



REVIEWER'S REPORT

Manuscript No.: IJAR-57148

Title: A Comprehensive Review and Computational Perspective on Simulation in Operations Research and Programming Language C

Recommendation:

- Accept as it is
- Accept after minor revision**
- Accept after major revision
- Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality	...			
Techn. Quality		...		
Clarity		...		
Significance	...			

Reviewer's ID: JPR-180

Detailed Reviewer's Report

The paper titled “*A Comprehensive Review and Computational Perspective on Simulation in Operations Research and Programming Language C*” presents an interdisciplinary exploration of simulation within the broader domain of Operations Research (OR). Overall, the study aims to integrate theoretical foundations, computational techniques, and programming implementations into a unified framework. The paper is ambitious in scope, attempting to bridge mathematics, computer science, and applied disciplines. It successfully highlights the growing importance of simulation as a decision-making and problem-solving tool across various domains such as healthcare, transportation, finance, and management sciences. One of the major strengths of the paper lies in its comprehensive literature review. The authors have incorporated a wide range of sources spanning multiple disciplines, demonstrating the interdisciplinary nature of simulation. The discussion on different types of literature reviews and the inclusion of various domains such as psychology, engineering, and supply chain management reflect the depth of the review process. However, while the breadth is commendable, the review sometimes lacks critical synthesis. Much of the literature is described rather than analytically compared, which reduces the critical engagement expected in a high-quality review paper.

The explanation of Operations Research development phases is clear and well-structured. The six-step framework from problem formulation to implementation provides a logical foundation for understanding how simulation models are developed and applied. This section is particularly useful for beginners, as it simplifies complex processes into understandable stages. Nevertheless, the discussion remains largely theoretical and would benefit from real-world case studies or examples to enhance practical relevance. Methodologically, the paper adopts an interdisciplinary and qualitative approach, relying heavily on secondary data. The integration of mathematical modeling, simulation theory, and programming concepts is well articulated. The authors also discuss various simulation classifications deterministic vs. stochastic, discrete vs. continuous which adds conceptual clarity. However, the absence of empirical validation or experimental analysis limits the robustness of the methodology. The study would be stronger if supported by data-driven experiments or comparative simulations.

A notable contribution of the paper is the inclusion of computational aspects, particularly the demonstration of random number generation using a C++ program. This practical illustration connects theoretical simulation concepts with programming implementation. The discussion on simulation programming languages (SPLs) is informative and highlights both historical and modern developments. The paper effectively traces the evolution from early languages like FORTRAN and SIMULA to contemporary languages such as C++, Java, and Python. Additionally, the explanation of modeling paradigms such as process interaction and event scheduling adds depth to the computational perspective. However, a comparative evaluation of these languages in terms of efficiency, usability, or application areas would have improved the analytical quality. The findings and discussion sections successfully reinforce the

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central argument that simulation is a multidisciplinary tool with wide-ranging applications. The paper emphasizes how simulation enhances decision-making, system optimization, and modeling of complex systems. This reinforces the relevance of the study in both academic and practical contexts. However, some parts of these sections are repetitive and reiterate earlier points instead of providing new insights or deeper analysis. The paper also acknowledges its limitations, which is a positive aspect. It clearly states that the study is conceptual and lacks empirical validation. The authors also recognize the challenge of covering such a broad interdisciplinary field comprehensively. This transparency adds credibility to the research.

In conclusion, the paper provides a broad and informative overview of simulation in Operations Research, successfully integrating theoretical and computational perspectives. Its strengths lie in its interdisciplinary approach, structured explanation, and extensive literature coverage. However, the paper would benefit from stronger critical analysis, empirical validation, and more advanced computational demonstrations. Despite these limitations, it serves as a useful reference for researchers and students seeking an introductory yet comprehensive understanding of simulation and its applications.