

Application of Bootstrap Exponentially Weighted Moving Average-Mann-Whitney (Bootstrap-EWMA-MW) Control Chart in Monitoring HAFED Polytechnic Bakery Production Process

Hussaini Abubakar^a, Sani Salihu Abubakar^b, Zakariyya Ibrahim Musa^b

^aDepartment of Mathematics and Statistics, Hussaini Adamu Federal Polytechnic, Kazaure.

^bDepartment of Statistics, Aliko Dangote University of Science and Technology, Wudil.

Corresponding Email: sanisalihabu@kustwudil.edu.ng

Abstract: *In every successful production settings, there should be some means by which the production process is monitored in real time. This study seeks to monitor the Bread production process of Hussaini Adamu Federal Polytechnic Bakery industry using the Bootstrap-EWMA-MW control chart. To achieve this specific aim, five loaves of bread were randomly chosen and their weight read every day for forty days, beginning from 1st November to 10th December, 2025. Applying the Bootstrap-EWMA-MW control chart on Phase II sample, the software output showed that a shift is detected at monitoring period 3. This implies that the chart is reliable and very effective in monitoring processes with same distributional properties as the Bread weight data from Bakery production process of the HAFED Polytechnic Bakery industry. The study thus recommends that in addition to applying Bootstrap-EWMA-MW control chart in general bakery settings, the production process of the HAFED Polytechnic Bakery factory be closely monitored as it operates under out-of-control condition, contrary to the belief of the management of the Bakery plant.*

Keywords: Bootstrap-EWMA-MW Control Chart, In-Control, Out-of-Control, Bakery Plant, Bread and Weight

