Journal of Integrated Design and Process Science 26 (2022) 197–221
DOI 10.3233/JID-230046
IOS Press

Extended Editorial

Seeing the Past, Planning the Future:

Proudly Celebrating 25 Years of Assisting the Convergence of Process Sciences and Design Science

Imre Horváth[a,*], Thomas T.H. Wan[b,*], Jingwei Huang[c], Eric Coatanéa[d], Julia M. Rayz[e], Yong Zeng[f] and Kyoung-Yun Kim[g,*]

[a]*Professor Emeritus, the Faculty of Industrial Design Engineering, Delft University of Technology, Delft, the Netherlands*

[b]*Professor Emeritus, the School of Global Health Management and Informatics, the University of Central Florida, Orlando, FL, USA*

[c]*Southwestern Medical Center, University of Texas, Dallas, TX, USA*

[d]*Faculty of Engineering and Natural Sciences, Tampere University, Tampere, Finland*

[e]*Department of Computer and Information Technology, Purdue University, West Lafayette, IN, USA*

[f]*Concordia Institute for Information Systems Engineering, Concordia University, Montreal, Canada*

[g]*Department of Industrial and Systems Engineering, Wayne State University, Detroit, MI, USA*

Abstract. This Extended Editorial has been compiled by the members of the Editorial Board to celebrate the 25th anniversary of the establishment of the Journal of Integrated Design and Process Science, which operates as the Transactions of the Society for Process and Design Science. The paper divides in three parts. The first part provides a detailed overview of the preliminaries, the objectives, and the periods of operation. It also includes a summary of the current application-orientated professional fields of interests, which are: (i) convergence mechanisms of creative scientific disciplines, (ii) convergence of artificial intelligence, team and health science, (iii) convergence concerning next-generation cyber-physical systems, and (iv) convergence in design and engineering education. The second part includes invited papers, which exemplify domains within the four fields of interest, and also represent good examples of science communication. Short synopses of the contents of these representative papers are included. The third part takes the major changes in scientific research and the academic publication arena into consideration, circumscribes the mission and vision as formulated by the current Editorial Board, and elaborates on the planned strategic exploration and utilization domains of interest.

Keywords: Anniversary special issue, Journal of Integrated Design and Process Science, Society for Design and Process Science, objectives and history, current profile, future perspectives and concerns

*Corresponding author: Imre Horváth, Professor Emeritus, the Faculty of Industrial Design Engineering, Delft University of Technology, Delft, the Netherlands. E-mail: i.horvath@tudelft.nl. Thomas T.H. Wan, Professor emeritus, the School of Global Health Management and Informatics, the University of Central Florida, Orlando, FL, USA. E-mail: thomas.wan@ucf.edu and Kyoung-Yun Kim, Department of Industrial and Systems Engineering, Wayne State University, Detroit, MI, USA. E-mail: kykim@wayne.edu.

ISSN 1092-0617/$35.00

1. Preliminaries, inauguration, and objectives

Twenty-five years is a relatively long time in human contexts. It is approximately the time of subsequent generations, which covers all the developments from being born to maturing into an adult, a professional, a partner, a parent, a representative, and so forth. This obviously goes together with significant changes, achievements and successes, but sometimes also with failures and disappointments. In the case of an academic journal, a lifetime of twenty-five years can also be regarded as the time of maturation. Over 25 years, a journal can let its roots deep into the soil of its academic field of interest, can make itself known in the international publication arena, can build a decent professional reputation, and may become a premier discussion forum for the served community of authors and readers. The Journal of Integrated Design and Process Science (JIDPS) is one of those journals which have reached a respectable mature stage and has unquestionably contributed to what is called 'dissemination towards scientific self-correction' in its focus fields. The Journal has been published by IOS Press since 1999 (Link A – *listed in References under Websites*).

The unique identity of its profile comes from the commitment and determination of its editors to deal with the science of design and complex processes in an integral manner, and to capture the essence of disciplinary convergence, technology integration, and research synergies. In addition, the Journal faithfully mirrors the unceasing digital revolution with all pros and cons which are addressed by scientists, engineers, and other stakeholders. It must also be frankly mentioned that, over the 25 years, many turbulences caused by disruptive scientific developments, changes in the societal value system, the shift towards short-term societal goals, complexification of the research arena, revival and penetration of artificial intelligence into processes of daily life, the all-encompassing proliferation of digital/mobile communication, propagation of various forms of open access publication (Aguzzi, 2015), the competition between publishers and editors for input, and so forth, have been influencing the work of this Journal, as well as of others.

The Journal has been registered on many publication administration and review websites, such as (i) Web of Science, (ii) Academic Accelerator, (iii) Resurchify, and (iv) SCImago, and is indexed in (i) Clarivate (ii) Scopus, (iii) Academic Search Premier, (iv) ACM Digital Library, (v) Compendex, (vi) EBSC's E and S&T Collections, (vii) SciVerse Scopus, and (viii) Ulrich's Periodicals Directory. In 2021, the Journal was ranked #124 on over 299 journals related to the multidisciplinary engineering research field (Link C). Based on these, it belongs to the category of 'higher-quality journals', which feature both consolidated contribution and high impact. Over the years, the Journal published more than 550 papers, which included more than 490 peer-reviewed research, survey, and application papers. The Journal's impact factor in 2023 is 0.6. Given the transdisciplinary nature of JIDPS, the editorial board of the Journal is working hard to attract more attention from the academic and industrial communities to the critical themes of JIDPS, in particular, concerning the on-going paradigmatic shift associated with the new industrial revolution and the wide proliferation of intellectualized problem-solving systems.

Over a quarter of a century, the Journal has been serving as an internationally operating, archival, peer-reviewed technical journal publishing (i) full-length research papers, (ii) full-length review papers, (iii) distinguished opinion and position papers, (iv) accounts on scientific case studies, (v) reports on major design and process projects, (vi) insightful tutorials on design and process, (vii) design and process codes, standards and proposals, and (viii) critical retrospective and prospective studies. It has pursued the establishment of a broad repository of cutting-edge knowledge concerning transdisciplinary notions of design and process science in a rigorous fashion (Meyer et al., 2023). The Journal has published both regular issues and strategic special issues on a wide variety of transdisciplinary topics and issues. A unique feature of the Journal is that it releases papers for a public debate not only on investigations concerning naturally existing phenomena, but also on industrially, technologically, and socially created complicated research problematics the world is facing today (Tanik et al., 2021). These problematics

spread over an uncountable number of topics, including implications of informatization, application of the means of artificial intelligence, proliferation of complex systems in our daily life, and the exploitation of knowledge-intensive solutions in fields of paramount importance (Sharp & Leshner, 2014). In order to facilitate a successful tackling of complicated research problematics, the journal attempted to facilitate international knowledge exchange, even scientific collaboration.

In addition to deep theoretical and conceptual insights, the editors always seek for outstanding studies and results related to methodological and procedural frameworks, computational processing tools, mechanisms and algorithms, application methods and procedures, and expert positions and future visions. In order to safeguard high professional, presentation, and science communication values, various goal-preserving and quality insurance measures have been introduced. In this context, the Journal systematically and successfully amalgamates principles of design thinking, systems thinking, computational thinking, and pragmatic thinking. The review process involves multi-cycle assessments by peer reviewers to ensure that the novel principles, methods, tools, and applications of design and process science are correctly and constructively used in solving engineering, healthcare, educational, and other societal problematics and problems.

The past editorial teams of the Journal have updated the scope and objectives of the journal multiple times according to the observed changes in learning and knowing design and process science, and to the shifts of the conditions and endeavours of the societal, industrial, academic, and business environments. Concerning environments, the primary assumption has been that design activities happen and industrial products work in, for, and with particular environments, which can be natural, human, and built environments (or some combination of these, as an obvious result of disciplinary convergence) (Yang et al., 2020). A natural environment includes things like time, space, matter, natural resources, and natural laws in nature. A human environment is related to human physical, biological, rational, and emotional properties, as well as how they work together. A built environment consists of everything created by human beings, such as knowledge, technologies, tools, buildings, software systems, policies, laws, organizations, and so forth. It is strongly believed that, while conventional sciences often deal with well-defined subsets of these environments, transdisciplinary design and process science is concerned with all components of these environments and crosses the boundaries of these environments and their components, by means of integrating natural sciences, social sciences, and engineering sciences knowledge (Zeng, 2011). At the time of submitting their manuscripts, authors are required to identify which environment their submission is orientated to. In addition, they are also supposed to explain the types of environmental interactions they have dealt with, and the research, design, and other methods they have adopted and used. These help readers comprehend both the scientific novelty and the scientific contribution of their submission.

2. A concise historical overview

Having been established as the Transactions of the Society for Design and Process Science in 1997, the Journal, on the one hand, has been a flagship publication forum for SDPS. On the other hand, enjoying the support of its IOS Press publisher, has opened itself towards internationally-based science communication. SDPS was formed as a non-profit organization in the USA in 1995 to strengthen the relationships between science and engineering, research and practice, and corroborated and intuitive knowledge (Link B). A paper recently published in the Special Issue compiled by the executives of the Society has provided a birds-eye-view on the historical evolution of the Journal, as well as a bibliometric/scientometric survey of its achievements over the past 25 years (Horváth, 2021). This neutral but critical survey exposes facts concerning publication statistics, but also provides a deep insight into the nature of the overall scientific contribution of the Journal and the impacts of the published

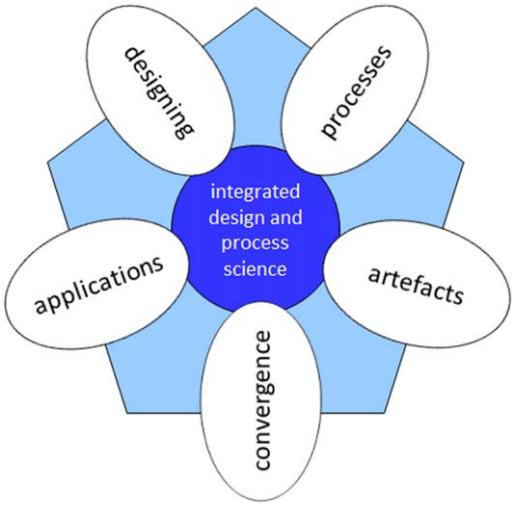

Fig. 1. The domains of interest identified by the mission statement (Horváth, 2021).

papers. In addition, it (i) offers a transparent classification of the published papers (ii), discusses the essence and relevance of their scientific contributions, and (iii) explores the major application fields and crossings over boundaries.

In the inauguration period, five generic attention fields have been identified by a policy document. These are shown in Fig. 1. The intention was to stimulate transdisciplinary design and process research over academic disciplines such as natural sciences, social sciences, mathematics, engineering, computer science, economics, management science, and health science. A decade and a half later, it has been extended to sustainability and educational sciences. Consequently, the survey completed in 2021 explored a remarkably broader range of domains of interest (DoIs). Based on a multi-step thematic sorting of the published papers, altogether 12 DoIs have been identified. A distinctive name was assigned to each of them, as shown in Fig. 2. The papers that could not be sorted into any one of these were included in a complementary one, called Supplemental.

The very first regular issue of the Journal was compiled from eight remarkable papers presented at the Second World Conference on Integrated Design and Process Technology. The common elements of these papers published in 1997 were interpretation and building transdisciplinary science, in particular from the perspective of integration of design and process science. More than 20 papers were published in the following five years, which have been cited many times as seminal road-paving contributions. After the years of successful introduction of the journal, the period of stabilization has come. The editors of the Journal have managed to call the attention of many authors to the new scientific issues they intended to address and managed to publish several seminal contributions. In this period, from 2002 until 2006, altogether 148 peer reviewed papers have been disseminated for public debate, and the total number of references to these papers has run above 500.

The next five years saw varying figures in terms of publications and citations – therefore, it has been referred to as the period of destabilization by Horváth, 2021). A total of 82 papers were published in four regular issues and the most cited paper appeared in 33 references in 2007. The fourth period lent itself to convalescing and produced favouring statistical figures. Altogether, 108 papers were published over five years and two of the papers could have more than 30 citations one year after their publication.

The last five years have been a period of unfolding. It is characterized by both a thematic consolidation (even strengthening) and a series of efforts towards road finding. The former can be seen as remarkable, the latter as indispensable with a view to the sudden and abrupt changes in the scientific

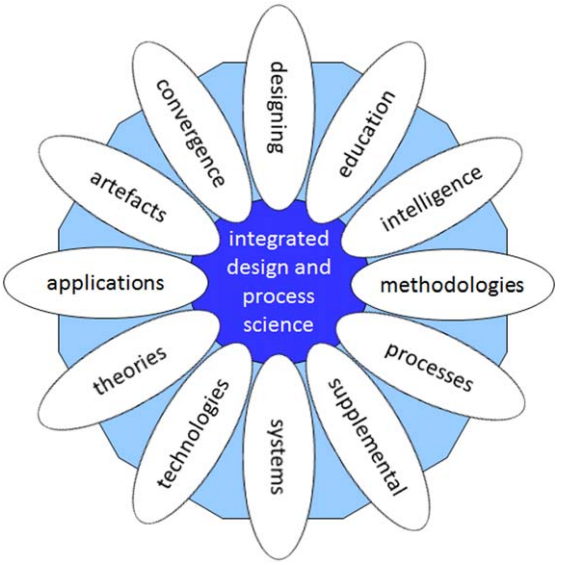

Fig. 2. The domains of interest identified by the recent survey (Horváth, 2021).

research and technology development arenas (Behrouzi et al., 2020). The papers published in this period exemplify the merging of design thinking, systems thinking, and computational thinking, and feature the dominance of complex heterogeneous systems as subjects studied in social contexts. Two anniversary special issues have been planned and published, concerning the 25th year of the establishment of the Society for Design and Process Science and the 25 years of the operation of the Journal, respectively. It may be interesting for the reader to learn that the largest number of papers have been published in the domains of design methodologies, design technologies, and practice of designing, but the number of papers addressing informatization, intellectualization, and intelligence of systems is rapidly increasing (Horváth, 2021).

3. Current application-orientated professional fields of interests

There have been four major professional fields of interests circumscribed that all concern the formation of disciplinary and technological synergies. These can be dubbed as: (i) convergence mechanisms of creative scientific disciplines, (ii) convergence of artificial intelligence, team and health science, (iii) convergence concerning next-generation cyber-physical systems, and (iv) convergence in design and engineering education.

According to its mission statement, the Journal aims at (i) establishing a transdisciplinary notion of design and processes, (ii) investigating both philosophical (theoretical) and practical (pragmatic) aspects of it, (iii) understanding design and processes across the boundaries of natural, human, and built environments, (iv) exploring efficient novel principles, methods, and tools, and (iv) facilitating the application of transdisciplinary design and process science to engineering, healthcare, and social life. Therefore, the first field of interest includes studies that contribute knowledge concerning (i) fundamental understanding and cognitive mechanisms, (ii) scientific, industrial, and educational positioning of design and creative processes, (iii) the involvement of humans, instrumentation, methodologies, and measures in design, (iv) the role of design in facilitating well-being and solving industrial, environmental, societal, human, etc. problems, and (v) the possible contribution of design to resolving complicated problematics.

Healthcare serves as a prime illustration of how principles and methodologies derived from design and process science can be applied (Cesario, 2009). When viewed through the lens of the Journal, the healthcare system can be understood as comprising personal factors, which pertain to the human system, and contextual/environmental factors, encompassing the natural and built systems. Consequently, the design of healthcare systems typically adheres to human-centred design (Giacomin, 2014), and evidence-based design (Ulrich et al., 2010) approaches. This alignment corresponds harmoniously with a design methodology known as environment-based design (Zeng, 2004), wherein human-centred design considers humans as integral components of the environment, while evidence-based design relies on evidence concerning the environment of healthcare systems. Integrative in itself, the second field of interest promotes and nurtures (i) the reciprocal interaction between health research and the disciplines of design and process science, (ii) the synthesis of bodies of knowledge of artificial intelligence and team science, (iii) the utilization of this in connection with health science, and (v) research and development efforts and results towards next-generation health systems (Li & Carayon, 2021).

The third field of interest has emerged in the palette of the Journal less than a decade ago as a dominant representative of disciplinary, technological, functional, architectural, and stakeholder integration (Horváth & Gerritsen, 2012). This field of interest covers (i) the fundamental mechanisms of knowledge synthesis in complex systems, (ii) overall problem solving processes and operations of cyber-physical systems, (iii) the trends of complexification, intellectualization, socialization, and personalization of cyber-physical systems, (iv) synthetic knowledge and ampliative processing mechanisms for intellectualized problem solving, (v) involvement of humans autonomous systems, design issues and challenges of self-organizing systems, and (vi) application examples and opportunities for distributed cyber-physical systems and system of systems (McKee et al., 2018). Triggered by novel technological affordances, large, even abrupt, changes are expected in this field already in the near future.

The fourth field of interest also features emerging transdisciplinary research perspectives, which are supposed to have a strong influence on the formation of education in the future. The convergence of disciplinary knowledge is posing the challenges of holism and transdisciplinarity for all levels and forms of education, whilst integrated technologies provide new means and alternative approaches for them (Camanho et al., 2023). This field of interest is strongly influenced by the recent developments of artificial intelligence research, whereas issues related to handling the information explosion, moving towards lifelong and autonomous learning, Internet-orientated transformation of education, holistic view on and comprehension of interlinked knowledge domains, operationalization of prognostic systems thinking, and many others, have remained open issues (Mayadas et al., 2009).

4. Invited works contributing to the current interest domains

In order to sample the papers in the various current fields of interest, a call for representative papers was released. From the submitted papers, the following ones were selected for the content of this Anniversary special issue (Table 1). Important to note that these papers do not completely cover the specified domains of interests. Notwithstanding, they exemplify topics that are close to the center of interest and represent remarkable professional and presentation qualities.

5. Convergence mechanisms of creative scientific disciplines

If ever, then in the 21st century there for sure will be a strong need for (i) cross-domain disciplinary fertilization, (ii) generation of synthetic knowledge, (iii) demolishing delineations among key technologies, and (iv) cross-domain research and innovation approaches (Phillips, 2019). However, a shift

Table 1
Invited representative papers contributing to the current interest domains

Field of interest	Title of paper	Corresponding author
Convergence mechanisms of creative scientific disciplines	An Investigation into the Development of Convergence Engineering	Murat Tanik
	Domain-Independent Design Theory and Methodology to Boost the Adoption of Design Methods	Yong Zeng
	A Prospective Analysis of the Engineering Design Discipline Evolution Based on Key Influencing Trends	Eric Coatanéa
Convergence of artificial intelligence, team science, and health science	Digital Engineering Transformation with Trustworthy AI Towards Industry 4.0: Emerging Paradigm Shifts	Jingwei Huang
	Convergence of Artificial Intelligence Research in Healthcare: Trends and Approaches	Thomas T.H. Wan
	Transdisciplinary Team Science in Health Research, Where Are We?	Lin Yang
Convergence concerning next-generation cyber-physical systems	Designing Next-Generation Cyber-Physical Systems: Why Is It an Issue?	Imre Horváth
	The Vision of Self-Evolving Computing Systems	Danny Weyns
	The Convergence of Computational Thinking, Computational Intelligence, and Multi-Agency	Duncan Anthony Coulter
Convergence in design and engineering education	Advancing Transformative STEM Learning: Converging Perspectives from Education, Social Science, Mathematics, and Engineering	Rebekah L. Elliott
	Prioritizing Actions and Outcomes for Community-based Future Manufacturing Workforce Development and Education	Karl R. Haapala

(a context change) is observable from information-based convergence to intellect-based convergence. The focus of the journal on scientific convergence with regard to design and process science is exclusive. This focus has played an important role from both theoretical and practical points of view in the past almost 25 years, and can be considered at least as, if not more, important in the next 25 years. In addition to dedication and perseverance, cultivation of this field assumes a sharp vision, mission, strategy, and a strong supporting society.

The paper by Michael Lipscomb, Murat Tanik, and Leon Jololian, titled 'An Investigation into the Development of Convergence Engineering', focuses on the development of techniques for promoting success in domain-diverse research, with a particular emphasis on "convergence engineering" - an approach that integrates life sciences and medicine with physical sciences and engineering. The authors present an exemplary history of domain-diverse research and identify several forms of such research. They cast a spotlight on convergence, which they propose as a problem-solving approach. They also propose the design process as an organizing framework for domain-diverse teamwork. Finally, they explore the need for research and training in forming and running such project groups. The paper references the 1991 book, Fundamentals of Computing for Software Engineers, which proposed that optimal artefacts and processes could not be developed out of a single discipline, and that the knowledge, tools, and techniques of diverse disciplines should be integrated to produce novel results. The authors provided an example of this by describing three separate teams that were given the same task of designing an embedded cruise-control system, with each team building a system based on their own expertise, resulting in non-integrated mechanical, electronic, and software systems. The paper also proposes two tools for creating common ground between participants of different domains: systems integration through abstract design, and combinatorics. The authors suggest that for domain-diverse research to be successful, a historical progression towards integration must be recognized. Overall,

the paper highlights the importance of domain-diverse research and the need for interdisciplinary collaboration and training in order to promote success in such work.

The next paper is contributed by Yuri Borgianni, Brian Dixon, Stephen Ekwaro-Osire, Oscar Nespoli, Joshua Summers, Thomas T.H. Wan, and Yong Zeng. Its title is: 'Domain-Independent Design Theory and Methodology to Boost the Adoption of Design Methods'. The authors discuss the challenges of implementing design methodologies in industrial product development. They argue that a universal approach to design methodology should be developed that can be adapted to specific design practices. The paper emphasizes the importance of design education, individual factors, and industry involvement in the development of a practical and effective design methodology. The paper highlights the need for designers to understand the importance of design methodology and its potential impact on the final product. The authors suggest that design education should focus on developing a thorough understanding of design methods and their application. The paper also points out that individual factors, such as personal creativity and experience, play a critical role in design methodology adoption. The paper concludes by stressing the importance of industry involvement in the development of a universal design methodology. The authors suggest that industry leaders should work with designers and design researchers to develop a practical and effective design methodology that can be implemented in industrial product development. Overall, the paper makes a valuable contribution to the ongoing discussion of design methodology and its potential impact on industrial product development.

The third invited paper in this field of interest addresses the topic of 'A prospective analysis of the engineering design discipline evolution based on key influencing trends'. Written by Eric Coatanéa, Hari Nagarajan, Suraj Panicker, and Hossein Mokhtarian, the paper examines the challenges faced by the design and manufacturing sectors due to various factors such as the predicted scarcity of energy and primary materials, the integration of electronic components and computing science, the production of data, emphasis on CO_2-free energy solutions, recycling and reuse, transformation of the consumption model, and geopolitical conflicts. These challenges require significant technological advancements to transform socio-economic practices, which can affect design and manufacturing activities. The article evaluates the potential impact of such transformations on the product design process and proposes modifications to current design practices to enable the development of a new generation of design tools. One important concept discussed in the article is bounded rationality, which acknowledges that rationality is often the exception rather than the norm in human decision-making processes. Another important concept is satisfaction, which involves finding feasible and pleasing solutions within specified time limits and using constrained resources. The article emphasizes the importance of early knowledge, which can provide crucial information during product development, but is often underutilized in current design practices. The article highlights the need for modifications to current design practices to enable the development of a new generation of design tools. It also emphasizes the potential impact of transformations on the product design process and identifies early design automation as a solution to cope with unmanageable cognitive load. Finally, the article discusses the potential services and functionality that will be offered by future design tools.

6. Convergence of artificial intelligence, team science, and health science

The Fourth Industrial Revolution is digitally transforming also the healthcare industry. Corresponding to Industry 4.0, Healthcare 4.0 is emerging (Li & Carayon, 2021). The central theme of this wave of revolution is to leverage trustworthy machine intelligence and team up advanced AI agents (such as LLM-based applications) with human professionals to provide better, more effective, and efficient healthcare services (Nishant et al., 2023).

Elaborated by Jingwei Huang, the paper titled 'Digital Engineering Transformation with Trustworthy AI towards Industry 4.0: Emerging Paradigm Shifts' discusses the fundamental changes brought by the fourth industrial revolution (4IR) and the crucial role of digital engineering transformation in this process. The 4IR is characterized by disruptive digital technologies, such as AI, IoT, cloud computing, high-speed wireless communication, and blockchain, that have led to a pervasive and profound digital transformation in almost every aspect of human society. The article argues that ubiquitous machine intelligence is the defining power brought by the 4IR, and digitalization is a condition to leverage it. Digital engineering transformation towards Industry 4.0 has three essential building blocks: digitalization of engineering, leveraging ubiquitous machine intelligence, and building digital trust and security. The article highlights the critical role of AI as a critical enabling technology in digital engineering transformation and the need for trustworthy AI to ensure the reliability, safety, security, privacy-preserving, fairness, explainability, traceability, transparency, and accountability of AI systems (Lenat & Marcus, 2023). The publishing of ChatGPT in late 2022 marks an unprecedented AI achievement and the large language models (LLMs) with potentially artificial general intelligence capabilities are becoming the new intelligence engine for AI systems (Link D). Integrating this new AI power with various engineering systems in the "built environment" will not only significantly increase the level of ubiquitous machine intelligence, but also automate and speed up digitalization. The rise of LLMs further strengthens various entities' competition for building intelligence in their systems to gain advantages in this new wave of industrial revolution. The rise of LLMs also raises a louder alarm about the necessity of trustworthy AI and digital trust (Lund, 2023).

The research questions emerging here are: (i) How do we design new systems in the new environment where large language models with potential artificial general intelligence capabilities pervasively exist? The issues are not only about how to use the new capabilities enabled by LLMs but also about how to interact with other systems equipped with such intelligent power. and (ii) How can we achieve trustworthy AI systems, both technically and ethically, in the era of artificial general intelligence facilitated by LLMs? The article also discusses the emerging engineering paradigm shifts in the 4IR and the relationship between the data-intensive paradigm and digital engineering transformation (Bone et al., 2029). Digital engineering is defined as the digital transformation in the field of engineering, and digital engineering transformation is about engineering paradigm shifts in the 4IR. The engineering design community is facing an excellent opportunity to bring the new capabilities of ubiquitous machine intelligence and trustworthy AI principles, as well as digital trust, together in various engineering systems design to ensure the trustworthiness of systems in Industry 4.0. Overall, the article provides valuable insights into the role of digital engineering and trustworthy AI in the 4IR and their potential to drive transformational changes in engineering and society as a whole (Cockburn et al., 2018).

Health has been defined by the World Health Organization as a complete state of physical, mental, social, and environmental wellbeing, not merely the absence of infirmity or disease. Provisioning public health services and establishing health systems not only offers several opportunities for disciplinary collaboration and transdisciplinary research, but also increasingly necessitates these. The need extends to investigating the dynamic nature of disease states observed in the longitudinal or multi-wave panel studies (Wan, 2002). With the prospective study data, investigators could assess the changing trajectories of health conditions, particularly in the study of chronic conditions. For instance, the polychronic disease research on transitional probabilities of disease such as Type 2 diabetes in transition. The collaborative research should explore the chronicity of diabetes evolving into multiple micro- and macro-vascular conditions. Clinicians would like to know how to intervene with the disease transition, when predicted changes in the disease could be empirically identified. As addressed below, the collaborative nature of team science also highlights the directions for developing physician-patient shared medical decision-making models (Wan, 2023). Hence, efficient and effective decision support systems

could be constructed by collaborative research teams and scientists from multiple disciplines. Both theoretically informed frameworks and methodological rigor are needed for highlighting the causal analysis of personal and social determinants of health.

Traditional epidemiological investigations on causal sequelae of disease or illness focus on detecting and identifying pathogenic sources of exposure or contamination. Because of the complexity of disease aetiologies under study, it is challenging to collect time relevant or time specific variables for performing causal analysis. Furthermore, the empirical investigation of disease processes or transitions has been hindered by the lack of theoretical domains that form the backbone of deductive research in health care. The questions surrounding the casual inquiry in health and healthcare may include the following: (i) Can a transdisciplinary research perspective guide the design of an integrative theory that will simultaneously consider relevant personal factors (i.e., micro-level variables) and contextual/environmental factors (i.e., macro-level variables) in the study of variations in health and health care at the national and global level? (ii) Should both time-constant and time-variant predictor variables be included in pursuing predictive modelling of the determinants of health? (iii) Are there robust data available that could capture health or healthcare in transition? (iv) What will be the most efficient way to solidify the effective use of existing national data from multiple countries in performing implementation science projects? and (v) Does team science enable the design of comprehensive studies that will capture the main effects as well as the interaction effects, from the interplay between the micro- and macro-level variables, in the pursuit of data science research projects?

In a comprehensive paper, Thomas T.H. Wan critically surveyed the current relationship of artificial intelligence and healthcare, and has systematically analysed the current and expectable impacts. The paper, titled 'Convergence of Artificial Intelligence Research in Healthcare: Trends and Approaches', first of all, identifies the trends and approaches to artificial intelligence (AI) research in healthcare. Wan argues that a value-based strategy requires the implementation of a patient-centred care system that benefits patient care outcomes and reduces costs of care. To achieve this, partnerships need to be established among academic scholars, healthcare practitioners, and industrial experts in software design and data science to enhance the formulation of theoretically relevant frameworks to guide empirical research and application, particularly in the search for causal mechanisms to reduce costly and avoidable hospital readmissions for chronic conditions. The paper emphasizes the importance of the convergence of multiple disciplines in the conduct of healthcare research. It highlights an example of implementing patient-centred care at the community level by employing AI research and informational technology.

Wan also stresses the need to pay special attention to human factors in delivering patient-centred care, including the use of information technology to identify and target population subgroups who are most likely to benefit from the use of innovative techniques, and utilizing knowledge-based information systems and technology to guide shared decision-making for patient care. Finally, the paper discusses the innovative collaboration needed to establish academia-industry partnerships for AI research and development in healthcare, which is essential to the improvement of quality and efficiency in care management practice. The Centers for Medicare and Medicaid Services (CMS) has launched projects for AI Health Outcomes Challenge since 2019 to predict unplanned hospital and skilled nursing facility admissions and adverse events. By partnering with the American Academy of Family Physicians and Arnold Ventures, CMS challenges researchers and practitioners to harness AI solutions to predict health outcomes for potential use in CMS Innovation Center's innovative payment and service delivery models.

Team science is not only progressing, but also becoming more influential. This is reflected by the paper by Lin Yang, Brittany Shewchuk, Ce Shang, Jung Ae Lee, and Sarah Gehlert, which has been contributed under the title 'Transdisciplinary Team Science in Health Research, Where Are We? The article argues that the complex nature of chronic diseases calls for a transdisciplinary approach to

research, which transcends discipline-specific methods and generates knowledge that is translatable into implementable solutions. The authors provide an overview of different forms of disciplinary collaboration, highlighting the limitations of multidisciplinary and interdisciplinary approaches in capturing the complexity of real-world problems. In contrast, transdisciplinary collaborations integrate different disciplines into a new intellectual space that advances population health. The authors discuss the nature of transdisciplinary collaborations and describe frameworks for developing a shared mental model in teams and evaluating transdisciplinary collaborations. They also highlight the role of team science in successful transdisciplinary health research and propose future research to develop the science of team science. The article cites cancer research as an example to illustrate the benefits of transdisciplinary collaborations.

The authors review transdisciplinary research projects funded by the US National Cancer Institute and show that transdisciplinary collaborations have led to significant advances in cancer prevention, detection, and treatment. The article concludes by arguing that a transdisciplinary approach to health research is essential for tackling the complex challenges posed by chronic diseases. The authors emphasize the need for more research to develop and evaluate effective transdisciplinary collaborations and to develop the science of team science. They also call for greater recognition of the value of transdisciplinary research in health policy and practice. Overall, the article provides a comprehensive overview of the benefits of transdisciplinary collaborations in health research and highlights the need for more research in this area. The authors make a compelling case for the value of transdisciplinary research in addressing the complex challenges of chronic diseases and provide practical guidance for researchers and policymakers seeking to develop effective transdisciplinary collaborations.

7. Convergence concerning next-generation cyber-physical systems

The paradigm of cyber-physical systems has been popular both in academic research and in industrial development. The Editorial Board of the Journal regards it as the first tangible outcome of integration of hardware, software, cyberware, knowledgeware, and brainware synthesis through integration of physical, cyber, virtual, social, and human technologies and knowledge into systems of complex functionality (Broy & Schmidt, 2014). This kind of manifestation of disciplinary convergence and the associated next-generation system design approaches (in which the systems themselves are also involved in their design and adaptation during runtime) have been nominated as a novel field of interest and concern for the journal, complementing the fundamentals, health, and education fields of computerization, informatization, and intellectualization.

While we are experiencing a relatively rapid paradigmatic evolution, researchers and developers are still struggling to (i) find a substantial common ground, (ii) develop a universal terminology and vocabulary, and (iii) propose a conceptual framework that captures the innate transdisciplinarity of CPSs. Paradigmatic evolution is jointly facilitated by novel technological developments and the aggregation of scientific knowledge. It can be expressed and measured in terms of the growing functionality, enrichment of the affordances, and increased cognitive abilities of this family of systems. As current directions of the paradigmatic evolution, (i) disciplinary complexification, (ii) functional intellectualization, (iii) contextualized socialization, and (iv) embodied personalization have been identified (Horváth, 2023a). Intellectualization increases the intelligence of CPS, and offers possibilities for socialization and personalization. At the same time, many researchers argue that the word “intelligence” has lost its meaning in the context of engineered systems due to its sloppy and confusing overuse to describe anything that shows a non-trivial operation or a sophisticated behaviour.

The members of the Editorial Board, together with the executives of the Society, share the view that by penetrating into the realms of bits, atoms, neurons, genes, and memes, CPSs will play an

even more important and influential role in the coming decades (Horváth & Tavčar, 2021). Though they cover only a limited part of the complete landscape of CPS development, implementation, and application, the three invited representative papers address current kernel issues of the discipline of cyber-physical systems. These concerns are (i) the design issues and challenges of next-generation cyber-physical systems design and realization, (ii) the issues associated with the underpinning self-evolving computing systems, and (iii) the issues of intellectualization of complex systems intended for use in human-in-the-loop applications. The three invited papers nicely complement each other, support a better understanding, and stimulate follow-up research activities in the discussed content dimensions and beyond.

Titled "Designing next-generation cyber-physical systems: Why is it an issue?", the paper by Imre Horváth discusses some major challenges involved in designing next-generation cyber-physical systems (NG-CPSs). He identifies the main reasons as (i) the shift of the CPS paradigm, (ii) the uncertainty related to the paradigmatic features of NG-CPSs, and (iii) the issues related to their run-time self-adaptation and self-evolution. He asserts that CPSs are the tangible results of the convergence of various technologies and sciences, including advanced information technology, nanotechnology, biotechnology, cognitive science, and social science, and are becoming increasingly complex. Additionally, the intellectualization, adaptation/evolution, and automation of CPSs, as well as the need for socialization and the exploitation of synthetic system knowledge produced by smart CPSs, further complicate their design. The author argues that interaction and cooperation with NG-CPSs should be seen from a multi-dimensional perspective, and that socialization of NG-CPSs requires more attention in research. The need for aggregation, management, and exploitation of the growing amount of synthetic system knowledge produced by smart CPSs is also addressed. The paper concludes by revisiting the limitations of forecasting and offering some reasonable propositions. The list of references includes selected seminal papers that underpin the argumentation of the author. Overall, Horváth provides a comprehensive overview of the challenges involved in designing NG-CPSs. He raises several important issues related to the intellectualization, adaptation/evolution, automation, socialization, and exploitation of synthetic system knowledge produced by smart CPSs. The paper presents a useful resource for researchers, developers, and managers interested in the design of next-generation cyber-physical systems.

The paper written by Danny Weyns, Thomas Bäck, Renè Vidal, Xin Yao, and Ahmed Nabil Belbachir under the title 'Vision of Self-Evolving Computing Systems', discusses the challenges of achieving sustainability in computing systems. One crucial aspect of sustainability is managing the complexity that arises due to ever-changing conditions these systems face. While smart computing systems can deal with many tasks autonomously, they can only handle anticipated changes, i.e., changes that occur within their operational domain. Unanticipated changes, such as anomalies outside their operational domain, the emergence of new goals or new technologies, require human-driven evolution of the computing system. With the ever-increasing complexity of computing systems and the continuous changes they face, human-driven approaches will eventually become unmanageable. The paper puts forward a vision for self-evolving computing systems, equipped with an evolutionary engine that enables them to evolve autonomously in response to unanticipated changes. The engine can integrate new computing elements that are provided by computing warehouses, providing specifications and procedures for their automatic integration. The paper outlines a conceptual architecture of self-evolving computing systems, illustrating the architecture for a future smart city mobility system that needs to evolve continuously with changing conditions. The paper highlights key research challenges in realizing the vision of self-evolving computing systems. Achieving this vision would break through the status quo of human-driven approaches and open up perspectives to major breakthroughs towards fully autonomous systems that operate in continuously changing environments.

Titled 'The convergence of computational thinking, computational intelligence, and multi-agency', the paper by Duncan Anthony Coulter, explores the intersection of three important concepts: computational thinking, computational intelligence, and multi-agency. The paper argues that complex systems tend to approximate multi-agent systems over time, and it is necessary to augment the current set of computational thinking competencies to include reasoning about multi-agent designs. The article also discusses the growing use of computational intelligence-based approaches to machine learning and data science related problem domains and how this necessitates a reasoned consideration of the intersection between those undoubtedly complex systems. The author suggests that multi-agent systems are a natural end point or strong attractor within the space of distributed systems development patterns. This means that complex system design approaches acquire the attributes of multi-agency over time. Multi-agent systems are composed of interacting sets of loosely coupled autonomous entities, and this design philosophy increases the modularization of complex system development, while the autonomy of each agent reduces the vulnerabilities brought on by central command and control architectures. The paper explores various software development patterns that are compatible with holonic multi-agency and considers the current skill sets required by software development workers and concomitant training activities focus on instilling computational thinking abilities, a set of related cognitive competencies useful in the development of such systems. Furthermore, the paper emphasizes that intelligent systems play an increasingly important role in modern development and often benefit from computational intelligence techniques for the purpose of parameter tuning. The paper also discusses the emergence of multi-agencies across a variety of related subdomains, and the key requirement for autonomy is increasingly implanted by way of computational intelligence techniques. Emergence in this context refers to the convergence of design principles to this common end state across a variety of sub-disciplines. Finally, the author suggests that while the development of such systems will require increasing use of computational intelligence techniques, the developers of such systems will increasingly need to exhibit computational thinking skills themselves. Overall, the article provides a valuable perspective on the intersection of computational thinking, computational intelligence, and multi-agency, and highlights the need for developers to be trained in these skills to create robust designs for complex systems.

8. Convergence in design and engineering education

The examination of design education is naturally fostering investigations into the cognitive and behavioural dimensions associated with design, learning, and collaboration as highlighted in the Design Education and Engineering Design special issue in 2017 (Kim et al., 2017) and the Design and Learning issue in 2022 (Altavilla et al., 2022). It predominantly revolves around addressing ill-structured problems, thereby introducing layers of intricacy into both the act of design and the process of design education. These hurdles often encompass fundamental design principles, tailoring, personalization, and specialized engineering considerations within specific domains. Enhancing proficiencies in multi-stage problem solving, for instance, can be attained by incorporating real-world challenges into the context of design problems. In advancing the knowledge in design education, scholars from diverse domains encompassing engineering design, the science of problem solving, education, psychology, engineering, business, and artificial intelligence have all played a role. Noteworthy among these are approaches rooted in various educational theories, such as project-based learning (PBL) (Blumenfeld et al., 1991), inquiry-based learning (Schwab, 1960), (Herron, 1971), discovery learning (Bruner, 1961, 2009), constructivism, and constructionism (Papert, 1996, 1998).

An emerging trend in engineering education involves the symbiotic interplay between learners and their learning environments through emergent intelligence. This dynamic offers valuable prospects

for both students and practitioners. In the forthcoming learning environments, integrating augmented human behaviour data acquired through bio-sensing and other sources within learners' surroundings will be imperative. For instance, manufacturing trainers, who presently function as monitors and direct controllers of cyber-physical systems (CPS), will be integrated into future CPS sensor networks as integral components, taking on roles as humans-in-the-loop (Nunes et al., 2015). These systems will provide cognitive support by learning and inferring human states, emotions, actions, and intentions. The challenge lies in establishing a symbiotic connection between these actively engaged workers and information systems, alongside data streams, to more effectively facilitate emergent intelligence and enhance learner performance within a connected built environment (Jacomini Prioli, et al., 2022). This endeavour necessitates a merging of expertise spanning various disciplines, including engineering, computer and information sciences, behavioural and social sciences, education, and learning sciences. For this special issue, two articles have been selected which exemplify the needs for convergence research in design and engineering education, specifically in advancing transformative STEM learning, and in reflecting on learning towards the realization of the new industrial revolution.

The paper by Rebekah Elliott, Carolyn G. Loh, Carolyn E. Psenka, Jennifer M. Lewis, Kyoung-Yun Kim, Karl R. Haapala, Donald Neal, and Gül E Okudan Kremer, addresses the important issue of 'Advancing Transformative STEM Learning: Converging Perspectives from Education, Social Science, Mathematics, and Engineering'. The authors discuss the need to broaden the participation of diverse young people and their communities in STEM education to generate solutions to local problems that have global implications. The authors argue that a transdisciplinary approach, bringing together the expertise of mathematics educators, social scientists, engineers, technologists, and community-based organizers, is vital for redefining what STEM is, who does STEM, and how STEM is accomplished. The paper presents a framework for designing place-based STEM education, driven by young people and families, which promotes data literacy and geospatial reasoning. The framework is centred on participatory community science, where youth and families are well-positioned to identify needs and problems, pose place-based questions, use a variety of tools, and create community-centred solutions that can be prototyped and iterated to address current and related future issues. The authors also emphasize the intersection of data literacy and geospatial reasoning as being critical to the everyday activities of learners and their families, and having a large impact on the quality of their lives. The framework is designed to provide more authentic, inclusive, and empowering learning opportunities that broaden youths' STEM participation. The paper concludes by discussing the underlying commitments, design principles, expected outcomes, and limitations of the framework. The authors encourage readers to consider applying the framework's ideas to an international context.

Building a workforce is an essential step towards the realization of a new industrial revolution. This stimulated the research completed by Karl R. Haapala, Kamyar Raoufi, Kyoung-Yun Kim, Peter F. Orazem, Christopher S. Houck, Michael D. Johnson, Gül E. Okudan Kremer, Jeremy L. Rickli, Federico M. Sciammarella, and Kris Ward. Titled 'Prioritizing actions and outcomes for community-based future manufacturing workforce development and education', their paper addresses this critical topic, reflecting the authors' long-term dedicated collaborative research and the converged opinions formed from a virtual research workshop at SDPS 2020. More specifically, this article discusses the challenges in developing high-skill career pathways for the manufacturing workforce, amidst concerns about labour displacement and skills shortages due to rapid innovations in manufacturing process technology, information technology, and systems technology. The article presents the results of a study that aimed to identify the key challenges in educating and training the current and future workforce and the specific activities required to design new manufacturing career pathways. The study analysed expert perspectives from industry and academia through two lenses: education (primary/secondary, technical, and university levels) and policy/innovation. The nominal group technique (NGT) was applied to capture these perspectives, enabling the generation of ideas followed by discussion and ranking by

the experts. The study found that the key challenges in developing high-skill career pathways for the manufacturing workforce include a lack of understanding of the manufacturing industry, a lack of awareness of the job opportunities available in the industry, a shortage of skilled workers, and a lack of collaboration between industry and education. In conclusion, the article emphasizes the need for prioritizing actions and outcomes in developing high-skill career pathways for the manufacturing workforce. The study provides a comprehensive framework for achieving this goal and highlights the importance of collaboration between stakeholders to address the challenges faced by the manufacturing industry.

9. Uncertainties concerning the future of scientific publishing

Science advances through many series of rich, scholarly dialogues and discussions, which can nowadays be hosted online by using the opportunities offered by the large number of digital communication and publication tools (Medina-Franco & López-López, 2022). On the website of the International Science Council (ISC), the following statement can be read: "The future of scientific publishing matters to everyone." (Link E). The authors of the publicly released article argue that "accessible publication of the results, data and ideas arising from research is a fundamental part of how science functions, how it advances, and how scientific evidence is used in different settings, from health care to disaster response to education." We cannot do anything but to agree with these and to express our beliefs that it remains so in the coming decades, even if the turbulence will not be less. We also believe that the Journal, together with many other committed journals, can profoundly contribute to these overall objectives. However, a lot has to be done to realize this mission and to serve the changing scientific interests. It has been the principle of editorial management that the Journal should not only stimulate research in holistic and converging manifestations of design, processes, and science, but should also underpin and facilitate knowledge generation about both the emerging notional fundamentals and the novel conceptual superstructures.

Looking into the future is always difficult and challenging, but it is especially complicated and uncertain in our accelerated era when there are so many emerging and intertwining developments (Yates et al., 2021). The effects of these are rather difficult to contemplate and account for. It is also known by the scientists and investigators that the academic publishing industry has got some wider problems, which are (i) partly associated with the uncertainties related to the shifting concerns, approaches, and evolution of science, and (ii) partly related to the issues caused by current and future technological developments and the unsettled principles of communicating science. The fact of the matter is that even the most frequently cited academic policy-makers and CEOs of scientific publishing houses are not completely aware of how to (i) resonate with the new knowledge environment, (ii) bridge the gap in understanding this complicated situation, (iii) address the current megalithic issues of academic publishing in the most promising manners, and (iv) embrace future opportunities and avoid emergent hazards. As far as the issues associated with the uncertainties related to the shifting concerns, approaches, and evolution of science are concerned, the past and current Editorial Boards extensively considered (i) the transdisciplinary developments and knowledge synthesis, (ii) the dialectic relationship of disciplinary convergence and divergence, (iii) the strong demand for cross-boundary research approaches and studies, and (iv) the importance guiding investigations and developments by the demands of application domains.

The Editorial Board is also aware of the deep concerns within the scientific community that contemporary publishing systems will fall far short of the needs of global science. In the next 25 years, this will most probably happen. According to the view of the ICS, "a small number of corporations control access to much scientific publishing - both for authors and readers. Currently, many institutions and

Fig. 3. Instead of an advertising board.

researchers are excluded from accessing articles that are hidden behind paywalls, and from publishing articles in journals at unaffordable fees. It can be frequently read that the existing scholarly publishing system is no longer meeting the needs of its main audience: researchers and the institutions in which they work." (Link E). In addition to being largely influenced by the exponential growth of published papers, proliferation of open access publishing, possibilities offered by digital repositories, diversification of the research themes, broadening international collaboration, debated measures of academic productivity, scientific publishing is and will be permeated by deviations towards business advantages, business orientated intentional manipulation of authors, uncompensated exploitation of reviewers, etc.

As far as the issues associated with the uncertainties related to the current and future technological developments are concerned, the Editorial Board is also aware of the problematics of authorship by AI tools (Fig. 3). It has already been experienced that AI systems and tools are increasingly used not only in thematic searches, proofreading, and/or language editing services, but also in topical compilation and textual development of documents (Curtis, 2023). As the quality of these generative systems and tools improves, it will be more and more difficult to tell their results from those generated by human authors. It raises many questions. Where does it lead to? No one knows the correct answer today. Notwithstanding, there are many efforts to regulate the involvement of AI tools in scientific publishing. The starting point of the most trustful and dependable explanations and activities has remained that responsibilities can only be attributed to humans.

In the sense that they are suspect to synthesize incorrect and incomplete contents and to generate biased and misleading conclusions, there is a risk associated with generative AI and other AI-assisted technologies. According to the position statement of COPE, "AI tools cannot meet the requirements for authorship as they cannot take responsibility for the submitted work. As non-legal entities, they cannot assert the presence or absence of conflicts of interest nor manage copyright and license agreements." (Link F). However, COPE has not excluded using AI tools as support means, but has stand up against fake papers and posited that "authors who use AI tools in the writing of a manuscript, production of images or graphical elements of the paper, or in the collection and analysis of data, must be transparent in disclosing in the Materials and Methods (or similar section) of the paper how the AI tool was used and which tool was used. Authors are fully responsible for the content of their manuscript, even those parts produced by an AI tool, and are thus liable for any breach of publication ethics". What it means is that there is a growing fundamental consensus that ChatGPT and similar AI tools should not be used uncritically in academic publishing. It must also be mentioned that the Editorial Board fully supports the position that AI tools should not be used to assist in the review, evaluation or decision-making process of any manuscript (Link G).

The above-cited position statements and regulations show that the international editorial community is aware of the fact that using AI chat-bots in the development of semantic contents and grammatically correct texts for submissions is a large challenge for journal editors because of the difficulties associated with (i) judging the originality of submissions, (ii) detect purely AI-generated text and images, (iii) shaping text patterns to reduce similarity and plagiarism, and (iv) creating uncertainty concerning the validity of the propositions and proposed future work. In view to the functional development of AI tools, it is yet undecided how AI errors, ambiguities, and plagiarism should be detected and filtered out reliably, beyond the current direct rejection policy which is preferred by some publishers with regard to the outcomes of generative pre-trained transformers (Hill-Yardin et al., 2023). Shall an artificial intelligence-based textual document developer software control the goal of its own content generation process, and check the outcome for compliance, trustworthiness, and usefulness? (Gendron et al., 2022). Or, should we change our human-style of writing academic papers in order to make them more distinguishable from AI-software generated texts? Should we use AI-power exclusively only in reviewing, surveying, comparing, and extracting past publications, but not is compiling genuine scientific reports (although many believe that AI will catch up in this regard too in a foreseeable future)? (Wang & Xu, 2023). Should we prevent accessing the authors personal publication record or digital correspondence in order to restrict AI tools to sophisticatedly personalize scientific communications? Which are the humans who are to be blamed or not when AI tools end up with incorrect or improper opinions, or put forward unaccountable decisions? Many unanswered questions and issues . . . These all together increase the need for human alertness, professional knowledge, ethics and faith, and up-to-date-ness.

10. Mission and vision in a dynamically changing world

Supradisciplinary research has emerged as a new doctrine of combining monodisciplinary, interdisciplinary, multidisciplinary, and/or transdisciplinary research approaches from epistemological, methodological, and procedural perspectives (Dube, 2021). There are efforts in the literature to develop a generic methodology and procedural frameworks to facilitate the practical execution of supradisciplinary research programs, crossing and eventually demolishing disciplinary boundaries (Horváth, 2023b). On the one hand, the activity scenarios and procedural frameworks of supradisciplinary research are supposed to specify the major concerns that have to be taken into consideration in a systematic manner at developing executional scenarios for supradisciplinary research. On the other hand, the integrative frameworks should facilitate (i) management of research organization tasks, (ii) joint formation of shared research infrastructure, (ii) setting up concrete research program, (iii) academic partnering and public stakeholder involvement, (iv) process flow management and capacity/competence allocation, (v) a holistic knowledge synthesis, assessment, and consolidation, and (vi) development of tools supporting the preparation and execution of large-scale supradisciplinary research.

The experiences gained over the years and the available results of various studies provide a proper starting point for the Journal for continuation. Very soon, based on a forerunning public discussion, concrete (partially novel) interest domains will be proposed by the Editorial Board. These will provide a unique opportunity for researchers to engage in cross-disciplinary dialogues, build networks for future collaborations in various frameworks of supradisciplinary research, and share and exchange ideas in the form of publicly compiled, fed, and curated publications, in addition to the traditional prescription-based and open access-based ones. Reaching beyond the academic audience (authors and readers) will also be an important action to get public players on board. Besides raising public awareness, organized efforts will be made to reach out to Ph.D. students, who are supposed to form the next generation

of authors, reviewers, advisors, etc. for the Journal, in addition to providing equal opportunities and bringing together leading international scholars and early career researchers from various disciplines and countries (Stern & O'Shea, 2019).

In the coming decades, not forgetting about its direct and strong ties to the Society for Design and Process Science, the Journal will be striving after a more global inclusivity by offering a forum for all professionals interested in novel manifestations and comprehension of design and knowledge-intensive processes, and intend to put these into up-to-date scientific perspectives, theories, methodologies, and practices. While there is due recognition of the facts that academic publications may be submitted in many different conceptual, cultural, and linguistic varieties, and that the estimation or evaluation of scientific values as well as the expectable practical impacts offered by research work and results are getting more complicated in the lack of a common metric of excellence, the pragmatic goal will be to circulate enabling ideas, research data, and practical evidence freely, quickly, openly, and efficiently for scrutiny, application, and re-use (Shah, 2022). And here is where the academic publisher may offer its brand as a major attractor for stakeholder cooperation and as a simple indicator of guaranteed quality.

The Editorial Board is committed and determined to contribute to the formation of the next 25 years of the existence of the Journal. The editors intend to be an informed broker between content submitters, content reviewers, and content utilizers, but also a direct contact and advisor to the academic publisher. They will seriously consider a new business model that better corresponds to the time after 2030. Though the professional interest domains can be only tentatively circumscribed for orientation, but not be exhaustively and selectively specified due to the above discussed matters, the editorials and contents of the published regular and special issues will inform the potential authors about what consolidated and emergent topics are considered relevant and are expected for the Journal. Summary information will also be provided on the Journal's website. The Editorial Board intends to make intense efforts to build a wide and devoted community beyond the scope of SDPS, to further develop and significantly extend the range of its stakeholders, including authors, reviewers, readers, and academic advertisers. It is also a concern of the Editorial Board how to facilitate manuscripts that carry the potential of becoming a highly cited paper, and how to reduce the number of non-cited papers. More attention will be given to virtual presence on public media and social spaces, since the observation is that potential authors turn increasingly to social networks and online sources for their inspiration and orientation.

The Editorial Board is also committed to ethical conduct and consideration of concerns. The explosion of submitted papers, and the unceasing demand from authors for short turn-around times have been putting the traditional paper submission systems and peer review systems under strain (Schulz et al., 2022). This is intertwined with the daily operations of an uncountable large number of predatory publishers, which are benefiting and exploiting the increasing demand by providing non-scrutinized routes to easy publication (Boukacem-Zeghmouri, 2023). The Editorial Board resonates with the assumption and/or observation that a "publish first and curate second" approach to publishing would be a strong alternative to the current quality assurance system and mechanism in our rapidly changing and further accelerating disciplines. According to this thinking model, multi-disciplinary curation occurs after publication, incorporating public community feedback as well as specialized expert judgment to consolidate articles for target audiences and to evaluate whether the contributed scientific work has stood the test of collective opinion and time. Papers strongly consolidated this way (i.e., having a high number of reflections) can be regarded as subjects of follow-up references and as truly valuable contributions to multiple scientific disciplines.

Stern and O'Shea (2019) claimed that the traditional journal approach of selecting papers before publication strikes us as outdated because it is often slow, costly, and harmful for science. It is slow and costly for authors and funders, because cycles of rejection and revision need time and demand human and computing resources that may improve articles, but also create obstacles with a view to advancing science in new directions. This concept of crowd curation is in line with the framework of

Mode 2 science, which (i) is often seen a new paradigm of socially distributed knowledge production, (ii) has a pluridisciplinary, collaborative, and application-oriented nature, (iii) is the subject of multiple accountabilities, and (iv) is typically considered in technological, social, political, and economic contexts (Gibbons, 2000). Crowd curation favours publishing forums with high international visibility and transdisciplinary curiosity, but probably needs a robust change in the mental models and attitudes (Askalidis & Stoddard, 2013). Analytic and prognostic systems thinking also plays an important role in practicing Mode 2 science. In this context, systems thinking (i) explains the manifestation and behaviour of systems as a whole, (ii) is dominated by abstraction and synthesis, and (iii) studies emerging and relational properties. It is supposed to be extended to the human behavioural domains (cognition, communication, leadership, etc.) (Heimeriks et al., 2008).

11. Planned editorial actions and domains of exploration/utilization

Peer-reviewed publishing was, is, and will remain a vital aspect of academic enterprise and life, accompanied by a clearly observable increase in the number of journals, magazines, and repositories (Price & Flach, 2017). The Journal will continue pursuing its own unique identity. But is this possible at all in the current war-field of academic publishing briefly described above? Thousands of other international and national journals are striving for academic vitality and business stability, and many predatory journals are also active in the hope of immediate financial advantages, rather than of well-deserved academic respect. Recognizing the novel expectations of Mode 2 science (Lenhard et al., 2006), many journals are aiming at similar objectives as JIDPS. Therefore, it has been considered that uniqueness may not be the only right objective for the Journal – striving after quality and impact seem to be more proper and advancing goals. Since the embedding scientific environment is rapidly changing, the Journal should prefer having a non-classical editorial policy as well as a topical spectrum which can be dynamically, but critically, adapted to the lasting trends, and which can offer multiple forms for reporting on (i) foundational scientific issues, (ii) research phenomena and problematics, (iii) empirical and theoretical results, (iv) engineering concepts and implementations, and (v) thoughts about matters beyond these.

In order to have a higher impact, the total number of papers published in a year should be increased significantly, while maintaining the rigor and turn-around times in reviewing and preparation for publication. Therefore, it is planned to increase the yearly number of regular and special issues in the coming decade. A gradual increase in the rejected/accepted manuscript ratio will also be attempted with the goal of achieving a one-to-five or one-to-six ratio. It is deemed to be of paramount importance to increase the international visibility and reputation of the journal in close collaboration with, and supported by, the publisher of the Journal. Evidently, achieving the above editorial goals needs not only a very high level of commitment, but also a 'thinking out of the box' mentality from all members of the Editorial Board of the Journal. They must consider the sheer fact that not only the conceptual and methodological framework of scientific research is changing, but also the manifestation of the subject of research (De Silva & Vance, 2017). The former change is characterized by the gradual integration of monodisciplinary, interdisciplinary, multidisciplinary, and transdisciplinary research into supradisciplinary research, involving the recent results of team science and knowledge science. The latter is mainly characterized by the gradual shift of research from naturally-based research phenomena through industrially- and socially-created research problematics to complex and complicated, large-scale, research challenge manifestations and solutions.

Likewise, proliferating developments such as multi-level open access, digital repository-based publishing, and artificial intelligence-supported content generation are already impacting severely on the principles and value system of traditional publishing practice (Jähne, 2021). As discussed by Kelty

et al., (2008), another development that is completely changing the landscape of scientific publishing is the open-ended post-publication review, which is bound to upend the process by which scientific reports are judged and rated. Since these all have a (constructive) design component and a (managing) process component, the journal may significantly contribute to addressing these challenges and to arriving at knowledge of promising solutions. The everywhere observed rapid growth of activities and outcomes is becoming problematic, not only from the aspect of maintaining sufficient editorial knowledge of the evolving individual fields, but also of finding the best peers, authors, reviewers, criteria, measures, implications, and so forth.

As far as concrete disciplinary interest domains are mentioned, the following topics will remain in the focus of interest: (i) fundamentals, theories and mathematical models of designing, in particular with a view to complex artefactual systems, (ii) convergence and synthesis of knowledge in creative processes, (iii) delegating design tasks to self-adaptive, self-evolutionary, and self-reproducing systems, (iv) handling innate complexities in design and processes, (v) intellectualization, socialization, and personalization of application-specific systems, (vi) mega- and meta-modelling in design and processes, (vii) utilizing the results of artificial intelligence research and taming the impacts in design and processes, (viii) cognitive, brain and behavioural science in creation and innovation, (ix) computing enablers and reasoning mechanisms for design and processes, (x) utilization of computational, collective, and synthetic intelligence in design and processes, and (xi) management of transdisciplinary research, systems development, and education related to design and processes.

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Author Biographies

Imre Horváth, C.Dr.Sc., Ph.D., dr.univ., studied mechanical engineering and engineering education at the Technical University of Budapest, Hungary. He was affiliated with the GANZ Hungarian Shipyards and Crane Factory until 1984. He had various faculty positions at the Budapest Technical University, Hungary, until 1996. He was a chair professor at the Faculty of Industrial Design Engineering of the Delft University of Technology, the Netherlands, from 1997 until 2021, focusing on the issues of advanced design support, and later on cognitive engineering of smart cyber-physical systems. He is now a professor emeritus. He has coached and promoted more than 25 Ph.D. students. He has published 114 articles in international journals, been involved in authoring 10 books, edited 16 books, written 34 book chapters, and published 258 conference papers as a first author or as a co-author. He was secretary, conference chair, chair, and past-chair of the Executive Committee of the CIE Division of the American Society of Mechanical Engineers in the period of 2003 and 2008. He is a public member of the Design Engineering Division of the Hungarian Academy of Sciences, a fellow of ASME, a fellow of the Society for Design and Process Science, and a member of the Royal Dutch Institute of Engineers. He has received two honorary doctor titles, the ASME lifetime achievement award, and the Pahl-Beitz ICONNN award. He has served several international journals as editor and is involved on advisory boards. He is the initiator of the International Tools and Methods of Competitive Engineering (TMCE) Symposia. He has contributed to the organization of more than 20 international conferences and has been invited as a keynote/plenary speaker multiple times. His current research interests are in systematic design research methodologies, intellectualization of cyber-physical systems, and the science of synthetic knowledge of intellectualized systems.

Thomas T.H. Wan, Ph.D., MHS, is a professor emeritus of the School of Global Health Management and Informatics at the University of Central Florida (UCF). Currently, he is a visiting distinguished professor of the Department of Healthcare Administration and Medical Informatics at the Kaohsiung Medical University in Kaohsiung, Taiwan. He received the A.B. degree from Tunghai University in 1965. He earned his Ph.D. in Sociology and Demography at the University of Georgia in 1970 and received the MHS degree in public health from Johns Hopkins University in 1971. In the past fifty years, he has been on the faculties of Cornell University, University of Maryland Baltimore County, Virginia Commonwealth University, and UCF. His research expertise includes healthcare informatics, population health management, long-term care research, and health systems analysis. He received a major NIH research grant to assess Affordable Care Act on rural health disparities and outcomes, a research grant from the Pabst Foundation for evaluating the use of a web-based artistic toolkit for reducing caregiving burden for caregivers of Alzheimer and related disorders, and a research grant from the Florida Hospital Creation Health Center to perform systematic review and meta-analysis of human factors influencing therapeutic outcomes of polychronic conditions. The effectiveness of care management innovations and practice for chronic diseases can be understood and achieved by modifying risk factors for avoiding readmissions. In 2021, he and Dr. Raj Gurupur earned an U.S. Patent for Heart Failure Readmission Evaluation and Prevention Systems and Methods. He has published a total of 14 books, 233 articles, and 28 book chapters. He is a co-editor-in-chief of the Journal of Integrated Design and Process Science.

Jingwei Huang, Ph.D., is a Data Scientist at University of Texas Southwestern Medical Center. His current research focuses on two pivotal fronts: the development of on-premise Large Language Models (LLMs) and the application of LLM-fuelled trustworthy AI systems in the domain of Digital Health. Dr. Huang's research expertise is across Trustworthy AI Systems, Big Data, Digital Trust, Digital Transformation, and Systems Engineering. In recent years, he has been actively engaged in the advancement of Digital Systems Engineering. His on-going research leverages digital health as a propulsive force to catalyse the evolution of Digital Systems Engineering. Contact him at jingwei.huang@gmail.com.

Eric Coatanéa, Ph.D., received his BS degree in Mechanical Engineering from the University of Western Brittany, Brest, France in 1990, his MS degree in Mechanical Engineering from INSA Toulouse, France in 1993 and his teaching certificate from Ecole Normale Supérieure de Cachan, France in 1994. He worked for 11 years as a lecturer in manufacturing engineering at the University of Western Brittany, Brest, France, while remaining active in athletics. He started joint doctoral studies in 2002 and received his joint PhD in Mechanical Engineering from the Helsinki University of Technology, Finland (now Aalto University) and the University of Western Brittany, Brest, France in 2005. He is a tenured professor of manufacturing engineering and systems engineering at the Faculty of Engineering and Natural Sciences, Tampere University, Finland. He was a Marie Curie fellow from 2005 to 2007. He has been a visiting professor at several universities. He leads the Manufacturing Research Group at the University of Tampere. His research interests include design and manufacturing activities, engineering design, causal inference, systems thinking and systems engineering. In particular, the research focuses on the early integration of simulation and decision support tools in the early design phases.

Julia M. Rayz, Ph.D., is a Professor and an Associate Department Head in Computer and Information Technology and a University Faculty Scholar at Purdue University. She earned her Ph.D. in Computer Science and Engineering in 2008, following an M.S. in Computer Science in 2004, and B.S in Computer Science as well as a B.A. in Mathematics, both in 1999, all from the University of Cincinnati, Ohio, USA. In addition to her academic career, Dr. Rayz worked as a software engineer, research engineer and a consultant for ontological semantic technology for close to 10 years. She has published over 150 papers in artificial intelligence, computational humour, computational semantics, fuzzy logic, information security, and robotic communication and intelligence. She has served on the editorial boards of European Journal of Humour Research and Journal of Integrated Design & Process Science, as well as consulting board of HUMOR: International Journal of Humor Research. Dr. Rayz is a Board Member of the North American Fuzzy Information Processing Society and a director of the Applied Knowledge Representation and Natural Language Understanding (AKRaNLU) Laboratory at the Computer and Information Technology Department, Purdue University. The lab's activities in natural language are funded by various government agencies and companies.

Yong Zeng, Ph.D., is a professor in Information Systems Engineering at Concordia University, Montreal. He is also an Adjunct Professor in the Department of Community Health Sciences at the University of Calgary. He is the President of the Society for Design and Process Science. He was NSERC Chair in aerospace design engineering (2015–2019) and Canada Research Chair in design science (2004–2014). Dr. Zeng researches creative design by developing and employing mathematical and neurocognitive approaches. He has proposed Environment-Based Design (EBD), addressing the recursive nature of design and the role of mental stress in designer creativity. He applies the EBD to the aerospace industry, medical devices, human resource management, municipality, teaching and learning, and health.

Kyoung-Yun Kim, Ph.D., is a professor in the Department of Industrial & Systems Engineering at Wayne State University, where he directs the Computational Intelligence and Design Informatics (CInDI) Laboratory. Dr. Kim's research focuses on design science; design informatics; semantic assembly design; welding and joining; and smart manufacturing. He has received external funding from federal agencies, including NSF, NIST, DMDII & MxD, NIDRR, VA-CASE, DOD, and DOE, and several industry partners. He is the Director of the Smart Manufacturing Demonstration Center (SMDC) and a Site Director for the NSF Industry and University Cooperative Research Center (I/UCRC) for e-Design. Dr. Kim is a Fellow of the Society of Design and Process Science and currently serves as Editor-in-Chief of the Journal of Integrated Design and Process Science. He received the top-cited article award (2005–2010) from Journal CAD and the 2003 IIE Transactions Best Paper Award. Google Scholar selected one of his articles as Classics in Manufacturing and Machinery. Dr. Kim served as the General Chair of FAIM 2022 (31st International Conference on Flexible Automa-

tion and Intelligent Manufacturing). The conference theme was Human-Data-Technology Nexus in Intelligent Manufacturing and Next Generation Automation. Dr. Kim was an invited professor at Université de Technologie de Belfort-Montbéliard (UTBM), France, in 2017 and was a visiting professor at Kyung Hee University, South Korea, in 2014.