Measuring the Regional "Third-Mission-Potential" of Different Types of HEIs

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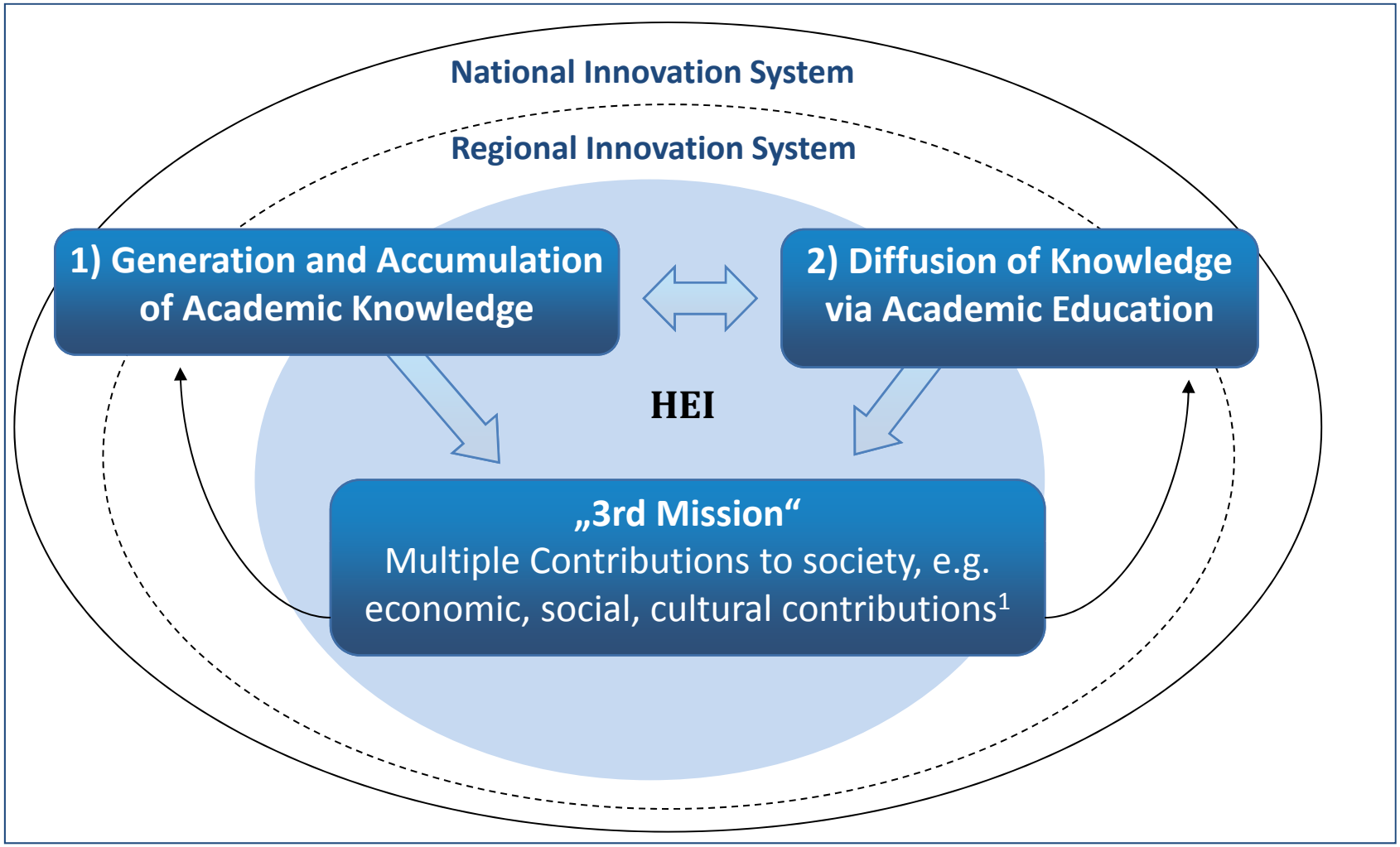
Functions of Higher Education Institutions



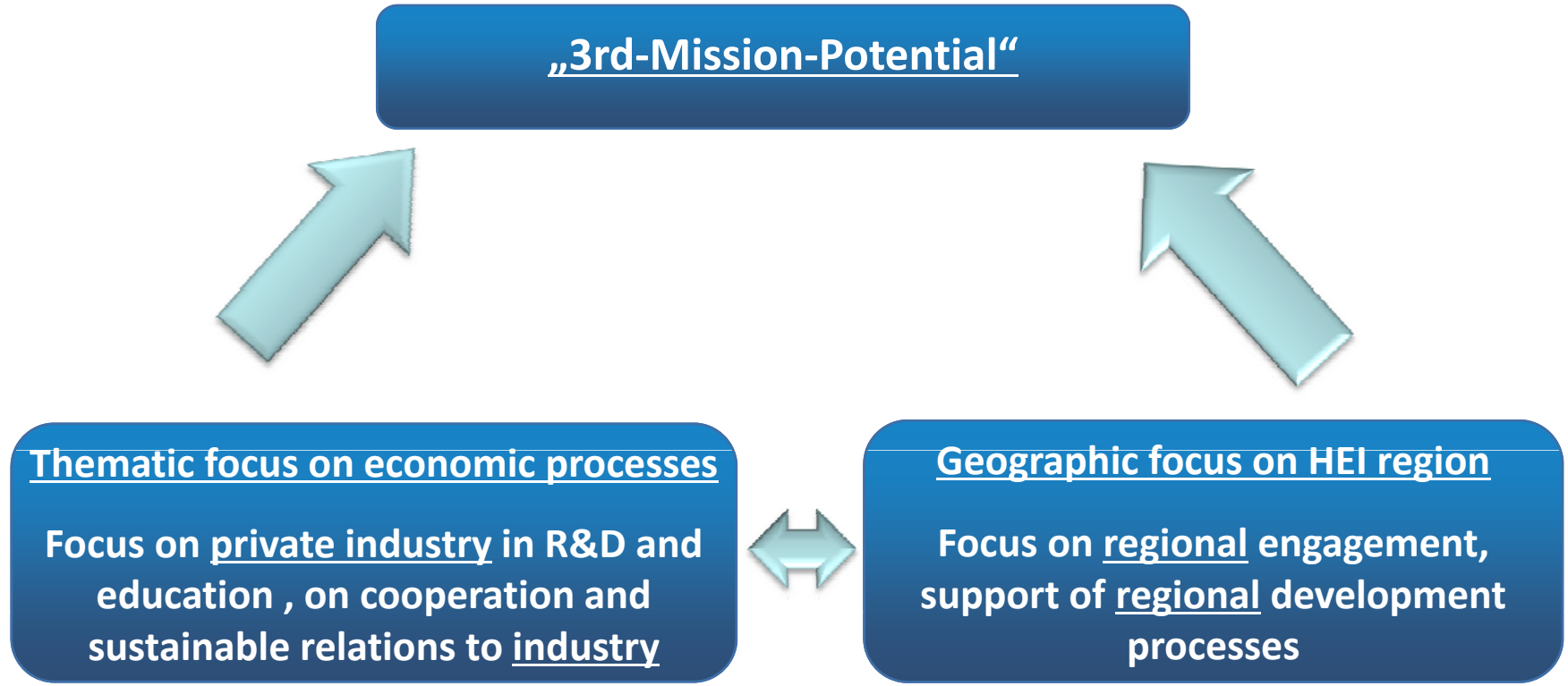
[1] Trippl / Sinozic / Smith 2012, p. 21

Functions of Higher Education Institutions
3rd Mission

→ **No clear definition, but several key concepts:**

- **Triple helix model** university-industry-government (Etzkowitz / Leydesdorff 2000)
- **The engaged university model**: university functions adapt to regional needs (e.g. Uyarra 2010)
- **Regional innovation systems concept:** innovation as social process in subsystems of knowledge generation & exploitation, enabled by institutions, supported by interaction (Asheim et al. 2011, Bathelt /Depner 2003)
- **Mode 2 of knowledge production approach:** knowledge generation by interaction of different disciplines and applicability to real-life problems (Gibbons et al. 1994)
- **Entrepreneurial university model:** targeting economic autonomy and knowledge transfer to industry (Clark 2001, Etzkowitz et al. 2000)
- **Regional System Builder:** HEI have socio-economic responsibility to build and support regional systems (Caniels / van den Bosch 2011)

Intermediary Factor of Influence:
3rd Mission Potential



Research Objectives

1) **Developing an empirical measure for 3rd-Mission-Potential**

2) **Applying this empirical measure to analyze the German Higher Educations System:**

- **Research Question 1:** The activities of which type of HEI - universities of applied sciences (*Fachhochschulen*) or universities (*Universitäten*) - are more focused on private industry employment?
- **Research Question 2**: The activities of which type of HEI are thematically better aligned with structure of private industry employment in the geographical environment, the HEI region?

Developing an Empirical measure for 3rd-Mission-Potential

Analyzing congruence between…

→ Structure of Education at HEI

- Data of German HEI graduates 2011
- Dissected by study fields, classification of Federal Statistical Office, 4-digit level
- Considered HEI: public, no religious / private HEI, no special thematic focus; N 1= 100 UAS, N2 = 80 U

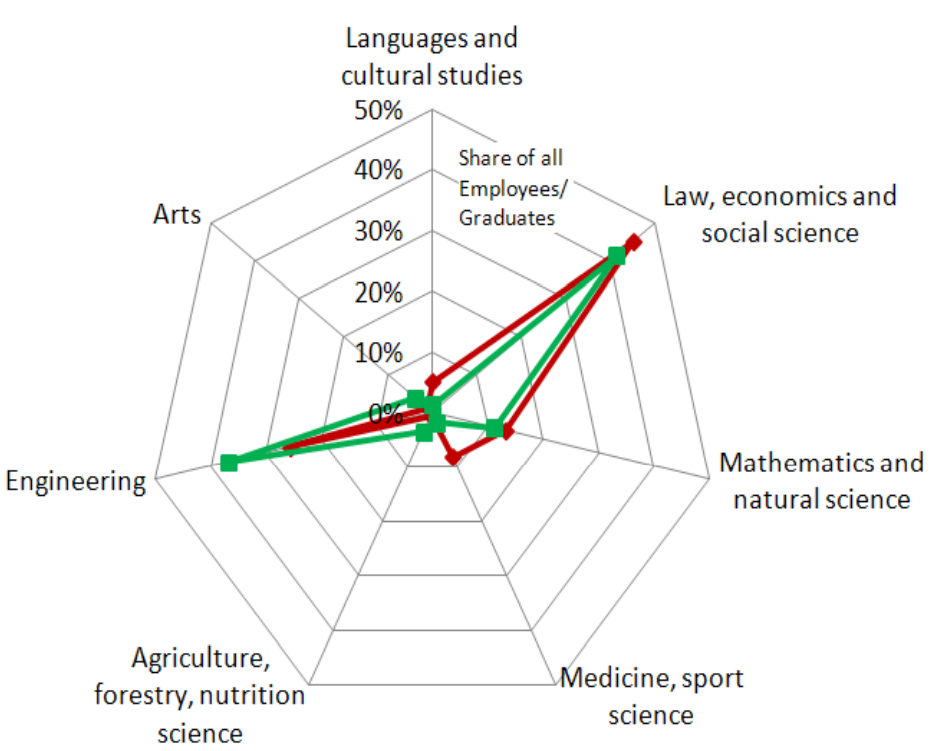
→ Structure of Employment

- Privat industry employment (*SvB*) 2011
- Dissected by occupations, classification of Federal Statistical Office KldB 92, 3-digit-level
- Only sectors with a share of academics> 5% considered, only academics
- Different geographical levels: Region (*NUTS-3*, *Kreis*, in which HEI is located), Federal State (*NUTS-1*), Nation
- Distributional key index: study areas are associated with thematically equivalent occupational field

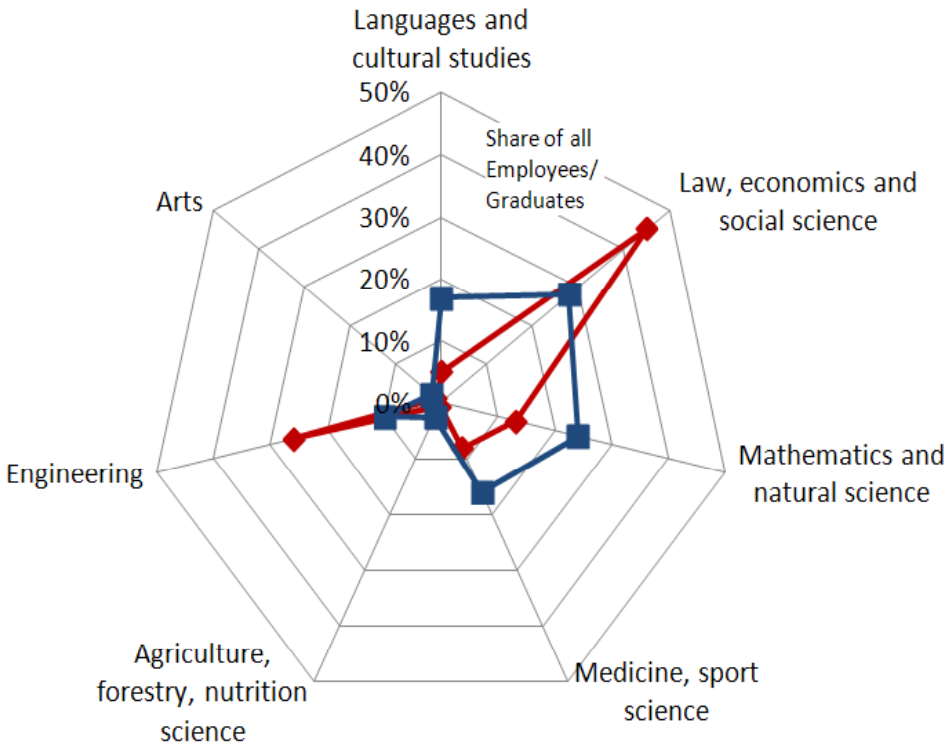
Federal Statistical Office = Statistisches Bundesamt

Comparing the „Fit“ of Education Structures of HEI with Data on National Employment

Universities of Applied Sciences



Universities



Employed Acadamics, 2011

Graduates of UAS (n=100) in Germany, 2011

Graduates of U (n=80) in Germany, 2011

First Conclusions

Q.1: The activities of which type of HEI - universities of applied sciences (*Fachhochschulen*) or universities (*Universitäten*) - are more focused on private industry-oriented education?

H 1: The congruence between the structures of education of UAS and private industry employment is generally higher compared to the equivalent of U.

→ Approved, but rather according to visual measures

→ **For valid approval, a more holistic empirical measure is necessary**

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Empirical measure for 3rd-Mission-Potential

Q.2: The activities of which type of HEI are thematically better aligned with the industry structure in the geographical environment, the HEI region?

H 2.1: In comparison to Us. structures, education activities of UAS. are thematically better aligned with the specific private industry structure in the geographical environment.

H 2.2: A special focus on regional private industry employment structures can be identified for education activities of universities of applied sciences.

Calculation of a Fit Index

$$FI_{hi} = \left(0{,}5 \times \sum_{j=1}^{m} \left| \frac{Y_{ij}}{\sum_{j=1}^{m} Y_{ij}} - \frac{X_{hj}}{\sum_{j=1}^{m} X_{hj}} \right| \right) \times 100$$

FI_{hi} = fit index of HEI h and considered geographic unit i

Y_{ij} = Employed academics in considered geographic unit i in industry/academic field j

X_{hj} = graduates at the HEI h in the industry/academic field j

m = industries/academic fields

→ Concept very similar to approach to determine the localization coefficient

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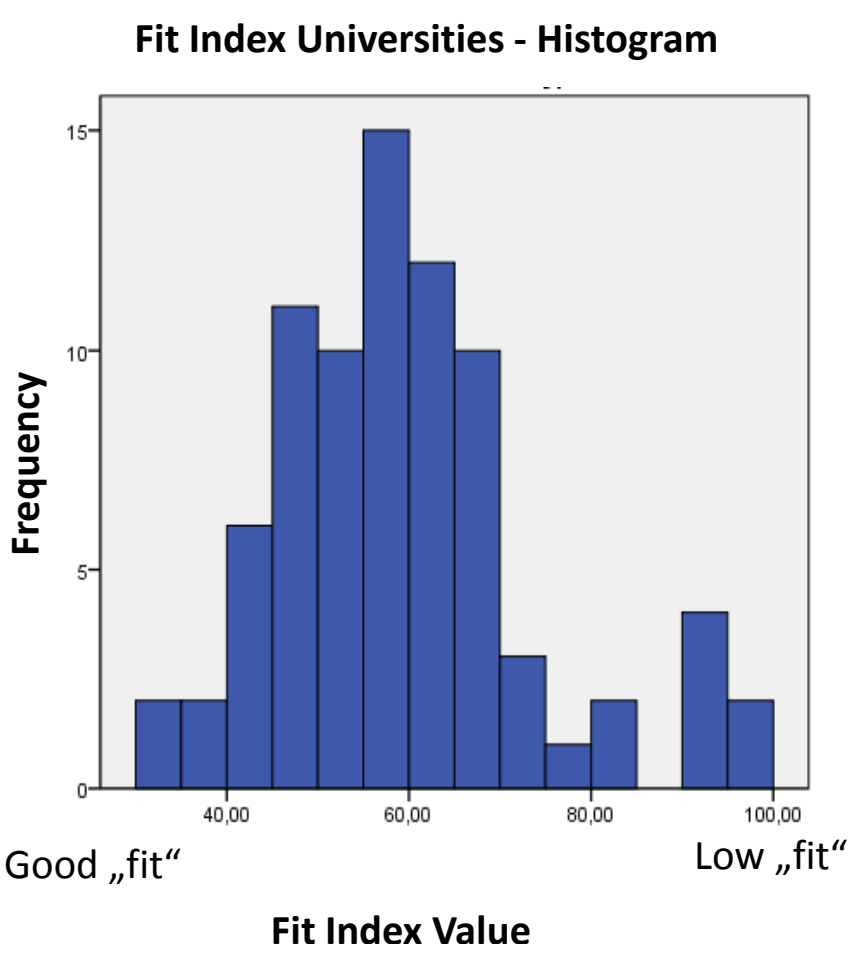
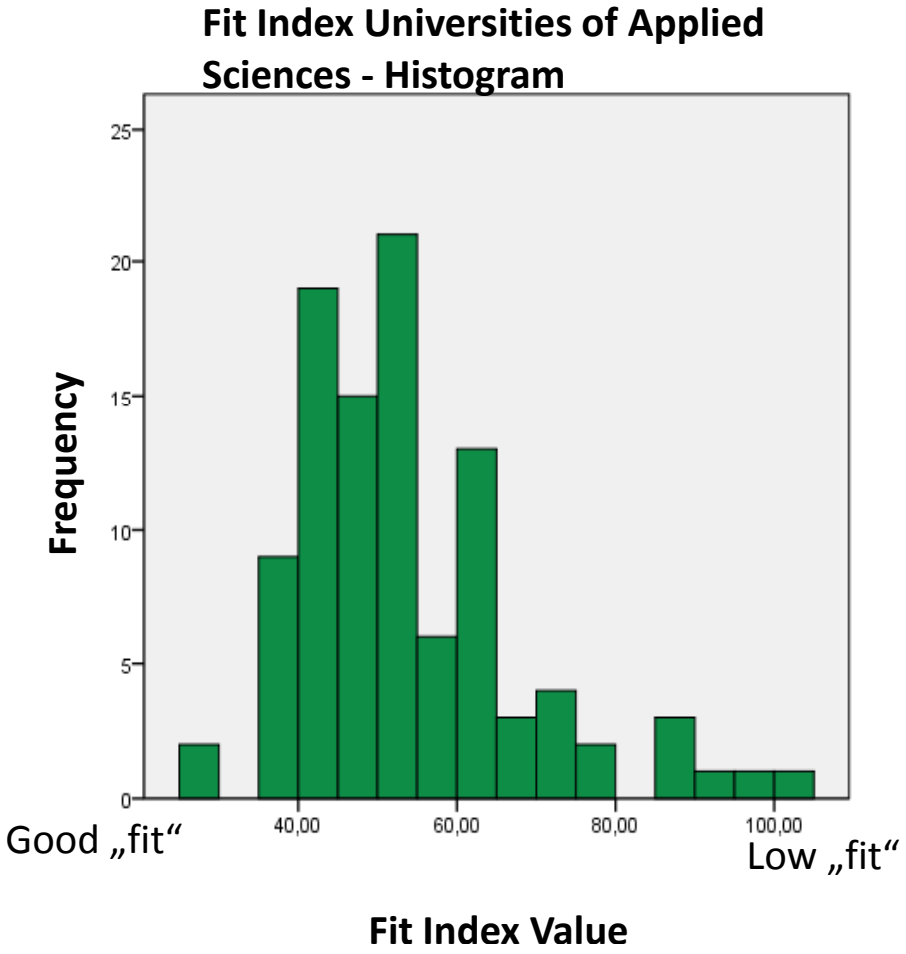
HEI-Region Fit Indices on Different Geographical Levels

HEI-region-fit indices to determine the fit between employment and the HEI's educational curriculum			
	Ø fit index		
	National level	**Federal State level (NUTS-1)**	**Regional level (NUTS-3)**
Universities of applied sciences (n=100)	52.43	52.78	53.78
Universities (n=80)	60.61	60.98	59.52
All HEIs (n=180)	56.06	56.43	56.33

Fit Index – Histograms for regional level





HEI-Region Fit Index on regional level:
Top 10: Good fit between HEI and regional industry

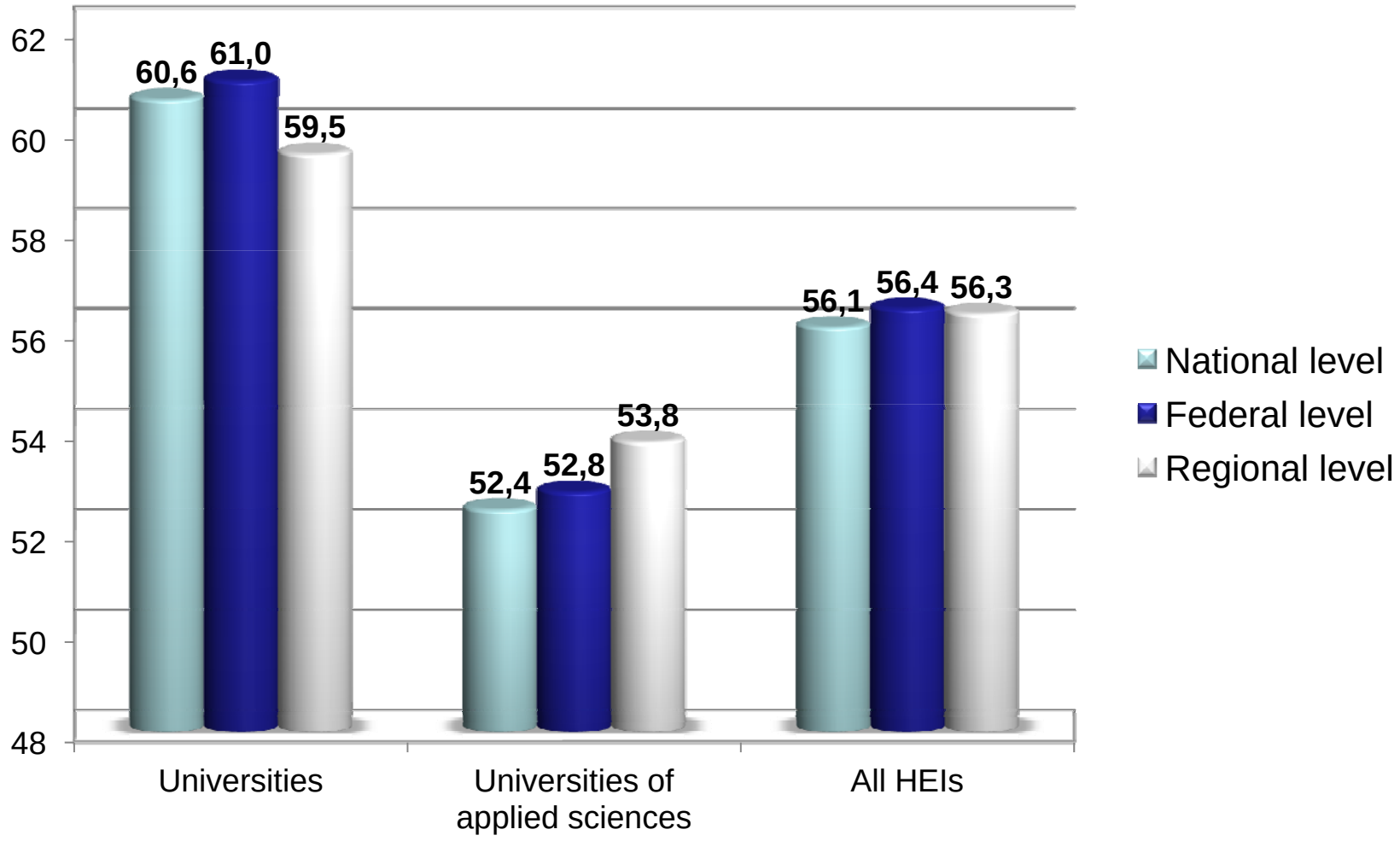
	Universities	Fit-Index (NUTS-3)	Universities of Applied Sciences	Fit-Index (NUTS-3)
1	TH Aachen	31,95	Duale Hochschule Baden Württemberg, Stuttgart (FH)	29,40
2	U Magdeburg	33,77	FH Ingolstadt	29,88
3	Karlsruher Institut für Technologie	37,71	H Bremen	35,66
4	TU Ilmenau	38,06	H für Technik und Wirtschaft Saarbrücken	36,97
5	TU Darmstadt	41,61	FH Kaiserslautern	37,14
6	U Paderborn	42,68	H Zittau/Görlitz (FH)	38,27
7	U Duisburg-Essen	42,75	FH Südwestfalen	38,83
8	Internationales Hochschulinstitut Zittau	43,24	FH Kiel	38,93
9	U Lüneburg	43,94	FH Dortmund	38,96
10	U Mannheim	44,01	FH Nürnberg	38,97

<u>Q.2:</u> The activities of which type of HEI are thematically better aligned with the structure of private industry in the geographical environment, the HEI region?

H 2.1: In comparison to Us. structures, education activities of UAS. are thematically better aligned with the specific private industry structure in the geographical environment.

H 2.2: A special focus on regional private industry employment structures can be identified for education activities of universities of applied sciences.

Fit Indices on Different Geographical Levels



Conclusion

- **Task sharing between universities and universities of applied sciences**
- **The curriculum of UAS is more aligned to the employment structure of private industry than the U‘s curriculum**
- **In comparison to U structures, the education activities of UAS are thematically better aligned with the specific private industry structure in the geographical environment.**
- **Nevertheless:** According to chosen research approach, UAS do not have a stronger geographical focus on regional industry employment than on national industry employment.

  → **They do not have a special focus on regional activities**

Future Outlook

Yes, the developed fit index was further tested…

- Statistical tests: Levenes test, Mann-Whitney-U-Test → significant difference between the two distributions (→ paper)
- Model variation: different forms of employment (→ paper)

… but should also be applied as valuable basis for further research :

- Panel data instead of cross-section analysis
- How does 3rd mission potential influence 3rd mission activities (e.g. regional knowledge transfer)?
- How does HEI-region fit index influence innovation, economic growth, etc.?

Thank you for your attention!

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Potential Factors of Influence on Regional Knowledge Transfer