

***THE IMPLEMENTATION OF TWO-FACTOR AUTHENTICATION (2FA)  
USING ONE-TIME PASSWORD (OTP)  
ON ANDROID-BASED E-COMMERCE APPLICATION***

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***ABSTRACT***

*The rapid growth of e-commerce in Indonesia has facilitated digital transactions while simultaneously increasing the risk of data breaches. Incidents involving major platforms such as Tokopedia, Bukalapak, and Lazada underscore the urgent need for enhanced security mechanisms. This study aims to design and implement a Two-Factor Authentication (2FA) system using a One-Time Password (OTP) to strengthen user authentication within Android-based e-commerce applications. The research methodology includes literature review, system development, and testing. The system generates random OTPs using the SecureRandom algorithm, encrypts them via SHA-256, and sends them to users through the JavaMail API. Additional features include input restrictions, two-minute validity periods, and a user-friendly interface. The implementation demonstrated improved registration security and user convenience. However, further enhancements are required, such as server-side verification, server-time-based validation, encryption of sensitive data, and integration with payment systems. The system shows promise as a secure solution and technical reference for developers implementing 2FA in mobile applications.*

*Keywords: Two-Factor Authentication, One-Time Password, E-Commerce, Data Security, Android Application*