ABSTRACTS

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Power of digitalization: statistical analysis of European SMEs

(pages 15-20)

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Keywords: analysis, digitalization, small and medium-sized enterprises.
Abstract: The ongoing effects of the pandemic have led to a heightened adoption of digital technologies among businesses. Acknowledging the importance of small and medium-sized enterprises (SMEs), the European Commission emphasizes the need for support in digitalization efforts. The study focuses on investigating the influence of digitalization on SME performance by analyzing data from 27 EU countries using econometric analysis. A thorough literature review explores the relationship between digitalization and SME performance. The findings of our study provide valuable insights for policymakers, suggesting the integration of digital tools into the infrastructure of SMEs, and also serve as inspiration for future research in this area.

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Design of simulation experiments using Central Composite Design

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Keywords: Central Composite Design, simulation experiments, design of experiments, Draper-Lin CCD plan.

ABSTRACTS

Abstract: In the context of research and development, it is key to achieve accurate and reliable results. However, often to obtain these results, a large number of experiments must be performed, which can significantly extend the research time and increase computational requirements. The solution to these problems may be efficient experimental planning, which allows for a reduction in the number of trials and optimization of the process. This article provides an insight into Central Composite Design (CCD) and its use in simulation experiments. We introduce various types of CCD designs, such as CCC (Central Composite Circumscribed), CCF (Central Composite Face centered), and CCI (Central Composite Inscribed), and analyze their use in creating second-order regression models. We also discuss the specific advantages and disadvantages of these approaches, as well as their possible alternatives, such as the Draper-Lin CCD design.

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Optimization of the production process using simulation modelling

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Keywords: optimization, production process, Tecnomatix Plant Simulation.
Abstract: The aim of this paper is to optimize the production process of graphics card assembly in an unnamed company. For the optimization of the production process, we will use the Tecnomatix Plant Simulation software from Siemens. The first and most important step to optimize the manufacturing process is to analyse the current process so that we can pinpoint where bottlenecks or downtime is occurring. For this reason, the first simulation is dedicated to the current production process. In the second simulation, we have successfully implemented all the proposed changes within the upgraded manufacturing process. These changes included replacing the human workforce with two robots in the tenth stage, which involves the assembly of large components. The implementation of the upgraded process allows 44 graphics cards to be assembled in one hour, an increase of 15 graphics cards compared to the current process. In an eight-hour shift, 353 graphics cards can be assembled, which is 118 graphics cards more than the current production process.