Artificial Intelligence for Engineering Design, Analysis and Manufacturing

cambridge.org/aie

Special issue: knowledge engineering and management applied to sustainability and innovation

Nada Matta[1], Tatiana Reyes Carrillo[1], Eunika Mercier-Laurent[2] and Danielle Boulanger[3]

[1]ICD, UTT, 12 Rue Marie Curie, 10004 Troyes Cedex, France; [2]CReSTIC, URCA & IFIP, 9 bd Paix, 51100 Reims, France and [3]Jean Moulin University, 6 cours Albert Thomas, 69008, Lyon, France

Introduction

Cite this article: Matta N, Reyes Carrillo T, Mercier-Laurent E, Boulanger D (2019). Special issue: knowledge engineering and management applied to sustainability and innovation. *Artificial Intelligence for Engineering Design, Analysis and Manufacturing* **33**, 114–116. https://doi.org/10.1017/S0890060419000167

Author for correspondence:
Nada Matta, E-mail: nada.matta@utt.fr, tatiana.reyes@utt.fr

Scope of the special issue

Innovation needs the knowledge to succeed and generates various impacts including environmental. Many research works have been done in separate disciplines, such as design and ecodesign, manufacturing, logistics, ecology, economy, artificial intelligence, knowledge management, complex systems, and others.

The consideration of environmental issues in product/service development can modify the whole process: objectives, outputs, resources, processes, and performance indicators of a company. Sustainable design and production considering renewable materials, recycling, energy optimization, and design for transition connected with economic and social objectives (implications for stakeholders, sharing knowledge, considering cultural, and social aspect, etc.) are more or less considered in a proactive or prescriptive way. These approaches lead to the development of innovative solutions (circular economy, hybrid energy production, etc.). We can note that sustainable production and consumption join the environmental innovation logic, allowing reducing material, energy, and emissions impact in the whole life cycle of the product or integration sustainable business models (product service system, design for sustainable social innovation, etc.). Even some criteria are integrated for sustainability but the application of these criteria is still not common or evident in industries.

A large number of works from various disciplines point out the need for managing complex and multidisciplinary knowledge related to sustainability and deep understanding of the relationships between all contributing components to sustainability study. Noting also works focus on transforming this knowledge into economic and social values and learning sustainable behaviors and culture. Knowledge engineering and management approaches and techniques have been successfully applied for design, manufacturing, medicine, crisis management, and many others. The complexity of these domains guides the definition of new paradigms to structure and use knowledge, especially on innovation. Several knowledge management methods have been proposed and applied to enhance organizational innovation, which is considered one of the important processes in companies.

The objective of this special issue is to gather contributions from both researchers and practitioners to discuss methodological, technical, and organizational aspects; feedback from the application of knowledge engineering; and management techniques to sustainability and successful innovation (Fig. 1).

Main topics

The articles in this issue are organized according to these main topics:

- Knowledge engineering and management methods, techniques and tools
- Design, manufacturing and logistics characterization
- Eco-innovation systems, process, support and applications
- Renewable energies
- Collective and Collaborative Intelligence
- Knowledge modeling and visualization methods and tools
- Collection and processing of Best Practices
- Knowledge Authoring and Knowledge Markup
- Web2.0 and the Semantic Web
- Provenance, Reliability and Trust
- Consistency, Coherence and validation of multiple knowledge sources
- Information and knowledge sharing systems and applications
- Learning systems: education and Training systems
- Creativity enhancing systems

© Cambridge University Press 2019

CAMBRIDGE UNIVERSITY PRESS

https://doi.org/10.1017/S0890060419000167 Published online by Cambridge University Press

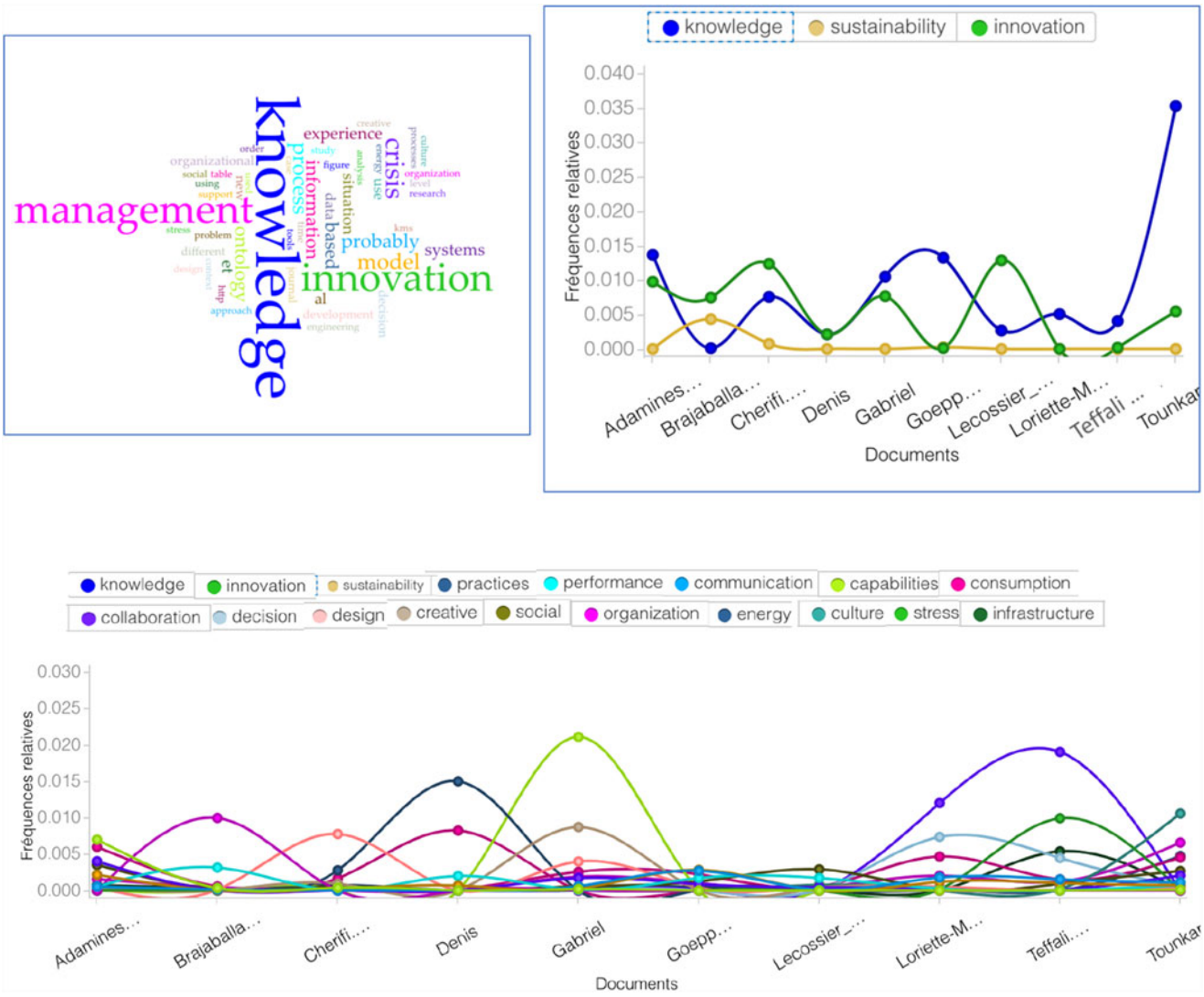


Fig. 1.

- Decision making support systems and tools
- Economic factors and characterization
- Human factors and social computing
- Knowledge discovery: Datamining, Textmining, ImageMining, Deep learning
- IoT and mobile applications
- Intelligent Platforms for e-services and e-business
- Applications, Industry 4.0, energy, transportation, …
- Complex systems and 4P-factory

Guest editors

- **Nada Matta (in Chief)**, University of Technology of Troyes (ICD/Tech-CICO), France
- **Eunika Mercier-Laurent (in Chief)**, CReSTIC, University Reims Champagne Ardennes, France and IFIP
- **Tatiana Reyes (in Chief)**, University of Technology of Troyes (ICD/Tech-CICO), France
- **Danielle Boulanger (in Chief)**, Jean Moulin University, Lyon 3, Lyon, France

Scientific committee

- Frederic Andres, National Institute for Informatics, Japan
- Ansgar Bernardi, German Research Center for Artificial Intelligence, Germany
- Eric Bonjour, University of Lorraine, France
- Danielle Boulanger, Jean Moulin University, Lyon 3, Lyon, France
- Abdelaziz Bouras, Qatar University, Qatar
- Faïez Gargouri, ISIM Institute, Tunisia
- Virginie Goepp, University of Strasbourg, France
- Knut Hinkelmann, University of Applied Sciences, Switzerland
- Edurne Inigo, University of Deusto, Spain
- Celso Juan Flores, Crealibre, Mexico
- Dimitris Karagiannis, University of Vienna, Austria
- Inaya Lahoud, Galatasaray University, Istanbul, Turkey
- Daniel O'Leary, USC Marshall Business School, USA
- Xiayuo Ma, Xidian University, China
- Eunika Mercier-Laurent, CReSTIC, University Reims Champagne Ardennes, France and IFIP
- Mieczyslaw L. Owoc, Wroclaw University of Economics, Poland

https://doi.org/10.1017/S0890060419000167 Published online by Cambridge University Press

- Nada Matta, University of Technology of Troyes (ICD/Tech-CICO), France
- Davy Monticollo, University of Lorraine, France
- Tatiana Reyes, University of Technology of Troyes (ICD/Tech-CICO), France
- Hilda Tellioglu, Vienna University of Technology, Austria
- Hatem Ben Sta, Université of Laval, Canada
- Thierno Tounkra, Telecom Institute, France
- Menaour Brahami, University of Oran, Algeria
- Andreas Riel, INP Grenoble

Papers overview

Papers show in this special issue different dimensions to deal with innovation, knowledge management, and sustainability. For instance, how ICT and knowledge management can help in innovation by offering more capabilities at the strategic and operation level in organizations; the impact of innovation on business or product design sustainability and by developing different techniques based from one hand on circular economic rules and from another hand on Triz method; model to measure user e-experience in innovation process; energy saving using statistical evaluation of water consumption; the use of ontology to support collaborative creative space and process in product design organizations; communication analysis to handle learning and coordination in community of practices; and systems to handle and learn from experience feedback in cooperative and stressed activities.

Different applications of these approaches are shown in pharmaceutics, crisis management, product design, governance, biology, water management domains. Different systems and approaches are proposed: IBS, CamCa, CWMO, ARIMA, EcaTriz, CCS, and Noe.



Nada Matta, Full Professor at the University of Technology of Troyes. She studies techniques in knowledge engineering and management and specially to handle cooperative activities as product design, crisis management, etc. Currently, she is Director of department of "Human, Environment and ICT". She assumed several responsibilities as: Director of "Scientific group of supervision, and security of complex systems" for 5 years and Director of department of "Information Systems and Telecom" for 2 years. She is involved in the organization of several workshops and Tutorials as: IJCAI, KMIS, ISCRAM conferences. She wrote several book on KM in companies and learning. http://matta.tech-cico.fr/en



Tatiana Reyes Carrillo, Assistant professor at the University of technology of Troyes. She's coordinator for the Eco-design Scientific and Technological Program at the Charles Delaunay Research Institute and for the Environment, Human and Machine research program at the Service and Industry of Future Institute of Troyes. In addition, she has coordinated several research projects. Outside her activities in the university, she is deeply involved in national and international research networks. She is co-founding member of the Eco-design of Systems for Sustainable Development network for exchanges between French researchers, companies and institutions. In terms of research interests, she works on the integration of sustainable criteria on the design process, the evolution of the sustainable knowledge and values in industrial system, and the evolution of pedagogical methods to integrate sustainability in the engineering curriculum.



Eunika Mercier Laurent, Full Professor at EPITA International, Associate Researcher with University of Reims Champagne Ardennes. Her current research interests are: innovation eco-systems, complex problem-solving using AI, impacts of AI, AI ethics, optimization, eco-design and knowledge management for innovation. Chair of the IFIP Artificial Intelligence Group, she organized several conferences related to Knowledge Management and Innovations, for instance the cycle of AI4KM conferences jointly to IJCAI and FEDCIS. She is author of over hundred scientific publications and several books on Knowledge Management, Innovation and Sustainability. https://www.researchgate.net/profile/Eunika_Mercier-Laurent

Danielle Boulanger, Full professor at IAE Lyon School of Management, University of Jean Moulin Lyon 3. Danielle does research in Artificial Intelligence, Computer Security and Reliability and Databases. She is involved in several studies related to DataBases and Knowledge Management. https://www.researchgate.net/profile/Danielle_Boulanger

https://doi.org/10.1017/S0890060419000167 Published online by Cambridge University Press