……..is dit genoeg theorie?

Prof. Dr. Piet Ribbers

TILBURG UNIVERSITY

Understanding Society

Enkele Uitganspunten voor: ‘Methoden en Technieken van Onderzoek” Avans Hogeschool

Opdracht

Academie voor ICT en Business van Avans Hogeschool:

- “ …..welke onderzoeksvaardigheden dienen in het curriculum te worden opgenomen?”
- Nieuw vak ‘Methoden en Technieken van Onderzoek”
- Op basis van 10 afstudeerrapporten (5 Informatica; 5 Bedrijfskundige Informatica)
- ….dus geen kwaliteitsoordeel van de afstudeerverslagen.

Het Vakgebied (Bedrijfs-)Informatiesystemen

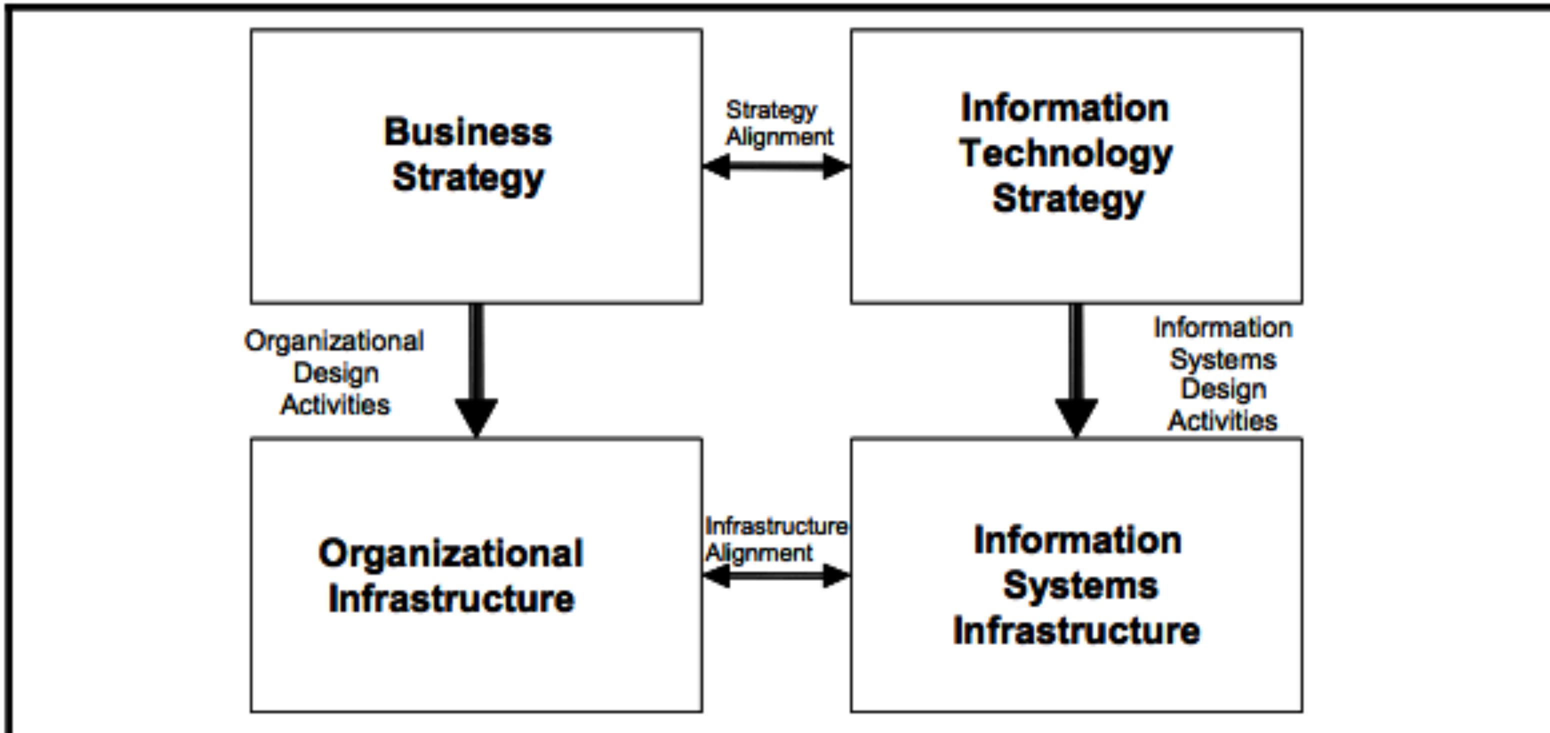


Figure 1. Organizational Design and Information Systems Design Activities (Adapted from J. Henderson and N. Venkatraman, "Strategic Alignment: Leveraging Information Technology for Transforming Organizations," *IBM Systems Journal* (32:1), 1993.)

Onderzoek in het vakgebied "Informatiesystemen"

<u>Twee benaderingen:</u>

- Verklarend, voorspellend onderzoek
  - Gericht op ontwikkeling van kennis, theorievorming
- Ontwerpgericht onderzoek
  - Gericht op het creeren/ontwerpen van een oplossing voor een probleemsituatie (een artefact)
- Beide typen versterken elkaar/ vullen elkaar aan.

Onderzoek in het vakgebied “Informatiesystemen

- *Informatica*: vooral ontwerpgericht onderzoek
  - echter een ontwerp wordt in een context gebruikt…
- *Informatiekunde* (Bedrijfskundige informatica): vooral verklarend en voorspellend onderzoek
  - echter met betrekking tot een ontwerp…
- *Dus beide vormen* komen aan bod bij elk, wel met een ander accent.

Verklarend onderzoek: Theorievorming

In more detailed terms, a theory may be viewed as a system of constructs and variables in which the constructs are related to each other by propositions and the variables are related to each other by hypotheses. The whole system is bounded by the theorist's assumptions, as indicated by Figure 1.

Table 3. Structural Components of Theory

Theory Component (Components Common to All Theory)	Definition
Means of representation	The theory must be represented physically in some way: in words, mathematical terms, symbolic logic, diagrams, tables or graphically. Additional aids for representation could include pictures, models, or prototype systems.
Constructs	These refer to the phenomena of interest in the theory (Dubin's "units"). All of the primary constructs in the theory should be well defined. Many different types of constructs are possible: for example, observational (real) terms, theoretical (nominal) terms and collective terms.*
Statements of relationship	These show relationships among the constructs. Again, these may be of many types: associative, compositional, unidirectional, bidirectional, conditional, or causal. The nature of the relationship specified depends on the purpose of the theory. Very simple relationships can be specified: for example, "x is a member of class A."
Scope	The scope is specified by the degree of generality of the statements of relationships (signified by modal qualifiers such as "some," "many," "all," and "never") and statements of boundaries showing the limits of generalizations.
Theory Component (Components Contingent on Theory Purpose)	**Definition**
Causal explanations	The theory gives statements of relationships among phenomena that show causal reasoning (not covering law or probabilistic reasoning alone).
Testable propositions (hypotheses)	Statements of relationships between constructs are stated in such a form that they can be tested empirically.
Prescriptive statements	Statements in the theory specify how people can accomplish something in practice (e.g., construct an artifact or develop a strategy).

*Dubin (1978) defines a real unit as one for which an empirical indicator can be found, and a nominal unit as one for which an empirical indicator cannot be found. Collective units are a class or set of units while member units are the members of the class or set. Further distinctions are made between enumerative, associative, relational, statistical, and complex units.

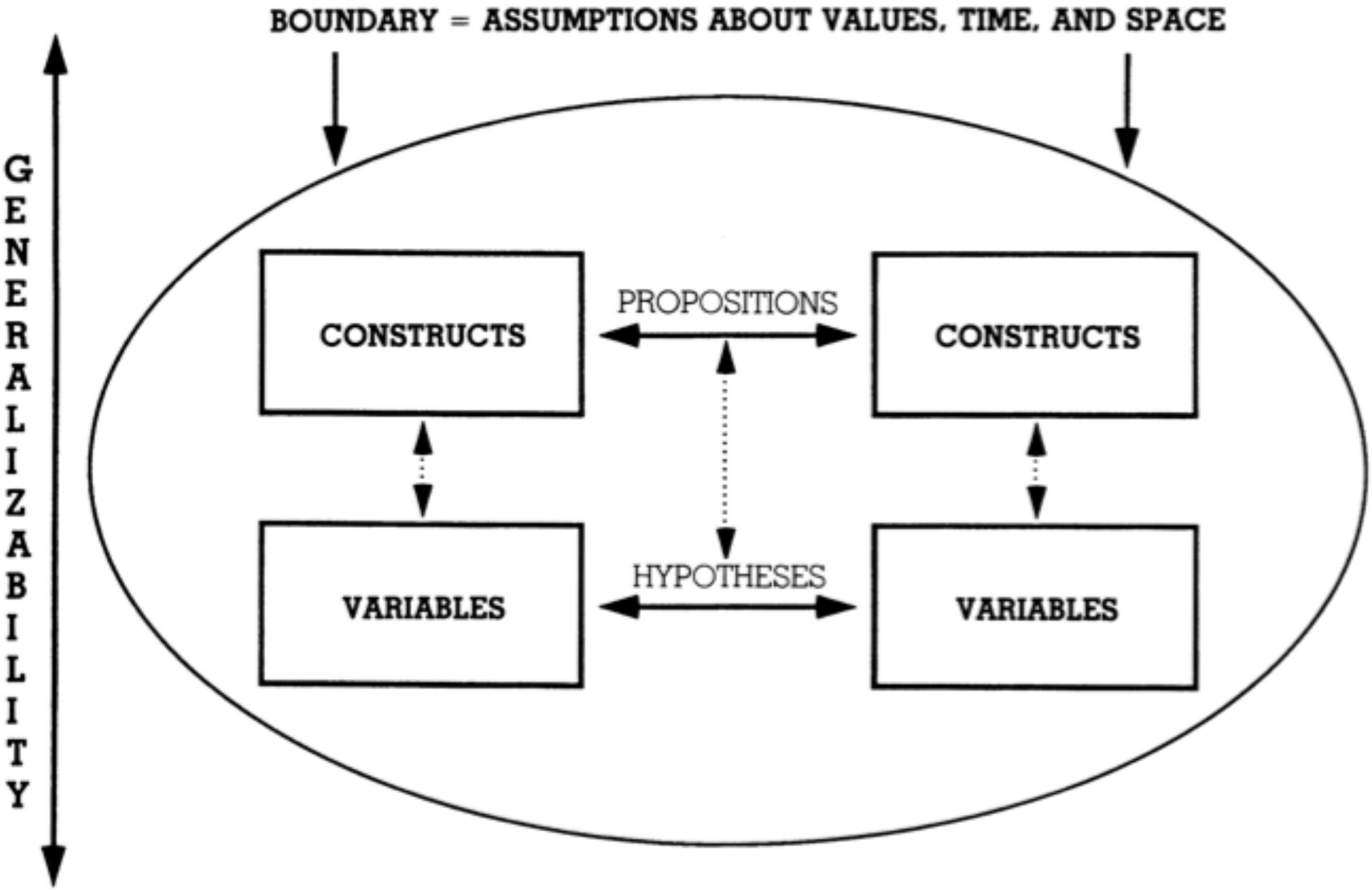


Figure 1. **Components of a theory.**

Bacharach et al, 1989

Thus, a construct may be viewed as a broad mental configuration of a given phenomenon, while a variable may be viewed as an operational configuration derived from a construct.

Een voorbeeld…

"Bedrijven investeren in interorganisationele systemen om daarmee bepaalde voordelen te bereiken. Een vraag is dan door welke factoren wordt die bereidheid bepaald en wat is er nodig om die voordelen te bereiken"

Research Questions

- Various types of interorganizational systems and various types of investments (Bharadwaj 2000)

- Relationship-specific investments are important (Welty et al. 2001)

- Trust and dependence can influence investments

1. How do dependence and various forms of trust affect the different types of relationship-specific investments?

Research Questions

- Various types of investments

- IOSs are used in different types of relationships

2. How do different types of relationship-specific investments effect the achievement of IOS capabilities?

Trust

- Trust can be defined as a party's willingness to be vulnerable to another party based on the belief that the latter party is *competent, open, concerned,* and *reliable* (Mishra 1996)
- Trust can facilitate relationship-specific investments as it is expected that the partner will not perform a damaging behavior (Nooteboom 2002).

Dependence

- Dependence is determined by the utility and substitutability of a specific partner organization (Cox et. al 2002)

- Dependence can make the organization vulnerable as it can be forced into harmful exchange settings (Ratnasingam 2000).

Resource-Based View

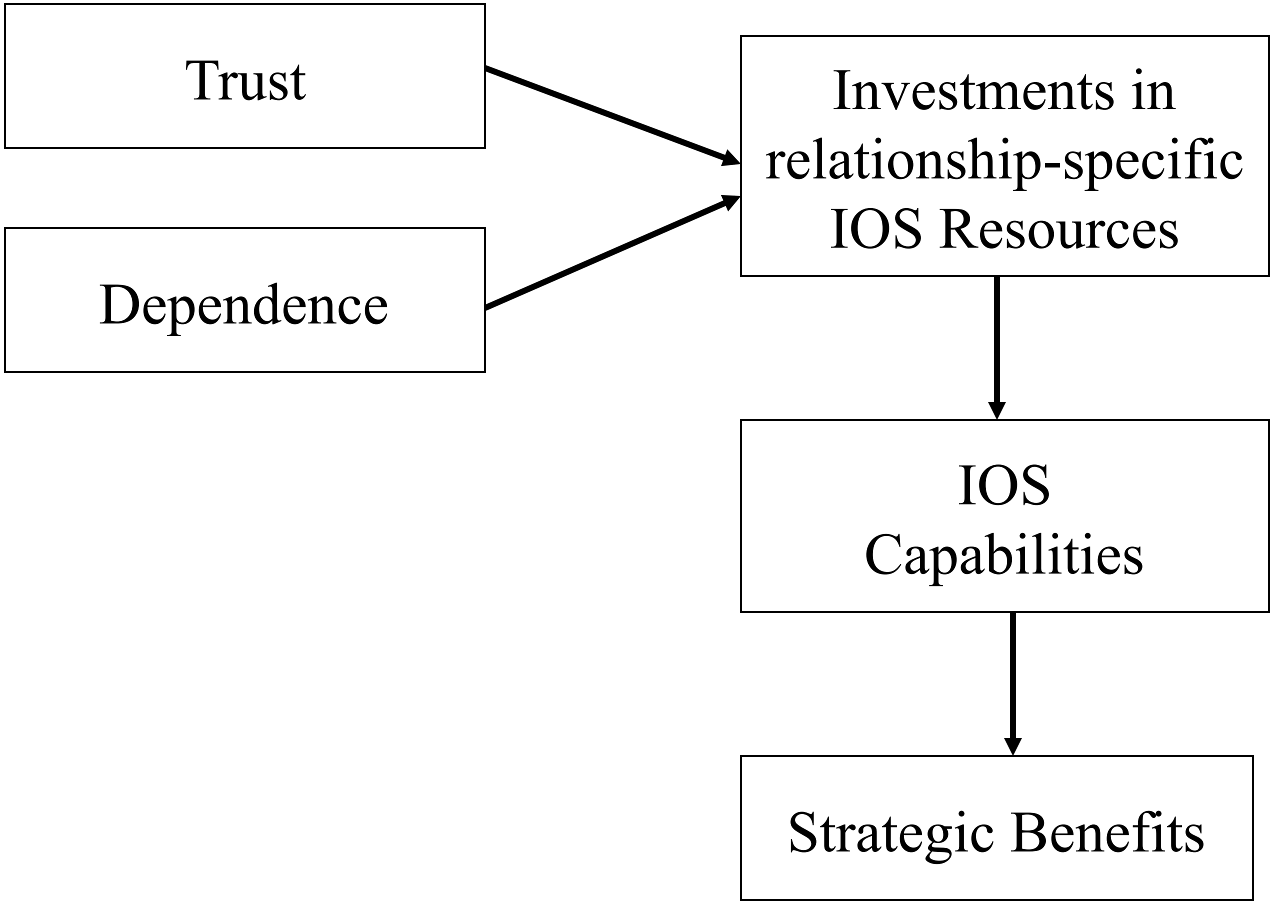
- RBV addresses the fundamental question of why firms differ and how firms achieve and sustain competitive advantage

- RBV has two basic assumptions:
  - Firms may be heterogeneous with respect to the resources and capabilities they own or control.
  - Resources may not be perfectly mobile amongst firms, and therefore heterogeneity can be sustained.

- Resources
  - Tangible IT resources
  - Human IT resources
  - Intangible IT resources

} Capabilities

Conceptual Model



Ontwerpgericht Onderzoek

Creeeren van een ontwerp dat in een bepaalde context innoverend is en/of een bestaande situatie verbetert. Hierbij zijn met name van belang:

- het concretiseren van de vraag of probleemsituatie, en het vaststellen van de relevantie ervan;
- het maken van het ontwerp (het ‘design’)
- de validatie en evaluatie van het ontwerp.

Table 1. Design-Science Research Guidelines	
Guideline	**Description**
Guideline 1: Design as an Artifact	Design-science research must produce a viable artifact in the form of a construct, a model, a method, or an instantiation.
Guideline 2: Problem Relevance	The objective of design-science research is to develop technology-based solutions to important and relevant business problems.
Guideline 3: Design Evaluation	The utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation methods.
Guideline 4: Research Contributions	Effective design-science research must provide clear and verifiable contributions in the areas of the design artifact, design foundations, and/or design methodologies.
Guideline 5: Research Rigor	Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artifact.
Guideline 6: Design as a Search Process	The search for an effective artifact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.
Guideline 7: Communication of Research	Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences.

Aanbevelingen voor “Methoden en Technieken van Onderzoek”

1. Ontwerpgericht vs voorspellend/verklarend: kenmerken, principes, opzet;
2. Probleemstelling en Onderzoeksvragen
3. Systematisch literatuuronderzoek: doen en rapporteren erover.

Aanbevelingen: Verklarend onderzoek

4. Het maken van een conceptueel model:
   – Constructen, variabelen (eventueel), relaties (proposities)
5. Toetsen van hypothesen

Aanbevelingen Ontwerpend Onderzoek

6. Het maken van een goed ontwerp
   – Dit vereist het bekwaam kunnen hanteren van de kennis uit de betreffende vakgebieden zoals informatica, informatiekunde en organisatiekunde.

Aanbevlingen

7. Empirische onderzoeksmethoden:
   - voor toetsing van proposities
   - evaluatie en validatie van ontwerpen
     - Bijv:
       - case study onderzoek
       - Interviews; Waarnemingen
       - statistiek (kleine aantallen)

Table 2. Design Evaluation Methods	
1. Observational	Case Study: Study artifact in depth in business environment
	Field Study: Monitor use of artifact in multiple projects
2. Analytical	Static Analysis: Examine structure of artifact for static qualities (e.g., complexity)
	Architecture Analysis: Study fit of artifact into technical IS architecture
	Optimization: Demonstrate inherent optimal properties of artifact or provide optimality bounds on artifact behavior
	Dynamic Analysis: Study artifact in use for dynamic qualities (e.g., performance)
3. Experimental	Controlled Experiment: Study artifact in controlled environment for qualities (e.g., usability)
	Simulation – Execute artifact with artificial data
4. Testing	Functional (Black Box) Testing: Execute artifact interfaces to discover failures and identify defects
	Structural (White Box) Testing: Perform coverage testing of some metric (e.g., execution paths) in the artifact implementation
5. Descriptive	Informed Argument: Use information from the knowledge base (e.g., relevant research) to build a convincing argument for the artifact's utility
	Scenarios: Construct detailed scenarios around the artifact to demonstrate its utility

Referenties

S.B. Bacherach: Organizational Theories: Some Criteria for Evaluation. Academy of Management Review, 1989, Vol. 14, No. 4, pp 496-515.
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Dank U

P.M.A.Ribbers@uvt.nl