

Research Policy and Funding Mechanism in Korea: Peer Review and Bibliometrics

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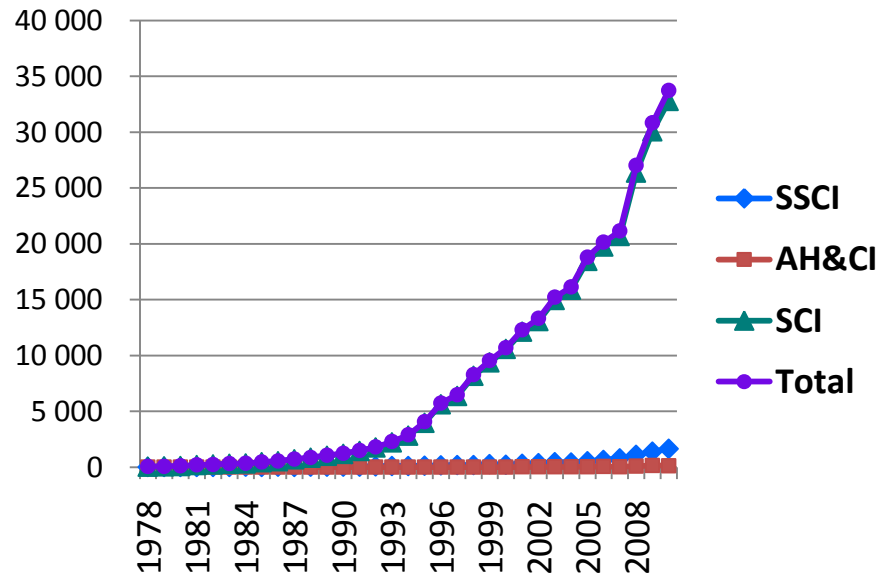
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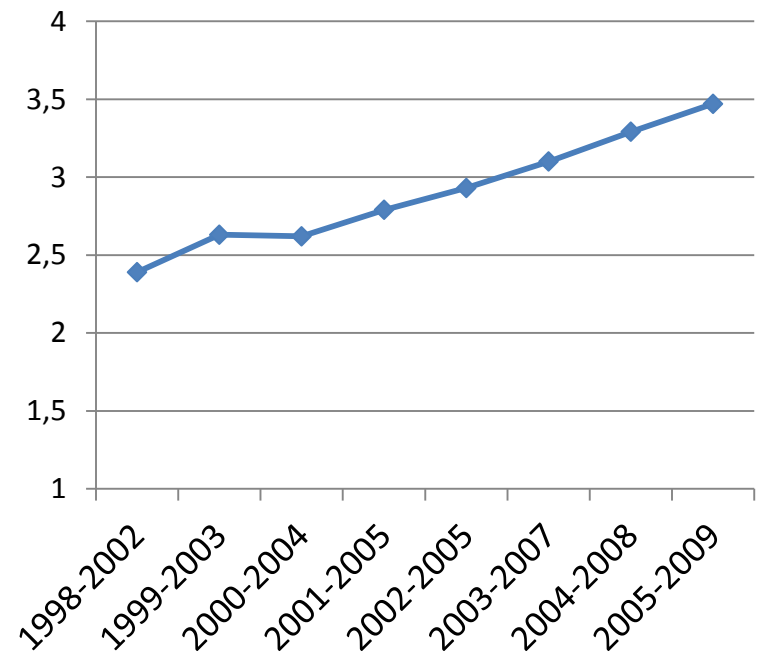
I. Research Productivity of Korean Researchers

Research Publications and Citations

Research Publications



Citations per Paper



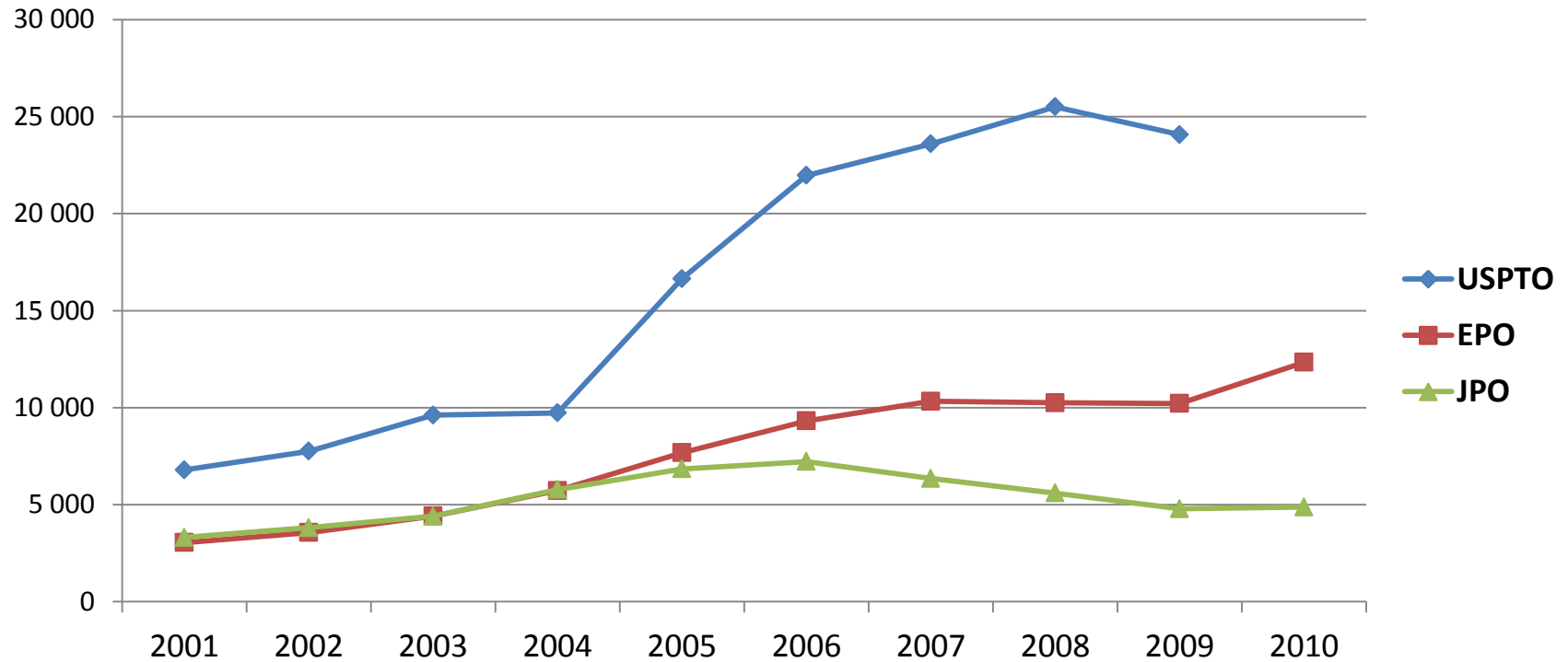
Sources: Web of science



I. Research Productivity of Korean Researchers

Patents in the Three Major Offices

Unit: Number of patent applications



Sources: USPTO, EPO, JPO



I. Research Productivity of Korean Researchers

● Global Ranking of Korean Universities (2010)

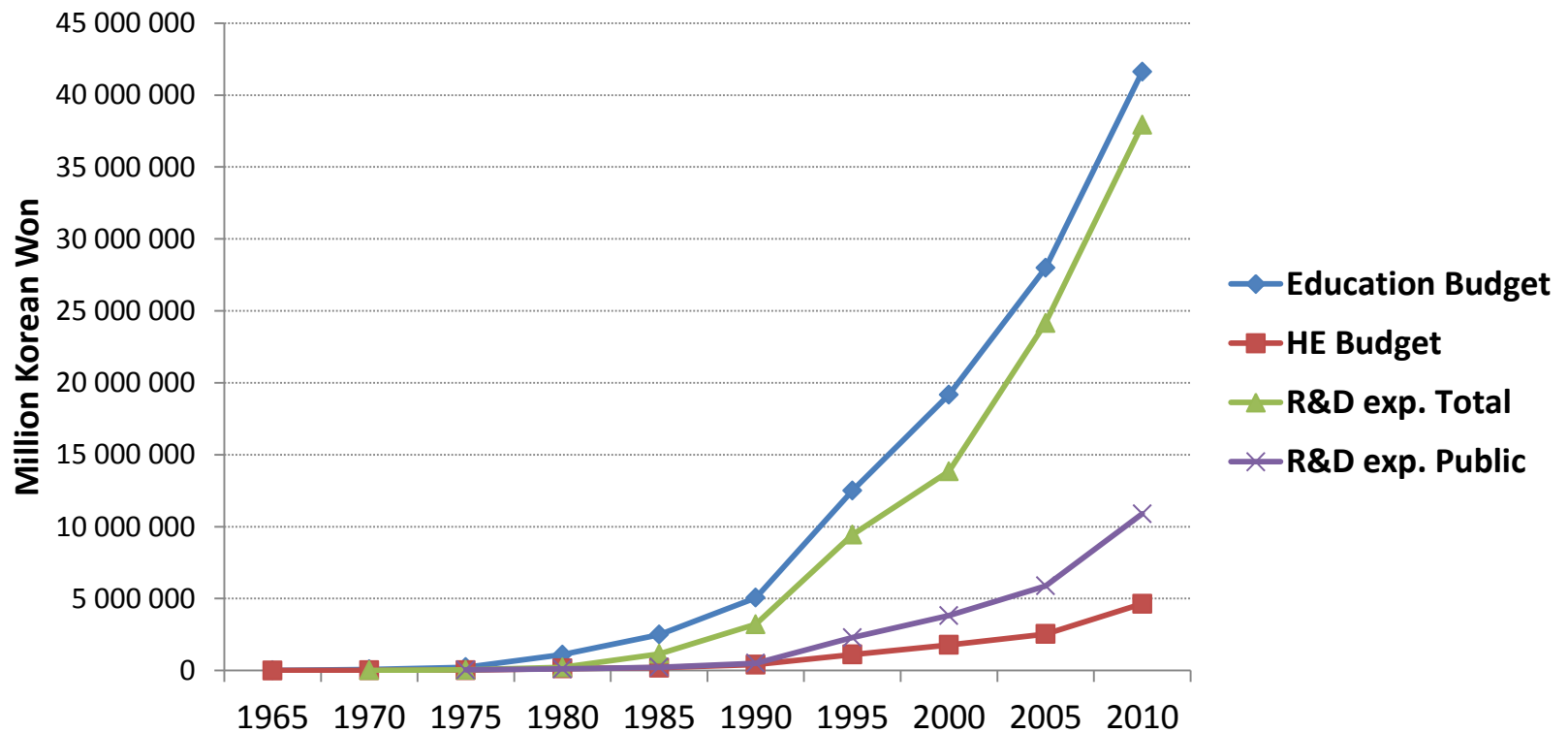
Unit: Number of universities

Characteristics	ARWU	THE	QS	Leiden (Orange)	MINES ParisTech
Top 50	0	1	1	0	2
Top 100	0	2	1	1	2
Top 200	1	4	5	2	2
Top 300	4			5	2
Top 400	7			7	3



II. Research Funding

R&D Expenditures (1965-2010)

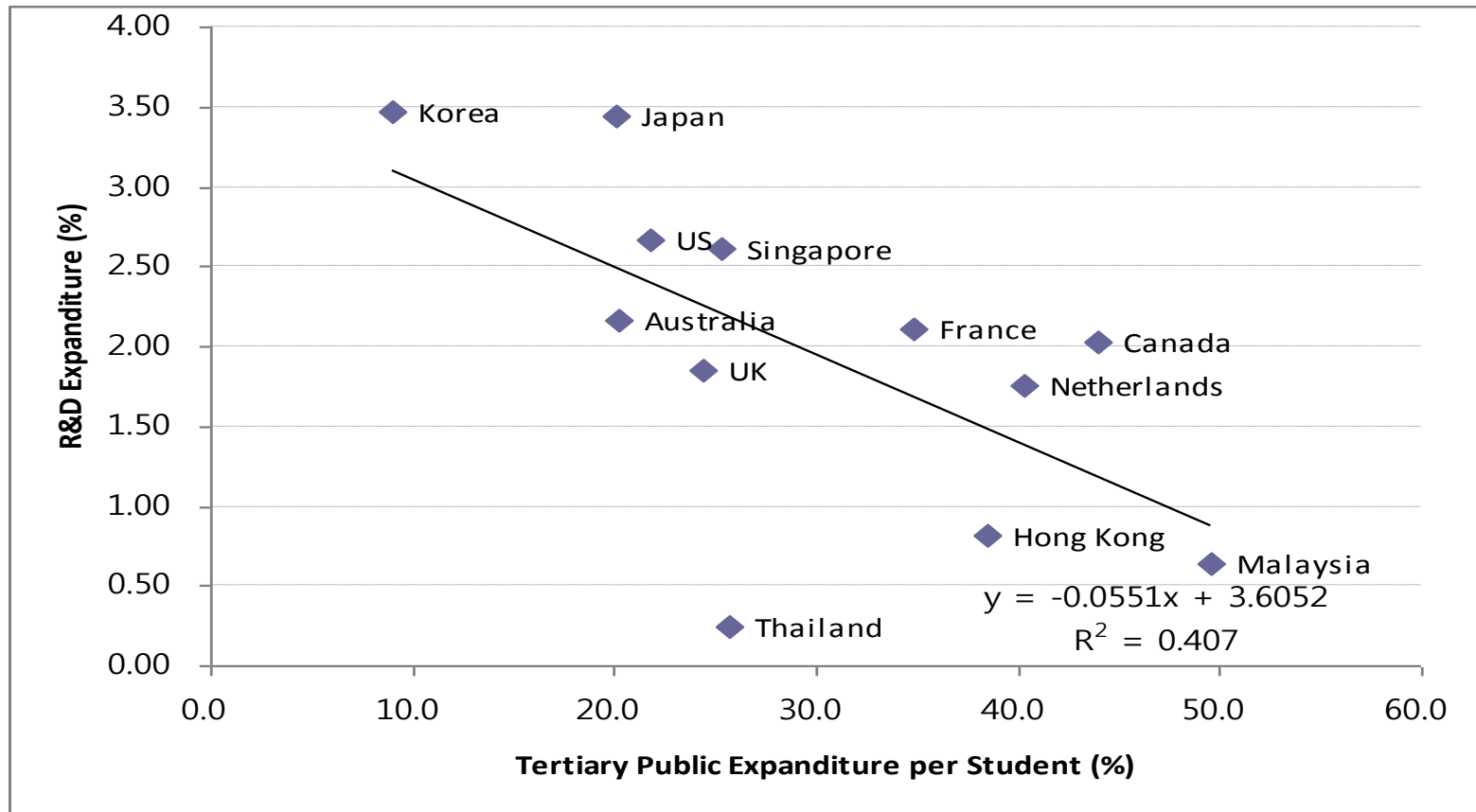


Sources: Ministry of Education, Science & Technology, Korea National Statistical Office



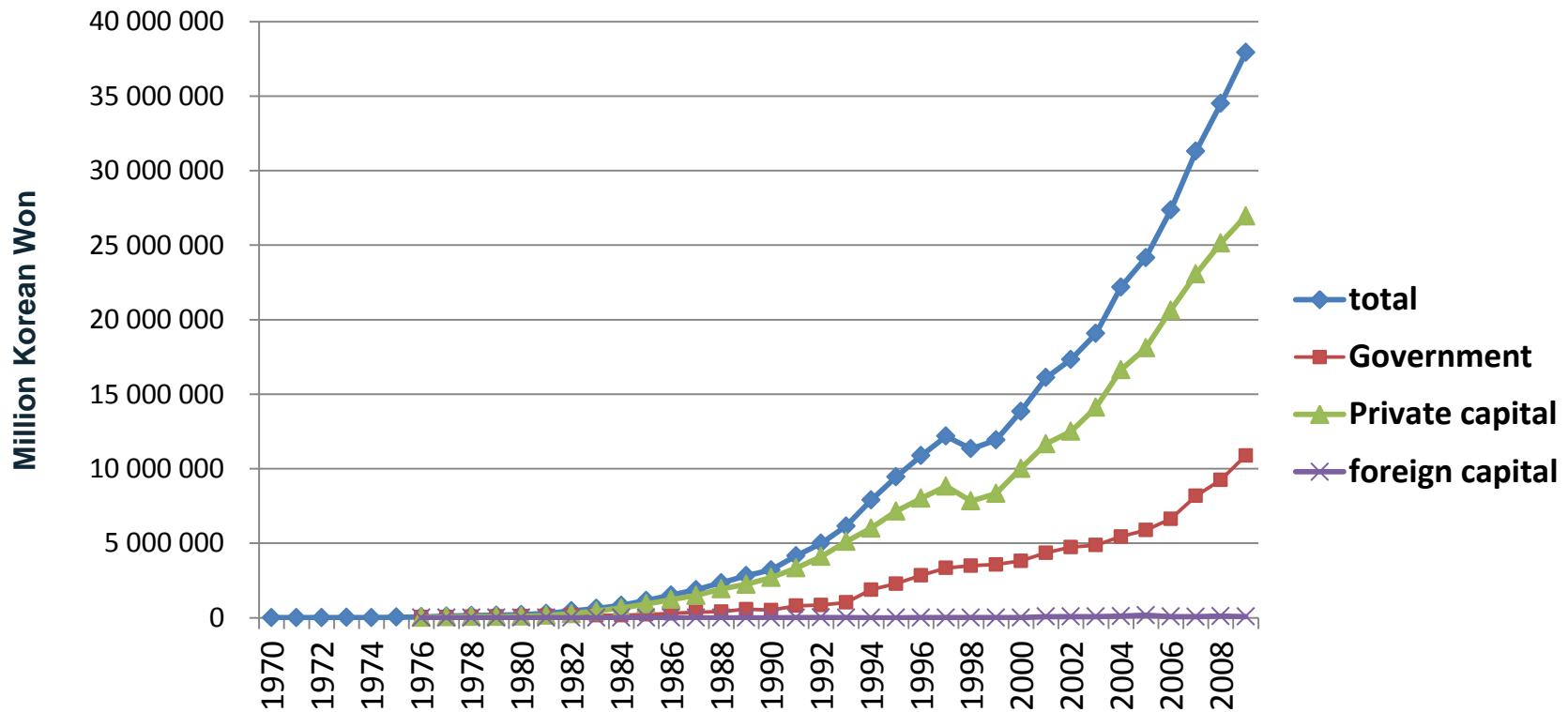
II. Research Funding

R&D vs. Higher Education Budget



II. Research Funding

Sources of Revenues

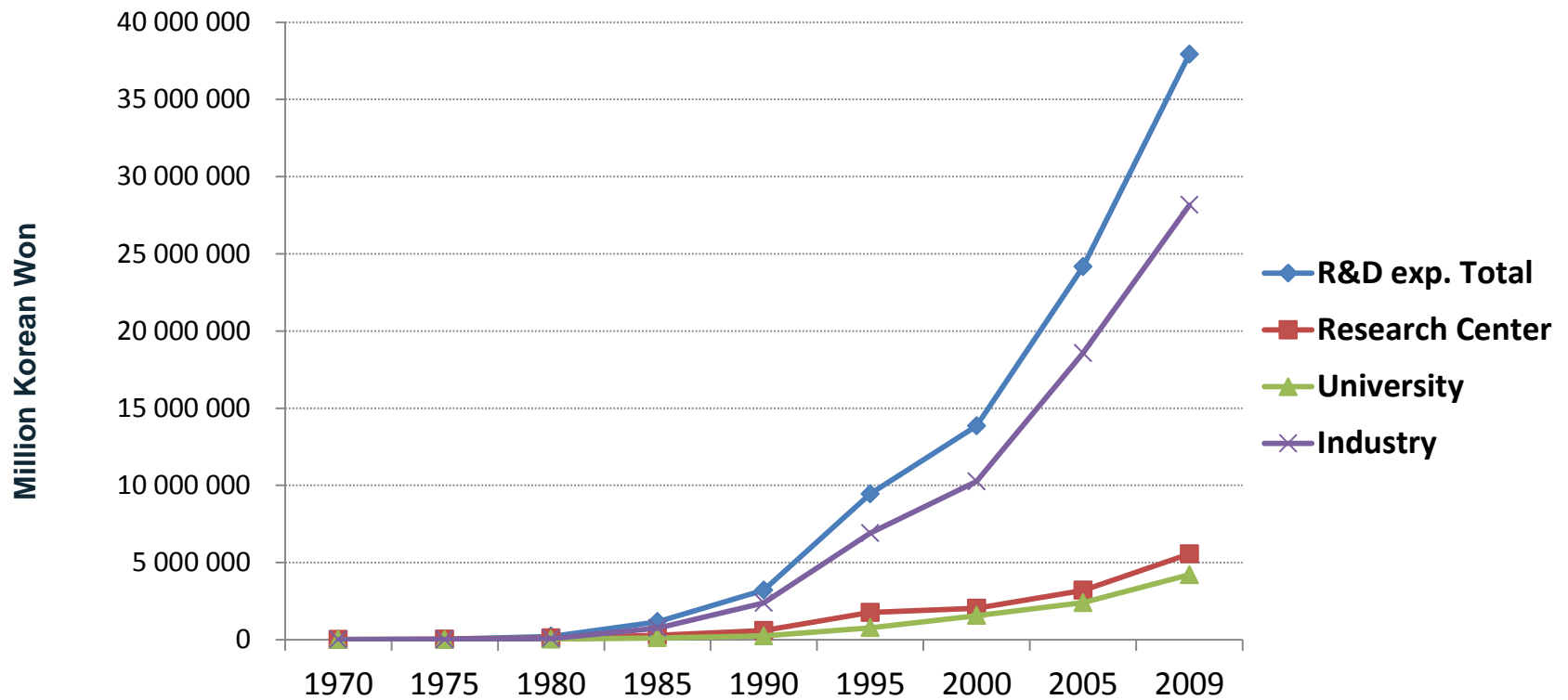


Sources: Ministry of Education, Science & Technology, Korea National Statistical Office



II. Research Funding

R&D Exp. by Users

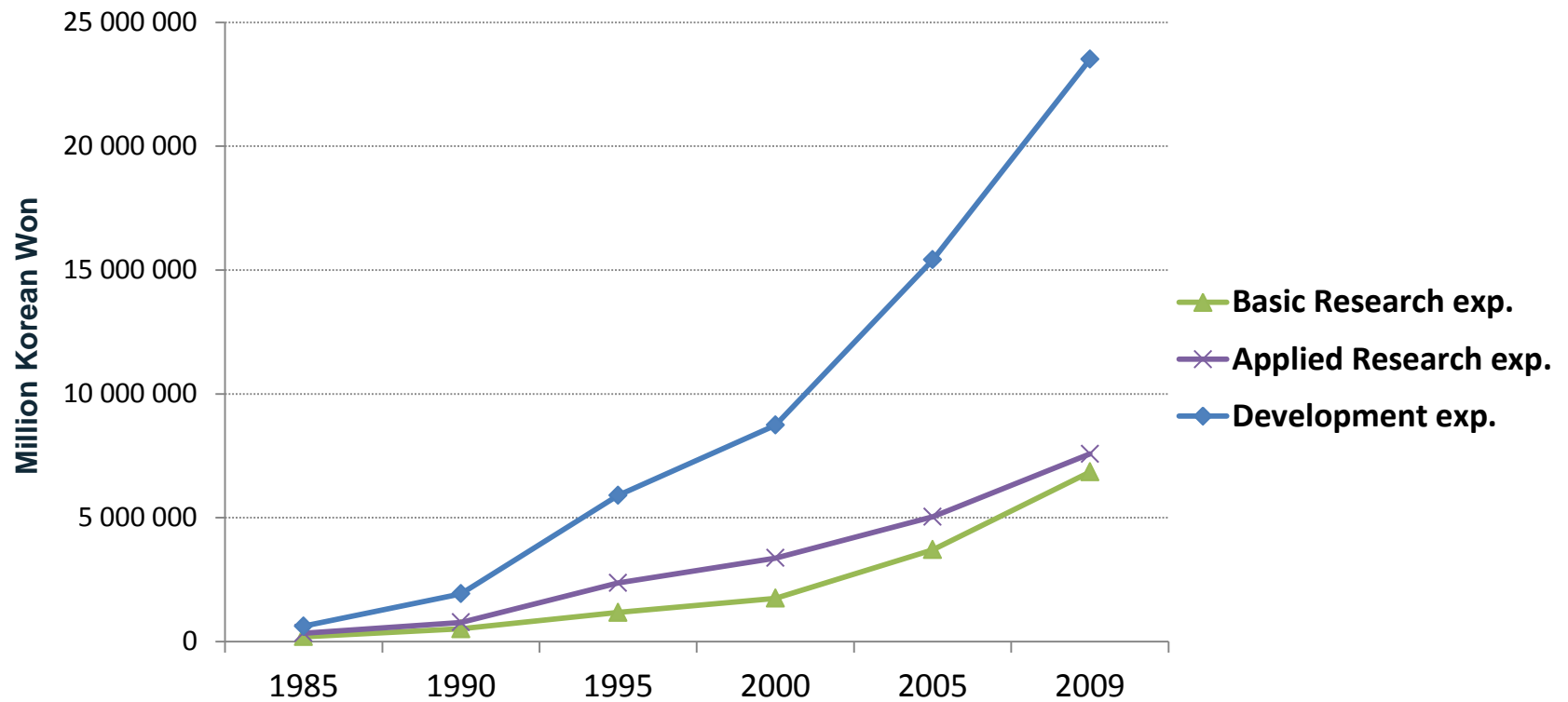


Sources: Ministry of Education, Science & Technology, Korea National Statistical Office



II. Research Funding

R&D Exp. by Types of Research

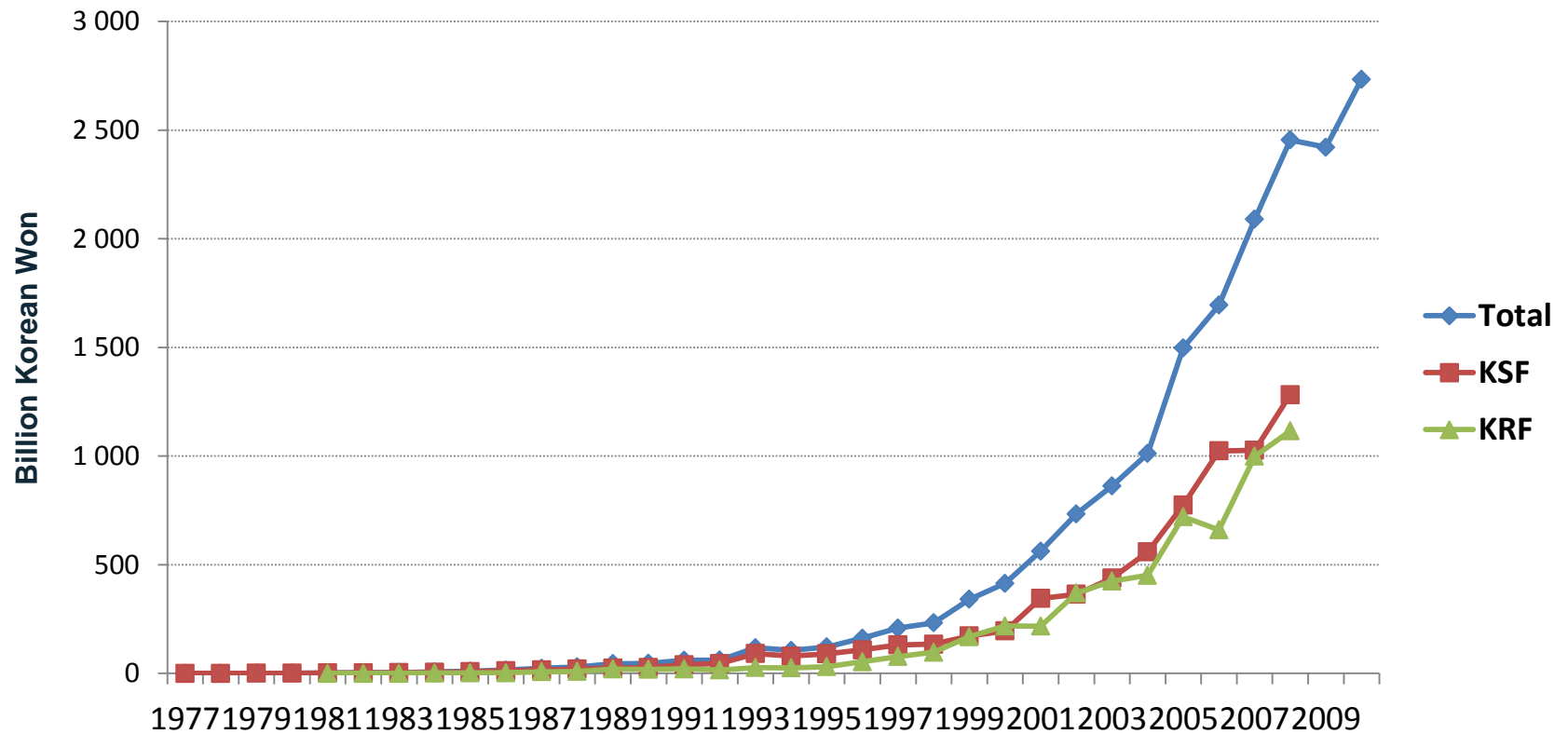


Sources: Ministry of Education, Science & Technology, Korea National Statistical Office



II. Research Funding

R&D for Academic Researchers: NRF of Korea



II. Research Funding

● Program-based Funding Policy (2010)

	BK21 (2nd)		World-Class University	Humanity Project	Social Science
	1st-stage	2nd-stage			
Duration	1999~2005	2006~2012	2008~2012	2008~2015	2010~2019
Total Budget (US\$)	1.3 billion	2 billion	825 million	400 million	120 million
Num. of Project Team	247	244	79	56	157

Notes: one dollar is 1,000 Korean Won



III. The Use of Peer Review and Bibliometrics

3-1. Evaluation Process: WCU project

- *Step 1. panel review by major areas (60%)*
 - research plan
 - bibliometric data (publication / citation)
 - research fund
 - institutional support
- *Step 2. international peer review (30%)*
- *Step 3. integrated evaluation (10%)*
 - professional panel review
 - evaluate based on the results of 1st and 2nd evaluation



III. The Use of Peer Review and Bibliometrics

3-2. Issues on Bibliometrics & Peer Review

● Bibliometrics

- Discipline differences: bio-medical sciences (40% of total publication)
- Counting method: integer vs. fractional
- Language barrier: English speaking and non-English speaking
- Mathew's law: richer become richer

● Peer Reviews

- reliability
- reviewer bias



III. The Use of Peer Review and Bibliometrics

3-3. Dilemma of Using Bibliometrics & Peer Review

● Peer Review

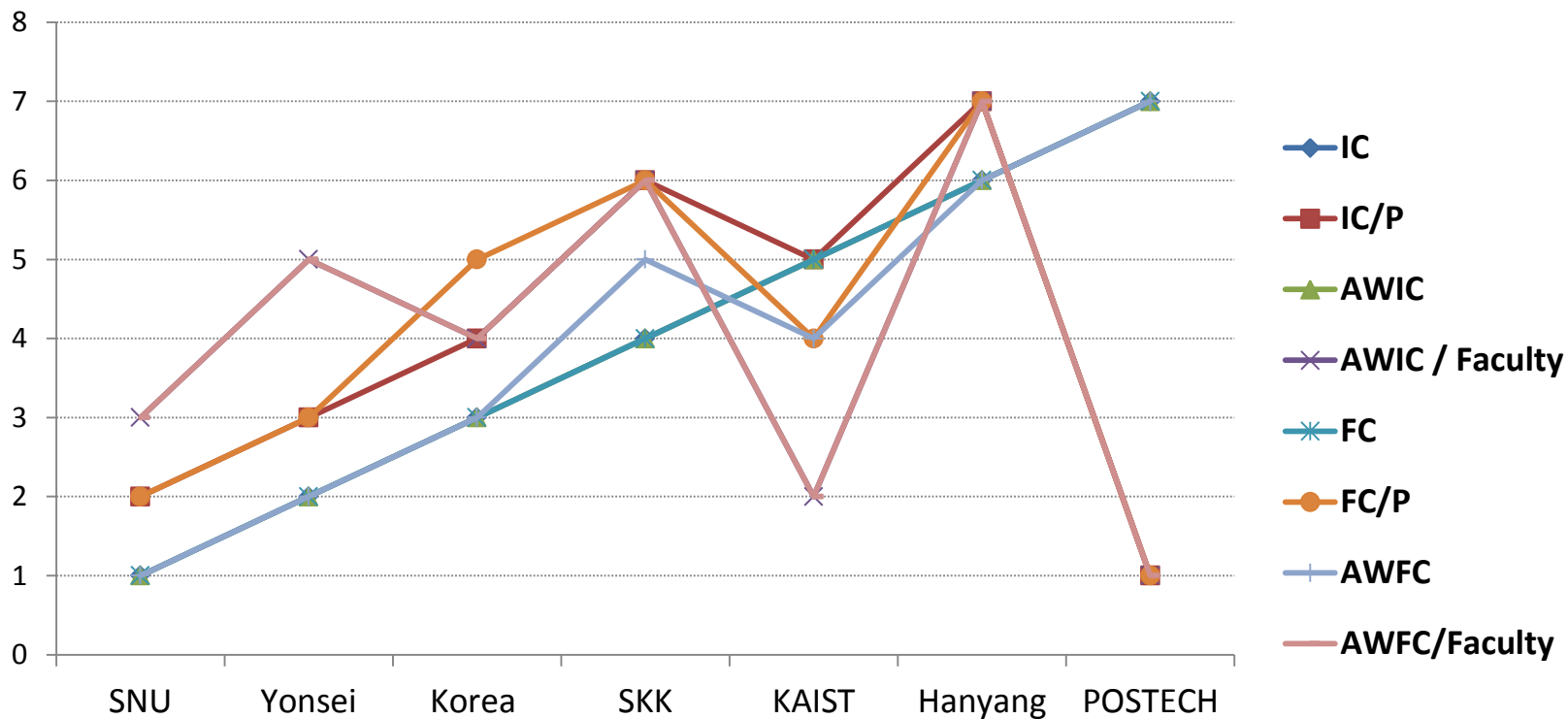
- peer review may be biased by:
 - human networks in a small society
- the evaluation may be biased by:
 - gender
 - disciplines
 - affiliated university
- fund applicants may suspicious of the academic quality of reviewers
 - competitive scholars may be excluded in the review process
 - or do not want to be a reviewer pool



III. The Use of Peer Review and Bibliometrics

3-3. Dilemma in Bibliometrics & Peer Review

Bibliometrics: citation analysis



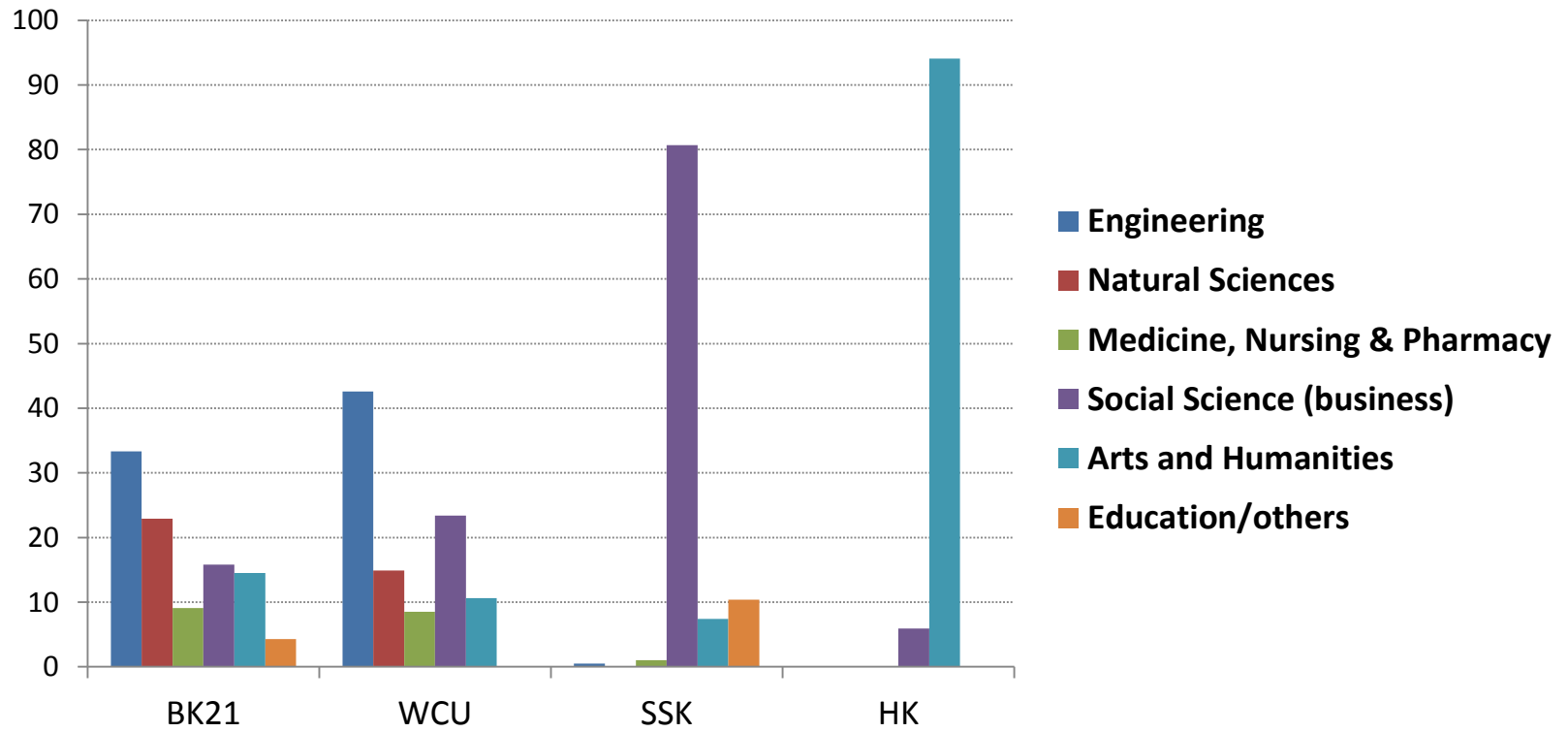
Notes: 1. This is the case of seven Korean research universities
2. Publication (2005-2007), Citation (2009) in Web of Science



III. The Use of Peer Review and Bibliometrics

3-4. Peer Reviewer

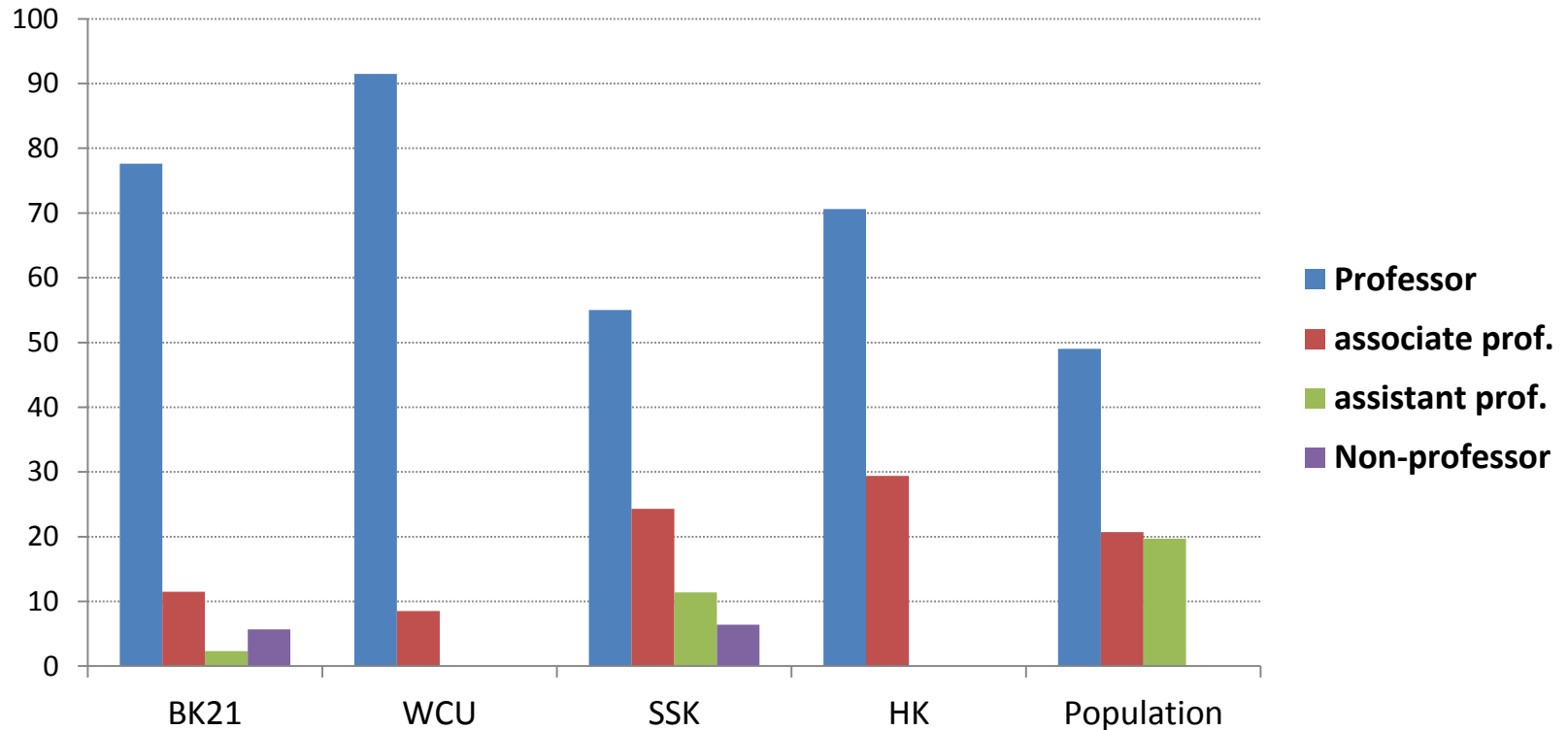
by Discipline



III. The Use of Peer Review and Bibliometrics

3-4. Peer Reviewer

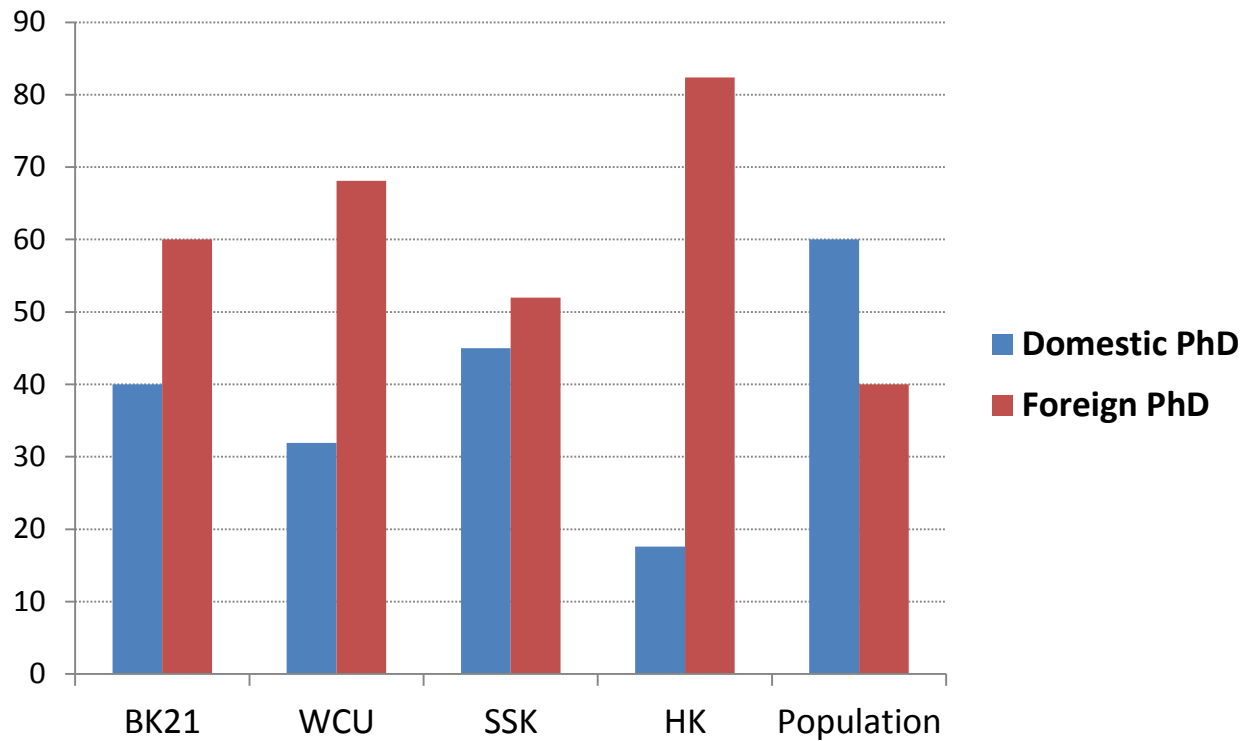
by Academic Ranks



III. The Use of Peer Review and Bibliometrics

3-4. Peer Reviewer

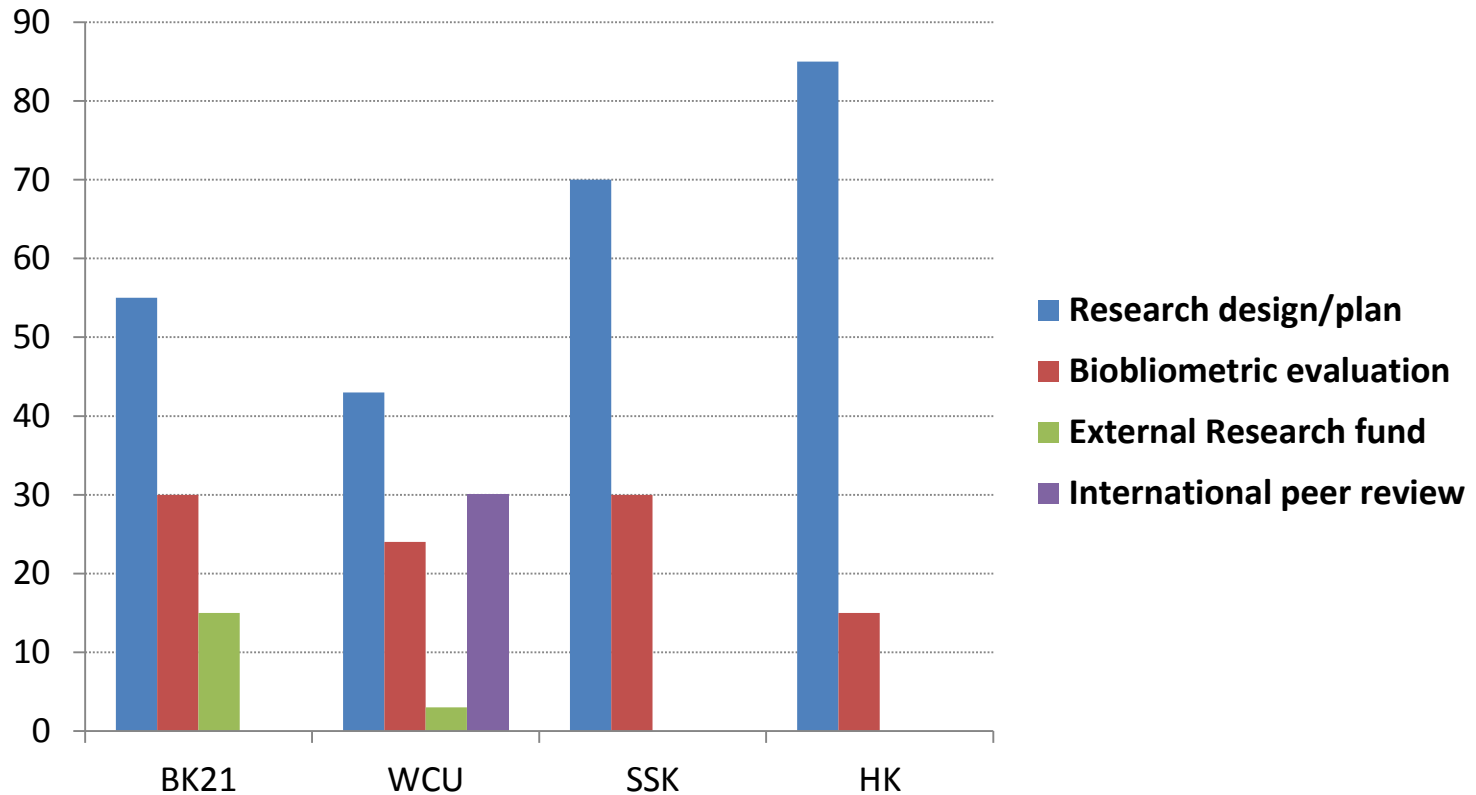
● by the Origin of Degree



III. The Use of Peer Review and Bibliometrics

3-5. Weights of Indicators

● Bibliometrics vs. peer review at Selection Stage



IV. Case Analysis: BK 21 Program

● Indicators and Weights: annual evaluation

Category of Indicators	Indicators	Number	Weights
Bibliometrics	Publication/citation/conference presentation	5	25%
External Fund	External research fund	3	15%
Patents/T-transfer	Patents/technology transfer	2	5%
Quality of Research	Quality of publication, R&D, U-I collaboration	5	20%
Quantitative data based Indicators	Measured by qualitative indicators except fours above	9	16%
Qualitative data based Indicators	Measured by quantitative indicators except fours above	7	19%
Total		31	100%



IV. Case Analysis: BK 21 Program

Impact of each Indicator on Total Score

	Indicator weights	R2	R2/weight
Bibliometrics	25 %	0.500	1.96
External Research Fund	15 %	0.449	3.00
Patent/technology-transfer	5 %	0.041	0.87
Research performance-based qualitative review	20 %	0.208	1.06
Others: Quantity-based peer review	16 %	0.059	0.37
Others: Quality-based peer review	19 %	0.253	1.31

Notes: the indicator and weight are based on type 1 projects



IV. Case Analysis: BK 21 Program

Correlation between Indicators

	Biblio	Fund	Patent_ technology	Research performance- based qualitative review	Others: Quantity_ peer	Others: Quality_ Peer
Total Score	0.707 **	0.670**	0.202	0.456 **	0.243	0.503**
Biblio		0.172	0.161	0.337 *	0.257	-0.024
Fund			0.125	0.162	-0.118	0.476 **
Patent/technology				0.081	0.014	-0.101
Research performance- based qualitative review					0.241	-0.218
Others: Quantity-based peer review						-0.184

Notes: ** significant at 0.01, * significant at 0.05



V. Conclusion

- **Bibliometric data have the highest prediction power in terms of total variance explained (R^2).**
- **However, external research fund has the strongest prediction power when the share of indicator weights is considered.**
- **Other indicators have lower prediction power or no correlation with total score.**
- **Interestingly, there is no association between quality indicator and quantity indicator.**



Thank You !

