Epistemological Foundations of Transdisciplinary Research: The Case of the Management of Innovation

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Rationale

• A significant part of the knowledge produced by research at business schools should not only take the hurdle of academic rigour but also the one of relevance and
• Trans-disciplinary research enhances relevance
• So, what is the epistemology or the grounds of developing multi-disciplinary knowledge?
A definition

- Trans-disciplinary research is research that involves bringing together research from two or more disciplines in an integrative manner (Klein 1996; Ausburg 2006).

- Similarly, multi-method research involves the utilization of multiple methodologies, either from the same or different disciplines, to study a phenomenon (Roth 2007; Boyer and Swink 2008; Davis et al. 2011).

Some Examples

- Research establishing how and to what extent innovation directly and indirectly shapes firm profits and stock price (Sorescu, Chandy, and Prabhu, 2003)

- Application of real options approach to the management of the innovation process (Loch & Bode Greuel, 2001)

- Business modeling literature
• Multidisciplinary research that produces new “interesting and influential” insights (Fawcett and Waller 2011) requires that researchers leave their disciplinary “comfort zone” and go beyond the boundaries of their own fields and into disciplines such as, finance, organizational behavior, psychology, engineering, or physics.
• What it is NOT: researchers from different fields working together on a common subject, but staying within the boundaries of their own disciplines.
• In product development, for example, that would mean a shift from modular product design and clearly defined innovation task interfaces to integral product designs and overlapping innovation task interfaces (Von Hippel 1990; Ulrich 1995).

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Mode 1 versus Mode 2 Knowledge Production

Mode 1 knowledge production
• Purely academic and mono-disciplinary
• Generally, the development of descriptive knowledge is theory-driven, focusing on existing situations.
• Explanatory science: Typical research product is a causal model

Mode 2 knowledge production
• Multidisciplinary and aims at solving complex and relevant field problems.
• The example to follow in academic management research to bridge the relevance gap (Starkey and Madan, 2001; Tranfield and Starkey, 1998)
• The development of prescriptive knowledge, is field-problem driven and solution-oriented, describing and analysing alternative courses of action in dealing with certain organizational problems.
• Design science: The typical research product is the technological rule (Van Aken, 2004)
Design Science Research

- The mission of an explanatory science is to explain the behavior of existing entities in a quest for truth, whereas the mission of a design science is to develop knowledge to support the solving of improvement of construction problems in a quest for improving the human condition.
- The intended product of design science research is a major issue. A specific design, tested in a specific setting constitutes empirical data rather than a main research product.
- Design science research should aim at developing general design propositions to be used in designing solutions to field problems.

Design science research has the following characteristics:

- research questions are driven by field problems (as opposed to pure knowledge problems);
- there is an emphasis on solution-oriented knowledge, linking interventions or systems to outcomes, as the key to solve field problems;
- the justification of research products is largely based on pragmatic validity (do the actions, based on this knowledge indeed produce the intended outcomes?).
- Van Aken & Romme (2009)
Getting to Field Problems: Take an industry perspective

**FIGURE 2**
The Life Sciences Industry and Its Boundaries

Stremersch & Van Dyck (2009)

Generating problems to solve: Taking an industry perspective

**FIGURE 5**
Importance of Decision Areas to Firm Performance and Patient Welfare

Stremersch & Van Dyck (2009)
Breaking out of the Comfort Zone

- Consider complexities associated with management phenomenon studied, especially at points of system interdependence.
- Identify alternative perspectives that view the phenomenon from a different lens.
- Formulate the research questions to capture the multiple perspectives of the phenomenon considered.
- Identify multiple research methods that offer synergy in addressing the formulated research questions or enable triangulation of research findings.
- Design the research program to address the research questions utilizing the multiple methods selected.

Sanders & Wagner (2011)

Example: Developing a Theory-based Conceptual Framework

![Diagram of System-Level and Component-Level with Solution Developer, Solution Provider, Technology Platform Developer, Solution Component Provider, Technology Market, Solutions Market]

Van Dyck & Debruyne (Work in Process)
A Critique: Design Research leads to Mid-Range Theory?

- Mid-range theory: acknowledging the role of objectivist, realist epistemology, evolutionary, also acknowledging the role of intersubjective, emergent, and metaphysical factors in shaping organizational reality (McKelvey 2003)
- Mid-range theory acknowledges the importance of abstraction, representation, and refinement of general principles that apply across multiple situations while also recognizing the limitations of such entitative abstractions in accurately representing emergent, contingent, and locally specific reality.