Evaluation of Some Selected Water Producing Companies Using the Data Envelopment Analysis

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Abstract
Production enterprises must constantly investigate variations in set goals while maintaining competitiveness. In recent times, there has been an explosion in the number of enterprises going into the production of water in Nigeria. Even multinational organizations have joined the market. Empirical evidence shows that in the past, retailers of sachet water were able to achieve ROI of 60%, while the real producers struggled to be sustainable. In this study, the relative efficiencies of four (4) water-producing companies (Decision Making Units (DMUs)) were evaluated over six months. Data Envelopment Analysis (DEA) models were formulated based on six inputs and two outputs. The inputs included data on labour, machines, borehole, water, holding tanks, and cost of production while the outputs were the number of sachets and bottled water produced. The efficient producers were identified, and potential improvements were suggested for those not as competitive. Further analysis showed that some of the DMUs could have produced 45.7% more bottled water using lesser inputs. The models should prove useful as effective decision support for improving competitiveness.

Keywords
Data Envelopment Analysis, Productivity, Efficiency, Competitiveness, Water Production

Biographies
Tosin Akintunde obtained the BSc, and MSc. degrees from the Department of Industrial and Production Engineering, University of Ibadan, Nigeria. Tosin, received a University Scholarship Award for a Master's degree. She is also a recipient of the Petroleum Development Fund Local Scholarship. As a researcher, Tosin is interested in using engineering tools to solve problems associated with productivity, supply chain, workflow, and safety across different industries such as the healthcare and manufacturing. As part of the thrust to improve the performance of small and medium scale enterprises that contribute up to 40% of the GDP of Nigeria, she studied the resilience of their supply chains. This is important given the disruptions occasioned by the COVID-19 pandemic. The results have since been published to enable enterprises engage more options in stabilizing their operations. She is looking forward to making immense contributions as she starts a career in academia.

Ayodeji Emmanuel Oluleye is a Professor of Industrial Engineering at the University of Ibadan (UI). He earned B.Sc. (Hons.) in Agricultural Engineering from the University of Ibadan, Nigeria, a Master's degree in Agricultural Machinery Engineering, from Cranfield Institute of Technology, England, and a Ph.D. in Industrial Engineering, University of Ibadan. He has served as a three-time Dean of the Faculty of Technology, University of Ibadan, Director Management Information Systems, and Chairman Information and Communication Committee, UI. He is a member of the Nigerian Society of Engineers, Fellow Nigerian Institute of Industrial Engineers, Fellow Nigerian Institution of Production Engineers. He is a registered engineer by the Council for the Regulation of Engineering, Nigeria (COREN). He serves as a member of the Technical Advisory Group (TAG) of Tertiary Education Trust Fund, Nigeria (TETFUND). He has over 80 publications in refereed Conference Proceedings and reputable Journals. His research

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