



Interdisciplinary Research - Challenges and Opportunities for Actuarial Profession

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Presentation outline



- **Introduction**
- **Concept of Interdisciplinary research**
- **IDR and Actuarial profession**

Introduction

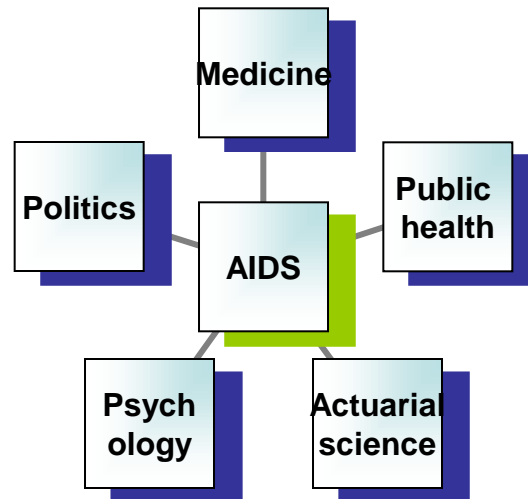


- **Multidisciplinarity**
- **Interdisciplinarity**
- **Transdisciplinarity**

Introduction



- **Multidisciplinarity:**
 - “*faculty from different disciplines working independently on different aspects of a project*”



Introduction



- **Interdisciplinarity:**
 - *“faculty from different disciplines working together on the same project”*
 - Multidisciplinary research may or may not lead to interdisciplinary research however...
 - It is highly unlikely to have interdisciplinary project without prior results in multidisciplinary investigation
- **Sometimes terms “multidisciplinarity” and “interdisciplinarity” are used as synonyms**

Introduction



- **Transdisciplinarity:**
 - “*application of theories, concepts, or methods across disciplines with the intent of developing an overarching synthesis. (...) the theories, concepts, or methods are not borrowed from one discipline and applied to another, but rather **transcend** disciplines and are therefore applicable in many fields.*”
 - Usually regarded as “highest” stage in merger of discipline

Concept of interdisciplinary research



- ***“For some it is quite old, rooted in the ideas of Plato, Aristotle, Rabelais, Kant, Hegel, and other historical figures who have been described as “interdisciplinary thinkers”. For others it is entirely a phenomenon of the twentieth century rooted in modern educational reforms, applied research, and movement across disciplinary boundaries ...“The actual term did not emerge until the twentieth century (.....). However, the basic ideas are quite old (.....)”.***
- **J.T. Klein. *Interdisciplinarity – History, Theory and Practice*, Wayne State University Press (1990)**

Concept of interdisciplinary research



- **No unique and widely accepted definition**
- **Definitions (interpretation even more) varies from very broad to very specific**

Concept of interdisciplinary research



From “traditional” research to IDR

Lonely researcher(s) working in single discipline

Lonely researcher using techniques from more than one discipline

Two or more researchers working as a team in **same** field

Two or more researchers working separately in **different** disciplines

Multi (Inter) disciplinary research team

Blackwell, G. W., "Multidisciplinary Team Research", *Social Forces*, Vol. 33 (1955)

Concept of interdisciplinary research



- ***“Research teams which possess all of these eight attributes are purely interdisciplinary:***
 - *Different bodies of knowledge are represented*
 - *Group members use different problem solving approaches in attempting to solve problems*
 - *Members perform different roles in solving problems*
 - *Members of the group work on a common problem*
 - *There is group responsibility for the final product*
 - *The group shares common facilities*
 - *The nature of the problem determines selection of personnel*
 - *Members are influenced by how others perform their tasks”*

Birnbaum P. H., “Contingencies for Interdisciplinary Research: Matching Research Questions with Research Organizations”, *Management science*, Vol. 27. No. II. (1981)

Concept of interdisciplinary research



Interdisciplinary research is a mode of research by teams or individuals that integrates

- Perspectives / concepts / theories **and/or**
- Tools / techniques **and/or**
- Information / data

from two or more bodies of specialized knowledge or research practice.

- **Its purpose is (...) to solve problems whose solutions are beyond the scope of a single field of research practice.**

Porter, A. L., Roessner, J. D., Cohen, A. S., Perreault, M., “Interdisciplinary Research: Meaning, Metrics and Nurture”, *Research Evaluation*, Vol. 15, No. 3 (2006)

Concept of interdisciplinary research



- ***“If we have a small multidisciplinary project with researchers a and b , trained in disciplines A and B , and individually capable of producing new knowledge K_A and K_B , this project becomes interdisciplinary when it produces knowledge k such that k does not belong to $K_A \cup K_B$, so for k to be new, it should involve knowledge not already part of disciplines A and/or B ”***

Beers, P. J., Bots, P. W. G., “Eliciting Conceptual Models to Support Interdisciplinary Research”,
Proceedings of the 40th Hawaii International Conference on System Sciences (2007)

Concept of interdisciplinary research



- **Interdisciplinary research becomes more and more important in development of modern sciences**
- **Main disadvantages are closely related to main advantage – to achieve new results which would never be achieved otherwise:**
 - **Time and effort**
 - **Cultural differences**
 - **“Quality” of results achieved**
 - **Tool or goal?**

Concept of interdisciplinary research



- **Cultural differences:**
 - **Unavoidable since every discipline represents its own “culture”:**
 - own “thought patterns” (paradigms)
 - Specific terms (including but not limiting to jargon and abbreviations, for example, IBNR, UPR etc.)
 - Different traditions how to technically present results (even if results are indeed the same)
 - Different notation for same or similar objects or phenomena’s etc.
 - **Participating researchers must be able to work in “multicultural” environment**

Concept of interdisciplinary research



- **Main Cultural differences:**
 - **Disagreement about what data is relevant**
 - **Discord about what research method is best and mostly convincing**
 - **Misunderstanding of terms (differences in meaning of the same word)**
 - **Methodological mistakes when applying methods from other fields**
 - **Communication problems**
 - **Ethical issues and many others**

Concept of interdisciplinary research



- ***“(...) (researchers) a and b initially each speak their own disciplinary ‘languages’ A and B, and to achieve common ground, they must each discover what they have in common (i.e. $A \cap B$) and extend their language to $A+C$ and $B+C$ where C consists of the concepts needed to better understand the empirical phenomenon they investigate”. ”***

Beers, P. J., Bots, P. W. G., “Eliciting Conceptual Models to Support Interdisciplinary Research”,
Proceedings of the 40th Hawaii International Conference on System Sciences (2007)

Concept of interdisciplinary research



- ***“Just as in languages the vocabulary cannot be entirely separated from the grammar, the syntax, or indeed the national culture, so in the disciplines "knowledge" cannot be isolated from the conjugate methods, the theories, or indeed the history and practice of the field”***

Bauer H. H., “Barriers Against Interdisciplinarity: Implications for Studies of Science, Technology, and Society (STS)”, *Science, Technology and Human Values*, Vol. 15, No. 1, (1990)

Concept of interdisciplinary research



- **“Quality” of results achieved:**
 - **Usually quite trivial results at least at the beginning especially if judged from perspective of “traditional” disciplines**
 - **First results may not be “recognized” by any existing field of science**

Concept of interdisciplinary research



- **Tool or goal?:**
 - **IDR may be very powerful tool used for achieving new knowledge but only if it is used properly**
 - **IDR should not be regarded as “tool” (for example to acquire more funds for research)**

IDR and Actuarial Profession



- **Actuarial profession may, by no means, be characterized as “area of interdisciplinary research”**
- **In (probably) narrowest sense public expect actuaries to apply mathematical methods when solving practical tasks that arose in insurance area**

IDR and Actuarial Profession



- **Almost any problem that actuaries are involved in requires at least some skills and knowledge from different areas of research and practice:**
 - Mathematics (usually “central” one)
 - Understanding of external environment (like possible inflation, rates of return, demographic changes, even general trends in business)
 - Understanding of internal environment (like communication with management, other departments, clients ...)

IDR and Actuarial Profession



- **Neither company management nor clients are no longer eager to accept without understanding What actuaries say**
- **So besides purely “technical” skills actuaries are required (at least but not limited) to:**
 - Be able to communicate clearly and effectively what they are doing
 - To understand general business environment, legal issues, etc.
 - To understand how psychological factors may affect model used and results received
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IDR and Actuarial Profession



- ***“Statistical training should be truly holistic (concerned with whole system rather than with single part) because that is the way statisticians are expected to operate in the real world”***

Kettenring, J. R., “What Industry Needs”, *The American Statistician*, Vol. 49, No. 1 (1995)

IDR and Actuarial Profession



- ***“Having experience in teamwork is very important, especially with respect to communications. We want people who can communicate easily and across disciplines, and who will have the other team members understand what statisticians are trying to tell them.”***

Ross, N.P. “What Government needs”, *The American Statistician*, Vol. 49, No. 1 (1995),

IDR and Actuarial Profession



- **It is easy to get an impression that actuaries are expected to know “everything” and be specialists in “everything”**
- **But this is impossible**
- **Employment of (at least some) principles applied in IDR may lead to acceptable solution**
- **Most probably it is impossible to “teach” and moreover “examine” skills needed for IDR, however...**

IDR and Actuarial Profession



- **At least some training may be started already in universities, for example, students should understand and appreciate that they will be expected**
 - Not only to give solution to problem but also to explain its “meaning”
 - To be able to work in team
 - To be able to communicate to non actuaries what they are doing, how assumptions used influence results received, why assumptions taken may be regarded as “realistic” and

IDR and Actuarial Profession



- **Actuarial profession is experiencing increased competition from other professions, like econometrics, statistics, risk management**
- **Some jobs earlier done by (exclusively) actuaries are now successfully carried out by representatives of other professions**

IDR and Actuarial Profession



- **Effective employment of principles of interdisciplinary research may help actuarial profession to withstand challenges of constantly changing situation**

Thank You!



Any questions / comments?

Please contact me at askucaite@mail.it