# Leveraging Artificial Intelligence for Efficient Quotation Management: A Performance Analysis of Custom GPT vs. Traditional Methods

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## Abstract

This study explores the application of artificial intelligence (AI), specifically Custom GPT, in automating quotation document management. The research focuses on extracting product details, product codes, and other relevant information from PDF documents and converting them into structured Excel formats. A total of 18 quotation samples from two major customers were analyzed. The primary objectives are to compare the performance of AI-driven processing with manual data entry and to develop methods for reducing redundant tasks in document handling. Experimental results demonstrate that Custom GPT significantly reduces processing time. Performance analysis indicates that ChatGPT improves efficiency by 70–90% in automating product data entry compared to manual input by employees. The findings suggest that AI technology enhances operational efficiency, minimizes errors, and allows employees to focus on higher-value tasks such as market analysis and customer relationship management. This research also provides guidelines for integrating AI into document management processes, offering a foundation for future AI-driven business applications.

**Keywords:** Artificial Intelligence, Custom GPT, Document Automation, AI-Driven Processing

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## Introduction

In the digital era, efficient business document management is essential for organizational operations and administration. Among various types of business documents, quotations play a crucial role as they contain product details, unit prices, and payment terms, influencing decision-making processes for both buyers and sellers. However, traditional paper-based document management poses significant limitations, particularly in terms of search efficiency and data entry accuracy.

Artificial Intelligence (AI) has emerged as a transformative solution to these challenges, offering advanced capabilities for optimizing document processing. AI consists of two major components: Machine Learning (ML) and Deep Learning (DL). Machine Learning acts as the computational core, utilizing statistical algorithms to enable computer systems to learn from data and improve performance over time. Deep Learning, an advanced subset of ML, simulates human cognitive processes through artificial neural networks, which typically include four key layers: the Input Layer, responsible for receiving data; the Hidden Layer, which processes and analyzes information; the Output Layer, where activation functions determine the final computational outcome; and the Prediction Layer, which generates decisions based on model predictions (Goodfellow, Bengio, and Courville, 2016).

Leveraging these AI advancements, ChatGPT—developed by OpenAI—demonstrates significant potential in transforming document management practices. As an AI-powered chatbot, ChatGPT facilitates the conversion of paper-based documents into digital formats and effectively processes unstructured or semi-structured data into structured, machine-readable formats. The continuous evolution of the GPT model, from GPT-1 to the current iteration, has introduced substantial improvements. GPT-3 excels in generating complex textual responses, answering factual queries, and performing language translations, while GPT-4 further enhances these capabilities through multimodal processing, integrating both text and images, and employing Reinforcement Learning from Human Feedback (RLHF) to improve response accuracy (OpenAI, 2023).

This research explores the application of ChatGPT in streamlining business document management, focusing on its ability to enhance data extraction, organization, and processing workflows. The study highlights key advantages such as flexibility in handling diverse document formats, automation of repetitive tasks, reduction of processing time and human errors, and continuous improvement through AI-driven learning mechanisms. By addressing the inefficiencies of traditional document management, AI-driven solutions such as ChatGPT present a significant opportunity to revolutionize organizational workflows, enabling more efficient, accurate, and scalable business operations.

## Research Objective

To explore the application of artificial intelligence (AI), specifically Custom GPT, in automating quotation document management.

## Research Methodology

### Research Design

This study employs experimental research to examine the application of ChatGPT in enhancing business document management efficiency. The research follows a structured five-step methodology

### Population and Sample

The study identifies the relevant population involved in document management and establishes criteria for selecting documents for experimentation, ensuring representation of real-world business document types and challenges. This study defines the population and sample by dividing it into two key components: quotation documents and sales representatives. The details of the sample selection process are as follows:

1. Quotation Documents: The selection of quotation documents was conducted using purposive sampling, focusing on projects from two major brands that collectively account for more than 80% of all quotation documents within the company. A total of 18 project quotations were selected for evaluation, specifically to assess the effectiveness of ChatGPT in processing and extracting essential information and formatting documents to be ready for the sales process

2. Sales Representatives: Sales representatives were selected using purposive samples, with three employees chosen based on varying levels of experience and proficiency in handling sales documents. This selection aims to test the use of ChatGPT in extracting information from BOQ documents, creating the quotation from information in BOQ, evaluating the ease of use of ChatGPT tool, and analyzing the feasibility of integrating AI technology into daily operations.

### Data Collection

Data collection was carried out by the researcher personally from the specified sample.

### Data Analysis

1. Analysis of existing workflows: A detailed as-is process analysis is conducted to identify inefficiencies and bottlenecks. Baseline data on processing time, accuracy, and workflow performance are collected for comparison.

2. AI-based solution evaluation: The study assesses the capabilities and limitations of Generative AI, focusing on prompt engineering and optimization techniques. A framework is developed for integrating AI into document management processes.

3. AI implementation and workflow enhancement: A new AI-driven workflow is developed, tested, and refined to improve document processing efficiency. The system is validated through real-world applications to ensure effectiveness.

4. Comparative Analysis and Performance Evaluation: Post-implementation data on processing time, accuracy, and resource utilization are compared with baseline metrics. The findings are analyzed to evaluate AI's impact, leading to conclusions and recommendations.

## Findings

### 1. Analysis of existing workflow

The field study on the process of generating quotations from the Bill of Quantities (BOQ) has revealed significant inefficiencies that contribute to delays in operations. The current workflow as shown in Figure 1 is complex and time-consuming, requiring employees to manually extract and transfer data from the BOQ to the quotation document. This process involves multiple critical data points, including customer information, project name, item descriptions, quantities, and unit prices. Moreover, employees must convert product codes from manufacturer-specific formats to the company's internal coding system and recalculate prices in cases where the BOQ values do not include value-added tax (VAT). Given that most sales transactions involve large-scale project orders, the data transfer from the BOQ to the quotation consumes approximately 80% of the total processing time. This inefficiency highlights the need for process improvements to enhance productivity and accuracy in quotation preparation. Table 1 presents the time (in minutes) taken by three employees to complete quotation documents for various projects, allowing for a comparative analysis of their efficiency

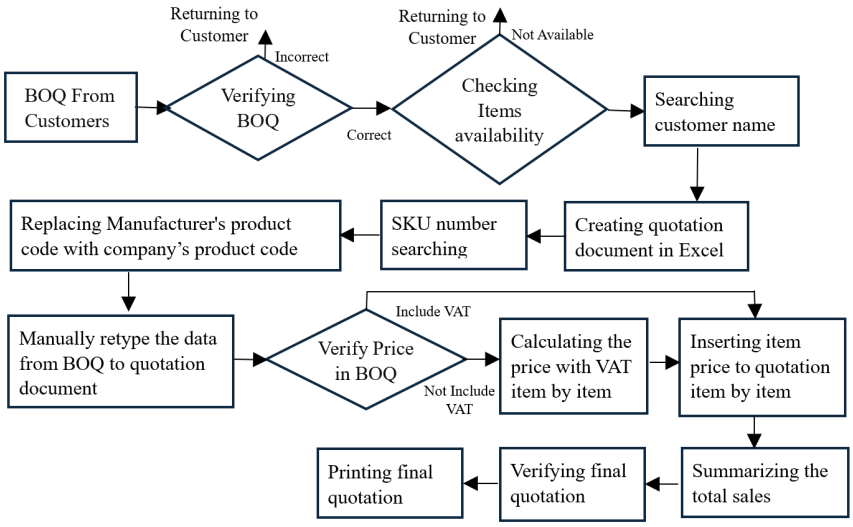


**Figure 1** The current workflow

**Table 1** Time spent by three employess to complete quotation from BOQ

| Project Number | Process Time (Minutes) | | | |
|---|---|---|---|---|
| | *Employee A* | *Employee B* | *Employee C* | *Average* |
| 101 | 10.50 | 11.30 | 12.55 | 11.45 |
| 102 | 10.47 | 11.02 | 12.30 | 11.26 |
| 103 | 10.52 | 12.31 | 12.20 | 11.54 |
| 104 | 15.20 | 16.50 | 16.54 | 16.21 |
| 105 | 24.56 | 25.30 | 25.49 | 25.25 |
| 106 | 23.24 | 25.25 | 25.49 | 24.52 |
| 107 | 19.54 | 20.34 | 24.21 | 21.36 |
| 108 | 119.30 | 132.45 | 134.01 | 128.45 |
| 109 | 3.65 | 5.31 | 5.01 | 4.52 |
| 110 | 10.02 | 10.30 | 10.46 | 10.26 |
| 111 | 13.40 | 13.54 | 13.47 | 13.47 |
| 112 | 13.04 | 13.41 | 13.26 | 13.24 |
| 113 | 3.01 | 3.54 | 3.25 | 3.27 |
| 114 | 8.03 | 8.21 | 8.14 | 8.13 |
| 115 | 5.56 | 6.32 | 6.34 | 6.07 |
| 116 | 15.46 | 15.55 | 16.05 | 15.69 |
| 117 | 12.45 | 13.23 | 14.01 | 13.23 |
| 118 | 28.31 | 28.23 | 28.45 | 28.33 |

**2. AI-based solution evaluation**

To address delays in the quotation creation process from BOQs (Bill of Quantities), the researcher chose to implement Custom GPT, a tool within the Generative AI family, as the primary solution for assisting employees. The primary objective was to support the management and processing of data contained in quotation documents. The tool was developed to extract key information such as product names, quantities, prices, and additional details, thereby significantly reducing the time required for manual data entry and minimizing potential errors from human input. One of the key advantages of Custom GPT is its ability to retain and reuse learned patterns without requiring repeated interaction with the GPT system. This feature enhances operational efficiency and reduces processing time by enabling the system to recognize patterns and automatically apply them to similar tasks. In this study, the researcher specifically tailored Custom GPT to address organizational requirements. Key components of the development process include:

(1) Knowledge Base Customization: The system was integrated with a database containing product codes, product names, barcodes, and vendor product codes. This enabled accurate data mapping and allowed the system to reuse the mapped information without requiring additional manual input.

(2) Specialized Capabilities: The tool was designed to extract data from quotation documents and automatically map it to the product database. This process was optimized to ensure efficient repetition for documents with similar formats, enhancing reliability and speed.

(3) Interactive Pattern Customization: The system was trained to recognize and process standardized workflows, enabling it to handle repetitive tasks without the need for reconfiguration. This customization enhanced the consistency of results and reduced the need for human intervention.

(4) External API Integration: The system was integrated with external APIs to retrieve data from external sources and collaborate seamlessly with other software systems. This feature allows continuous operation without requiring reconfiguration for each use.

By developing this system, the researcher not only addressed the issue of processing delays but also established a standardized and consistent workflow. The ability of Custom GPT to replicate tasks with high precision based on pre-designed workflows improved overall operational efficiency and reduced errors caused by human repetition.

**3. AI implementation and workflow enhancement**

Following the selection of Custom GPT as the primary tool for this study, the researcher focused on developing a system that prioritizes prompt engineering to enhance communication with the model. The primary goal was to facilitate accurate data extraction from documents, including key details such as project name, customer name, price validity date, quotation number, and tabular data such as product codes, item names, vendor product codes, quantities, unit prices, and net prices. The development process adhered to four fundamental principles:

1) Role Definition (Persona): The system was assigned the role of a "Quotation Processor" to ensure that its operations aligned with the intended purpose of creating and managing quotations effectively

2) Task Specification: Four primary tasks were defined for the system

- Data extraction from quotation documents, covering customer information, product codes, item names, quantities, and prices.
- Mapping product codes from vendors in the BOQ to the internal product codes of the organization
- Identifying items with prices exclusive of VAT.
- Calculating VAT-inclusive prices for items listed without VAT

3) Context Setting: A foundational database linking internal product codes with vendor product codes was integrated into Custom GPT's knowledge base. This allowed the system to automatically map and process data without requiring manual intervention.

4) Output Formatting: The output was designed to be presented in Excel table format, with the ability to export the data as an Excel file for further use. The table includes all relevant fields, ensuring the data is well-structured and ready for practical application.

By incorporating these principles, the system was tailored to meet the specific needs of the quotation generation process. The focus on prompt design and system customization ensured efficient data processing and output accuracy, significantly enhancing the user experience. Figure 2 illustrates the prompts used to interact with ChatGPT, guiding it through the designed processes for document management automation.

> This GPT assists in creating formatted Excel tables based on specific input requirements. It processes vendor-provided data from 'BOQ_from_vendor.pdf' or 'BOQ_from_vendor.jpeg'. They will be many items. Please extract them all in the file without making me wait long time and uses a mapping file 'Products_Cotto.xlsx' or knowledge file to match vendor product codes or barcode with company article IDs. The resulting table includes columns such as 'Description', 'Product Code', 'Quantity', 'Unit Price', 'Net Price', and 'Net Price incl. VAT'. The headers are bold, monetary values are rounded to two decimal places, and column widths are adjusted to fit content. A summary row at the bottom shows the total net price including VAT. It also extracts customer information like 'Project Name', 'Customer Name', 'Quotation Number', and 'Price Validity Date' from the BOQ file, placing it at the top of the table. The output is saved as 'Test_Cotto__with_newprompt.xlsx'. It ensures completeness and accuracy of all data, handling unmatched items by labeling them as 'Not Found'.

**Figure 2** The prompt used in this study

The framework for processing data from BOQ documents to generating quotation outputs in Excel format can be summarized into four components as follows.

1) Actor System

- Document upload: users upload BOQ documents into the system for processing.
- Feedback provision: users can provide feedback or specify necessary corrections to improve the system's performance.

2) Generative AI System

- Data extraction: the AI system extracts key information from the uploaded documents, such as project details, product codes, quantities, and prices.
- Data validation: extracted data is validated for accuracy and consistency before proceeding to subsequent processing steps

3) OCR (Optical Character Recognition) System

- Document processing: the OCR system converts textual content in the uploaded documents into a digital format that can be processed by the AI.

4) Database System

- Data Mapping: extracted data is mapped to the reference database, which contains product codes, item names, and vendor information, ensuring accurate alignment.

- Output Generation: the system generates an Excel file with all relevant data organized into a structured format, ready for further use.

This system architecture enhances operational efficiency by integrating the functionality of each component seamlessly. The structured collaboration between these components ensures higher accuracy, reduced complexity, and a streamlined process. Each component plays a distinct role while being interconnected, resulting in a cohesive and efficient workflow

The adoption of Custom GPT to replace manual processes in generating quotations from Bill of Quantities (BOQ) has significantly streamlined workflow operations. By leveraging the AI system's capabilities, several manual steps have been eliminated, reducing the complexity and time required for data processing. Figure 3 illustrates the traditional workflow, highlighting the processes that have been replaced by AI-powered automation in ChatGPT. Meanwhile, Figure 4 presents the optimized workflow after the integration of Custom GPT, demonstrating a more efficient and automated approach to quotation generation. This transformation not only enhances efficiency but also minimizes human intervention, ensuring greater accuracy, faster processing, and improved standardization in quotation preparation.

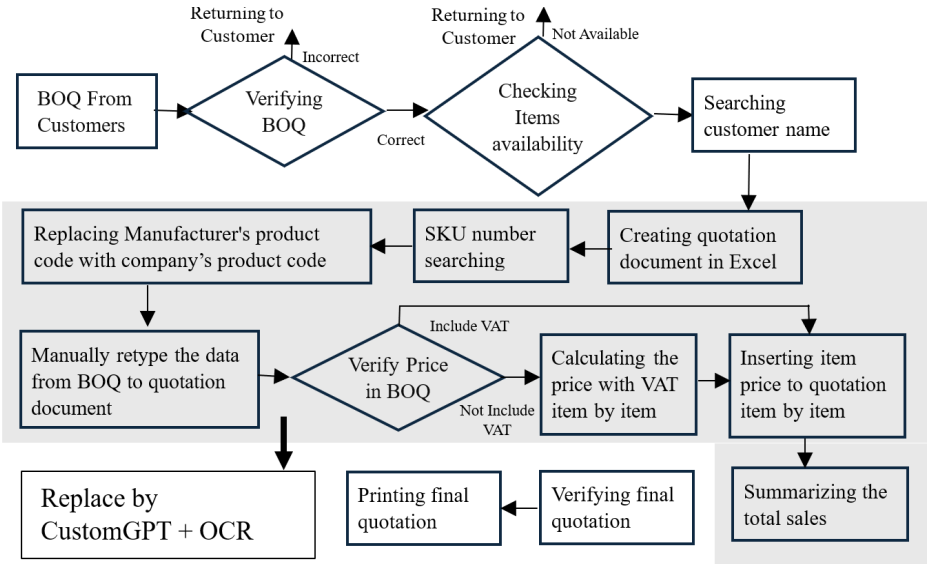


**Figure 3** The traditional workflow before using Custom GPT

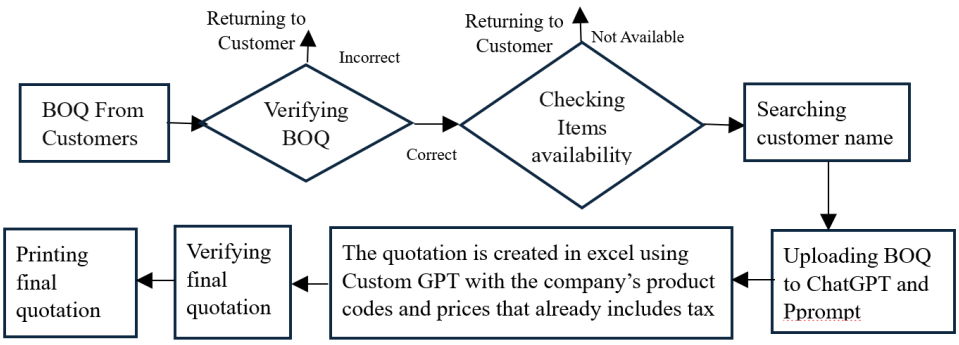


**Figure 4** The optimized workflow after the integration of Custom GPT

## Limitations of The Study

The study's findings are constrained by certain limitations that affect the generalizability of the results. Firstly, the analysis was based on only 18 quotation samples from two major customers, which limits the statistical power and diversity of the dataset. Such a small sample size may not adequately capture the variability found in quotation documents across different industries or organizational contexts. Secondly, the research was conducted within a single organization operating in a specific business environment—namely, the processing of quotation documents for large-scale project sales. This narrow scope restricts the applicability of the findings, as the workflows, systems, and user behaviors observed may differ significantly in other companies or sectors with distinct operational practices.

## Conclusion

The study examined the workflow of employees in generating quotations from Bill of Quantities (BOQ) before and after the implementation of Custom GPT. The results indicate a significant reduction in unnecessary manual tasks and overall processing time. Key improvements include Automated product data entry, Automated product code mapping, and Automated price calculation with tax inclusion: The system eliminates the need for manual price adjustments.

The improvement in efficiency was quantified using the following formula for the percentage reduction in processing time:

$$\text{Percent Time Reduction} = \frac{\textbf{Time Before AI} - \textbf{Time After AI}}{\textbf{Time After AI}} \; x \; 100$$

The evaluation was conducted on 18 sample projects, and the results demonstrated a substantial increase in efficiency.

According to the performance analysis, ChatGPT achieved an efficiency improvement of 70-90% in automating product data entry, compared to manual input by employees. The qualitative analysis, illustrated in the accompanying graph in Figure 5, validates the effectiveness of Custom GPT in minimizing workload and optimizing workflow processes.

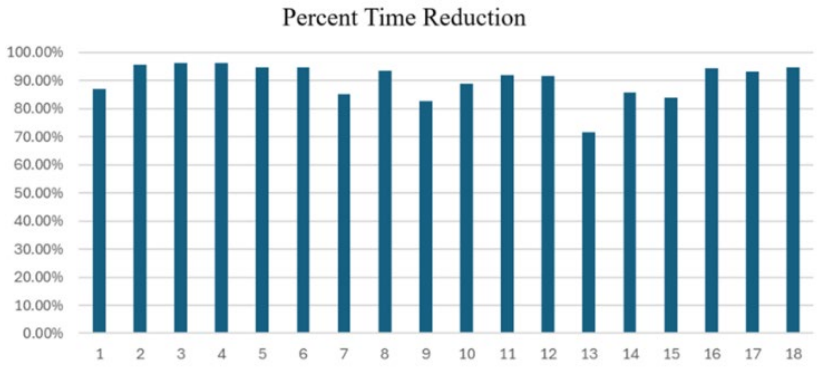


**Figure 5** Percent time reduction in data entry

The application of ChatGPT in automating quotation processing from customer Bills of Quantities (BOQs) demonstrates significant improvements in efficiency, accuracy, and resource optimization. By integrating Custom GPT, businesses can reduce document processing time, minimize human errors, and streamline sales operations. The automation of data extraction and organization enhances responsiveness, allowing sales teams to generate accurate quotations more quickly, ultimately improving customer satisfaction. Additionally, the reduction of repetitive tasks enables employees to focus on higher-value activities, while AI adoption fosters skill development and organizational readiness for future technological advancements. The study highlights ChatGPT's potential in transforming traditional document management into a more efficient, error-free, and data-driven process, providing organizations with a competitive advantage in an increasingly digital business environment

## Recommendation

Future research could explore the longitudinal impact of AI integration on business operations, including how efficiency gains evolve over time and affect overall productivity. Studies should also examine user adaptation and acceptance**,** focusing on learning curves, trust in AI outputs, and changes in job roles. Additionally, conducting a comprehensive cost-benefit analysis would provide valuable insights into the financial viability and return on investment of AI-driven document automation systems in various organizational settings.

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