

10th Triennial IFAC Conference on Manufacturing Modelling, Management and Control  
(MIM 2022)

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Special session: The applications of Bayesian networks in manufacturing, supply chain, and logistics.

**Session Co-Organizers:**

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**Motivations:**

Bayesian network is a subfield within artificial intelligence that is rapidly gaining popularity (Friedman et al., 1997). A number of practical applications of Bayesian networks are being discovered in manufacturing, supply chain, and logistics. As the supply chain develops towards globalization and lean, it is more and more likely that the supply chain will be interrupted due to interference from natural disasters or human factors, and a wide range of facts prove the existence of the ripple effect. Bayesian networks were first introduced into the field of supply chain management by Hosseini et al. (2016), and were first used to assess the resilience of the supply chain. Hosseini et al. (2020) proposed a new method combining Markov process and dynamic Bayesian network, which is considered to be an excellent tool for assessing the risk of supply chain disruption. In the context of the global outbreak of the new crown epidemic, Hossein and Ivanov (2021) have proposed a multi-layer Bayesian network to help corporate decision makers better assess the risk of supply chain disruption. Although the benefits of Bayesian networks in manufacturing, supply chain, and logistics are numerous, there are still some limitations, such as the imprecision of probability.

This special session will provide a forum to investigate, exchange novel ideas and disseminate knowledge covering the broad area of Bayesian network applications in manufacturing, supply chains, and logistics. Experts and professionals from academia, industry, and the public sector are invited to submit papers on their recent research and professional experience on the subject. High quality papers reporting on relevant reviews of existing literature, theoretical studies, case studies, interdisciplinary research are all very welcome.

**Main topics:**

This proposal supposes to give a state-of-the-art of Bayesian network applications in manufacturing, supply chains, and logistics. The authors are invited to contribute theoretical and applied research papers in the areas including but not limited to the following topics: 1. Risk assessment in manufacturing and logistics. 2. Causality Bayesian network in manufacturing, supply chain, and logistics. 3. Control and estimation in manufacturing, supply chains, and logistics. 4. Ripple effects in supply chain management. 5. Etc.

**The deadlines for IFAC MIM 2022:**

25 November 2021: submission of invited sessions

25 December 2021: submission of papers (6 pages in IFAC format)

15 February 2022: Notification to authors/ Start of registration

15 March 2022: Final paper submission

30 April 2022: Early registration rates expire

**References:**

[1] Friedman, N., Geiger, D., & Goldszmidt, M. (1997). Bayesian network classifiers. *Machine learning*, 29(2), 131-163.

[2] Hosseini, S., & Ivanov, D. (2019). A new resilience measure for supply networks with the ripple effect considerations: A Bayesian network approach. *Annals of Operations Research*, DOI: 10.1007/s10479-019-03350-8.

[3] Hosseini, S., Ivanov, D., & Dolgui, A. (2020). Ripple effect modelling of supplier disruption: integrated Markov chain and dynamic Bayesian network approach. *International Journal of Production Research*, 58(11), 3284-3303.

[4] Hosseini, S., & Ivanov, D. (2021). A multi-layer Bayesian network method for supply chain disruption modelling in the wake of the COVID-19 pandemic. *International Journal of Production Research*, DOI: 10.1080/00207543.2021.1953180.