System Analysis and Design of Company XYZ's RFQ/RFP Processes

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Abstract

The study analyzed the procurement process at Company XYZ. It was determined that an existing information system is available and in use by the company. However, the RFQ/RFP process is still manually performed. Specifically, RFQ/RFPs are prepared outside of the existing system, and then sent to vendors via email. To address this gap, a new system was proposed wherein procurement staff and vendors can have a common interface to prepare and float RFQ/RFPs (client side), and review and respond to RFQ/RFP (vendor side). This solution is expected to reduce PR-to-PO cycle time by 46%.

Keywords
Procurement, RFQ, RFP, vendor registration, system analysis and design

1. Introduction
1.1 Company Background
Company XYZ is a holdings company with more than 10 years of operation in the middle east. It consists of several business units under a diversified portfolio – from advertising, events management, and project management (Company XYZ, 2021).

Figure 1 shows the high-level structure of the company. A Chief Executive Officer (CEO) is in-charge of the entire company, supported by the Internal Audit Team which serves as the check and balance. Under the CEO are the divisions, each independent from each other and consists of several business units headed by its own management team. As an integrated group of companies, the support functions for all these business units – specifically Human Resources (HR), Information Technology (IT), Procurement, Marketing, Legal, and Strategy – are centralized in the head office. This allows for economies of scale in terms of workload and resource allocation.

The HR department oversees the end-to-end employee lifecycle, i.e., from recruitment to onboarding, employment regularization, retention activities, until separation. This also covers the logistics and legal aspects related to either the local transfer of employee sponsorship or bringing in new employees from another country.

Meanwhile, the IT department is responsible for all information system-related facets of the company. It operates under a service level agreement (SLA) with the business units and other support functions, prioritizing activities and issues based on the SLA. Among these are maintaining the IT infrastructure and ensuring that systems, servers, and applications are up and running according to the defined availability, securing periodic back-up of all databases and files in shared folders, and developing IT solutions according to the needs of the business units and support functions.

For Procurement, the support is transactional in nature and focused on ensuring that the required goods and services are delivered on a timely manner, at a reasonable cost, and according to the specifications and criteria set by the requesting unit. The department also monitors the spend per business unit, as well as cost savings, and reports these

to top management on a monthly basis. Procurement department is considered one of the critical functions in the company as the efficiency and effectiveness of its processes could impact the cash flow.

In the case of Legal, Marketing, and Strategy, the departments act on an ad hoc or advisory/consultative effect. Legal department handles all internal and external matters which may expose the company to legal risks, such as but not limited to: preparation and review of contracts/agreements, execution of legal formalities related to company transactions, review of company operations from a legal standpoint, provision of legal assistance or advice on taxation, funds, and other implementing policies applicable to the country where the company operates, analysis of legal issues and disputes or resolutions, and acting as legal counsel or representative of the company. Marketing department, meanwhile, directs the development and execution of marketing communications across the company, drives internal and external communications strategy, and manages brand delivery and consistency. Finally, Strategy department covers strategic and corporate planning. The department ensures a strategic path is defined for the company – applying synergy where relevant – and that it is implemented, monitored and evaluated for effectiveness.
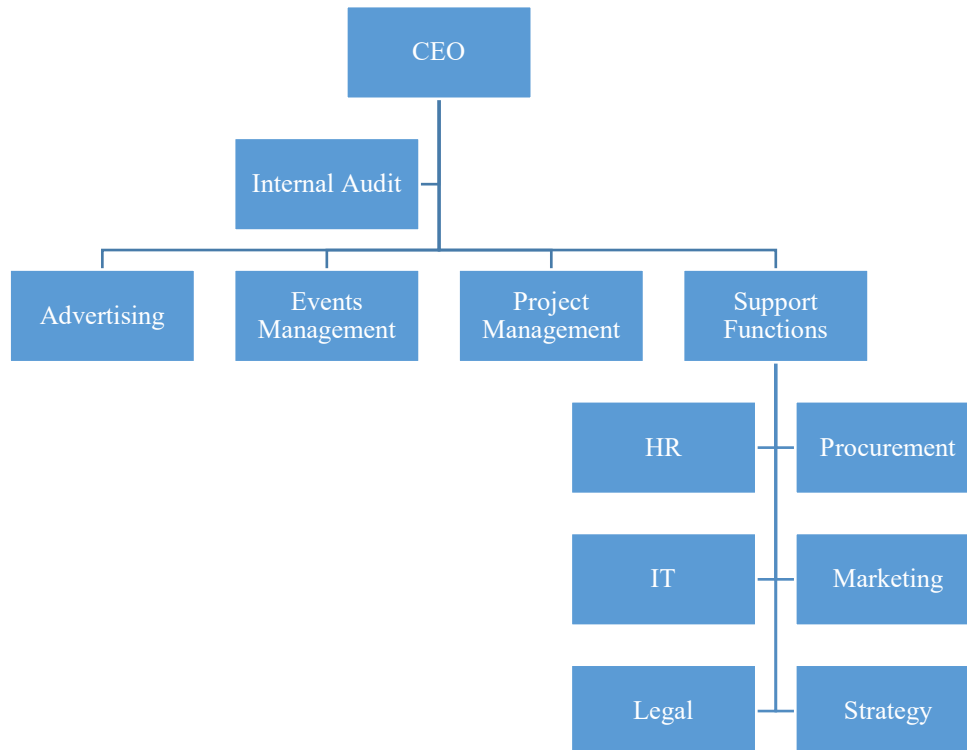

Figure 1. High-level organization structure for Company XYZ

1.2 Situational and Problem Analysis

This study was focused on the application of computer-based information system to improve process efficiency at Company XYZ. Based on random interviews and review of the company's performance reports, the procurement department was determined to be one of the problem areas (Company XYZ, 2021). In particular, the PR-to-PO cycle time for the company averages 6.5 days – almost two days longer or 41% higher than the benchmark figure of 4.6 days for US companies (Zycus Inc., 2014). Moreover, this is far behind the 4.2 hours average PR-to-PO cycle time among fully automated global companies reported by Coupa (2021). Based on the analysis of cycle time per department, procurement itself contributes the most time (~ 80%) in the process (Company XYZ, 2021).

To further understand the procurement processes and the department itself, a SWOT analysis was performed, as shown in Figure 2. Among the identified strengths were the presence of experienced staff, well established policies and procedures, centralized procurement platform, established vendor pool, and fast PR/PO approval (done online). However, it was also noted that vendors take a while to respond to RFQ/RFP. This process occurs outside the procurement platform – including the RFQ/RFP preparation – and is therefore executed manually via email and

phone calls to prospective vendors. Another observation was the inefficient back-and-forth clarification of PRs due to incomplete information from requestors.

Given these, the company can capitalize on the following opportunities to make use of its strengths and address some of its weaknesses: globalization and digital transformation. The advent of technology has paved way for global sourcing, making international vendors easily accessible at a touch of a button. Having several vendor options puts the company at an advantage in terms of negotiating power. Meanwhile, digital transformation can help not only in increasing process efficiency but also in providing decision-makers more value through automated and real-time business intelligence reports. The challenge though is in securing vendor as well as client and company information, as the threat of cyber security continues to proliferate in this era.
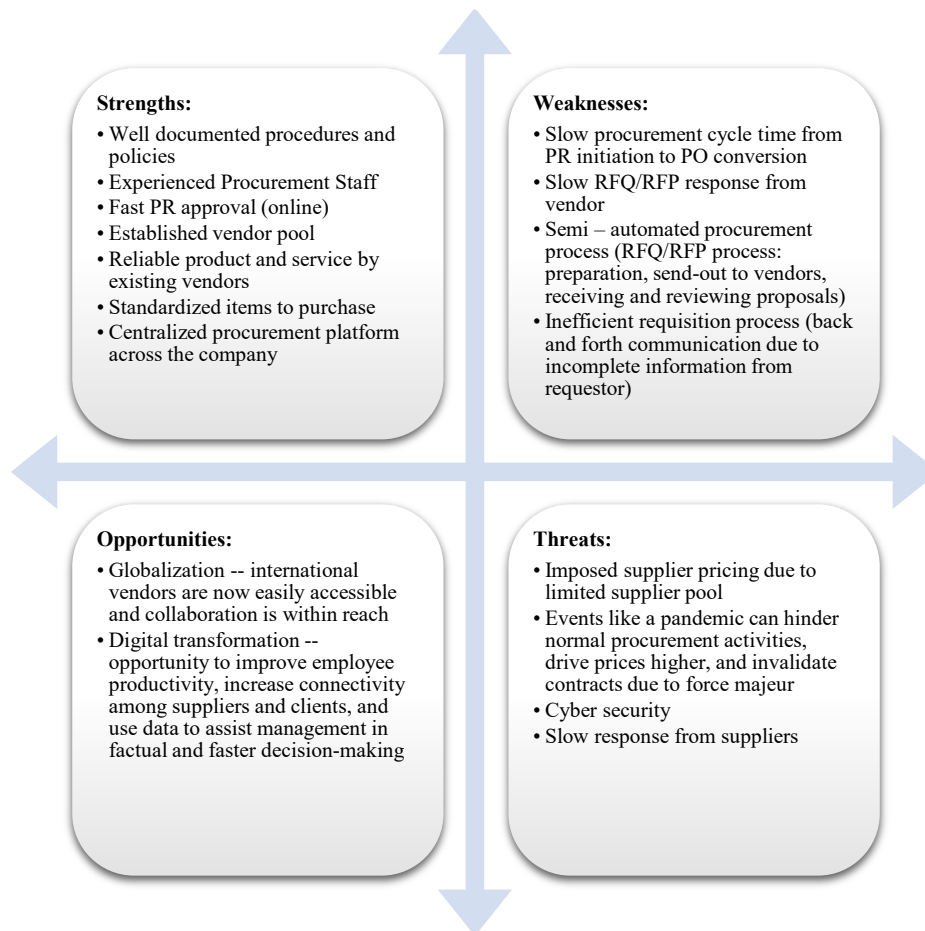
Strengths:
- Well documented procedures and policies
- Experienced Procurement Staff
- Fast PR approval (online)
- Established vendor pool
- Reliable product and service by existing vendors
- Standardized items to purchase
- Centralized procurement platform across the company

Weaknesses:
- Slow procurement cycle time from PR initiation to PO conversion
- Slow RFQ/RFP response from vendor
- Semi – automated procurement process (RFQ/RFP process: preparation, send-out to vendors, receiving and reviewing proposals)
- Inefficient requisition process (back and forth communication due to incomplete information from requestor)

Opportunities:
- Globalization -- international vendors are now easily accessible and collaboration is within reach
- Digital transformation -- opportunity to improve employee productivity, increase connectivity among suppliers and clients, and use data to assist management in factual and faster decision-making

Threats:
- Imposed supplier pricing due to limited supplier pool
- Events like a pandemic can hinder normal procurement activities, drive prices higher, and invalidate contracts due to force majeur
- Cyber security
- Slow response from suppliers

Figure 2. SWOT analysis for procurement department

1.3 Root Cause Analysis
Since there is already an existing information system for procurement, and only RFQ/RFP process was identified as offline or performed outside of the existing system, it was decided to focus the analysis and improvement on this area.

To understand the factors affecting the slow RFQ/RFP response time from vendors, a root cause analysis was performed as shown in Figure 3. Based on this, the recurring theme was the limited functionality of the existing information systems. There were no features enabling procurement staff to directly prepare and float RFQ/RFP in the system for vendors to access, review, accept, and respond to.
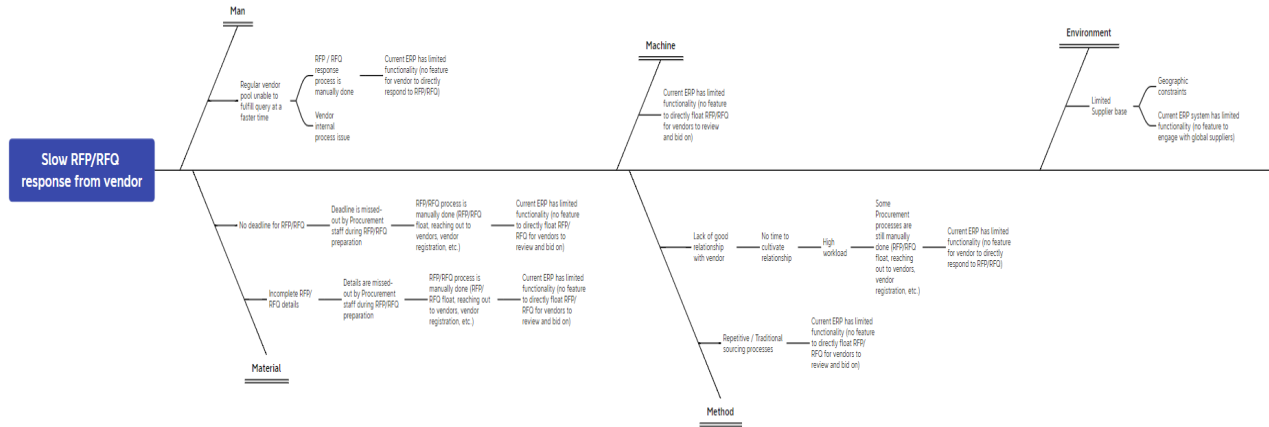
Figure 3. Root cause analysis for slow RFQ/RFP response from vendors

1.4 Objectives
This study aims to analyze and design an automation solution for RFQ/RFP process to be able to improve vendor's RFQ/RFP response times, consequently reducing PR-to-PO cycle time for Company XYZ.

2. Literature Review
According to David Eakin (2003), there is no doubt that there is potential for savings in the use of e-procurement. E-procurement offers positive results in terms of transactional benefits, improved compliance, management information, and lower prices. Transactional benefits include the implementation of automated processes with global coverage incorporating best practices and elimination of redundant processes. It also creates greater data accuracy and promotes supplier relationships built electronically or web based. Compliance benefits are created due to the awareness that the system creates which is facilitated by the user-friendly interface, a set of standard processes and tools, such as the e-procurement system. Management information benefits will provide users and management of key information essential in operational decision making and eliminate the need for resource allocation in data retrieval and storage. Lastly, price benefits will follow through as the e-procurement tool can obtain a clear picture of the company's standing in terms of expenditure.

Similarly, Mukhopadhyay and Kekre (2002) mentioned that the greatest potential for a supplier's business to grow is when a customer initiates an electronic link, where a supplier operationally adapts and enhances the link. Also, business costs between customer and supplier can be minimized by the improvement of the efficiency aspect of the cycle completion of procurement orders. As an effect of these positive results, overhead expenses of order-processing and payment are decreased for both the supplier and customer. To have more insight into this electronic link implementation, they have suggested further analysis on the process and strategic measures with the use of these technologies over time.

According to Evans et al. (2008), online digital platforms act as a link that connects individuals to other individuals, groups, or a particular item/s of interest. It provides users a variety of social and technical boundary resources, like application programming interfaces (APIs) that allow data access, software development kits, and different formats that significantly decrease the cost of use. Platforms generate value creation by providing and utilizing the scope of economies for both the supply and demand side of the markets, which translates to greater positive interaction for the buyer and seller (Gawer, 2014). A successful platform is one that acquires and links a group of users, customers, suppliers of products and services, which compose the platform's ecosystem (Caillaud and Jullien, 2003; Parker et al. 2016). Digital Technology permits the creation of a more scattered economic activity and gives suppliers a wider range to reach customers, who previously were thought of as out-of-reach (Moriset and Malecki, 2009).

The internet has changed the way supply chain management systems operate. Online business relationships tend to develop in this age of ICT, making the modern sourcing processes available not only for local entities but also for geographically distant businesses. This sourcing process can be defined as electronic sourcing (e-sourcing) which is

the activity of searching for prospective suppliers over the internet with the use of B2B (business to business platforms). Companies utilizing e-sourcing allows a greater number of suppliers to be part of a pool where they can gain easy access to and harness the value-added processes that the activity brings. As a result, this platform can provide a competitive advantage to an assembly of suppliers and for mutually abled platforms, an abundance of buyers as well (Fuks and Kawa, 2009).

3. Methods
The study analyzed the procurement RFQ/RFP process at company XYZ and explored the potential application of a computer-based information system. SWOT analysis and root cause analysis were performed to determine the problem areas as well as the corresponding root causes. A structured approach to systems development, i.e., system analysis, design, and evaluation, was done to ensure the development of an appropriate solution to the problem.

4. Results and Discussion
4.1 System Analysis
Procurement process starts with the requesting unit raising a PR via the Procurement Portal. The Requestor will need to select the appropriate category of the item to be purchased, provide appropriate details in the specified fields, and confirm that budget is available for such purchase. Otherwise, the request will not proceed. Upon submission, the Requestor and the Procurement Team will receive an email notification specifying the PR number and date of request. Procurement Staff will have to open the Portal to view the details of the PR and review it for clarity and completion of information. In case of any need for clarification, the PR will be returned to Requestor through the same interface. The Requestor will receive another email notification in this case and will need to respond to the clarification request via Portal.

Once the PR is approved for the next step, the Procurement Staff will verify if qualified vendors are available to fulfil the PR. If yes, RFP/RFQ/solicitation documents will be prepared offline by the Procurement Staff and route for Requestor's review via email, after which the documents are sent to the vendors for appropriate response. If none, the Procurement Staff will identify potential vendors and follow the Vendor Registration process. All of these are performed outside the system.

Upon receipt of vendor proposals via email, the Procurement Staff will evaluate proposals and prepare a comparative sheet whereby the proposals are assessed based on the selection criteria. This is done via MS Excel, which is then uploaded in the Procurement Portal for online review of authorized approvers.

The entire procurement process is mapped out in Figure 4. The automated processes or those with system interfaces were marked accordingly, as well as manual tasks. Based on the department's report, on average the raising of PR up to the approval process, which are executed online, is done in one-and-a-half (1.5) days whereas five (5) days are spent on the following activities: preparing and floating RFP/RFQ, receiving and evaluating vendor proposals, and recommending and awarding a vendor. These are all manually performed and then inputted in the system for online approval.
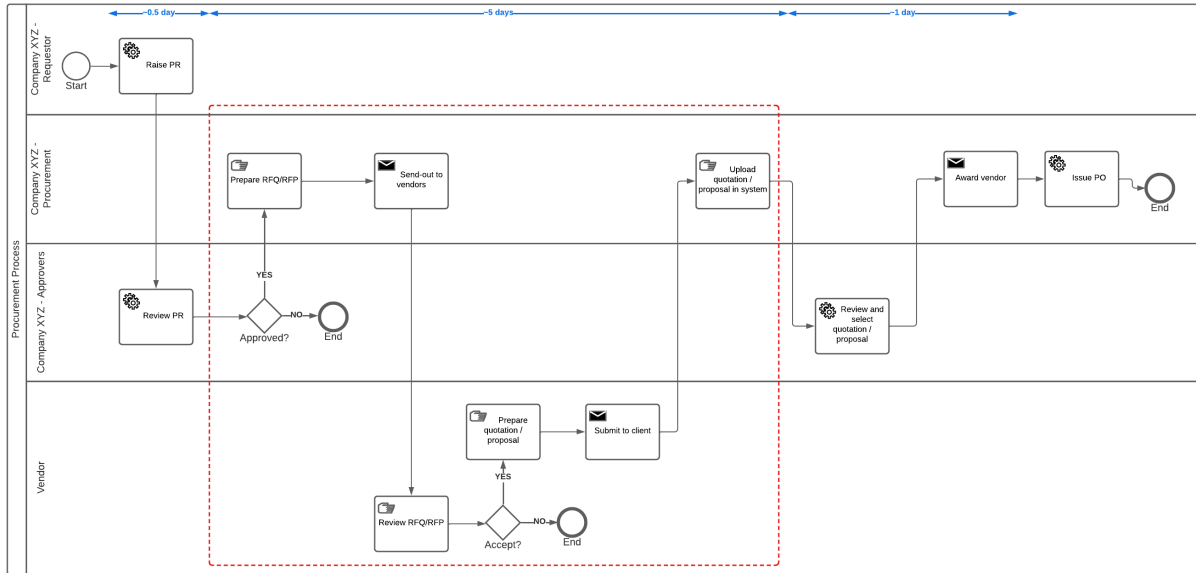
Figure 4. Current procurement process (Procurement Department, 2015)

Based on the process description, and the problem statement previously discussed, the system requirements can be summarized as follow:

Table 1. Procurement system requirements

Category	Description
Output	▪ The system should reflect the result of the bidding (standing of the vendor at the end of bidding). ▪ The system should award the vendor which meets the requirements set by the company (e.g., lowest price, etc.)
Input	▪ The vendor should register in the system to be included as a network vendor. ▪ The company should specify its requirements through RFQ/RFP to be floated in the system. ▪ The vendor should respond to the RFQ/RFP and provide required details such as pricing, product description and specification, etc.
Process	▪ The system should provide a summary of the prices, product description/specification, and other offers provided by the vendors. ▪ The system should process the inputs by vendors and provide real-time analysis to determine the ongoing bidding result. ▪ The system should provide the real-time top vendors which meet the specified criteria/requirements of the company. ▪ The vendor will have the opportunity to reduce bidding price or change its offering every minute until no more bidders perform price reduction.
Performance	▪ The system should be supported by all the network vendors. ▪ The system should be available 24/7 with minimal to zero downtime.

Control	▪ The system should provide login security for both the company and vendors.
	▪ The system should generate email notifications to vendors to notify the following:
	   o Password expiration
	   o Certificate expiration (e.g., trading license, VAT certificate, etc.)
	   o RFQ/RFP availability

4.2 System Design
4.2.1 Proposed System
Figure 5 shows the HIPO chart for procurement system. Sourcing and vendor management aspects were evaluated for possible improvement areas. The study explored methods to connect the company with a larger pool of vendors, as well as automate and cut short repetitive sourcing processes at the same time. With the help of the proposed platform, the company is expected to gain access to a diverse set of vendors from different parts of the world. The task of sending an unlimited number of queries to a selected set of suppliers is eliminated due to the automatic functionality of the platform. Once RFQ/RFPs are approved for posting in the platform, these will be available to all registered vendors for review, acceptance/rejection, and appropriate response. Similarly, the task of routinely looking for qualified suppliers and commissioning them, as part of the old system, will no longer be needed as the platform itself will ensure that the vendor pool will be regularly checked and updated.
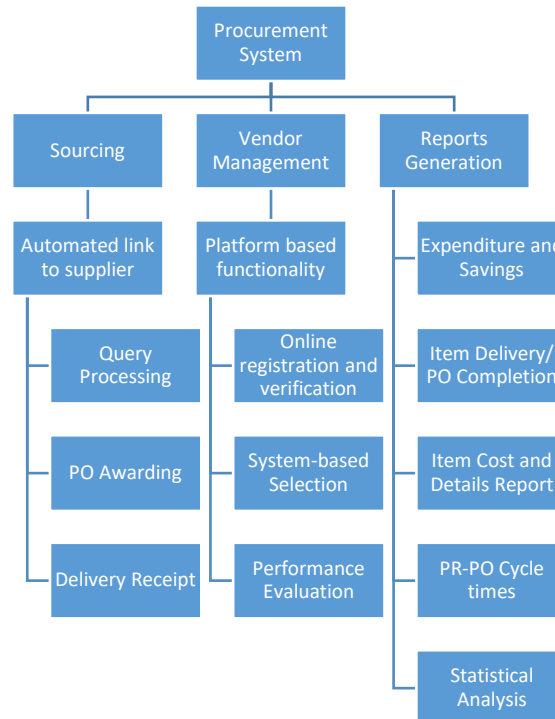
Figure 5. HIPO chart for procurement system

Figure 6 presents the use case diagram for the proposed system, while Figure 7 shows the proposed changes in the existing system. Once a PR is approved, the procurement staff will prepare the RFQ/RFP in the proposed system. Details such as background information, detailed requirements, scope of work, technical specifications, plans or drawings, deadline, evaluation criteria, etc. will be specified. Once this is internally reviewed and approved for posting, the RFQ/RFP will automatically be floated in the proposed system, where the registered vendors will automatically be notified. The vendors will have the option to review the RFQ/RFP and accept or reject it. If the vendor decides to participate in the RFQ/RFP, the vendor will have to input its bid (if RFQ) or proposal (if RFP) in the proposed system. The procurement staff will then be notified once vendors enter their bids/proposals. For RFQ, there will only be 15-minute timeframe to complete the bidding on the scheduled date. The bids/proposals will be automatically evaluated in the system unless a manual review is selected as an option by the procurement staff. Once the winning bid/proposal is determined, the corresponding vendor will be notified by the proposed system for the subsequent process, i.e., PO issuance.
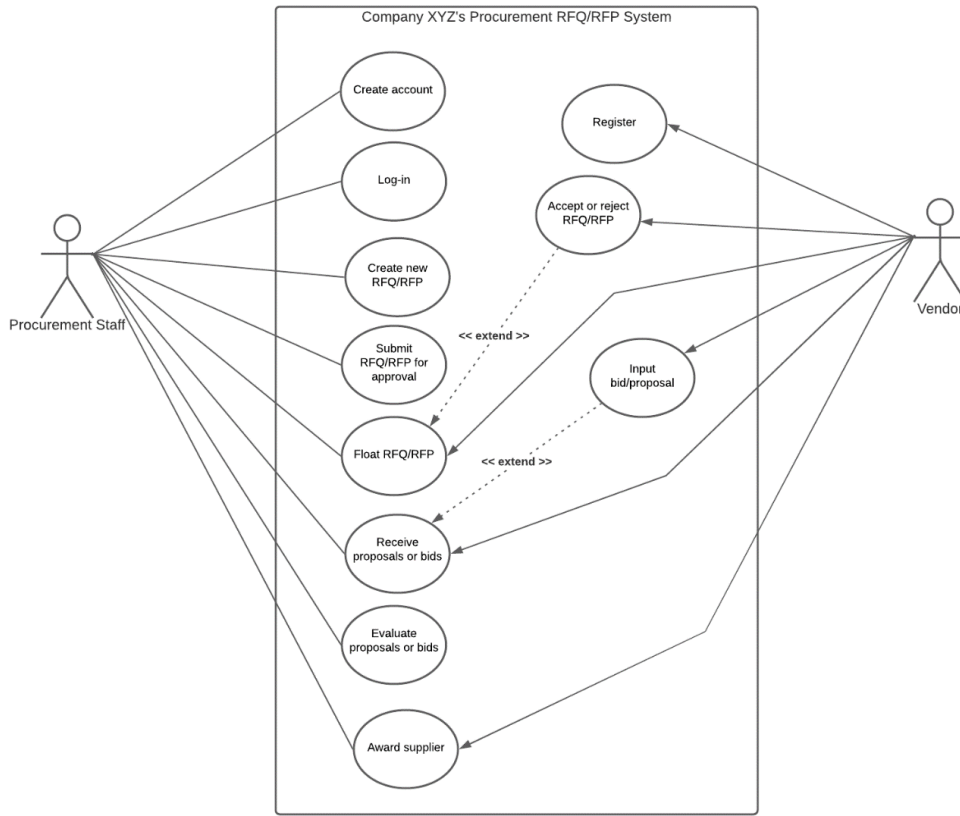
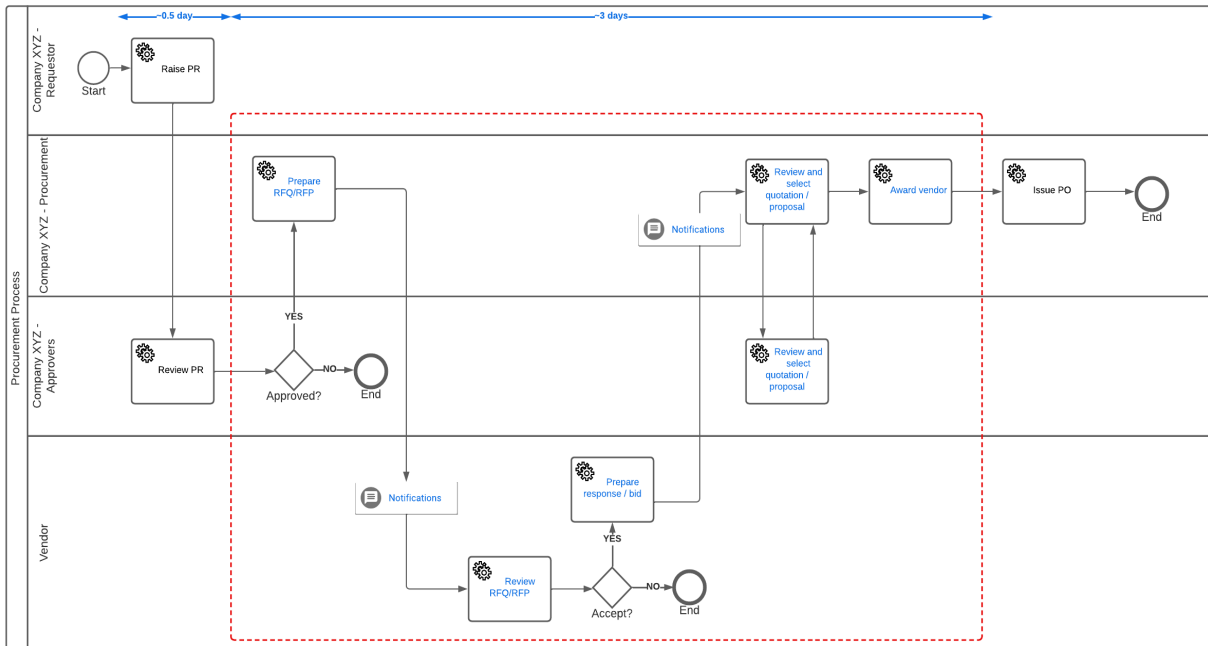Figure 6. Use case diagram for the procurement RFQ/RFP system

Figure 7. Proposed changes in the procurement process

5.2.2 System/User Interface
Buyer-Supplier Interface
On the main page of the vendor's interface, account owners can view their company's profile and update credentials when necessary. Buyers will be notified if there are changes, for their exclusion or inclusion of the supplier in their current supplier list. Vendors can also view active requests from buyers on RFQs or bidding proposals. In addition, the page will also consolidate information on approved, rejected, or on-going events as he goes through processing requests and receiving updates from the buyers. From these summaries, the vendors will be able to identify the particular request or outcome if he wants to go into the specifics of the events.
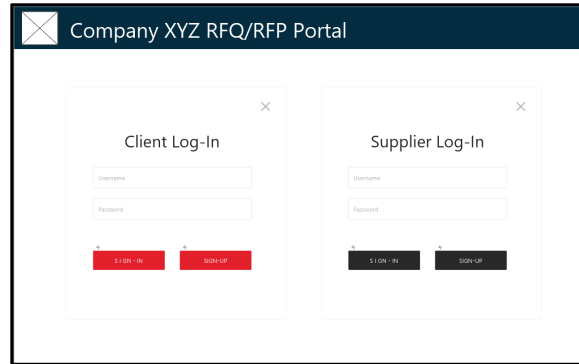
Figure 8. Proposed system's web page

Vendor Registration System
For buyers to have a direct link to vendors, vendors will need to register their details into the system. An authorized account creator from the vendor's side needs to register his details and the company's relevant information, (e.g., company details, commercial registration and licenses, bank details, products and services offered, certifications, etc..) to complete the vendor account creation. Thereafter, the vendor account will be available to the different buyers for their sourcing.
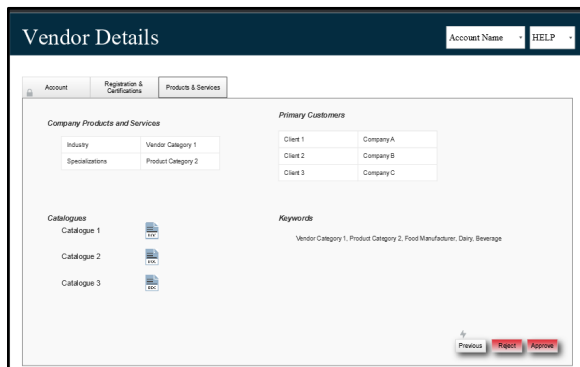

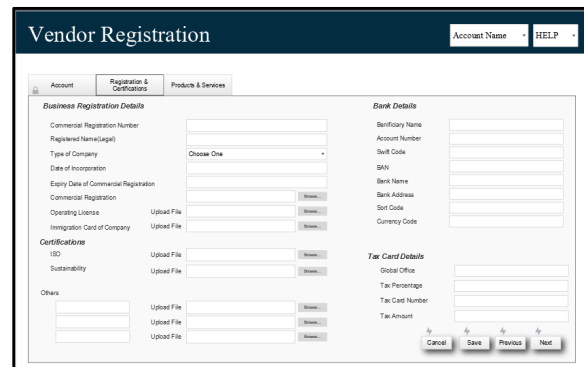Figure 9. Proposed system's vendor registration – client interface

Figure 10. Proposed system's vendor registration – supplier interface

Landing Page – Dashboard
The Dashboard page is included to show a visual summary of activities performed on the software. Both supplier and buyer interfaces have the same main features: activities, RFQs, and RFPs. The widgets display the list of activities performed with a status of each activity and graphical illustrations of the summary of RFQs and RFPs for easy visualization and analysis. The activities page shows all the events, including RFP and RFQ. The activities on the buyer interface status are active, completed, and rejected, while supplier interface status includes awarded, ongoing, and lost. RFQ is used for items with no contract with any suppliers. Every action performed on a quotation floated is shown on the RFQs page on the buyer interface. It can be distinguished with the quotation number written on each activity, and the status of each is displayed as active, rejected, and completed. The cycle time of each RFQ

is also declared. On the other hand, the supplier interface does not show the cycle time, and the status are awarded, quotation submitted, and received. RFP is used for tender agreements or contracts on which the bidding will occur. RFP in the buyer interface will show the list of RFPs, and the status will be either completed or ongoing. While supplier interface status is ongoing, completed, proposal submitted, and received.
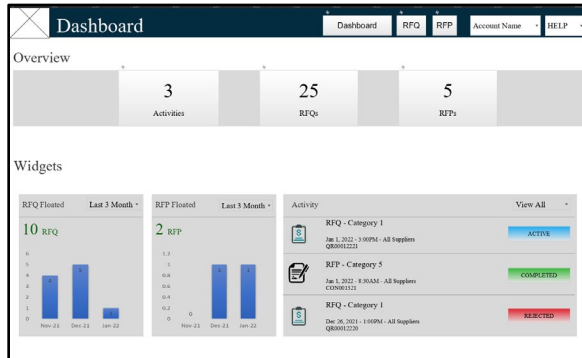

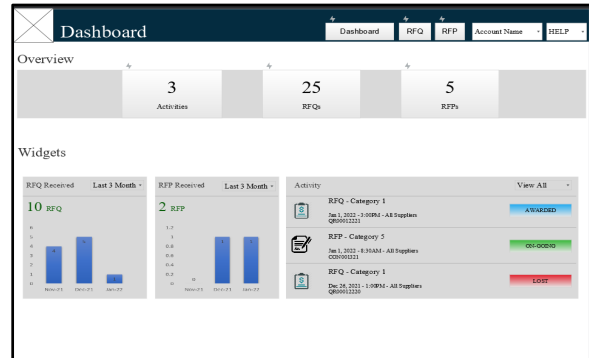Figure 11. Proposed system's dashboard – client interface

Figure 12. Proposed system's dashboard – supplier interface

RFQ/RFP Page

The RFQ/RFP page serves as the interface where the user (client side) can specify the details of the RFQ/RFP. In particular, background information on end-user (company), as well as detailed requirements, scope of work, technical specifications, plans or drawings, deadline, evaluation criteria, etc. will be inputted so that vendors can review these for appropriate response. Only registered vendors in the system will be notified upon floating of RFQ/RFP, after which, vendors may decide to participate in the RFQ/RFP or not. Vendors will only have 2 days to respond to RFQs. In the same page/interface, the vendor will need to specify its proposal for further evaluation.
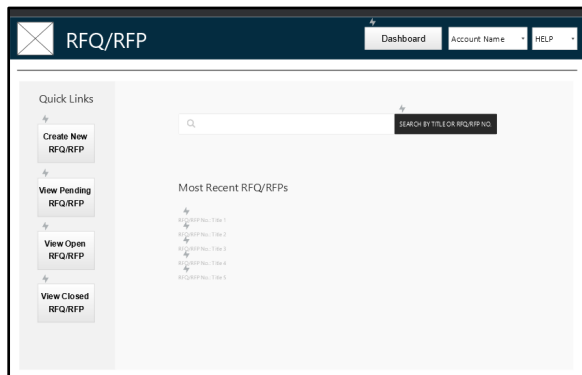

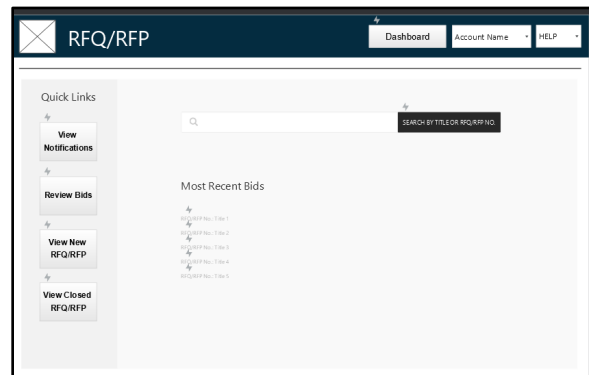Figure 13. Proposed system's RFQ/RFP page – client interface

Figure 14. Proposed system's RFQ/RFP page – supplier interface

Bidding Page

The Bidding page of the supplier and buyer interface varies on the inclusion of the checklist option of the supplier. The checklist includes Review, Accept, and Submit a bid participate in the bidding. The event content is the same for all users, consisting of bidding details and bidding results. Event overview contains details of the bidding such as owner or initiator of the bid, event type, currency, commodity, location, contract validity in months, and contract effective date. The bid timing, duration, and bid interval are also specified. The bidding rule states that a buffer is needed to protect the lead bid. During this time, the bidder can place multiple bids without knowing the lead bid or its own rank. In addition to the rule, the current standing or ranking will be shown to each supplier's every bid interval. This is for the supplier to decide and strategize to be the lead bidder. After the bidding, the supplier interface will show the summary of the bids made, while the buyer interface will show the summary of the bids

made by suppliers per rank. In case of delivery or stock issues in the future, the ranking will help the buyer identify possible supplier replacements. Both users can review and download the content of the bidding page.
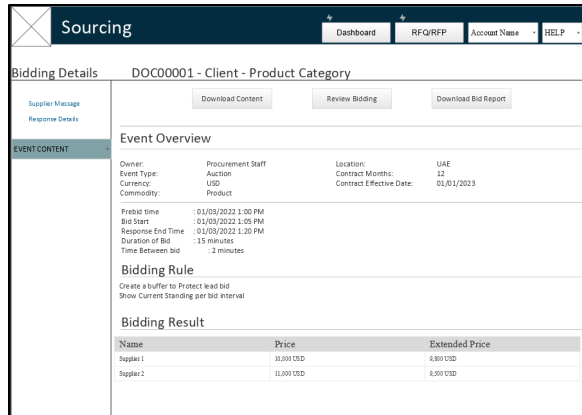

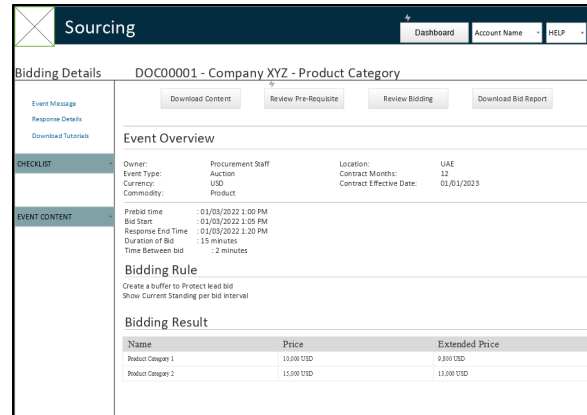Figure 15. Proposed system's bidding page – client interface

Figure 16. Proposed system's bidding page – supplier interface

5.3 System Evaluation

The proposed system was designed to complement the existing information system at Company XYZ. It automates the remaining manual process in procurement, i.e., the RFQ/RFP process, and provides a venue for client and vendors to communicate seamlessly and reduce the need for separate forms and documents. There is a time limit as to when the vendors can bid for RFQ/RFP, therefore cycle time is controlled, and vendors are narrowed down to only those seriously interested to participate.

The proposed system will see that processes related to the aforementioned are minimized as queries and POs will instantaneously be available to suppliers once approved by the corresponding department and/or purchasing manager. In addition, the previous model engages with a supplier or set of suppliers specifically selected by the purchaser. In contrast, the improved model will allow a wider set of suppliers registered in the network to immediately gain access to the company's requests, in the form of queries, bids or orders.

From an average of 5 days spent on the RFQ/RFP process, it is expected to decrease to 3 days. In effect, the PR-to-PO cycle time will be reduced from 6.5 days to 3.5 days.

6. Conclusion

The study focused on the procurement process at Company XYZ. It was observed that the average PR-to-PO cycle time was far from benchmarks. Further analyses showed that vendors respond slowly to RFQ/RFPs sent by procurement staff. Among the root causes identified was the limited functionality of the existing information system, resulting to the RFQ/RFP process being manually performed.

To address this gap, a new platform was proposed which can be integrated with the existing procurement information system. With the new platform, procurement staff and vendors can have a common interface to prepare and float RFQ/RFPs (client side), and review and respond to RFQ/RFP (vendor side). This solution is expected to reduce PR-to-PO cycle time by 46%.

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