Technology Partners for Sustainable Foundry Strategies

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on behalf of

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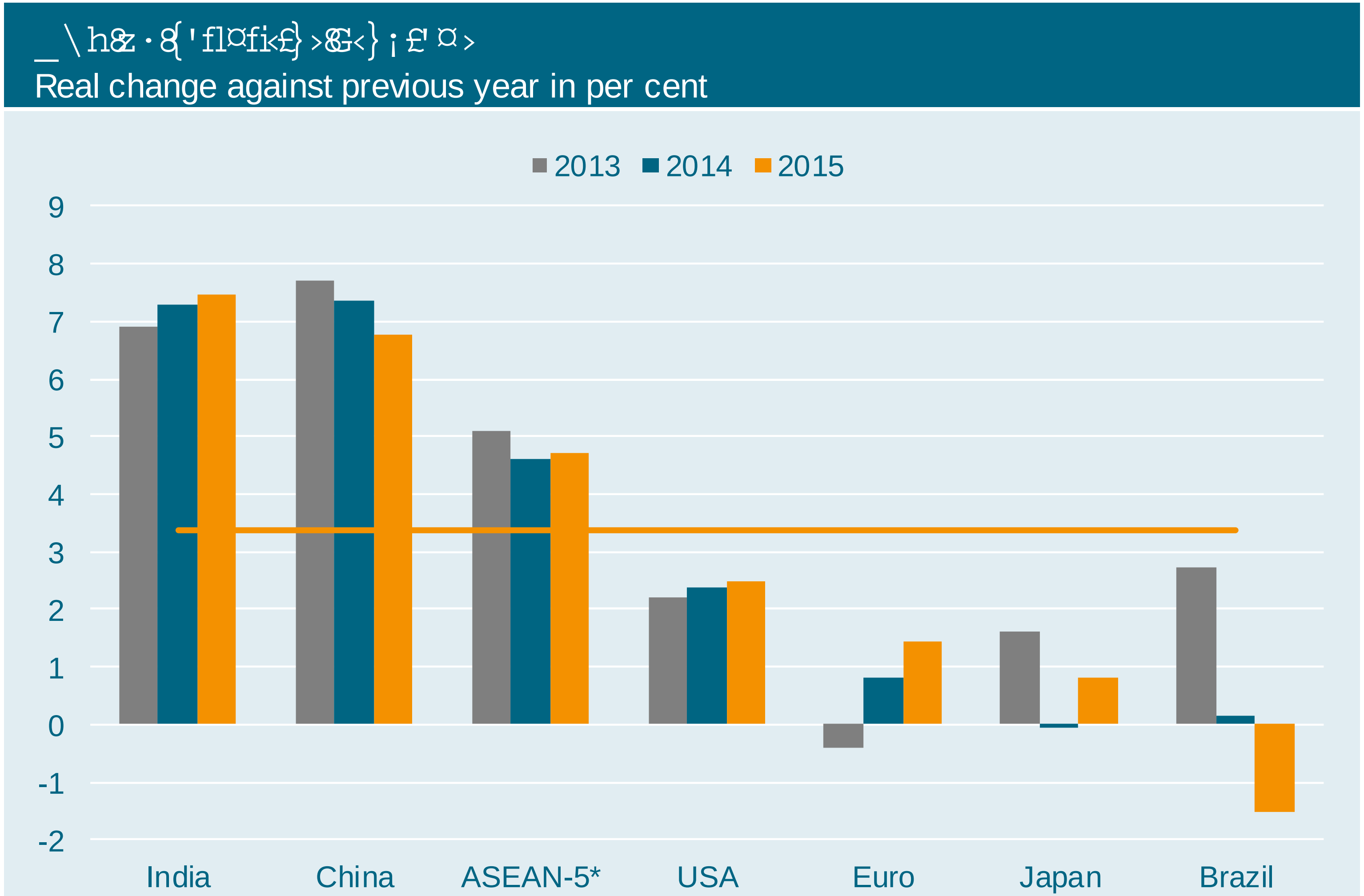
Dr. Timo Würz, General Secretary

Overview

- Macroeconomic situation
- Relevant industrial sectors
- CEMAFON statistics / foundry statistics
  - German foundries' situation
- Process and technology support for the casting value chain

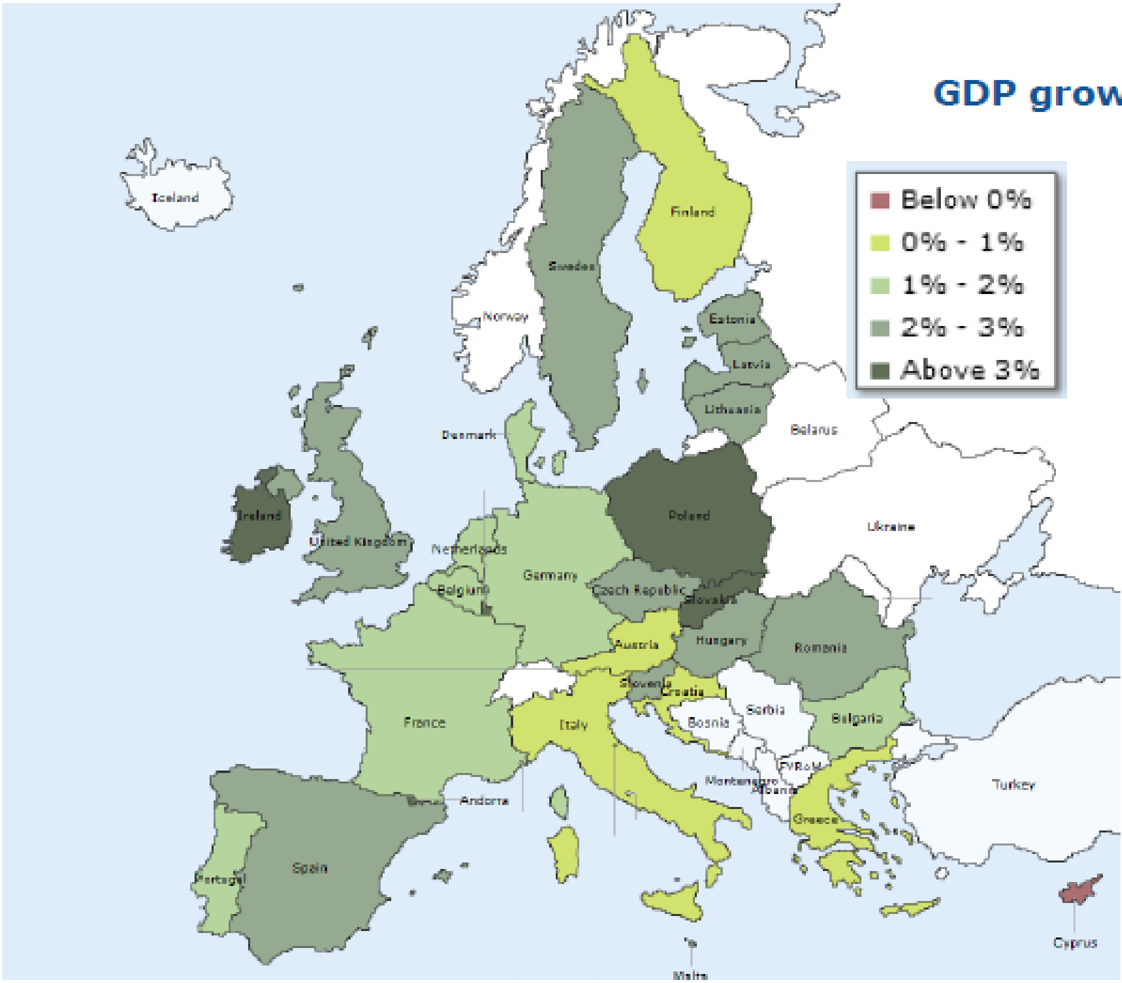
GDP by countries / regions



*Indonesia, Malaysia, Philippines, Thailand and Vietnam.

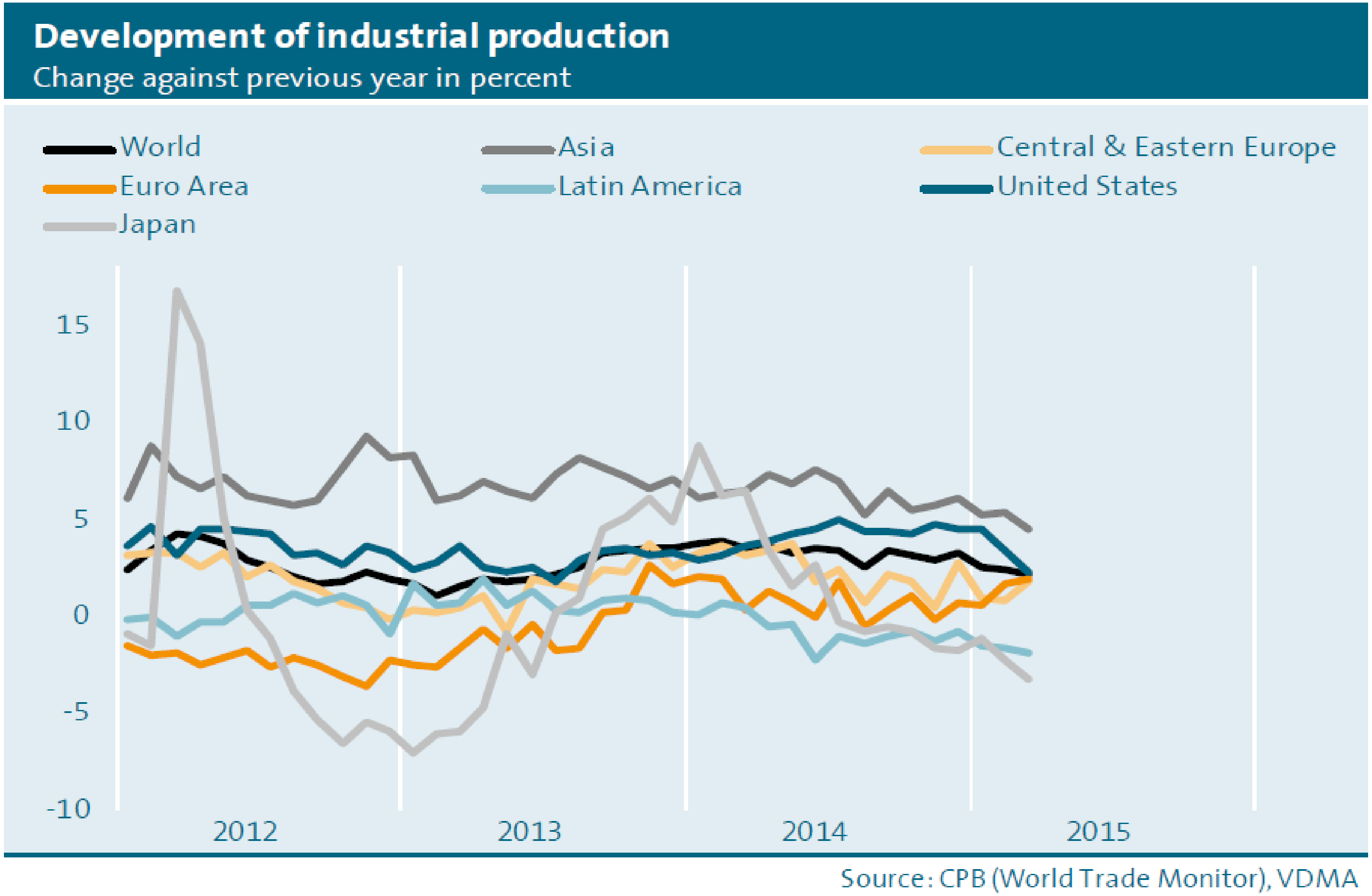
Source: IMF (July 2015), VDMA

2015 European GDP growth forecasts



Source: European Commission

World regions: Development of industrial production



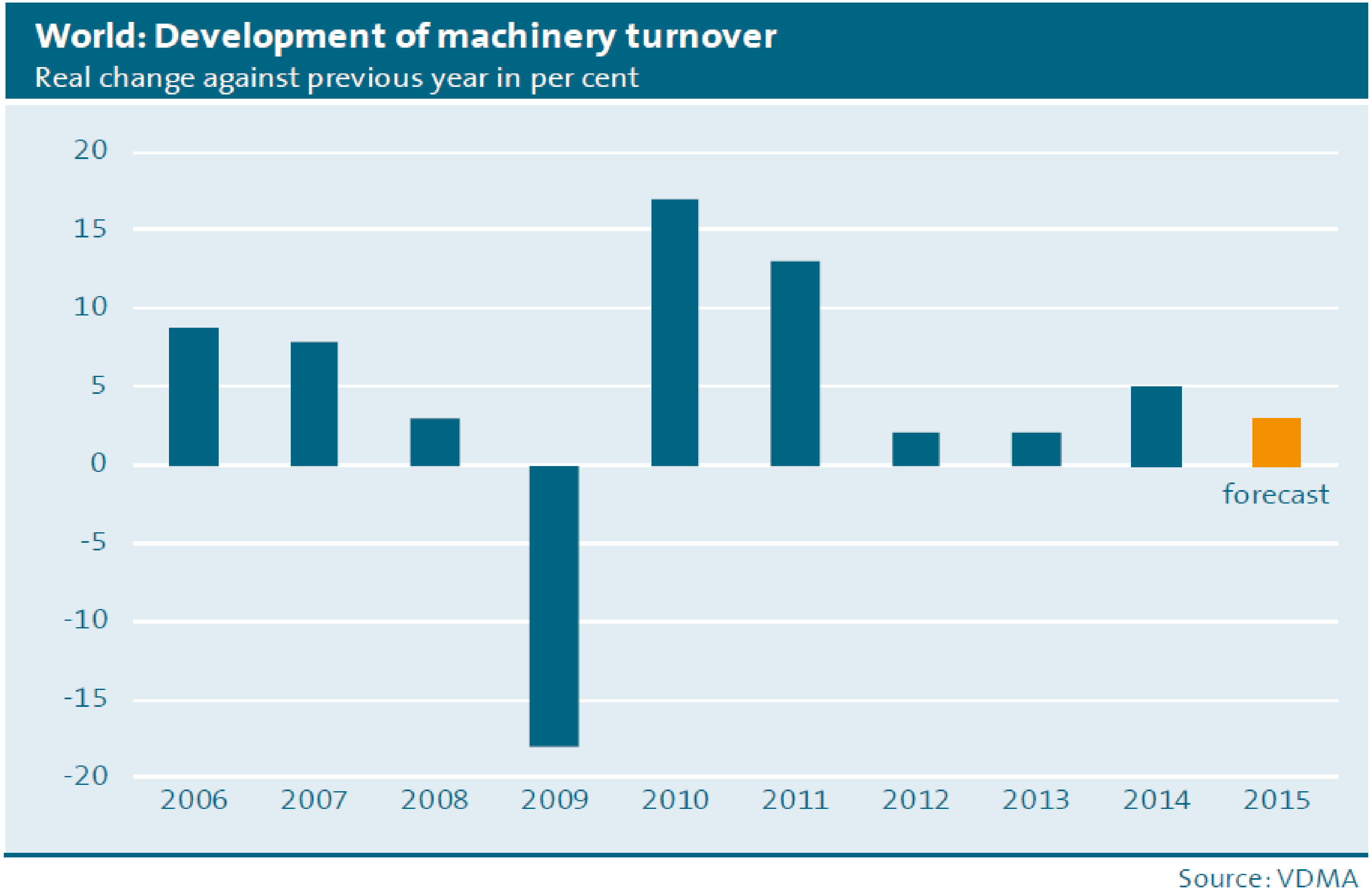
World industry production
Growth and quality

- World industry production highlights

- World metal casting production
  - 103,229,774 metric tons (2013)
- World motor vehicle production
  - 89,747,430 units (2014)
- World crude steel production
  - 1,649 megatons (2013)
- World machinery turnover
  - 2,330 billion Euros (2014)

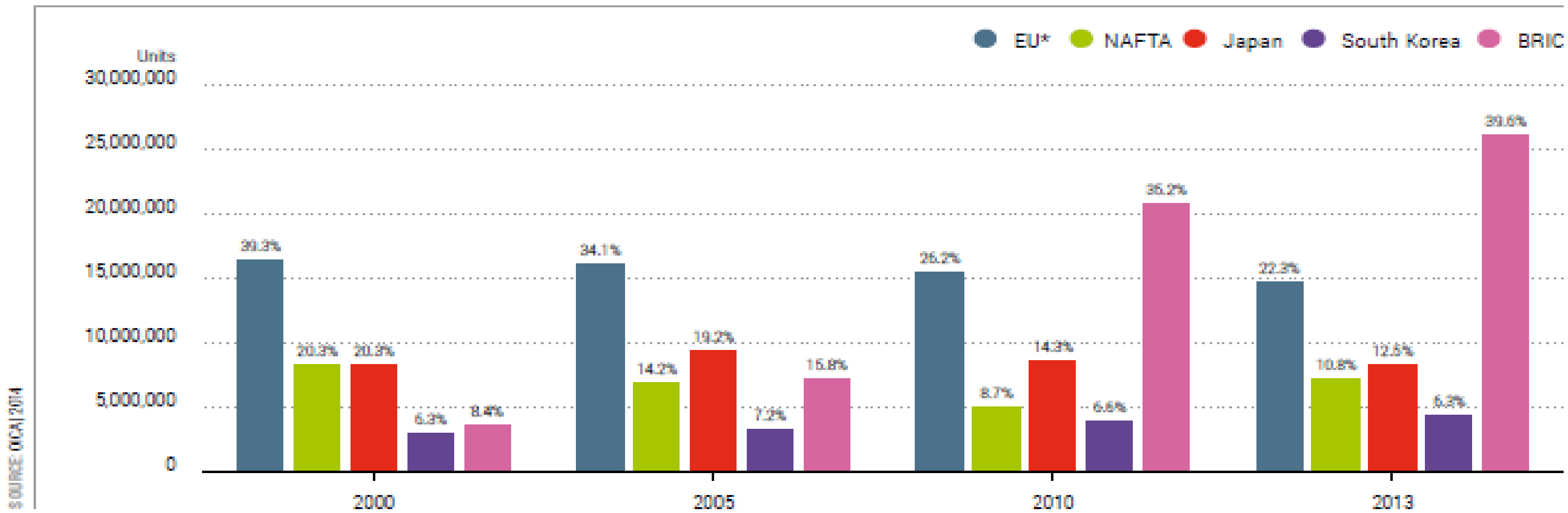
Source: Modern Casting (48th World Census); OICA; Worldsteel Association; VDMA estimate

World: Development of machinery turnover



Passenger car production 2000 – 2013

Passenger car production — **international comparison, % share | 2000 – 2013**



Passenger car production — **world | 2013**

	VOLUME	% SHARE
EU*	14,616,202	22.3%
NAFTA	7,084,136	10.8%
Japan	8,189,323	12.5%
South Korea	4,122,604	6.3%
BRIC	25,886,146	39.6%
Others	5,534,876	8.5%
Total World	**65.433.287**	**100%**

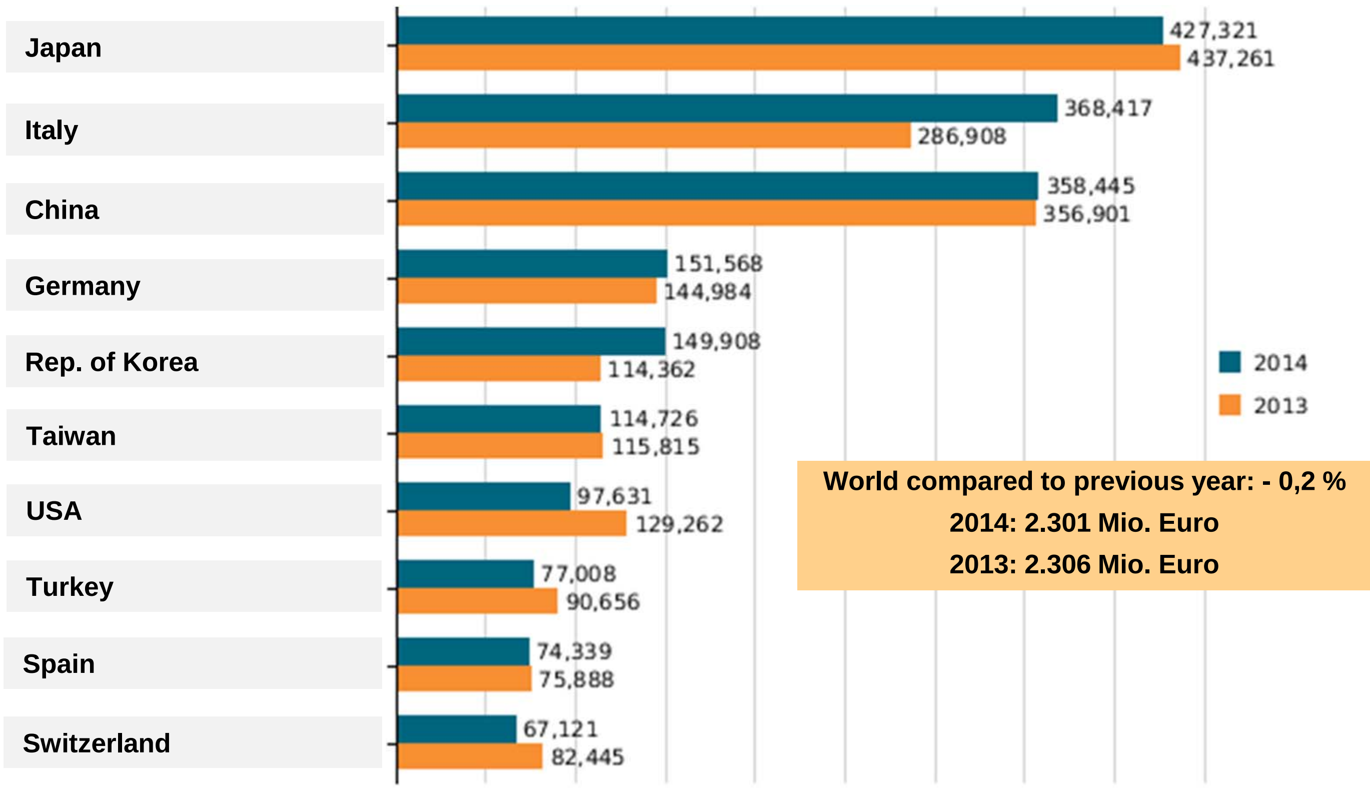
SOURCE OICA | 2014

* constant EU27 perimeter throughout the period

Source: ACEA

World machinery trade – major export nations for foundry machinery 2014 / 2013

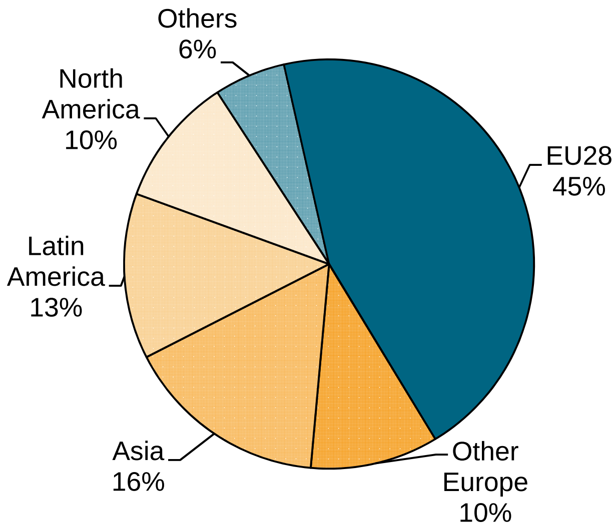
World machinery trade – major export nations for foundry machinery in million euros



Source: National Statistical Offices, VDMA

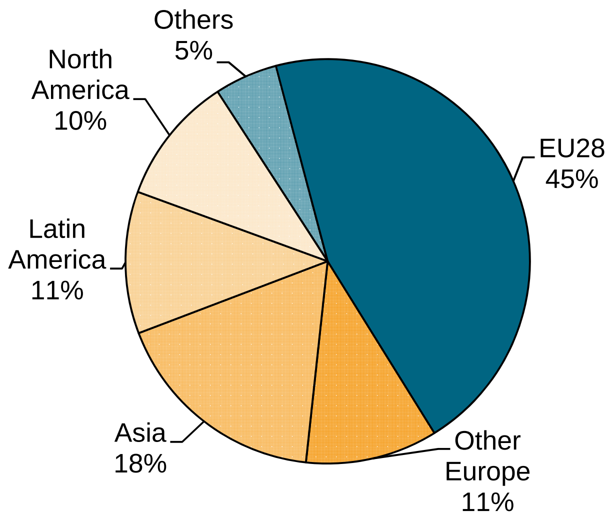
Export structure
CEMAFON 2014 / 2013

2013



Europe (CEMAFON) – 604 mill.€

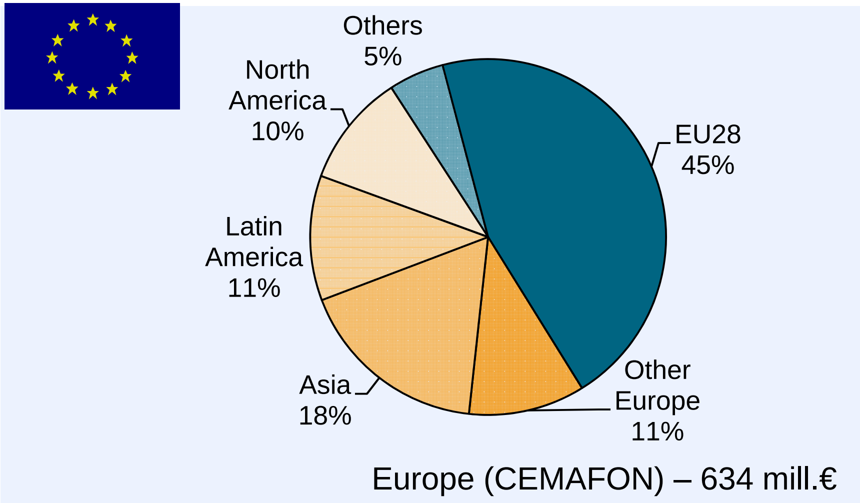
2014

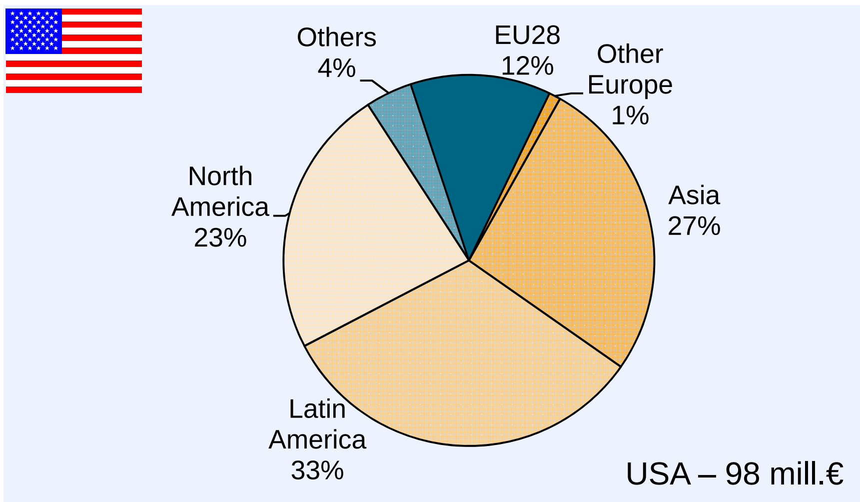


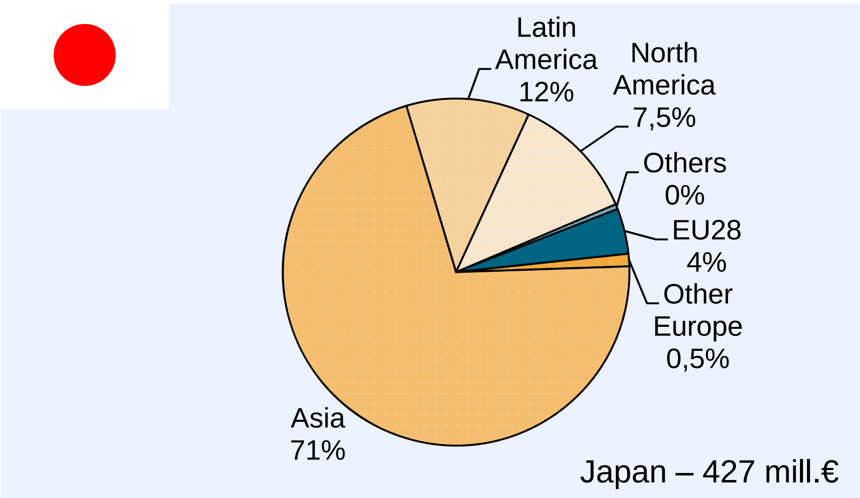
Europe (CEMAFON) – 634 mill.€

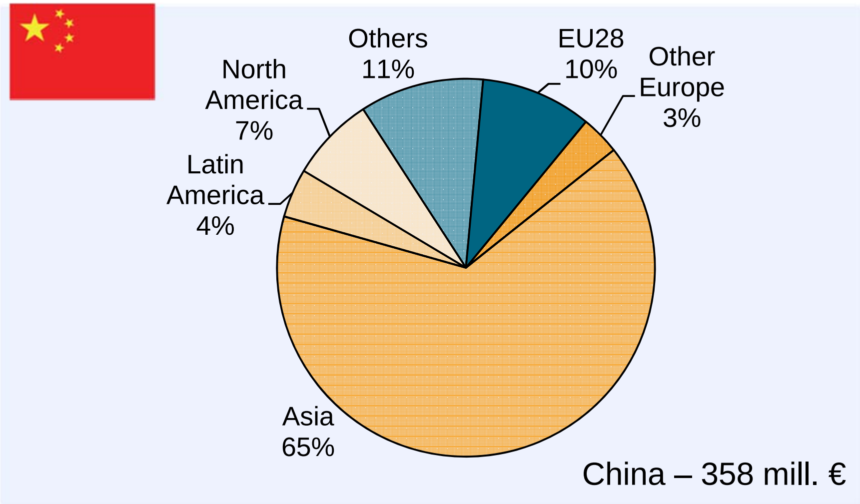
Source: National Statistical Offices, VDMA

Export structure
CEMAFON, USA, Japan and China 2014



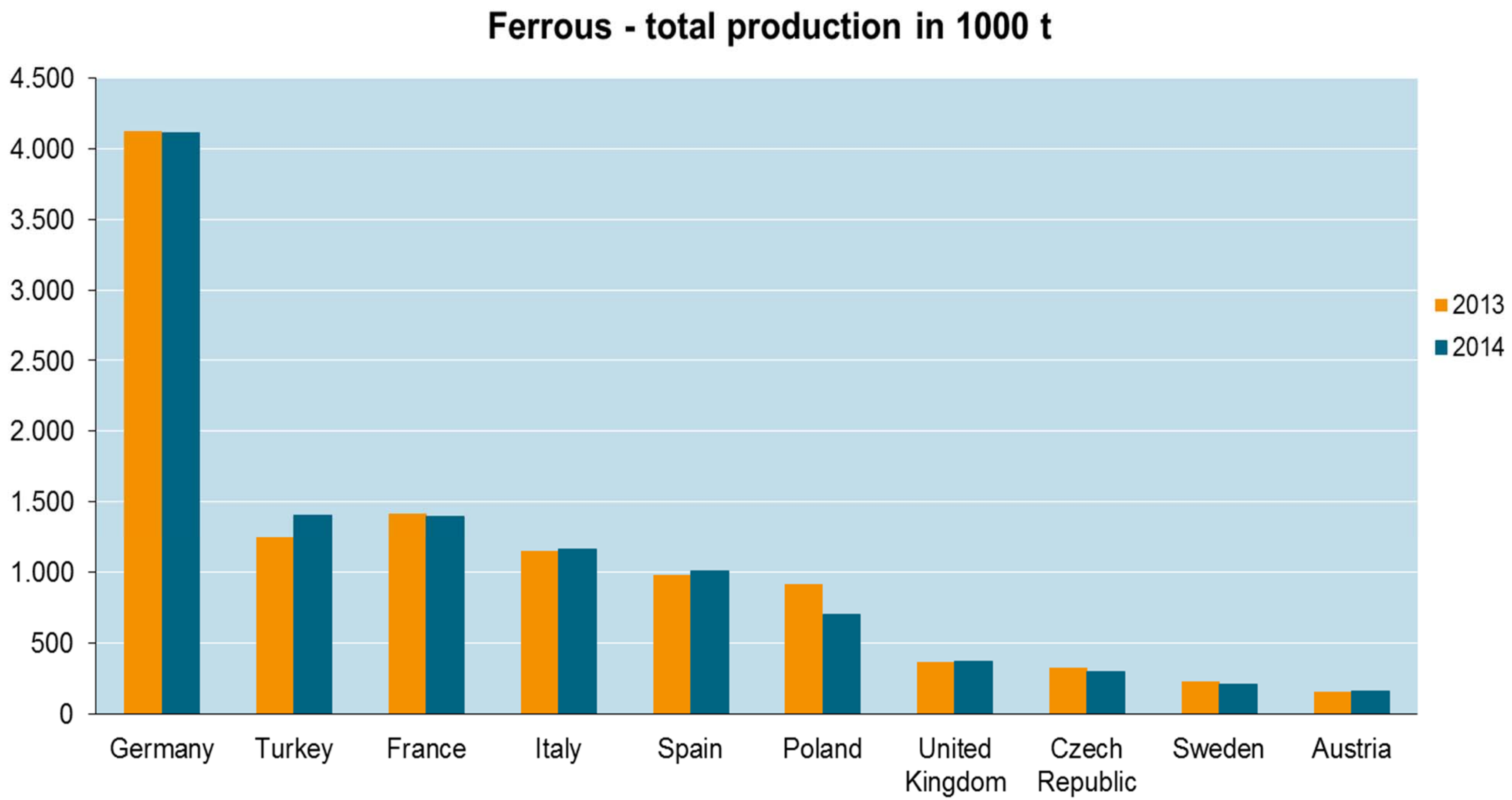






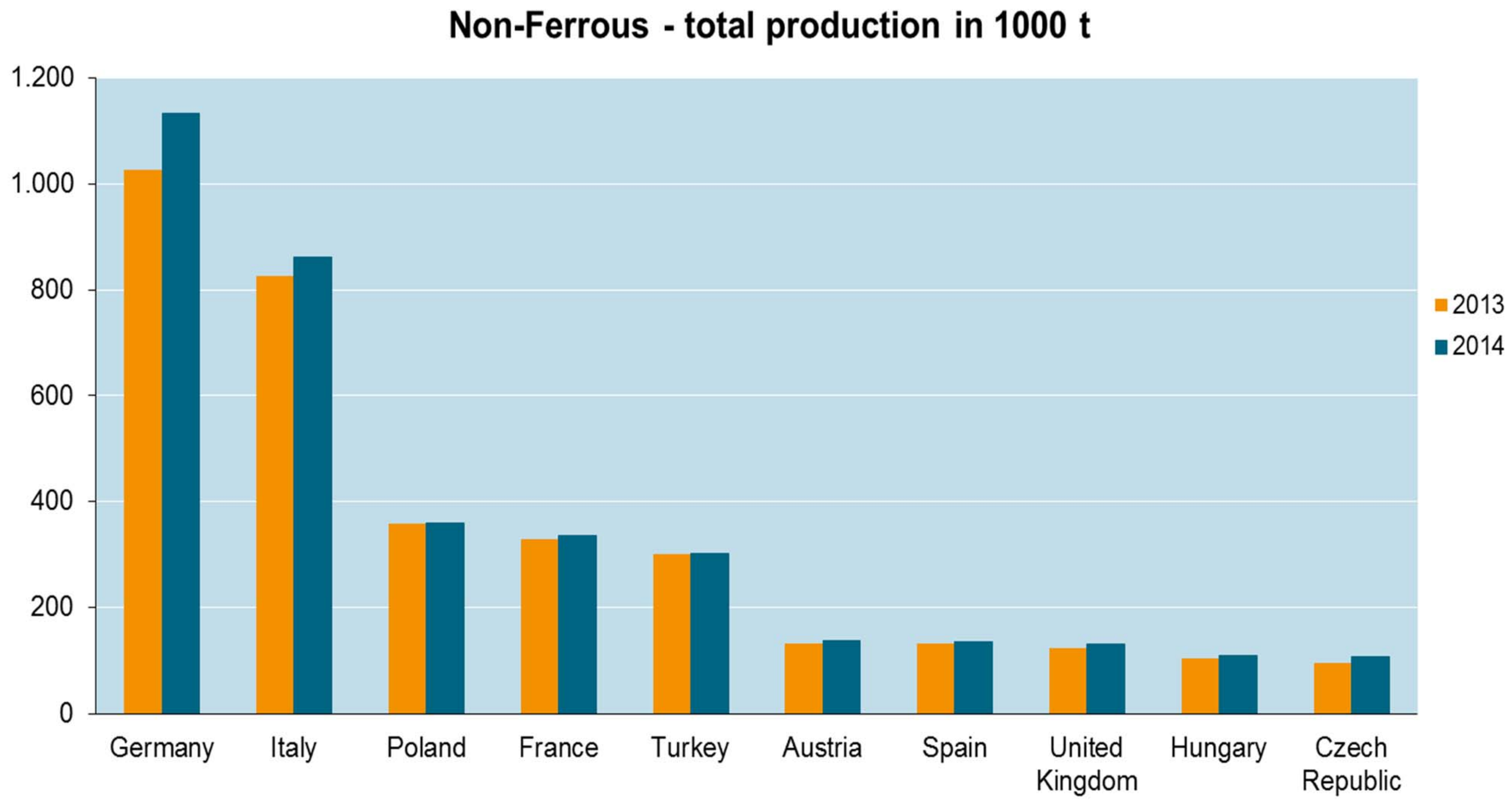
Source: National Statistical Offices, VDMA

CAEF casting production – top ten producers 2013 / 2014



Source: German Foundry Association (BDG), CAEF

CAEF casting production – top ten producers 2013 / 2014



Source: German Foundry Association (BDG), CAEF

Key data – 2014
Foundry trends – e.g. Germany

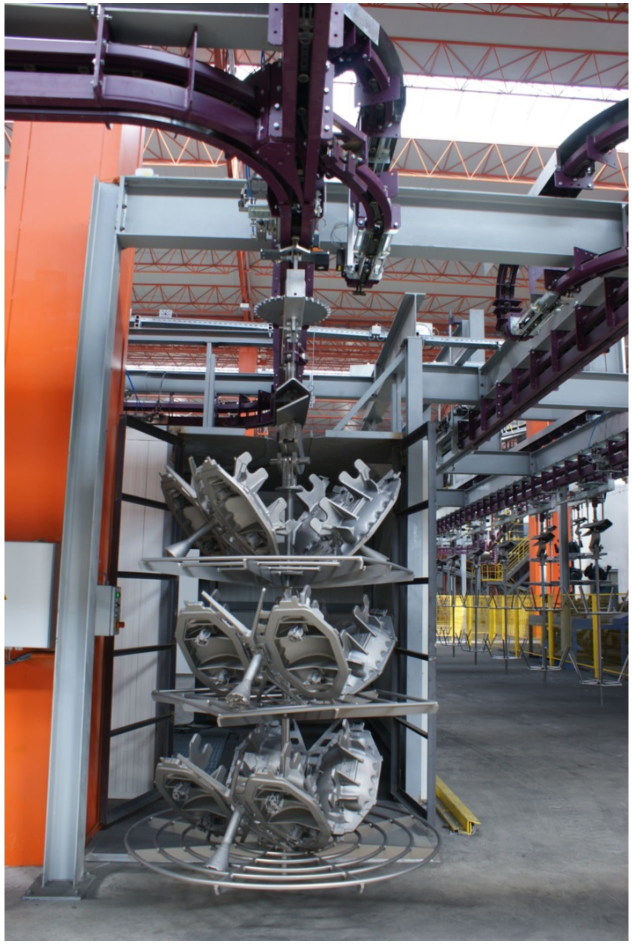


Photo: Agtos

Production

- 5.248 mill. t
  - Fe: 4.116 mill. t; NF: 1.132 mill. t

Turn-over

- ca. 13.295 bn. € *
  - Fe: 7.307 bn. €; NF: 5.988 bn. €

Workforce

- 78,800 *
  - Fe: 44,200; NF: 33.300
  - 595 foundries

* (foundries with staff > 50)

Source: BDG – German Foundry Association

Customer sectors 2014
Foundry trends – e.g. Germany

Iron and steel castings (total)

- 4.116 mill. t / - 0.2%
- 7.3 bn € / + 0.4%

Vehicle manufacturing

- 2.290 mill. t
  - 56% / + 1%

Machinery

- 1.058 mill. t
  - 26% / - 3%

Other

- 0.769 mill. t
  - 19% / + 1

Non-ferrous castings (total)

- 1.132 mill. t / + 10.4%
- 6.0 bn € / + 9.7%

Vehicle manufacturing

- 0.875 mill. t
  - 77% / + 17%

Other

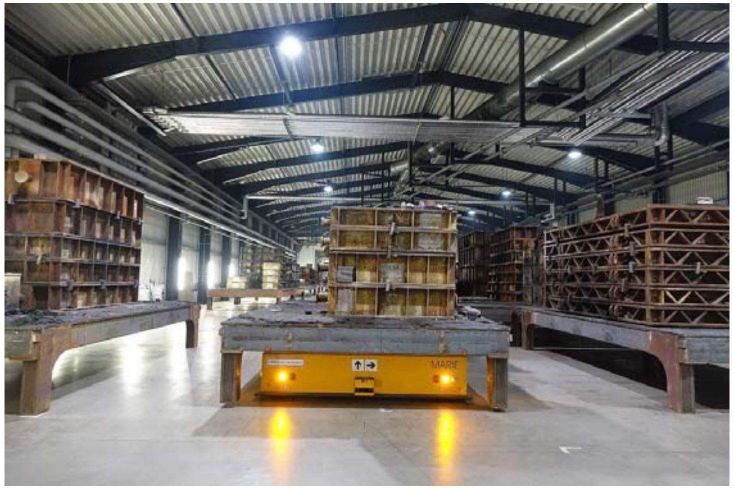
- 0.258 mill. t
  - 23% / - 8%

Machinery

  - 1%

Source: German Foundry Association (BDG)

Innovation and modernization
Foundry trends – e.g. Germany



Photos: Kurtz, KUKA

Productivity

- continuous investment related to new processes / materials (appr. 500 – 600 mill. € / year)
  - light-weight components
  - resource and energy efficiency
  - increased complexity of castings
  - closer tolerances
  - combined materials
  - increased use of structural components
  - increased share of non-ferrous metals
  - continuous process networking ('Smart Foundry')
- technology and market driven

Source: German Foundry Association (BDG), VDMA

Global casting value chain challenges
Business and economy

Foundries and foundry machinery suppliers need to cope with

- Competing technologies
- Competing materials
- Efficiency and sustainability issues
- Customer industries' requirements
  - Globalisation / localisation
  - Market dynamics
  - Quality of services and logistics
- Macroeconomic developments
  - E.g. commodity prices
  - E.g. fluctuations of currencies
- *Skills, efficiency, productivity and flexibility are key*

Source: VDMA, German Foundry Association (BDG), IKB Deutsche Industriebank

Global casting value chain challenges
Processes and technology

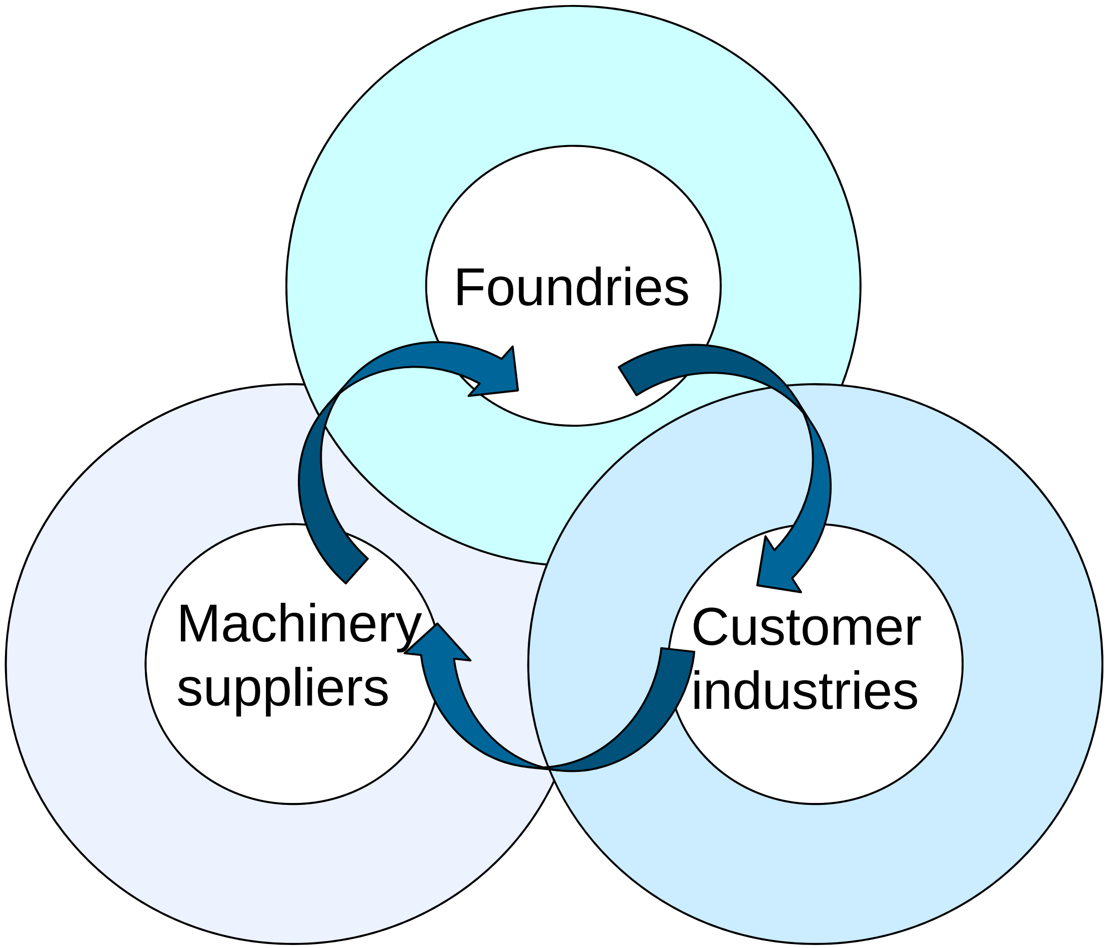
Efficiency improvement, resource conservation, productivity

- From component supplier to system partner
  - Enabling technologies for
    - increased complexity of castings
    - closer tolerances
    - light-weight structures
    - high-quality metals
    - combined materials
  - Energy-efficient components & processes
  - Process simulation / optimisation
  - Harmonization of resource flows (energy, water, consumables)
  - Networked automation and data mining
  - Integration of additive manufacturing technologies
  - Full-service over complete life-cycle
- Innovative technology for sustainable production and increased productivity

Source: VDMA

CEMAFON

Foundry partners – striving for excellence



➢ Tailor-made solutions for business excellence

Thank you for your attention!

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