1. Record Nr. UNINA9910768453203321

Titolo	Handbook of Engineering Systems Design / / edited by Anja Maier, Josef Oehmen, Pieter E. Vermaas
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2022
ISBN	3-030-81159-X
Edizione	[1st ed. 2022.]
Descrizione fisica	1 online resource (1040 pages) : illustrations
Collana	Engineering Series
Disciplina	620 620.0011
Soggetti	Engineering design Technology - Philosophy Business information services Psychology, Industrial Economics - Sociological aspects Industrial management Engineering Design Philosophy of Technology IT in Business Work and Organizational Psychology Economic Sociology Industrial Management
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Introducing Engineering Systems Design: A new engineering perspective on the challenges of our times -- History of Engineering Systems Design Research and Practice -- Design perspectives, theories and processes for engineering systems design -- The Evolution of Complex Engineering Systems -- Sustainable Futures from an Engineering Systems Perspective.-Digitalisation of Society -- Systems thinking: practical insights on systems-led design in socio-technical engineering systems -- Technical and Social Complexity.-Human Behaviour, Roles, and Processes.-Risk, Uncertainty, and Ignorance in

Engineering Systems Design -- Properties of Engineering Systems.-Engineering Systems Design Goals and Stakeholder Needs -- Architecting Engineering Systems -- Data-Driven Preference Modelling in Engineering Systems Design -- Formulating engineering systems requirements -- Designing for Human Behaviour in a Systemic World -- Designing for Technical Behaviour -- Dynamics and Emergence: Case Examples from Literature -- Designing for emergent safety in engineering systems -- Flexibility and real options in engineering systems design -- Engineering Systems in Flux: Designing and Evaluating Interventions in Dynamic Systems -- Engineering Systems Integration, Testing, and Validation.-Evaluating Engineering Systems Interventions.-Research Methods for Supporting Engineering Systems Design -- Transforming Engineering Systems -- Asking Effective Questions.-Choosing Effective Means -- Creating Effective Efforts -- Ethics and Equity-Centred Perspectives in Engineering Systems Design -- Roles and Skills of Engineering Systems Designers -- Educating Engineering Systems Designers: A Systems Design Competences and Skills Matrix.-Engineering Systems Interventions in Practice -- Public Policy and Engineering Systems Synergy -- Transitioning to Sustainable Engineering Systems -- Engineering Systems Design: A Look to the Future.

Sommario/riassunto

This handbook charts the new engineering paradigm of engineering systems. It brings together contributions from leading thinkers in the field and discusses the design, management and enabling policy of engineering systems. It contains explorations of core themes including technical and (socio-) organisational complexity, human behaviour and uncertainty. The text includes chapters on the education of future engineers, the way in which interventions can be designed, and presents a look to the future. This book follows the emergence of engineering systems, a new engineering paradigm that will help solve truly global challenges. This global approach is characterised by complex sociotechnical systems that are now co-dependent and highly integrated both functionally and technically as well as by a realisation that we all share the same: climate, natural resources, a highly integrated economical system and a responsibility for global sustainability goals. The new paradigm andapproach requires the (re) designing of engineering systems that take into account the shifting dynamics of human behaviour, the influence of global stakeholders, and the need for system integration. The text is a reference point for scholars, engineers and policy leaders who are interested in broadening their current perspective on engineering systems design and in devising interventions to help shape societal futures.