PRIORITIES FOR ADDRESSING OPPORTUNITIES AND GAPS OF INDUSTRIAL BIOTECHNOLOGY FOR AN EFFICIENT USE OF FUNDING RESOURCES (PROGRESS)

Final Conference September 27th, Brussels

In-depth Analysis and Scenarios for Enzymes

Bärbel Hüsing

progress

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 723687

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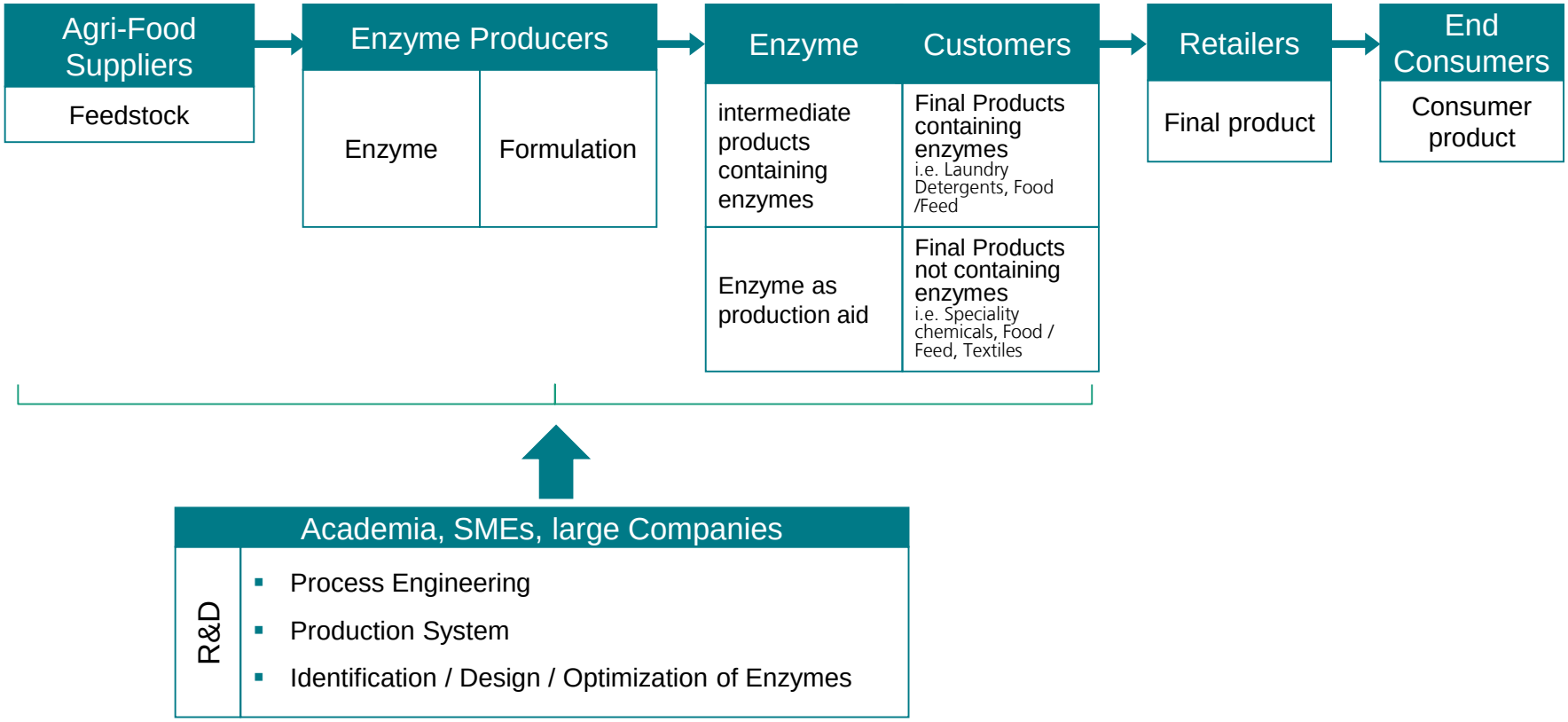
Value Chain - Enzymes



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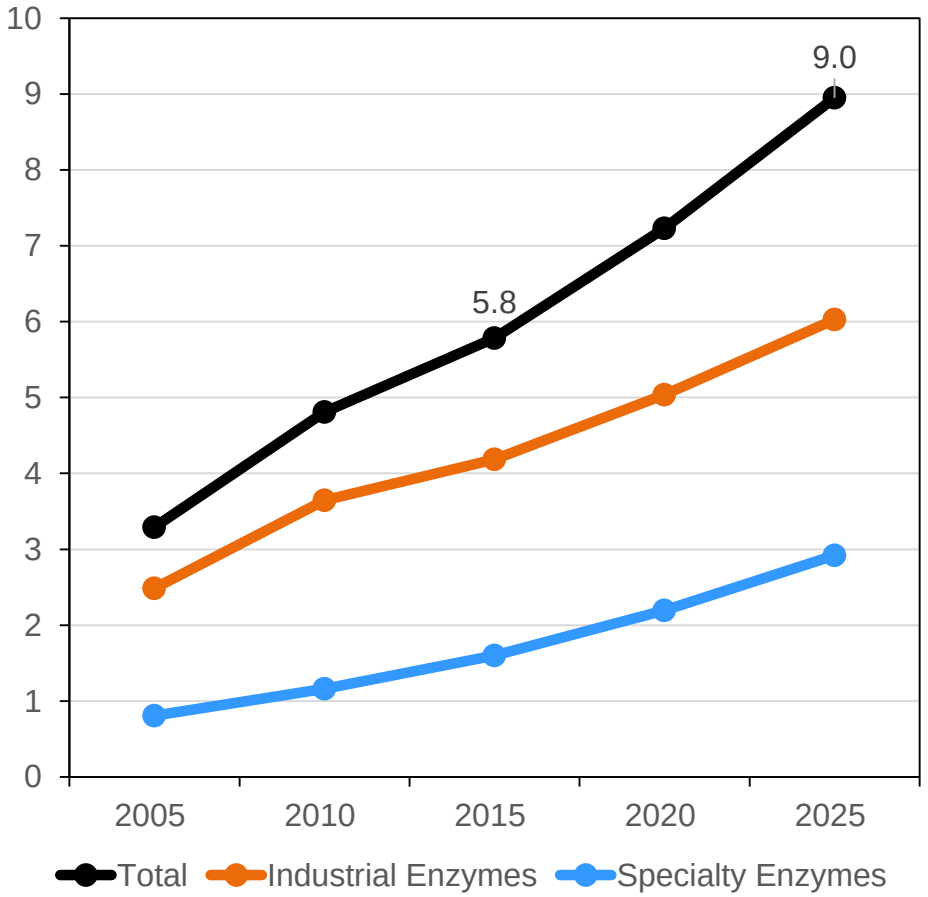
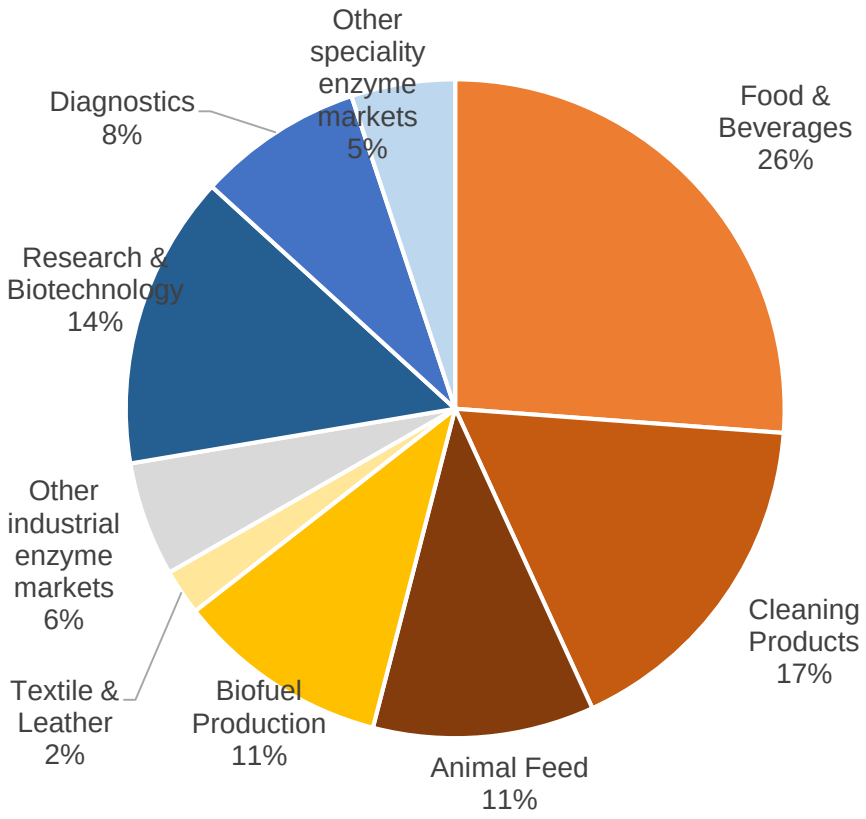
Global Enzyme Market and Enzyme Applications

World Enzyme Demand (billion $)



World Enzyme Demand, by application

2015, total = 5,8 billion $



Source: Freedonia Market Research, 2016

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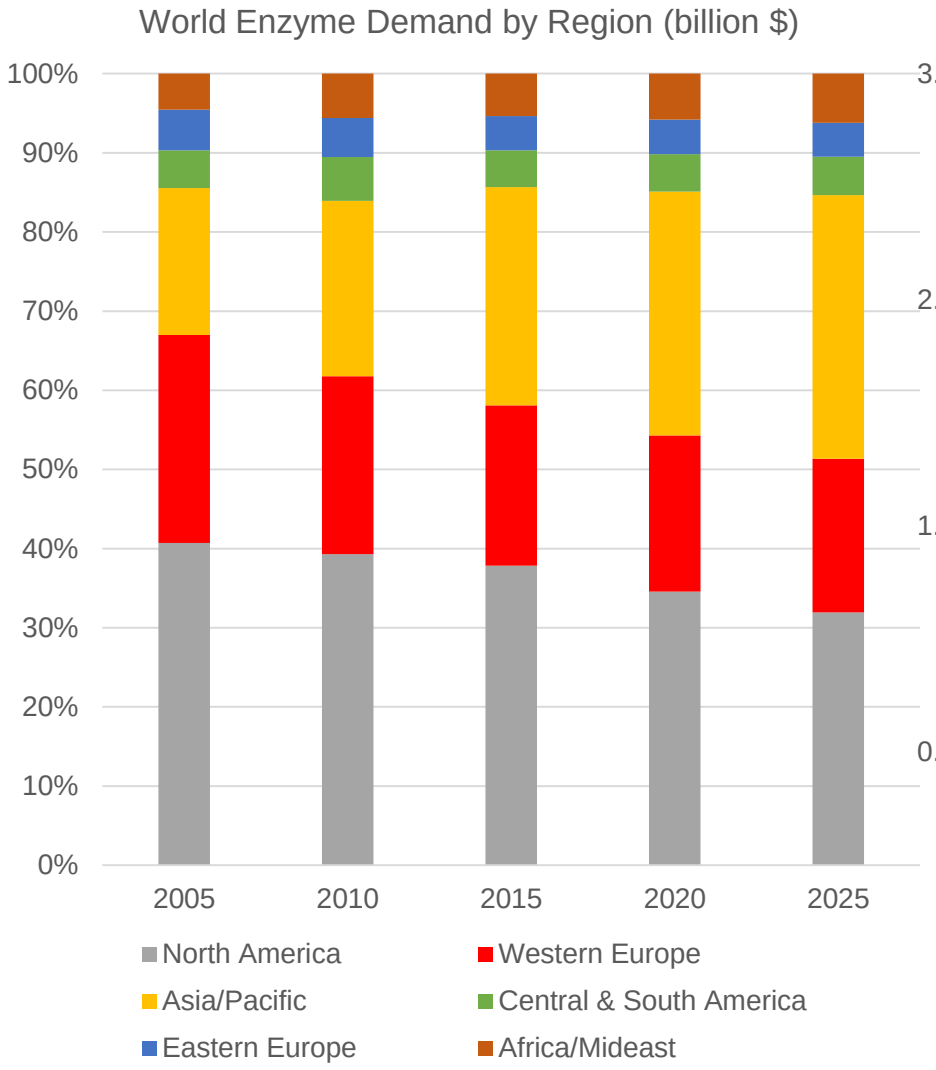
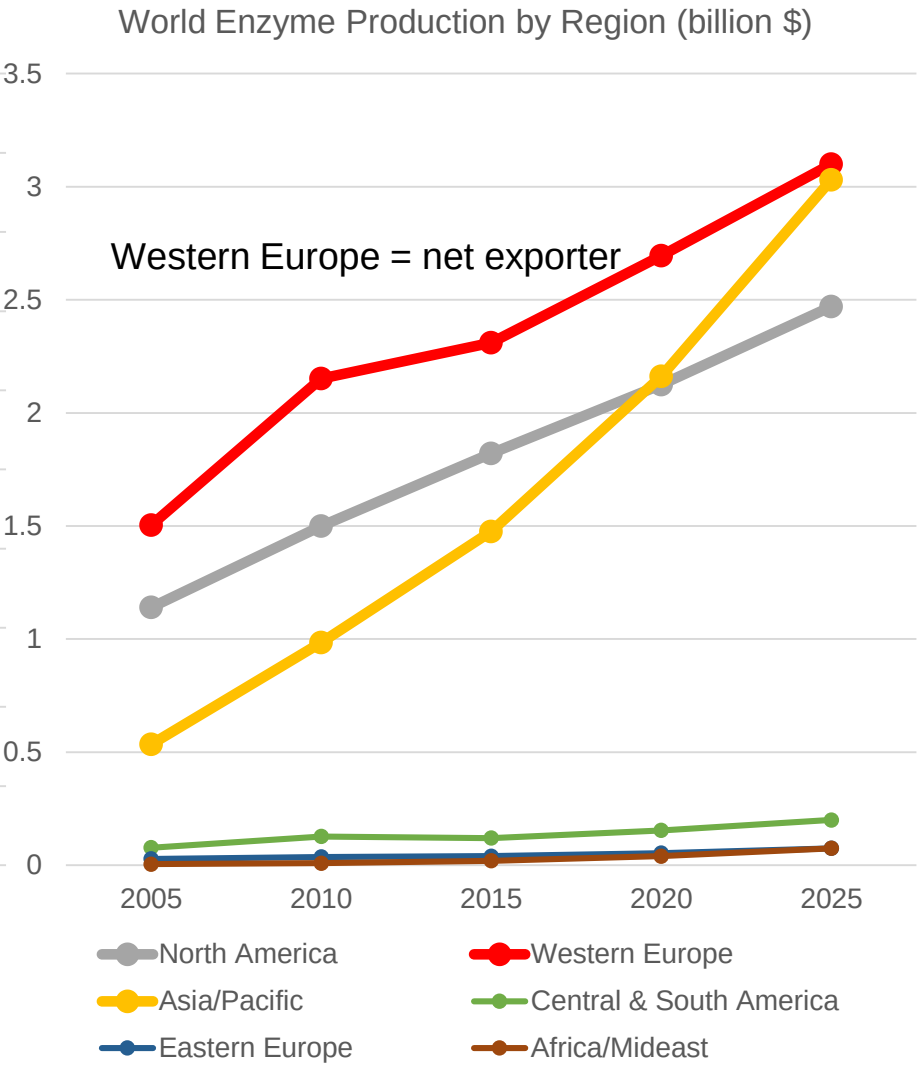
Enzyme Market – European position





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Key developments and factors for the value chain

Technology	Business	Policy
▪(Methods for) novel and optimized enzymes ▪Novel applications (e.g. waste, customer-specific needs) ▪Novel approaches (e.g. multi-enzyme cascades, cell-free enzyme production) ▪Academia and SMEs as technology and innovation providers; strong IP position of large enzyme companies	▪Growth and increased demand by emerging middle class ▪Leading position challenged by emerging players (e.g. China, India) ▪Strategic focus on technological excellence, innovative products, customer/country-specific needs ▪Geographical distribution of activities (R&D, production, sales) ▪Market pull dependent on policy framework, oil price	▪Policy support for substitution of fossil feedstocks, resource-efficient industrial production ▪Regulation for technology and safety/health aspects of enzymes

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Future Scenarios

1. Technology push, "optimal"	2. High oil price, consumer concerns	3. Supporting policy, global competition
▪Significant technological progress, new approaches quickly adopted by industry ▪Intensive cooperation between academia, large and SM Enterprises ▪Positive perception by customers and end-users ▪Growth in all market segments ▪EU leads in innovation and production - even relocation of enzyme production (Asia to EU)	▪Replacement of fossil-based feedstocks and chemicals ▪Enzyme use "in body contact" disfavoured (perception, regulation, R&D investment) ▪EU focuses on certain industrial uses, loses other segments to Asia which innovates in all fields	▪Coordinated EU policy (R&D support, market pull measures) ▪Moderate knowledge transfer SME – large companies ▪Intensive competition from Asia/Pacific region, significant advances in R&D and production ▪Competitive advantage of EU companies over Asia maintained in certain segments due to technology and process innovations

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Conclusion

- Enzyme value chain is a key enabler for
  - substitution of fossil by renewable feedstocks
  - for optimisation of environmental performance of industrial production
  - for novel products, processes, services, applications in broad range of process industry sectors and consumer goods
- Significant contribution to value added of final products
- Europe's leading position is challenged by Asia/Pacific region
- Important role of public R&D&I policy, but R&D priorities and strategies of large leading companies equally important
- Focus on technological excellence, innovative products and applications
- Favourable market conditions and demand pull by high oil price, environmental standards and positive public perception

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BACKUPS, RESERVE

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Patent applications

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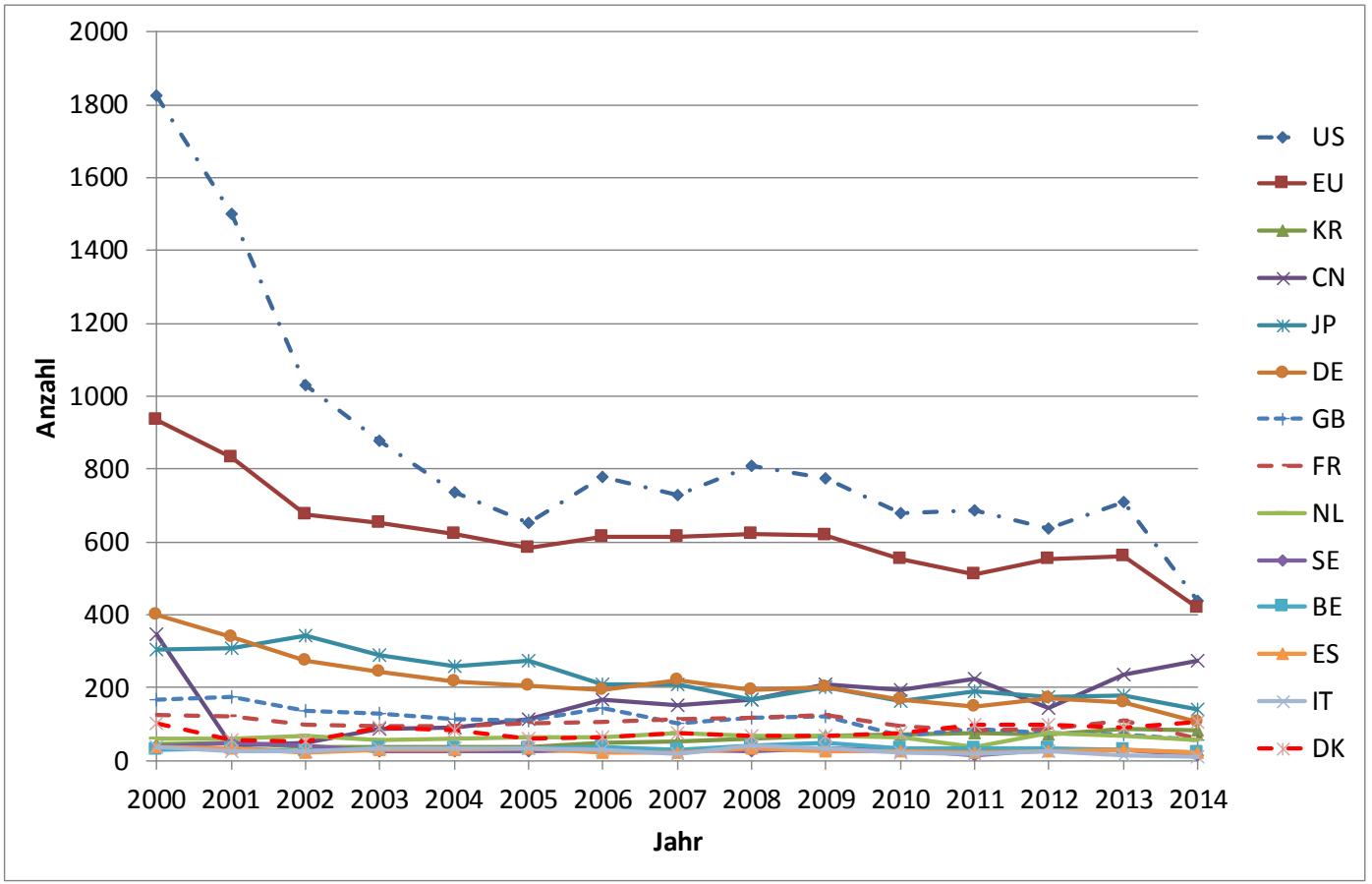

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