

Workshop on the
Implications of Convergence for How the
National Center for Science and Engineering Statistics
Measures the Science and Engineering Workforce

Discussion of Implementation and Feasibility

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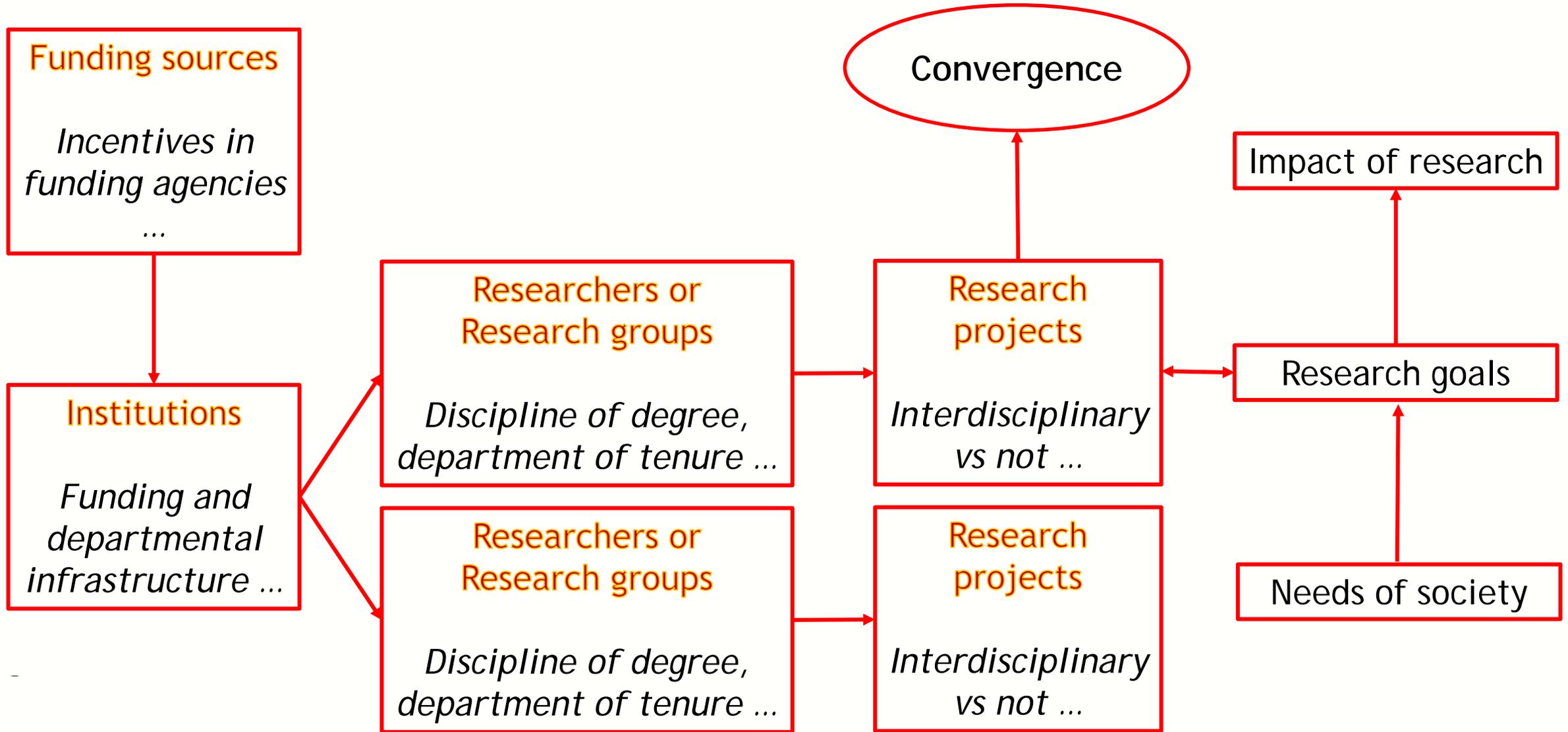
Framework for considering “convergence”

- What research questions do we want to answer?
 - “why is measuring convergence important?” [Schiffer]
 - NCSES - Describing the research enterprise?
- What is the underlying causal model?
- What units are involved in the causal processes?
- What characteristics of those units are important to measure?
- What units can be used for collecting data?

- Where does “convergence” fit in??
 - Of what unit is it a property?
 - What is the conceptual definition?
 - What is the operational definition?



"Conceptual model"



Conceptual definitions of convergence

- Units play different roles in the social and scientific processes that give rise to various phenomena that might be labeled convergence
- Where in the process do you want to think of “convergence”
 - as an effect - What produces convergence?
 - as a cause - What are the consequences of convergence
- If we want to know what produces “convergence,” factors that are part of the cause cannot be part of the definition of the effect
- “Unitary” definition of convergence that is relevant for all units might be unachievable, in addition to being unnecessary



Convergence ...

- What unit is convergence a property of?
- Identify relevant facets or dimensions of the concept
 - Collaboration? Interdisciplinary?
 - Synthetic? Intellectual? Social? Methodological? Process?
- Measuring dimensions separately allows flexibility
 - Concept can change over time
 - Relevant dimensions may vary by discipline
 - Inter-disciplinary research involving social scientists may look very different from examples we discussed



• Measuring dimensions separately requires more measures or questions

Units of many kinds

- If convergence is a property of research projects or research goals, tagging would be done most accurately at the project level
 - Tagged when the grant is made?
 - Tagging across funding agencies?
- Universities are convenient units of data collection, but they are aggregators from the units at which convergence actually occurs
- Ongoing advice about organization of record keeping in units from which data are collected
 - Advisory board or testing panel?



Operational definitions of complex constructs

- Cannot rely on respondents to implement complex definitions in instructions consistently, particularly when knowledge is low
 - Easy to expect respondents to resolve inconsistencies and contradictions when they answer - “they’ll figure it out”
- An alternative to long text is questions that implement instructions in separate questions
 - *Does this project involve researchers from more than one discipline?*
 - But...Who is a “researcher”? What is a “discipline”?
- Complex definitions have many dimensions and may require multiple questions, but they are easier to answer and likely to be read



Interdisciplinary or convergent

- “Interdisciplinary” may be less valid but more reliable
 - May only roughly index convergence
- Disciplines - and taxonomy of disciplines - will continue in importance
- Convergent today ... a new discipline -- or new school -- tomorrow
- Changing list of disciplines itself charts paths of convergence and establishment of new order

