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A WEB-BASED QUICK RESPONSE (QR) CODE IDENTIFICATION MANAGEMENT SYSTEM FOR THE BIDS AND AWARDS COMMITTEE (BAC) OF SAN JOSE LOCAL GOVERNMENT UNIT (LGU)

AN UNDERGRADUATE RESEARCH PROJECT

Presented to the Faculty of the College of Arts, Sciences, and Technology
OCCIDENTAL MINDORO STATE UNIVERSITY
San Jose Campus

In Partial Fulfillment of the Requirements for the Degree
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

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CHAPTER 1

INTRODUCTION

Background of Study

Government procurement requires transparent, competitive, and accountable procedures in the acquisition of goods, infrastructure projects, and consulting services. In the Philippines, the Bids and Awards Committee (BAC) carries out key activities such as evaluating bids and recommending contract awards. Republic Act No. 12009, or the New Government Procurement Act, promotes the use of technology to improve efficiency, transparency, and accountability in procurement.

Digital systems can help procurement personnel organize records and document activities throughout the bidding process. In a study conducted in Surabaya, Indonesia, Novitaningrum (2024) found that e-procurement improved transparency and accountability. The study also emphasized that technology must be supported by proper procedures and responsible implementation.

The BAC of the Municipality of San Jose receives procurement records through both manual and online processes. Requesting offices submit hardcopy purchase requests, and bidders pay bidding document fees manually. Bidders may submit bids online through the system or physically to the BAC. A centralized platform is therefore needed to organize online submissions, record manually received bids, and link bidder profiles, bidding histories, and payment records.

This study therefore proposes a web-based Quick Response (QR) Code Identification System for the BAC of the Municipality of San Jose. Each bidder company

will have a QR code linked to its profile in the system. When scanned by authorized personnel, the code will provide access to the company's profile and recorded bidding history. The system will also record bids received by the BAC and include access controls and safeguards for stored information in line with the Data Privacy Act of 2012. The study will evaluate the system's accuracy, usability, and usefulness in managing bidder profiles and submission records.

Objectives of the Study

The primary objective of this study is to develop and evaluate a Web-based Quick Response (QR) Code Identification Management System for the Bids and Awards Committee (BAC) of the Municipality of San Jose. The system aims to support the management of bidder company profiles, bidding histories, supporting documents, procurement requests, and online bid submissions and records of manually received bids. Specifically, this study aims to:

1. Design a web-based system with the following features for each user type:

a.) Administrator

a.) Provides a dashboard overview of procurement activities and records;

b.) Manages records of hardcopy purchase requests received from requesting offices;

c.) Creates, updates, and monitors procurement projects;

d.) Reviews bidder registrations and manages bidder eligibility records;

e.) Records and monitors bidding document fee payments;

f.) Manages procurement awards and contract records;

g.) Maintains supplier information and user accounts;

h.) Assigns BAC staff to procurement projects;

i.) Generates procurement reports and analytics;

j.) Maintains audit logs of user actions and system activities;

k.) Provides information about the BAC office and the system through an About page;

l.) Enables communication with bidders and staff through messaging; and

m.) Provides notifications about procurement activities and updates.

b.) Bidder

a.) Provides a dashboard overview of bidding activities;

b.) Displays available procurement projects and their requirements;

c.) Allows online bid submission and the viewing of records of online and manually submitted bids;

d.) Enables tracking of bid submission status;

e.) Displays awarded projects and related contract records;

f.) Allows the updating of company profiles and required documents;

g.) Enables communication with authorized personnel through messaging; and

h.) Provides notifications about projects, submissions, payments, and awards.

c.) Bac Staff

a.) Provides a dashboard overview of assigned procurement activities;

b.) Allows the viewing and processing of purchase requests within assigned responsibilities;

c.) Displays assigned procurement projects for monitoring;

d.) Supports the review of submitted bids and quotations;

e.) Records and monitors bidding document fee payments within authorized access;

f.) Generates reports on assigned procurement activities;

g.) Enables communication with administrators and bidders through messaging; and

h.) Provides notifications about assigned projects and pending tasks.

2. Develop web applications using the following technologies and tools:

a) PHP with the Laravel framework;

b) Neon PostgreSQL;

c) HTML;

d) CSS;

e) JavaScript;

f) Python;

g) Visual Studio Code; and

h) GitHub.

3. Test and improve the system's QR code scanning, profile and bidding history retrieval, bid receipt recording, document review, request monitoring, notifications, and access permissions.

4. Evaluate the developed system using a standard software quality evaluation tool and feedback from administrators, authorized BAC staff, bidders, and IT evaluators.

Significance of Study

Local Government Unit (LGU). The proposed system will provide the Municipality of San Jose with a centralized platform for maintaining procurement records, bidder company profiles, and online bid submissions and records of manually received bids. These organized records may support the retrieval of information, monitoring of procurement activities, and preparation of reports for administrative review.

Bids and Awards Committee (BAC), Administrators, and Authorized Staff. The system will assist BAC personnel in recording received bids, reviewing supporting requirements, monitoring document status, and maintaining bid fee payment records. Scanning a bidder's QR code will allow authorized personnel to access its company profile and recorded bidding history. These features may make record retrieval and submission monitoring more efficient.

Bidders and Suppliers. The system will enable bidders to maintain their company profiles, view procurement opportunities, access their QR codes and bidding histories, and monitor the status of uploaded supporting requirements. Notifications concerning incomplete documents or requested revisions may help bidders respond to the BAC's findings and follow the progress of their records.

Community and Public Stakeholders. The system may support transparency by making approved procurement information available through its public features while

restricting access to confidential records. More organized procurement records may also help the LGU respond to requests for information and support public accountability.

Future Researchers. This study may serve as a reference for developing web-based procurement record management systems that use QR codes to retrieve company profiles and transaction histories. Its development procedures and evaluation findings may guide further research on record retrieval, access controls, document monitoring, and the usability of government information systems.

Conceptual Framework

The conceptual framework follows the Input–Process–Output (IPO) model, as illustrated in Figure 1. It presents the requirements, development activities, and intended output of the proposed Web-based Quick Response Code Identification system management for Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU).

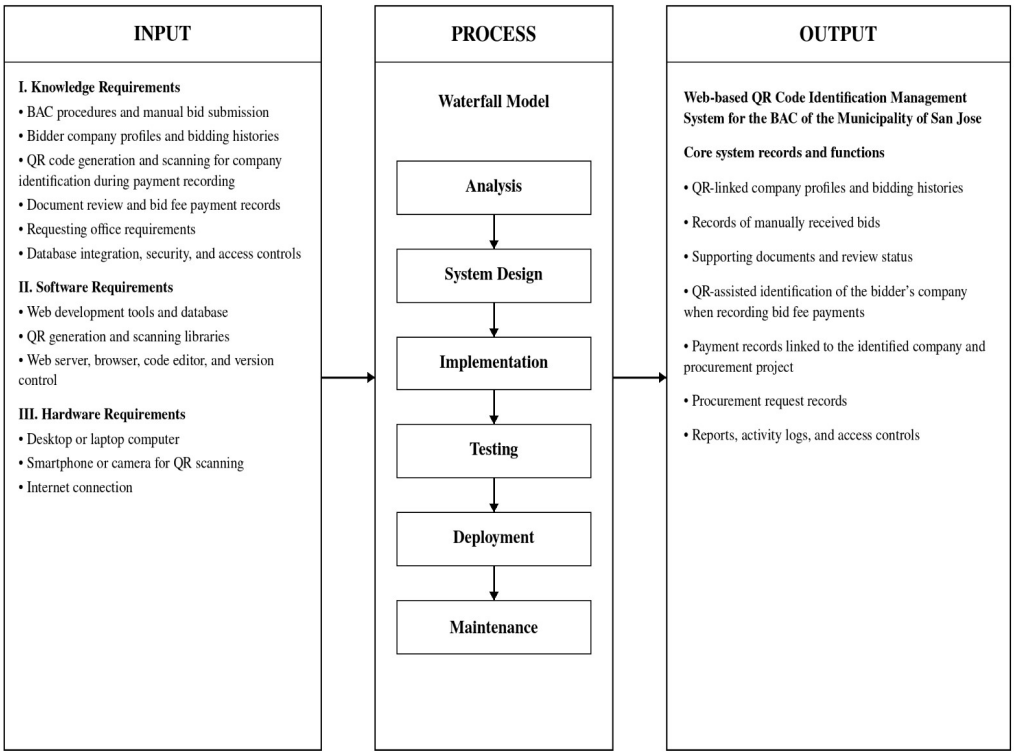

Figure 1. Input–Process–Output Paradigm of the Web-based QR Code Identification Management for Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Scope and Limitations

This study focuses on the design, development, testing, and evaluation of "A Web-based Quick Response Code Identification system management for Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)." The system will serve administrators and authorized BAC staff, bidders and suppliers, within San Jose LGU;

requesting offices submit hardcopy PRs and have no login accounts. System development is scheduled for completion during the first full week of October 2026, while testing and evaluation will be conducted within October 2026

The system will maintain bidder company profiles and recorded bidding histories. Each company's QR code will allow authorized BAC personnel to retrieve these records. Other functions will include procurement opportunity management, supporting document storage and review, status updates and revision notifications, bid fee payment records, reports, and activity logs. Authorized BAC personnel will maintain purchase request records and provide status updates to requesting offices. Access to system functions and information will depend on assigned user permissions.

The system supports online and manual bid submission. Bidders may submit bids and supporting documents through the online platform or physically to the BAC. Authorized BAC personnel encode records of manually received bids. Purchase requests and bidding document fee payments remain manual transactions recorded by authorized personnel. Requesting offices have no login accounts. Evaluation covers the system functions, QR-linked record retrieval, and access controls through testing and participating users' feedback.

The study is limited to the requirements and procedures of the BAC of San Jose LGU. Its findings may have limited applicability to other government offices with different procurement workflows. System access, document uploads, and notifications will depend on internet connectivity, compatible devices, and the availability of the hosting service.

QR code scanning will retrieve the company record associated with the code. Authorized personnel will still need to confirm the identity or authority of the person

presenting it. The accuracy of bidding histories, document statuses, and payment records will depend on correct data entry and review. Bidding document fees are paid manually. The system will record those payments but will not, by itself, confirm that payment has been received. Decisions concerning bidder qualification, document validity, and contract awards will remain with authorized officials.

Available time, resources, and the number of participating users may limit the extent of testing and evaluation. Privacy and security safeguards will be incorporated into the system's design; however, the evaluation will assess selected system functions and controls rather than provide formal certification of compliance with data privacy requirements.

Operational Definition of Terms

For better understanding, the following terms are defined according to their use in this study.

Quick Response (QR) Code. A digital code generated for a registered bidder company and linked to its record in the system. Authorized BAC personnel can scan the code to retrieve the company's profile and recorded bidding history and identify the company when recording bidding document fee payments.

QR Code Identification System. The system function that generates company QR codes, links them to bidder records, and retrieves the corresponding company information when scanned, including during payment recording.

QR Code Scanner. A browser-based tool that uses a compatible device's camera to read a company's QR code and retrieve its linked record for company identification and payment recording.

Administrator and Authorized BAC Staff. Personnel who manage procurement records, bidder profiles, document reviews, purchase request records, bidding document fee payment records, reports, and other system functions according to their assigned permissions.

Admin Control Panel. The interface through which administrators and authorized BAC staff access and manage the system's records and functions.

Bidder or Supplier. A company or business registered in the system that participates in procurement opportunities and maintains a company profile and supporting documents.

Bidder Registration Module. The system function used to record a bidder company's information and establish its profile. Registration in the system does not automatically establish eligibility or qualification for a particular procurement opportunity.

Company Profile. The digital record containing a bidder company's registered information and associated records, accessible according to user permissions.

Bidding History. The recorded list of procurement activities in which a bidder company has participated, including submission statuses and outcomes entered by authorized personnel.

Purchase Request (PR). A hard copy of the document submitted by a requesting LGU office to the BAC to communicate its procurement needs. Authorized BAC personnel

enter its relevant details into the system; the requesting office does not directly submit or manage the PR through the system.

Purchase Request Record. The digital record created by authorized BAC personnel based on a hardcopy purchase request received from a requesting LGU office. It contains the request's relevant details and recorded status.

Procurement Opportunity. A posted project or procurement requirement that bidders can view through the system.

Manual Bid Submission. The procedure in which a bidder physically submits a bid to the BAC, after which authorized BAC personnel record its receipt in the system. Online Bid Submission. The alternative procedure in which a bidder submits a bid and supporting documents through the system.

Bid Receipt Recording. The process of entering information about a physically received bid and linking it to the appropriate bidder company and procurement opportunity.

Supporting Documents. Files uploaded or stored in the system to support bidder registration, document review, and procurement record management.

Document Review. The examination of supporting requirements by authorized BAC personnel to record their completeness, identify issues, and communicate requested revisions. Recorded review statuses do not independently establish document authenticity or bidder qualification.

Document Status. The recorded condition of a supporting requirement, indicating whether it is complete, incomplete, under review, or requires revision, as applicable.

QR-Assisted Payment Recording. The process in which authorized BAC personnel scan a bidder company's QR code to retrieve and confirm its identity before

entering bidding document fee payment details. Scanning identifies the company and does not, by itself, process or confirm payment.

Bid Fee Payment Record. A digital record of a bidder company's payment for bidding documents, linked to the company identified through QR scanning. It includes the relevant procurement opportunity, amount, payment date, receipt or reference number, and recorded payment status.

Procurement Monitoring. The use of recorded procurement, purchase request, submission, and payment information to follow the progress of activities within the system.

Notifications. System messages or email updates informing users about document statuses, requested revisions, payment record updates, and relevant procurement activities.

System Authentication. The process of checking a user's login credentials before allowing access to an account.

Access Control. The assignment and enforcement of permissions that determine which records and functions a user can view or modify.

Activity Logs. Records of system actions, such as logins and changes to procurement, bidder, document, or payment information, used to help trace recorded activities.

Document Repository. The system's storage area for organizing and retrieving procurement and bidder documents according to access permissions.

Bids and Awards Committee (BAC). The committee within San Jose LGU whose authorized personnel will use the system to support procurement record management and related activities.

Local Government Unit (LGU). The municipal government of San Jose, Occidental Mindoro, which serves as the study's implementation and evaluation setting.

Web-Based Platform. The application environment that allows authorized users to access system functions through a compatible web browser.

Database. The organized collection of stored company profiles, bidding histories, payment records, document information, purchase request records, and activity logs used by the system.

Reports and Analytics. Summaries and presentations of recorded system data that assist authorized personnel in monitoring procurement activities and preparing reports.

Web Server. The hosting service or computer that runs the web application and makes its functions accessible through a network connection.

CHAPTER II

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter reviews literature and studies relevant to the developed and deployed web-based Quick Response (QR) Code Identification System Management for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU).

Digitalization of Government Procurement

Digitalization offers opportunities to improve the handling of government procurement activities. According to the Department of Budget and Management (DBM, 2023), digitalization and innovation were important directions of the procurement reform proposed at that time. The department identified electronic bidding and the modernization of centralized procurement as approaches to streamlining government purchasing procedures.

The modernization of procurement subsequently became an important direction under Republic Act No. 12009. According to the Government Procurement Policy Board–Technical Support Office (GPPB-TSO, 2024), the New Government Procurement Act emphasizes emerging technologies, innovative solutions, transparency, efficiency, and accountability. These principles provide a policy context for information systems that assist procurement personnel.

Nevertheless, digital tools require effective institutional practices. Procurement reporting and accountability improved in Surabaya's electronic procurement environment, according to Novitaningrum (2024). The study also recognized continuing fraudulent

practices and the importance of ethical conduct and law enforcement. This indicates that technology alone cannot guarantee procurement integrity.

These sources support the relevance of the present study to government procurement digitalization. The deployed system provides access to procurement opportunities, online document submission, status monitoring, and organized records. Its contribution must be evaluated in relation to its actual functions and the procedures followed by the San Jose LGU BAC.

Web-Based Systems and Centralized Records Management

Understanding institutional procedures is necessary when developing a records management application. According to Alade (2023), requirements for a web-based electronic document management system were gathered through interviews, stakeholder accounts, and examination of existing workflows. The study demonstrates how organizational needs can guide the design of document management functions.

A similar approach is relevant to Philippine public offices. A web-based records management system addressed manual record-keeping concerns in the Office of Senior Citizen Affairs, according to the author-contributed summary of Libadia et al. (2025). The summary emphasizes record accessibility, information security, and governance requirements.

The organization of digital archives also depends on an appropriate database structure. According to Safudin et al. (2024), their application for the Gunungsindur District Office incorporated requirements analysis and database modeling to support

document storage and searching. This illustrates the relationship between user needs and the arrangement of digital records.

These studies inform the centralized records management functions of the present system. Company profiles are associated with procurement projects, bidding history, documents, submission records, and bid fee payment records. Maintaining these relationships allows authorized personnel to locate information within a common platform.

The accuracy of these records depends on consistent encoding and updating. Bidding history represents the company's participation recorded in the application, while payment entries must correspond to official receipts or other supporting records. Neither record should be interpreted as information independently verified by the software.

Online Document Submission and Tracking

Electronic document management involves more than storing files. Documents must remain connected to the activities and users responsible for them. According to Alade (2023), a web-based application can organize institutional documents around established workflows and support access to relevant information.

Access restrictions are equally important in digital repositories. Authentication and authorization formed part of the archive application examined by Safudin et al. (2024). According to the authors, continued security testing and user training were also recommended, showing that reliable document management requires operational support.

Tracking information can help users follow the movement and status of records. According to Acedo et al. (2025), a document tracking system for Catanduanes State

University combined a centralized database with QR codes that identified documents and supported status monitoring.

These findings are relevant to the present system's online submission, document review, and repository functions. Uploaded files must be linked to the correct bidder company and procurement project. Status information and notifications help communicate whether requirements are complete, incomplete, or need revision.

Records should also distinguish online submissions from documents received physically by the office. A completeness status communicates the outcome of requirements checking; it does not independently establish document authenticity, bidder eligibility, or the award of a contract. Such decisions remain subject to the appropriate procurement review.

QR Code Technology and Information Retrieval

QR codes provide a practical connection between a readable symbol and digital information. According to DENSO Corporation (2020), the technology was developed to handle information in an easily readable format and later expanded into applications such as inventory management, electronic tickets, and information sharing.

Scanning can also support the recording and retrieval of application data. QR technology was integrated into a mobile time-utilization tracking application, according to Nicolas (2019). Although the application served a different purpose, it demonstrates the use of scanned codes in an organized information-processing workflow.

Within institutional document management, QR codes can identify associated records. According to Acedo et al. (2025), their web-based tracking system linked QR

codes with document information and status. This provides an example of connecting scanning with information maintained in a centralized application.

The present study applies this approach to bidder companies. A company's QR code allows authorized personnel to retrieve its profile and recorded bidding history. The function supports record identification and access to associated information.

However, the code does not independently verify the identity of its presenter or authenticate the company's documents. Its usefulness depends on accurate links between the code and database records, together with permissions that control access to the retrieved information.

Information Security, Access Control, and Data Protection

Government information systems require safeguards for personal data. National Privacy Commission Circular No. 2023-06 addresses the security of personal data in the government and the private sector and expressly repeals Circular No. 16-01 (National Privacy Commission [NPC], 2023). It provides a current regulatory basis for organizational, physical, and technical safeguards, including appropriate access restrictions and security measures.

Security controls should correspond to organizational needs and risks. According to the Joint Task Force (2020), NIST Special Publication 800-53 Revision 5 provides adaptable security and privacy controls. Relevant areas include access control, identification and authentication, audit and accountability, and contingency planning.

Information protection also requires an organizational management approach. ISO/IEC 27001 establishes requirements for an information security management system,

according to the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC, 2022). Its approach includes identifying and addressing information security risks.

These references support access permissions that reflect the responsibilities of the system's users. Administrators and authorized BAC staff manage procurement records according to assigned permissions. Bidders access their company records and online submission functions. Requesting offices have no login accounts; BAC personnel encode their hardcopy purchase requests.

Restrictions must also apply to QR-linked information and stored documents. Activity records can support the review of transactions and changes, provided that they are accurate and protected. Applying these principles does not automatically establish certification or legal compliance; safeguards must be considered alongside current regulatory requirements and LGU policies.

Web Development Technologies and Implementation

The developed system uses Laravel as its application framework, GitHub for source code management, Vercel as its deployment platform, and Neon for hosting its PostgreSQL database. These technologies perform different roles in developing, maintaining, and operating the application. The following literature explains capabilities relevant to their use in the study.

Laravel

An application framework provides conventions and components that help organize web application development. According to Otwell (2023), Laravel 10 introduced

improvements to application method signatures and class templates, including argument and return types. These changes illustrate the framework's support for more explicitly defined application code.

The organization of application components also affects development and maintenance. Laravel 11 introduced a simplified application structure while retaining customization of routing, middleware, and exception handling, according to Otwell (2024). These capabilities provide developers with mechanisms for organizing requests and application behavior.

Laravel's development tools also include starting structures for common application functions. According to Sam (2025), the updated starter kits provide scaffolding for authentication, dashboards, and user profile settings. The announcement also discusses developer tools supporting routes, configuration, middleware, and code diagnostics.

These sources explain framework capabilities relevant to the present study. Laravel provides the application framework through which the researchers implement the system's procurement and records management functions. These include processing requests associated with company profiles, document submissions, bidding history, and payment records.

The reviewed announcements describe different stages of Laravel's development. They do not indicate that the present system uses every feature discussed. The actual framework version and implemented components must be identified in the methodology.

Vercel

Deployment platforms connect application development with an environment accessible to users. According to Ding et al. (2020), Vercel allows projects to designate a production Git branch and distinguishes production deployments from preview deployments. This arrangement supports separate handling of changes intended for review and those intended for public use.

Integration with source code repositories can support the deployment workflow. Hallie (2023) explains that Vercel's Git integration can respond to commits by initiating deployments. According to the article, preview environments also allow collaborators to examine changes and provide feedback. The discussion provides a historical explanation of the platform's deployment approach.

Controlled release procedures are another deployment consideration. According to Knichel and Massa (2024), Vercel supports workflows in which checks can be completed before a deployment is promoted to production. Their discussion illustrates how deployment availability can be coordinated with validation procedures.

These sources are relevant to Vercel's role in the present system's deployment. Hosting makes the deployed application accessible through its configured web address, while repository integration can support the delivery of application changes.

The specific build process, runtime configuration, and connection between deployed components must be documented according to the actual implementation.

GitHub

Source code management helps developers preserve changes and understand how an application evolves. According to Dye (2022), well-organized Git commits communicate the history and purpose of code changes. Meaningful commits can assist developers in reviewing modifications and investigating the origin of problems.

Repository-based workflows can also support automated development activities. Patterson (2020) discusses GitHub Actions workflows associated with forks and pull requests. According to the article, permissions and access to repository secrets are important considerations when configuring these workflows. This emphasizes the relationship between development automation and repository security.

Project maintenance also benefits from tracking development activities. According to Koppert (2023), GitHub's Issue Metrics Action can measure information associated with issues, pull requests, and discussions, including response and completion times. Such information can help maintainers understand collaboration and project progress.

These sources support GitHub's role as the source code repository of the present system. Git-based history provides a reference for reviewing revisions and maintaining the application during development and after deployment.

The platform's additional capabilities, including Actions and issue metrics, are discussed as related technical literature. Their availability does not imply that the researchers implemented them. The methodology should describe the repository practices actually followed in the project.

Neon and PostgreSQL

Database hosting provides an operating environment for maintaining application data. According to Shamgunov (2024), Neon provides a PostgreSQL-based platform whose architecture separates storage and compute. The article explains how this arrangement supports database development capabilities such as branching and independent management of computing resources.

Separate database environments can assist developers when making changes. Neon's database branching creates a copy-on-write branch that can be modified independently of its parent, according to Chebri (2023). The article also describes branch reset as a way of updating a development branch with the parent's data and schema.

Recovery is another consideration in database management. According to Abdelwahab (2023), Neon's branching capabilities can be used to restore data to a previous state. The article demonstrates a recovery approach based on database branches, providing a technical reference for planning database maintenance and recovery procedures.

These sources establish the relevance of Neon to the present study's database environment. The system uses PostgreSQL hosted on Neon to maintain structured information associated with bidder companies, procurement projects, bidding history, document records, submissions, and bid fee payments.

Neon's available features should be distinguished from those actually configured in the application. The database connection, access restrictions, and recovery arrangements must be documented and tested according to the deployed setup. Database hosting should also be distinguished from the storage service used for uploaded files.

System Design and Software Quality Evaluation

Software quality evaluation requires defined criteria and evidence. ISO/IEC 25010:2011 contains eight product quality characteristics. This study used seven selected characteristics: functional suitability, performance efficiency, compatibility, usability, reliability, security, and portability. Functional suitability is labeled Functionality in the questionnaire. Maintainability was outside this user-rating instrument; the findings therefore do not represent assessment of all eight characteristics. The revised ISO/IEC 25010:2023 model contains nine characteristics, whereas this study retained the 2011-based labels (ISO/IEC, 2011, 2023).

Measures must also be interpreted in context. ISO/IEC 25023 provides quantitative measures for system and software product quality, according to ISO/IEC (2016). It does not prescribe universal grading ranges because interpretation depends on the product, user needs, and other relevant factors.

The clarity and accessibility of the interface are additional considerations. According to the World Wide Web Consortium (W3C, 2023), the Web Content Accessibility Guidelines 2.2 include criteria concerning understandable content, interaction, and identification of input errors. These are relevant to users completing online forms and other application tasks.

These references support the evaluation of the deployed BAC system. Relevant tasks include viewing opportunities, submitting bids online, uploading documents, monitoring status, retrieving company records through QR codes, and managing submission and payment records.

Assessment should examine correct outputs, successful task completion, response times, reliability, access restrictions, and interface clarity. User feedback should be supported by functional testing and appropriate technical observations. The selected standard edition, criteria, respondents, instrument, and evaluation procedures must be explained in the methodology.

Deployment establishes availability in an operating environment. Evidence from testing and evaluation is still necessary to determine how well the system performs its intended functions.

Related Studies

Procurement digitalization provides one point of comparison for the present study. According to Novitaningrum (2024), the Surabaya study used a descriptive qualitative approach to examine transparency and accountability. It connected electronic procurement with improved reporting while identifying continuing institutional risks. The present study focuses on online procurement functions and local records management within the San Jose LGU BAC.

Public-office records management provides another comparison. According to Libadia et al. (2025), their study addressed manual record-keeping in the Office of Senior Citizen Affairs. Its organizational setting supports the importance of adapting digital functions to public-office responsibilities. The present application differs through its focus on bidder companies, procurement submissions, bidding history, and payment records.

QR-supported information processing offers a third comparison. A time-utilization tracking application was examined through respondents and IT experts, according to

Nicolas (2019). This demonstrates the relevance of user and technical perspectives when assessing a QR application. Since the present system retrieves company profiles and bidding history, its evaluation must focus on those tasks.

Together, these studies provide perspectives on procurement governance, institutional records, and QR-based information processing. They inform the present research without establishing that identical outcomes will occur in the San Jose LGU setting.

Synthesis of the Reviewed Literature and Studies

Digital procurement requires institutional support, according to Novitaningrum (2024). This reinforces the importance of maintaining appropriate review procedures alongside the system's online functions.

The design of document management applications should reflect stakeholder needs and existing workflows, according to Alade (2023). This supports organizing functions around the responsibilities of BAC personnel, bidders, and requesting offices.

Web-based records management can address the information needs of a particular public office, according to Libadia et al. (2025). This highlights the relevance of developing an application suited to its implementing organization.

The reviewed literature supports integrating online procurement activities, document submission, centralized records, and QR-based retrieval. The present system applies these concepts to bidder company profiles, bidding history, procurement documents, submission records, and bid fee payment records.

The study's contribution lies in bringing these functions together for the identified San Jose LGU BAC workflow. Evaluation of the deployed application will provide evidence of its suitability for users and its performance in supporting the intended activities.

CHAPTER III

METHODOLOGY

This chapter presents the project design, development process, operational procedures, testing procedures, and evaluation procedures for the developed system.

Project Design

The project design of "A Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)" consists of public pages and modules for the Administrator, BAC Staff, and Bidder/Supplier. Figure 2 shows the hierarchical arrangement of these components

The public pages display announcements, BAC information, procurement opportunities, awards and contracts, and contact details. Administrator and BAC Staff modules support procurement management, bidder records, document review, payment recording, reports, and activity monitoring according to assigned permissions. Authorized personnel encode hardcopy purchase requests and physically received bids. QR scanning retrieves company profiles and bidding histories and identifies companies when recording bidding document fee payment

The Bidder/Supplier modules allow users to update company information, view available projects, submit bids online, upload supporting documents, monitor recorded submission and document statuses, access company QR codes, and receive messages and notifications.

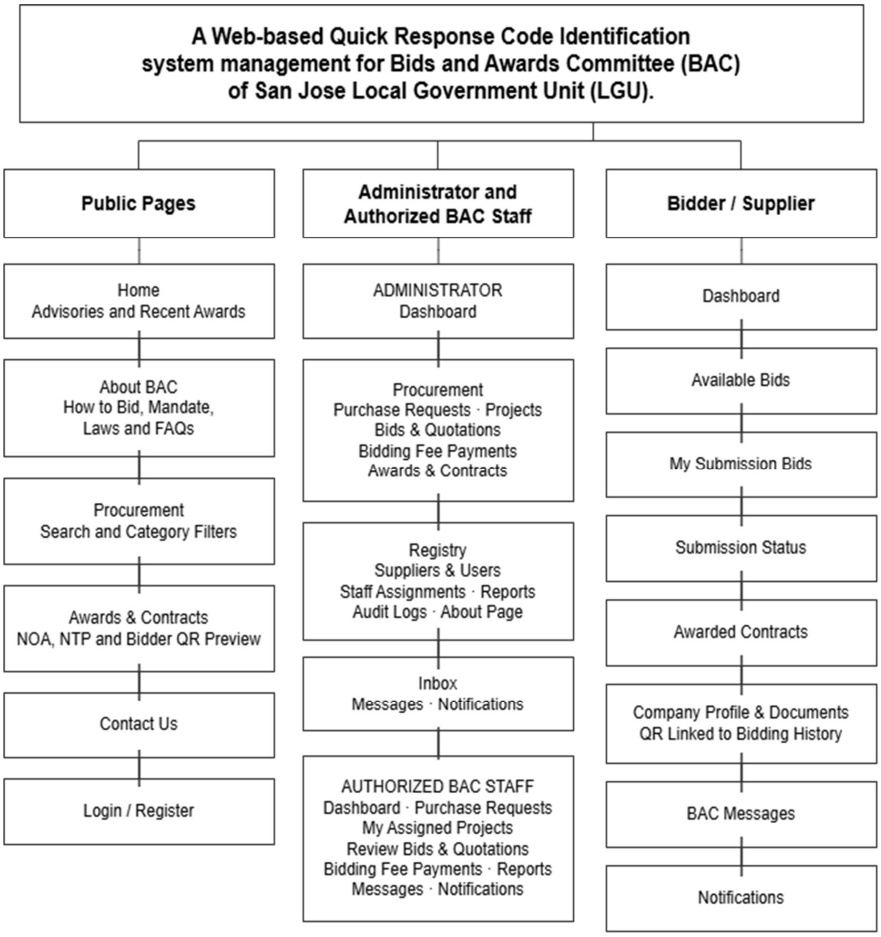

Fig. 2. Hierarchical Diagram of a Web-based Quick Response Code Identification system management for Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

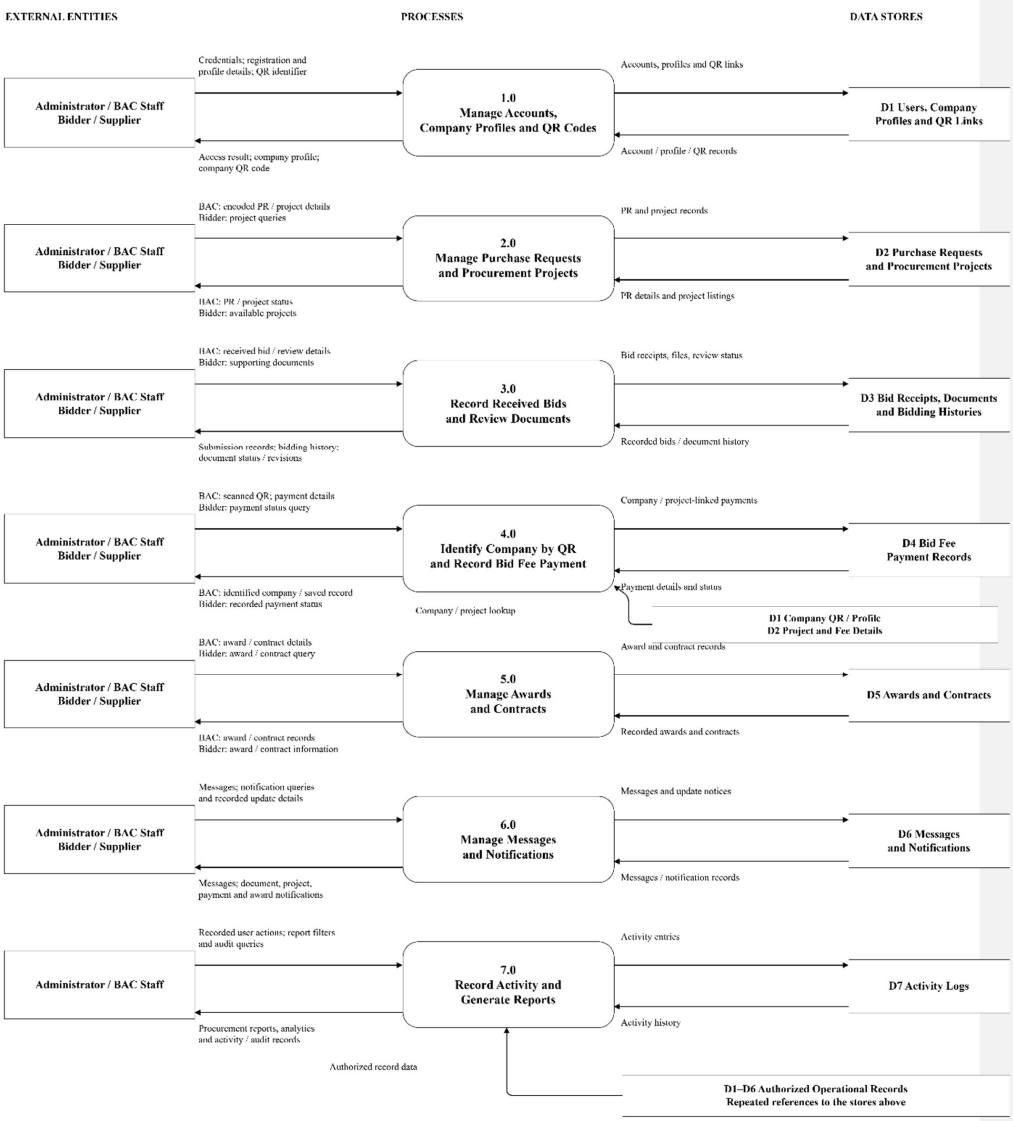

Fig. 3. Data Flow Diagram of a Web-based Quick Response Code Identification system management for Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

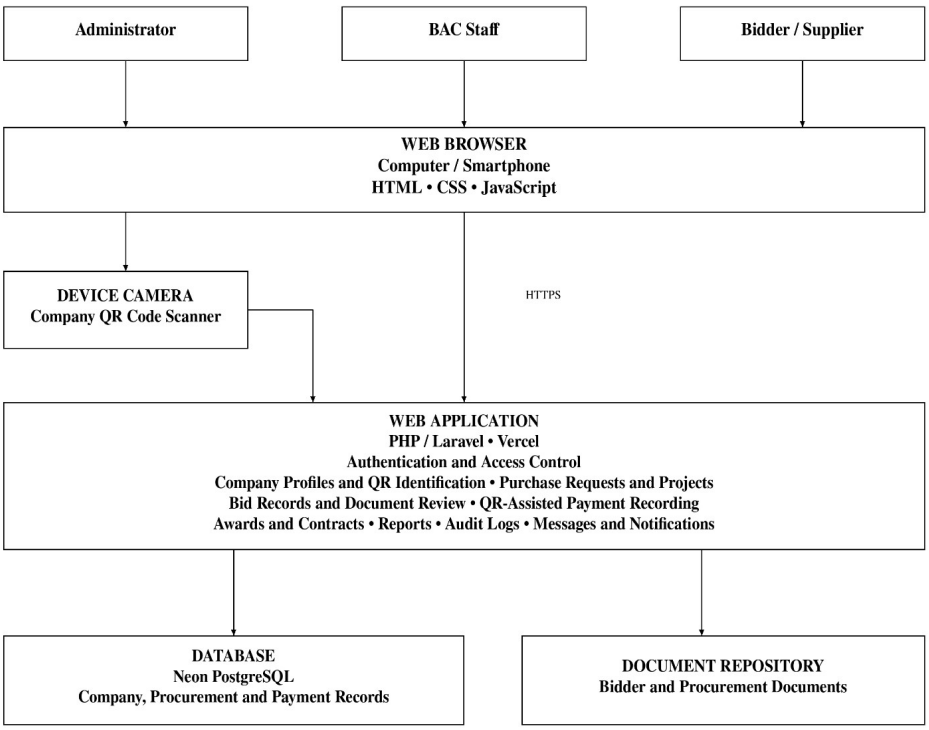

Fig. 4. Architecture diagram of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

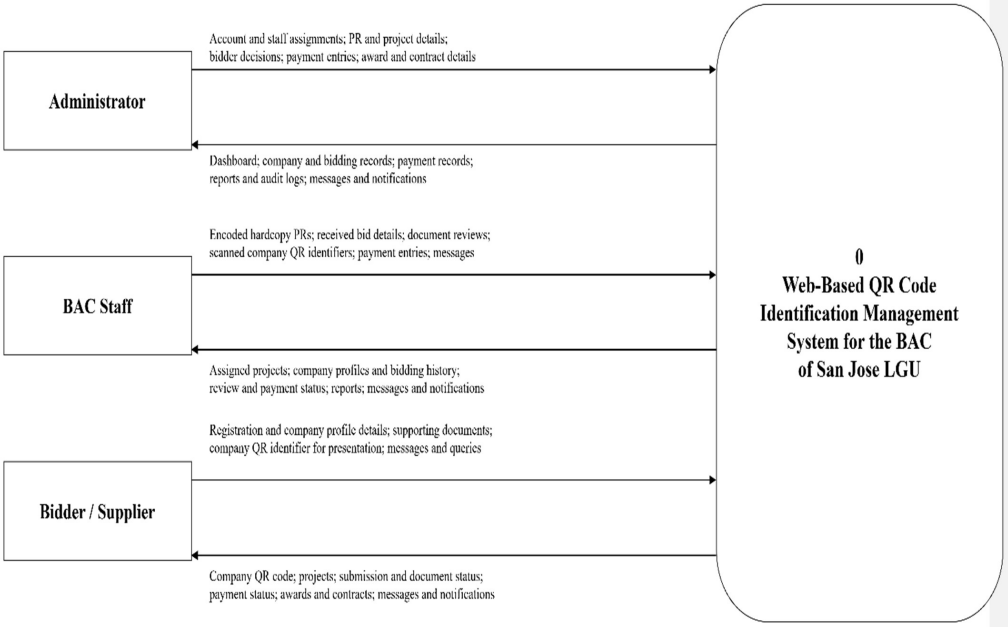

Fig. 5. Context Diagram of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Project Development. The researchers used the Waterfall Model to organize development into requirements analysis, system design, implementation, testing, deployment, and maintenance, as illustrated in Figure 6. These phases guided the development and refinement of procurement records, online and manual bid submission records, company QR identification, and manual payment recording functions.

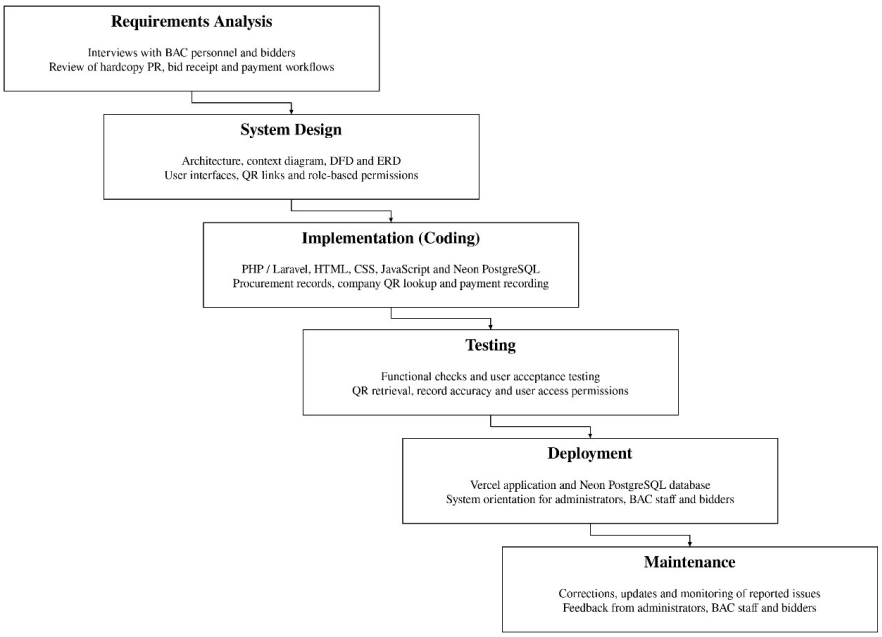

Fig 6. Waterfall Model of A web-based Quick Response Code Identification for Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Requirements Analysis. The researchers identified BAC record management needs through interviews and document reviews. Requirements covered company identification, hardcopy purchase request encoding, online bid submission, recording of manually received bids, and recording of manually paid bidding document fees.

System Design. The researchers prepared system diagrams, database structures, interfaces, and workflows for administrators, BAC staff, and bidders. The design included QR-linked company records, online submissions, manual bid receipt records, document review, and access permissions. Requesting offices were not assigned login accounts.

Implementation. The researchers developed the web application using PHP and Laravel, HTML, CSS, JavaScript, and PostgreSQL hosted on Neon. The implemented modules supported the procurement and record management requirements identified for the BAC.

Testing. Functional checking addressed QR scanning, linked company records, online bid submission, manual bid receipt entries, payment records, and access permissions. User evaluation provided feedback on seven selected software quality characteristics. The resulting ratings are reported in Chapter IV.

Deployment. The application was deployed using Vercel with its PostgreSQL database hosted on Neon. Authorized users accessed system modules through a compatible browser. Access depended on internet connectivity, hosting availability, and assigned user permissions.

Maintenance. Revisions addressed interface consistency, navigation, record presentation, QR identification, and payment recording. Continued correction of reported issues and review of user feedback support maintenance of the deployed system.

Operation Procedure

1. Open a web browser on a smartphone, tablet, laptop, or desktop with an active internet connection.
2. Enter the official system URL and wait for the homepage to load.
3. Browse publicly available information, such as published bidding opportunities, bidding schedules, awarded projects, and documents authorized for public access.
4. Use the available search, filter, and sort functions to locate relevant projects and published records.
5. Log in using an authorized account to access the dashboard and functions assigned to the user's role.
6. For authorized BAC personnel, encode the relevant details of hardcopy purchase requests received from requesting offices.
7. Monitor the procurement request status and update request information when permitted or when corrections are requested.
8. For Administrators/BAC Secretariat personnel, review procurement requests, record review decisions, and manage bidding projects according to assigned permissions.

9. Upload or update bid documents and other project records authorized for publication.
10. For Bidders/Suppliers, view procurement opportunities and submit bids online or physically to the BAC. Pay bidding document fees manually and monitor recorded submission and payment statuses through the bidder account.
11. Access the assigned company QR code and present it to authorized BAC personnel for company identification or payment recording.
12. For authorized BAC personnel, scan company QR codes, retrieve linked records, review accessible documents, and record review results within their assigned permissions.
13. Check notifications for request updates, new submissions, document revisions, and other relevant transactions.
14. For authorized administrators, review monitoring reports and verify that procurement requests, submissions, payments, evaluations, and QR transactions are correctly recorded.
15. Report system issues or provide feedback when necessary, then log out after completing the transaction.

Testing Procedure

1. Prepare test cases with defined inputs, expected outputs, and pass or fail criteria for each system function.

2. Test the system using available browsers, including Chrome, Firefox, Safari, and Edge, and record the browser versions used.
3. Test compatibility using available desktop and mobile devices, including Android devices within the target Android 8.0–13 range. Document the versions actually tested.
4. Evaluate loading times and responsiveness on test devices with at least 4GB RAM, recording their specifications and network conditions.
5. Check the interface on mobile, tablet, and desktop screen sizes to verify readable content, usable controls, and responsive layouts.
6. Test hardcopy purchase request encoding, required-field validation, document uploads, request review, and recorded status updates by authorized BAC personnel.
7. Test project posting, document uploading, search, filtering, sorting, and access to published bidding information.
8. Test online bid submission and BAC encoding of manually received bids, including required fields, linked documents, submission statuses, and revision notices. Check the recording of manually paid bidding document fees.
9. Test company QR code generation, record retrieval, and payment-record association using valid, invalid, and unreadable QR codes.
10. Verify login, logout, session handling, and role-based access. Confirm that users cannot access or modify records outside their assigned permissions.

11. Check applicable deadlines and workflow restrictions, including whether transactions are accepted or blocked at the correct stages.
12. Test notifications and verify that the intended users receive accurate transaction updates.
13. Assess system behavior under different internet connection conditions, including mobile data, Wi-Fi, and interrupted connections.
14. Conduct user acceptance testing with selected administrators, authorized BAC staff, bidders or suppliers, and IT evaluators.
15. Record identified issues, apply corrections, and repeat affected test cases to confirm that the problems have been resolved.

Evaluation Procedure

The system was evaluated by 20 respondents: 10 IT experts, two administrators, three BAC staff members, and five bidders. The questionnaire covered seven selected characteristics based on ISO/IEC 25010:2011: functionality, performance efficiency, compatibility, usability, reliability, security, and portability. The following procedures distinguish functional checking, demonstration, and questionnaire evaluation.

1. Preliminary Evaluation

    a. Preliminary checking focused on system functions and the procurement record management requirements identified for the BAC.

Commented [MR1]: Confirm from actual research records: evaluation date(s), evaluator selection and IT-expert qualifications, questionnaire provenance/review, consent, and supporting test records. Do not claim unsupported measurements or validation. Libadia et al. was checked through an author-contributed summary, not the full article.

b. Functional checks covered hardcopy purchase request encoding, online bid submission, manual bid receipt recording, supporting documents, company QR identification, and manual fee payment recording.

c. Login, assigned permissions, document handling, and data storage formed part of the checking scope.

d. Identified issues provided a basis for corrections and further checking.

2. Project Demonstration

a. The participating evaluators comprised IT experts, administrators, authorized BAC staff, and bidders.

b. The demonstration concerned tasks appropriate to each role. BAC functions included encoding hardcopy PRs, recording manual bids and fee payments, reviewing documents, and scanning company QR codes. Bidder functions included company profiles, online bids, document uploads, and status monitoring.

c. The questionnaire used five-point ratings to assess functionality, performance efficiency, compatibility, usability, reliability, security, and portability. Accessibility-related items were included under usability rather than treated as a separate reported criterion.

d. Demonstration activities and user feedback supported the review of system functions. Questionnaire ratings represent evaluator judgments rather than independently measured response times or security certification.

e. Feedback informed the system refinements described in Chapter IV.

3. Final Evaluation

a. The final evaluation comprised the completed questionnaire responses from the 20 participating evaluators.

b. The assessment covered the seven selected quality characteristics. Quantitative conclusions were based on questionnaire ratings; technical performance or security claims require separate test records.

c. The 20 completed evaluation forms were analyzed using arithmetic means. Each item mean was calculated across the 20 responses; each criterion mean was the average of its item means. The grand mean was the unrounded average of the seven criterion means. Results were rounded to two decimal places and interpreted using Table 1.

d. The criterion means and individual item ratings were reviewed to identify strengths and areas for improvement.

e. The evaluation findings informed the conclusions and recommendations. The five-point descriptive ranges used in this study are shown in Table 1; these ranges are not prescribed by ISO/IEC 25010 or ISO/IEC 25023.

Table 1. Likert Scale, Description, and Range Distribution.

CHAPTER IV

RESULTS AND DISCUSSION

This chapter presents the project description and structure, capabilities, limitations, and project evaluation.

Project Description and Structure

The Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU) is designed to organize procurement records and support company identification through QR codes. The system consists of public pages and modules for administrators, BAC staff, and bidders/suppliers.

The public pages provide access to BAC information, procurement opportunities, awards and contracts, and contact details. Administrators and authorized BAC staff manage procurement projects, encode hardcopy purchase requests and physically received bids, receive online bids, review supporting documents, and maintain payment and award records. QR scanning allows authorized personnel to retrieve company profiles and bidding histories and identify companies when recording bidding document fee payments.

Bidders can manage their company profiles, submit bids online, upload supporting documents, view available projects, access their company QR codes, and monitor recorded submission and payment statuses. Reports, activity logs, messages, and notifications support monitoring and communication. Access to restricted records and functions depends on each user's assigned permissions.

Figure 7 shows the system's ho ع, which provides navigation to BAC information, procurement opportunities, d contracts, contact details, and login or registration. It also displays procurement s and buttons for browsing procurement opportunities and viewing awards.

Fig. 7. Homepage of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 8 presents the system's sign-in and bidder registration forms. Registered users can sign in using their email address and password or the available Google sign-in option. New bidders can register by providing company and contact details and uploading

required eligibility documents. Submitted registrations are reviewed by the BAC Secretariat before bidders can participate in bidding.

Fig. 8. Sign-In and Bidder Registration Forms of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 9 illustrates the Administrator Dashboard and Purchase Requests page. The dashboard summarizes active procurements, pending tasks, and upcoming schedules to help administrators monitor activities requiring attention. The Purchase Requests page organizes records encoded from signed hardcopy requests received by the BAC.

Fig. 9. Administrator Dashboard and Purchase Requests Page of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 10 shows the Projects and Biddings and Bid Management pages. The Projects and Biddings page allows administrators to create, publish, and monitor procurement projects, assign staff, and track budgets, deadlines, and project statuses. The Bid Management page organizes submitted bid records by project and bidder, displaying document completeness, submission details, and procurement stages. Search, filtering, and review options help authorized personnel locate and examine relevant records.

Fig. 10. Projects and Biddings and Bid Management Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 11 presents the Bidding Fee Payments and Awards and Contracts pages. The payment page lists projects with bidding document fees and allows authorized personnel to scan a company's QR code, record payment details, and export records. The Awards and Contracts page displays awarded projects, winning bidders, contract amounts, and supporting documents.

Fig. 11. Bidding Fee Payments and Awards and Contracts Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 12 displays the Manage Users and Staff Assignments pages. The Manage Users page enables administrators to review bidder registrations, maintain user accounts, and monitor account roles and statuses, including pending, approved, suspended, and blacklisted records. The Staff Assignments page allows administrators to assign procurement projects to BAC staff, view their assigned projects, and remove assignments when necessary.

Fig. 12. Manage Users and Staff Assignments Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 13 features the Report Analytics and Audit Logs pages. The Report Analytics page summarizes procurement budgets, contract values, savings, collected bidding fees, and pending purchase requests. A procurement pipeline chart shows how projects progress through the recorded stages. The Audit Logs page lists system activities, including the action performed, affected record, responsible user or system process, and date and time. Search, filtering, and export options support record monitoring and review.

Fig. 13. Report Analytics and Audit Logs Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 14 shows the About Page settings, Messages, and Notifications interfaces. The About Page settings allow administrators to maintain office contact details and the composition of the BAC and Secretariat for public display. The Messages page organizes conversations with bidders and staff to support inquiries and updates. The Notifications page lists system alerts concerning procurement activities, uploaded documents, and project progress, with options to view unread updates and mark notifications as read.

Fig. 14. About Page Settings, Messages, and Notifications Interfaces of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 15 presents the Bidder Dashboard and Available Projects page. The dashboard summarizes open opportunities, recorded submissions, pending results, contracts won, and upcoming deadlines. The Available Projects page allows bidders to browse and search procurement opportunities.

Fig. 15. Bidder Dashboard and Available Projects Page of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 16 illustrates the My Submission Bids and Submission Status pages. The My Submission Bids page organizes a bidder's recorded submissions, showing project details, bid amounts, receipt numbers, document review statuses, and results.

Fig. 16. My Submission Bids and Submission Status Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 17 presents the Awarded Contracts and Company Profile and Documents pages. The Awarded Contracts page shows projects won by the bidder, approved bid amounts, award milestones, and links to contract documents and QR-linked certificates. The Company Profile and Documents page organizes registration requirements, company details, bidding records, and the company's public record QR code. Bidders can preview, download, or replace documents and check their recorded account status.

Fig. 17. Awarded Contracts and Company Profile and Documents Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 18 shows the bidder's BAC Messages and Notifications pages. The BAC Messages page allows bidders to communicate with administrators and staff regarding their accounts and bids. The Notifications page provides updates on bid evaluation, post-qualification, award decisions, contract signing, and the issuance of the Notice to Proceed.

Fig. 18. Bidder BAC Messages and Notifications Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 19 presents the BAC Staff Dashboard and Purchase Requests page. The dashboard highlights assigned procurement activities, bids requiring review, and upcoming schedules to help staff prioritize their tasks.

Fig. 19. BAC Staff Dashboard and Purchase Requests Page of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 20 illustrates the My Assigned Projects and Review Bids and Quotations pages for BAC staff. The My Assigned Projects page displays assigned procurements, project budgets, submission deadlines, bid opening schedules, pending tasks, and received bids. The Review Bids and Quotations page helps staff locate submissions and examine document completeness and recorded stages.

Fig. 20. BAC Staff My Assigned Projects and Review Bids and Quotations Pages of the Web-Based Quick Response Code Identification Management

System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 21 presents the BAC Staff Bidding Fee Payments and Reports pages. The payment page summarizes recorded collections and projects with bidding document fees. Staff can scan company QR codes, record payments, and export payment records. The Reports page summarizes assigned projects, showing approved budgets, awarded amounts, savings, received bids, and project statuses. A status chart and project summary help staff monitor procurement activities within their assignments.

Fig. 21. BAC Staff Bidding Fee Payments and Reports Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Figure 22 displays the BAC Staff Messages and Notifications pages. The Messages page enables staff to communicate with administrators and bidders, search conversations, and exchange updates. The Notifications page lists alerts about project assignments, revised bid documents, and scheduled bid opening activities.

Fig. 22. BAC Staff Messages and Notifications Pages of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Project Capabilities and Limitations

The Web-Based Quick Response Code Identification Management System supports the management of procurement and bidder records for the BAC of San Jose LGU. Its capabilities and limitations are described below.

Project Capabilities

1. Provides public access to BAC information, procurement opportunities, announcements, and awards and contracts.
2. Allows administrators and authorized BAC staff to manage procurement projects and encode hardcopy purchase requests and records of physically received bids, while accepting online bids from bidder accounts.
3. Maintains bidder company profiles, supporting documents, and recorded bidding histories.
4. Generates company QR codes that authorized personnel can scan to retrieve linked company records and identify bidders during bidding document fee payment recording.
5. Supports document review, status updates, and requests for revisions.
6. Records manually paid bidding document fees and maintains award and contract information.
7. Enables administrators to manage user accounts, monitor bidder account statuses, and assign projects to BAC staff.
8. Provides reports, procurement summaries, activity logs, messages, and notifications.
9. Restricts access to system records and functions according to assigned user permissions.

Project Limitations

1. The system is designed around the requirements of the BAC of San Jose LGU and may require modifications for use by other offices.

2. System access depends on internet connectivity, a compatible browser, and the availability of the hosting services.
3. QR scanning requires a compatible camera and a readable code. It retrieves the linked company record but does not independently verify the identity or authority of the person presenting it.
4. Purchase requests are received as hardcopy documents and encoded by BAC personnel. Requesting offices do not directly submit or manage requests through the system.
5. The system supports online bids and records of manually received bids. Any original documents required by the BAC must still be submitted according to the applicable office procedures.
6. Payment recording does not process financial transactions or independently confirm that funds have been received.
7. The accuracy of records, reports, and statuses depends on correct encoding, timely updates, and review by authorized personnel.
8. Document authenticity, bidder qualification, blacklisting, and contract award decisions remain the responsibility of authorized officials.

Table 2. Browser and Device Compatibility Test Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Project Evaluation

The Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU) was evaluated to determine whether its features met the intended requirements and supported users' tasks. The evaluation covered company profile management, procurement records, document review, QR-based company identification, bidding document fee payment recording, reports, messages, and notifications.

The system was assessed in terms of functionality, performance efficiency, compatibility, usability, reliability, security, and portability. These criteria provided a basis for examining its operation, ease of use, accessibility across supported environments, and protection of restricted records.

A total of twenty (20) evaluators participated in the assessment: ten (10) IT experts, two (2) administrators, three (3) BAC staff members, and five (5) bidders. IT experts represented 50% of the participants, administrators accounted for 10%, BAC staff comprised 15%, and bidders constituted 25%

The functionality evaluation yielded an overall mean of 4.67, interpreted as "Excellent." Coverage of specified tasks and user objectives and support for task accomplishment both received means of 4.70. The correctness and precision of results obtained a mean of 4.60, also rated "Excellent."

Table 3. Functionality Evaluation Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

The system received an overall mean of 4.70 for performance efficiency, interpreted as "Excellent." Response time, processing speed, and throughput obtained a

mean of 4.75, while resource utilization earned 4.65. Both indicators were rated "Excellent."

Table 4. Performance Efficiency Evaluation Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

The compatibility evaluation obtained an overall mean of 4.63, interpreted as "Excellent." The system's ability to perform its required functions without adversely affecting other systems received a mean of 4.65. Its capacity to exchange information with other systems earned 4.60, also rated "Excellent."

Table 5. Compatibility Evaluation Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

The usability evaluation yielded an overall mean of 4.59, interpreted as "Excellent." Suitability for users with diverse characteristics and capabilities received the highest mean of 4.70, followed by satisfying interface interaction at 4.65, ease of learning at 4.60, and protection against user errors at 4.55. Ease of operation and control obtained 4.45, rated "Very Good."

Table 6. Usability Evaluation Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

The system achieved an overall reliability mean of 4.65, rated "Excellent." Availability received the highest score of 4.70, followed by dependable operation under normal conditions at 4.65 and continued operation despite hardware or software faults at 4.60. These results suggest that evaluators considered the system accessible and reliable for its intended tasks under the conditions assessed.

Table 7. Reliability Evaluation Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

The security evaluation yielded an overall mean of 4.68, interpreted as "Excellent." Restricting data access to authorized users received the highest mean of 4.75, while preventing unauthorized access or modification and tracing individual user actions both obtained 4.65. These ratings suggest that evaluators viewed the system's access controls, data protection, and accountability features positively within the evaluated conditions.

Table 8. Security Evaluation Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

The portability evaluation obtained an overall mean of 4.65, interpreted as "Excellent." Adaptability to different or changing hardware, software, and operating environments received a mean of 4.75, while installation and uninstallation in a specified environment earned 4.55. Both indicators were rated "Excellent," suggesting that evaluators viewed the system favorably in terms of adaptability and deployment within the assessed environments.

Table 9. Portability Evaluation Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

The summary of evaluation results shows that the system achieved a grand mean of 4.65, interpreted as "Excellent." All seven criteria received an "Excellent" rating, reflecting favorable assessments of the system's functions, responsiveness, compatibility, ease of use, reliability, security, and portability. These findings suggest that the evaluators

considered the system suitable for supporting the procurement record management tasks included in the study.

Performance efficiency obtained the highest mean of 4.70, indicating positive assessments of response time, processing performance, and resource utilization. Security followed with a mean of 4.68, reflecting favorable ratings for restricting access to authorized users, preventing unauthorized changes, and tracing user actions. Functionality received 4.67, suggesting that evaluators found the available functions appropriate for accomplishing specified tasks and producing results with the required precision.

Reliability and portability both earned means of 4.65. These ratings indicate that evaluators generally consider the system dependable under the assessed conditions and adaptable to the environments covered by the evaluation. Compatibility obtained 4.63, reflecting positive assessments of its ability to operate alongside other systems and exchange information as evaluated.

Usability received the lowest mean of 4.59 but remained within the “Excellent” category. This result suggests that participants generally found the system learnable and satisfying to use. However, the lower rating for ease of operation and control identifies an area for refinement. Clearer instructions, simpler navigation, and more intuitive controls may further improve the experience of administrators, BAC staff, and bidders.

Taken together, the findings support a favorable assessment of the system’s software quality within the scope of the evaluation. They provide a basis for considering its use in BAC record management while guiding further improvements. The ratings represent evaluator judgments under the conditions assessed and should be supported by continued testing, maintenance, and user feedback during actual operation.

Table 10. Summary of Evaluation Results of the Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU)

Recommendations

Based on the evaluation results and the system's intended operations, the following enhancements are recommended for future development:

1. **Integrate online payment for bidding document fees.** Allow bidders to pay through the system and enable authorized BAC personnel to verify payment details and associate each transaction with the corresponding company and procurement project.
2. **Enable automatic posting to the official BAC Facebook page.** When authorized personnel publish a procurement announcement in the system, automatically create a corresponding Facebook post containing a brief description and a link to the complete announcement. This feature could increase the visibility of procurement opportunities and reduce repeated posting tasks.
3. **Integration with the LGU's existing systems.** Future development may connect the system with the LGU's accounting or treasury system to facilitate payment verification and reduce repeated encoding of transaction details.

4. **Digital signatures for selected documents.** The system may incorporate digital signatures for documents approved for electronic signing by the LGU, allowing authorized personnel to sign and verify documents electronically.
5. **Further evaluation during actual procurement activities.** Future researchers may assess the system over a longer period and with more users to examine its performance during simultaneous transactions and identify improvements based on actual BAC operations.
6. **Expansion to other LGU offices or BAC units.** Future studies may explore adapting the system for other offices or municipalities, with workflows and access permissions configured according to their requirements.
7. **QR-based attendance recording.** Allow registered participants to scan their company QR codes during pre-bid conferences or bid openings, with BAC personnel confirming attendance.

Modification of the System

The researchers refined the system based on feedback from the research adviser, IT evaluators, and intended users. These revisions focused on improving interface consistency, navigation, text readability, and the presentation of procurement records. QR code scanning and payment recording workflows were also reviewed to support company identification and accurate record entry.

Finalization of the System

The researchers checked the revised system to determine whether its functions met the identified requirements. Final checking covered user permissions, procurement

records, document handling, QR identification, payment recording, reports, messages, and notifications. The system documentation was updated to reflect the completed features, while online payment and automatic posting to the official BAC Facebook page were retained as recommendations for future development.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of findings, conclusions, and recommendations based on the result of tests and evaluations.

Summary of Findings

1. The study developed a Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU). The system provides modules for the Administrator, BAC Staff, and Bidder/Supplier, with access determined by assigned permissions. Its features support hardcopy purchase request encoding, online bid submission, manual bid receipt recording, procurement project management, bidder records, document review, bidding document fee payment recording, awards and contracts, reports, activity logs, messages, and notifications.
2. The QR code identification feature enables authorized BAC personnel to retrieve a registered company's profile and bidding history. It also assists personnel in identifying the appropriate company when recording bidding document fee payments. Hardcopy purchase requests received from requesting offices are encoded by authorized BAC personnel.
3. Twenty respondents evaluated the system, consisting of ten IT experts, two administrators, three staff members, and five bidders. The evaluation covered functionality, performance efficiency, compatibility, usability, reliability, security, and portability.
4. The system obtained a grand mean of 4.65, interpreted as "Excellent." Performance efficiency received the highes f 4.70, followed by security at 4.68, functionality at 4.67, reliability oility at 4.65, compatibility at 4.63, and usability at 4.59. All seven criteria received an "Excellent" descriptive rating.
5. The findings indicate that evaluators considered the system suitable for its intended tasks within the evaluated conditions. Although usability received an overall

"Excellent" rating, ease of operation obtained 4.45, interpreted as "Very Good," identifying an area for further refinement. Online payment for bidding document fees and automatic publication of linked announcements to the official BAC Facebook page were identified as possible future enhancements.

Conclusions

Based on the study's objectives and the results of testing and evaluation, the following conclusions were drawn:

1. The Web-Based Quick Response Code Identification Management System for the Bids and Awards Committee (BAC) of San Jose Local Government Unit (LGU) was developed with the following features:

    a. Administrator and Authorized BAC Staff modules for managing purchase requests, procurement projects, bidders, bidding document fee payment records, awards and contracts, users, and staff assignments.

    b. Bidder/Supplier modules for viewing available projects, maintaining company profiles and supporting documents, submitting bids online, and monitoring recorded online or manual bids, submission statuses, and awarded contracts.

    c. BAC Staff modules for accessing assigned projects, encoding purchase requests, reviewing bids and quotations, recording bidding document fee payments, and preparing reports according to assigned permissions.

d. QR code generation and scanning features for retrieving company profiles and bidding histories and identifying the corresponding company during payment recording.

e. Dashboards, reports and analytics, and audit logs that support the monitoring of recorded procurement activities.

f. Messages and notifications that support communication and provide updates to the intended users.

2. The web application was developed using PHP and Laravel for application processing, HTML, CSS, and JavaScript for the interface, and PostgreSQL hosted on Neon for database management. Visual Studio Code and GitHub supported coding and source code management.
3. Testing and revisions addressed identified issues in user access, procurement records, document handling, QR identification, and payment recording. These activities helped align the implemented functions with the established system requirements.
4. The system obtained a grand mean of **4.65**, interpreted as **"Excellent."** Functionality, performance efficiency, compatibility, usability, reliability, security, and portability all received "Excellent" ratings. These results indicate that evaluators considered the system suitable for its intended tasks within the evaluated conditions.

Recommendations

The Web-Based Quick Response Code Identification Management System is recommended for use by authorized BAC personnel and registered bidders of San Jose

LGU to support procurement record management, company identification, document monitoring, and bidding document fee payment recording.

The following enhancements are recommended for future development:

1. Integrate an online payment facility for bidding document fees, allowing bidders to pay remotely and authorized BAC personnel to verify and link transactions to the corresponding company and procurement project.
2. Enable automatic posting of procurement announcements to the official BAC Facebook page. Each post may contain a brief description and a link to the complete announcement in the system to increase visibility and reduce repeated posting tasks.
3. Further improve ease of operation by refining navigation, instructions, and interface consistency, considering that this usability indicator received a “Very Good” rating.

Future researchers may evaluate the system over a longer period during actual procurement activities and with more participants to identify further improvements in its performance and usability.