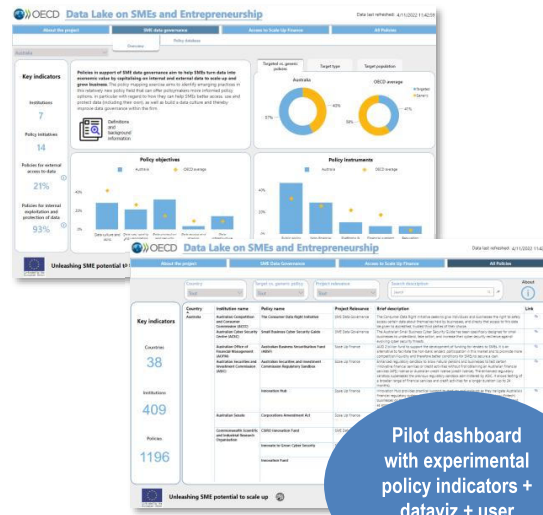


- ❖ Financing SMEs and Entrepreneurs: An OECD Scoreboard



A data infrastructure in support of SME&E policy making:

- ❖ OECD Data Lake on SME&E policy



www.oecd.org/cfe/smes/datalake.htm

Policy networks:

- ❖ OECD Platform for the Entrepreneurship Education Collaboration and Engagement Network



www.oecd.org/cfe/smes/eecole.htm

- ❖ OECD Digital for SMEs Global Initiative



www.oecd.org/digital/sme/

OECD Council Recommendation on SME and Entrepreneurship policy



Offers a coherent and strategic approach to SME&E policies, encompassing a **mix of targeted and horizontal policy dimensions**, and placing emphasis on effective governance mechanisms.

www.oecd.org/cfe/smes/oecd-recommendation-on-sme-and-entrepreneurship-policy/



Case studies on strategic value chains and the role of FDI-SME ecosystems

What are the main **features** and the relative **importance** of the value chain for EU and OECD economies?

- ✓ How important is the sector for EU and OECD **economies and innovation systems**?
- ✓ How **dependent** it is on FDI and SMEs?
- ✓ How **resilient** is the value chain (e.g. long, complex, highly centralised)?
- ✓ How **sustainable and circular** is the value chain?

What are the **transformations at play** in the value chain and their possible impacts on FDI-SME ecosystems?

- ✓ Which main **transformations** would the value chain go through?
- ✓ What would be the **impact** on FDI, SME sector, market conditions, and FDI-SME linkages and ecosystems?

What are the **policy implications** of these transformations?

- ✓ What are the **policy implications** for developing and strengthening FDI-SME ecosystems?
- ✓ How to **coordinate** action at supranational, national and subnational levels?
- ✓ How to **tailor policy interventions** to sectoral or value chain contexts, in order to create a conducive environment for FDI-SME linkages & spillovers?



FDI AND SME TRENDS IN THE AUTOMOTIVE INDUSTRY

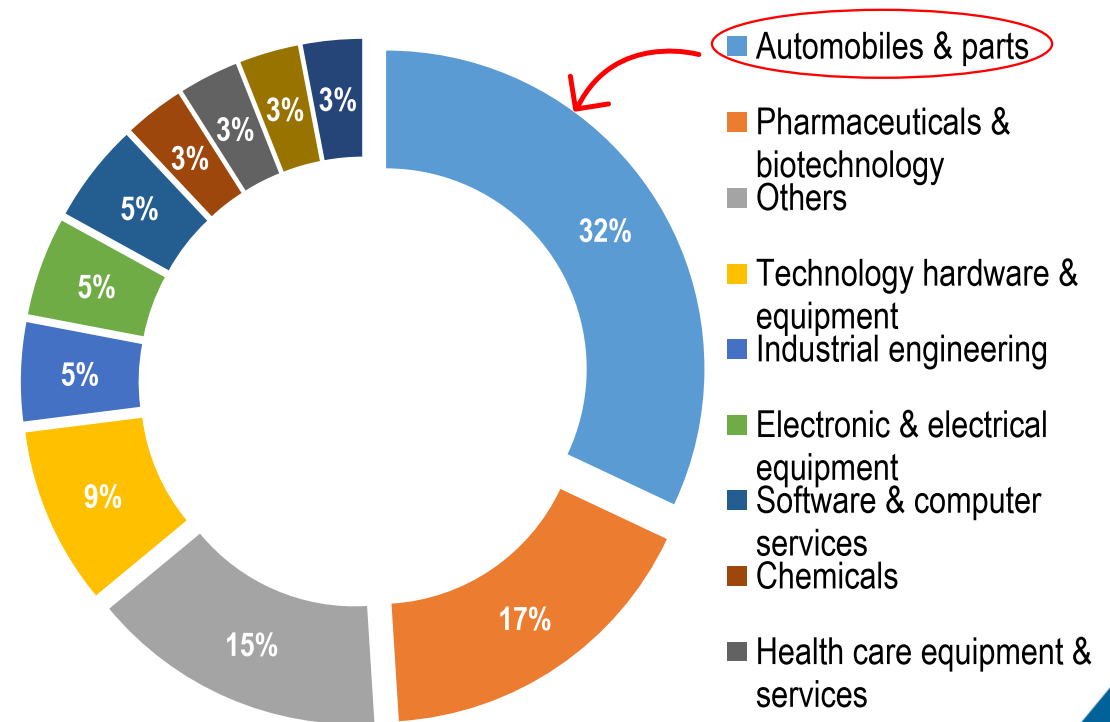


The automotive industry is key for OECD economies

Key to OECD and EU **economies** and **innovation ecosystems**:

- ❑ 8-10% of total **manufacturing employment** in the EU and OECD
- ❑ Most automotive suppliers are SMEs
- ❑ First industrial sector for **R&D investment** in the EU (32% in 2020)
- ❑ Spillovers to other sectors (e.g. software, electronics & transport, insurance, media services etc.)
- ❑ Critical to several OECD/EU **regional economies**

R&D shares of industrial sectors in the EU, 2020

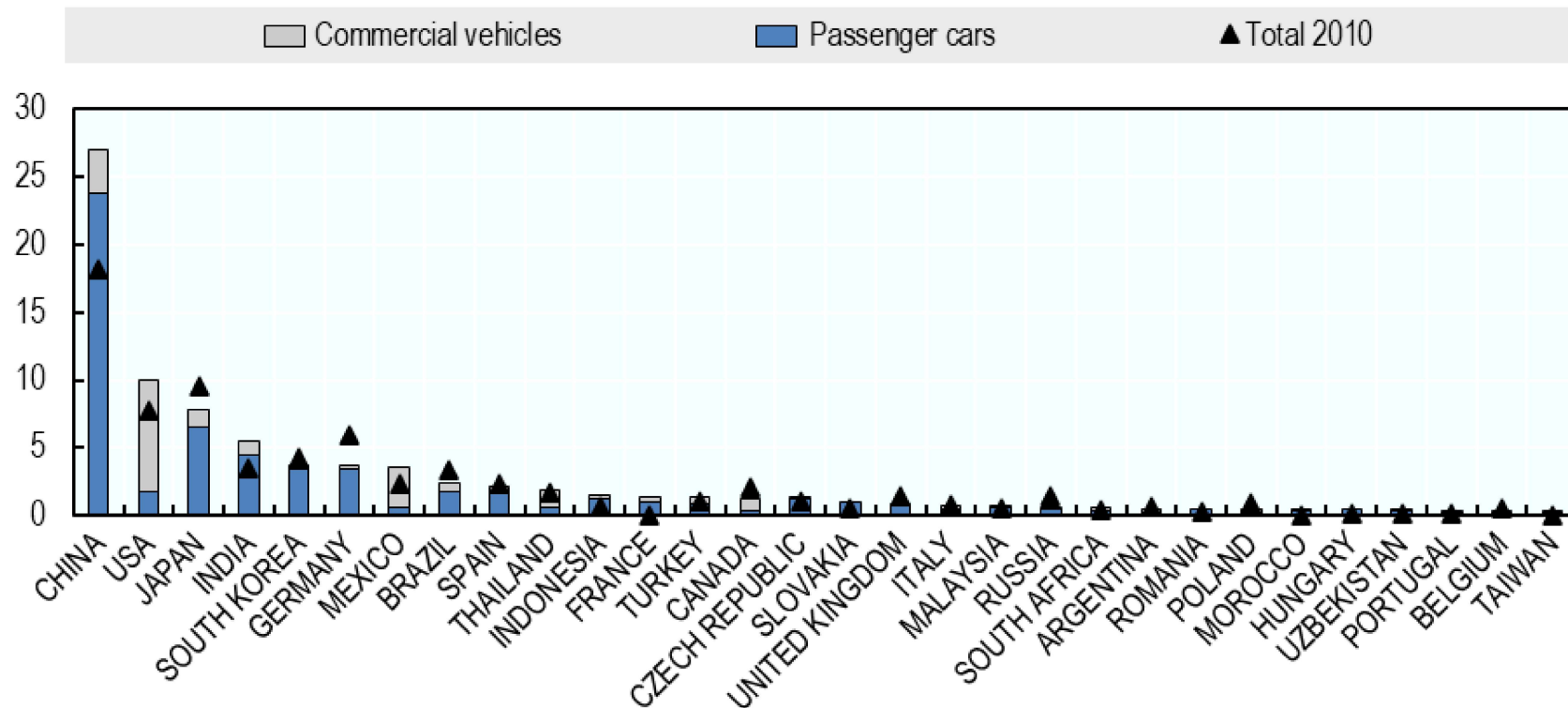


Source: ACEA based on the 2021 EU Industrial R&D Investment Scoreboard



China and US are the world's top vehicle producers...

Top 30 countries in world's vehicles production, 2022 and 2010
In millions



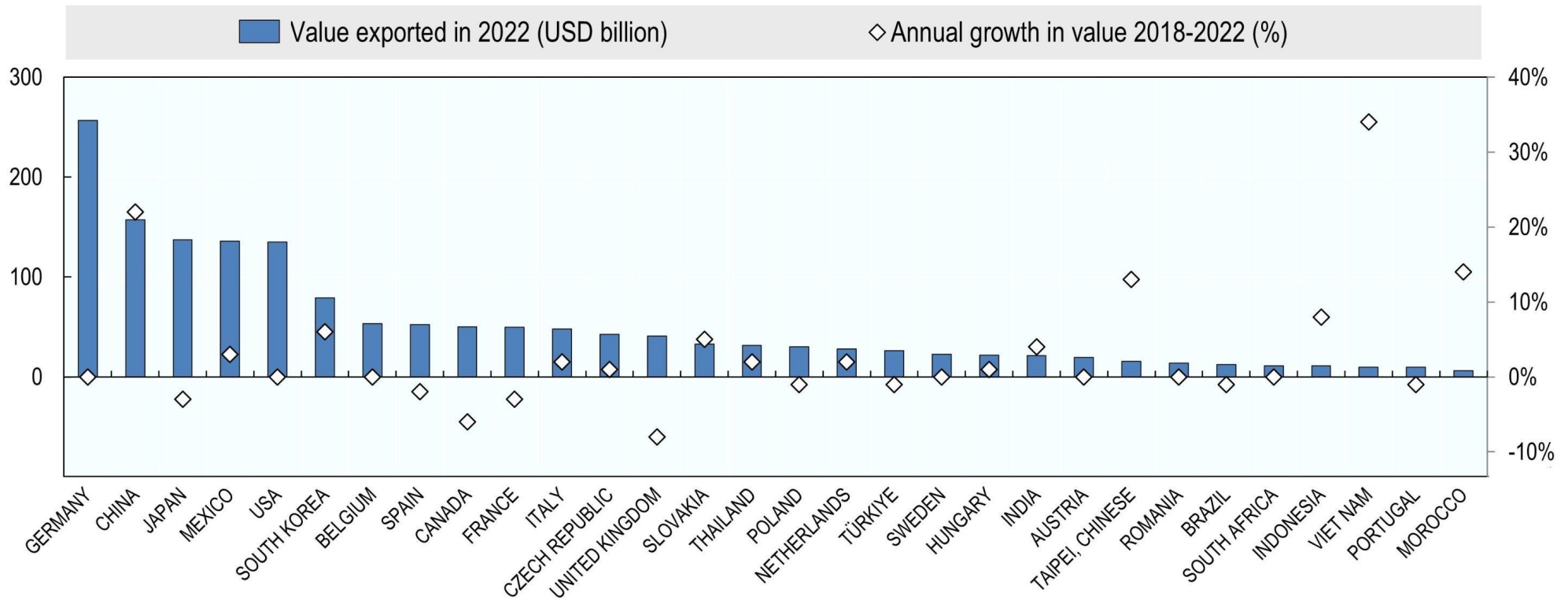
Source: OECD elaboration based on data from the International Organization of Motor Vehicles Manufacturers (OICA), 2023





...but Europe leads world's automotive exports

Top 30 exporters of motor vehicles, 2022
In billions



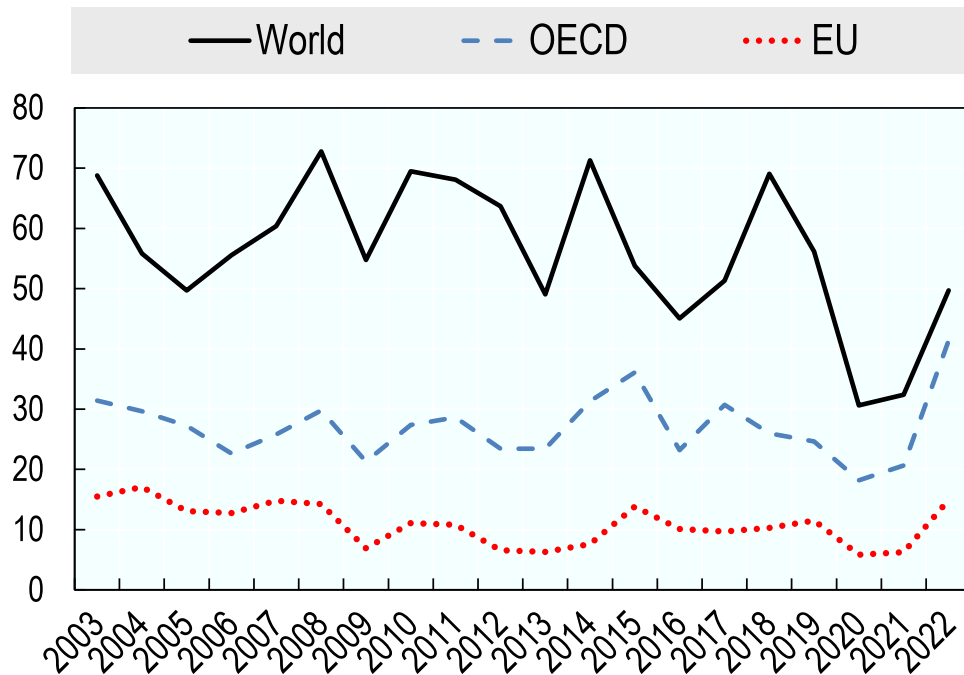
Source: OECD elaboration based on data from the International Trade Center (ITC) Trade Map, 2023, www.trademap.org/Index.aspx



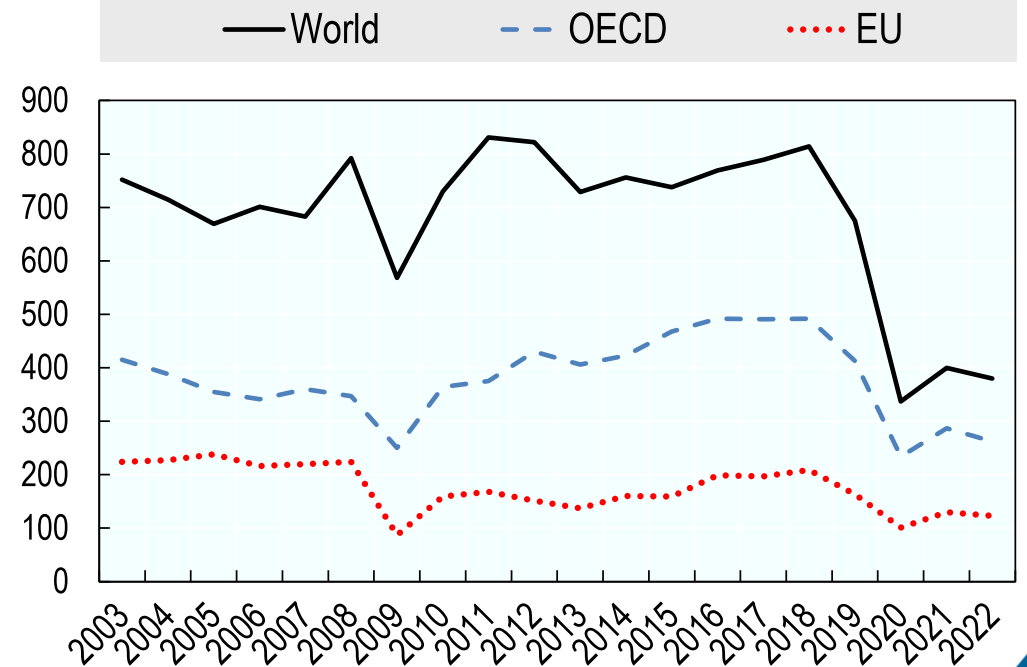


Automotive FDI flows slowed down during the pandemic, but 2022 saw a rebound

A. Value of greenfield FDI in the automotive sector, 2003-2022, (in USD billion)



B. Number of greenfield FDI projects in the automotive sector, 2003-2022

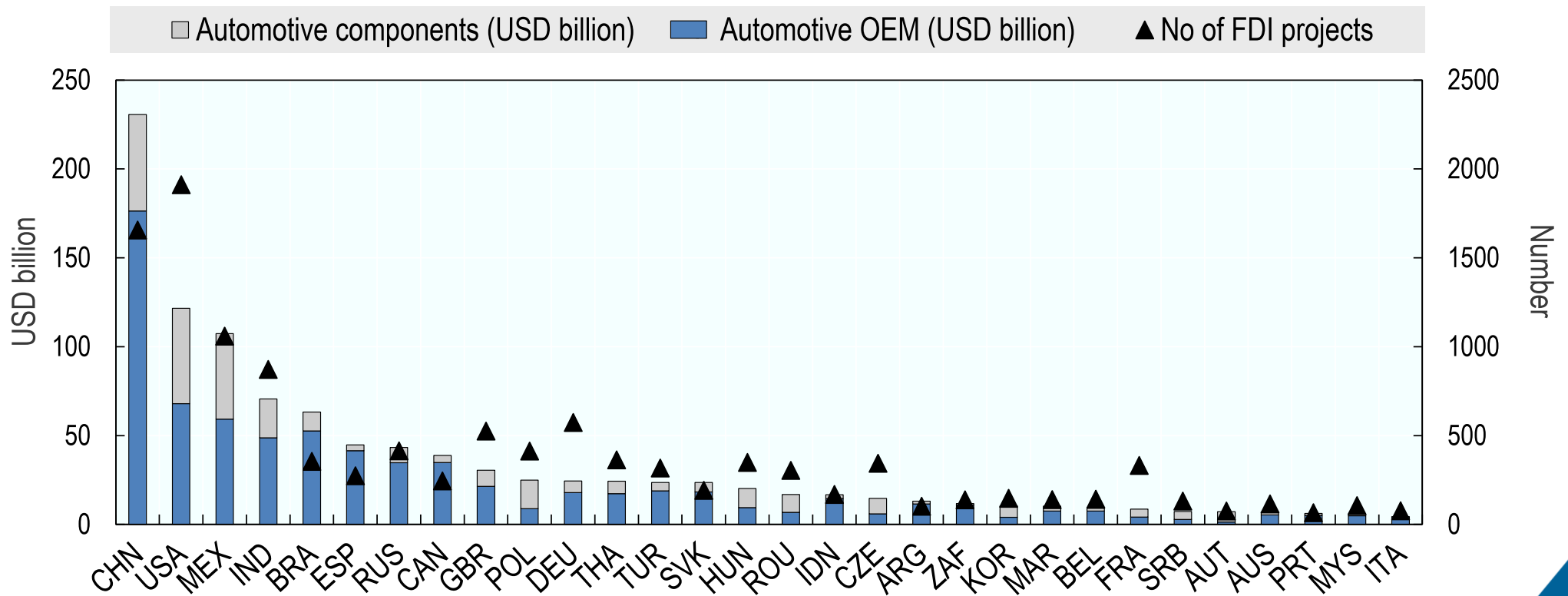


Source: OECD calculations based on Financial Times fDi Markets database.



China, USA and Mexico have been the greatest recipients of FDI in the automotive sector

Top 30 countries for greenfield FDI inflows in automotive, 2003-2022



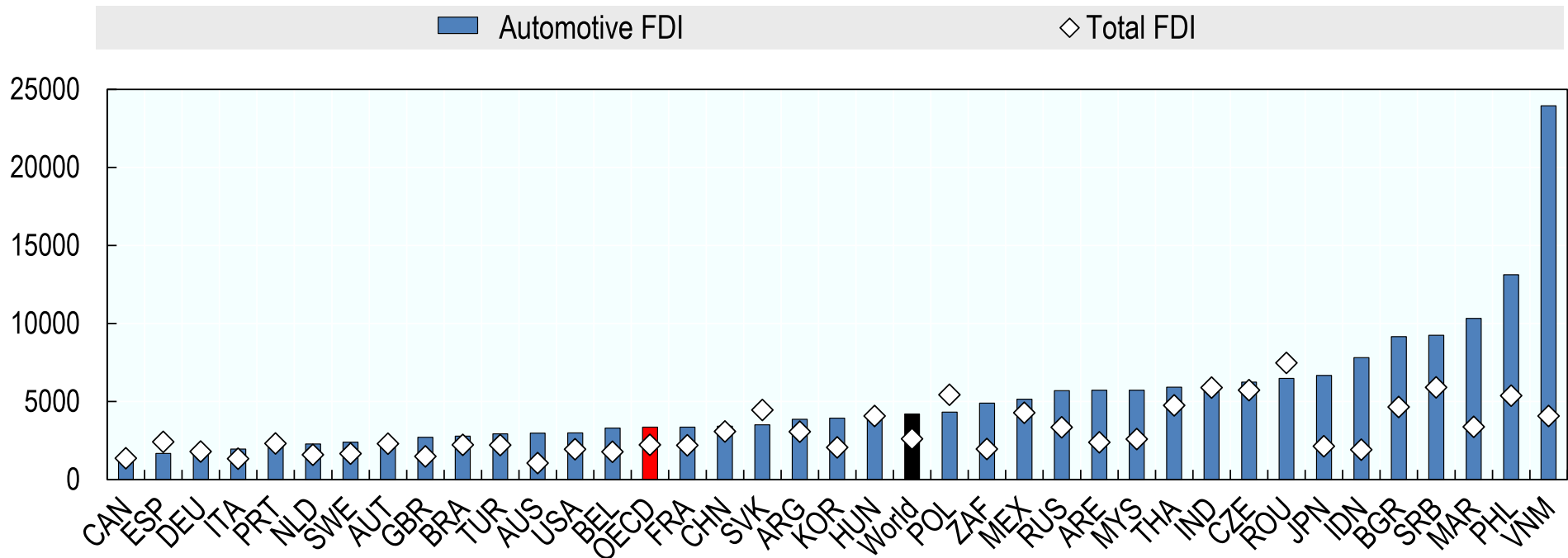
Source: OECD calculations based on Financial Times fDi Markets database.





The job-creation intensity of automotive FDI strongly varies across economies

Jobs per billion USD of greenfield FDI in the automotive sector
(average 2003-2022)

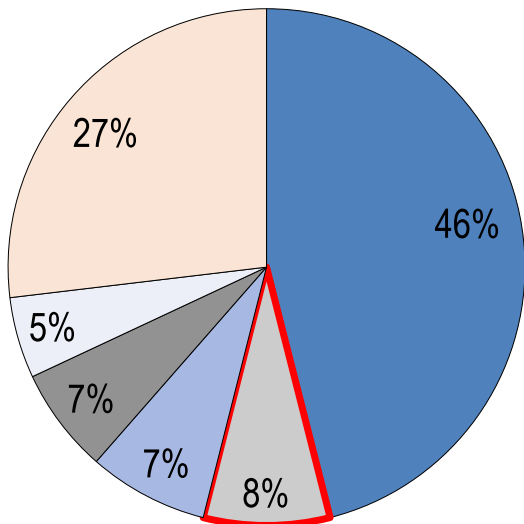
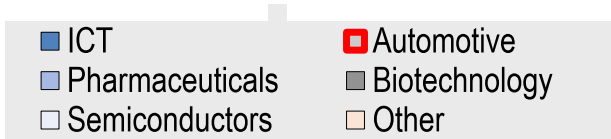


Source: OECD calculations based on Financial Times fDi Markets database.

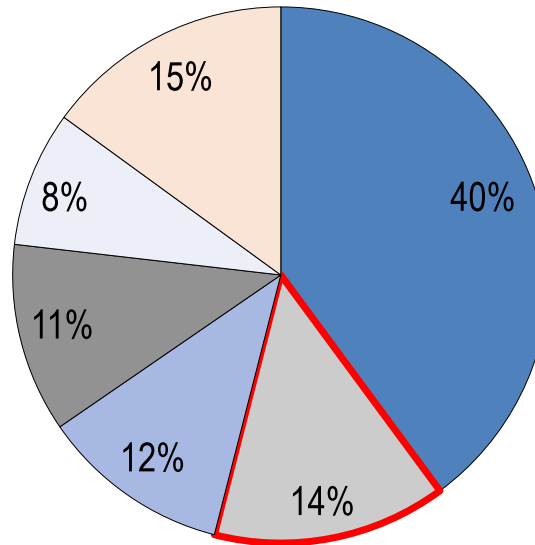
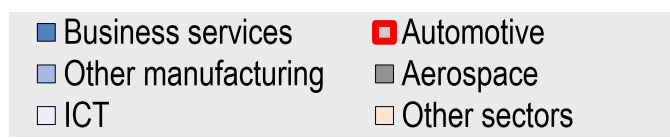


Automotive FDI involves significant R&D and training activities, but manufacturing remains the top one

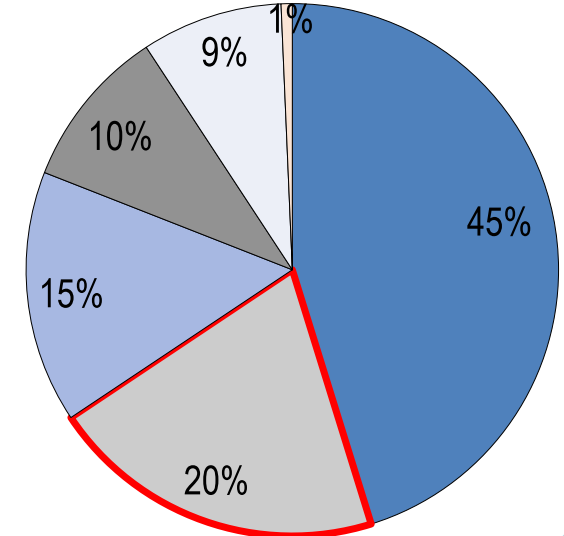
A. Greenfield FDI in R&D activities by sector, 2003-2022



B. Greenfield FDI in education & training activities by sector, 2003-2022



C. Greenfield FDI in manufacturing activities by sector, 2003-2022



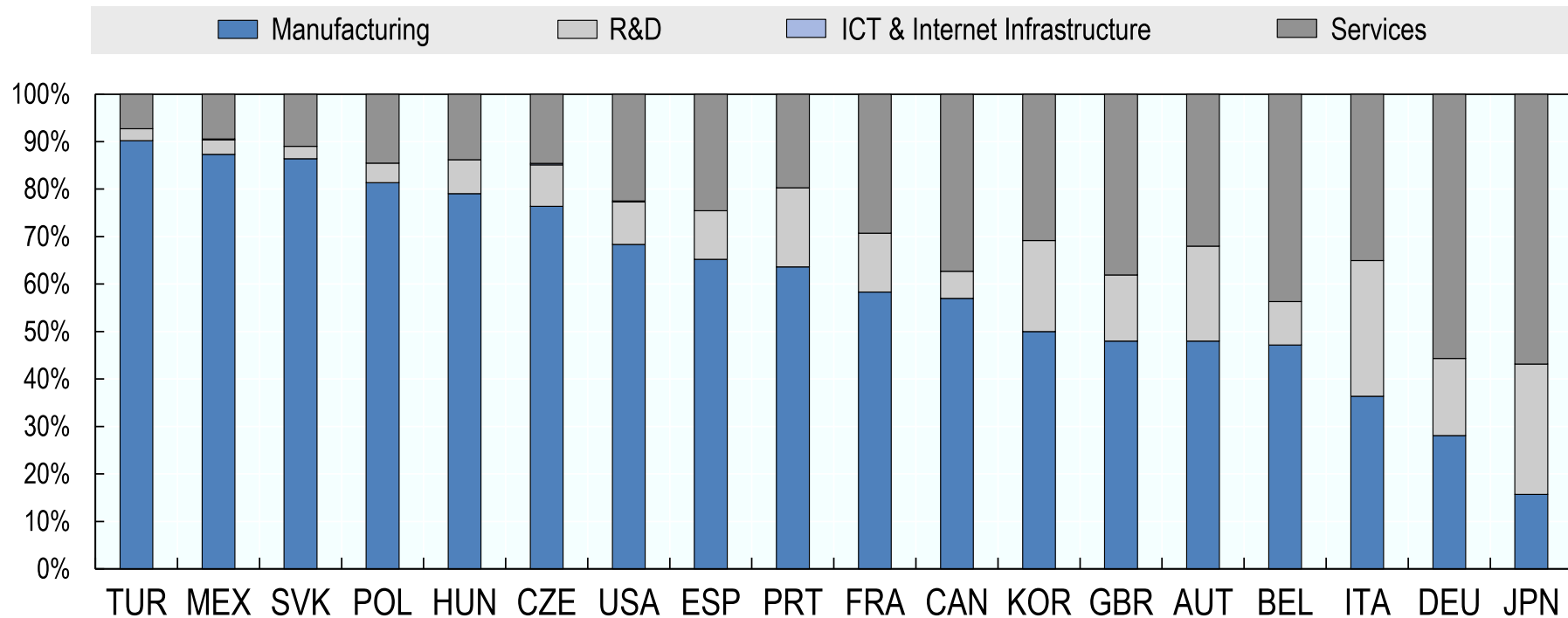
Notes: The calculations include only OECD economies.
Source: OECD calculations based on Financial Times fDi Markets database.





OECD economies attract FDI in different value chain segments of the automotive industry

Share of automotive greenfield FDI projects by business activity
(2003-2022)



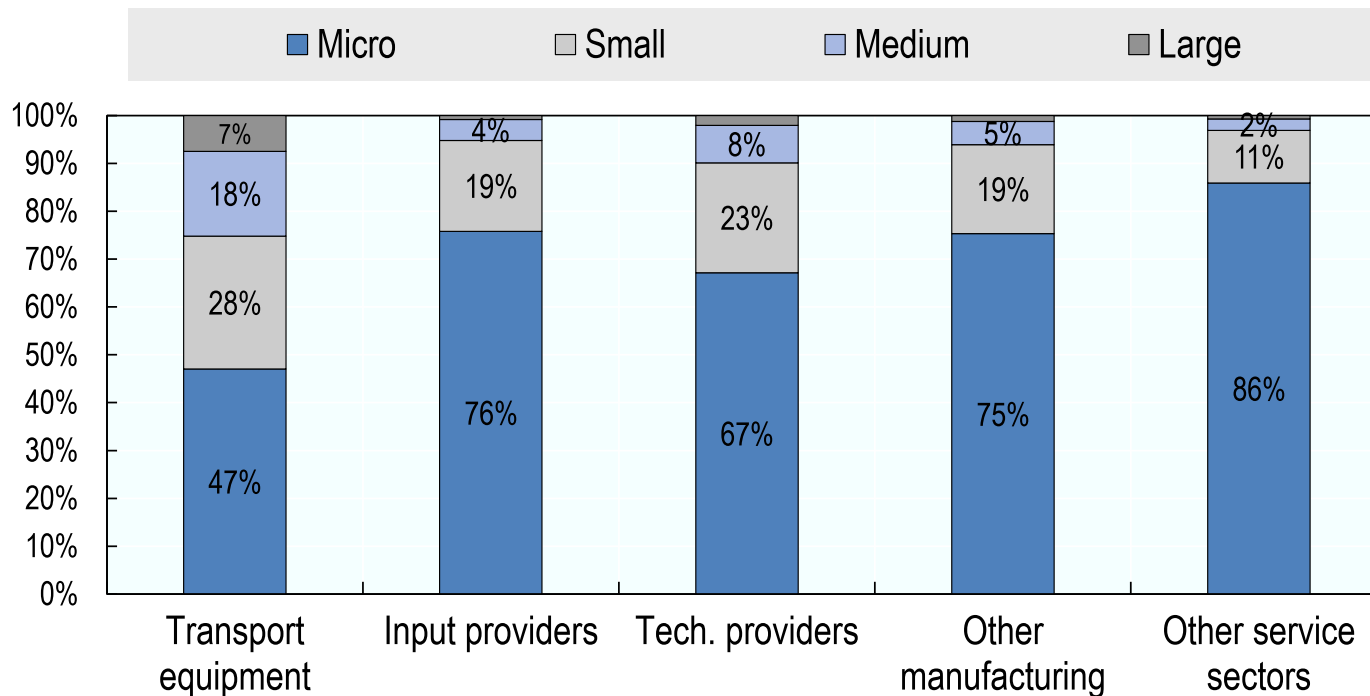
Notes: The calculations include only OECD economies.
Source: OECD calculations based on Financial Times fDi Markets database.





In the OECD, the automotive GVC is predominantly made up of SMEs

Distribution of firms involved in the automotive value chain by firm size

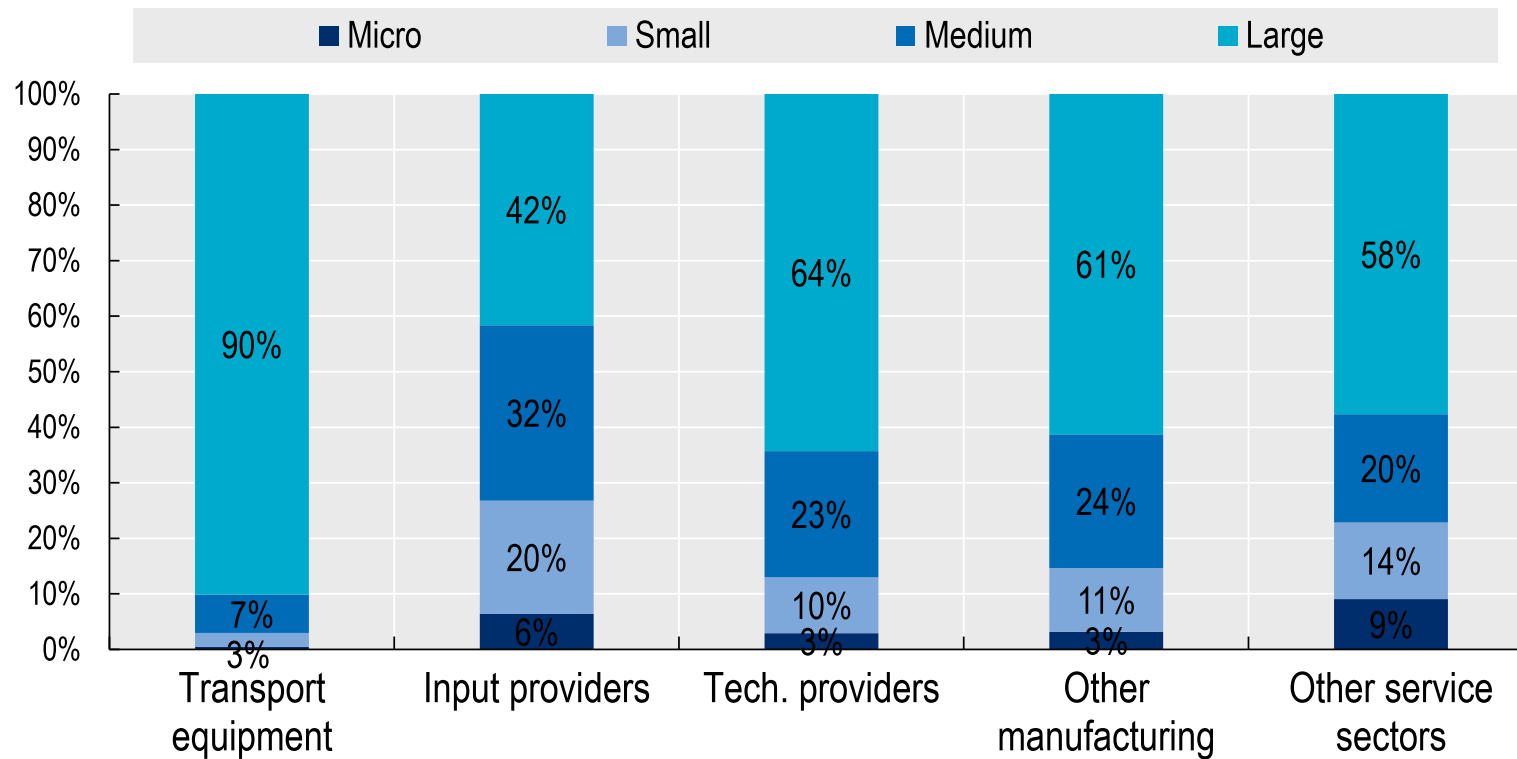


Source: Dechezleprêtre, A., et al. (2023), "How the green and digital transitions are reshaping the automotive ecosystem", OECD Science, Technology and Industry Policy Papers, No. 144, OECD Publishing, Paris, <https://doi.org/10.1787/f1874cab-en>



Yet, most of the value added is created by large enterprises

Value added of firms involved in the automotive value chain by firm size

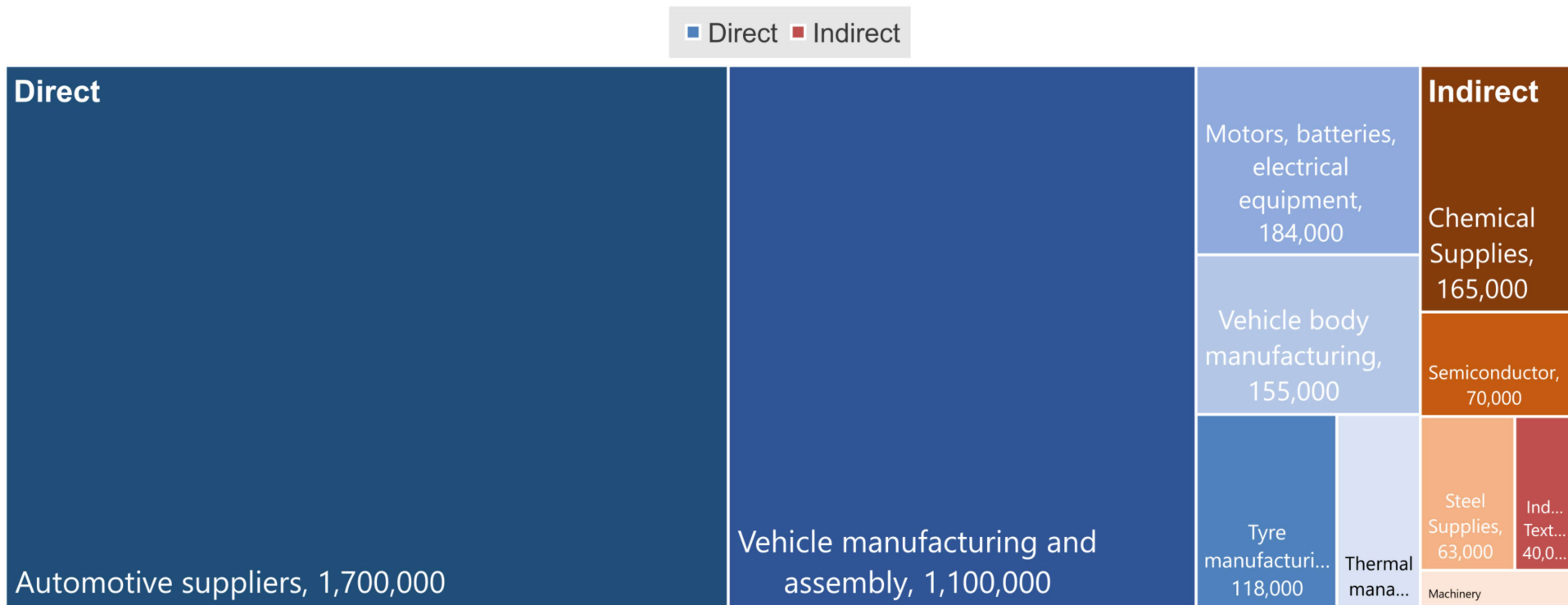


Source: Dechezleprêtre, A., et al. (2023), "How the green and digital transitions are reshaping the automotive ecosystem", OECD Science, Technology and Industry Policy Papers, No. 144, OECD Publishing, Paris, <https://doi.org/10.1787/f1874cab-en>



Automotive suppliers significantly contribute to employment in the EU

Manufacturing employment distribution in the automotive value chain (2020)
In millions

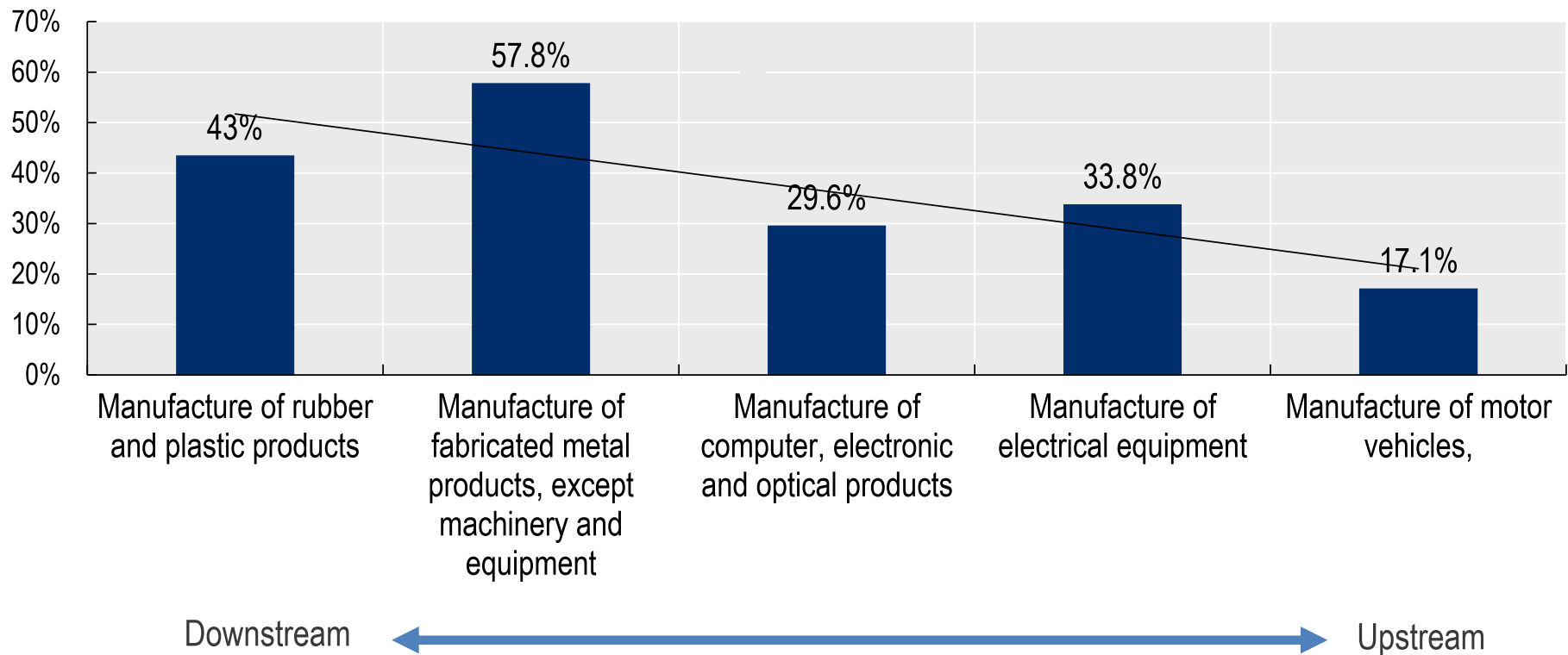


Source: OECD based on (Eurostat, 2020)



Downstream sectors surpasses upstream in outbound trade

Contribution of SMEs to Export Value in automotive value chain related sectors



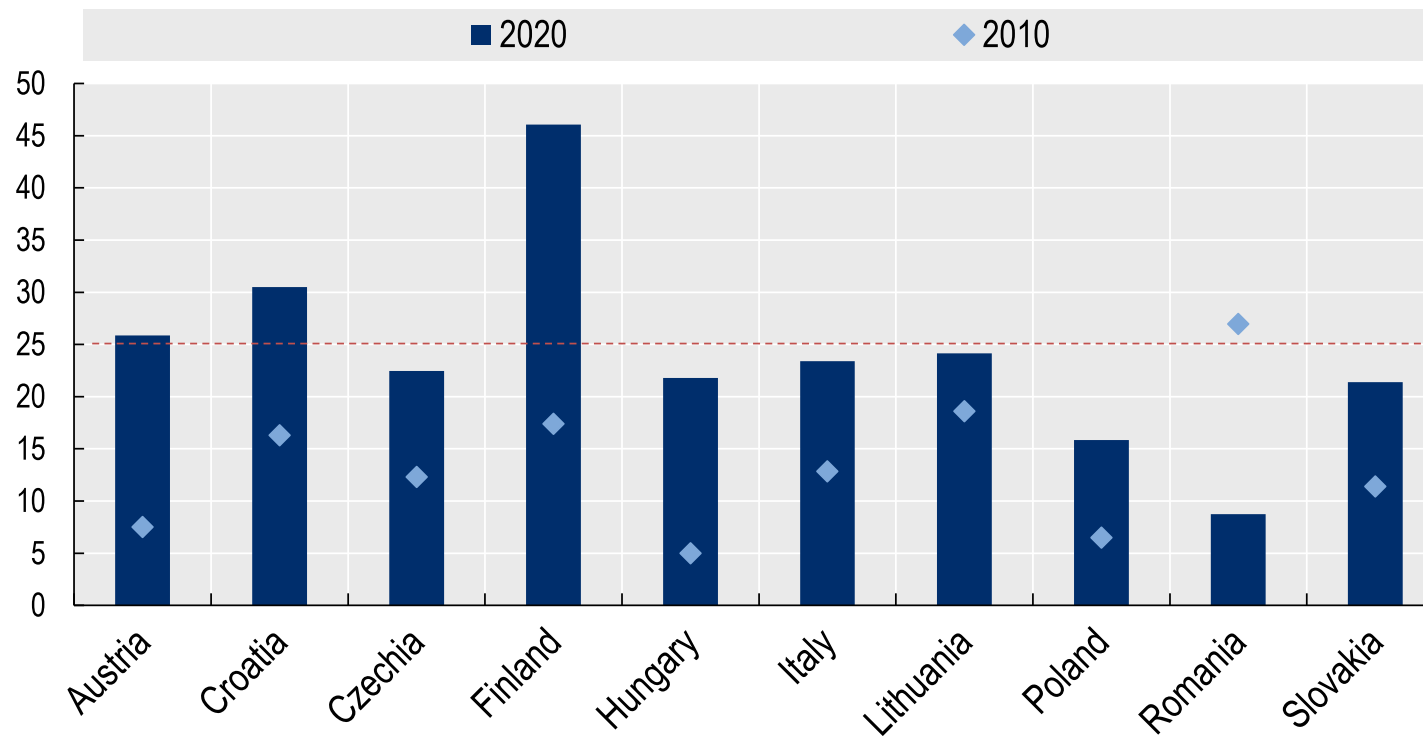
Source: OECD calculations based on Eurostat (Trade by NACE Rev. 2 activity and enterprise size class)





Innovation Collaboration as Absorptive Capacity in Manufacturing SMEs

Innovative Manufacturing SMEs collaborating with others



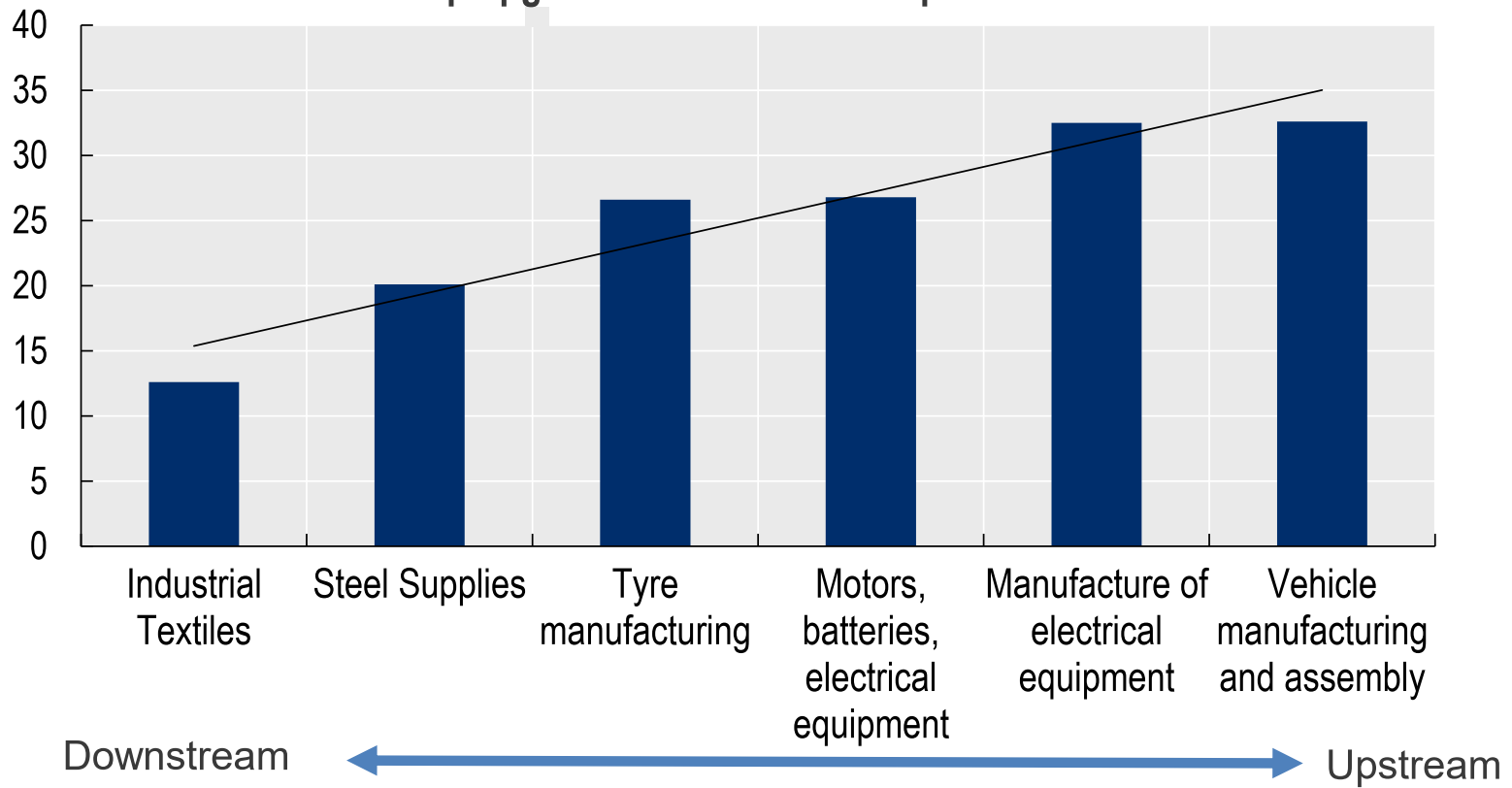
Source: OECD based on (Eurostat 2020) Community Innovation Survey CIS-11 (fig A and B) and OECD TEC database (2021) (fig C).





Digital Upskilling Fuels Technology Adoption in Upstream Sectors

Share of SMEs that provided training to develop/upgrade ICT skills of their personnel



Source: OECD based on (Eurostat, 2020), Community Innovation Survey





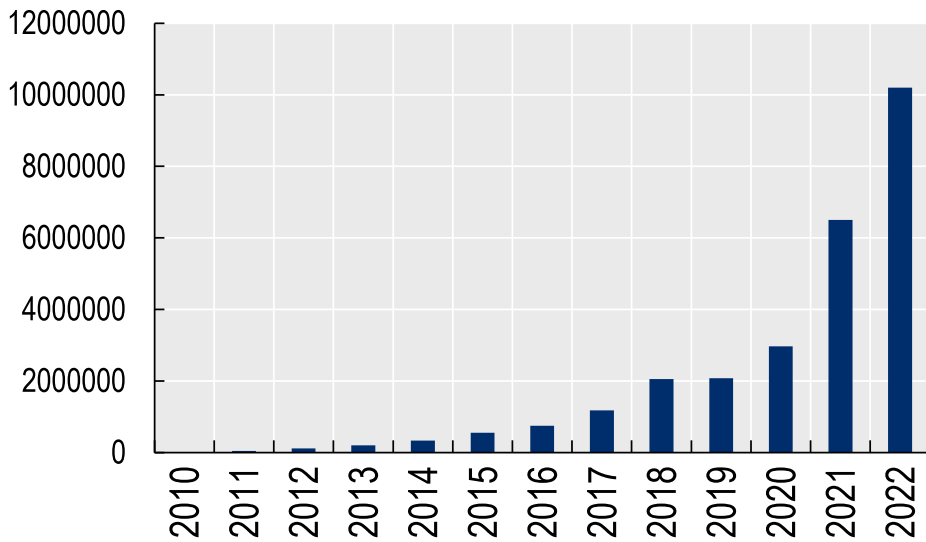
UNDERSTANDING THE TRANSFORMATIONS AT PLAY IN THE AUTOMOTIVE VALUE CHAIN



The twin transition of the automotive industry

Greening of the sector

Global EV sales



Source: IAE, Global EV Outlook 2023

New components

Specialisation

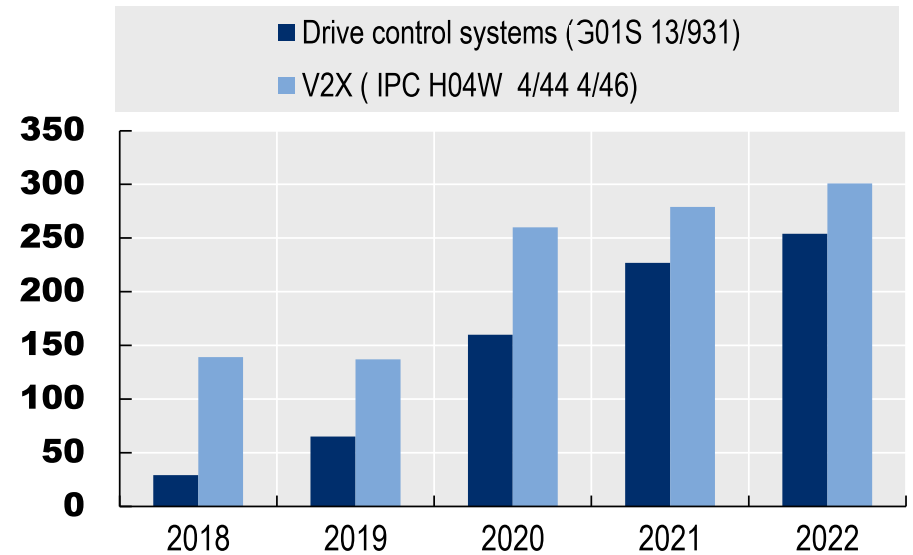
Infrastructure

New skills



Connected & Autonomous

Patent Filing Trends for connected and autonomous driving



Source: Lexology, 2023

Standards

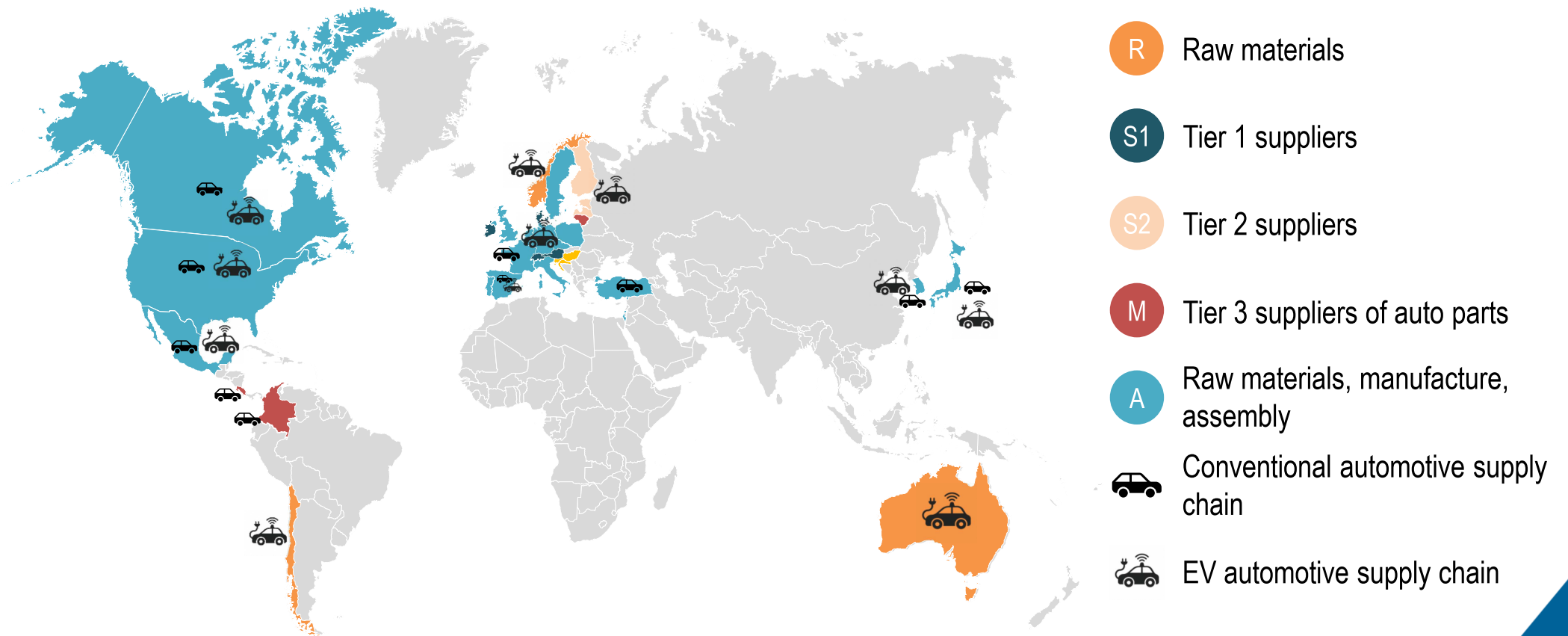
New players

Regulation

Softwarisation



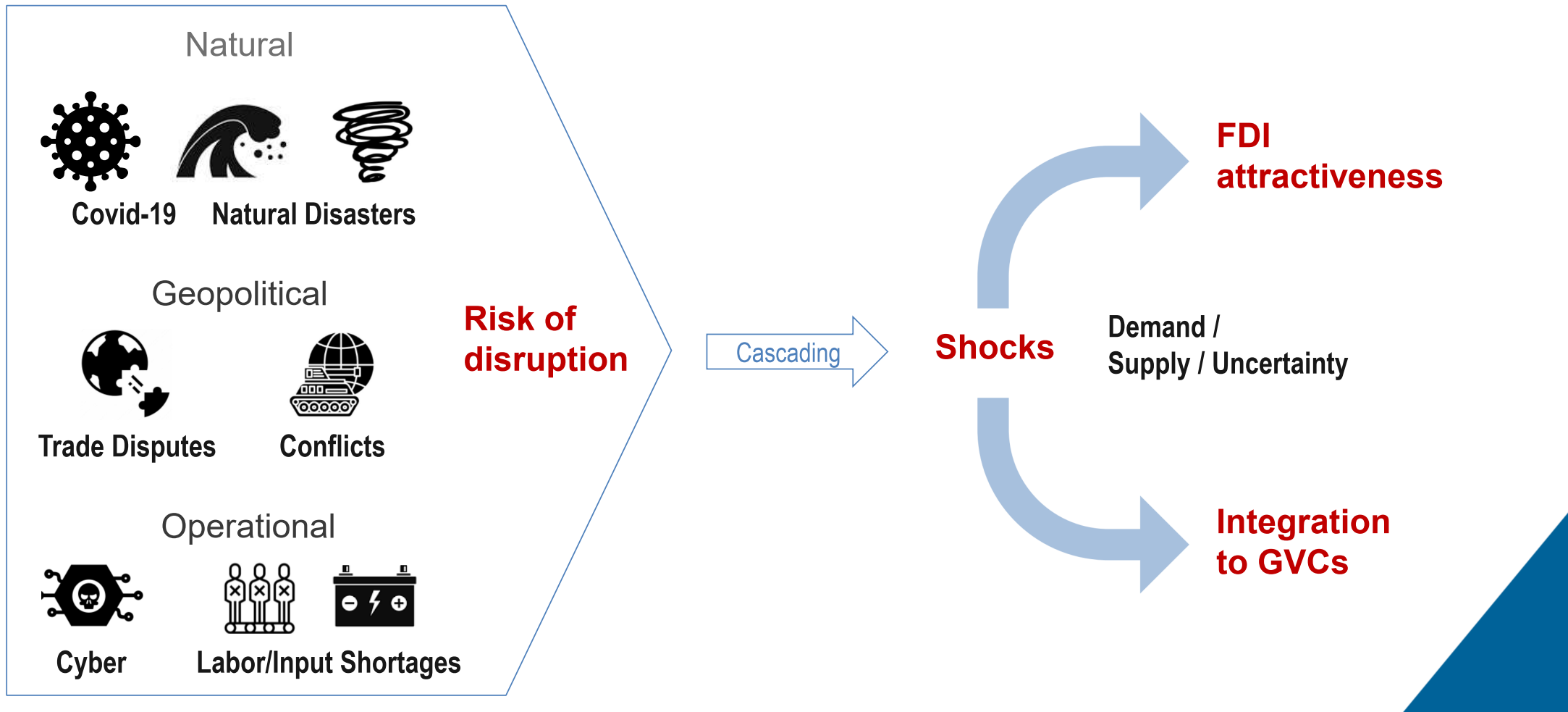
New automotive value chains are important for all OECD countries



Source: OECD elaboration based on desk research



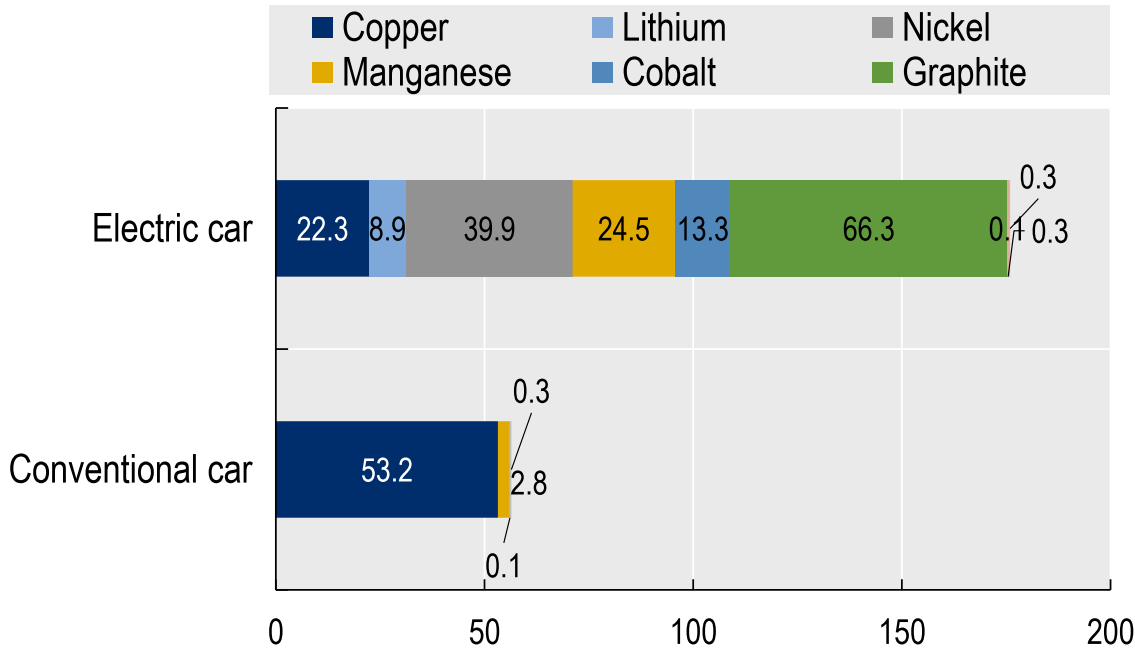
Dual transition has increased vulnerability to GVC shocks





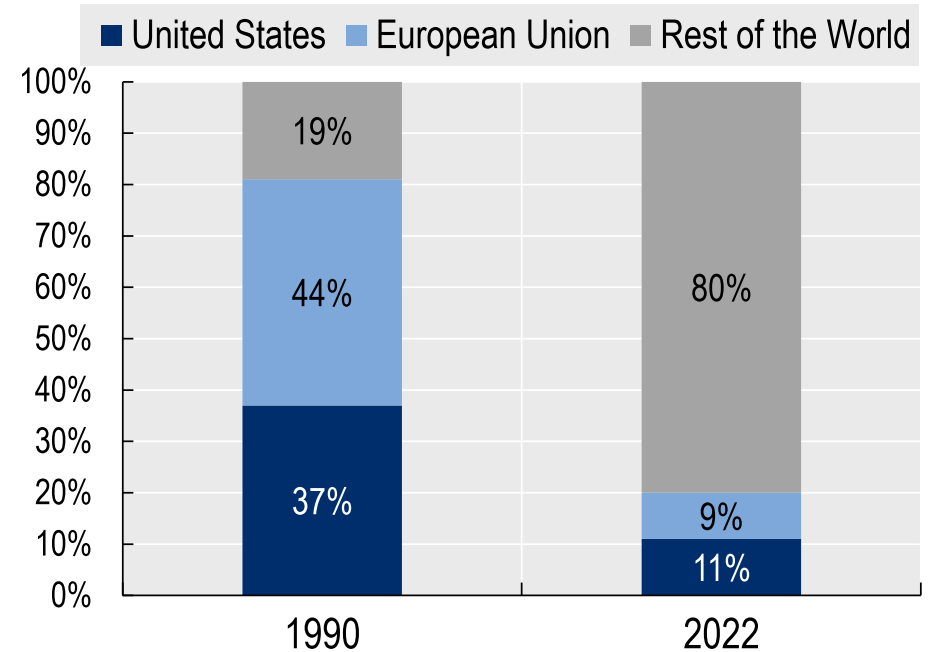
Rise of new market players: Increased vulnerability to risk & GVC shocks

Minerals used in electric cars vs. conventional cars (kg/vehicle)



Source: IEA, Minerals used in electric cars compared to conventional cars, IEA, Paris <https://www.iea.org/data-and-statistics/charts/minerals-used-in-electric-cars-compared-to-conventional-cars>, IEA.

Global semiconductor production capacity



Source: Deloitte, five fixes for the semiconductor shortage 2023



How could FDI-SME linkages evolve as GVCs transform? And what role for FDI and SMEs?



(De)Globalisation

- New (niche) markets
- Sourcing (strategic) abroad, incl. skills
- FDI spillovers
- Supply chains finance
- Attracting quality FDI

A reconfiguration of GVCs?

- Re-building connections and networks
- Trade tensions
- Call for more resilience, sustainability & circularity in GVCs
- Inertia in economic systems & strong rationale for interconnectedness

Cost efficiency

Specialisation



Sustainability

High uncertainty



THANK YOU !

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Annex C: OECD-EU WS FID 'Foresight_Sessions'

The future of the automotive value chain and the role of FDI-SME ecosystems

OECD Foresight Workshop

25 September 2023

THE GREENING OF THE AUTOMOTIVE INDUSTRY

In brief

- The global demand for green vehicles has increased by 1000 times in the last ten years and has tripled in the past three years only. Demand is expected to continue growing. This will likely increase competition for the production and procurement of rare raw materials needed to produce these vehicles. To some extent, the production process will be simplified as electric motors require less parts and maintenance as compared to internal combustion engines. On the other hand, more complex algorithms, software, and hardware will be incorporated.
- Foreign direct investment (FDI) in electric vehicles surged in 2022, with a large number of automotive multinational enterprises (MNEs) accelerating the electrification of their fleet and announcing increased investments in battery production for electric vehicles (EVs). The shift towards green technologies in the automotive sector provides opportunities for SMEs to join their supply chains, but also challenges to SMEs part of the Internal Combustion Engine (ICE) value chain.
- Simultaneously, sustainability concerns have gained prominence within laws and regulations. These regulations encompass various aspects such as circularity, product carbon footprint, chemical restrictions, responsible business conduct. How MNEs and SME suppliers adapt to this evolving regulatory environment will ultimately dictate their capacity to engage in sustainable automotive value chains.

Context

Climate-related concerns and policy requirements, technological advances, and new trends in consumer preferences are driving the demand for green vehicles (EC, 2018^[1]). Global sales of electric vehicles (EV) increased from less than 10 thousand in 2010 to over 10 million in 2022 and have tripled in the last three years (2020-2022) (IEA, 2022^[2]); (IEA, 2023^[3]). EVs now make-up 14% of global vehicle sales and, by some estimates, are expected to account for half of global car sales by 2035 (Goldman Sachs, 2023^[4]). The shift in global demand for green vehicles has also increased competition for the production and procurement of components and raw materials. For the case of batteries — the most essential part of an EV — three Asian countries (China, Korea, and Japan) hold 92% market share of their manufacturing (Dungs, 2023^[5]). The same geographical concentration is observed in the extraction and refining of key raw materials. Efforts in the US and Europe (IRA and EBA250) aim to speed up the development of the entire EV value chain and increasing the energy storage capabilities of EV batteries.

According to the International Energy Agency (IEA), an increasing number of automotive multinational enterprises (MNEs) have committed to ambitious electrification goals, with a few European carmakers planning to increase the participation of EVs in car sales to at least 50% by 2030. Foreign direct

investment (FDI) in EV business surged in 2022 with 281 projects globally valued at \$93.7 billion, opening doors for SMEs in the automotive supply chain (Ewing, 2023^[6]). How SMEs integrate will depend on the extent of their exposure and their adaptability. On the one hand, SMEs engaged in manufacturing components unrelated to the powertrain (e.g., windshields, seatbelts, upholstery) are likely to be less affected. On the other hand, SMEs involved in supplying parts or offering maintenance for internal combustion powertrains will face the most significant impact, as EVs have fewer parts and require less maintenance. Additionally, SMEs embracing circular economy practices may play a pivotal role in reducing waste and enhancing resource efficiency within the EV manufacturing ecosystem.

The development of supporting industries will also determine the extent that green FDI flows into CO₂-intensive segments of the automotive value chain, and the speed with which multinational car manufacturers adopt new EV technologies. European car manufacturers are still catching up with many international competitors in developing purely battery electric vehicles (BEVs) – rather than plug-in-hybrid electric vehicles (PHEVs) –, which requires significant investment in energy storage technologies (European Parliament, 2021^[7]). In recent years, the increasing demand for purely electric cars and the phasing-out of government incentives for hybrid ones has led original equipment manufacturers (OEMs) to increase investments in EV battery production, with some of them announcing plans to developing their own independent battery production capacities in-house or through joint ventures, rather than outsourcing it to their suppliers (Financial times, 2021^[8]).

Measures to enhance sustainability in the automotive value chain have gained prominence across jurisdictions. Recent EU developments, such as the 2035 ban on the sale of new petrol and diesel cars to reduce emissions and promote electric vehicles, the End-of-Life Vehicles Directive encouraging circularity practices, and the Sustainability Reporting Directive fostering sustainable practices in the automotive value chain, are already reshaping the automotive value chain and FDI-SME ecosystem. Additionally, Governments have various tools to support the development of FDI-SME ecosystems for the greening of the automotive value chain, through the EV transition. These tools include incentives to promote green FDI, to facilitate the development and deployment of green technologies by automotive MNEs, and to support SMEs' adaptation to the new market standards and requirements through access to finance initiatives and re-skilling programmes. Additionally, governments can support collaborative initiatives between OEMs, specialised R&D centres, academia, and automotive suppliers' associations. While it may be too early to assess the effectiveness of these policy tools, policymakers can help investors and SMEs access these options effectively.

Questions for discussion

1. What are current and emerging mega-trends related to the green transition that affect FDI trends and the integration of SMEs into automotive value chains?
2. What opportunities do these trends offer for the seamless integration of SMEs into automotive value chains of the future, and what potential for strengthened business linkages and partnerships exist between automotive MNEs and their SME suppliers?
3. What factors could undermine the development of robust FDI-SME ecosystems across the EVs value chain?

TOWARDS AUTOMATED, CONNECTED AND AUTONOMOUS VEHICLES

In brief

- Modern cars are becoming ever more “software on wheels”. Most of their functions (e.g., engine control, safety, infotainment) are run by software, with on average 3,000 chips needed in every vehicle to be fully operational. And the trend is increasing, with estimates that by 2030, almost all new vehicles sold worldwide will be connected. Connectivity –a key enabler of vehicle automation– allows vehicles to monitor and interact with the driving environment. Connected and autonomous vehicles can potentially create up to USD 400 billion in revenues by 2035.
- While automotive MNEs and their direct first-tier suppliers hold a competitive edge in capturing this value due to their privileged access to customers, they also face increased competition by some of the world’s largest ICT firms, which have successfully commercialised vehicle software systems over the past decade, as well as from new “EV only” automotive MNEs with strong internal ICT capacity. Dependencies on software and data from third parties means that “traditional” automotive MNEs may need to turn towards industry partnerships and joint ventures to establish themselves in the connected and autonomous vehicles market. The increasing role of software in modern vehicles makes the automotive value chain also much more reliant on the supply of semi-conductors, which is strained by geopolitical tensions.
- There are some key issues that will likely impact the extent through which SMEs can capture the value generated through increased connectivity. First, the extent to which OEMs internalize connected/autonomous development will play a pivotal role, determining the space of opportunity for SMEs operating in areas such as cybersecurity, testing, and quality assurance. Another challenge arises from the absence of standardized protocols for vehicle connectivity. This lack of standardization is likely to increase costs for SMEs and can also hinder the interoperability of their products and services with a wide range of vehicle models and brands, thereby limiting their market reach.

Context

Modern cars are becoming ever more reliant on software for their functioning. From “engine control units” (ECU) to manage fuel injection in ICE cars, to emission control systems, lighting, infotainment system, and car safety (airbags, speed throttlers, electronic stability control) most functions in a car are nowadays controlled by software. Legacy car manufacturer are often relying on hundreds of separated software modules provided each by different companies in their supply chain, each on with their own code and Ips, with no interaction with each other (C2A, 2023^[9]). Indeed, this means that the automotive value chain is more and more reliant on the supply of semiconductors, as a car needs on average 3,000 chips to be fully functioning. During the COVID pandemic, this reality came to bite many automotive MNEs as they were forced to consistently cut production due to the global chip shortage (New York Times, 2021^[10])

More automatized, connected and autonomous vehicles can also share information through wireless communication with other vehicles, the road infrastructure and pedestrians and are equipped with “autonomous driving” technologies which undertake parts of the driving task leveraging machine-learning software. By some estimates, about 95% of new vehicles sold globally will be connected and autonomous in 2030, up from around 50% in 2021. A transition from hardware to software-as-a-service (SaaS) and subscription business is happening. This shift provides incentives for companies to monetize data from these vehicles collected by installed in them software (Atos, 2018^[11]). As a

result, passenger car advanced driver-assistance systems and autonomous-driving systems could create USD 300-400 billion in revenues by 2035 (Deichmann et al., 2023^[12]).

Software will play an increasing role in the automotive value chain. Its value in a car was about 20% in 2022 and is expected to reach over 40% by 2030 (Benam, 2021^[13]). SMEs operating in areas not traditionally associated with automobiles, such as cybersecurity firms, testing, and quality assurance, are likely to find new opportunities within the value chain. At the same time, non-automotive firms, and in particular ICT firms, are becoming more central to the automotive ecosystem. ICT services and software development now hold the focus of more than 20% of automotive startups (European Commission, 2020^[14]). The remarkable surge in investments, totalling USD 220 billion between 2010 and 2019, directed toward new mobility startups underscores the growing interest in the potential of transformative technologies. Since 2010, more than 1,100 companies across diverse technology clusters have attracted these substantial investments (Holland-Letz et al., 2019^[15]).

Increasing competition from global tech giants and new automotive MNEs with broad internal ICT capacity means that traditional automotive MNEs may have to further scale up their investments in R&D and innovation and adapt their production processes in the areas of connectivity (e.g. high-tech cameras, sensors, etc.), advanced driver assistance systems (ADAS) and electronic interfaces. Over the past decade, some of the world's largest multinational ICT companies have gained momentum in the development of connected and autonomous vehicle software systems, and new automotive MNEs whose business model is structured around advanced internal software capabilities (and EVs), which in some cases even include chip design, are constantly expanding their market share (Financial Times, 2018^[16]). To increase their control over the value chain, some automotive MNEs are transitioning from being integrators of software and systems supplied by others into software development companies themselves.

Not all of the leading automotive manufacturers will have the financial resources, access to data, skills and digital capabilities that big technology companies have to lead the market for connected and autonomous vehicles. Industry partnerships and joint ventures between OEMs, digital companies and their suppliers may be required to ensure sufficient investments in the digital transformation of the automotive sector in Europe and beyond (European Parliament, 2021^[7]). OEMs have recently established spin-off companies with a focus on autonomous driving and artificial intelligence, potentially impacting the role of independent SMEs. The potential for knowledge and technology spillovers to Tier 1 and Tier 2 suppliers will be largely affected by the extent to which traditional automotive MNEs will develop their own software solutions in-house and their willingness to share that knowledge to reduce the fixed-cost burden of R&D design and production. At the same time, the increasing importance of large ICT companies may provide opportunities for SMEs operating in the electronics industry (e.g. cybersecurity services, data and infrastructure providers for connectivity applications, etc.) to join their suppliers base.

Moreover, certain structural challenges associated with the deployment of connected and autonomous vehicles have the potential to hamper the active participation of SMEs in related value chains. One prominent issue is the regional fragmentation on vehicular communications standards which can hinder the interoperability of SMEs IT products and services with various vehicle models and brands, limiting their market reach. Additionally, many national and subnational governments have passed legislation and regulations to ensure safe testing, data protection, and safe deployment of connected and autonomous vehicles. These regulations could impose substantial compliance barriers on SMEs, which can be burdensome due to stringent safety testing, complex data protection measures, and extensive approval processes. This can increase operational costs and hinder SMEs' market entry and innovation in the connected and automated vehicle value chains.

Questions for discussion

1. How will traditional automotive MNEs address the challenges stemming from the emergence of automated, connected and autonomous vehicles and the increased competition from the ICT sector and a new generation of automotive MNEs?
2. What role can FDI play in the digital transformation of the automotive industry?
3. How can SMEs overcome the challenges posed by the transformation of the automotive value chain and fully leverage the opportunities presented by software-driven changes? How can partnerships with MNEs facilitate their transition?

VALUE CHAINS OF THE FUTURE

In brief

- Due to the highly specialised and integral nature of the car manufacturing process, the automotive sector has been traditionally characterised by a significant fragmentation of production processes and dominated by a small number of large MNEs which exert significant power over the value chain. This trend is exemplified by Europe, where 35% of intermediate inputs are procured from foreign sources, highlighting the interdependence of international supply chains.
- Emerging trends within the automotive industry, notably the transition toward EVs and connected and autonomous technologies, are challenging the position and control of OEMs over the value chain. New market entrants such as global ICT firms, and highly specialised and innovative suppliers gain influence while geopolitical tensions have led OEMs to evaluate and identify risks in their supply chains.
- While the evolving automotive industry landscape provides numerous opportunities for SMEs to participate in GVCs, geopolitical conflicts, trade disputes, and regulatory changes can result in sudden disruptions in material and component supply chains, as well as significant shifts in FDI locations, posing challenges to SME integration into automotive value chains.

Context

The automotive industry is highly globalised and fragmented along complex and long GVCs that involve a myriad of small actors but that are essentially dominated by large MNEs –the so-called original equipment manufacturers (OEMs)– positioned at the top of the pyramid as lead firms responsible for vehicles’ design, branding and assembly. One level down, first tier suppliers produce complete subsystems by cooperating with a large network of lower tier suppliers and subcontractors. The length of the automotive GVC, measured as per the number of intermediate inputs used to produce a final good or service, is one of the highest among industrial sectors (OECD, 2021, p. 93^[17]) (IMF, 2022^[18]) (De Backer and Miroudot, 2013^[19]). This reflects the importance of vertical linkages between the motor vehicles industry and other industries, producing the many components (e.g. steering wheels, engines, car windows) required for the manufacturing of cars.

SMEs are largely present in the automotive value chain, typically accounting for most lower tier supplier firms (Pfeifer, 2022^[20]). In Germany, for instance, around 85% of total automotive suppliers (especially second and third tier) are SMEs (EC, 2020^[21]). Although positioned along the entire value chain, SMEs tend to concentrate in the aftermarket and the manufacturing of automotive components (European Union, 2020^[22]). In sales and aftermarket, SMEs account for over 99% of total enterprises and employ most of the workforce. In manufacturing, SMEs account for 92% of total business, although employment remains concentrated in larger companies (European Union, 2020^[22]).

The automotive supply chain is being affected by geopolitical tensions, economic shifts, technological advancements and environmental trends. The COVID-19 pandemic and Russia’s war of aggression against Ukraine have led OEMs to evaluate and identify risks in their supply chains. Geopolitical tensions have additionally given rise to national security concerns, prompting the implementation of more rigorous scrutiny on FDI in sectors of strategic importance for domestic economies (International Monetary Fund, 2023^[23]). This heightened scrutiny has the potential to constrain the flow of FDI into enterprises operating within the automotive value chain (Ashurst, 2023^[24]). As a response to these disruptions, OEMs have attempted to relocate their supply chains to reduce logistics costs and mitigate supply chain risks. Governments have also implemented policies incentivising reshoring,

nearshoring, or friendshoring of supply chains¹. Shortening supply chains have also been complemented by inward-looking policies and regulatory requirements including local content requirements that countries as Indonesia and the United Kingdom have introduced (Global Trade Alert, 2019^[25]) (Torsoli, Milligan and Wickham, 2023^[26]).

The shift towards EVs as well as connected and autonomous vehicle technologies and the scarcity of raw materials needed to produce these vehicles have led some countries such as Zimbabwe and Netherlands to impose trade restrictions on key inputs (Government of Netherlands, 2023^[27]) (Quartz, 2021^[28]). On the other hand, European Union, have secured access to critical EV production materials, including rare raw materials, through international agreements one of which was signed with Namibia (European Commission, 2022^[29]). For European car manufacturers, dependencies on raw materials from third countries and on software, data and technological know-how from key supporting industries (e.g. batteries, semiconductors) risk to change the balance of power in the automotive value chain away from traditional OEMs and towards new market entrants, including established ICT firms as well as highly specialised young firms focusing on core emerging technologies (Dechezleprêtre et al., 2022^[30]). Questions are increasing as to how European OEMs can sustain their competitiveness vis-à-vis Asian emerging economies as well as non-automotive players, in particular US tech giants.

The changes in trade and FDI fragmentation present a dual scenario for SMEs' integration into OEMs' supplier chains. Reshoring trends in their local areas may create new opportunities, while similar trends in other regions could hinder internationalization. The extent to which SMEs can benefit from this evolving landscape depends, amongst other factors, on OEMs' evolving corporate strategies and ability to adapt to the new market standards brought by technological advancements and environmental trends; as well as on SMEs' potential to strengthen their technological capacities and integrate into new business networks, primarily in regional value chains.

Questions for discussion

1. What are some 'wildcard' scenarios that could impact the automotive GVC in the coming decade? What policies and strategies can be put forward to strengthen its resilience?
2. What are the implications of these scenarios for FDI flows in the automotive sector as well as in key supporting industries (e.g. batteries, semiconductors, extraction of raw materials)?
3. How will emerging trends (e.g. accelerated adoption of EVs, digital transformation, shift in consumer preferences, increased competition from emerging market actors) affect OEMs' position and power over the value chain and what are the implications for SMEs' integration into their suppliers base?

¹ Reshoring is bringing manufacturing and production services back to the country or region in which the company operates due to the fragility of global supply chains or more favourable trade policies. Nearshoring is when a company relocates business operations to a nearby country, often with a shared border, where labour is more affordable, and the shipping and communication channels are strong. Friendshoring is rerouting supply chains to, or sourcing goods or services with, business in countries that are politically and economically aligned with a company's home country.

References

- Ashurst (2023), *Italian FDI control: bumpy road for foreign investments following the “Pirelli case”?*, <https://www.ashurst.com/en/insights/italian-fdi-control-bumpy-road-for-foreign-investments-following-the-pirelli-case/>. [24]
- Atos (2018), *Look Out 2020+ Automotive*, https://atos.net/wp-content/uploads/2018/10/ATOS_LOOK-OUT_AUTOMOTIVE.pdf. [11]
- Benam, B. (2021), “Software is the Value of the Car”, *CodeX*, https://medium.com/codex/software-is-the-value-of-the-car-bcaf96a2d37f#id_token=eyJhbGciOiJSUzI1NiIsImtpZCI6ImZyZWZIN2E5YmRhNDZiYWU2ZUY5N2U0NmM5NWwNkYTQ4OTEyZTU5NzkiLCJ0eXAiOiJKV1QiLCJpc3MiOiJodHRwczovL2FjY291bnRzLmdvb2dsZS5jb20iLCJhenAiOiIyMTYyOTYwMzU4. [13]
- C2A (2023), *Ford CEO: It's very difficult for car companies to get software right*, <https://c2a-sec.com/ford-ceo-its-very-difficult-for-car-companies-to-get-software-right/>. [9]
- De Backer, K. and S. Miroudot (2013), “Mapping Global Value Chains”, *OECD Trade Policy Papers*, No. 159, OECD Publishing, Paris, <https://doi.org/10.1787/5k3v1trgnbr4-en>. [19]
- Dechezleprêtre, A. et al. (2022), “How the green and digital transitions are reshaping the automotive ecosystem”, *OECD Science, Technology and Industry Policy Papers*, <https://doi.org/10.1787/f1874cab-en>. [30]
- Deichmann, J. et al. (2023), “Autonomous driving’s future: Convenient and connected”, *McKinsey & Company*, https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/autonomous-drivings-future-convenient-and-connected#. [12]
- Dungs, J. (2023), “China Has Perfectly Tangled The Battery Value Chain With Electric Vehicles - A Combo The U.S. And Europe Will Find Hard To Beat”, *Forbes*, <https://www.forbes.com/sites/jenniferdungs/2023/08/17/china-has-perfectly-tangled-the-battery-value-chain-with-electric-vehicles-leading-to-a-combo-the-us-and-europe-will-find-hard-to-beat/?sh=54fed37b66ab>. [5]
- EC (2020), *Blueprint for Sectoral Cooperation on Skills: Towards a common vision on addressing SMEs skills needs in the automotive sector: strengthening the development of upskilling and reskilling strategies*, Luxembourg: Publications Office of the European Union, 2020, <https://doi.org/10.2826/962616>. [21]
- EC (2018), *Strengthening Strategic Value Chains for a future-ready EU Industry. Report of the Strategic Forum for Important Projects of Common European Interest*. [1]
- European Commission (2022), *COP27: European Union concludes a strategic partnership with Namibia on sustainable raw materials and renewable hydrogen*, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6683. [29]
- European Commission (2020), *Technological trends in the automotive industry*, <https://ati.ec.europa.eu/sites/default/files/2020-08/Sectoral%20Report%20Automotive.pdf>. [14]
- European Parliament (2021), *The Future of the EU Automotive Sector*, [7]

[https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695457/IPOL_STU\(2021\)695457_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695457/IPOL_STU(2021)695457_EN.pdf).

European Union (2020), *Blueprint for sectoral cooperation on skills: Towards a common vision on addressing SMEs skills needs in the automotive sector: strengthening the development of upskilling and reskilling strategies*, Luxembourg: Publications Office of the European Union, 2020, <https://doi.org/10.2826/32756>. [22]

Ewing, G. (2023), "Electric vehicle FDI accelerates", *fDi Intelligence*, [6]
<https://www.fdiintelligence.com/content/data-trends/electric-vehicle-fdi-accelerates-82593>
(accessed on September 2023).

Financial Times (2018), *Tech companies tinker under the hood of the automobile industry*, [16]
<https://www.ft.com/content/ff7b46e8-f480-11e8-ae55-df4bf40f9d0d>.

Financial times (2021), *futur, VW plans six European battery factories by 2030 as it bets on electric*, [8]
<https://www.ft.com/content/6be4159e-cdb7-48e1-b0d1-4b88054805f9>.

Global Trade Alert (2019), *Indonesia: 2019 presidential regulation to promote local EV industry*, [25]
<https://www.globaltradealert.org/intervention/73880/local-content-requirement/indonesia-2019-presidential-regulation-to-promote-local-ev-industry> (accessed on 23 August 2023).

Goldman Sachs (2023), *Electric vehicles are forecast to be half of global car sales by 2035*, [4]
<https://www.goldmansachs.com/intelligence/pages/electric-vehicles-are-forecast-to-be-half-of-global-car-sales-by-2035.html> (accessed on 28 August 2023).

Government of Netherlands (2023), *Regulation of the Minister for Foreign Trade and Development Cooperation of 23 June 2023, no. MinBuza.2023.15246-27 introducing a licensing requirement for the export of advanced production equipment for semiconductors that are not listed in Annex I*, [27]
<https://zoek.officielebekendmakingen.nl/stcrt-2023-18212.html#>.

Holland-Letz, D. et al. (2019), "Start me up: Where mobility investments are going", *McKinsey & Company*, [15]
<https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/start-me-up-where-mobility-investments-are-going>.

IEA (2023), *Electric Vehicles*, [3]
<https://www.iea.org/energy-system/transport/electric-vehicles>.

IEA (2022), *Global EV Outlook 2022*, IEA, Paris, [2]
<https://www.iea.org/reports/global-ev-outlook-2022>.

ILO (2021), *The future of work in the automotive industry: The need to invest in people's capabilities and decent and sustainable work. Issues paper for the Technical Meeting on the Future of Work in the Automotive Industry (Geneva, 15-19 February 2021)*, International Labour Office, Sectoral Policies Department, Geneva, ILO, 2020, [31]
https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/meetingdocument/wcms_741659.pdf.

IMF (2022), *Cars in Europe: Supply Chains and Spillovers during COVID-19 Times*, [18]
<https://www.imf.org/en/Publications/WP/Issues/2022/01/14/Cars-in-Europe-Supply-Chains-and-Spillovers-during-COVID-19-Times-511743>.

International Monetary Fund (2023), *World Economic Outlook: A Rocky Recovery*, [23]

<http://www.imf.org/-/media/Files/Publications/WEO/2023/April/English/text.ashx>.

New York Times (2021), "A tiny part's big ripple: global chip shortage hobbles the Auto Industry", *New York Times*, <https://www.nytimes.com/2021/04/23/business/auto-semiconductors-general-motors-mercedes.html>. [10]

OECD (2021), *OECD SME and Entrepreneurship Outlook 2021*, OECD Publishing, Paris, <https://doi.org/10.1787/97a5bbfe-en>. [17]

Pfeifer, M. (2022), "SMEs in Automotive Supply Chains: A Survey on Six Sigma Performance Perceptions of Czech Supply Chain Members", *Processes*, Vol. 10/4, p. 698, <https://doi.org/10.3390/pr10040698>. [20]

Quartz (2021), *Zimbabwe has banned the export of raw lithium*, <https://qz.com/why-zimbabwe-has-banned-the-export-of-raw-lithium-1849918099#:~:text=The%20ministry%20of%20Mines%20and,income%20economy%20has%20been%20realized.%E2%80%9D> (accessed on 2023 August). [28]

Torsoli, A., E. Milligan and A. Wickham (2023), *UK lobbies for laxer Brexit trade rules as carmakers seek help*, <https://www.ajot.com/news/uk-lobbies-for-laxer-brexit-trade-rules-as-carmakers-seek-help>. [26]

Annex D: OECD-EU WS FDI 'Supply Chain Scenario description'

Scenarios

The following scenarios are based on the axes of globalisation vs. deglobalisation and collaboration vs. competition. The scenarios would explore how the global integration or fragmentation of the automotive industry would affect the various GVC participants, alongside the trends of cross-industry collaboration or increased competition among key players. This can range from scenarios where collaboration and cooperation lead to a more integrated and equitable GVC, to scenarios where intense competition results in power imbalances and fragmentation. Workshop participants can explore how the balance of power within the automotive GVC can either foster collaboration and innovation or lead to competitive struggles and disparities.

Scenario 1: Global Integration and Integrated Collaboration

Globalisation with collaboration:

The global automotive value chain remains highly interconnected, characterized by open markets, international cooperation, and a strong emphasis on global integration. The automotive GVC continues to span across borders and has successfully embraced green and digital technologies. While the availability of raw materials remains limited, technological advancements between countries lead to the sharing of technology and scientific knowledge, while governments express their commitment to economic liberalisation and trade openness. Geopolitical tensions related to the automotive industry are mitigated through dialogue and cooperation. International automotive agreements and standards are widely adopted, creating a cohesive global automotive ecosystem. There is a high degree of collaboration among OEMs, Tier 1, Tier 2, and Tier 3 suppliers, as well as new market entrants. They work together closely to share innovation, knowledge, and resources. These collaborations result in a highly integrated and interconnected GVC where each participant plays a crucial role in the value chain. The balance of power is more equitable, with collective efforts driving sustainability and technology adoption.

Scenario 2: Global Integration and Exclusive Dominance

Globalisation with dominant players:

In this scenario, globalisation persists, characterized by open markets, international cooperation, and a strong emphasis on global integration. Governments express their commitment to economic liberalisation and trade openness and work together to harmonise industry standards and regulations on smart and green mobility to ensure compatibility across regions. The automotive industry has adopted green and digital technologies but certain world regions and value chain segments still lag behind because a few industry giants have achieved exclusive dominance in the value chain. They have significant control over critical technologies, patents, and supply chain resources, limiting the influence of smaller suppliers and new entrants. GVC participants, including OEMs, suppliers, SMEs, and new market entrants, prioritize their individual interests and market power. Collaboration is minimal, and power is concentrated in the hands of a few. Competitive rivalries and protectionist strategies result in a fragmented and inefficient ecosystem.

Scenario 3: Fragmentation and Integrated Collaboration

Regional Resilience and Collaboration:

In this scenario, geopolitical tensions, trade restrictions, and reshoring strategies have led to a regionalized automotive industry with less global integration. The world experiences a rise in geopolitical tensions and a retreat from global cooperation. Major powers adopt protectionist stances, leading to trade disputes and increased regionalism. International institutions struggle to maintain their relevance, and multilateral agreements are frequently challenged or abandoned. Deglobalisation leads to the fragmentation of global supply chains. Nations focus on self-sufficiency and prioritize domestic industries. Protectionist policies, including tariffs and import and FDI restrictions, become commonplace. Regulations become more fragmented and divergent across countries. There is less harmonization of standards, making it challenging for businesses to navigate differing regulatory landscapes. Despite deglobalisation, the automotive value chain has wholeheartedly embraced green and digital technologies, with OEMs leading innovation. There is a high degree of collaboration among regional stakeholders. OEMs, suppliers, SMEs, and new market entrants such as ICT companies prioritize working together to drive innovation, efficiency, and sustainable practices. However, these industry partnerships are limited to specific regional blocks.

Scenario 4: Fragmentation and Exclusive Dominance

Regional Dominance with Limited Global Integration:

In this scenario, geopolitical tensions, trade restrictions, and reshoring strategies result in a highly regionalized automotive industry with limited global integration. Major powers adopt protectionist stances, leading to trade disputes and increased regionalism. Economic growth becomes uneven, with some countries experiencing stagnation while others pursue isolationist economic policies. Regulations become more fragmented and divergent across countries and there is less harmonization of standards. The automotive value chain struggles to adopt green and digital technologies. A few regional giants achieve exclusive dominance within their regions, controlling critical aspects of the value chain. Collaboration is limited, and competition often turns into rivalry, leading to fragmentation and inefficiencies within the value chain. Trade barriers and protectionist measures hinder the flow of automotive components and technologies across borders. FDI is restricted as nations focus on safeguarding their domestic industries, leading to isolated and self-reliant approaches. The automotive industry faces challenges related to supply chain disruptions, reduced innovation, and economic stagnation as a result of this dominance-focused approach.