



# How to overcome faculty borders and make universities more interdisciplinary? Experiences from Europe

Frank Ziegele | CHE | Brasilia, September 2019

Starting point: Interdisciplinary research and teaching + learning is urgently needed

- Answers to global challenges and third mission of universities need contributions from many disciplines
- Scientific progress often happens by linking different disciplinary approaches
- Borders of disciplines are continuously dynamic
- Labor market wants specialists, but also generalists

Side remark:

What is interdisciplinarity?

- Two or more disciplines involved
- Same question, but different paradigms
- „parallel play“, but high interaction
- methods could also synthesize (in the end, new discipline might emerge)
- Publications/outcomes separate or shared, joint products

*(no discussion of fine distinctions between multi-, inter- and transdisciplinary)*

# University structures are not well-prepared for interdisciplinarity





However, disciplines/faculties of course still make sense  
in research and teaching+learning

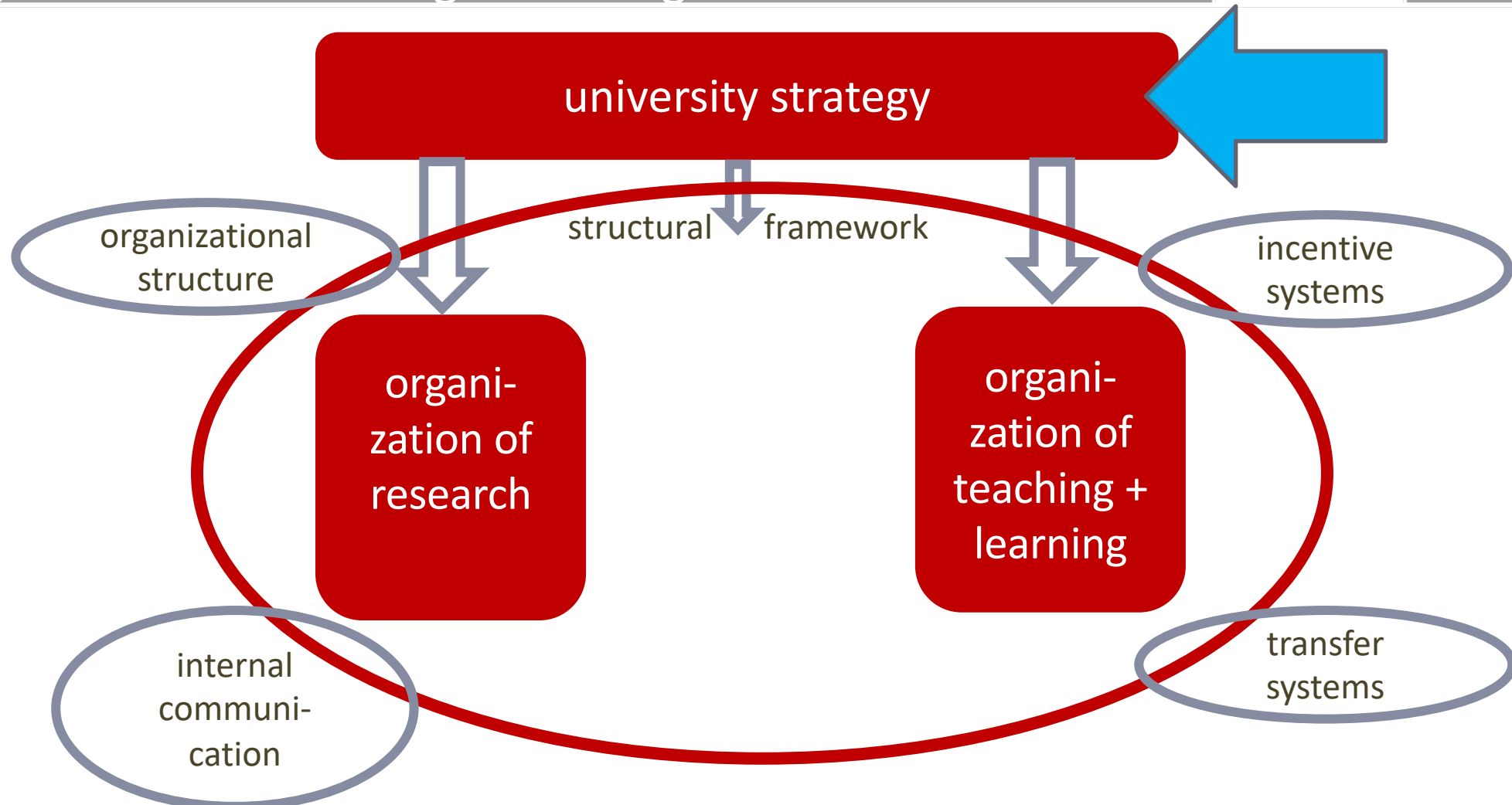
- Achievement of depth in theoretical and methodical knowledge (only then you can start to cross borders...)
- Academics need a „homeland“ with people of their kind
- You are only prepared to deal with something different if you know your own identity

This leads to an important task for higher education management

University structures and processes have to protect disciplinary homelands and at the same time stimulate interdisciplinary collaboration



There are several ways to foster interdisciplinarity:  
through university strategy, structural framework,  
organisation of teaching + learning and research



## University strategy: Orientation towards topics requires interdisciplinarity

- Resource-based view: bundling of internal strengths to focus on cross-cutting topics, setting priorities
- Market-based view: address external needs – grand challenges, SDGs
- Focus on third mission: relations to society, regional engagement, solving local problems

# Example University College London: Strategic Focus on Grand Challenges

**CHE**  
Centre for  
Higher Education

Global Health

## UCL Grand Challenge of Global Health

Global Health combines intellectual capital from across all disciplines, to find innovative, workable solutions.

Sustainable Cities

## UCL Grand Challenge of Sustainable Cities

Sustainable Cities examines one of the most urgent issues facing the world today: increasing and relentless urbanisation.

Cultural Understanding

## UCL Grand Challenge of Cultural Understanding

Cultural Understanding examines differing, complex and relationships between and culture.

Human Wellbeing

## UCL Grand Challenge of Human Wellbeing

Human Wellbeing goes beyond traditional definitions of health and works with a wide range of disciplines

Justice & Equality

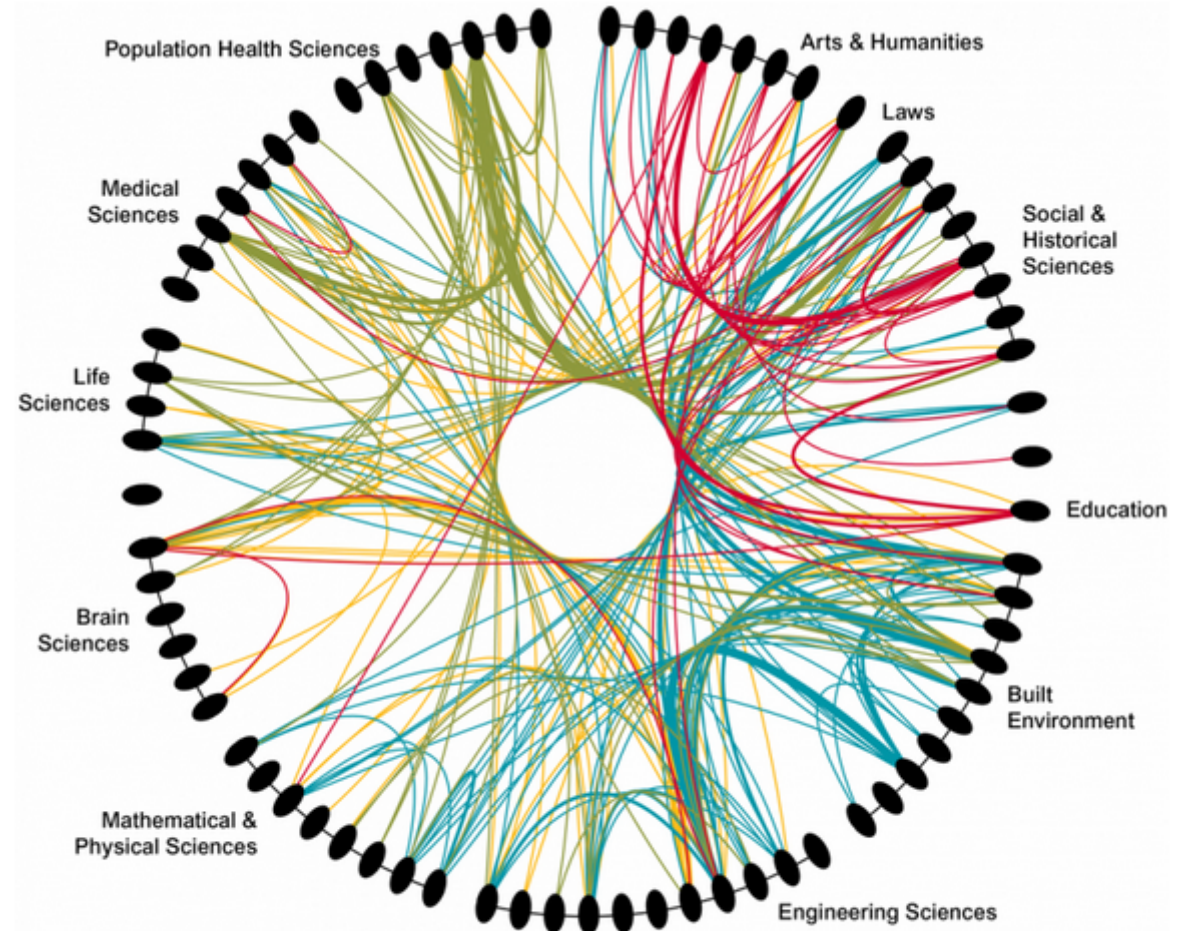
## UCL Grand Challenge of Justice & Equality

Justice & Equality examines the barriers that people face to just solutions and equality of opportunity.

Transformative Technology

## UCL Grand Challenge of Transformative Technology

Transformative Technology examines innovation and technology reaching benefits for society.



New cross-disciplinary research collaborations stimulated by UCL Grand Challenges Small Grants in **Global Health** (2009/10–2016/17), **Sustainable Cities** (2010/11–2016/17), **Cultural Understanding** (2011/12–2016/17) and **Human Wellbeing** (2011/12–2016/17)

How to overcome faculty borders and make universities more interdisciplinary? Exp



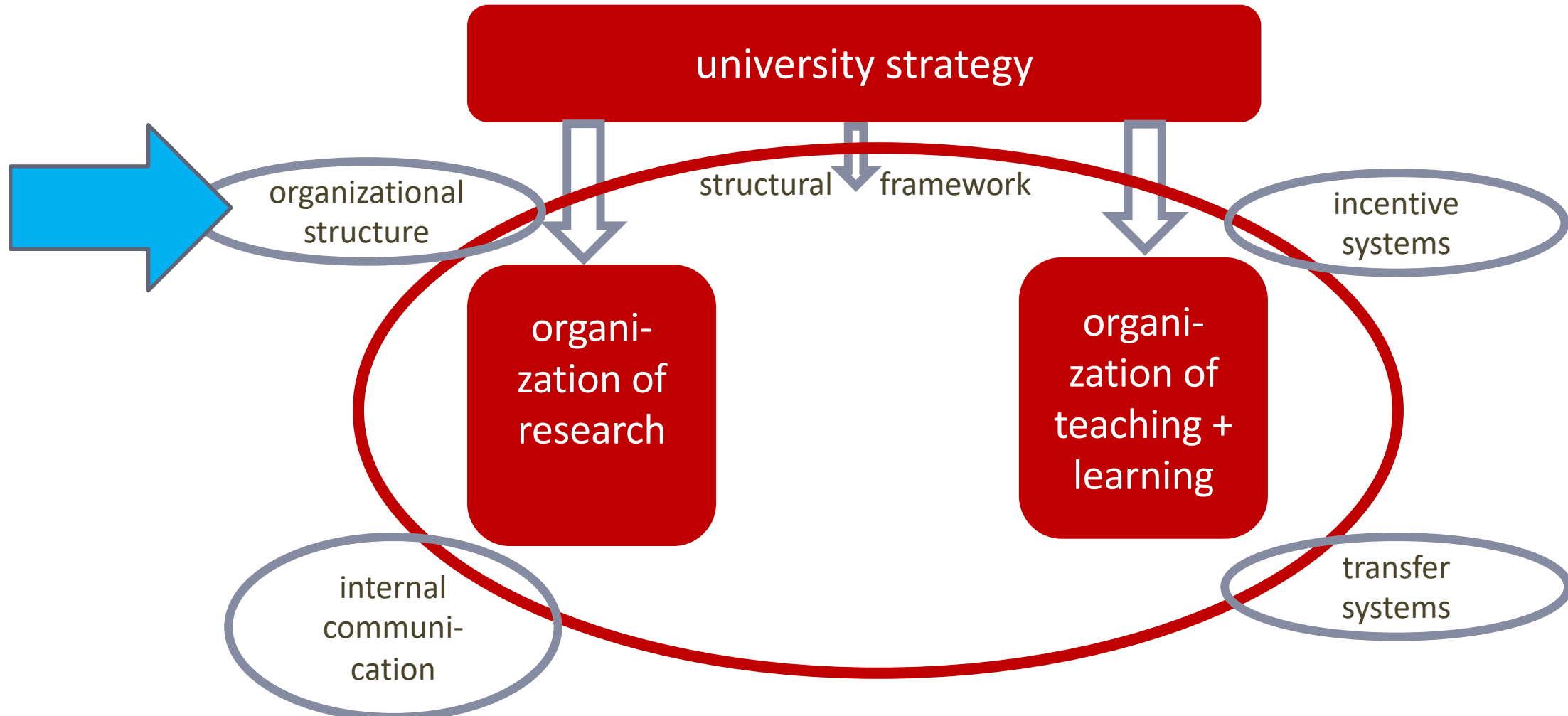
# Example Wuppertal University: Teaching and Research Profiles (internal strengths)



- Building blocks of matter, simulation
- Education and knowledge in social and cultural contexts
- Health, illness prevention and movement
- Language, narration und editing
- Natural Environment, Energy and Safety
- Innovation and economic change



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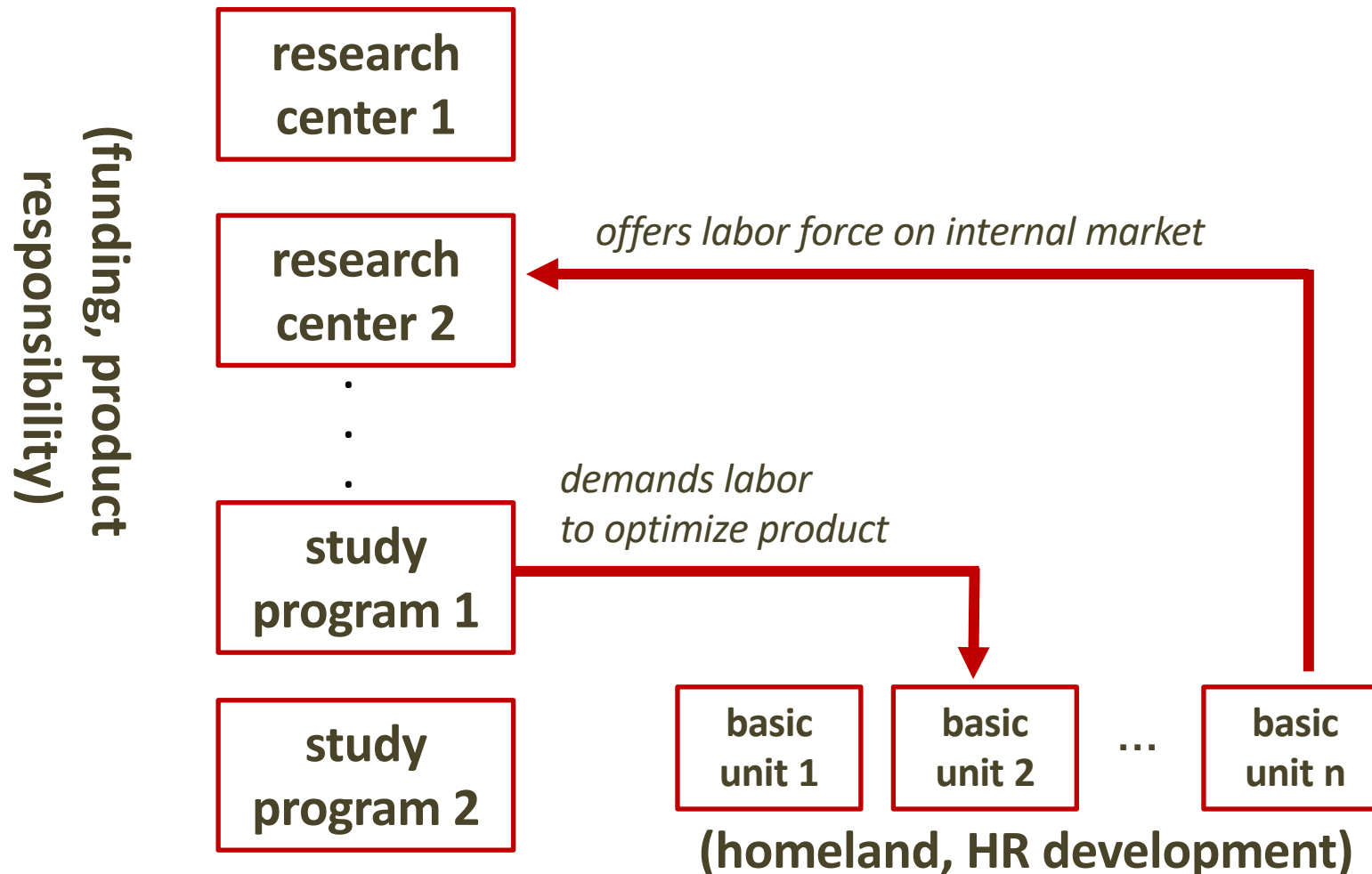
## Organization: cross-cutting horizontal structures help to overcome faculty borders

<b>Matrix</b>	<ul style="list-style-type: none"><li>▪ Goals + leadership in both dimensions</li><li>▪ Organizational units for horizontal aspect</li></ul>
<b>Coordinator</b>	<ul style="list-style-type: none"><li>▪ Institutionalized structure for coordination</li><li>▪ No formal decision rights</li></ul>
<b>Teams</b>	<ul style="list-style-type: none"><li>▪ Task forces, project groups</li><li>▪ Formal elements with specific goal</li></ul>
<b>Cross-cutting processes</b>	<ul style="list-style-type: none"><li>▪ Joint standards</li><li>▪ Joint planning processes</li></ul>
<b>Networks</b>	<ul style="list-style-type: none"><li>▪ Meetings, workshops</li><li>▪ Interaction</li></ul>



increasing complexity and costs,  
less relevance of faculty structure

# Example some Dutch universities: internal labour market as strong matrix structure



## Example University Erlangen-Nürnberg: interdisciplinary centre as weaker matrix structure



### interdisciplinary Centre for Public Health

- Own governance structure, membership
- Explicit own goals
- Involved faculties: medicine, philosophy, theology, engineering, economics
- Tasks: research, consulting/policy advice
- Contact point with multitude of stakeholders

# Example TU Darmstadt: „Forum Interdisciplinary Research“ as institutionalized coordinator

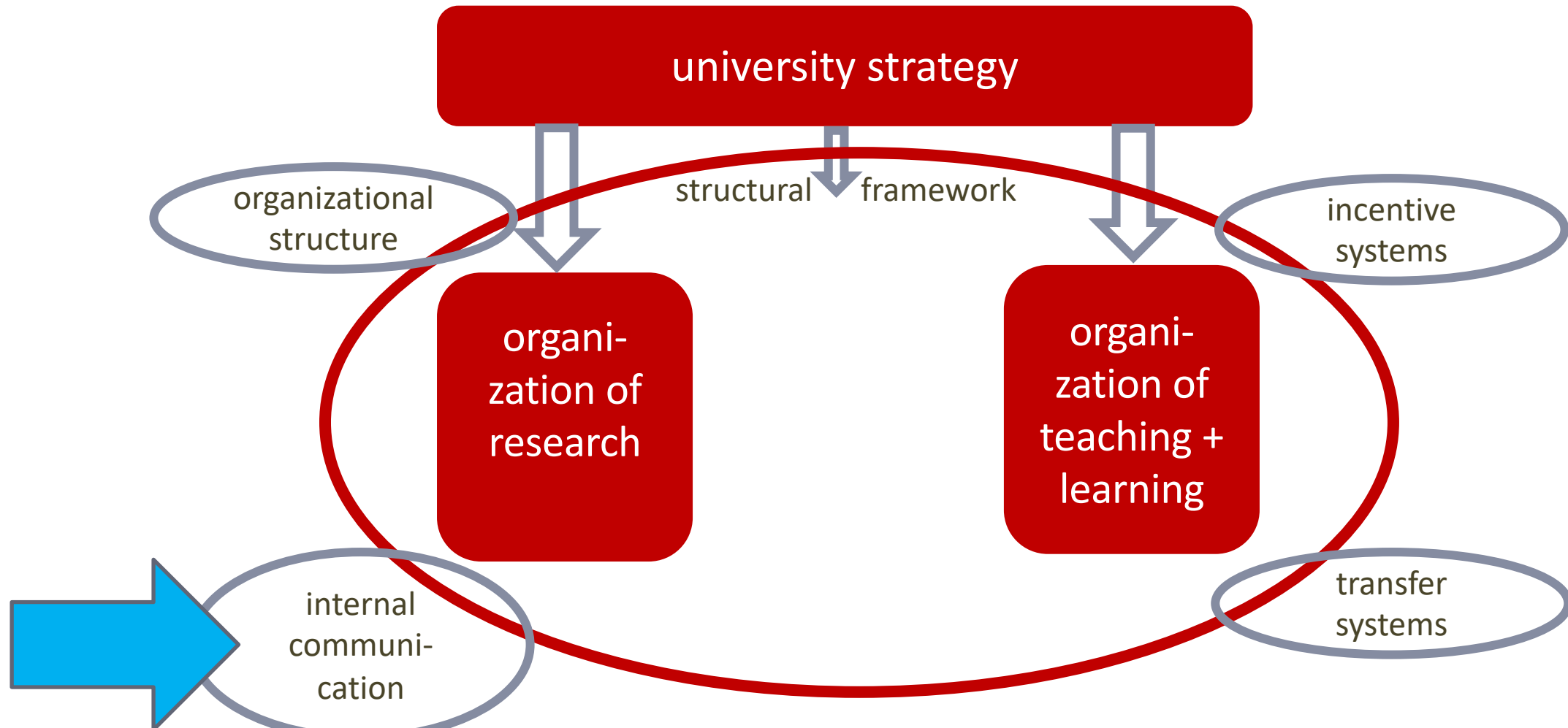


TECHNISCHE  
UNIVERSITÄT  
DARMSTADT



- Central platform for whole university
- Structure: director – fellows (for 2-3 years) – administration
- Agenda setting by promoting topics (digitalization, water, creativity, humans + machines, etc...)
- Tasks/formats:
  - Workshops, conferences, informal meetings
  - Yearly „day of interdisciplinarity“
  - Small internal competitive fund
  - Services for bottom-up initiatives

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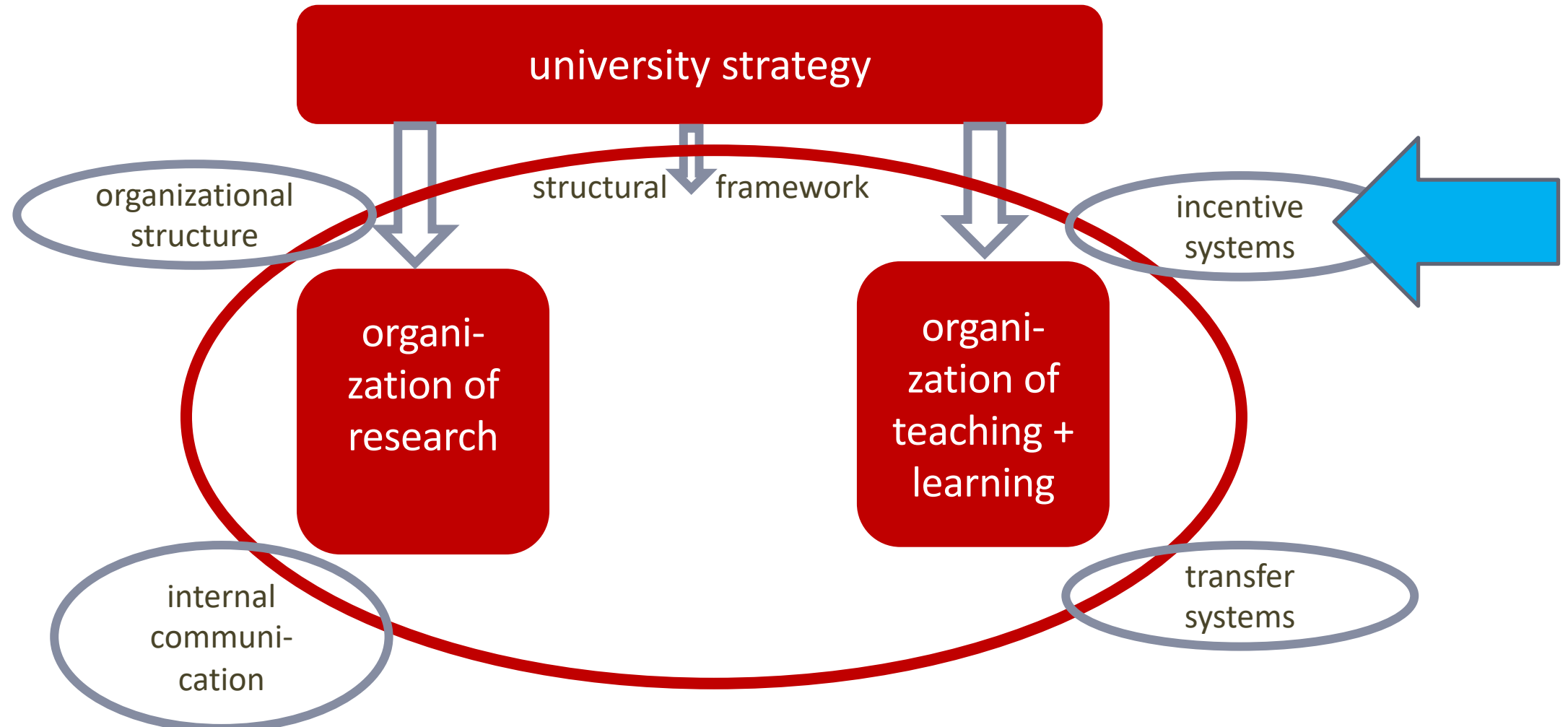




## Internal communication: Potential collaborators have to get into contact

- Workshops, brown bag lunches, retreats, ...
- Internal research scouts (TU Dresden)
- Informal meeting of all newly appointed professors (including president)

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## Incentive systems: Financial incentives could promote interdisciplinarity

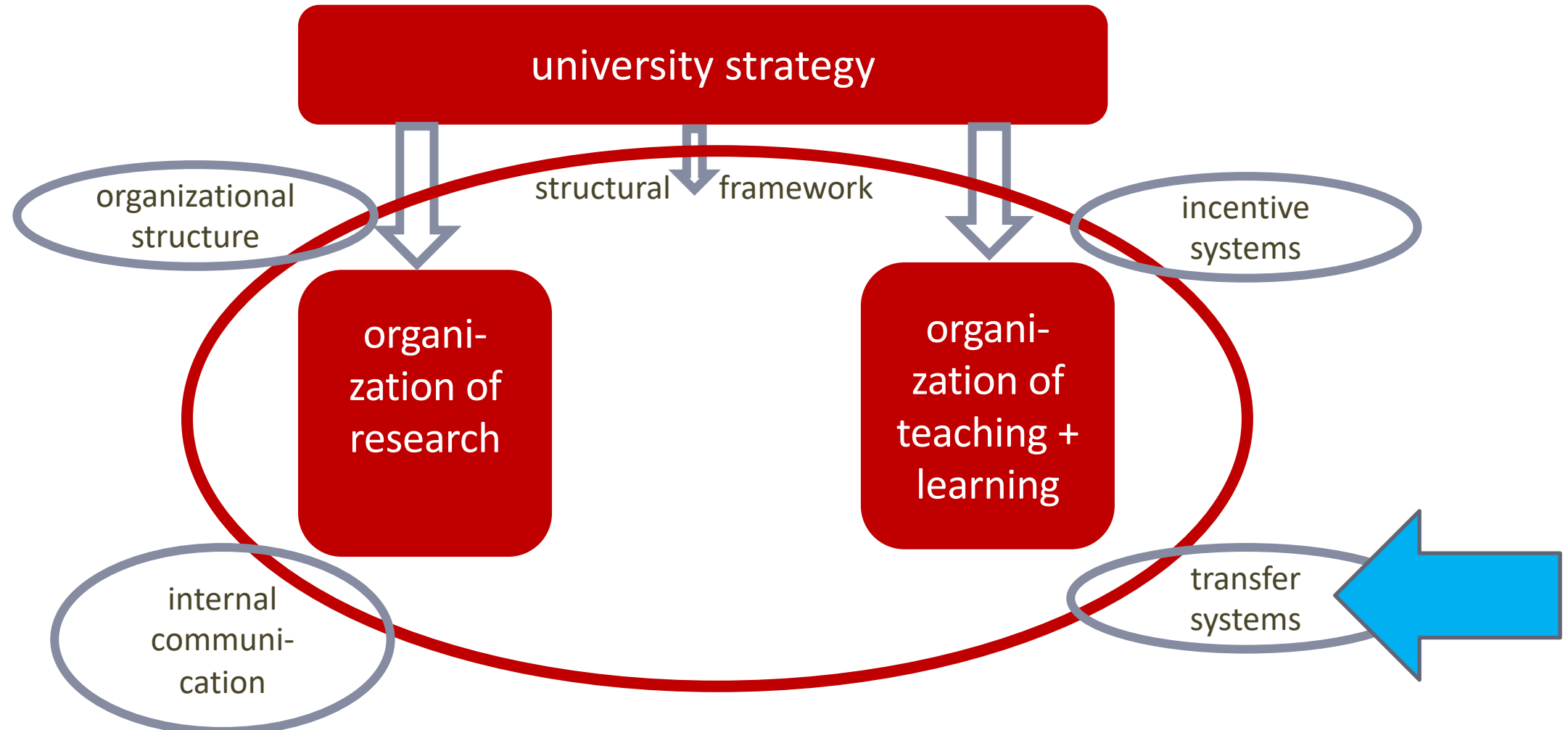
- Funding pools for interdisciplinary research proposals (different target groups possible, e.g. Ph.D. candidates)
- Internal competition to become a unit of priority
- Team rewards instead of individual incentives
- Rewards for „collaborative students“ in formula funding
- Target agreements in appointment processes for professorships (contribution to cross-cutting topics)

## Example Siegen University: internal research excellence competition



- 2 – 3 „profile areas“ identified and communicated as centres of excellence of the university
- More „potential areas“ with the potential to become excellent
- Dynamics: Periodical quality assessment, profile areas might fall out, potential areas might move up to profile areas, new potential areas could come in

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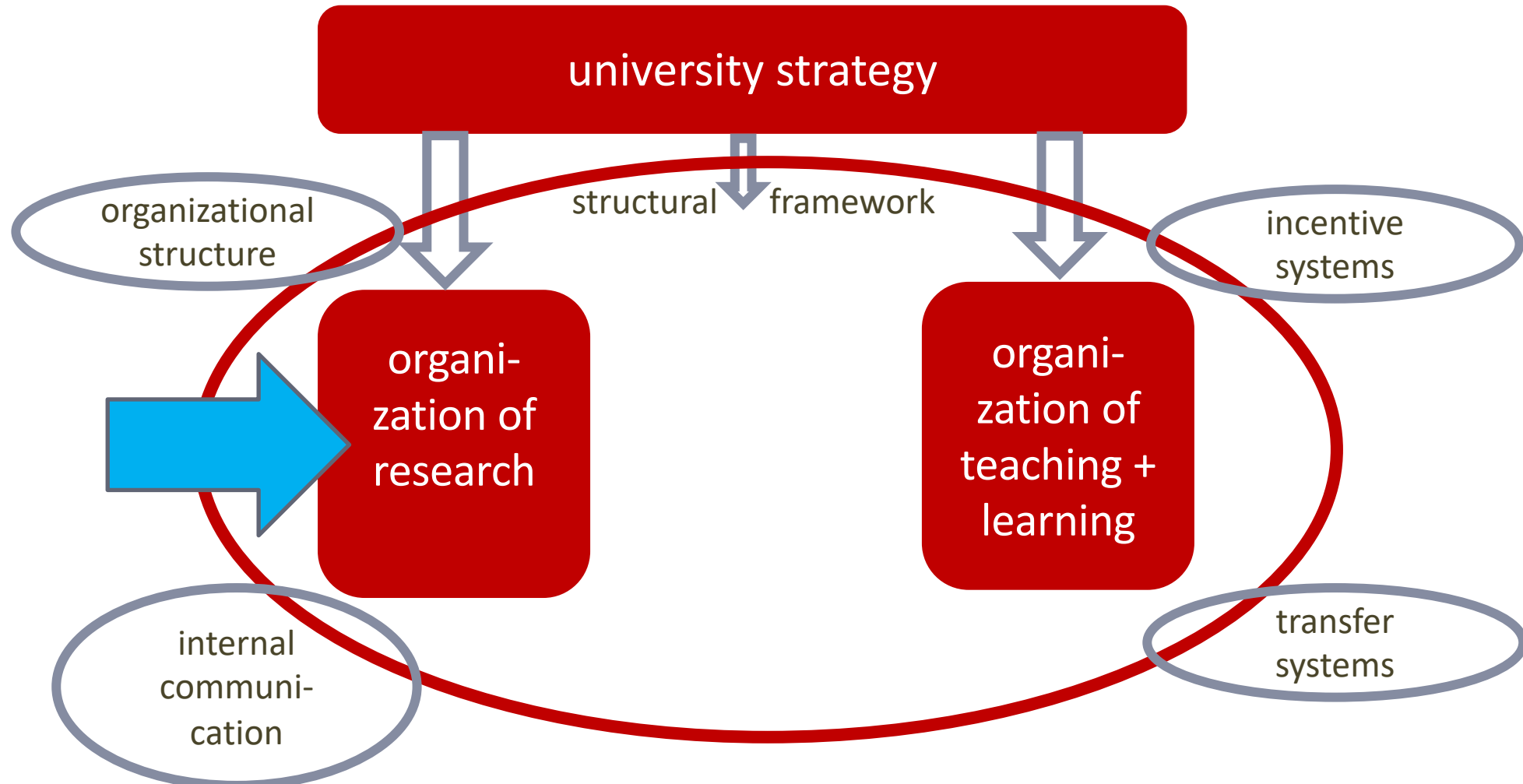


## Transfer: A bi-directional transfer approach could promote interdisciplinarity by asking for solutions

- Create contacts between researchers and local communities to reveal their needs
- Bi-directional approach (Siegen University):  
university transfers knowledge, partners give inputs to research (demand orientation in funding topics)
- Knowledge vouchers (NL: public funding for SME who address universities with a problem and want to collaborate)



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## Organization of research: Conditions for research could stimulate interdisciplinarity

- Topic-oriented Ph.D. schools
- Special formats for joint research (example ZIF Bielefeld)
- Open-topic professorships (TU Dresden: not attached to faculties, active search for outstanding young people, no predefined tasks)

# Example Freiburg University: „Freiburg Institute of Advanced Studies“



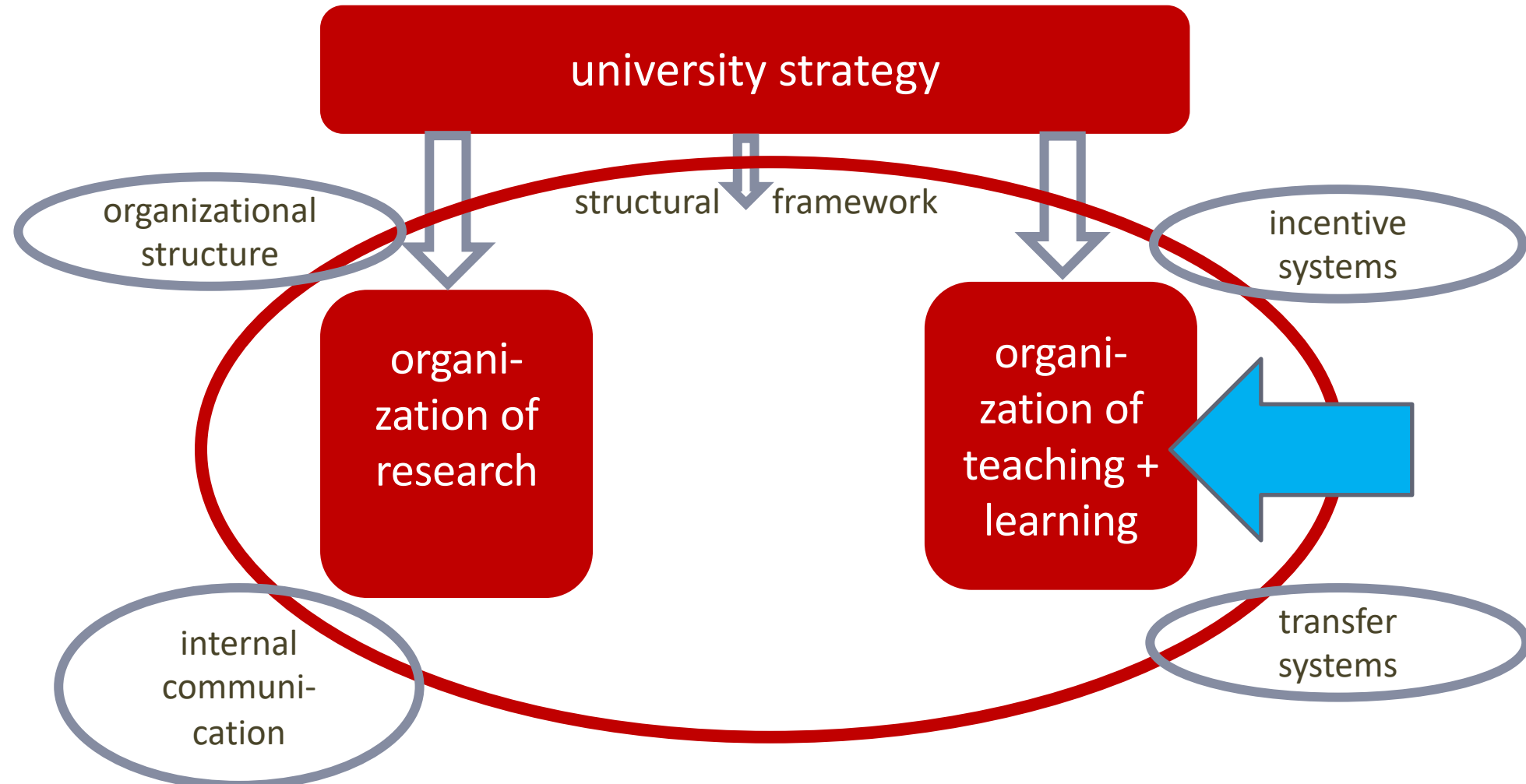
- 50 fellows per year, minimum 3 months, internal + external, junior and senior
- Freedom to do research for some time without every day tasks
- Own (and nice) building
- Exchange formats: interdisciplinary colloquia, tea time, joint lunches, dinner speeches, retreat (participation obligatory, fixed in fellowship agreements)

## Example study by Hollaender (2003): interdisciplinary research groups need good operative management

### success factors for performance of interdisciplinary research groups

- Inspiring and motivating leadership
- Proximity of group members
- Joint processes of planning and decision-making
- Corporate identity, trust-building
- Take time to develop joint language
- Systematic stakeholder involvement
- Conflict resolution mechanisms

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## Organization of teaching: study programs could be organized in a more interdisciplinary way

- Differentiation of programs:  
topic-oriented masters, comprehensive programs, merging disciplines  
(creating new disciplines possible)
- Service learning  
(local community service)
- Starting studies with a university-wide project
- College models of teaching + learning
- Problem – based learning



# Example Germany: Trends in differentiation of study programs

increase in number of study programs 2005 – 15:  
11.000 to 18.000

## intradisciplinary differentiation

specific sector  
(health  
management)

sub-topic  
(business  
studies vs.  
marketing)

## interdisciplinary differentiation

topic-oriented  
(mobility,  
renewable  
energies)

hybrids (bio  
computer  
sciences)

generalistic  
(law, economics  
and political  
sciences)

**controversial discussion!**

# Example University of Twente: Bachelor „Technology and Liberal Arts + Sciences“



UNIVERSITY  
OF TWENTE. | HIGH TECH  
HUMAN TOUCH



- „New Engineer“: engineering, sciences, social sciences
- Personal Development Plan: student choice on curriculum (+ self evaluation report)
- Project based approach (projects, up to whole semester)
- „week of inspiration“ with out-of-the-box lectures

## Semester 2: Sustainable systems

The project for the second semester will be Sustainable Systems. Energy engineering, and Multidimensional Calculus & Optimization will be given in the Science & Math domain. The Social Sciences will cover Organizational Change, Emerging Technologies & Innovative Societies. Next to these courses you will have the freedom to choose your own courses. These courses are called Electives. They can be offered by University College Twente, but you can also choose to take courses from other studies at the University of Twente or even from other Universities.

## Semester 3: Living under Extreme Conditions

Semester three will be focused around the project: Living under Extreme Conditions. For Science & Math you will do Lab work & Experimentation and Material Sciences. Next to that Ethics and Research Methodology & Experimentation will be given in the Social Sciences domain. Also in this semester you can choose your own Electives.

# Example Jacobs University Bremen: Jacobs Bachelor, Foundation Year



## YEAR 1 – CHOICE

The first study year is characterized by a broad offer in disciplinary and interdisciplinary education. Students select three CHOICE modules from a variety of study programs. The combination of CHOICE modules is flexible and allows students to decide on their major in the second year of study.

## YEAR 2 – CORE

In the second year, students take three in-depth, discipline-specific CORE modules. One CORE module can also be taken from a second, complementary discipline, which allows students to incorporate a minor study track into their undergraduate education.

## YEAR 3 – CAREER

In the fifth semester, the World Track provides students either with an extended internship or a study abroad opportunity at a partner university. Students may also opt to stay on campus and continue their undergraduate education. In the third year, students also select specialization courses within their study program and pursue a project/research module including the Bachelor thesis.

### UNDERGRADUATE COURSES

As a Foundation Year student you can participate in all undergraduate classes offered at Jacobs University and explore different fields of study:

- Mobility
- Health
- Diversity

Learn more about our undergraduate program [here](#).

### SUBJECT-RELATED COURSES

Get an impression of various fields of study and prepare for them with semester courses exclusively designed for Foundation Year students:

- Statistics
- Sciences & Engineering
- Business & Social Sciences
- Psychology
- Environmental Sciences
- German Politics & Culture

# Example Leuphana University Lüneburg: first semester and opening week



## MODULE: RESPONSIBILITY AND SUSTAINABILITY

**Content** **Registering for courses**

The module deals with the **social responsibility of scientists**. This responsibility is made tangible in a concrete way by means of the example of sustainable development. The course of lectures and the accompanying tutorials set out the content framework for the module: they introduce the topic of sustainable development and furnish you with the initial tools so that you are able to get your bearings in the interdisciplinary debate on sustainability.

In the **course of lectures**, you encounter characters who provide you with differing perspectives – switching between individual specialist fields and civic practice. In the **project seminars**, you tread research ground for the first time and develop your own hypotheses for sustainable development together with your fellow students.

You present the initial results of your research to one another at the **conference week** », open to members of the university.



## SHARING IN A GLOBALIZED WORLD | LEUPHANA OPENING WEEK 2019

First-semester students at Leuphana begin their studies with the Opening Week. The Opening Week is both a practical workshop and a forum for ideas. During the Opening Week you will gain a first impression of the way in which scientific work, social practice and responsibility as well as general educational goals are combined at the college. The focus is on you for seven days: you own the campus.

This year, the Leuphana Semester focuses on the globally interconnected society Digital transformation and sustainable development are major topics you will discover and discuss. What is our role in the world society? The Opening Week marks the beginning of this research process and focuses on *Sharing in a Globalized World*.



## Concluding with some general observations

- Topic-/problem-orientation (and third mission) is a main driver
- Variety of institutional settings for interdisciplinary research
- Communication, reward and incentive systems have to support strategies
- Crucial role of study entry phase
- Study programs have to find the balance
- Faculties without horizontal structures will fail to meet the needs of societies
- An academic homebase is still inevitable, but no reason to isolate

Thank you for your attention!

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