

Deutsche
Forschungsgemeinschaft

Peer Review Made in Germany: A Look at the DFG Model

Marion Müller
Bethesda, April 30, 2008





**"Peer review is
50% garbage,
50% malice and
10% good advice."**

(Professor Sleight, head of cardiology
John Radcliffe Hospital Oxford, at a
Royal Society of Medicine meeting)

And This What You Can Expect:

- 1. Introduction: Facts & Figures about DFG**
- 2. The Mechanics of DFG's Peer Review System**
- 3. Did you know ...?**
- 4. Points for Discussion**

1. Introduction: Facts & Figures about DFG

2. The Mechanics of DFG's Peer Review System
3. Did you know ...?
4. Points for Discussion

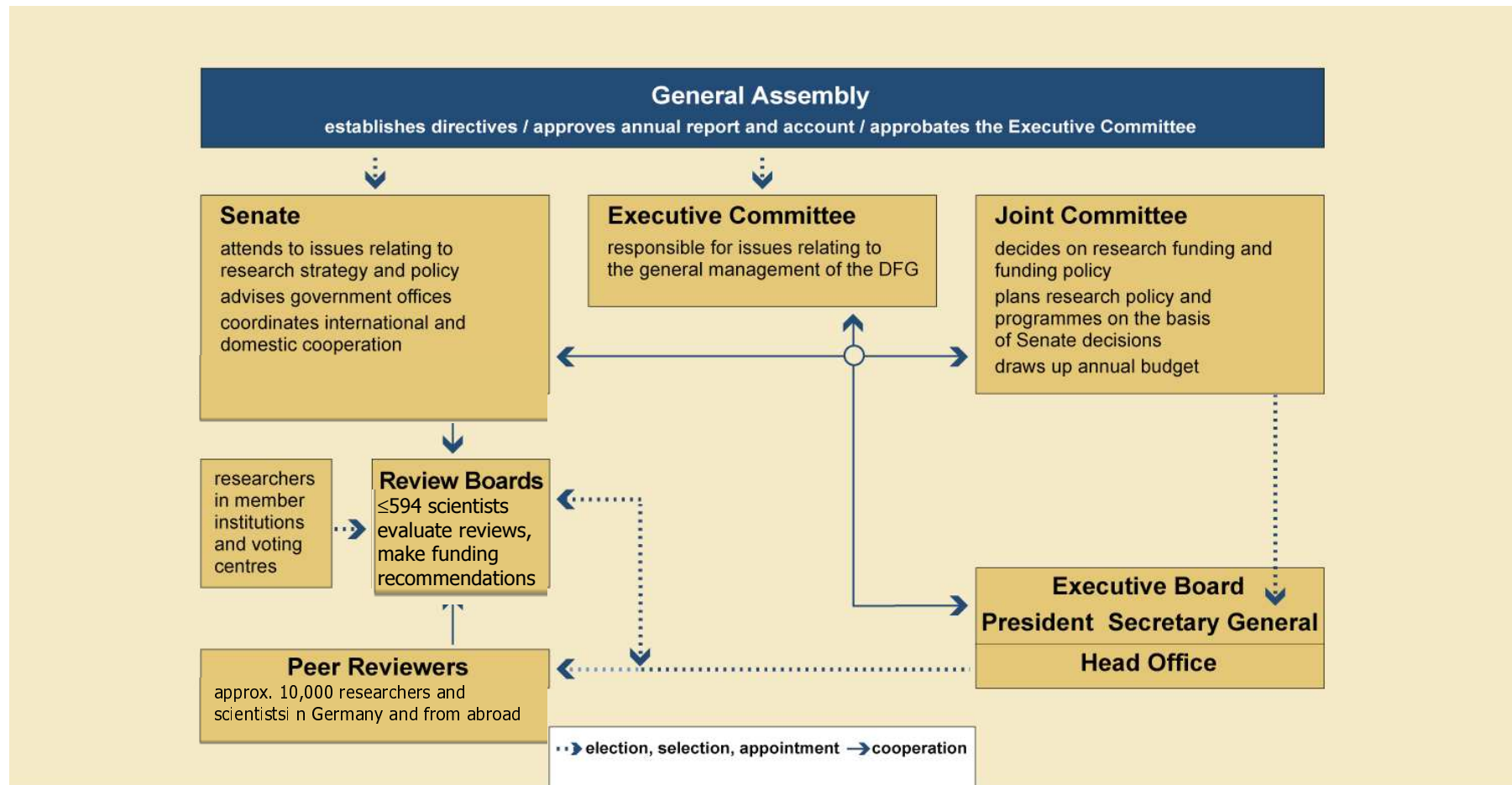
Deutsche
Forschungsgemeinschaft

German Research Foundation DFG: Who We Are and What We Do

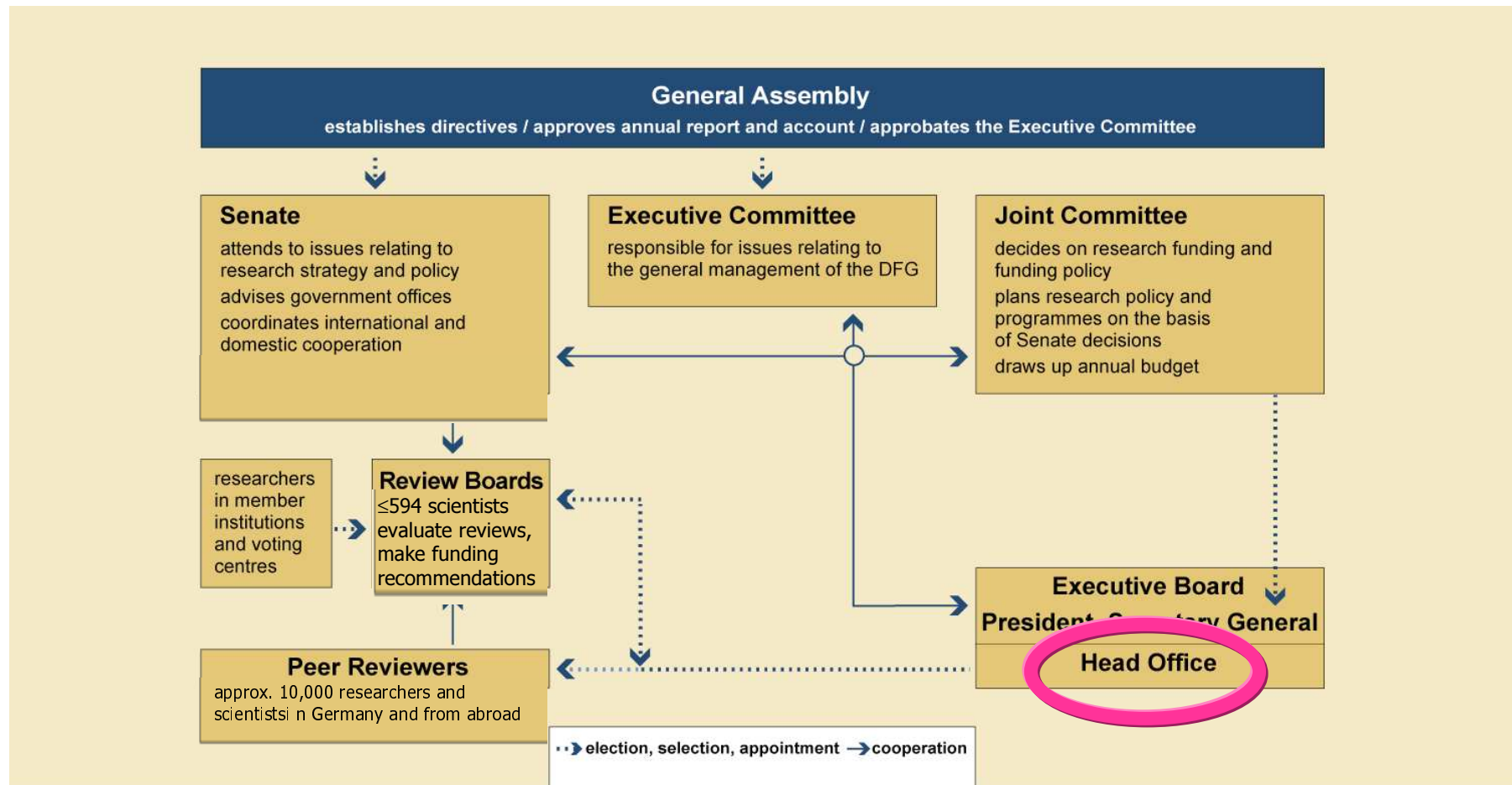
- central **public funding organization** for academic research in Germany (largest in Europe)
- **member organization** (universities, academies)
- **advisory function** for **politics**
- special focus on supporting **young academics**
- promoting **international research co-operation**
- serving **all fields** of science and the humanities including medicine by financing research projects and facilitating research collaboration
- independent multi-tiered **peer review**



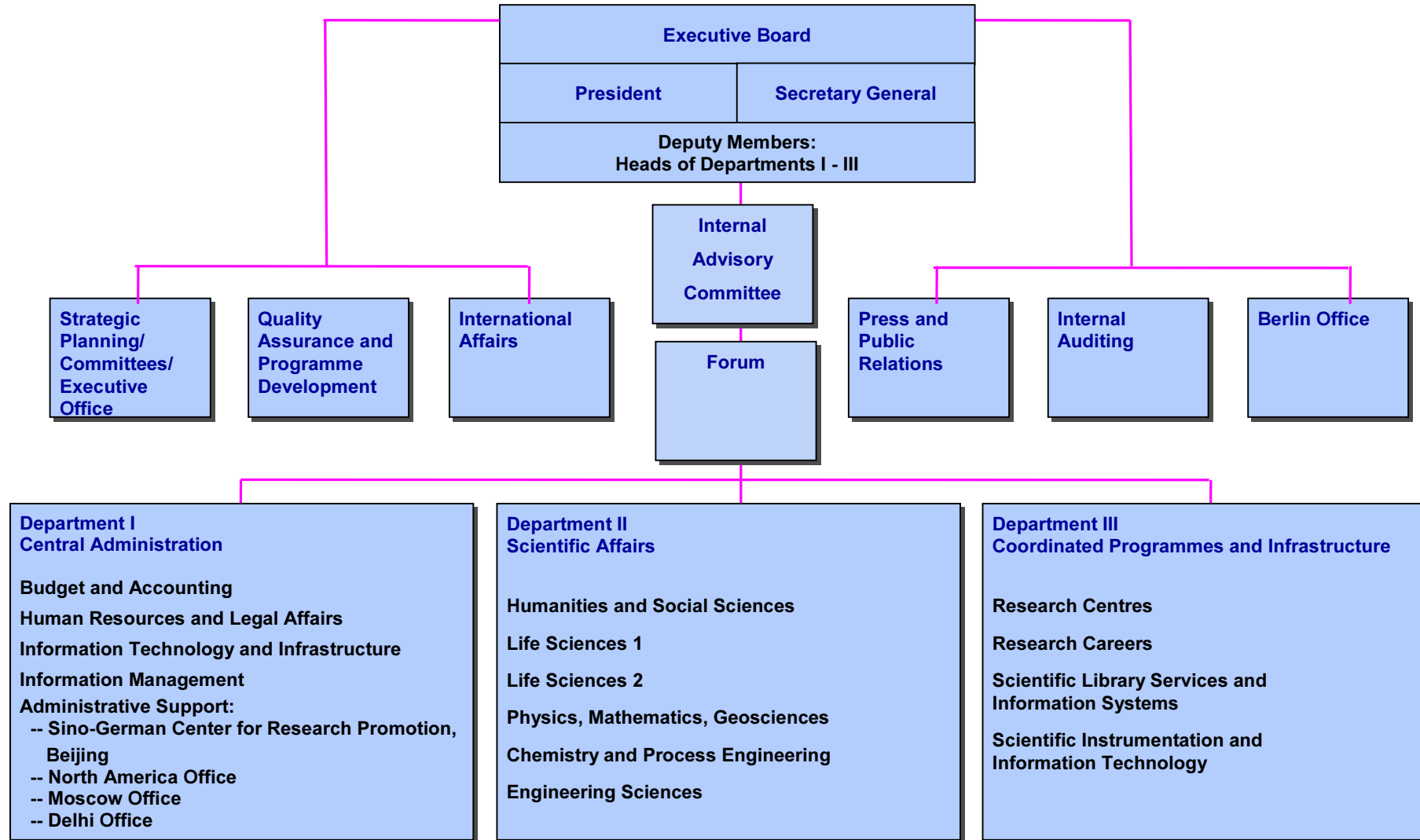
DFG: Structure and Profile



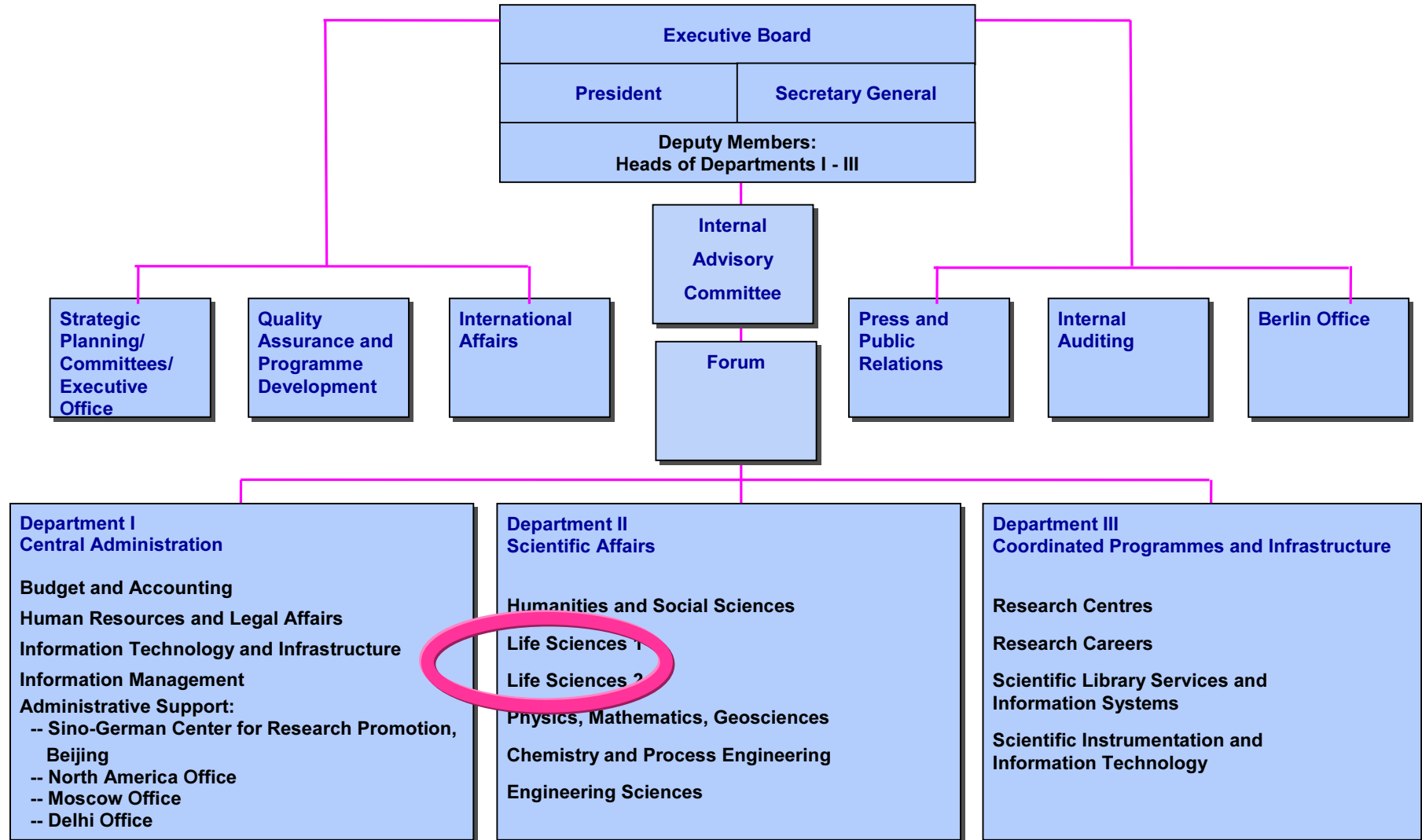
DFG: Structure and Profile



DFG Head Office Bonn



DFG Head Office Bonn



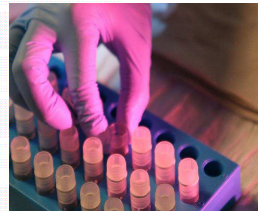
Department II - Scientific Affairs / Life Sciences

Scientific discipline	Research Areas	Review Boards
Life sciences	Biology	201 Foundations of biology and medicine
		202 Plant science
		203 Zoology
	Medicine	204 Microbiology, virology and immunology
		205 Medicine
		206 Neurosciences
	Veterinary medicine, agriculture and forestry	207 Agriculture, forestry, horticulture and veterinary medicine

Department II - Scientific Affairs / Life Sciences Division 1

Scientific Areas of Responsibility

205-01 Medical Biometry, Epidemiology, Medical Informatics
205-03 Human Genetics
205-04 Pathology and Forensic Medicine
205-05 Clinical Chemistry and Pathobiochemistry
205-06 Pharmacy
205-10 Internal Medicine - Angiology
205-11 Internal Medicine - Pneumology
205-12 Internal Medicine - Hematology, Oncology
205-13 Internal Medicine - Gastroenterology, Metabolism
205-14 Internal Medicine - Nephrology
205-15 Internal Medicine - Endocrinology
205-16 Internal Medicine - Rheumatology
205-17 Pediatrics
205-18 Gynaecology and Obstetrics
205-19 Dermatology
205-20 Urology
205-22 Cardiothoracic Surgery
205-23 Orthopaedics, Traumatology
205-24 Dentistry, Oral Surgery
205-25 Radiology, Nuclear Medicine, Radiotherapy



205-26 Biomedical Technology and Medical Physics
206-01 Molecular Neuroscience
206-02 Cellular Neuroscience
206-09 Clin Neurosciences II - Psychiatry, Psychotherapy
206-10 Clin Neurosciences III - Ophthalmology
206-11 Clin Neurosciences IV - Otolaryngology
206-12 Neuroimaging
207-01 Soil Sciences
207-02 Plant Cultivation
207-03 Plant Nutrition
207-04 Ecology of Agricultural Landscapes
207-05 Plant Breeding
207-06 Phytomedicine
207-07 Agricultural and Food Process Engineering
207-08 Agricultural Economics and Sociology
207-11 Animal Breeding, Maintenance and Hygiene
207-12 Animal Nutrition and Nutrition Physiology
207-13 Foundations of Veterinary Medicine
207-14 Foundations of Pathogenesis, Diagnostics, Therapy
207-15 Clinical Veterinary Medicine

Department II - Scientific Affairs / Life Sciences Division 2

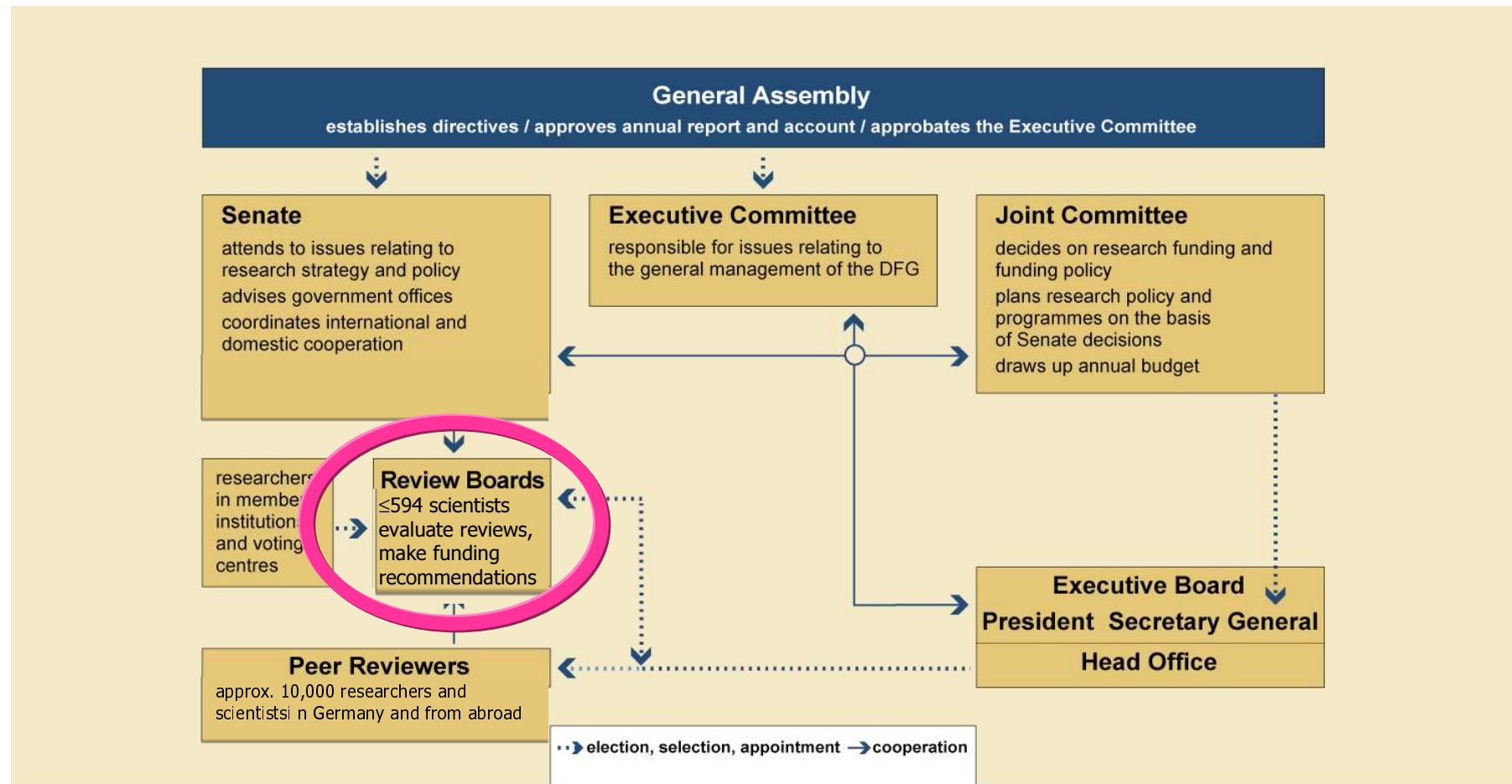
Scientific Areas of Responsibility

201-01	Biochemistry
201-02	Biophysics
201-03	Cell Biology
201-04	Structural Biology
201-05	General Genetics
201-06	Developmental Biology
201-07	Bioinformatics and Theoretical Biology
201-08	Nutritional Sciences
202-01	Systematic Botany and Evolution
202-02	Ecology and Ecosystem Research
202-03	Allelobotany
202-04	Plant Physiology
202-05	Plant Biochemistry and Biophysics
202-06	Plant Cell and Developmental Biology
202-07	Plant Genetics
203-01	Special Zoology, Morphology
203-02	Evolution, Biodiversity, Physical Anthropology
203-03	Comparative Biochemistry, Animal Physiology and Ecophysiology
203-04	Sensory and Behavioural Biology
203-05	Animal Ecology and Ecosystem Research



203-06	Animal Genetics, Cell and Developmental Biology
204-01	Metabolism, Biochemistry and Genetics of Microorganism
204-02	Microbial Ecology and Applied Microbiology
204-03	Medical Microbiology, Molecular Infection Biology
204-04	Virology
204-05	Immunology
205-02	Occupational and Social Medicine
205-07	Pharmacology and Toxicology
205-09	Internal Medicine - Cardiology
205-21	Vascular and Visceral Surgery
206-01	Molecular Neuroscience
206-02	Cellular Neuroscience
206-03	Developmental Neurobiology
206-04	Systemic Neuroscience
206-05	Comp Neurobiology and Comp Sensory Physiology
206-06	Neuroethology and Cognitive Neuroscience
206-07	Neurogenetics and Psychiatric Genetics
206-08	Clin Neurosciences I - Neurology, Neurosurgery
207-09	Inventory Control and Use of Forest Resources
207-10	Basic Forest Research

DFG: Structure and Profile



DFG Review Boards – Research and Scientific Disciplines

- scientific disciplines: 4
- review boards: 48
- review board members: 594

Scientific discipline	Research area	Review board
Humanities and social sciences	Humanities	101 Ancient cultures
		102 History
		103 Fine arts studies
		104 Linguistics
		105 Literature, theatre and media studies
		106 Ethnology, non-european cultures and religious studies
		107 Theology
		108 Philosophy
	Social and behavioural sciences	109 Education sciences
		110 Psychology
		111 Social sciences
		112 Economics
		113 Jurisprudence
Life sciences	Biology	201 Foundations of biology and medicine
		202 Plant science
		203 Zoology
	Medicine	204 Microbiology, virology and immunology
		205 Medicine
	Veterinary medicine, agriculture and forestry	206 Neurosciences
		207 Agriculture, forestry, horticulture and veterinary medicine

Review board	Research area	Scientific discipline
Natural sciences	Chemistry	301 Molecular chemistry
		302 Chemical solid state research
		303 Physical chemistry of molecules, liquids and interfaces, general theoretical chemistry
		304 Analytical chemistry and method development
		305 Chemistry of biological systems
		306 Polymer research
	Physics	307 Condensed matter physics
		308 Optics, quantum optics and physics of atoms, molecules and plasmas
		309 Particles, nuclei and fields
		310 Statistical physics and nonlinear dynamics
		311 Astrophysics and astronomy
	Mathematics	312 Mathematics
	Geosciences	313 Atmospheric science and oceanography
314 Geology and palaeontology		
315 Geophysics and geodesy		
316 Geochemistry, mineralogy and crystallography		
317 Geography		
318 Water research		
Engineering sciences	Mechanical and industrial engineering	401 Production technology
	402 Mechanics and constructive mechanical engineering	
	Thermal and process engineering	403 Process engineering and technical chemistry
	404 Heat energy technology, thermal machines and drives	
	Material science and engineering	405 Materials engineering
	406 Materials science and raw materials	
	Computer science, electrical and system engineering	407 System engineering
408 Electrical engineering		
409 Computer science		
Construction engineering and architecture	410 Construction engineering and architecture	

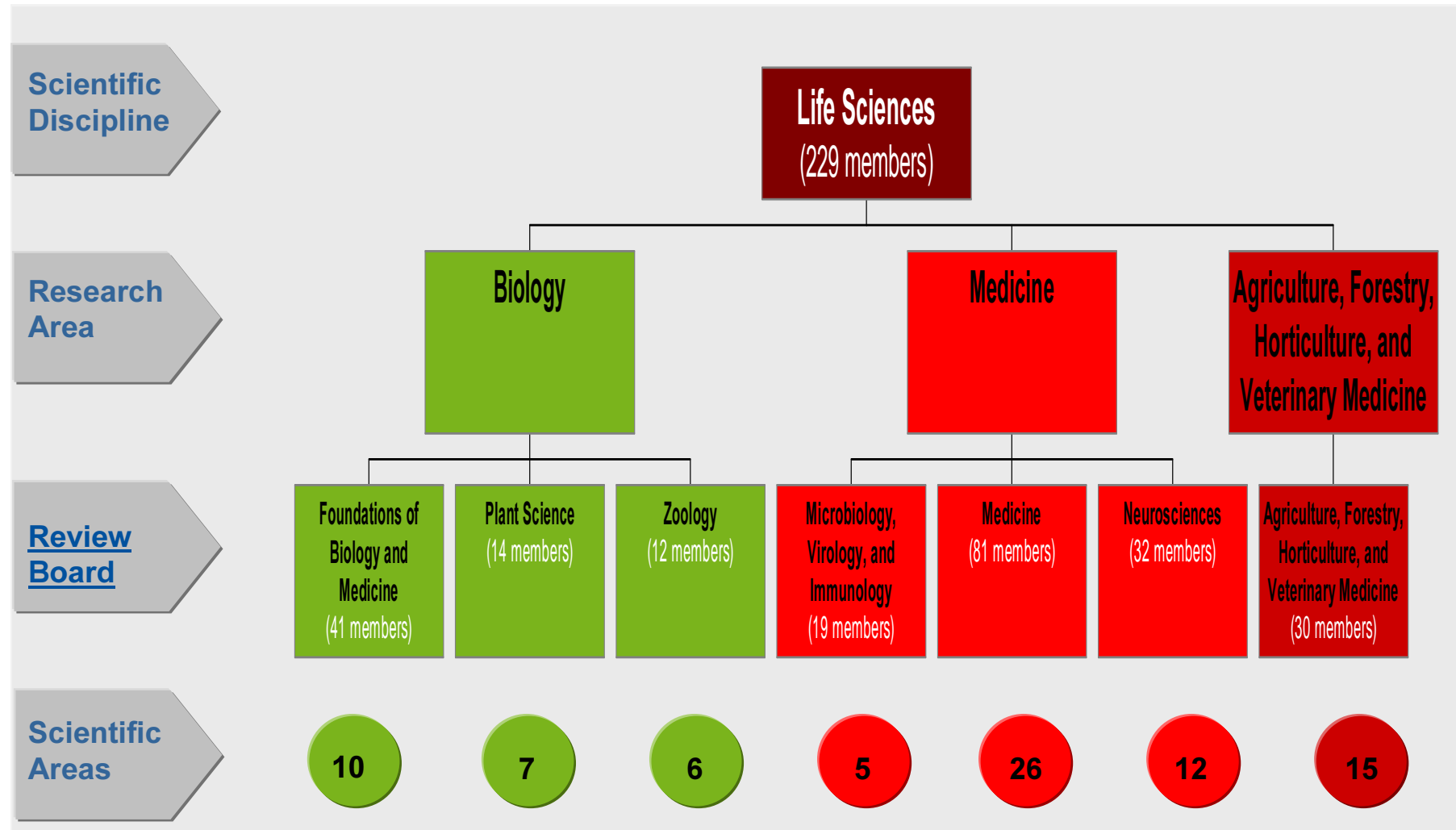
DFG Review Boards – Research and Scientific Disciplines

- scientific disciplines: 4
- review boards: 48
- review board members: 594

Scientific discipline	Research area	Review board
Humanities and social sciences	Humanities	101 Ancient cultures
		102 History
		103 Fine arts studies
		104 Linguistics
		105 Literature, theatre and media studies
		106 Ethnology, non-european cultures and religious studies
		107 Theology
		108 Philosophy
	Social and behavioural sciences	109 Education sciences
		110 Psychology
		111 Social sciences
		112 Economics
		113 Jurisprudence
Life sciences	Biology	201 Foundations of biology and medicine
		202 Plant science
		203 Zoology
	Medicine	204 Microbiology, virology and immunology
		205 Medicine
	Veterinary medicine, agriculture and forestry	206 Neurosciences
		207 Agriculture, forestry, horticulture and veterinary medicine

Review board	Research area	Scientific discipline
Natural sciences	Chemistry	301 Molecular chemistry
		302 Chemical solid state research
		303 Physical chemistry of molecules, liquids and interfaces, general theoretical chemistry
		304 Analytical chemistry and method development
		305 Chemistry of biological systems
		306 Polymer research
	Physics	307 Condensed matter physics
		308 Optics, quantum optics and physics of atoms, molecules and plasmas
		309 Particles, nuclei and fields
		310 Statistical physics and nonlinear dynamics
		311 Astrophysics and astronomy
	Mathematics	312 Mathematics
	Geosciences	313 Atmospheric science and oceanography
314 Geology and palaeontology		
315 Geophysics and geodesy		
316 Geochemistry, mineralogy and crystallography		
317 Geography		
318 Water research		
Engineering sciences	Mechanical and industrial engineering	401 Production technology
		402 Mechanics and constructive mechanical engineering
	Thermal and process engineering	403 Process engineering and technical chemistry
		404 Heat energy technology, thermal machines and drives
	Material science and engineering	405 Materials engineering
		406 Materials science and raw materials
	Computer science, electrical and system engineering	407 System engineering
		408 Electrical engineering
		409 Computer science
	Construction engineering and architecture	410 Construction engineering and architecture

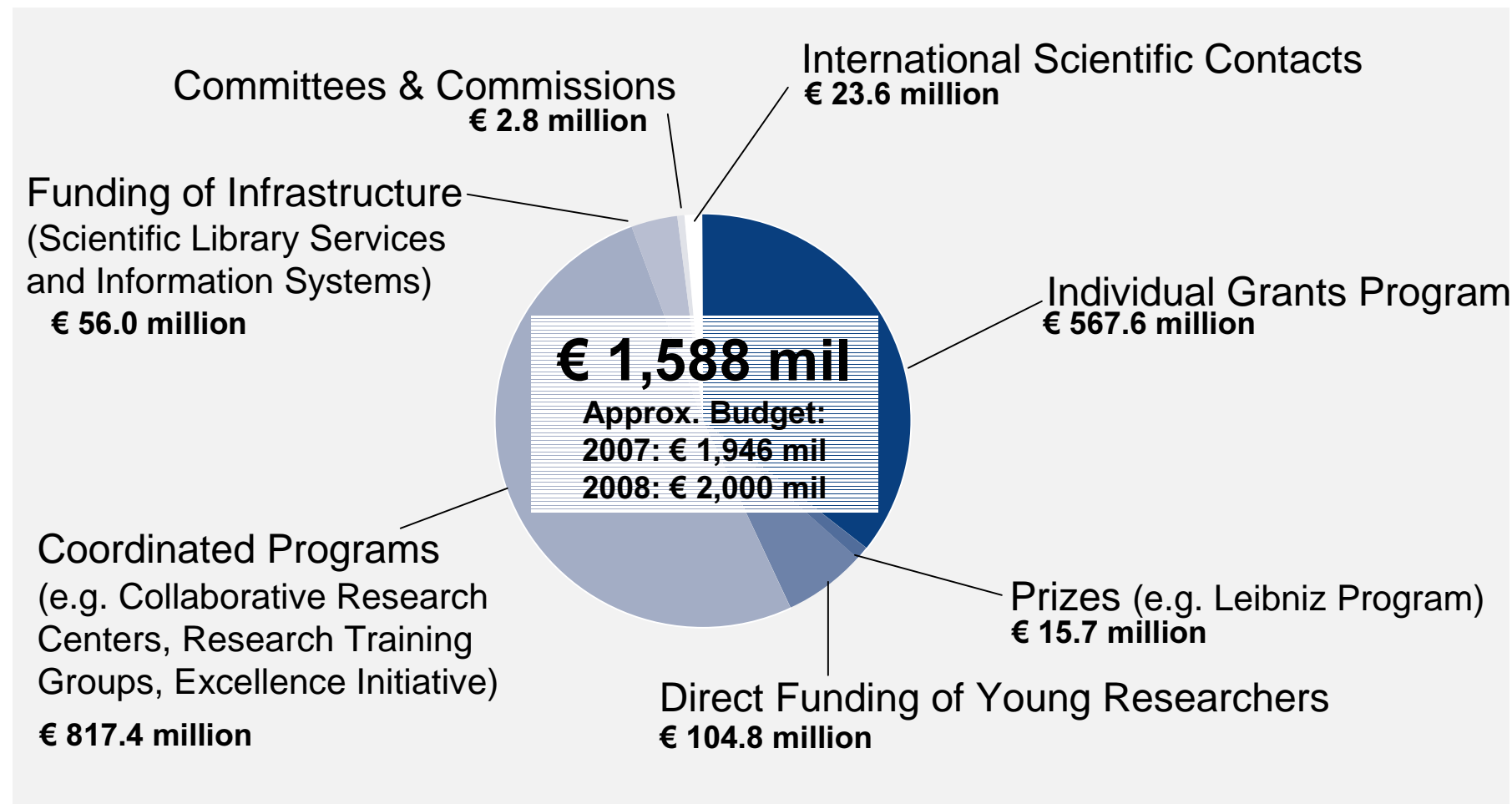
DFG Review Boards – Scientific Disciplines: Life Sciences



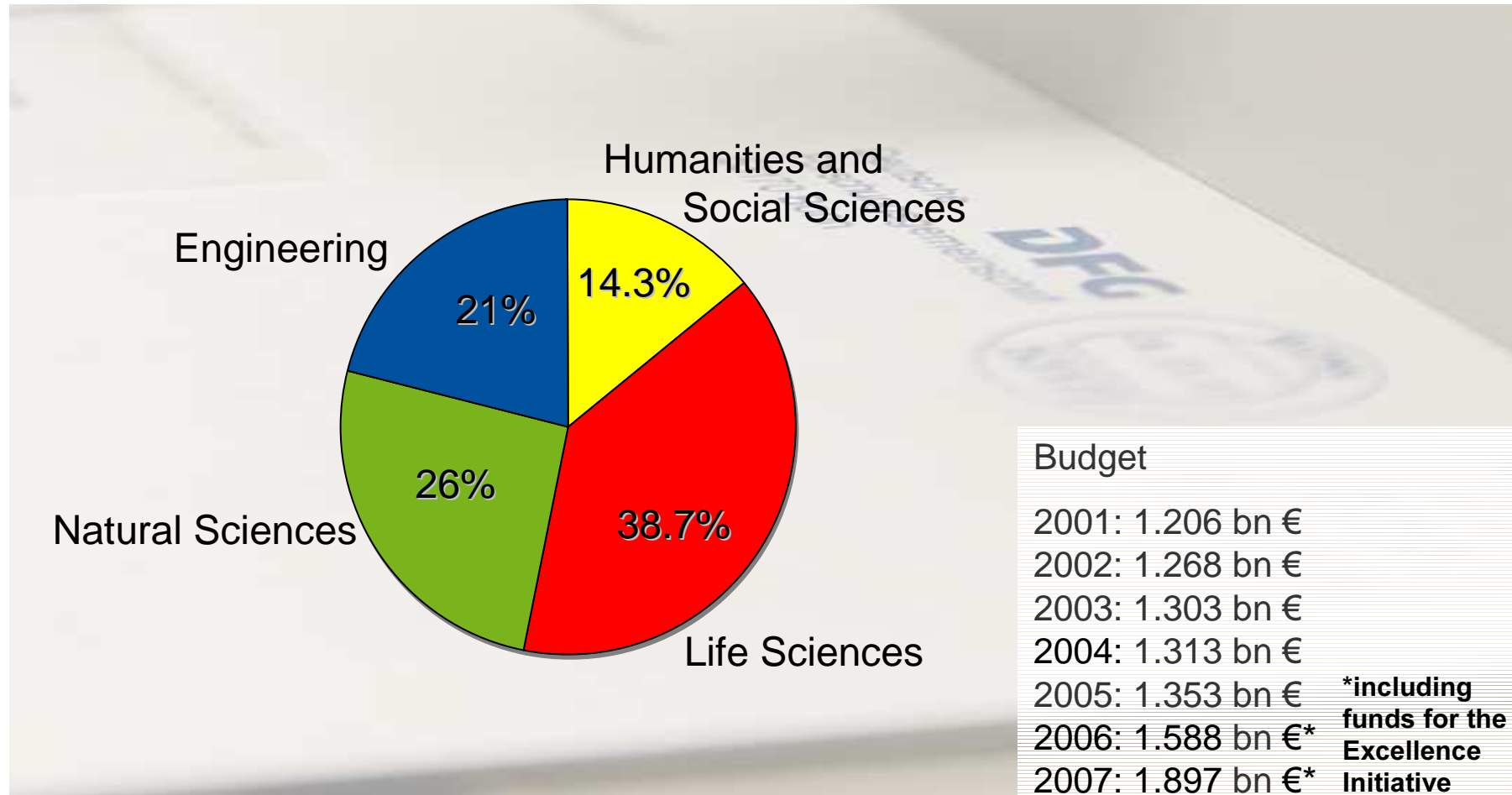
DFG Review Boards – Regulatory Framework

- Choice between various working methods laid down in the framework policy and thus ability to structure the review and evaluation of proposals according to the Review Board's individual disciplines.
- The framework policy allows for oral sessions and for written procedures or a combination of both.
- Several Review Boards can convene in the form of [review fora](#) or can, on a regular basis, split up into [study sections](#).

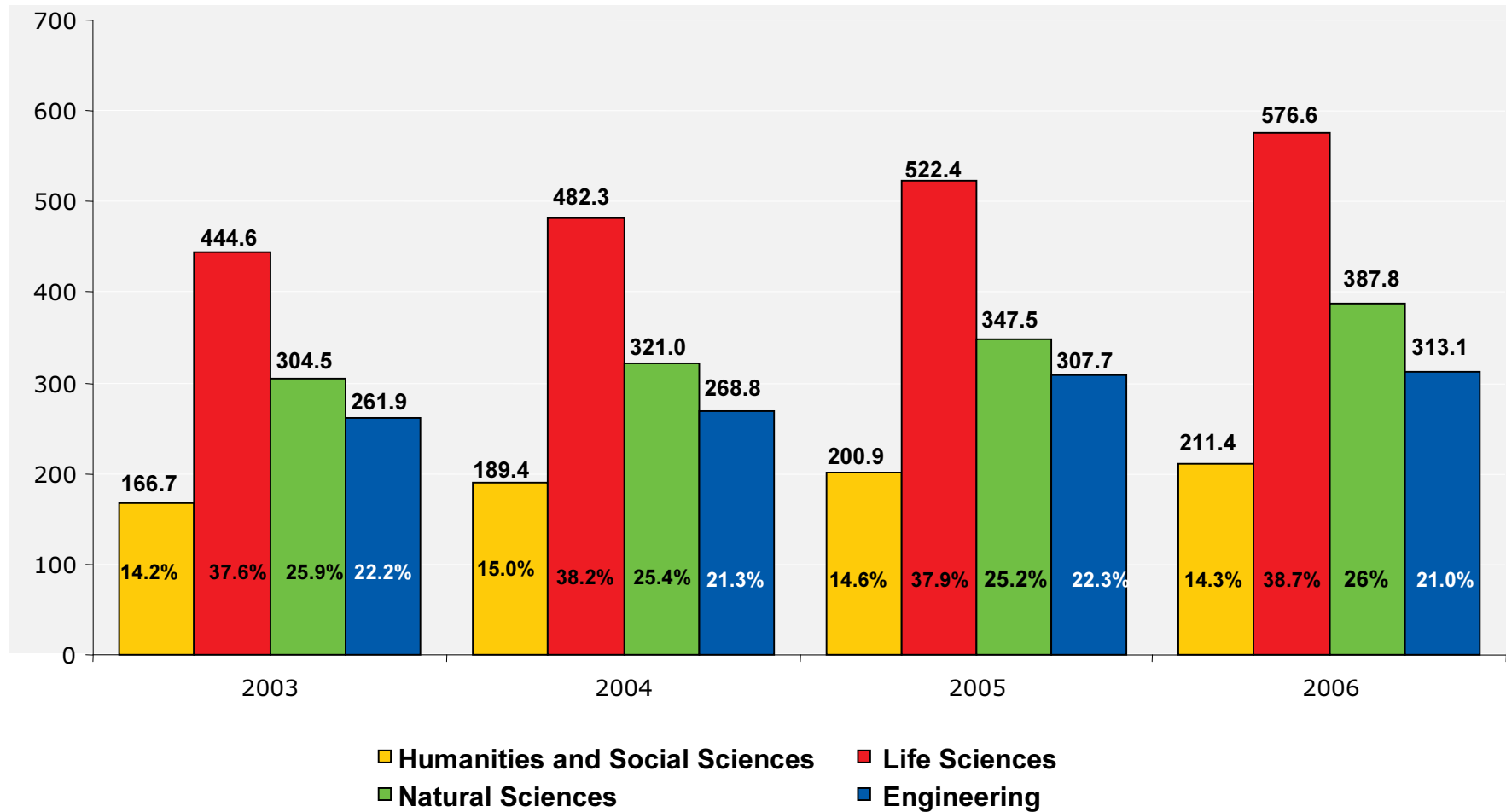
DFG Programs: Approvals 2006 (in €)



Distribution of Research Funding by Scientific Discipline* 2006



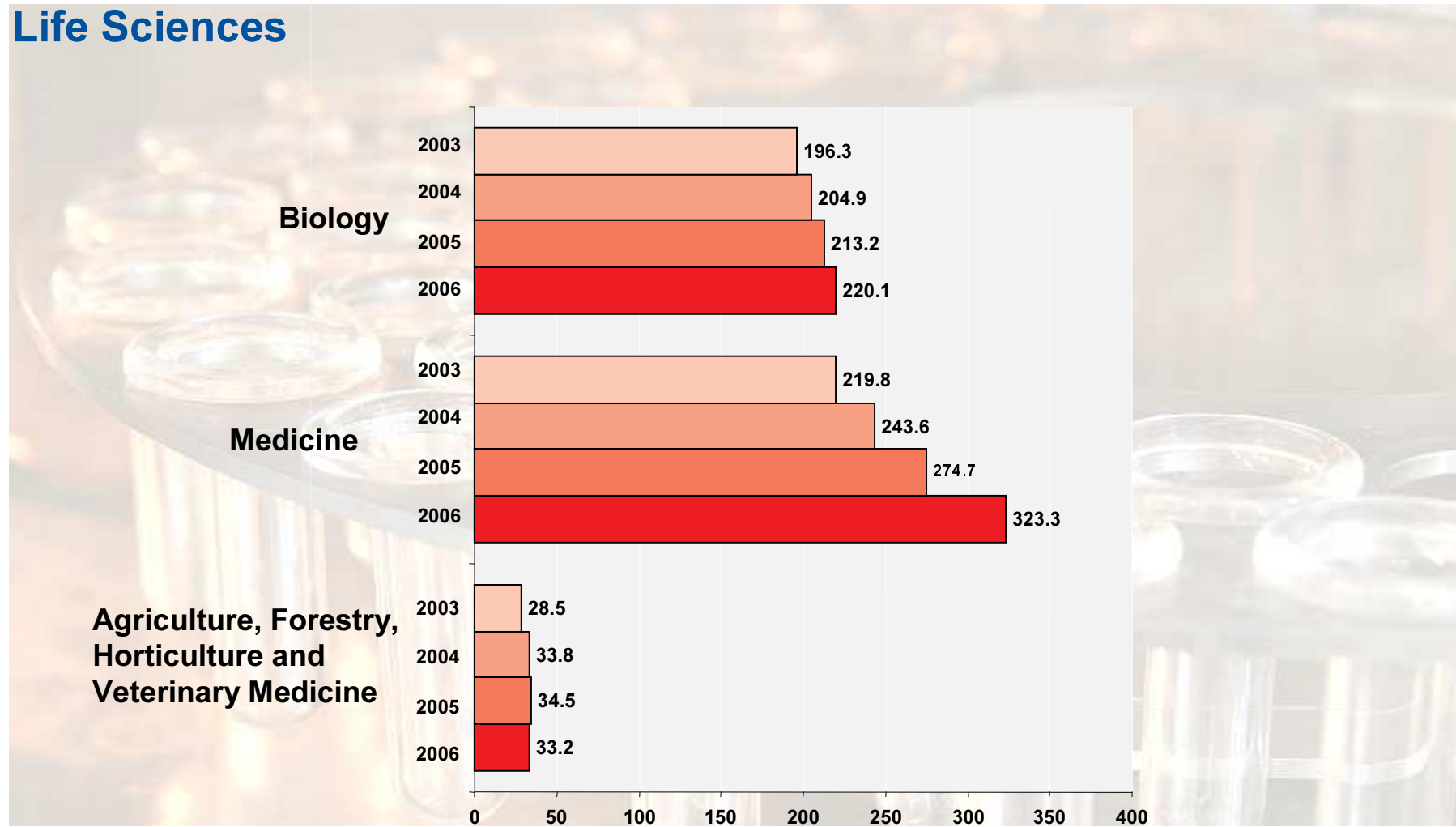
Distribution of Research Funding* by Scientific Discipline 2003–2006 in million Euro



* on the basis of DFG Individual Grants Programs, Programs Promoting Young Researchers, Coordinated Programs
Source: DFG

Research Funding* by Scientific Discipline 2003–2006 in million Euro

Life Sciences



* on the basis of DFG Individual Grants Programs, Programs Promoting Young Researchers, Coordinated Programs
Source: DFG

Indicators in the DFG "Life Sciences"

Medicine

2002 – 2004

- approx. €727 million to the research area of medicine = nearly 20% of the total DFG budget
- medicine is the largest of the research areas differentiated by the DFG

Funding is divided between

- 68 institutions of higher education of the above amount (approx. €646 million; 89%)
- 108 non-university research institutions (approx. €71 million; 10%)
→ **Medicine: research area with the highest number of non-university DFG funding recipients**

Biology

2002 – 2004

- approx. €591 million for projects with a primarily biological orientation = 16% of the total DFG budget
- biology second largest DFG research area after medicine (20%)

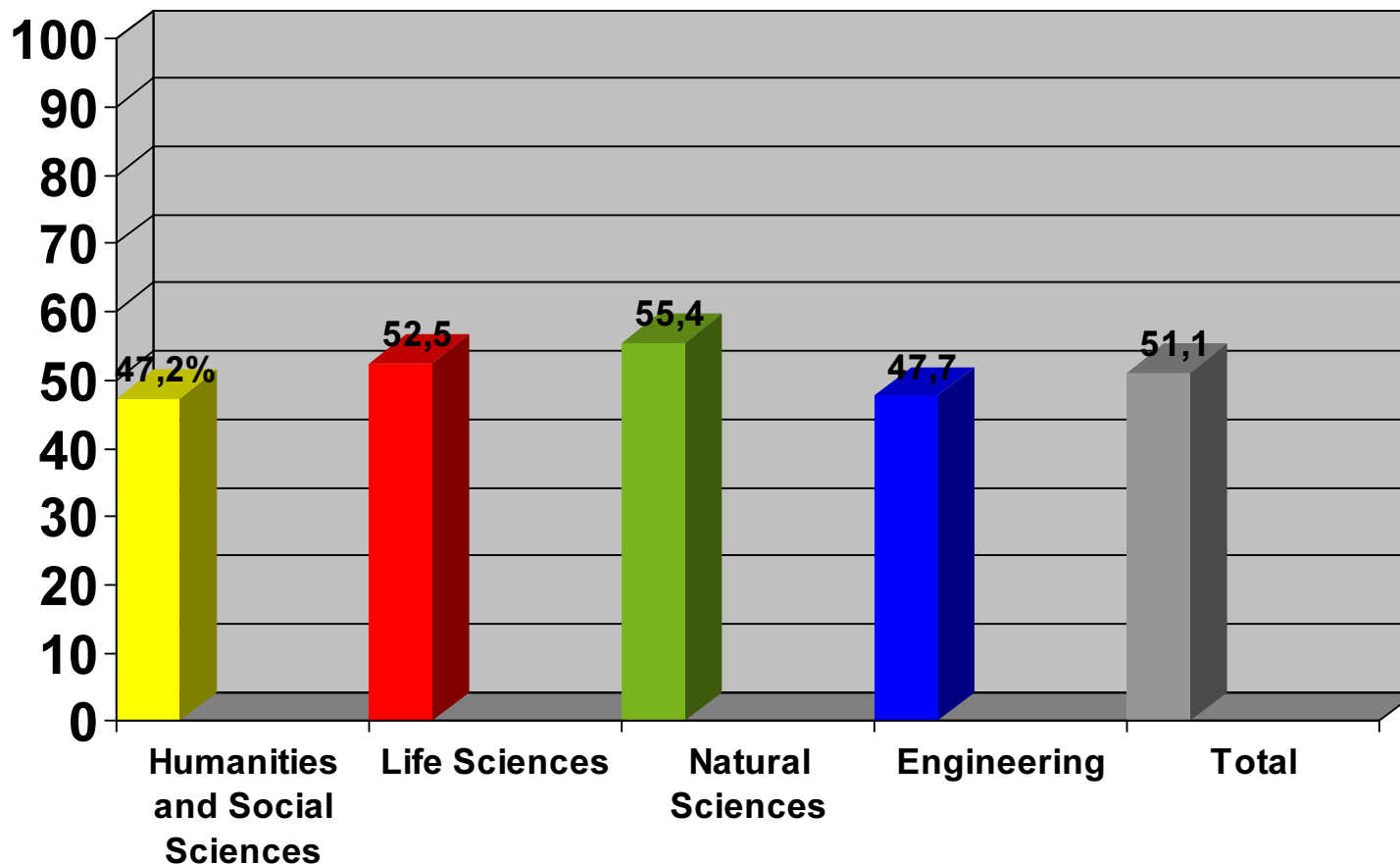
Funding is divided between

- 59 institutions of higher education (approx. €500 million; 85%)
- 89 non-university institutions (approx. €91 million; 15%)

Individual Grants Program

- bottom-up principle
- no thematic solicitations
- qualified researchers (as a rule, those holding a doctorate) from all disciplines working at German universities / research institutions
- 2006:
 - approx. 10,000 proposals p.a.
 - approx. 5,100 approvals p.a.
 - funding rate (by number of proposals) 51%
 - funding rate (by sum of money) 37%

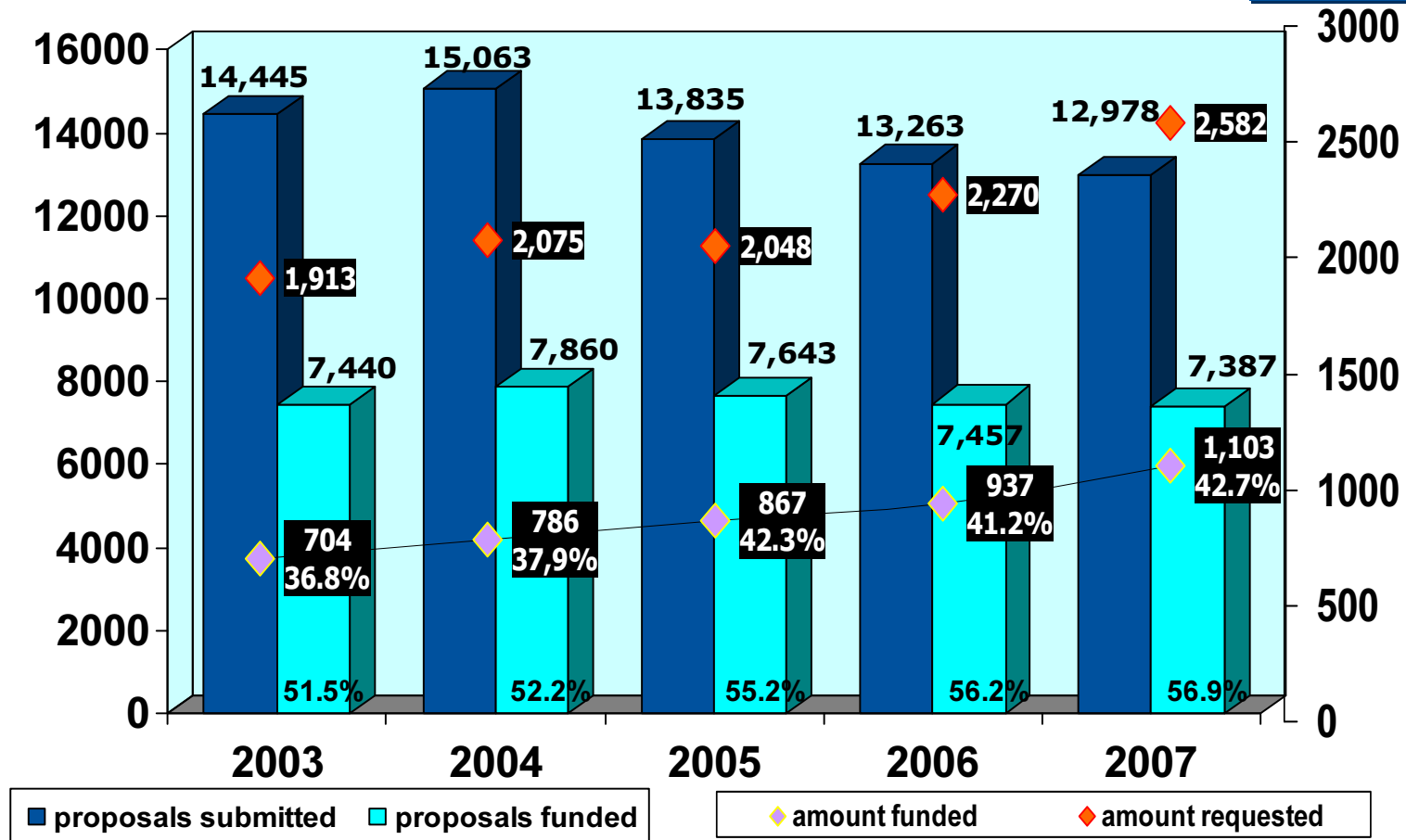
Funding Rate based on the Number of Research Grants in the Individual Grants Program by Scientific Discipline in 2006



Proposals Submitted* to DFG vs Proposals Funded

in absolute numbers

in € millions



*includes: individual grants program, programs for young researchers, coordinated programs, funding of committees, central research facilities

1. Introduction: Facts & Figures about DFG
- 2. The Mechanics of DFG's Peer Review System**
3. Did you know ...?
4. Points for Discussion

Before the gates of excellence ...



"Before the gates of excellence the high gods have placed sweat; long is the road thereto and rough and steep at first; but when the heights are reached, then there is ease, though grievously hard in the winning."

(Hesiod, *Works and Days*).

Spanning the Scale

"There cannot be any better system to select the best scientists and projects in a quality oriented scientific competition"

say dedicated peers and successful grant applicants.

"I would never (again) show my best ideas to my well-positioned competitors, especially as

- a young scientists
- a newcomer to the field
- a woman

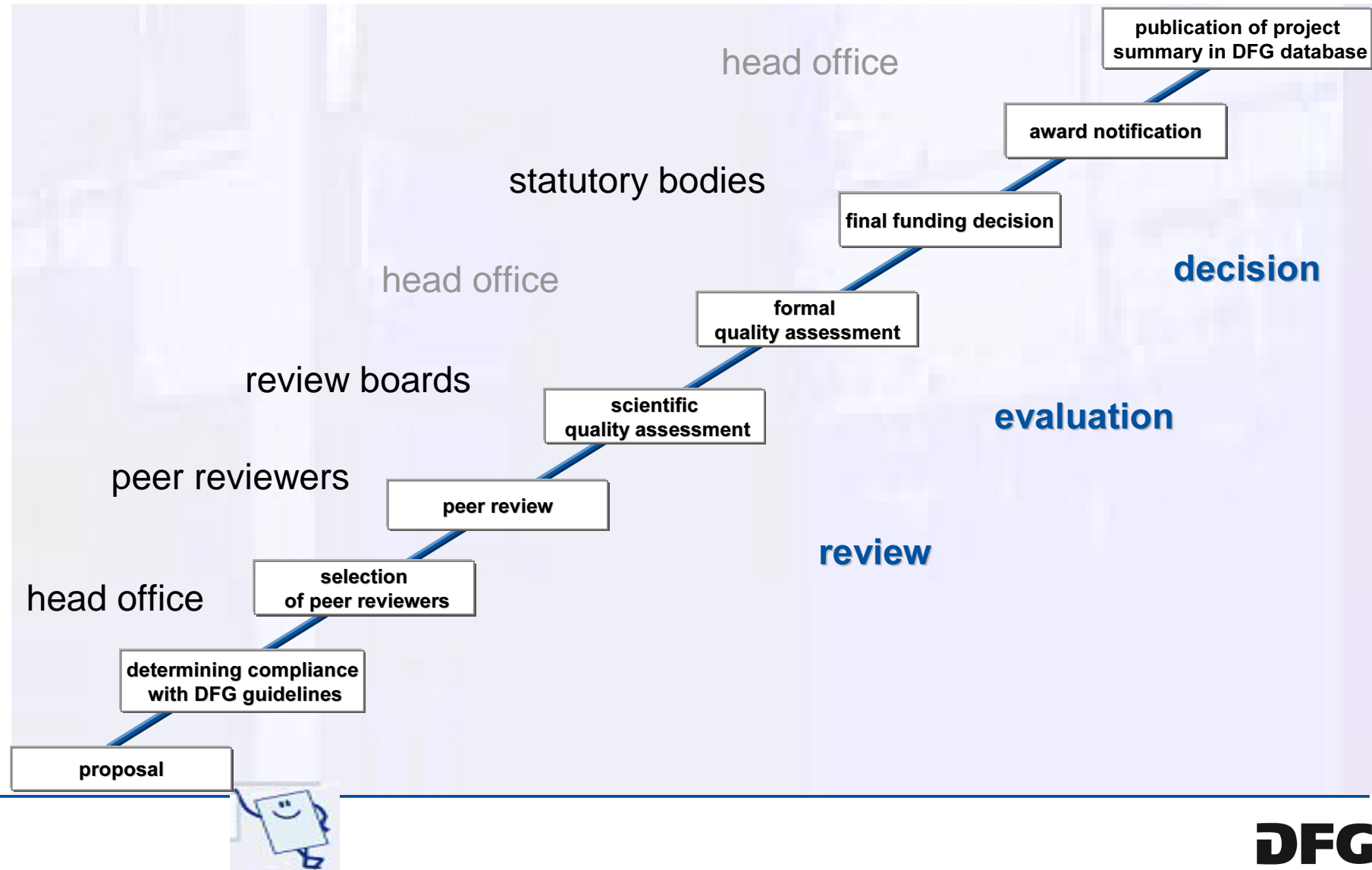
or/ and if my project is a

- high-risk or / and
- interdisciplinary- / transdisciplinary project,"

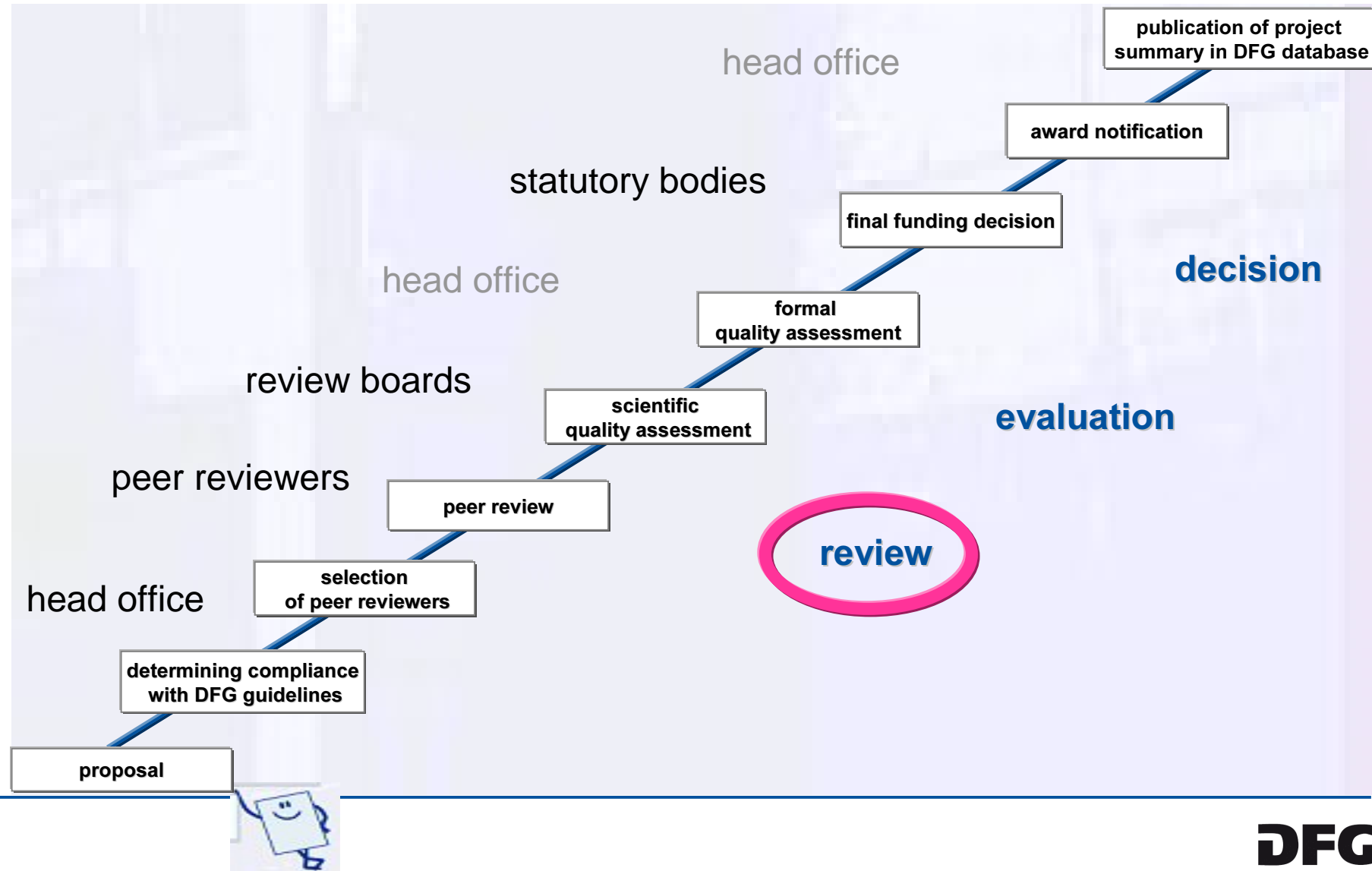
say disappointed grant applicants and opponents of peer review.

"Peer review is like democracy: It is not an ideal system, but the best existing compromise,"
is the most used formula.

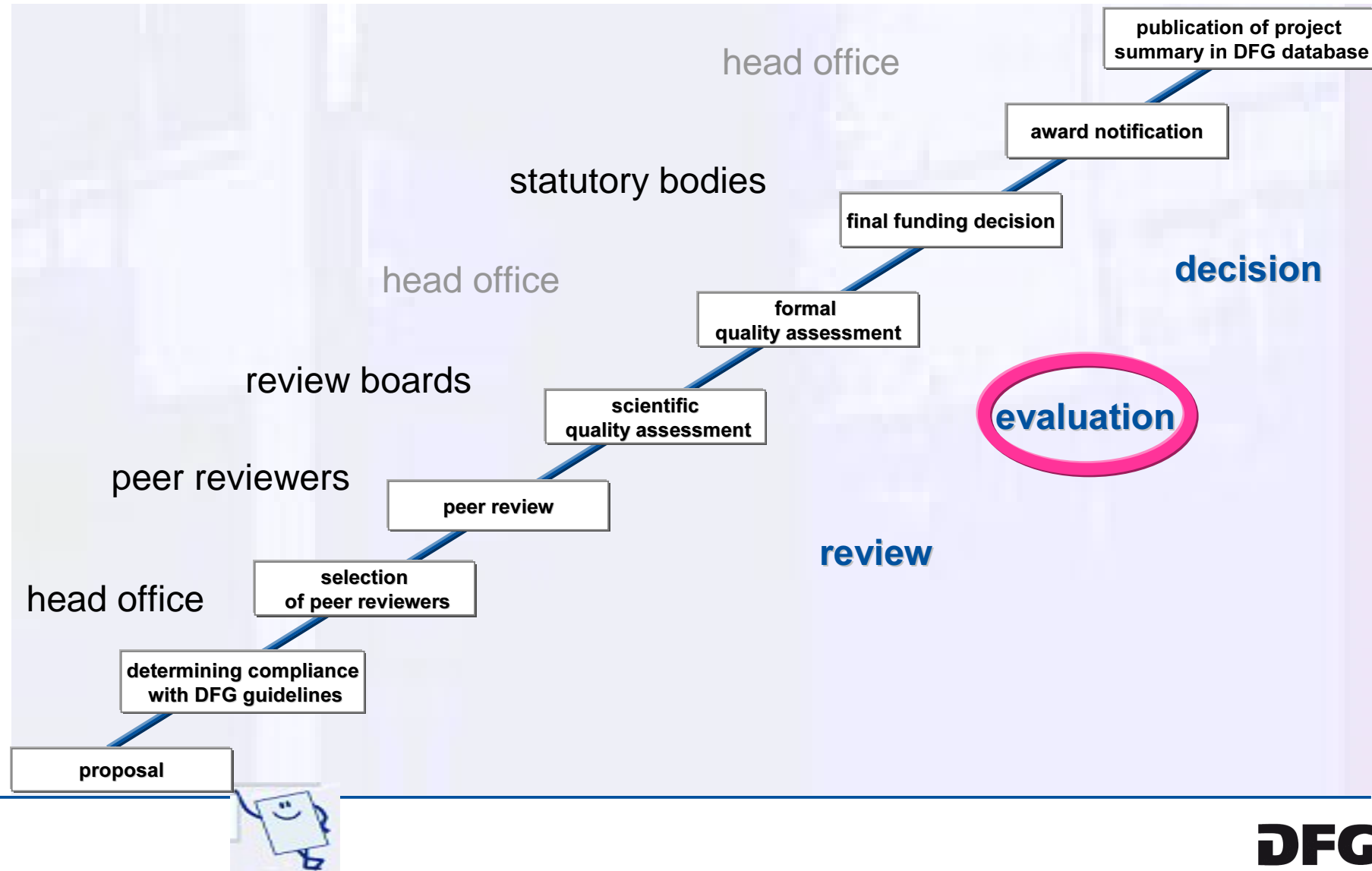
Quo Vadis, Proposal? The Review Process – An Overview



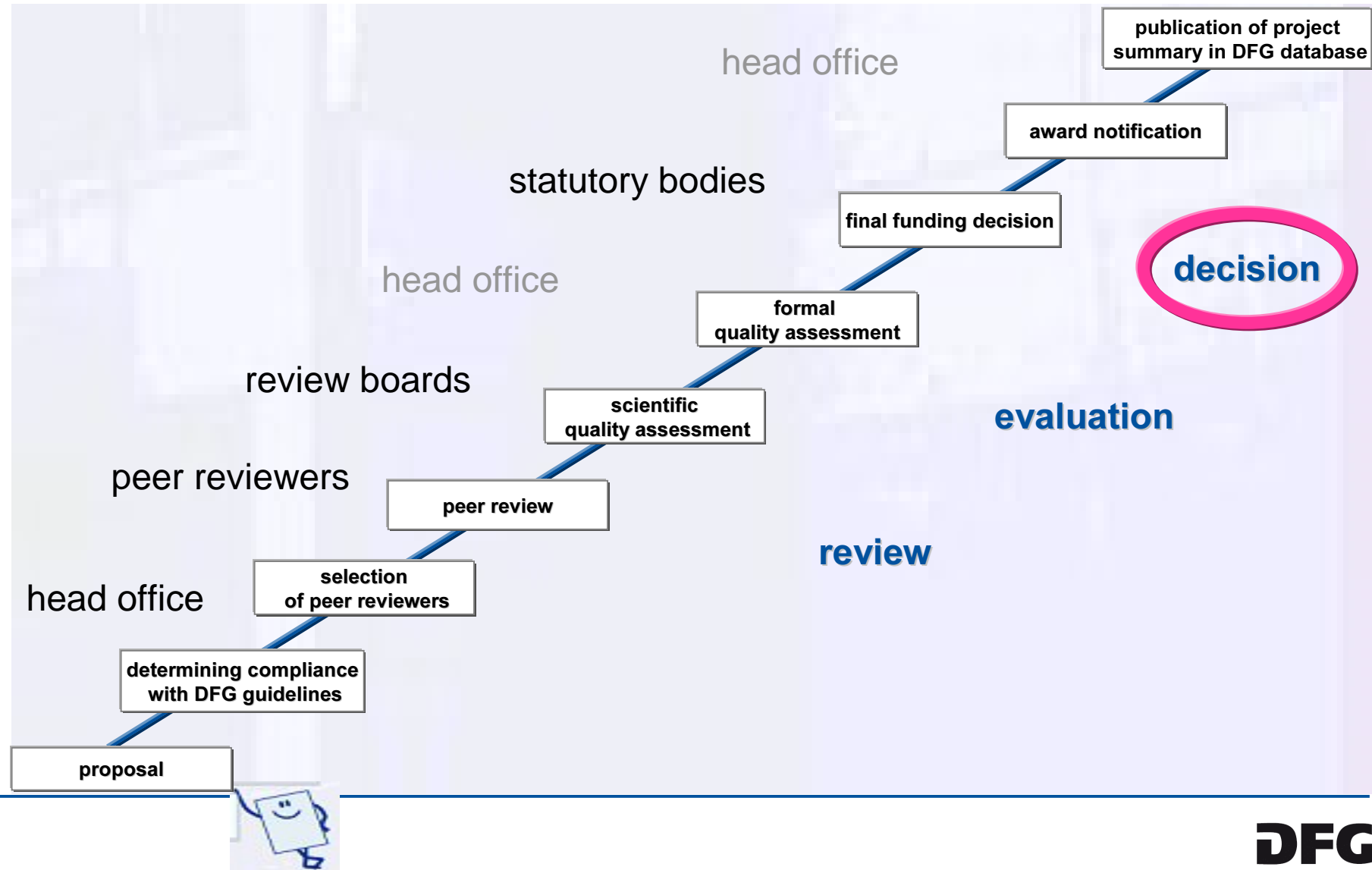
Quo Vadis, Proposal? The Review Process – An Overview



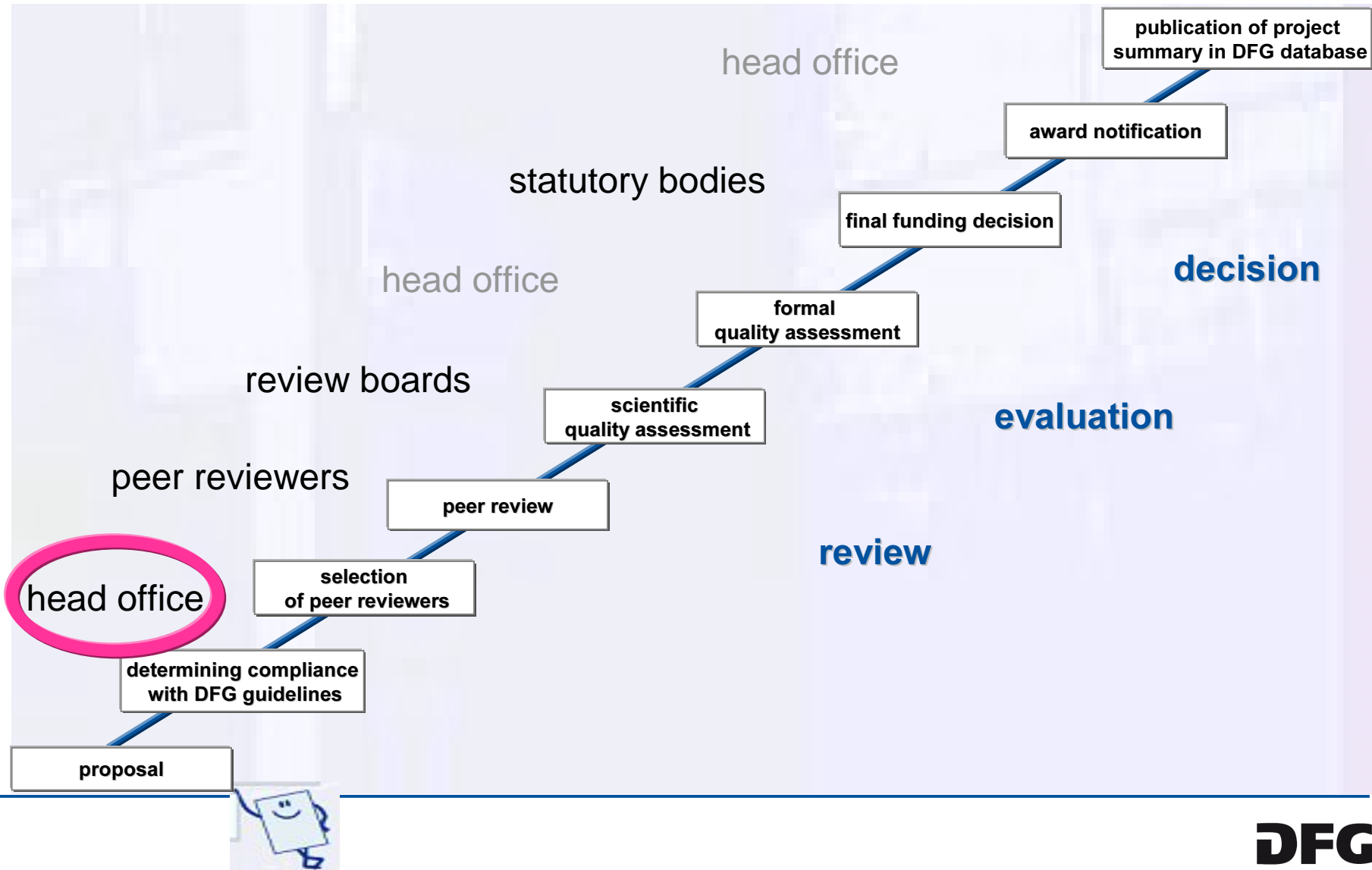
Quo Vadis, Proposal? The Review Process – An Overview



Quo Vadis, Proposal? The Review Process – An Overview



Quo Vadis, Proposal? The Review Process – An Overview



Deutsche
Forschungsgemeinschaft

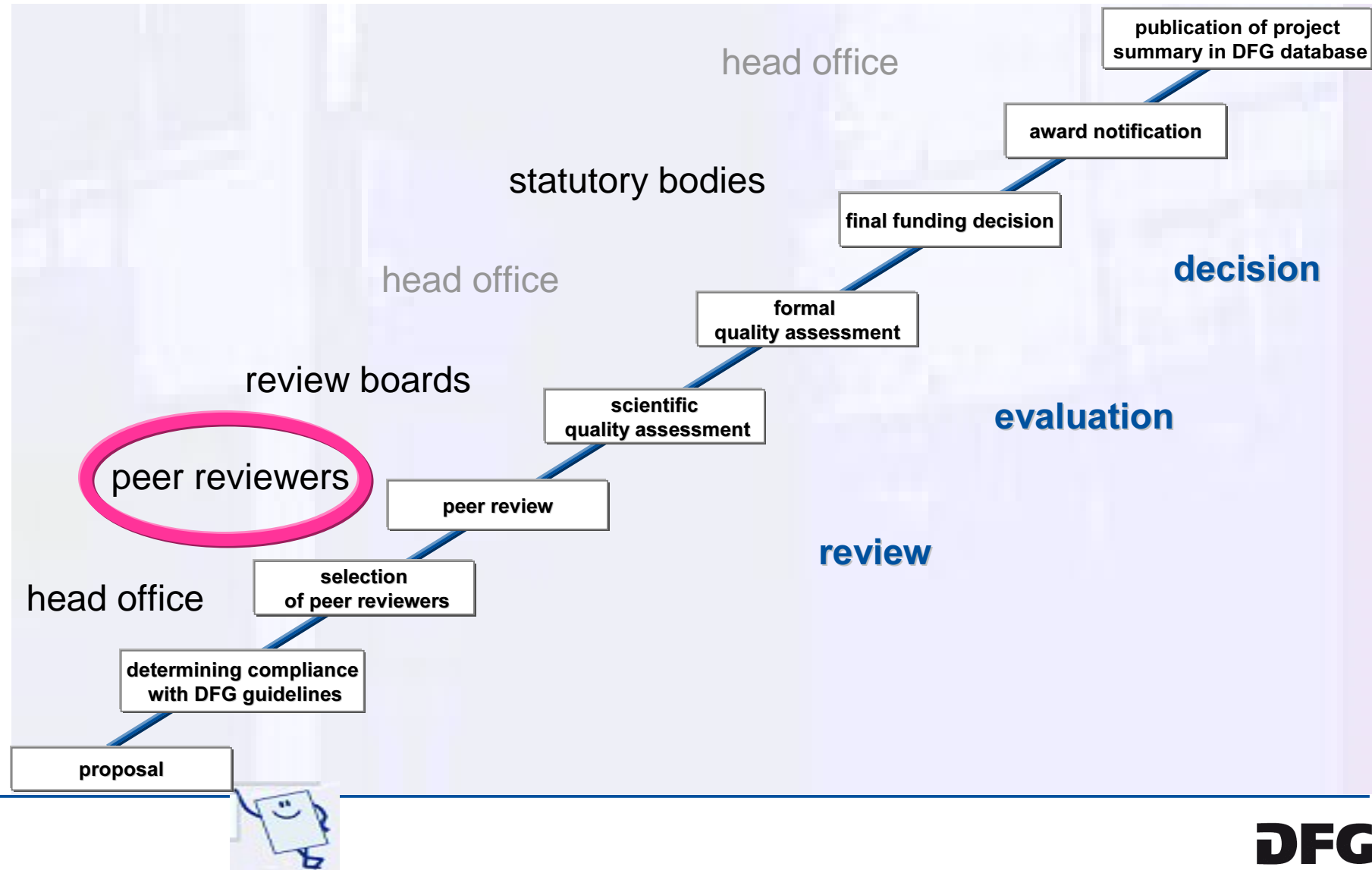
Encounters along the Way



management of review process

- selects reviewers
- prepares draft funding recommendation
- notifies applicant about decision (incl. reviewers' comments)

Quo Vadis, Proposal? The Review Process – An Overview



Encounters along the Way



management of review process

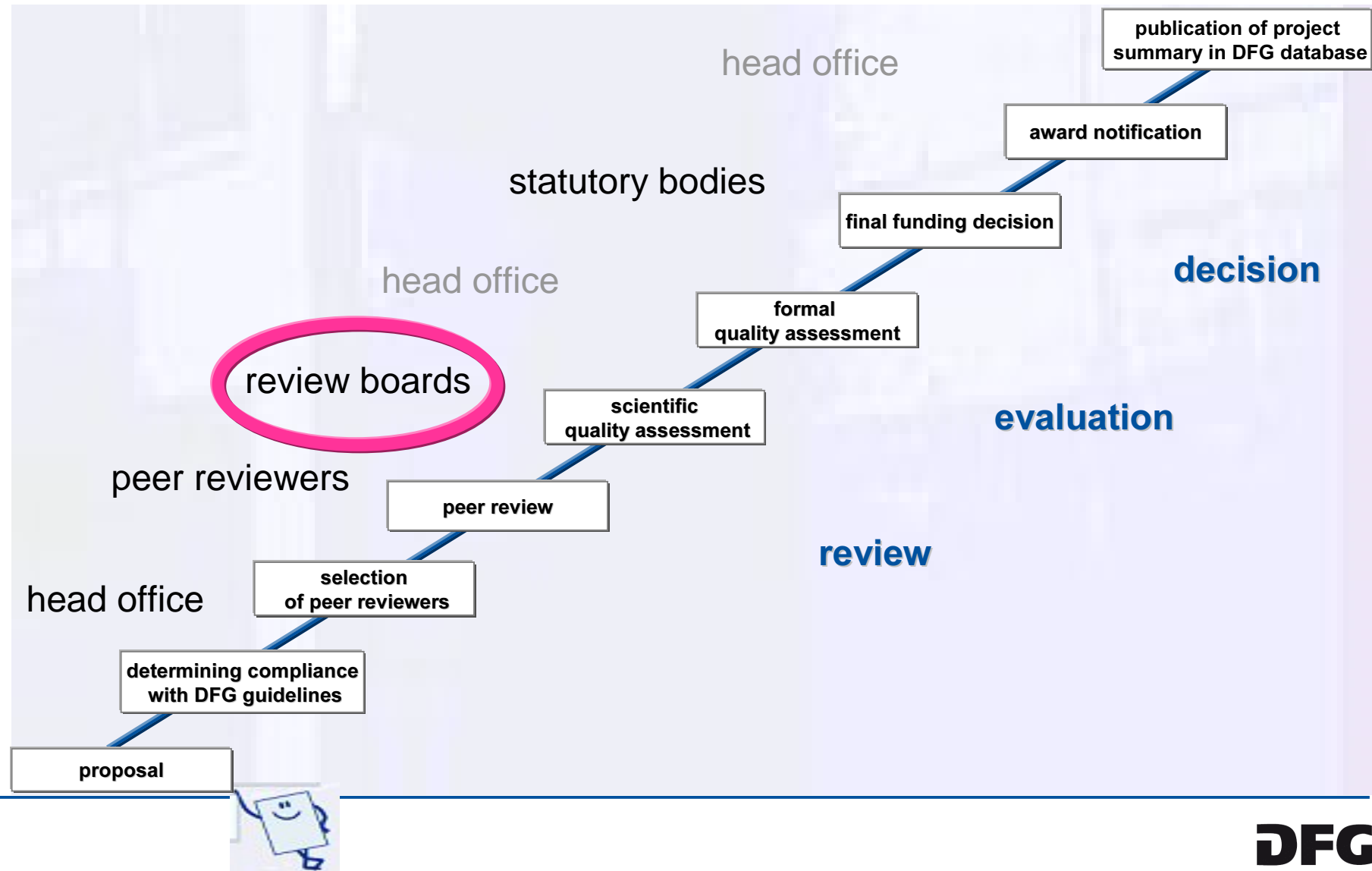
- selects reviewers
- prepares draft funding recommendation
- notifies applicant about decision (incl. reviewers' comments)



reviewing of proposals (written or oral)

- criteria: quality of the proposal; PI's qualification; originality; innovativeness; working program; feasibility; resources; infrastructure; funding requirements

Quo Vadis, Proposal? The Review Process – An Overview

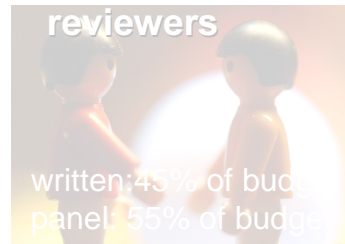


Encounters along the Way



management of review process

- selects reviewers
- prepares draft funding recommendation
- notifies applicant about decision (incl. reviewers' comments)



reviewing of proposals (written or oral)

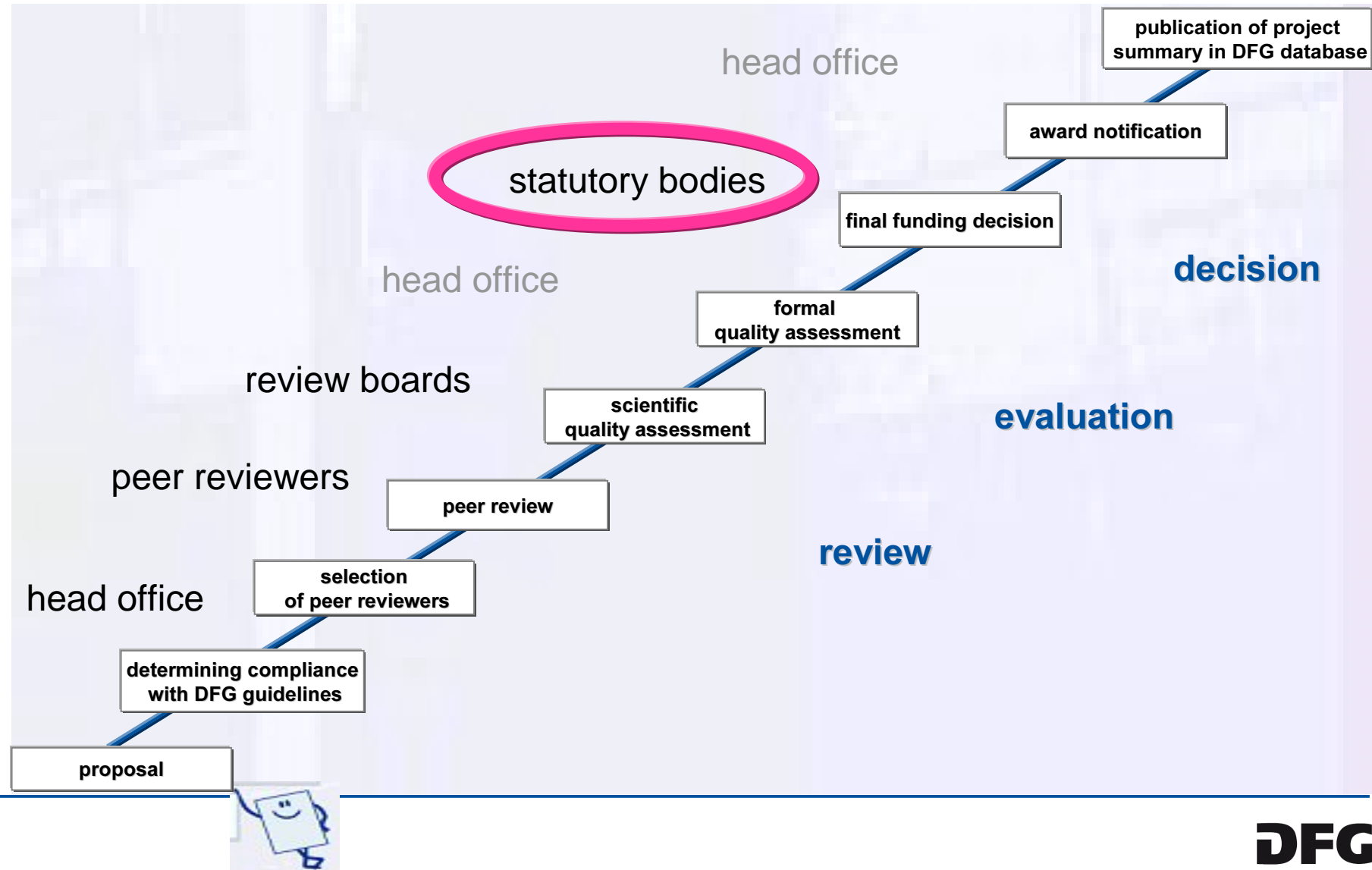
- criteria: quality of the proposal; PI's qualification; originality; innovativeness; working program; feasibility; resources; infrastructure; funding requirements



evaluation of the review process

- assuring quality standards across programs
- monitoring the selection of reviewers
- evaluating and comparing reviews
- participating in on-site visits
- advisory function to DFG in matters regarding strategic planning

Quo Vadis, Proposal? The Review Process – An Overview



Encounters along the Way

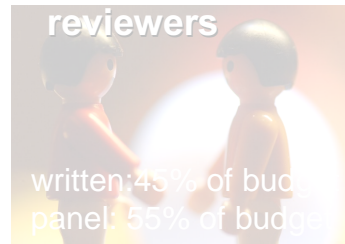


head office

Deutsche
Forschungsgemeinschaft

management of review process

- selects reviewers
- prepares draft funding recommendation
- notifies applicant about decision (incl. reviewers' comments)



reviewers

written: 45% of budget
panel: 55% of budget

reviewing of proposals (written or oral)

- criteria: quality of the proposal; PI's qualification; originality; innovativeness; working program; feasibility; resources; infrastructure; funding requirements



review
boards

evaluation of the review process

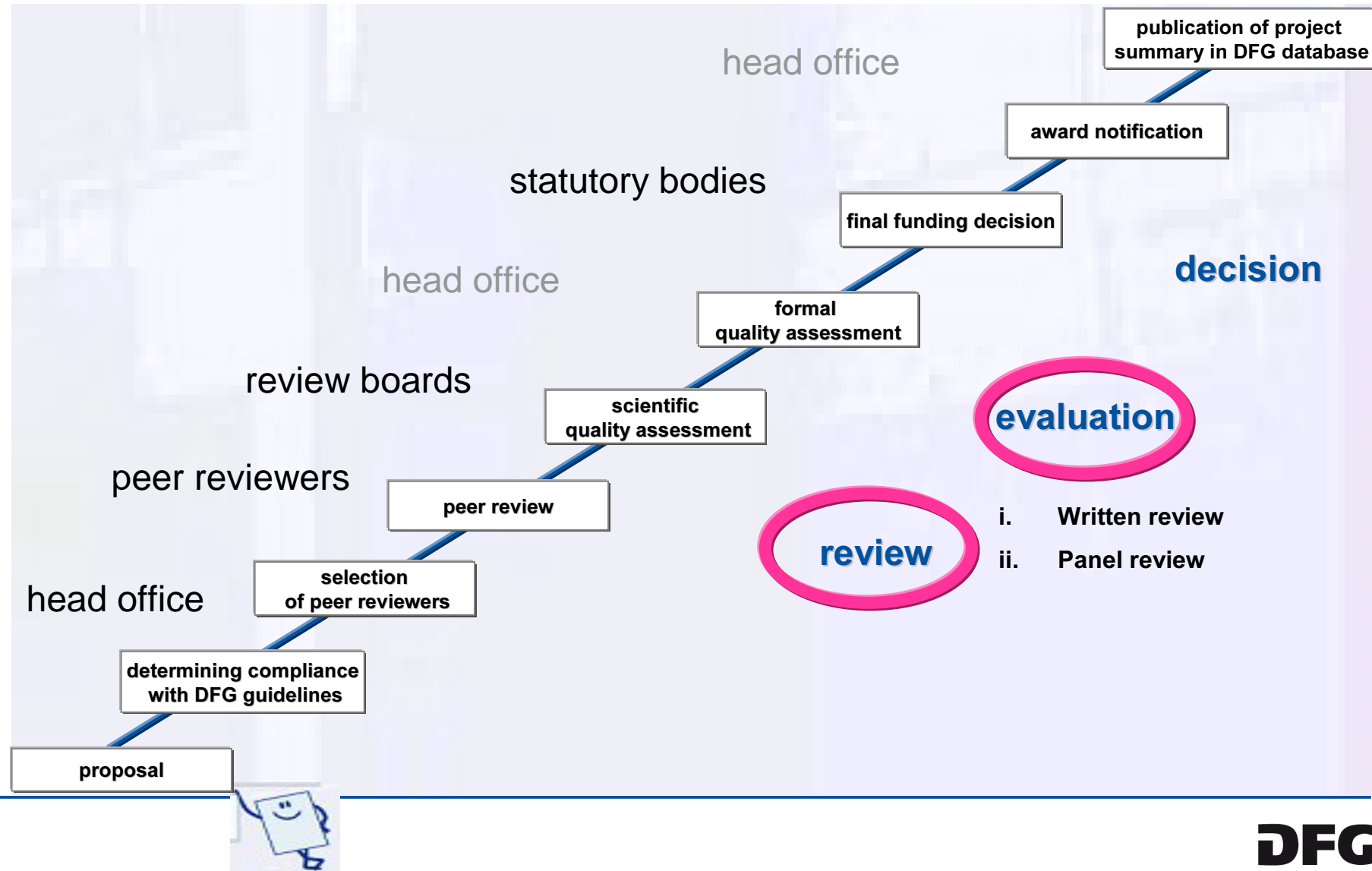
- assuring quality standards across programs
- monitoring the selection of reviewers
- evaluating and comparing reviews
- participating in on-site visits
- advisory function to DFG in matters regarding strategic planning



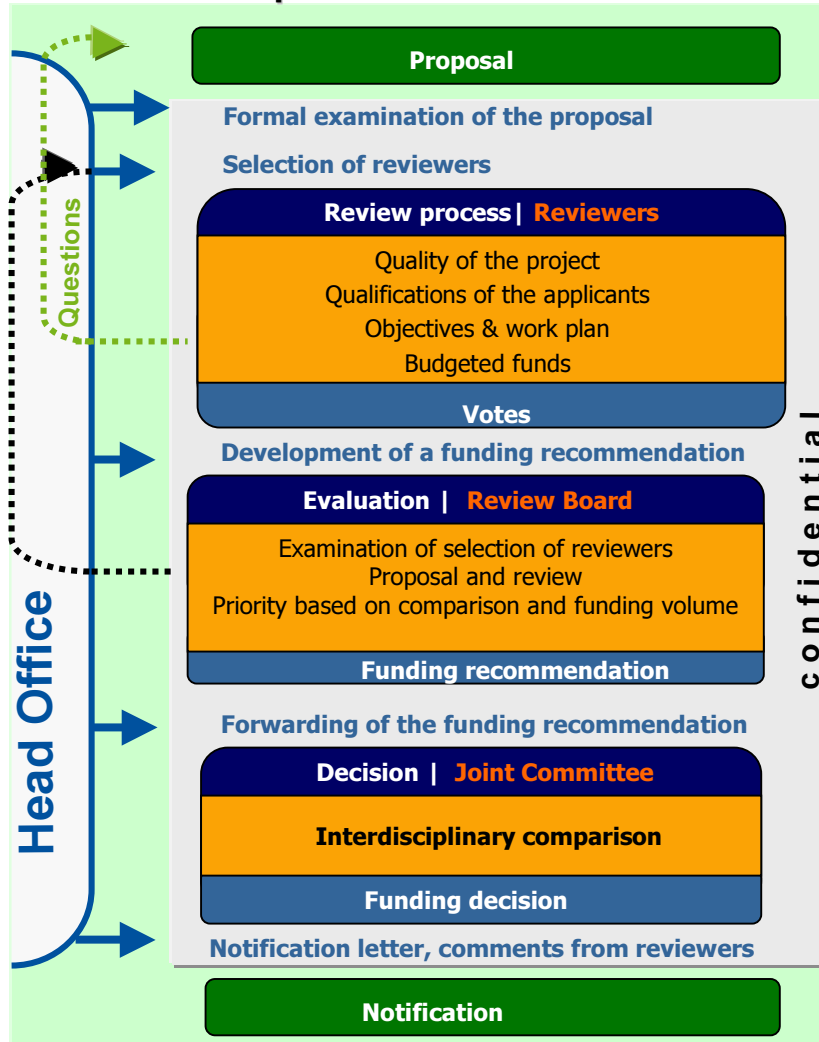
statutory
bodies

funding decision

Quo Vadis, Proposal? The Review Process – An Overview



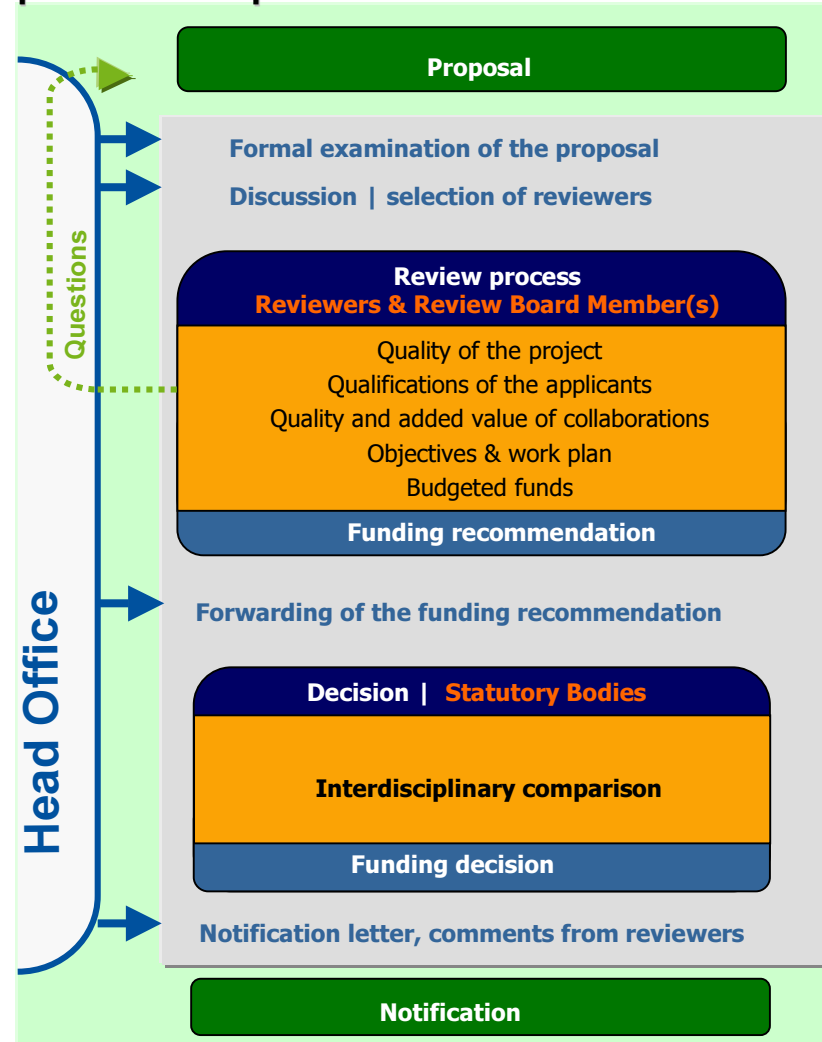
written review process



2002 – 2004:

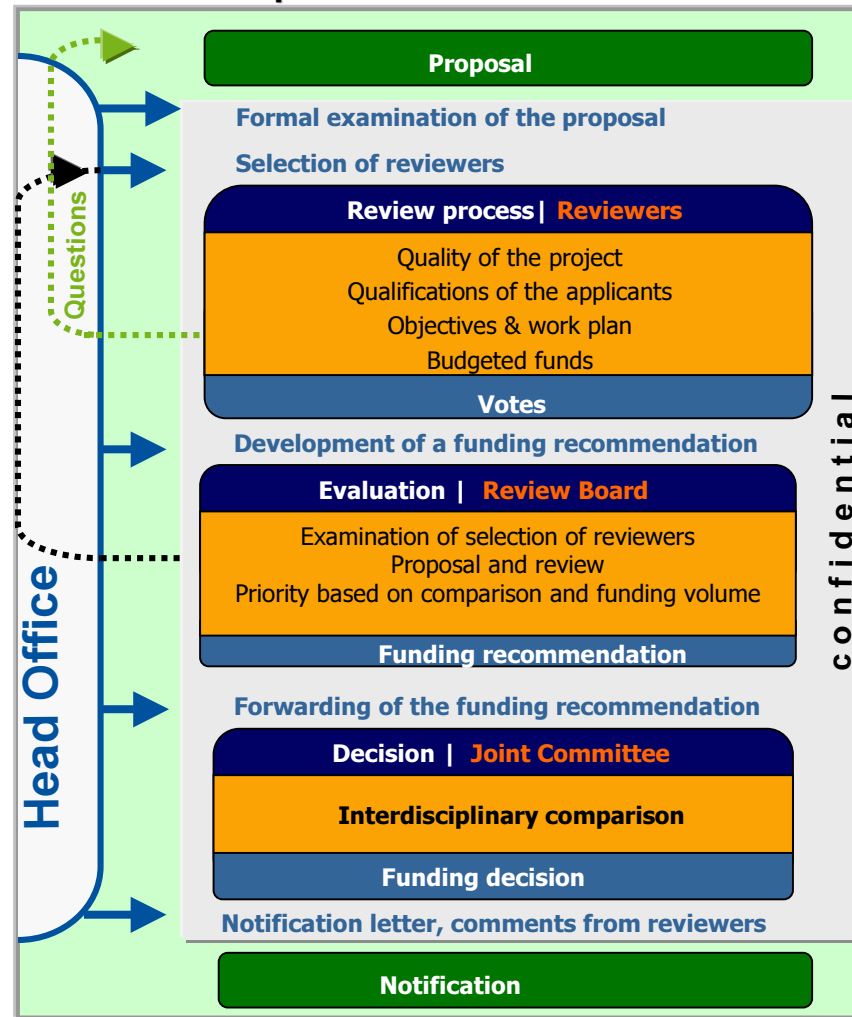
- 24,419 proposals
- 10,883 reviewers
- 65,665 reviews
(approx. 2.7 reviews per proposal)
- 88% thereof for the individual grants programme; 12% for the programs that promote young researchers

panel review process

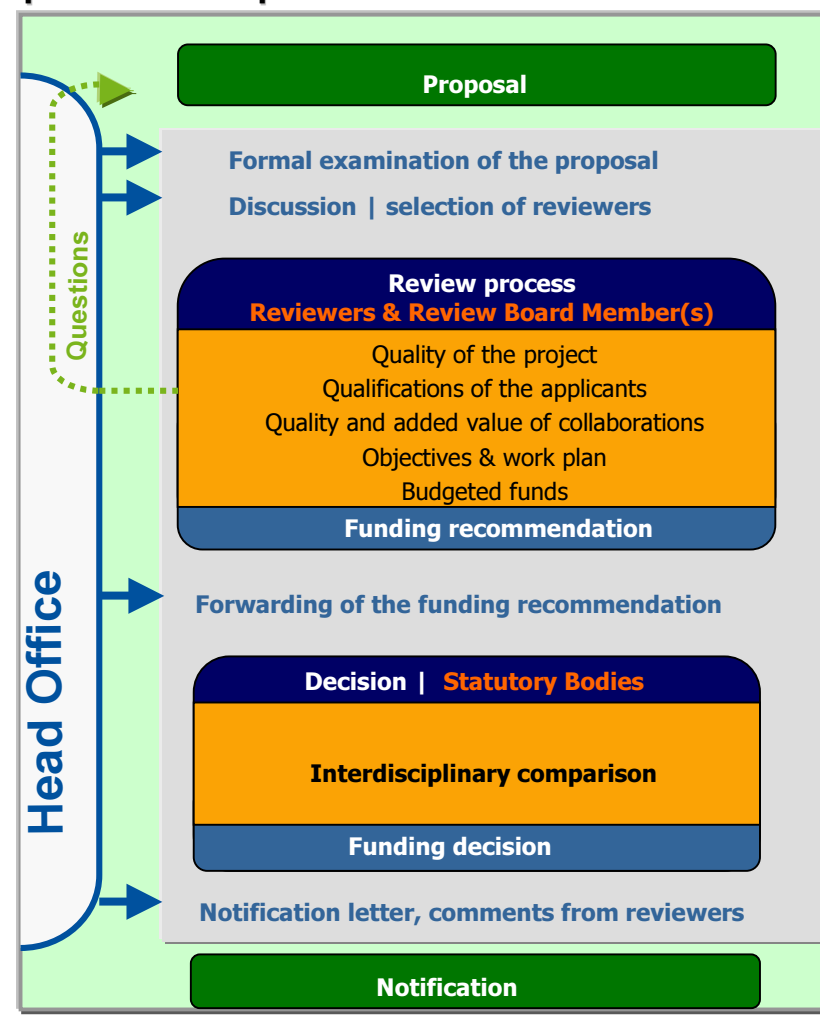


Quo Vadis, Proposal? Summary

written review process

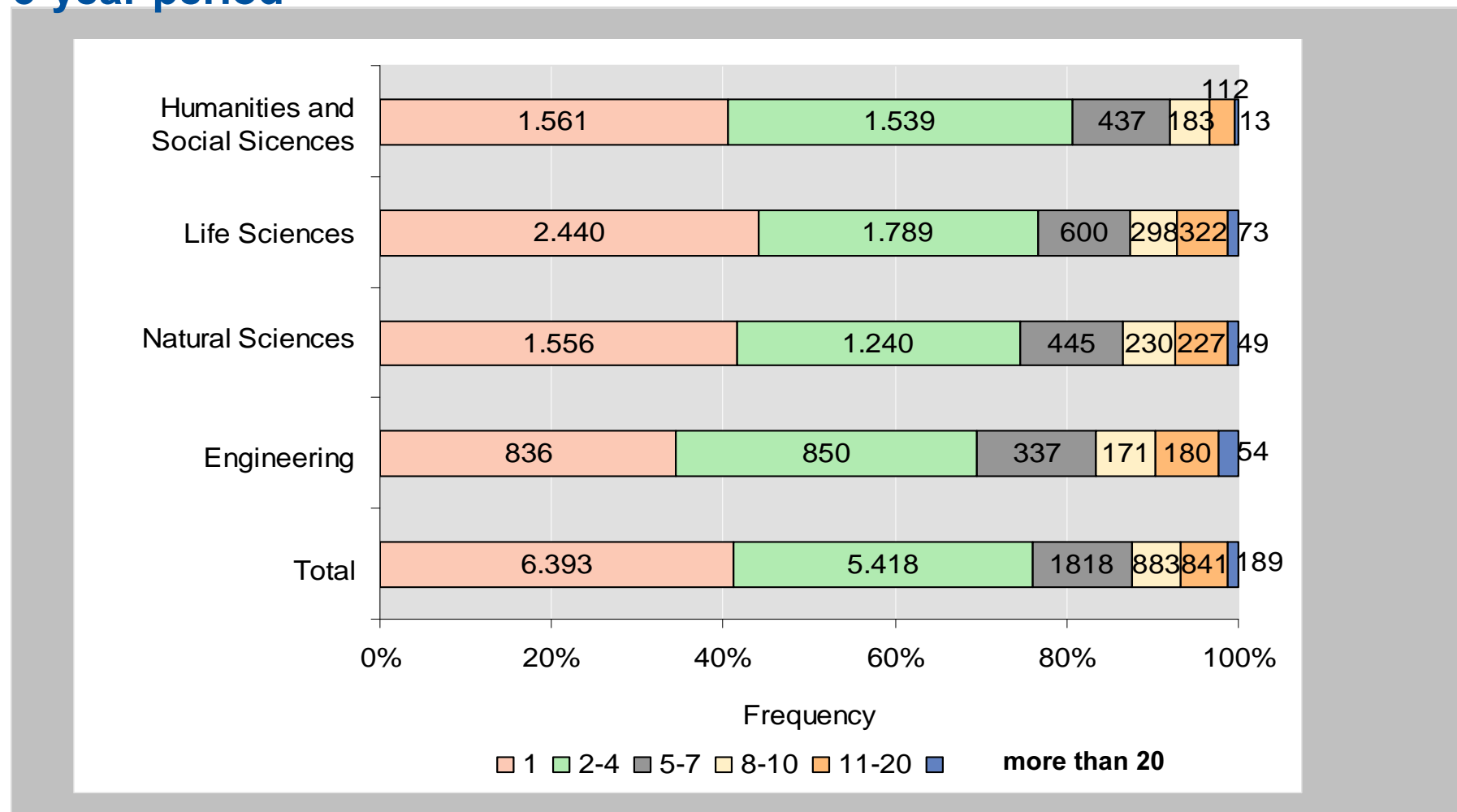


panel review process



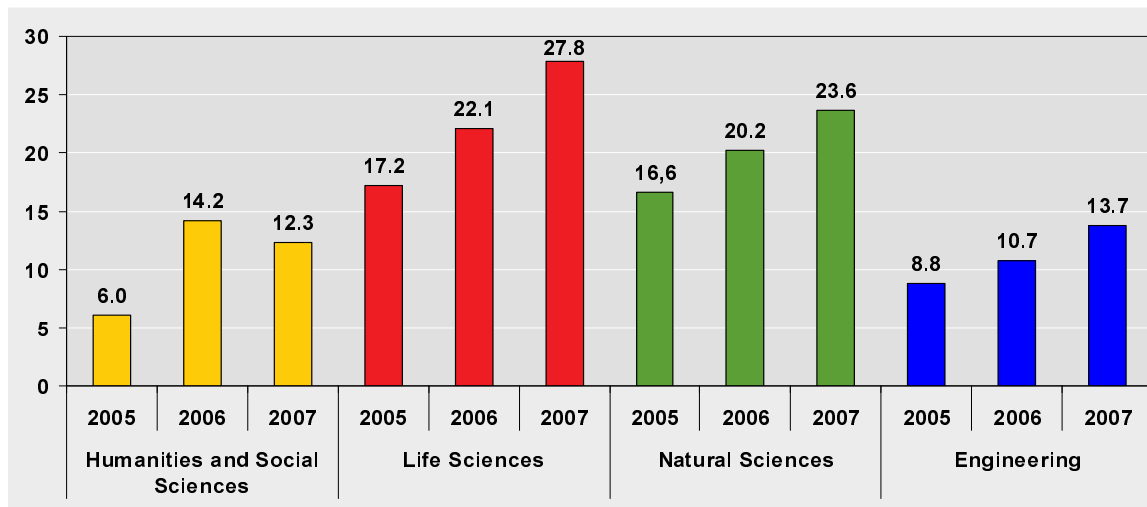
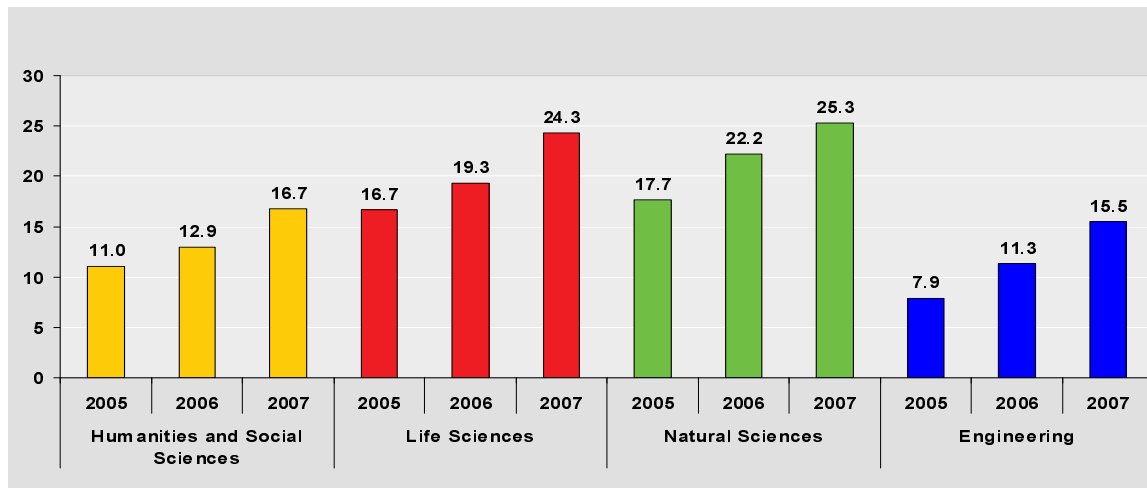
1. Introduction: Facts & Figures about DFG
2. The Mechanics of DFG's Peer Review System
3. **Did you know ...?**
4. Points for Discussion

Did You know ... that 75% of the Reviewers Produce 1 to 4 reviews in a 3-year period



Deutsche
Forschungsgemeinschaft

***Did You know ...* that the Percentage of Reviewers from Abroad Has Been Increasing?**

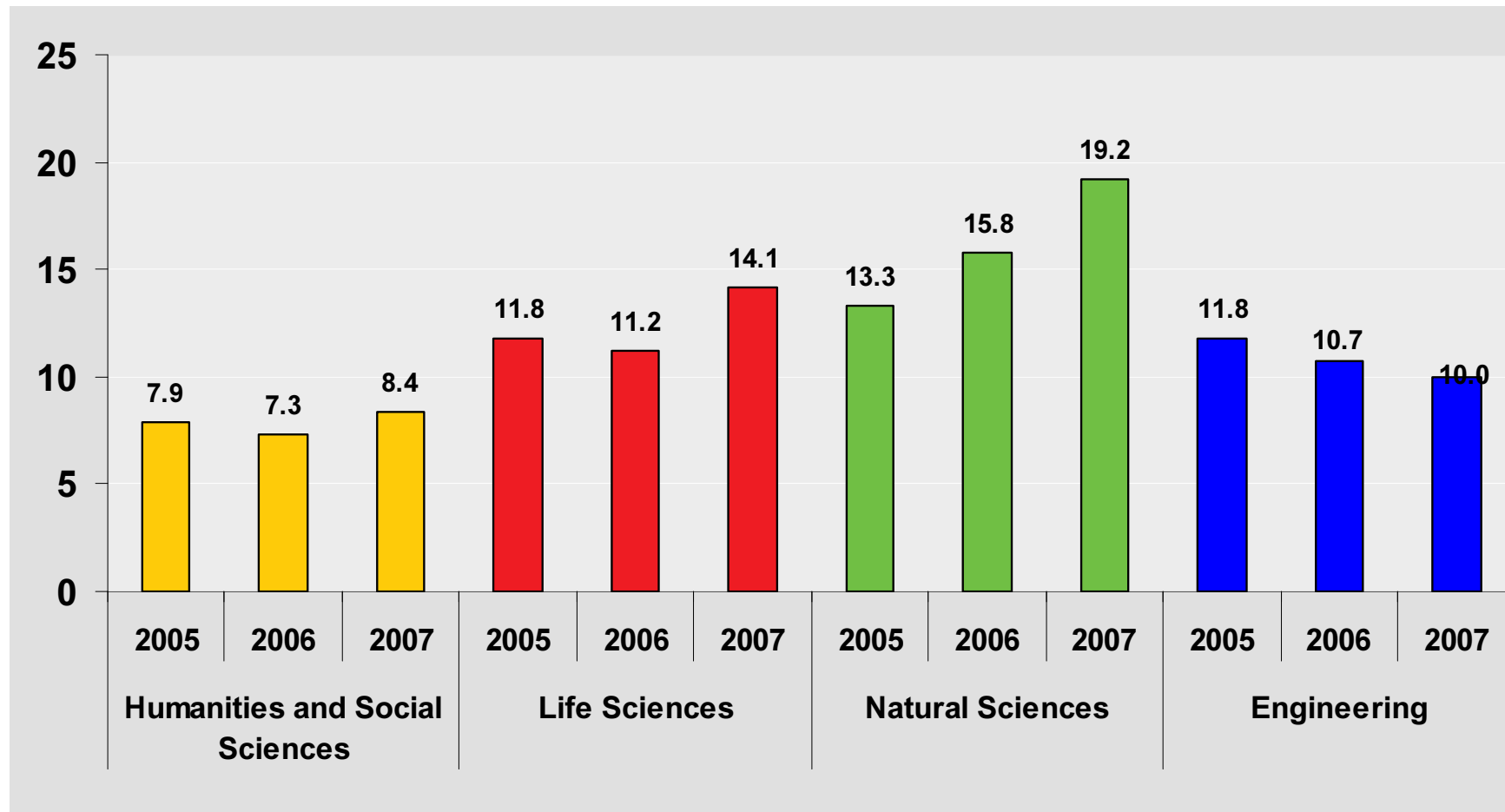


total

**and
thereof:**

**percentage of
reviewers from
North America**

Did You know ... that the Percentage of Proposals Submitted in English Shows an Above-Average Score for the Life Sciences?



Did You Know ... that the Review Board Election Results Saw an Increase in the Proportion of Female Researchers?

	2003 election results (paper ballot election)	2007 election results (first on-line election)
eligible voters	approx. 90,000	approx. 95,000
actual ballots cast	39,000	36,313
review boards	48 review boards (subdivided into a total of 201 subject areas)	48 review boards (subdivided into a total of 203 subject areas)
number of candidates	1,329	1,363
number of candidates elected	577 (69 ♀, 508 ♂)	594 (100 ♀, 494 ♂)
average age of candidates	50.9 years	50.8 years
average age of elected members	51.9 years	51.6 years
proportion of female researchers	12%	16.84%

***Did You Know ...* how Review Board Members Feel about Their Work?**

- response rate of almost 80%
- 70% find that the three stage review process is well suited to judge an application's scientific merit
- only 8.7% regard the time spent as "very high"; 35.3% as "high"
- the majority values compensation through reputation higher than financial compensation, which shows a strong identification of the Review Boards with DFG as **the** German self-governing research funding organisation
- 89% find reviewer's anonymity important
- 86% find that a double-blind review process would make no or little sense
- 50% favor a regular and systematic survey of the long term validity of reviewers findings and of the fairness of the procedure
- 70% favor a publication of a shortened version of project's final reports

1. Introduction: Facts & Figures about DFG
2. The Mechanics of DFG's Peer Review System
3. Did you know ...?
- 4. Points for Discussion**


Points for Discussion

- challenges of peer review:
 - experts know ever more about ever less
 - close rivals are bad arbiters
 - plagiarism
 - cronyism
 - grantsmanship vs scholarship
 - How do we:
 - ❖ set priorities between:
 - different fields of research activities?
 - individual projects vs. big coordinated projects?
 - ❖ evaluate inter- and transdisciplinary research projects?
 - ❖ balance between safety and risk?
 - ❖ protect new ideas and avoid mainstream orientation?
 - ❖ keep the system cost-efficient?
- **consequences of increasing international collaboration for peer review processes**
- **joint solicitation – joint application – joint peer review?**
- **development of common standards; joint training for reviewers?**
- **bench-marking**

Deutsche
Forschungsgemeinschaft

Thank you very much for your
attention!

marion.mueller@dfg.de



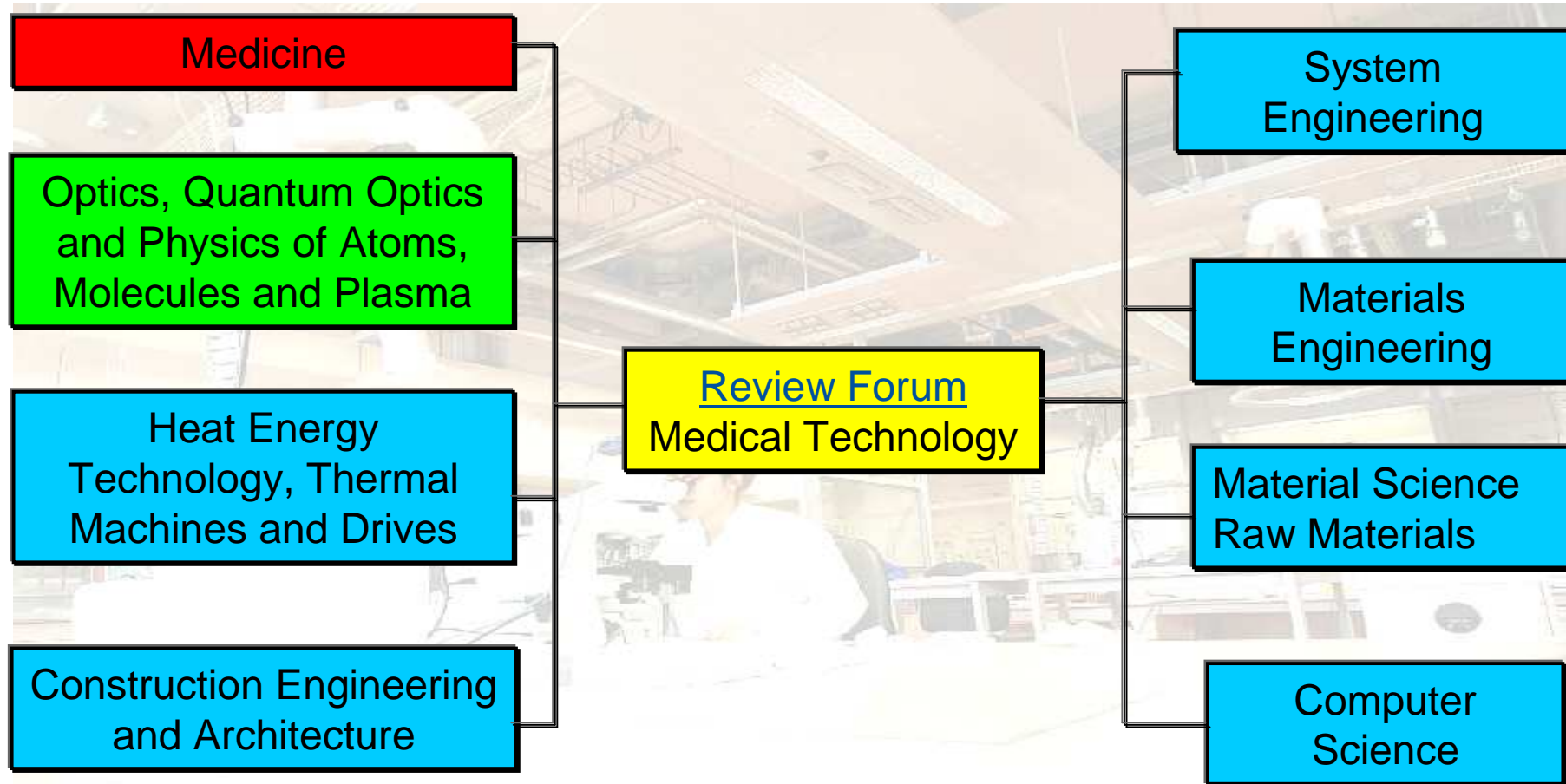
1776 I Street
Suite 1000
Washington, DC 20005
T +1 202 785 4206
F +1 202 785 4410



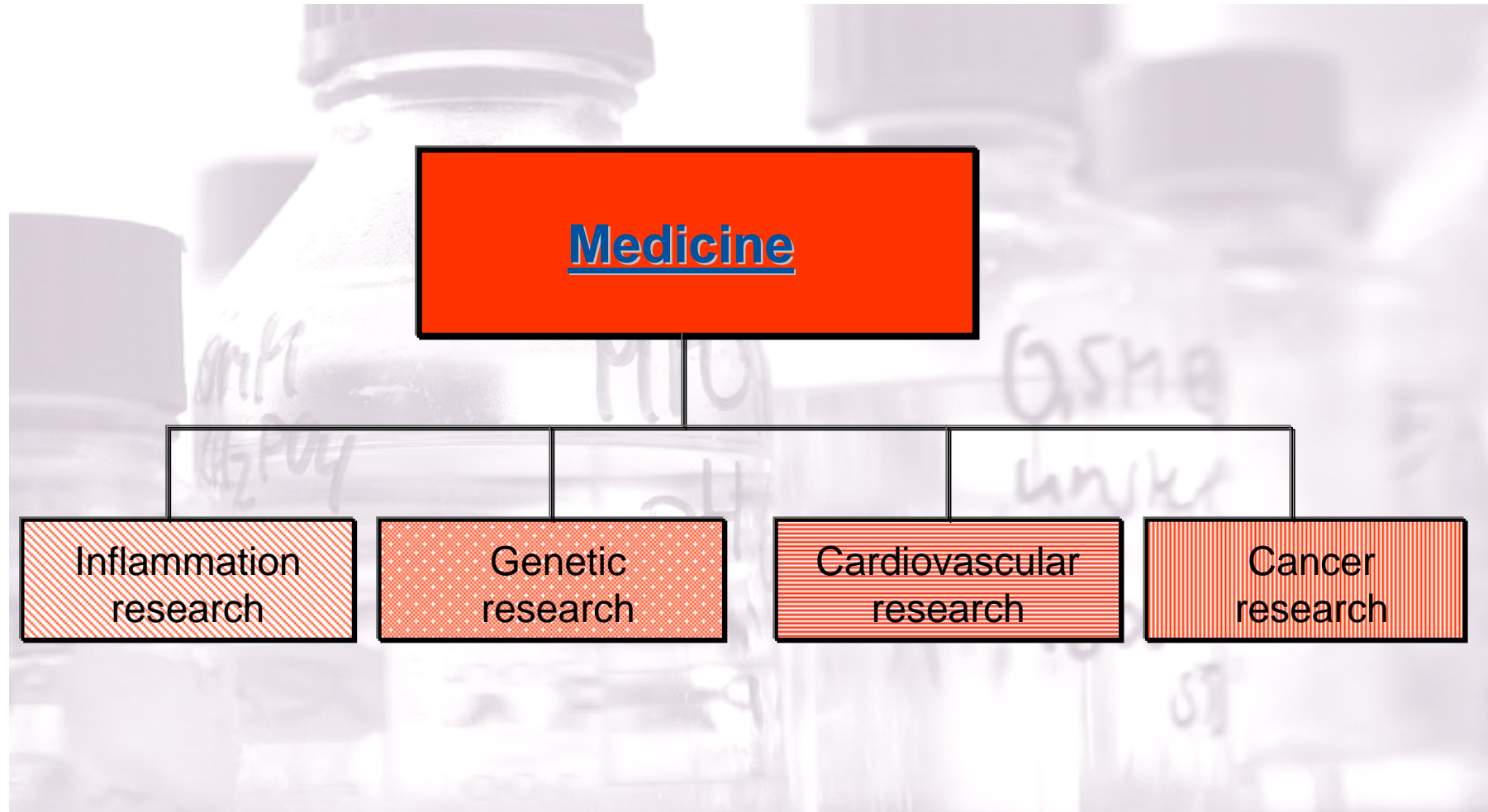
871 UN Plaza
Suite 611
New York, NY 10017
T +1 212 339 8300
F +1 212 339 7139



Several Review Boards May Work together in an Interdisciplinary Review Forum



Review Boards Might Fan out into Study Sections



Review Board – Life Sciences

review board system does justice to multidisciplinary collaboration:

For example: [Review Board "Foundations of biology and medicine"](#).

Proposals dealt with here are evaluated by review board members from different research areas:

- biochemists,
- cellular and molecular biologists,
- geneticists,
- biophysicians,
- food scientists,
- anatomists and
- physiologists.