

FACULTAD DE INGENIERÍA

Escuela Académico Profesional de Ingeniería Industrial

Tesis

**Simulation of the SLP Methodology to Improve the
Productivity of the Peruvian Textile Sector**

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Para optar el Título Profesional de
Ingeniero Industrial

Huancayo, 2024

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SIMULATION OF THE SLP METHODOLOGY TO IMPROVE THE PRODUCTIVITY OF THE PERUVIAN TEXTILE SECTOR

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SIMULATION OF THE SLP METHODOLOGY TO IMPROVE THE PRODUCTIVITY OF THE PERUVIAN TEXTILE SECTOR

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ABSTRACT

The Systematic Layout Panning Methodology (SLP) is the most used for its capacity of an optimized design in the work areas towards the delay of the productive process. This research develops and evaluates a plant design model for micro and small companies in the Peruvian textile sector, allowing the redesign of work areas to obtain a higher production. The model was made by obtaining the required measures of each area and timing the production time that takes each product, using the three phases of the SLP methodology, then it was simulated in FlexSim software. The answer provided in the investigation, comparing how many garments are produced with the previous plant design and with the new process using the SLP methodology, shows that there is a significant improvement in productivity of 12% additional at the time of the simulation, the time was reduced from 23.5 minutes to 21.11 minutes, and production increased from 146 to 162 sweaters per employee showing that the SLP methodology improves productivity and reduces distribution problems in the plant.

CCS CONCEPTS

• **Computing methodologies** → Modeling and simulation; Simulation types and techniques; Simulation by animation; • **Applied computing** → Operations research; Industry and manufacturing.

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ICIEA-EU 2023, January 09–11, 2023, Rome, Italy

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ACM ISBN 978-1-4503-9852-7/23/01...\$15.00

<https://doi.org/10.1145/3587889.3587910>

KEYWORDS

SLP, Productivity, Layout, Distribution plant, Industrial Engineering, Simulation

ACM Reference Format:

Daniel, G, Saenz, Angie, K, Flores, Britney, D, Marcos, Sario, A, Chamorro, and Ruben, D, Arzapalo. 2023. SIMULATION OF THE SLP METHODOLOGY TO IMPROVE THE PRODUCTIVITY OF THE PERUVIAN TEXTILE SECTOR. In *2023 The 10th International Conference on Industrial Engineering and Applications (ICIEA-EU 2023)*, January 09–11, 2023, Rome, Italy. ACM, New York, NY, USA, 7 pages. <https://doi.org/10.1145/3587889.3587910>

1 INTRODUCTION

In the last decade, it was shown that the textile industry has a great importance in the world economy, by the fact that production increased by 97% and trade increased by 175% 1. Until 2018, China led this industry by generating \$8 637 540 dollars per month, while Peru represented 0.8% of the world figure by generating \$328 638 per month 2. Otherwise, Peruvian industry was recognized in Latin America by its quality of cotton, skills in weaving, dyeing, spinning and textile finishing 3, 4.

By 2019, the textile sector was the third most representative activity in the productive sector with 6.4% of the manufacturing GDP and 0.8% of the national GDP 5. In addition, this sector had an average annual growth of 4.3% in the last ten years 6.

Ninety-five percent of the total textile industries are represented by micro and small enterprises, however, these industries have the main exit rate in the Peruvian market, by the reason of factors such as the economic situation, high competition, low productivity and lack of business plan 7. Currently, textile companies present problems in their production due to excessive use of plant space, low productivity, transportation and unnecessary movement of personnel-material, problems that are usually caused by poor distribution of work areas 8. Samia mentions that a disorderly and disorganized work environment will only deliver unproductive results 9. In the same way, Flores points out that poor production design is caused by the basic and empirical knowledge of textile company owners 10.

For this reason, multiple tools for organizing work areas have been used over the years. León applied the 5s and SLP methodology to design the warehouse distribution model of an automotive company, obtaining a 40% improvement in productivity and an