Completion Rates as a Performance Indicator: Influencing Factors

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Overview

1. Three examples of completion rates as a performance indicator in Performance Based Funding (PBF) systems

2. Initial conditions for high completion rates: "Elite" vs. "Normal" Universities / "Metropolitan" vs. "Regional" Universities

3. Multivariate analyses of input-output relationships for universities in Saxony: "Metropolitan" vs. "Regional" Universities

4. Preliminary Conclusions

1. Completion rates as a performance indicator in Performance Based Funding (PBF)

- In many state-wide models of PBF, the number of graduates or completion rates are used.

- With increasing performance budgets stronger effects are expected - intended *and* unintended (approx. ½ billion € / 20-33% in the budgets)

- Expected effects are related to the adequacy of indicators (are they valid? reliable?), and also to the perception of the PBF as fair* and just

  (see Wottawa 2001, Streicher 2005, Krempkow 2007, Liebig 2009)

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*For this topic (perception of fairness- & justice of performance measurement and Performance Based Funding systems on Higher Education Institutions) a separate article is in print: See the next volume of „QiW", no. 3/2010 (in German): http://www.universitaetsverlagwebler.de/QiW.html)

Three examples of PBF in the Federated States of Germany

State	Baden-Württemberg	North Rhine-Westphalia	Berlin
Other subjects (state without medi-cine)	- Research: Uni 35%; 20% FH (=Uni of applied science) - young academics: 10%, - teaching: Uni 55%, FH 80%) number of graduates: 30% ; FH 40% , - equation: "up to 31%" (shifts in proportion of female alumnus., professors, academic staff , graduates).	- Research: Uni 50%; FH 15% - young academics: "success of equation" considered, - teaching: Uni 50%, FH 85%: number of graduates - equation: additional 5% by number of alumnus (bonus-penalty [malus] system).	-Research: Uni 45%; FH 15% - young academics: see below (equation) (no proportion defined). - teaching: Uni 50%, FH 80%, completion rate -equation: 5% (proportion of female alumnus, professors, …, values >50% capped).
Medi-cine	- **Research: 60%,** - young academics: **Med.** none (faculty scholarship / MOBILMED- participation (criteria under consideration), - **teaching: 40%,** - Gender: **with contracts**	- **Research: 75%,** - young academics : none, - **teaching: 25% ,** - Gender: non.	- **Research: ~13 %,** - young academics : (application-based, any sum quoted), - **teaching: ~63%** - Gender: none. - furthermore application based funding „Stellenpool": ~23 %

Sources: BW: Medizin: MWK 2009, Land: König 2009 (part of a volmue); NRW: MIWFT 2009, Land: MIWFT 2009, Schwarzenberger 2009b, RWI 2008: 94; BE: SenBWF 2009, Charité 2009, Land: Schwarzenberger 2009a.

Three Examples of Inner-Department PBF in Medicine

	Freiburg Example	Münster Example	Göttingen Example
Proportion of PBF of federal state subvention	approx. 12 %	approx. 25 %	approx. 10 %
Balance of functions (weight of the functions/ allocated resources out of PBF) according to criteria/ indicators	**Research (weight within PBF: 60%):** third-party funds and publications **Teaching (weight in PBF: 40%):** IMPP factor (final grades), load of teaching, evaluation of teaching	**Research (66%):** third-party funds and publications **Teaching (33%):** IMPP- factor (final grades), load of teaching, satisfaction of students	**Only Research (100%):** third-party funds and publications **Teaching (0%):** (but planned)
Assessment period	Past 3 years	Past 5 years	Past 3 years

Data: Krempkow (2010); Brähler (2009); Table: Krempkow.

Different opinions: comparable Initial Conditions?

- **"It is only fair to compare universities that are truly similar from the view of their goals, their profiles, and their structures."**

  (Gero Federkeil, Centre for University Development (CHE), for the advancement of the EU concept of a global university ranking)

- **"It is normal in life that there are not the same initial conditions."**

  (Peter Frankenberg, Minister of Education and Science of Baden-Württemberg)

=> Question: (How) is it possible to compare initial conditions in order to measure competition between universities?

2. Initial Conditions for Completion Rates: Model
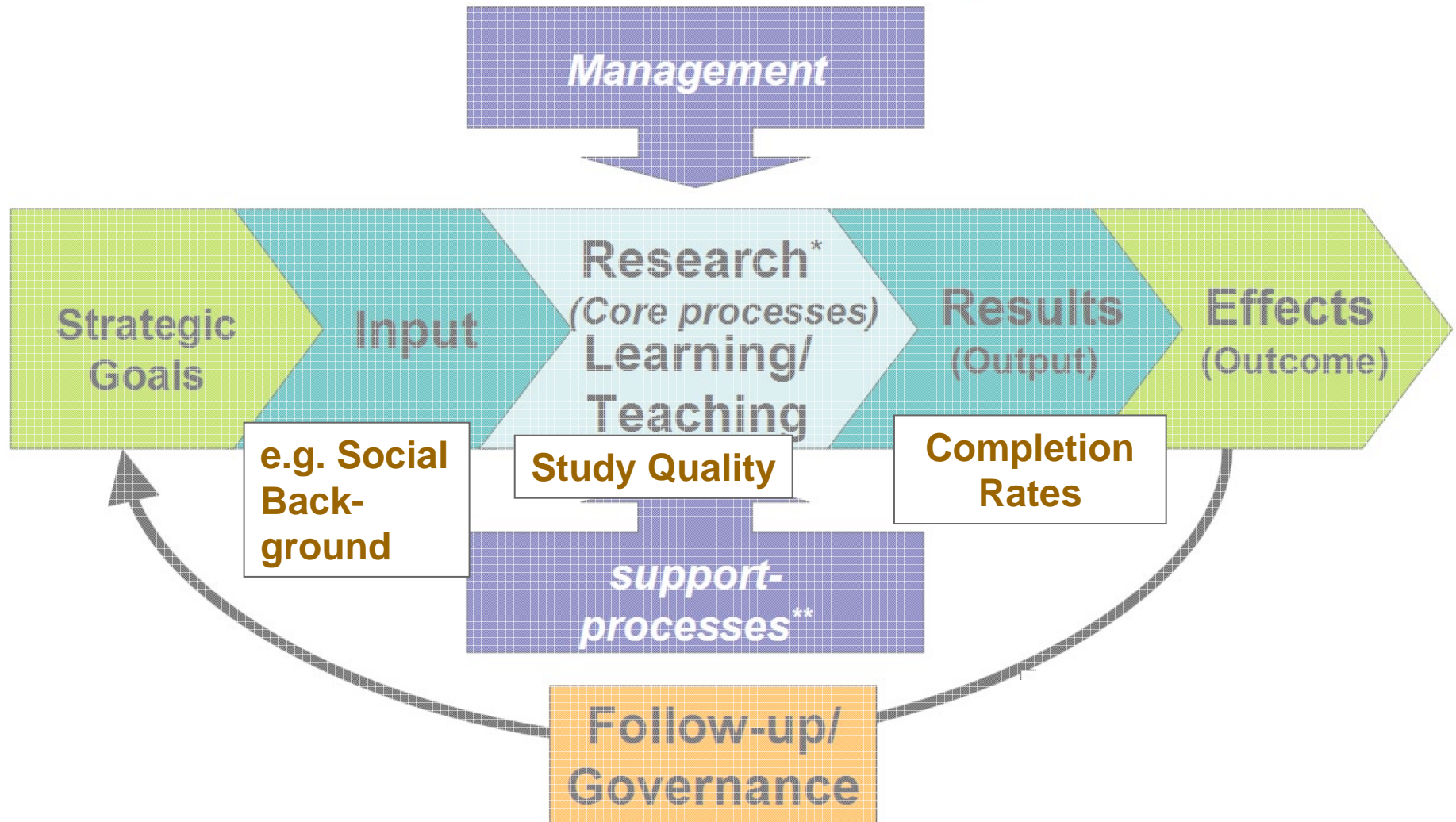
Graphic: Krempkow 2010, according to Nickel 2007, Teichler 2003

Overview

Initial Conditions in the field of study and teaching

- Frequently cited:

  - "**Study Skills",** mostly measured by university entrance scores (*Abitur-Noten*)

- Parallel discussions about diversity / social dimension of study:

  - *Background aspects:* educational background, gender, migratory background

  - *Special life circumstances*: e.g. parenthood, pregnancy, long-term care of family members, frequency of gainful employment

⇒ **Diversity** along with "study skills" will also be classified at the level of study as a *partial* **aspect of various initial conditions** that influence performance. (German Council of Science and Humanities [WR] 2008:78; Krempkow 2009:51, 2010)

State of Information

- Often implicit expectation of similar initial conditions within the same kind of higher education institutions; *or* expectation of the insignificance of differences.

  Question: To what extent are these expectations true?

- **=> 1st Goal:** Analyze the similarities of initial conditions according to the results of the INCHER-KOAB study and the Saxon University Report

Data Bases

(1) INCHER- Cooperation Project in Graduate Surveys
("Kooperationsprojekt Absolventenstudien - KOAB")

- Survey year 2008, n=34,000 graduates, response rate ~50%
- For design see Schomburg (2008); for methods: Heidemann et al. (2009)
- Data from *table section A*: "Fundamental Analysis for Advancement through the Excellence Initiative" („Grundauswertung nach Förderung durch Exzellenzinitiative") see Heidemann (2010); also for a university see Krempkow 2010)

(2) Saxon University Report

- Survey year 2006, n=10,000 students; response rate 54%
- This is according to the level of study and covers different initial conditions for a similar cohort of graduation. See for details: Lenz et al. (2006), Krempkow et al. (2008, 2010),
- Detailed methodology: Krempkow (2008)

(1) **Nationwide** Initial Conditions
Example: "Elite" vs. "Normal" Universities

Problems: **So far, there is barely any nationwide data** that allows an analysis of the level of different universities / departments (accordingly, recent data from CHE, HIS[1], INCHER (expected) is not available as SUF.)

▪ **Currently only aggregated data** from the INCHER-KOAB table section is usable. So only differences *between the groups* of "elite" and "normal" universities are testable (as per the 3rd line of the federal Excellence Initiative, funded vs. fully not funded)

▪ **Differences *within* the groups of "elite" vs. "normal" universities** are currently not testable. Only an exemplary "elite" university is analysable. However, this is also one of the six winners of the funding foundation's competition "Excellence in Teaching" and is thus a fitting case to consider not only its basic conditions, but also its *teaching*.

Conclusion: **Nationwide only a descriptive overview of differences is available**
A causal interpretation of interdependencies based on this data is not possible!

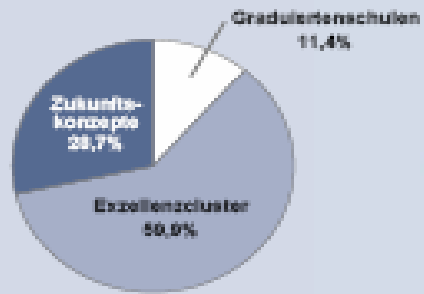Desired: multivariate analysis of nationwide graduate surveys in the future

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[1] Names of the participating universities in the HIS-SUF were withheld in order to preserve their anonymity.

(1) Excellence Initiative:
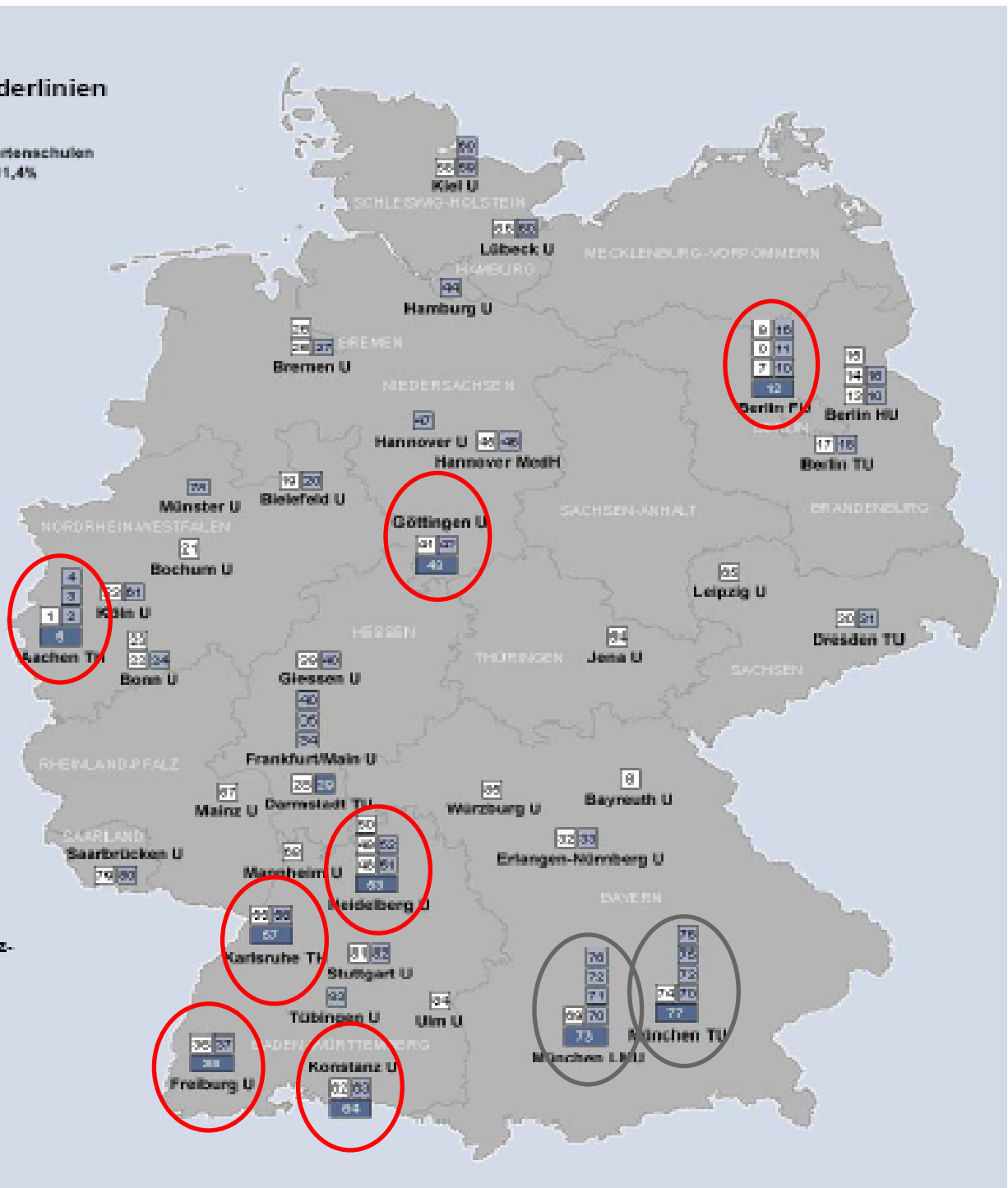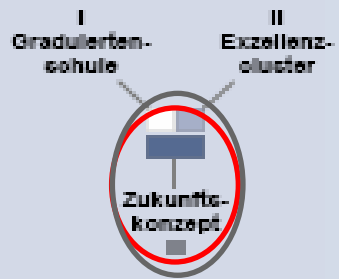
"Elite" Unis (with promoted future strategy):

in KOAB included

Bewilligungen nach Förderlinien

(1) Initial Conditions: Examples of "Elite" vs. "Normal" Unis.

Question: Are initial conditions for German universities similar? (here: for teaching performance)

Results of the 2008 survey of graduates in the INCHER-KOAB (academic year 2007 aprox. one year after graduation, without PhD graduates)	U of Frei-burg (CI)[1] (n=~300)	"Elite" Unis (n=~7,000)	"Normal" Unis (n=~8,000)	Difference „Elite" to "Normal"
Background *(external conditions/input):*				
Educational background (non-academic fathers, in %)	**41 (+/-6)**	**42**	**55**	**13**
Gender affiliation (female, in %)	**57 (+/-5)**	**51**	**58**	**7**
Migration background[2] (students who finished their school education in other countries, in %)	4 (+/-2)	7	3	4
Special life circumstances *(external conditions/input):* Parenthood (children in household, in %)	9 (+/-3)	8	12	4
Familial reasons for extending study time (pregnancy, children, care of family member: scale 1=highly important; 5 = no value. 1+2 in %; [stat. mean])	12 [4.4] (+/-.2)	11 [4.5]	14 [4.3]	3 [.2]
Gainful employment as reason to extend study time (scale 1=highly important; 5=no value 1+2; [mean])	30 [3.5] (+/-.2)	30 [3.5]	38 [3.3]	8 [.2]
"Study skills" *(external conditions/input):* University entrance scores (*Abiturnote*) (mean)	1.9 (+/-.06)	2.1	2.4	.3

[1] The confidence interval (CI) is given here in parentheses. The CI is at 95% for the alpha (type I) level of error. This indicates reliability and value. The same results would be found with 95% probability of repeated questioning under the same terms and conditions.
[2] Can also be classified as "international" (cf. Lenz et al 2006). Therefore, no clear positive or negative assessment is possible.

(1) "Output" of "Elite" vs. "Normal" Universities

Results of the 2008 survey of graduates in the INCHER-KOAB (academic year 2007 aprox. one year after graduation, without PhD)	U of Freiburg (CI) (n=~300)	"Elite"- Unis. (n=~7,000)	"Normal" Unis. (n=~8,000)	Difference "Elite" to "Normal"
Study prospective / Study results (output):				
Time frame: duration of study (average semester)	**11** (+/-.3)	**11**	**10**	1
Completed degree in study period (in %)	**39** (+/-5)	**38**	**38**	0
Performance perspective: entrance scores (stat. mean)[1]	**1.85** (+/-.06)	**1.8**	**1.9**	.1
Completion rate (in %; data: University of Freiburg/official statistic)	**53**	N/A	**33**	**20**

=> "Elite" University of Freiburg has a significantly higher completion rate than "normal" universities

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[3] The assessment of student's final grades is difficult, because the method of awarding grades can also vary greatly depending on location (for more details see WR 2003, Lenz et al 2006, WR 2007).

(2) Universities in Saxony (the SMWK's Region of Responsibilities)
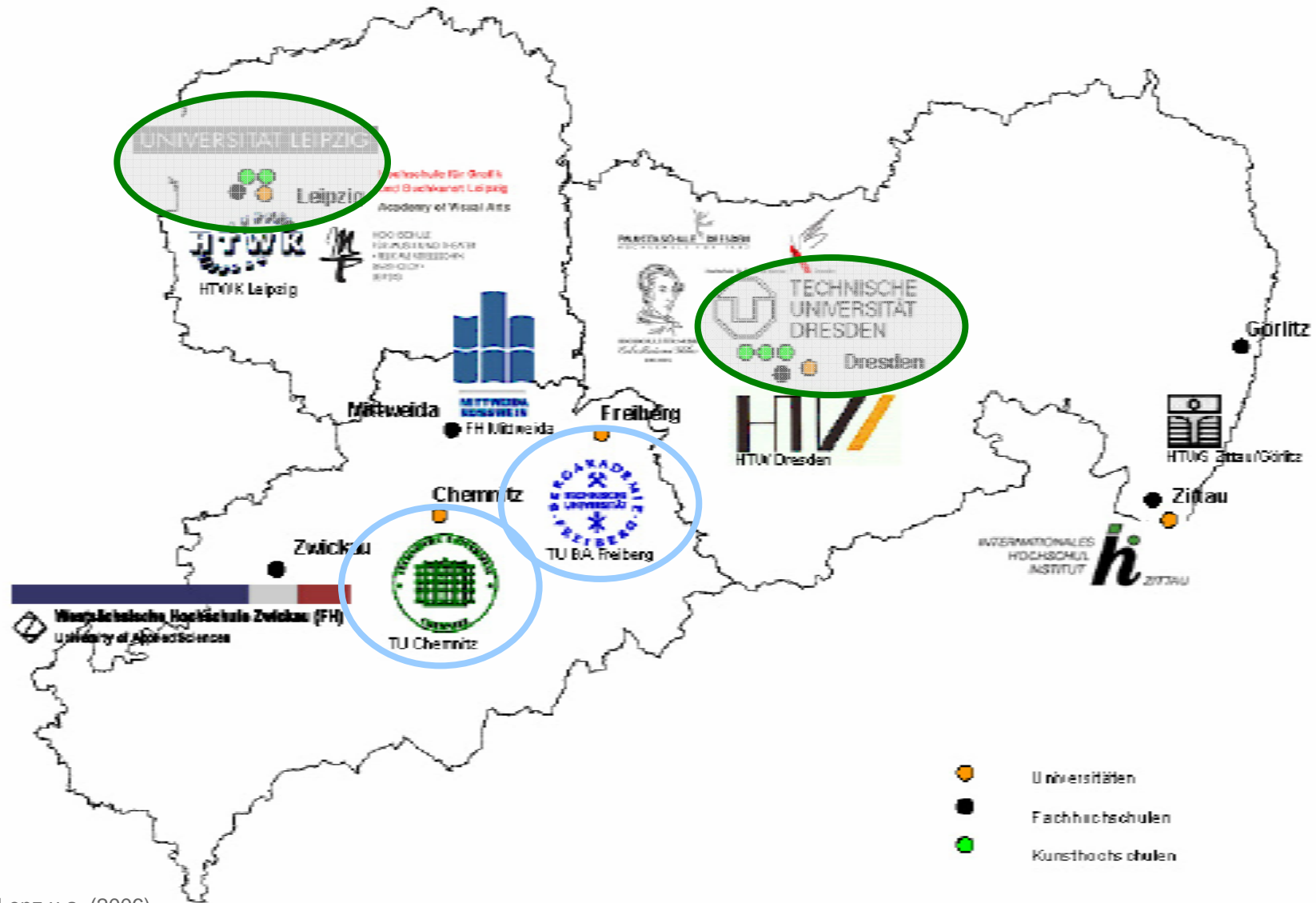
Graphic: Lenz u.a. (2006)

(2) Initial Conditions in the Federated States of Germany: Saxony Example

Question: Are Initial Conditions for Saxon Universities similar? (here: teaching performance)

Results: Students surveyed in 2006 for the Saxon University Report (without PhD)	Metropol. Unis (CI)[1] (n=~3,000)	Regional Unis. (CI) (n=~2,000)	Difference Metro.-Reg. Unis
Background: educational (non academic father, in %)	47 (+/-2)[1]	56 (+/-2)	9
Gender affiliation (female, in %)	51 (+/-2)	42 (+/-3)	9
Migration Background[2] (students who finished their school education in other countries, in %)	3 (+/-1)	2 (+/-1)	1
Life Circumstances: Parenthood (% with children)	4 (+/-1)	4 (+/-1)	0
Impact of financial conditions in the study period (higher need for frequent gainful employment (scale: from 0=not at all to 6=strong: value 5+6, in %; [mean])	30; [3.0] (+/-.1)	32; [3.2] (+/-.1)	2; [.2]
Proportion of gainfully employed (average >10h per week, in %) and duration per week [in h, mean]	10; [3.3] (+/-.2)	14; [3.9] (+/-.2)	4; [.5]
Proportion of part-time students (self-assessed, in %); duration of student activities per weed [in h, mean]	22; [35] (+/-2)	33; [32] (+/-2)	11; [3]
"Study Skills": university entrance scores (*Abiturnote*) (mean)	2.1 (+/-.05)	2.4 (+/-.05)	.3

[1] Averages weighted by number of on campus students in 2005. Confidence interval in parenthesis. The CI is at 95% for the alpha (type I) level of error.
[2] Can also be classified as "international" (cf. Lenz et al 2006). Therefore, no clear positive or negative assessment is possible.

(2) Output in the Federated States of Germany: Saxony Example

Results: Students surveyed in 2006 for the Saxon University Report (Data: Students [excluding PhD students] interviewed, here only universities included: n=5,111)	Metropolitan Unis (n=~3,000)	Regional Unis (n=~2,000)	Difference Metropolitan-Regional Unis
Study results (Output, data: official statistic):			
Time frame: duration of study (average semester)	11.8	11.8	0
Proportion of students in prescribed period of study (in %)	81	81	0
Performance perspective: uni. entrance scores (stat. mean)[3]	1.9	2.0	1
Graduation rate (analogous to the OECD calulation method, in %)	50	46	4

⇒ "Metropolitan" universities have a somewhat higher completion rate than "regional" universities

⇒ But a correlation with initial conditions can not be simply supposed. Rather, empirical documentation through multivariate analysis must be provided.

[3] The assessment of student's final grades is difficult, because the method of awarding grades can also vary greatly depending on location (WR 2003, 2007).

3. Multivariate Analysis of Input-Output Contexts for Universities in Saxony

Multiple linear regression with data from Krempkow (2008) and online survey Saxon University Report (only Universities, standardised Beta coefficients)	Model 1 (dependent: completion rate)	Model 2 (dependent: completion/ rate)	Model 3 (dependent: completion rate)	Model 4 (dependent: completion rate)
Number of included courses of study: n=92	corelation. $R^2 = .34**$	corelation. $R^2 = .34**$	corelation. $R^2 = .33**$	corelation. $R^2 = .33**$
Metropolitan- vs. Regional universities (1/0)	-.11	-.13	-.15	-.14
Culture of Disciplines: Engineering+Science vs. Humanities+Social Sciences (1/0)	**.28***	**.28***	**.28***	**.30***
First year students (1. semester., 6. Previous year)	-.09	-.10	-.09	-.09
Educational background (% of fathers with uni. degree)	.17+	.16+	.14	.15
Uni entrance score (stat. mean of online survey)	-	-	-.06	-.06
Proportion of women (in %)	**.39***	**.40***	**.39***	**.40***
students finished their school in other countries (in %)	-	-.08	-.08	-.08
Study conditions (scale:100=positive)	**.35***	**.36***	**.37***	**.40***
Libraries (scale: 100=positive)	**-.31***	**-.30***	**-.31***	**-.32***
Advancement of competence (scale: 100=positive)	.27+	.26+	.24	.16
Quality of instruction (scale:100=positive)	-	-	-	.09

4. Preliminary Conclusions

For the results of INCHER-KOAB and Saxon University Report

- For current PBF systems initial conditions appear **more favourable for "metropolitan" universities** than for "regional" universities.
- **Similar for "elite" universities** it is a probably relation: initial conditions and output more favourable than for "normal" universities.
- You should pay attention to a possible false conclusion: This was **not an effect of the Excellence Initiative!** (See the data base! Maybe differences are more observable through the Excellence Initiative.)

Implications:

- If similar results arise: **"Elite" universities and their teaching capacities are better positioned** to compete for resources by state PBF (not only in Research, also in Teaching"). And: For "regional" universities and universities with other bases of students it is hardly possible to achieve above-average completion rates

=>**Further development of PBF**: Initial conditions are to be systematically taken into account (see also references in WR 2008)

Thank you for your attention!

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Ausführlichere Informationen/ Links:

- Heidemann, Lutz, 2009: Beitrag zur 8. Tagung des Netzwerkes Absolventenstudien: Studienbedingungen, Kompetenzerwerb und Berufserfolg - Eine erste Rückmeldung von 35.000 Hochschulabsolventen. Berlin: Freie Universität Berlin.

- Kamm, Ruth & Krempkow, René, 2010: Ist leistungsorientierte Mittelvergabe im Hochschulbereich „gerecht" gestaltbar? In: Qualität in der Wissenschaft (QiW), Nr. 3/2010, 71-78.

- Krempkow, René, u.a., 2010: Absolventenstudien als outcome evaluation. In: Sozialwissenschaften und Berufspraxis (SuB) 1/2010, 43-63. (Themenheft "Die Vermessung der Sozialwissenschaften").

- Krempkow, René, 2009: Von Zielen zu Indikatoren – Versuch einer Operationalisierung für Lehre und Studium im Rahmen eines Quality Audit. In: QiW 1/2009, 44-53.

- Krempkow, René, 2008: Die Validität und Zuverlässigkeit indikatorengestützter Hochschulbericht-erstattung am Beispiel eines Bundeslandes. In: Böttcher, Wolfgang / Bos, Wilfried / Döbert, Hans / Holtappels, Heinz Günter. (Hg.): Bildungsmonitoring und Bildungscontrolling in nationaler und internationaler Perspektive. Münster: Waxmann, 59-68.

- Krempkow, René, 2008: Studienerfolg, Studienqualität und Studierfähigkeit. Eine Analyse zu Deter-minanten des Studienerfolgs in 150 sächsischen Studiengängen. In: Die Hochschule 1/2008, 91-107.

- Krempkow, René, 2007: Leistungsbewertung, Leistungsanreize und die Qualität der Hochschullehre. Bielefeld: UniversitätsVerlagWebler www.universitaetsverlagwebler.de/krempkow.html,

- Lenz, Karl / Krempkow, René / Popp, Jaqueline, 2006: Sächsischer Hochschulbericht 2006. Dresden. http://ids.hof.uni-halle.de/documents/t1780.pdf

- Schomburg, Harald, 2008: Interview mit dem Leiter des bundesweiten Absolventenprojekts, INCHER Kassel. In: QiW 3/2008, 58-61.