

Roel J. Wieringa

# Design Science Methodology

for Information Systems  
and Software Engineering

 Springer

# Design Science Methodology For Information Systems And Software Engineering

**Michael Felderer,Guilherme Horta  
Travassos**



## **Design Science Methodology For Information Systems And Software Engineering:**

**Design Science Methodology for Information Systems and Software Engineering** Roel J. Wieringa, 2014-11-19

This book provides guidelines for practicing design science in the fields of information systems and software engineering research. A design process usually iterates over two activities: first designing an artifact that improves something for stakeholders and subsequently empirically investigating the performance of that artifact in its context. This validation in context is a key feature of the book since an artifact is designed for a context; it should also be validated in this context. The book is divided into five parts. Part I discusses the fundamental nature of design science and its artifacts, as well as related design research questions and goals. Part II deals with the design cycle, i.e., the creation, design, and validation of artifacts based on requirements and stakeholder goals. To elaborate this further, Part III presents the role of conceptual frameworks and theories in design science. Part IV continues with the empirical cycle to investigate artifacts in context and presents the different elements of research: problem analysis, research setup, and data analysis. Finally, Part V deals with the practical application of the empirical cycle by presenting in detail various research methods, including observational case studies, case-based and sample-based experiments, and technical action research. These main sections are complemented by two generic checklists: one for the design cycle and one for the empirical cycle. The book is written for students as well as academic and industrial researchers in software engineering or information systems. It provides guidelines on how to effectively structure research goals, how to analyze research problems concerning design goals and knowledge questions, how to validate artifact designs, and how to empirically investigate artifacts in context, and finally how to present the results of the design cycle as a whole.

*Contemporary Empirical Methods in Software Engineering* Michael Felderer, Guilherme Horta

Travassos, 2020-08-27 This book presents contemporary empirical methods in software engineering related to the plurality of research methodologies: human factors, data collection and processing, aggregation and synthesis of evidence, and impact of software engineering research. The individual chapters discuss methods that impact the current evolution of empirical software engineering and form the backbone of future research. Following an introductory chapter that outlines the background of and developments in empirical software engineering over the last 50 years and provides an overview of the subsequent contributions, the remainder of the book is divided into four parts: Study Strategies (including e.g., guidelines for surveys or design science), Data Collection, Production, and Analysis (highlighting approaches from e.g., data science, biometric measurement, and simulation-based studies), Knowledge Acquisition and Aggregation (highlighting literature, research threats to validity, and evidence aggregation), and Knowledge Transfer (discussing open science and knowledge transfer with industry). Empirical methods like experimentation have become a powerful means of advancing the field of software engineering by providing scientific evidence on software development, operation, and maintenance, but also by supporting practitioners in their decision-making and learning processes. Thus, the book is equally suitable for academics aiming to expand the field and

for industrial researchers and practitioners looking for novel ways to check the validity of their assumptions and experiences Chapter 17 is available open access under a Creative Commons Attribution 4.0 International License via link [springer.com](http://springer.com)

*An Introduction to Design Science* Paul Johannesson, Erik Perjons, 2021-09-20 This book is an introductory text on design science intended to support both graduate students and researchers in structuring, undertaking and presenting design science work. It builds on established design science methods as well as recent work on presenting design science studies and ethical principles for design science and also offers novel instruments for visualizing the results both in the form of process diagrams and through a canvas format. While the book does not presume any prior knowledge of design science it provides readers with a thorough understanding of the subject and enables them to delve into much deeper detail thanks to extensive sections on further reading. Design science in information systems and technology aims to create novel artifacts in the form of models, methods and systems that support people in developing, using and maintaining IT solutions. This work focuses on design science as applied to information systems and technology but it also includes examples from and perspectives of other fields of human practice. Chapter 1 provides an overview of design science and outlines its ties with empirical research. Chapter 2 discusses the various types and forms of knowledge that can be used and produced by design science research while Chapter 3 presents a brief overview of common empirical research strategies and methods. Chapter 4 introduces a methodological framework for supporting researchers in doing design science research as well as in presenting their results. This framework includes five core activities which are described in detail in Chapters 5 to 9. Chapter 10 discusses how to communicate design science results while Chapter 11 compares the proposed methodological framework with methods for systems development and shows how they can be combined. Chapter 12 discusses how design science relates to research paradigms in particular to positivism and interpretivism and Chapter 13 discusses ethical issues and principles for design science research. The new Chapter 14 showcases a study on digital health consultations and illustrates the whole process in one comprehensive example. Also added to this 2nd edition are a number of sections on practical guidelines for carrying out basic design science tasks, a discussion on design thinking and its relationship to design science and the description of artefact classifications. Eventually both the references in each chapter and the companion web site were updated to reflect recent findings.

**Design Science at the Intersection of Physical and Virtual Design** Jan vom Brocke, Riitta Hekkala, Sudha Ram, Matti Rossi, 2013-06-21 This book constitutes the refereed proceedings of the 8th International Conference on Design Science Research in Information Systems and Technology DESRIST 2013 held in Helsinki, Finland in June 2013. The 24 full papers, 8 research in progress papers, 12 short papers and 8 poster abstracts were carefully reviewed and selected from 93 submissions. The papers are organized in topical sections on system integration and design meta issues, business process management and ERP theory, development, emerging themes, green IS and service management, method engineering, papers describing products and prototypes and work in progress papers. **Design**

**Science Research Methods and Patterns** Vijay K. Vaishnavi,2007-10-30 Design research promotes understanding of advanced cutting edge information systems through the construction and evaluation of these systems and their components Since this method of research can produce rigorous meaningful results in the absence of a strong theory base it excels in investigating new and even speculative technologies offering

**Research Methodologies, Innovations and Philosophies in Software Systems Engineering and Information Systems** Mora, Manuel,2012-02-29 Philosophical paradigms theoretical frameworks and methodologies make up the answering and problem solving systems that define current research approaches While there are multiple research method books the subject lacks an update and integrated source of reference for graduate courses Research Methodologies Innovations and Philosophies in Software Systems Engineering and Information Systems aims to advance scientific knowledge on research approaches used in systems engineering software engineering and information systems and to update and integrate disperse and valuable knowledge on research approaches This aims to be a collection of knowledge for PhD students research oriented faculty and instructors of graduate courses

*The Routledge Companion to Management Information Systems* Robert D. Galliers,Mari-Klara Stein,Abayomi Baiyere,2025-06-02 The field of information systems has been evolving since the first application of computers in organizations in the early 1950s Focusing on information systems analysis and design up to and including the 1980s the field has expanded enormously with our assumptions about information and knowledge being challenged along with both intended and unintended consequences of information technology This second edition takes stock of the progress made in recent years and presents a forward looking perspective that can help to shape future scholarly conversations both in the field of information systems but also in cognate fields where information technology is having profound effects With the advances in digital technology such as artificial intelligence the Internet of Things cloud computing blockchain green tech and the like we herald a digital era and can envision a shift and a need for new logics new ways of thinking and new ways of engaging with digital technology now and in the near future As compared to the four themes in the previous edition this book introduces a fifth theme Digital Phenomena to specifically attend to contemporary issues and what is a pertinent agenda for future research This prestige reference work offers students and researchers a critical reflection on major topics and current scholarship in this evolving field with each chapter providing a balanced overview of current knowledge identifying issues and discussing relevant debates This book is required reading for any student or researcher concerned not just with the broad and expanding field of management information systems per se but all those in cognate disciplines interested in the impacts management and use of modern information technologies in organizations and modern society whether it be strategy organizational behaviour marketing sociology or the like This single volume repository deals not just with the current state of knowledge the current debates and the extant literature but also with questions concerning emerging management concerns and implications of the fast changing world of digital technologies

Journal of Management Information Systems ,2007

**Tailoring Software Infrastructures** Christian Dörner,2010 Today s non tayloristic work environments call for flexible work practices supported by dynamic IT systems Changing and optimising business processes has become an important adaptation mechanism in this context However process models cannot capture every conceivable real life situation and firms software infrastructures often do not provide the flexibility required for supporting design in use through effective tailoring processes The involvement of business users in the continuous redesign of business processes is a beneficial solution for these problems as it enhances decision processes by making specific information available more quickly However involving business users in these redesign processes requires specific design tools This book presents the development of an environment that enables business users to independently model business processes and workflows The environment reduces the technical skills required for modelling business processes and workflows to enable business users to tailor heterogeneous software infrastructures It also provides improved documentation facilities The facilities add usage related information about Web services to the existing functional metadata which is already included in current Web service standards and workflow modelling tools The environment enables business users to create this usage related information cooperatively which leads to a domain specific documentation of Web services Based on this information it provides an enhanced search system that identifies related services and service functions The evaluation of the environment showed that users had a positive perception of modelling business processes and workflows They considered this to be useful for the visualisation and automation of business processes as well as for the creation of calculations since it could enhance the efficiency and efficacy of their work

**Which Degree Guide** ,2001 *Software Education Conference (SRIG-ET '94)* Martin Purvis,1995

**International Journal of Computer Systems Science & Engineering** ,2005 **British Universities' Guide to Graduate Study** ,1993 Readings in Human-computer Interaction Ronald M. Baecker,William A. S. Buxton,1987 **CIAI Info Share** ,1989 **Which Degree in Britain** ,1999 A comprehensive guide to full time degree courses institutions and towns in Britain Proceedings of the National Science Council, Republic of China ,2000 *Subject Guide to Books in Print* ,1997 *Peterson's Guide to Graduate Programs in Engineering and Applied Sciences* ,1991 ASEE ... Profiles of Engineering & Engineering Technology Colleges ,1998

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