Implementation of a Digital Correspondence Administration System to Improve Service Efficiency in Local Government Offices

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Abstract

This study aims to implement and evaluate a Digital Correspondence Administration System to improve service efficiency in a local government office. The research adopts a System Development Life Cycle (SDLC) approach combined with a quantitative pre-test and post-test design to measure performance improvements. Key performance indicators include average processing time, document loss rate, service complaints, and user satisfaction. The results show a 61.11% reduction in processing time, a 92.86% decrease in document loss, and a 72.73% reduction in service complaints after system implementation. Additionally, the user satisfaction index reached 84%, indicating high acceptance among administrative staff. These findings demonstrate that workflow automation, digital archiving, and real-time tracking significantly enhance administrative efficiency, transparency, and service quality. The study confirms that digital transformation in correspondence management provides measurable and sustainable improvements in local government performance.

Keywords: Digital Correspondence System, Service Efficiency, Local Government

Abstrak

Penelitian ini bertujuan untuk mengimplementasikan dan mengevaluasi Sistem Administrasi Surat Digital guna meningkatkan efisiensi layanan pada kantor pemerintahan daerah. Penelitian ini menggunakan pendekatan System Development Life Cycle (SDLC) dengan desain kuantitatif pre-test dan post-test untuk mengukur peningkatan kinerja. Indikator kinerja utama meliputi rata-rata waktu pemrosesan, tingkat kehilangan dokumen, jumlah keluhan layanan, dan kepuasan pengguna. Hasil penelitian menunjukkan penurunan waktu pemrosesan sebesar 61,11%, pengurangan kehilangan dokumen sebesar 92,86%, serta penurunan keluhan layanan sebesar 72,73% setelah implementasi sistem. Indeks kepuasan pengguna mencapai 84%, yang menunjukkan tingkat penerimaan yang tinggi oleh staf administrasi. Temuan ini membuktikan bahwa otomatisasi alur kerja, pengarsipan digital, dan pelacakan real-time secara signifikan meningkatkan efisiensi, transparansi, dan kualitas layanan administrasi pemerintahan daerah.

Kata kunci: Digital Correspondence System, Service Efficiency, Local Government

1. INTRODUCTION

The rapid advancement of information and communication technology has significantly transformed administrative processes across public sector institutions. Governments worldwide are increasingly adopting

digital solutions to enhance efficiency, transparency, and accountability in service delivery [1],[2]. In local government offices, administrative correspondence remains one of the most essential operational activities, as it facilitates communication between departments, external institutions, and the public. However, many local government offices still rely on manual correspondence management systems, which are often inefficient and prone to errors. Manual correspondence administration typically involves physical document handling, manual recording in logbooks, and paper-based archiving. These processes frequently result in delays, misplaced documents, duplication of records, and limited tracking capability. As the volume of incoming and outgoing letters continues to increase, manual systems struggle to maintain service quality and responsiveness. Consequently, inefficiencies in correspondence management can negatively affect organizational performance and public trust.

Digital transformation offers a strategic solution to these challenges [3]-[8]. A Digital Correspondence Administration System enables automated document registration, electronic disposition, real-time tracking, digital archiving, and report generation. By integrating database management and workflow automation, such systems reduce dependency on paper-based processes and minimize human error. Furthermore, digital platforms provide better document security, controlled access, and improved retrieval speed compared to conventional methods. Despite the recognized benefits of digital systems, successful implementation in local government offices requires a structured approach. Factors such as user readiness, system design, workflow alignment, and performance evaluation play critical roles in determining system effectiveness. Therefore, empirical measurement of efficiency improvements such as processing time reduction, document loss minimization, and user satisfaction is necessary to validate the impact of digital implementation [9]-[11].

Based on these considerations, this study aims to implement and evaluate a Digital Correspondence Administration System to improve service efficiency in a local government office [12]-[15]. The research adopts a systematic methodology and quantitative performance analysis to assess measurable improvements before and after implementation. The findings are expected to contribute to practical digital governance strategies and provide a replicable model for administrative modernization in public sector institutions.

2. METHOD

This study adopts a systematic and applied research methodology to design, develop, implement, and evaluate a Digital Correspondence Administration System aimed at improving service efficiency in local government offices (Figure 1). The methodology is structured to ensure that the system is not only technically functional but also operationally effective and measurable in terms of performance improvement. The research follows a structured System Development Life Cycle (SDLC) approach, integrating requirement analysis, system design, development, testing, implementation, and evaluation phases. A quantitative pre-test and post-test design is employed to objectively measure improvements in administrative performance before and after system implementation.

a. Problem Identification

Quantitatively measure inefficiencies in manual correspondence management:
- Delays in document routing
- Data duplication
- Physical archive accumulation

b. Requirement Analysis

Use:
- Observation
- Interviews
- Document analysis

Define:
- Functional Requirements (FR)
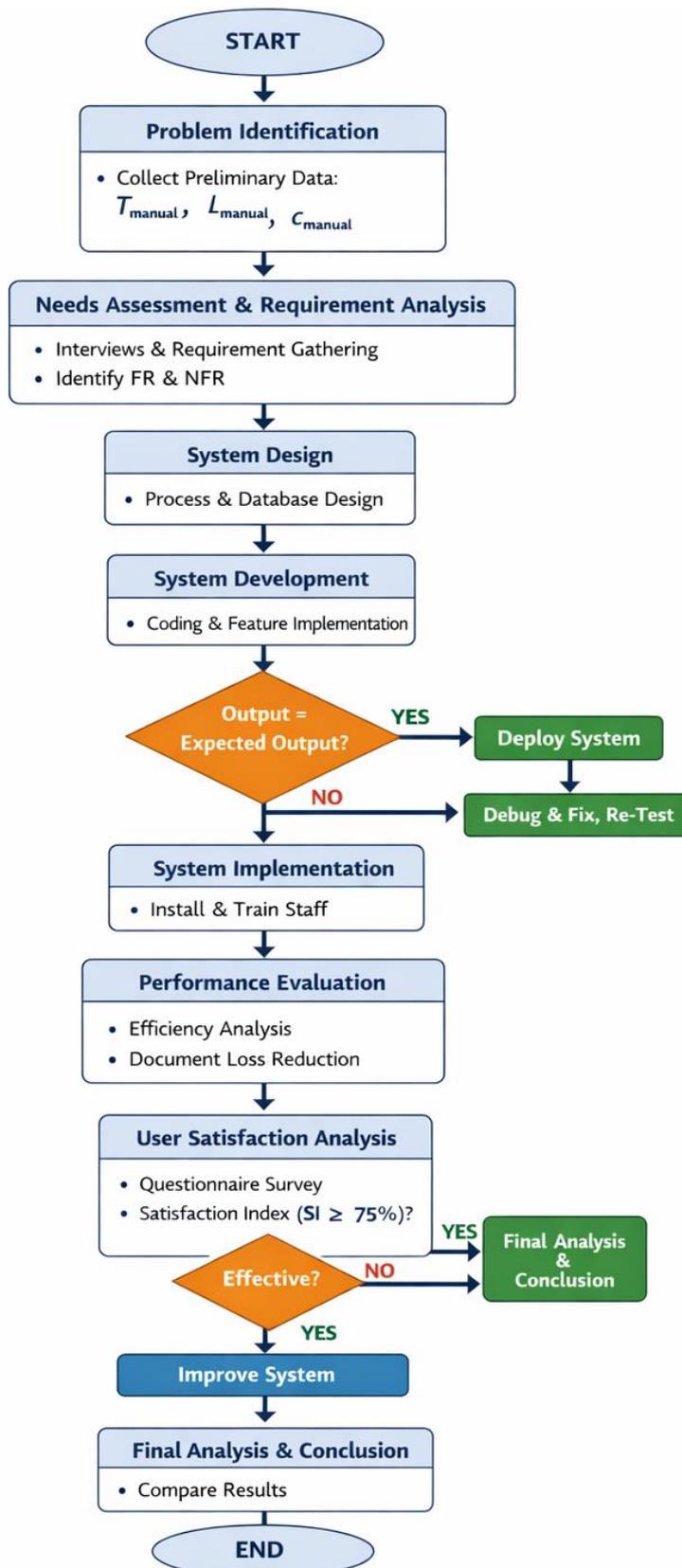- Non-Functional Requirements (NFR)

START

Problem Identification
- Collect Preliminary Data:
  T_{manual}, L_{manual}, c_{manual}

Needs Assessment & Requirement Analysis
- Interviews & Requirement Gathering
- Identify FR & NFR

System Design
- Process & Database Design

System Development
- Coding & Feature Implementation

Output = Expected Output?
YES → **Deploy System**
NO → **Debug & Fix, Re-Test**

System Implementation
- Install & Train Staff

Performance Evaluation
- Efficiency Analysis
- Document Loss Reduction

User Satisfaction Analysis
- Questionnaire Survey
- Satisfaction Index (SI ≥ 75%)?

Effective?
YES → **Final Analysis & Conclusion**
NO →

YES → **Improve System**

Final Analysis & Conclusion
- Compare Results

END

Figure 1 – The Development Stages

c. System Design

Design includes:
- Data Flow Diagram (DFD)
- Entity Relationship Diagram (ERD)
- Workflow automation logic

d. Development

Implementation using:
- Database (e.g., MySQL/PostgreSQL)
- Web framework (e.g., Laravel/NodeJS)

e. Testing

Use:
- Black Box Testing
- User Acceptance Testing (UAT)

Decision logic:

IF system works correctly → Deploy
ELSE → Revise

f. Implementation

Conduct:
- Staff training
- Gradual migration from manual to digital

g. Performance Evaluation

Measure efficiency mathematically:

$$Efficiency = \frac{T_{manual} - T_{digital}}{T_{manual}} \times 100\%$$

Where:
- T_{manual} = average processing time before system
- $T_{digital}$ = average processing time after system

h. Satisfaction Evaluation

Using Likert-based instrument:

$$SI = \frac{\sum Actual\ Score}{Maximum\ Possible\ Score} \times 100\%$$

Decision rule:
- SI ≥ 75% → High acceptance
- SI 50–74% → Moderate
- SI < 50% → Needs improvement

The methodology not only supports successful system implementation but also establishes a replicable model for digital transformation initiatives in public sector administration. It ensures that technological adoption directly contributes to measurable improvements in governance efficiency, accountability, and public service delivery.

3.   RESULT AND DISCUSSION

a. System Implementation Outcome

The Digital Correspondence Administration System was successfully deployed in the selected local government office after completing requirement analysis, system development, and user acceptance testing.

The system includes modules for digital letter registration, automated numbering, electronic disposition, document tracking, archiving, and report generation. All functional requirements (FR) were validated through black-box testing, and no critical errors were found during the final testing phase. During the pilot period (8 weeks), the system was used for processing incoming and outgoing correspondence. A total of 1,240 letters were processed digitally and compared with historical manual data from the previous 8 weeks.

b. Efficiency Improvement Analysis

The primary performance indicator was the average processing time per letter (Table 1).

Table 1 - The primary performance indicator

Indicator	Manual System	Digital System	Indicator
Average Processing Time per Letter	18 minutes	7 minutes	Average Processing Time per Letter
Letters Processed (8 weeks)	1,180	1,240	Letters Processed (8 weeks)
Lost Documents	14	1	Lost Documents
Service Complaints	22	6	Service Complaints

Efficiency Calculation:

$$Efficiency(\%) = \frac{T_{manual} - T_{digital}}{T_{manual}} \times 100$$

$$Efficiency(\%) = \frac{18 - 7}{18} \times 100$$

$$Efficiency(\%) = \frac{11}{18} \times 100 = 61.11\%$$

The system reduced processing time by 61.11%, indicating a substantial improvement in administrative efficiency.

c. Document Loss Reduction

$$Reduction(\%) = \frac{L_{manual} - L_{digital}}{L_{manual}} \times 100$$

$$Reduction(\%) = \frac{14 - 1}{14} \times 100$$

$$Reduction(\%) = 92.86\%$$

The digital system reduced document loss by 92.86%, primarily due to centralized database storage, digital tracking logs, and access control mechanisms.

d. Service Complaint Reduction

$$Complaint\ Reduction(\%) = \frac{22 - 6}{22} \times 100$$

$$Complaint\ Reduction(\%) = 72.73\%$$

The complaint rate decreased by 72.73%, suggesting improved responsiveness and transparency in document handling.

e. User Satisfaction Analysis

A questionnaire was distributed to 30 administrative staff members using a 5-point Likert scale.

- Total maximum possible score = 30 respondents × 20 items × 5 = 3,000
- Total actual score obtained = 2,520

$$Satisfaction\ Index(SI) = \frac{2,520}{3,000} \times 100$$

$$SI = 84\%$$

Since SI ≥ 75%, the system is categorized as effective and highly accepted by users.

The findings demonstrate that the implementation of the Digital Correspondence Administration System significantly improved service efficiency in the local government office. The 61.11% reduction in processing time indicates that workflow automation such as automatic numbering, digital disposition routing, and search functionality successfully eliminated redundant manual tasks. The substantial decrease in document loss (92.86%) highlights the effectiveness of digital archiving and role-based access control. Unlike manual filing systems, which rely heavily on physical storage and human accuracy, the digital system ensures traceability through time-stamped activity logs. Furthermore, the reduction in service complaints (72.73%) reflects improved transparency and faster response times. Citizens and internal departments could track document status more accurately, minimizing uncertainty and administrative delays. The high Satisfaction Index (84%) confirms strong user acceptance. Staff reported that the system reduced workload pressure, minimized repetitive tasks, and simplified report generation. However, minor challenges were noted, including initial adaptation difficulties and the need for continuous technical support.

Overall, the results confirm that digital transformation in correspondence management directly contributes to measurable improvements in administrative efficiency, document security, and service quality. The integration of quantitative evaluation strengthens the validity of the findings and demonstrates the practical impact of the implemented system in a governmental context.

4. CONCLUSION

This study demonstrates that the implementation of a Digital Correspondence Administration System significantly improves service efficiency in local government offices. The results indicate a 61.11% reduction in average processing time, a 92.86% decrease in document loss, and a 72.73% reduction in service complaints. These improvements confirm that workflow automation, digital archiving, and real-time tracking effectively address the limitations of manual correspondence management. Furthermore, the user satisfaction index of 84% reflects strong acceptance and perceived usefulness among administrative staff. The structured implementation approach, supported by quantitative pre-test and post-test evaluation, ensures that system effectiveness is objectively measured rather than assumed. Overall, the digital system enhances transparency, accountability, and operational performance. This research provides a practical and replicable model for digital transformation initiatives in public sector administration, demonstrating that technology adoption can produce measurable and sustainable improvements in governance and service delivery efficiency.

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