Exploring the Scientific Impact of Information Systems Design Science Research: A Scientometric Study

Gerit Wagner
Universität Regensburg
Gerit.Wagner@ur.de

Julian Prester
Universität Regensburg and Australian School of Business, University of New South Wales
j.prester@student.unsw.edu.au

Guido Schryen
Universität Regensburg
Guido.Schryen@ur.de

Universität Regensburg

Agenda

1. What are the most impactful IS-DSR papers?
- Definition and dual objectives of IS-DSR
- Types of design science papers
- Map of impactful IS-DSR papers
2. Which factors explain the scientific impact of IS-DSR?
- Research Model
- Estimation Results

Definition and goals of IS-DSR

Definition: ”Research that invents a new purposeful artifact to address a generalized type of problem and evaluates its utility for solving problems of that type” (Venable and Baskerville 2012, p.142)

Dual Objectives of IS-DSR

Utility for Practice

Pragmatic-design camp
- Hevner et al. (2004)
- March and Smith (1995)
- Nunamaker et al. (1990)

Knowledge Contribution

Design theory camp
- Walls et al. (1992)
- Markus et al. (2002)
- Gregor and Jones (2007)

Focus of this paper

Types of design science papers

Methodology, Theory, Philosophy of Design Science

- Simon (1969)
- Walls et al. (1992)
- March and Smith (1995)
- Hevner et al. (2004)
- Gregor and Jones (2007)

Papers on *how IS-DSR should be done*

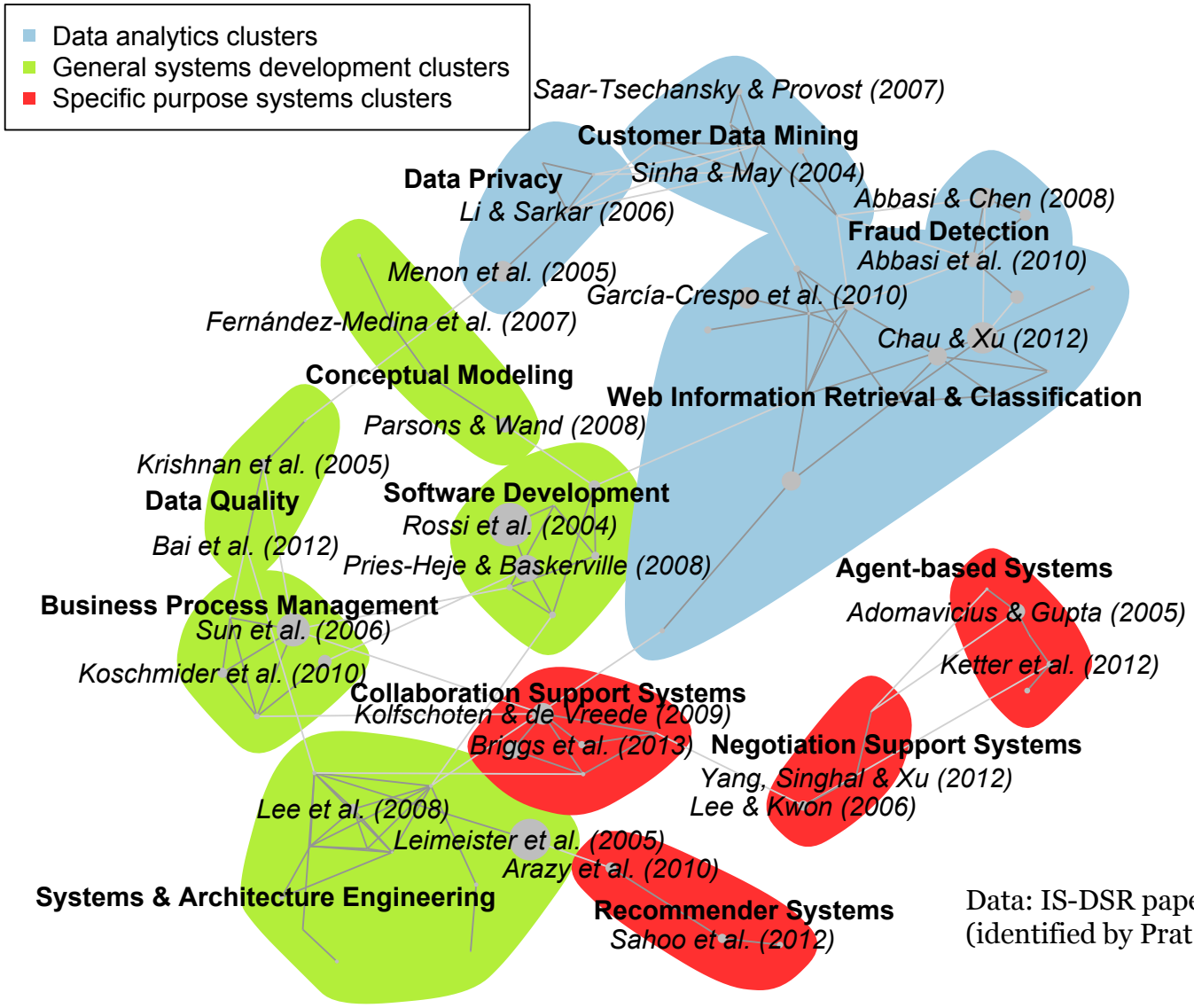
IS-DSR (application) papers

- Markus et al. (2002)
- (Codd (1970))
- ???

Papers *actually doing IS-DSR*

Focus of this paper

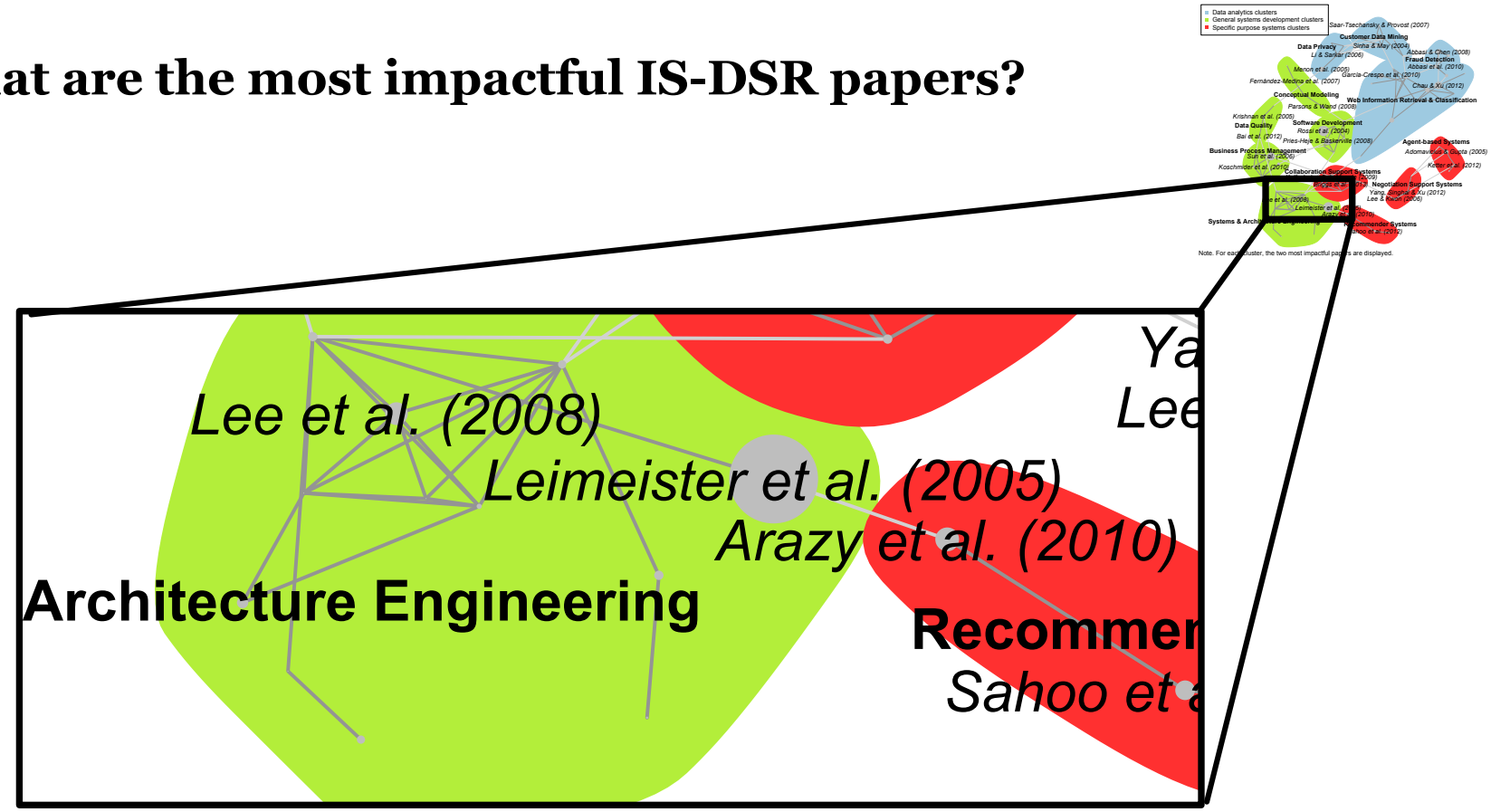
Exploring the scientific impact of information systems design science research



Data: IS-DSR papers in AIS basket (2004-2014) (identified by Prat et al. (2015))

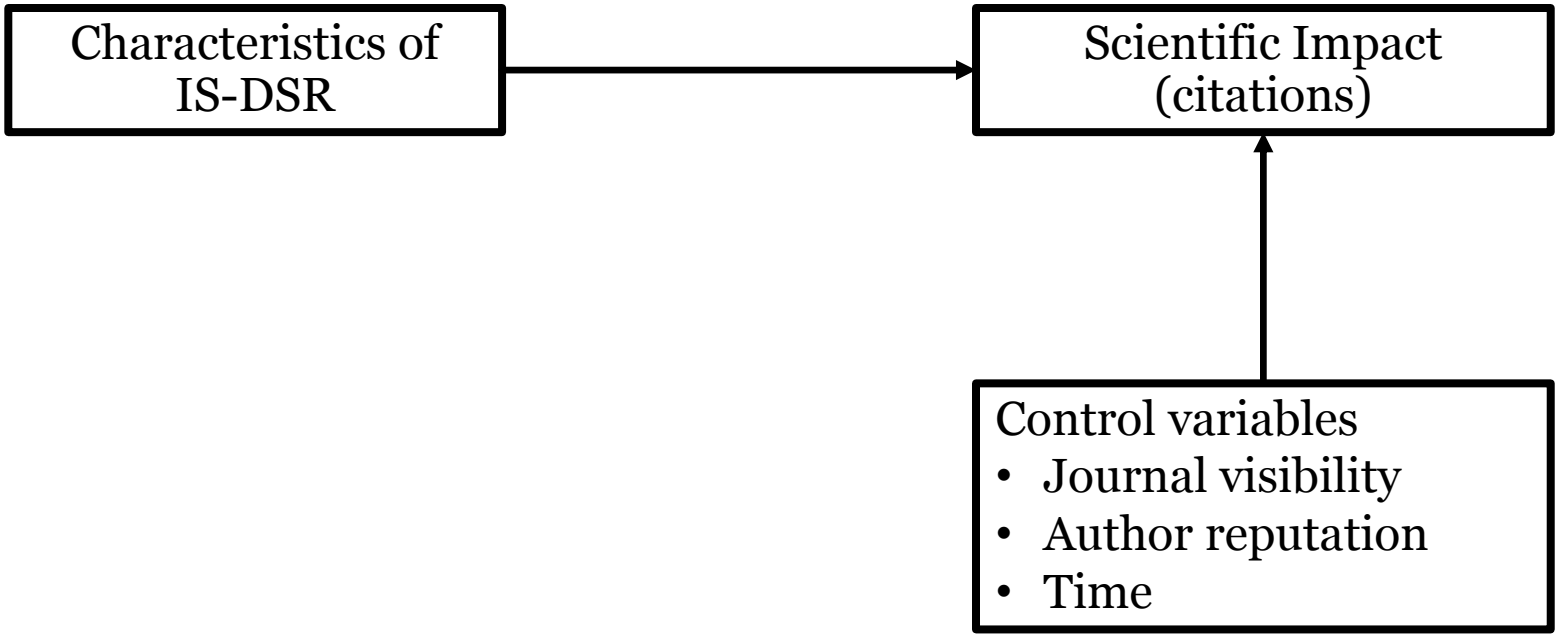
Note. For each cluster, the two most impactful papers are displayed.

What are the most impactful IS-DSR papers?

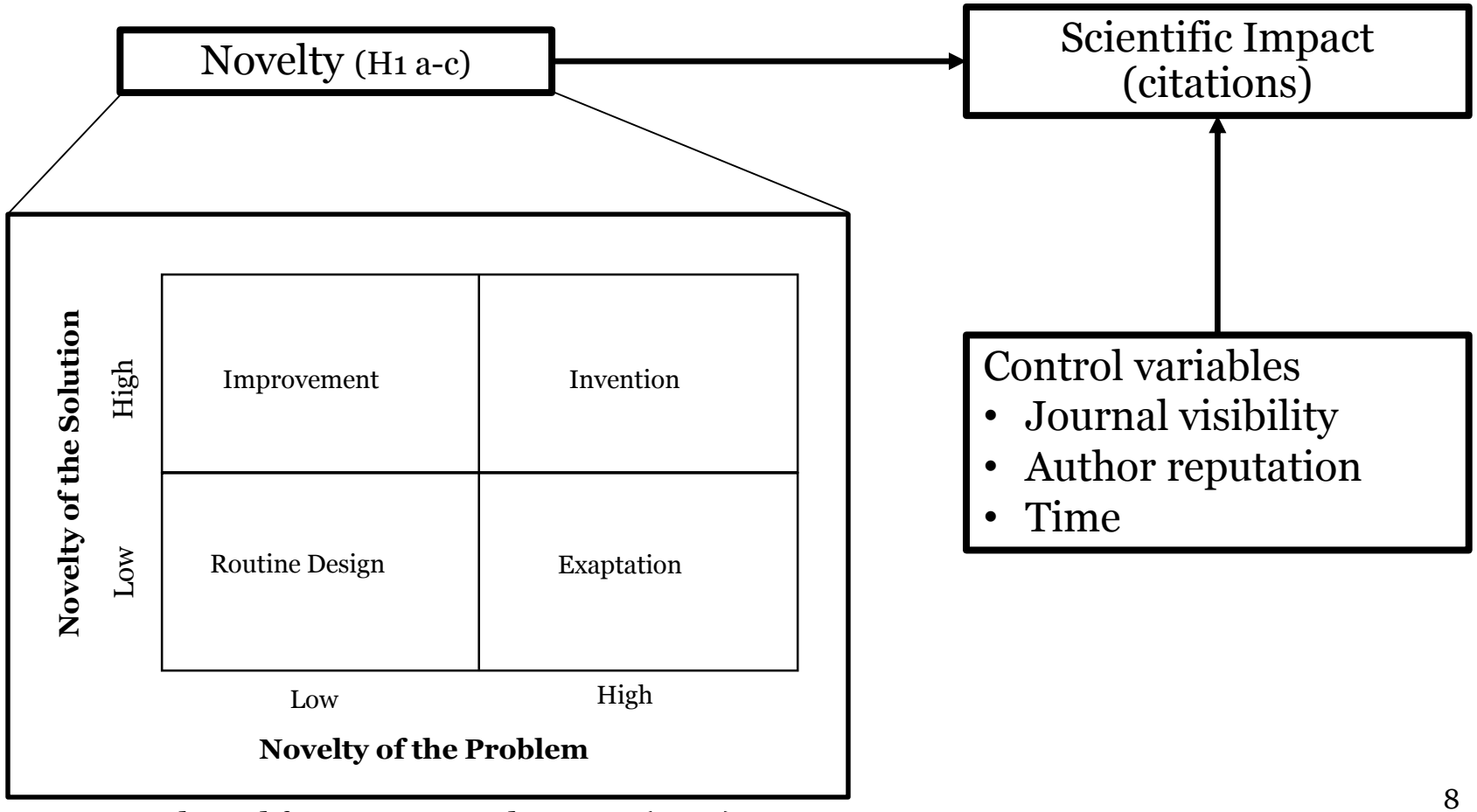


Which factors explain the scientific impact of IS-DSR papers?

Research Model

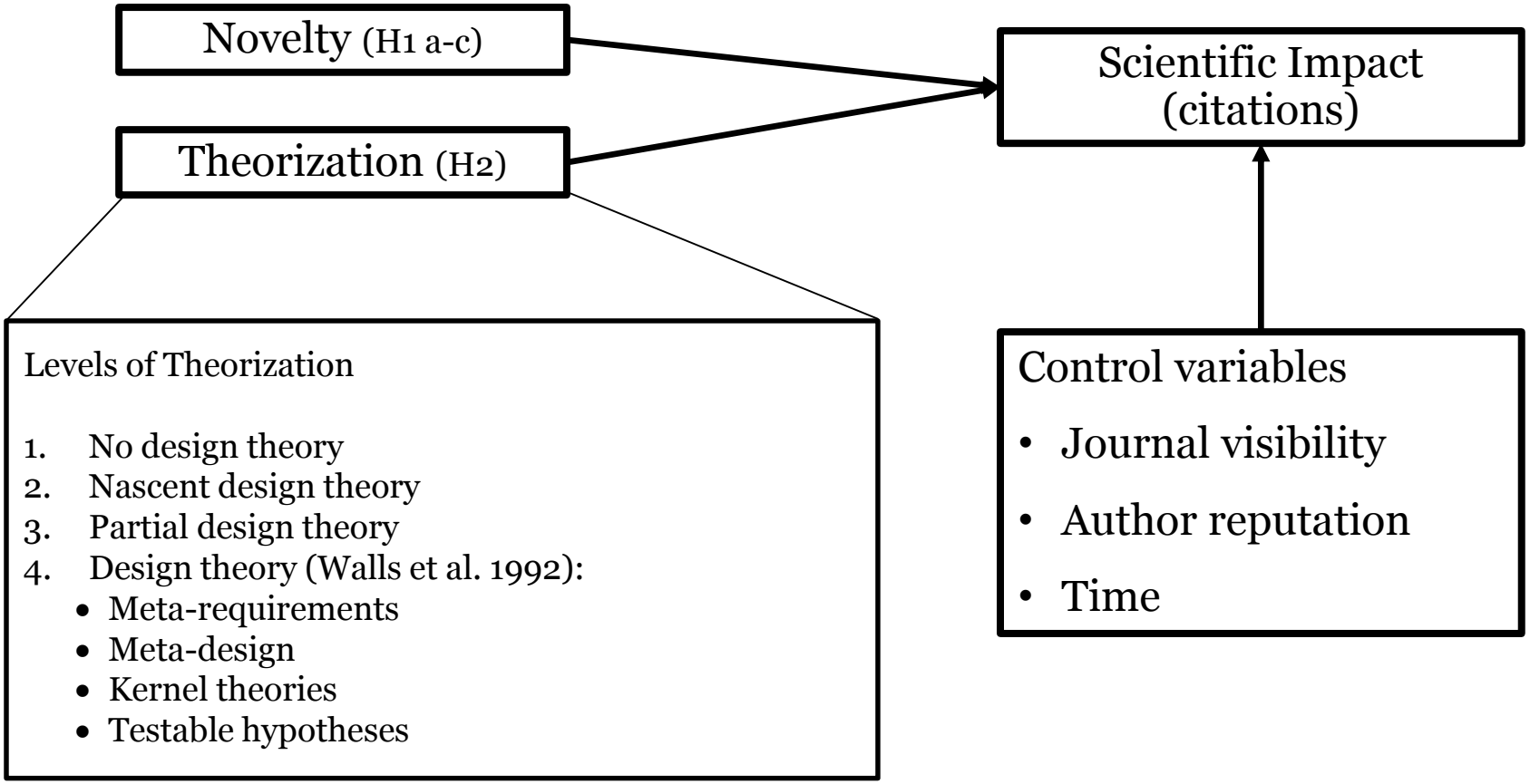


Exploring the Scientific Impact of IS-DSR



Adapted from Gregor and Hevner (2013)

Exploring the Scientific Impact of IS-DSR



Based on Walls et al. (1992), Gregor and Hevner (2013)

GLM and Results (n=115)

$$log(citations) = \beta_0 + \beta_1 Journal\ impact\ factor + \beta_2 h{-}index + \beta_3 Age\ of\ publication + \beta_4 Novelty + \beta_5 Theorization + \epsilon$$

	Estimate	z-Value
Journal impact factor (control variable)	0.31 (0.05)	6.03 ***
h-index (control variable)	0.03 (0.01)	2.77 **
Age of publication (control variable)	0.19 (0.03)	6.90 ***
Novelty [a]: routine design	0.22 (0.33)	0.66
Novelty [a]: exaptation	0.55 (0.19)	2.92 **
Novelty [a]: invention	0.47 (0.22)	2.12 *
Theorization	0.38 (0.11)	3.39 ***
Nagelkerke R^2	0.47	

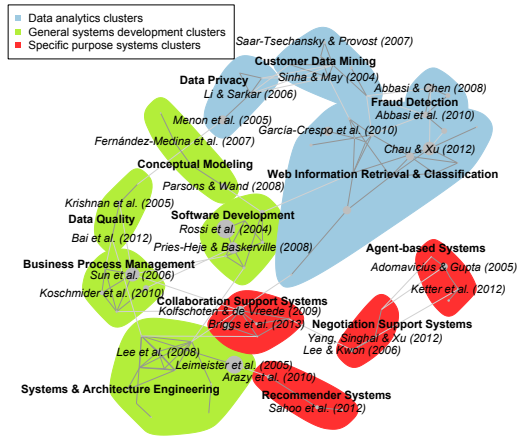
Notes. The model includes an intercept. Standard errors are in brackets.

Significance levels: *** indicates p<0.001, ** indicates p<0.01, * indicates p<0.05 (two-sided tests).

[a] Improvement was used as the reference group.

Conclusions

- Contribution 1: Overview of impactful IS-DSR papers and topics
- Contribution 2: Novelty and theorization affect scientific impact of IS-DSR.



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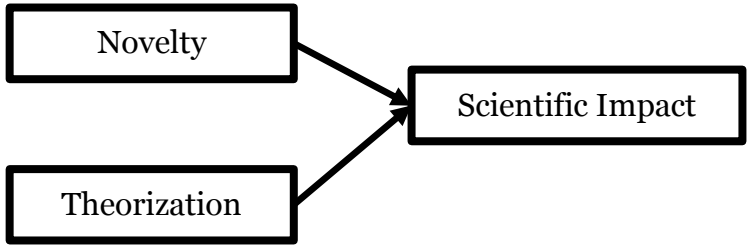

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Gregor, S., and Hevner, A. 2013. "Positioning and Presenting Design Science Research for Maximum Impact," *MIS Quarterly*, (37:2), pp. 337–356.

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March, S. T., and Smith, G. F. 1995. "Design and Natural Science Research on Information Technology," *Decision Support Systems*, (15:4), pp. 251–266.

Markus, M. L., Majchrzak, A., and Gasser, L. 2002. "A design theory for systems that support emergent knowledge processes," *MIS Quarterly*, (26:3), pp. 179–212.

References (II)

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Overview of Support Provided for the Hypotheses

Hypothesis 1a	(-)	Scientific impact is lower for DSR papers focusing on routine design (applying known solutions to known problems).	Not supported
Hypothesis 1b	(+)	Scientific impact is higher for DSR papers focusing on exaptation (applying known solutions to new problems).	Supported**
Hypothesis 1c	(+)	Scientific impact is higher for DSR papers focusing on invention (developing new solutions for new problems).	Supported*
Hypothesis 2	(+)	Scientific impact is higher if DSR contributions are theoretical.	Supported***

Significance levels: *** indicates $p<0.001$, ** indicates $p<0.01$, * indicates $p<0.05$ (one-sided tests).

Construction of the Scientometric Map