



DIG PhD scholarship

Title	Decision making approaches and tools for the sustainable operations of complex Industry 4.0-based manufacturing systems
Theme	<p>Decision making and decision support have been changing along the last years thanks to the innovation that digitalization is bringing in manufacturing and, in particular, in the shop floor activities. In particular, technological solutions are changing the way data are collected and analysed due to the possibility to connect machines among each others.</p> <p>In this context, there is a strong need for research activity on the proper development of new decision making approaches and tools capable to fully exploit the availability of data. More and more data will be collected in the future at shop floor level and the way decisions are taken will change significantly and more dynamically. The availability of data will lead to the possibility to manage more complexity. This will further remark the need of real time decisions while coupling the decision making activities with the continuous use of proper supporting tools. The decision support may be a key enabler for decisions at different levels, from strategic to operational levels, and considering impacts in the different sustainability dimensions.</p> <p>Proper research should be then conducted, investigating the transition to the scenario in which Industry 4.0 solutions will enable the analysis of complex production settings under the requirements of sustainability. To this end, the research must consider not only the role of Manufacturing Execution Systems as source of data, but also the new role of more pervasive technologies than traditional automation solutions that are emerging at the physical level (such as collaborative robots, mobile robots, smart devices, ...) . More data will be generated, related also with the interaction with operators, creating new information and knowledge from the shop-floor. Therefore, decision making approaches and tools, considering different perspectives on the manufacturing systems (at different levels, i.e. system-, workstation-, machine- and worker- levels) will be essential for more dynamic decisions towards resilience to disruptions in the system. The final objective is to achieve optimization under dynamically changing operating conditions and considering a more holistic perspective aimed at the sustainable performance of the plants.</p>
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