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## Big data and machine learning skills, experience, methods, and big data usage. Empirical evidence from manufacturing firms in Zimbabwe.

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The use of big data and machine learning in decision making processes in manufacturing industries is gaining momentum as manufacturers seek to enhance production performance and competitiveness. Big data technologies have transformed manufacturing decision-making, resulting in data-driven approaches. To compete in today's dynamic market, manufacturing organizations must adapt and evolve, which necessitates the effective use of data for forecasting future events and making decisions. Advanced analytics applied to large datasets allows firms to acquire deeper insights, spot patterns, forecast future trends, and optimize processes. Limitations of conventional data processing methods create new opportunities for development and innovation. However, in developing countries such as Zimbabwe the benefits of the use of big data are not fully realized in manufacturing industries. Three essential requirements are needed to effectively use big data. These are big data skills, experience using big data, and effective data processing methods. The study focused on assessing how the three factors influence the utilization of big data in the manufacturing industry. Understanding data skills, experience and processing methods is essential in building big data management skills and improving adoption in manufacturing firms. A preliminary survey was conducted on 36 manufacturing companies in Zimbabwe. The data was analyzed using SPSS version 27. The results showed that only 16.7% of the companies were effectively using big data. The effectiveness of data processing methods, big data skills, and experience using big data, significantly affect the utilization of big data in manufacturing ( $p < 0.05$ ). In addition, the effectiveness of data processing methods has a positive impact on the quality of decisions and accuracy prediction level. The study therefore recommends manufacturers to train their employees on the required skills and upgrade data processing methods. In the future, to address limitations of this study, there is need to widen the sample size to produce widely generalizable results.

Keywords: big data, machine learning, data processing, data experience.

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