



ASSOCIATION OF RESEARCHERS IN **CONSTRUCTION MANAGEMENT**

**Summary of the
ARCOM Doctoral Workshop**

Design Science Research (DSR) in Construction

15 – 17 May, 2024

University of Twente

Workshop Convenor: Dr. Emmanuel Aboagye-Nimo, Birmingham City University

Workshop Organisers: Dr. Léon olde Scholtenhuis, Dr. Andreas Hartmann, Dr. Marc van den Berg

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Programme

Wednesday May 15, 2024, at UT Campus, Building de Vrijhof, De Veldmaat 5, 7522 NM Enschede: Icebreaker and Campus Walk

Thursday May 16, 2024, at DesignLab Room Connect, University of Twente Campus, Enschede

Time	Activity
8h45-9h15	Walk-in
9h15-9h30	Welcome at UTwente, ARCOM DSR
9h30-10h15	Keynote on Design Science Research by Prof. Jörg Henseler
10h15-10h30	Refreshments
10h30-12h00	Characteristics of Design Science Research (lecture)
12h00-13h30	Lunch in DesignLab
13h30-14h15	Perspectives on DSR from Different Scientific Disciplines (lecture)
14h15-15h00	Part I – Designing a DSR study: what to look at? (interactive lecture)
15h00-15h30	Refreshments
14h30-17h00	Part II – Designing a DSR study: what to look at? (interactive lecture)
17h00-17h30	Wrap up
17h30-19h00	Travel to town
19h00 – 21h00	Dinner at De Ouwe Compagnie Walstraat 39 7511 GG Enschede tel. 053-4308160

Friday May 17, 2024, at DesignLab Room Connect, University of Twente Campus, Enschede

Time	Activity description
9h00-9h15	Opening
9h15-9h45	Keynote on Co-Design and Engaging Stakeholders by Dr. Francesca Toso
9h45-10h15	DreamTeam Tour DesignLab
10h15-10h45	Break
10h45-12h00	Your project (presentations)
12h00-13h00	Lunch
13h00-14h00	Apply DSR and Share Findings (hands-on session)
14h00-14h30	Writing Up (lecture)
14h30-15h00	Refreshments
15h00-16h00	Theme tables (hands-on/discussion session)
16h00-16h30	Plenary reflection and closure

Summary

Following the success of the first post-pandemic international Doctoral Workshop at the University of Limerick, the University of Twente had the privilege of hosting the second international workshop this year. This unique workshop, entitled Design Science Research (DSR) in Construction, aimed to explore new methodological frontiers in our field.

At the ARCOM23 keynotes, Prof. Andy Dainty and Prof. Fred Sherratt emphasized the need for the construction management (CM) community to look beyond our own labs and engage with the empirical realities we study. The Doctoral Workshop on DSR echoed this sentiment, highlighting how research can be more impactful and relevant in specific contextualized settings, while still maintaining global relevance. This was a key theme of the seminar, which took place between May 15 and 17 in Twente, the Netherlands.

Design Science Research is not about understanding practice but about changing the practice itself (Wieringa 2009). This is quite a fundamental shift compared to behavioural studies that focus on describing and explaining but not yet on changing or predicting change. Thus, DSR has philosophical roots other than our 'known' methodologies. DSR is rooted in pragmatism, where the utility (applicability) of knowledge plays a key role (Van Turnhout 2023). Researchers are seen as part of the system, together with stakeholders, and focus on a relevant problem in a specific context. Researchers gain knowledge about designing artefacts (e.g., core design principles, guidelines, methods, processes and digital support systems) created to support practice in that context. The process involves activities such as exploration of the wicked problem (Hevner 2004), followed by artefact design, demonstration, evaluation, and communication (Peffer et al. 2007). DSR abstracts general knowledge or so-called field-tested technological rules through collaborative design and intervention with artefacts (Van Aken and Romme 2009). The design process then allows for understanding the problem and how the solution may achieve the desired impact.

Just like with other methods, DSR has practical constraints and risks. There is, however, also a lot to gain, especially when projects require you to make a direct impact on society, support industry, and when you aim to reduce the gaps between practice and theory.

While the DSR methodology is well-established in engineering and medical domains, it has yet to grow into the (construction) management field. The DSR workshop, therefore, commenced by outlining the needs, motivations, and conditions for DSR. Prof. Henseler and Prof. Toca (both from the University of Twente, Dept of Product Market Relations) provided justifications for how DSR can be a powerful tool for solving real-world problems, discussed its epistemological differences with behavioural and natural sciences, and illustrated how fields such as CM can benefit from this more collaborative approach to research in an applied field. Dr. Hartmann, Dr. olde Scholtenhuis, and Dr. Van den Berg (also from the University of Twente) then delved into DSR principles, and demonstrated the application of various DSR research models in a construction research project.

Refuelled by a dinner and breakfast and refreshed by a good night of sleep, our 11 participants from institutes in the EU, UK, Africa and the Middle East presented their work on DSR. Greatly supported by Prof. Chan (TU Delft), Day 2 was focused on reflecting the applicability of DSR. After creating groups constituting early-stage PhD delegates and recently graduated doctors, the day continued with discussions of all doctoral projects. It was reflected on how projects were already doing DSR, what possible changes (parts of) could be implemented to start a DSR project, or how their DSR work could be written up in journals unfamiliar with the methodology. We learnt about the various considerations

of using DSR to develop digital support systems, create principles for improved stakeholder management, develop instruments for increasing circularity, and improve infrastructure transitions.

After a fruitful discussion, we concluded that the workshop was not only beneficial, but also should be repeated to further disseminate its merits within our domain. As a result, we are considering proposing a Special Issue for a journal such as CM&E, and planning the next DSR Workshop, potentially before or during a future ARCOM Conference. These proposed actions reflect our commitment to continuing the dialogue and advancing the application of DSR in the construction management field.

We greatly thank all participants for their enthusiasm and participation, acknowledge ARCOM for providing financial support for this initiative, and appreciate the University of Twente's willingness to host this event on its campus.

Léon olde Scholtenhuis, Andreas Hartmann, and Marc van den Berg – University of Twente

References

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS quarterly*, 75-105.

Peffer, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of management information systems*, 24(3), 45-77.

Van Aken, J. E., & Romme, G. (2009). Reinventing the future: adding design science to the repertoire of organization and management studies. *Organization Management Journal*, 6(1), 5-12.

Van Turnhout, K. (2023). *Handboek ontwerpgericht wetenschappelijk onderzoek*, 2^e druk, Boom Uitgevers, Amsterdam.

Wieringa, R. (2009, May). Design science as nested problem solving. In *Proceedings of the 4th international conference on design science research in information systems and technology* (pp. 1-12).

Delegate List

Ana Conceição, Eline Baert, Hazal Deniz Kaya (Delft University of Technology); Ece Boyacioglu (Northumbria University), Max Lee (University of Wolverhampton); Narmin Abouelkhier (United Arab Emirates University); Omimah Cagdas (Istanbul Technical University); Semere Mulatu Bekele (Addis Ababa University); Yifei Yu (University of Twente); Parek Toby Maduot (Anglia Ruskin University)