

# AI-BASED SYSTEM FOR AUTOMATED PROJECT ESTIMATION IN THE PRINTING INDUSTRY

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**Relevance and aim of the research:** Modern printing companies face increasing demand for personalized, short-run, and fast-turnaround orders. In such a dynamic environment, accurate and rapid estimation of project cost, production time, and required materials is critical for maintaining profitability and customer satisfaction. Traditional estimation methods rely heavily on manual input and expert judgment, which are time-consuming and often inconsistent. This paper presents the adaptation of the AI-powered system Flex Estimate AI for use in the printing industry. Originally developed for IT project assessment, the system has been successfully tailored to evaluate printing jobs, offering fast, transparent, and data-driven estimates.

**Methodology:** The system integrates several artificial intelligence techniques, including regression analysis, clustering, and natural language processing (NLP). In the printing domain, these technologies enable automatic extraction of job parameters (e.g., print size, paper type, binding method) from technical documentation or client briefs. Historical job data and production parameters are used to train the system's models, allowing for predictive estimation of production time, costs (materials, machine usage, labour), and required resources. A modular architecture includes a data pre-processing module, an analytical engine, a user-friendly interface, and a document generation module.

**Results:** Flex Estimate AI has been tested in a pilot implementation at two mid-sized printing firms. The system reduced average estimation time by over 65%, and preliminary cost deviations decreased from 20% to under 10% in real orders. Clients reported increased trust due to transparent breakdowns of cost components and expected delivery terms. Internally, the system facilitated better scheduling, resource allocation, and material planning.

**Conclusions & practical implications:** The integration of Flex Estimate AI into printing workflows enables faster response to client inquiries, more accurate cost estimation, optimization of material use and equipment load, reduced dependency on expert estimators, and improved overall production planning. Its AI-driven logic makes it adaptable to various printing formats, finishing techniques, and equipment setups. Future developments

include integration with ERP systems and supplier databases for end-to-end digital job planning.

**Keywords:** AI estimation system, cost optimization, printing industry, production planning, project management