



RESEARCH REPORT 2022-203

SWITCH TO E-TENDERING

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Study program: Logistics Engineering

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Company: Port of Duqm Company SAOC

Place of publication: Vlissingen

Date: 9/12/2022

Version: 1.0

Preface

The purpose of this dissertation is to meet the graduation criteria for the logistics engineering and supply chain management program at HZ University of Applied Sciences. Its main focus is to explain what an e-tender is. The scope of the dissertation covers the entire process, starting from sales inquiry up to the switch to E-tender. I conducted research and wrote this dissertation while working at Port of Duqm company from February 5 to June 5.

I collaborated with my supervisor, Mr Wael Al-Shukaili, to develop my research question. Although the research was intricate, conducting thorough investigations enabled me to address the question we had identified. Fortunately, my tutor, Mrs G.A.M. Beemt-Denissen from HZ, was always accessible and willing to provide answers to my inquiries. I am grateful to my supervisor for their exceptional direction and assistance throughout the graduation period. Additionally, I would like to express my appreciation to all the respondents who participated in the analysis. Without their cooperation, conducting this research would not have been possible.

I would like to express my gratitude to my fellow colleagues who work in the supply chain department for their exceptional collaboration. It was always beneficial to exchange thoughts and ideas about my research with them. Furthermore, discussing various issues with my friends and parents were also helpful. I would like to give a special acknowledgement to my mother and aunt Fatema for their invaluable advice and supportive words, which motivated me to keep going even when I lost interest.

Badar Hamood Al-Burtamani

Muscat, 15th May 2023

Summary

The Port of Duqm serves as the primary entry point to the largest Special Economic Zone in the entire Middle East region (SEZD). This graduation thesis focuses on the Port of Duqm company in Oman. A key performance indicator (KPI) for the company in 2023 is the adoption of digitalization and the utilization of technological advancements. This strategic objective aims to unlock various benefits, such as improved operational efficiency, enhanced transparency, and increased competitiveness (Duqm Port, 2022). To achieve this objective, a project has been initiated to transition to E-tendering, which facilitates transparency and accountability through the digital documentation of procurement activities, thereby promoting fairness and reducing the risks associated with corruption. To address this matter and explore potential solutions, the following primary research question has been formulated.

'How can the current procurement process in tendering be enhanced to transition to E-tendering in the supply chain for Port of Duqm company before 2024?'

The thesis delves into the examination of the current procurement process in tendering within the supply chain of the Port of Duqm company. Its primary focus is on identifying opportunities for enhancement and devising strategies for a seamless transition to E-tendering by the year 2024. By embracing digitalization and leveraging technological advancements, the Port of Duqm company aims to unlock a range of benefits, including improved efficiency, enhanced transparency, and heightened competitiveness. The primary question has been divided into the subsequent sub-questions:

- What does the logistics concepts of Duqm Port look like?
- What is the current process of tenders?
- What are bottlenecks in the current process of tendering?
- What is the practice of e-tender in Oman?
- Which software will be the best choice?
- How can the new platform and process be implemented?

The report commenced by conducting a systematic literature review, examining the tender process, relevant laws, and identifying bottlenecks. It also discussed measures for improving tendering procedures, E-tendering challenges, processes, and software. Value Stream Mapping (VSM) was subsequently employed to visually depict the current tender process and identify potential bottlenecks using swimlane diagrams. Interviews were conducted to gather practical insights on E-tendering practices in Oman. The IT and procurement departments will utilize the MoSCoW factors to select appropriate software. Moving into the implementation phase, a PDCA approach, SWOT analysis, and Gantt chart will be employed to effectively organize tasks and allocate responsibilities for the project.

The result chapter of this report provides an introduction to logistics concepts for the Port of Duqm Company (PODC). It outlines the current tender process, including details about Oman's tender law, tender types, and the specific tender process employed by PODC. The chapter also highlights the identified bottlenecks in the current tender process using swimlane diagrams. Furthermore, insights on E-tender process practices in Oman are presented and gathered through interviews. The chapter then delves into the selection of the appropriate system and process through the utilization of the MoSCoW framework. Finally, an implementation plan is outlined using the PDCA approach to effectively organize tasks and ensure a smooth transition to the chosen E-tendering process.

In the discussion chapter, the report explores considerations for implementing new software in the E-tender process. It also discusses future prospects and trends of E-tendering, while identifying key features and qualities required in suitable software. The next researcher should define new KPIs and employ PDCA for ongoing improvement. Success can be measured by reduced lead time, decreased paperwork, streamlined tracking, and improved efficiency.

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Abbreviations

PDC	Port of Duqm Company
PODC	Port of Duqm Company
PR	Purchase Requisition
PO	Purchase Order
RFQ	Request For Quotation
RFT	Request For Tender
RFP	Request For Proposal
ERP	Enterprise Resource Planning
IFS	Enterprise Resource Planning used in PODC
PQQ	Pre-Qualification Questionnaire
B2B	Business to Business
SEZAD	Special Economic Zone Authority of Duqm
ITC	Internal tender committee
PASFR	Public Authority for Stores and Food Reserve
KPI	key performance indicators
CEO	Chief Executive Officer

1 Introduction

This chapter will provide an introduction of this research report. Following an explanation of the background material will be a problem statement and the research objective. Then, the main and secondary research questions will be formulated. In addition, the scope and limitations of this report will be highlighted. The purpose of the report and the reading instruction will be described in the conclusion.

1.1. Background & Research Statement

The Port of Duqm is being transformed into a strategic stronghold with the addition of an airport and railway system, complementing its extensive road network and existing maritime connections. The Sultanate of Oman is increasingly recognized as an attractive investment location, thanks to its Free Trade Agreements (FTAs) with the United States and Singapore. However, the tendering process in Duqm port currently relies on manual procedures from announcement to award. This manual process has led to several challenges, including time wastage, excessive paperwork, and difficulties in tracking progress. Therefore, adopting an E-Tendering solution is seen as a potential remedy for these issues. This research aims to identify the best approach for implementing this solution.

E-tendering has been identified as a technique to help change the construction industry's culture and practices. E-tendering is the electronic exchange of tender documents, according to Royal Institution of Chartered Surveyors e-tendering advice (RICS, 2010). This research focuses on the administration of the e-tendering process, not internet auctions which e-tender is a component of the process of carrying out procurement online. Its primary purpose is to make for a quicker and more effective method of locating potential suppliers.

The objective of this research will be to gain a clear understanding of the current procurement process and transform it into an e-tender process while addressing the existing bottlenecks.

1.2. Research question

This study aims to provide insights and propose various approaches to address the central theme of this issue, focusing on the main question: 'How can the current procurement process in tendering be enhanced to transition to E-tendering in the supply chain for Port of Duqm company before 2024?'

And moving on to the subsidiary questions that are prompted by the main question, which are as follows:

- What do the logistics concepts of Duqm Port look like?
 - In order to have a comprehensive understanding of the structure of the organisation, it is necessary to discuss the company's logistics concept.
- What is the current process of tenders?
 - To figure out the current process of tendering and how traditional tender is going on in Duqm port.
- What are the bottlenecks in the current process of tendering?
 - This question will talk about the bottlenecks that impact traditional processes and cause the problem.
- What is the practice of e-tender in Oman?
 - In this question, the definition of e-tender will be pointed out and how the process is going on.
- Which software will be the best choice?
 - A question will provide the answers to how the new system of e-tender will handle the process effectively.
- How can the new platform and process be implemented?

- Finally, this question is about how the execution plan for the e-tender process can be implemented in the Duqm port to avoid the bottleneck in the traditional tender.

Using information gathered from online resources, books, researchers' thoughts, and interviews with a wide range of experts, this study will investigate how the current state of the primary problem may result in certain drawbacks for the company's functionality construction, in addition to addressing the supplementary questions. Results from both qualitative and quantitative approaches will be contrasted and compared to draw a conclusion or, at the very least, a set of prospective answers.

1.3. Research scope

Scope in:	Scope out:
<ul style="list-style-type: none"> • Tendering process issues • ERP system of Duqm Port • Tendering committee of Duqm Port • Technical defects • Implementation plan 	<ul style="list-style-type: none"> • Port operation • Port profits • The resource of port

Table 1 the scope of research

1.4. Research function

This report will be grounded in the extensive research conducted to find viable alternatives to the current establishment and workable solutions to the primary issue at hand, which is switch the current process to be E-tendering process from announce till awarded the tenders. Research like this allows for a more in-depth analysis of the situation, the identification of connected issues, and the development of low-cost strategies to boost output without sacrificing quality.

2. Theoretical framework

In this section of the research, the outcomes of the literature review are going to be broken down and contrasted with one another. The main research question, as well as the sub-questions, are connected to the themes that are explored starting with tender with its process, tender law and bottlenecks of tender. In second part, the point in between of traditional tender and e-tender is the measurement of improvement. Finally, the topic of this research is e-tender, its process, benefits, challenge and the software that used in e-tender process.

2.1. Tender

According to Executive Compass (2022), a tender is a document that must complete when bidding for a contract; the tender document is how a buyer analyses the appropriateness for the contract, often based on price and quality factors - users will therefore likely be asked to answer to a pricing document and set of questions. The whole tendering procedure and its operation are described in the next section (Compass, 2022). A "tender" is a request for proposals or bids on a specific project. A tender is a formal request for proposals (bids) for a public or private project with a strict deadline for submission. Tender can also mean to accept a formal offer, such as a takeover proposal. Shareholders who accept a takeover bid can respond by tendering their shares or securities (Kenton, 2022).

Examples of tendering include the procedure by which contractors submit bids to different levels of government. For instance, private businesses vie for contracts with the government. Proposals with pricing depending on the necessary work are submitted as part of the process. Three federal departments often issue RFPs: Energy, Health and Human Services, and Homeland Security (KENTON, 2022).

All sources agreed that tender has similar definition.

2.1.1. Tender process

A comprehensive tendering process is utilised in order to guarantee that it is providing the most value for the money. In broad strokes, it starts with a needs assessment, then moves on to the selection of suppliers and the actual tender, and finally concludes with the awarding of the contract and the monitoring of the contract (Martínez, 2022). The 'Invitation to Tender' is issued by a client who requires a supplier for a variety of contracts involving the supply of goods, works, utilities, or services. While public procurement is a separate matter, the majority of tendering procedures follow a similar course. Below, we have provided an overview of the standard tendering process for construction contracts (Taylor, 2019). In the following figure shows the tender process:



Figure 1 Tender process (Martínez, 2022)

Identify Tender Opportunity

Finding an opportunity that has the potential to be successful is the first stage in the process of tendering. There is a plethora of tender alert services that can supply information that has been vetted regarding conceivable prospects.

Express Interest

Before having full access to the tender documentation, participants may be required to express interest. This may be done via an online gateway or directly with the soliciting organisation. company can decide whether or not to proceed with the tender once it obtains the tender papers. If company decide to opt out, it must ensure that the soliciting organisation has been told.

Complete Pre-qualification Questionnaire

This is probably going to be the stage where there is a whole lot of effort, and there may be a lot of tension involved as well. There is going to be a hard and fast cutoff time for the submission of information. During this phase of the bid evaluation process, it will be possible to ask questions, and both the questions and the responses will be communicated to all of the bidders (LNG, 2023).

Complete Invitation to Tender

After the PQQ is completed, a short list of potential bidders will most likely be compiled. These companies will be given the opportunity to submit their bids. This will include their business ideas for the deal, such as their pricing and other details (Surrey, 2023).

Deliver Presentation

A handful of the remaining bidders may be invited to present. This will be chance to sell! It is also the time when bidder will be asked in-depth questions about your proposal and bid. Importantly, at this stage of the bid process, the communication will begin to become less formal and a dialogue will develop (Royal, 2023).

Conduct Negotiation

According to (DONATO, 2022), The ultimate decision, down to a single possible supplier, will be made, and the chosen business will likely be subject to negotiations. This is the element of the bidding process which may make the difference between a good contract, and one which is far less viable.

Sign Contract

After all of the previously mentioned stages of the bid process have been finished, the only thing that remains to be done is for the contract to be signed, and then the contract may be mobilized (volopay, 2023).

Usually, the process of tender is similar in all companies but, sometimes there are some different in the process depend on company procedure.

2.1.2. Tender law

In this paragraph will talk about the tender law in Oman.

According to the Tender Board (2012), also known as the Tender Board was founded in 1972 with the mission of managing all government projects as well as requests for projects from various government ministries and other government agencies. The ministry's Internal Procurement Committees may be used to award projects with a total value of less than OMR 3,000,000. All projects with a budget greater than that threshold are required to be floated before and awarded by the Tender Board.

2.1.3. Tender bottleneck

Finding the places in which bottlenecks in procurement most frequently occur is the first step in both avoiding them and fixing them when they do occur (Du, 2009). Although the public sector and private enterprise frequently have quite different aims and requirements, it is likely that procurement departments of all sizes will find themselves plagued by bottlenecks in the following four crucial areas:

Approval Process and Workflow

Delays and inaccuracies in the approval process can snowball into a disaster. Suppose a big raw materials order is delayed because the paper approval form was sent to the wrong person, returned to purchasing, and then sent to the correct staff member—who just went on vacation. Without a contingency workflow or eProcurement capabilities like mobile access and reminder alerts, the approval process halts (Mahendrawathi, 2017).

Denied materials, production cannot meet quota or customer demand, so an untested supplier is called in. Accounting misses out on supplier discounts for particular quantities and dates (and may have to pay for other orders later than anticipated due to cash flow problems). Customers whose products go on backorder may request refunds or cancel orders. Company has lost consumers and suppliers' goodwill and money (CSCMP, 2010).

Supplier Relationships/Supply Chain Management

The use of strategic sourcing can help entire firm save money while also increasing its value. However, one of the benefits that comes with properly managing one's supply chain is the development of robust and fruitful connections with one's suppliers. If company have a supply chain that is properly organized, it will be much simpler to form these relationships, which will allow to take advantage of prospects for joint ventures, as well as support and flexibility in the event of an emergency (C. Tolmie, 2010).

Spend Analysis

Accurate analysis and planning of expenditures rely heavily on control and transparency in their operations. It is possible that you will experience delays as a result of duplicate orders, fraudulent spending, and rogue spending if your procurement department and accounts payable team do not have complete spend insight. Data on expenditures that is erroneous leads to planning and forecasting that is also inaccurate, which may hinder the completion of future projects and create chaos during the process of financial reporting and audits (Jensen, 2009).

Lead Time Management

When it comes to procurement, the old adage "time is money" rings especially true. Accurate and minimal lead times are essential for everything, from the maintenance of safety stock inventories through the creation of tangible commodities. It is essential for the success of company to acquire the goods it requires exactly when it requires them in order to satisfy the requirements of clientele and realize expansion and profitability objectives.

These four areas of the procure-to-pay process give procurement teams with a wealth of opportunity for process development as well as enhanced levels of both productivity and efficiency when the appropriate technologies are utilised (Murphy, 2022).

2.2. Tender improvement measurement

In B2B sales, participating in tenders can be a complicated, time-consuming, and expensive method of conducting business. When selecting whether or not to pursue a tender, it is critical to make an accurate assessment of the odds of winning and the potential magnitude of the deal. Resources are limited and could have been spent on more lucrative business transactions. When you establish priorities for which business prospects to pursue, you reduce the likelihood that a

particular department will be overworked and ensure that your attention is directed on the offers that have a genuine opportunity to be successful. It is also helpful to prioritize the contracts that are the most strategically relevant and/or the largest (Witteveen, 2022).

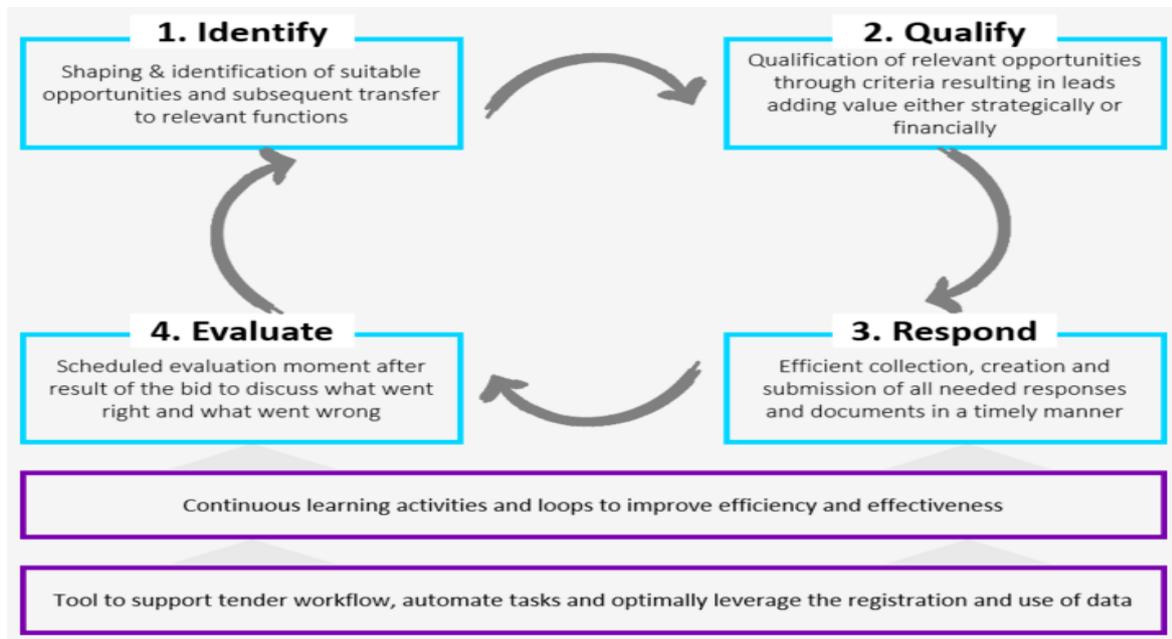


Figure 2 four phases of tender (Witteveen, 2022)

Above figure shows the Identify, Qualify, Respond, and Evaluate are the four phases that should be included in the tender process. After that, work together with representatives from relevant departments to co-create a new process that will replace the current one.

2.3. E-tendering

According to GEP (2022), through e-Tendering, which is a process that involves using online platforms to solicit and evaluate bids, a company can improve its efficiency and provide more insight into its suppliers. This process is also beneficial for source-to-pay operations as it allows them to streamline their processes (GEB, 2022).

During a paperless e-Tendering process, bids are solicited, proposals are submitted in response to formal buyer requirements, documents are exchanged, and shortlisted vendors and their proposals are evaluated. After a formal requirements document is developed and authorized by the buyer (e-Informing), and some suppliers are pre-qualified or short-listed (e-Tendering), the digital e-Procurement process moves onto the e-Tendering stage (e-Sourcing).

By digitizing the formerly manual process of processing bids, this digital tendering facilitates more organized and manageable procurement. That makes it simpler for the procurement manager to handle bids and assess them.

2.3.1. E-tendering benefits

The manual process is notorious for being time-consuming and cumbersome, frequently requiring a period of at least three months to be completed. This can be quite expensive for both the purchasers and the sellers of the goods (Tindsley, 2008). Here are some of the reasons why an electronic tendering system might be the better choice for purchasers:

Improve cost saving

When compared to the manual method, it can result in significant cost savings due to the reduced amount of time spent on the procedure, the manual overhead from negotiations, and the paper involved (Vijayarama, 2002).

A structure and transparent process

Opportunities, papers, and notifications can all be shared on the e-Tender platform that is being used, making it simple for your suppliers to work together. You will have full visibility of the situation and will be able to time stamp any changes, updates, or questions that are made. This will produce a thorough audit record of every action taken (NTTC, 2019).

More productive bid evaluation

All of the information pertaining to tendering can be controlled through a single interface. In light of this, comparisons and evaluations of providers can be carried out on this page as opposed to using email and individual document printouts to assess response times. Suppliers can also be alerted of modifications or updates to the process collectively and in a uniform manner through an e-Tender system. This helps to ensure that there is a minimum amount of bias in the decision-making process (Stephenson, 2008).

Start for digital transformation

An organization's financial system can be updated with the supplier information that is acquired using e-Tender platforms, or the information can be entered directly into databases of suppliers and contracts. In addition to this, they supply procurement experts with helpful management information, such as a breakdown of the product categories that are being sourced, the typical amount of time it takes to award contracts, and the value of the expenditures that are covered by contracts (procureport, 2020).

When organizations include electronic tendering processes into their procurement strategy, companies open themselves up to a wide variety of benefits. Because of the exponential growth of technology, its integration into the workings of businesses is unavoidable. A considerable competitive advantage can be gained by having an awareness of both the current application of technology and its expected path in the next years (Ajam, 2010).

Electronic tendering, also known as E-Tender, is reportedly one of the many fascinating developments in the modern construction industry, as stated by Harry, The Builder in Construction News and Views, Issue 3 (JUBM, 2002). It is a term that refers to the management and facilitation of the tendering process through the utilization of the Internet and other electronic media. Despite the fact that it does not fundamentally alter the way the tendering process is carried out, it improves the process by making use of the digital technologies that is available today (Mastor, 2005). The distinctions between traditional tender and electronic tender are outlined in Table 2.

Traditional tender	E-tender
Weak evidence of auditing	Tender submissions and downloads are both recorded. An order confirmation and submission receipt are generated instantly.
High volumes of paper used and stored	Online viewing and submission of bids reduces paper use by over 90 percent. With e-Documentation, tender documents require no physical storage space.

Bidders need plenty of notice to travel to a single location to make tender purchases	Since online access to tender documents removes geographical barriers, the process is more streamlined and less time-consuming than ever before (by an estimated 80%).
An insufficient amount of reliable, accessible information	As a result of the fact that all bid documents are kept safely online, backed up on remote servers, and are guaranteed to be available 99.9% of the time.
Weakness in the Privacy and Integrity of Data	All activities that take place on the internet are recorded, and access to various categories of information can be provided on the basis of "need to use." This provides complete authority over all documents and information pertaining to the tender.
A high amount spent on processing	Automation of the procedure eliminates the monetary burden. The elimination of the need to manage materials requested by bidders is a further resource-saving benefit of making documents available online.
Inefficient and time-consuming processing	Processing hundreds or even thousands of bids are simplified by an automated documentation flow that eliminates the need for manual data entry and compilation by over 80%.

Table 2 Comparison of Traditional and e-Tender (Mastor, 2005)

2.3.2. E-tender challenges

While there are many obstacles that must be overcome before an e-Tendering system or process can be widely adopted, researchers have pinpointed a specific set of problems and misconceptions that stand in the way of widespread use of e-tendering (Kajewski, 2004).

For example, Despite the growing prevalence of eTendering processes in the construction sector, some contractors and consultants view them as an "unfair practice" if they are unable to take advantage of electronically receiving or submitting tender documents. Providing tenderers with the choice of obtaining their tender documentation in either paper or electronic format is a simple solution to this problem (CITE, 2003).

Two further major hurdles to electronic tendering have been discovered. For starters, some consultants view e-Tendering as being more beneficial to contractors than to themselves. The majority of contractors and consultants have not yet adopted the e-Tendering procedure, despite the fact that an increasing number of contractors are capable of and encouraged to return their tender bids online (even when the initial tender materials were received in paper format). More work is needed to highlight the possible benefits and opportunities accessible to contractors, consultants, and clients when implementing an e-Tender process, but this can help overcome both obstacles. Therefore, experts recommend that the creators, owners, and managers of these e-Tendering systems and procedures regularly host public e-Tender information dissemination programmes in order to reach this higher level of understanding and awareness within the construction sector (Weippert, 2004).

2.3.3. E-tender process

E-tendering is a safe and reliable method, as MERX (2014, p. 5) explains. E-tender is "a reasonably basic technical solution centered around a secure email and an electronic document management," as Brook (2008, p. 316) confirms and elaborates. Tender documents are uploaded to a website with login, authentication, and viewing restrictions. Technically, a number of procedures take place in e-Perolehan before a contract is given, and these are all a part of e-tender. E-Notification, e-Access, e-Submission, e Assessment/Evaluation, and even e-Awarding are all key components (AZIS, 2020). The following is a detailed explanation of each of these steps:

E-Notification:

On alert potential bidders, tender documents are uploaded to e-Perolehan when they have been prepared. The client/consultant then either makes the tender available to any and all bidders or notifies a select group of bidders.

E-Access:

All prospective bidders must first register and get a unique access code before they can view the online tender materials, which include the tender submission process and due date.

E-Submission:

The bids must be submitted by the interested parties in the data format specified by the customer or consultant. Informational requirements for successful tender submissions are laid out in detail by the client or consultant.

E-Evaluation

After the deadline has passed, authorized employees will evaluate the quality of each and every proposal that was submitted.

E-Awarding:

e-Awarding is primarily concerned with the administration of the process of awarding contracts.

2.3.4. E-tender software

According to Carrie Ratcliff (2020), E-tendering software provides a comprehensive and conveniently accessible picture of the entire tendering process. By utilizing a centralized solution housed in the cloud, all stakeholders have access to real-time data in a format that is standardized, comparable, and reportable. Bids, queries, communications, and responses are all held in one location. This increases openness. Automation decreases the time and resources required to manage the bid process for both vendor and buyer, allowing them to focus on their core competencies rather than on administrative tasks (ProcurePort, 2019).

2.4. Conceptual model

The conceptual model is shown in figure 3, which can be found below. The primary research question on the left side serves as the basis for the development of two distinct themes that are based on the sub-questions. The arrows provide a visual representation of all the thoughts and theories associated with each issue, illustrating the connections between certain ideas.

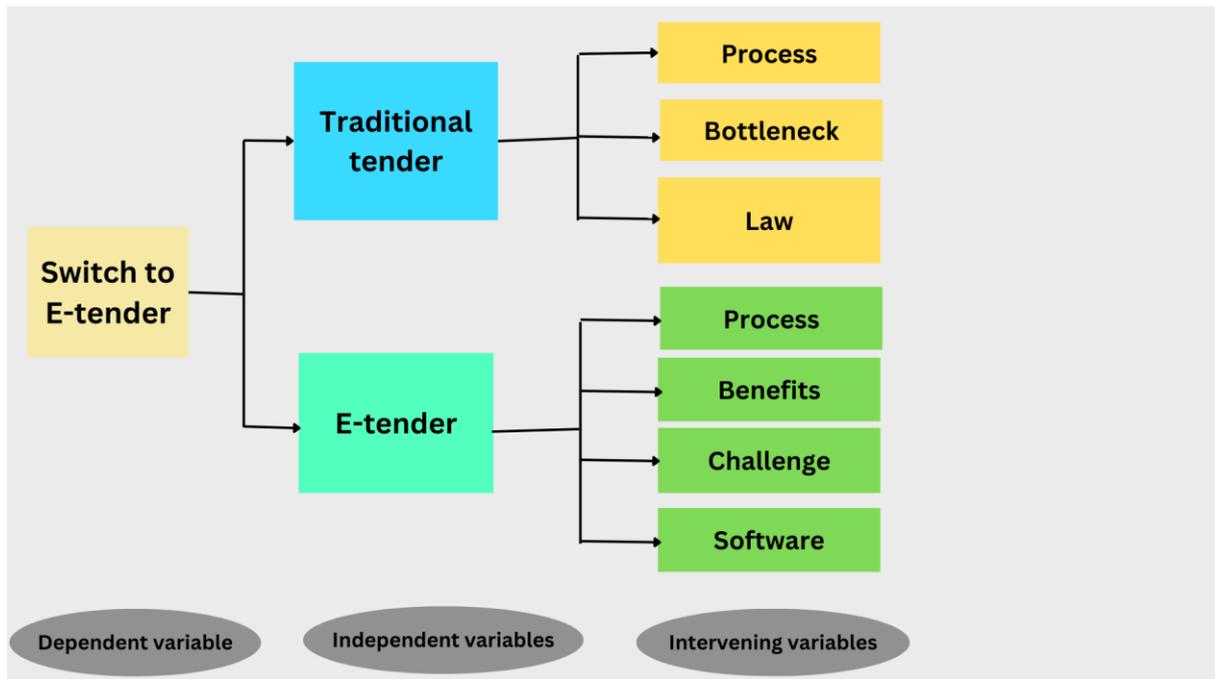


Figure 3 Conceptual model of E-tendering

The findings of the literature review will examine the main research question and its sub-questions, which are linked to various themes such as the tender process, tender law, and the bottlenecks with tenders. The next part of the analysis focuses on assessing the extent of improvement between traditional tendering and e-tendering. Lastly, the research centers on e-tendering, encompassing its process, benefits, challenges, and the software utilized in the e-tender process.

3. Research method

This chapter will break down the research method into discussions of each individual research issue. This study has both a descriptive and exploratory of nature, and it is framed as a policy question. The procedure for gathering and analyzing data, as well as any relevant software and hardware, must be described. Lastly, it will talk about the study's validity and reliability.

3.1. Research strategy

Desk research is going to be the method of investigation that Data of both a qualitative nature will be collected which is utilised in this study for the degree requirement. The database that is maintained by Port of Duqm contains all of the information that pertains to the tendering procedure and the results of these. Desk research is the most effective approach for conducting research because all of the information can be found within the system. There is a possibility of some overlap with the questions pertaining to the plan and the interviews; nonetheless, this will serve mostly as a backup in the event that information is lacking.

3.1.1. What does the logistics concepts of Duqm Port look like?

This sub-question calls for qualitative study because it is an unanswered question that cannot be resolved using quantitative methods. The data collection methods which will be employed for this first sub-question include the use of questions and existing material, often known as desk research. The interviews will be used and the questions will be organized in advance, although spontaneous inquiries are possible. The role will be going to meet HR administrator, administration officer and tendering specialist from Duqm Port will be interviewed in this fashion so that we may draw comparisons between their responses. Since previous students have already detailed the logistics idea of Duqm Port, desk research will also be utilised as a means of gathering information. So, a reanalysis will be conducted as things may be modified.

The data will be collected through open interviews and desk research will be analyzed using a grounded theory methodology. After transcribing the interviews, these will be evaluated by utilizing the programme QDA miner. Here, labels will be developed in order to locate and compare what is being stated about a given issue by the respondents. If it seems that the desk research already produces a lot of information, it may be opted to just let the outcomes be controlled by the interested parties.

To answer this first part of the topic, we will refer to the seven-part logistical framework developed by Visser van Goor (2015). The CODP, ICT, infrastructure, and planning and control systems are all types that make up this framework. Since the logistical framework has been used before, there is no need to incorporate it in the theoretical foundation.

3.1.2. What is the current process of tenders?

This sub-question pertains to a form of study that is more qualitative in nature, as the emphasis is placed on the content. There is a possibility of involving figures, but there will be no calculations. Desk research is going to be the method of choice for gathering information in order to answer this supplementary inquiry. To be more exact, this is referred to as a secondary analysis because the data are utilised for a purpose that is distinct from the primary one. The database of the Duqm port contains information on the entirety of the tender procedure. In the event that not enough information can be gleaned from the available material, open interviews might be used instead.

In terms of the method for analysing the data, if interviews are carried out, the grounded theory approach will be used, and QDA miner will be used to carry it out. The interviews will be with two co-workers in procurement department. From these interviews will come up with current tender

process of Duqm port by using value stream mapping to show the lead time of each process to compare with e-tender process.

3.1.3. What is bottleneck in the current process of tender?

In order to discover specific issues, it may be helpful to conduct an open interview with two persons from the procurement department. This individual interview may have a greater understanding of how the tender process works. In the event that the results obtained through desk research are insufficient, this step will be taken that information from the theoretical framework will be used.

The grounded theory technique, using QDA miner as the data analysis tool, will be utilised for the possible open interview with procurement manager. This will be the data analysis method that will be employed. The findings from the desk research will be arranged in an orderly fishbone, with the goals of categorising the various issues and locating any potential connections between the bottlenecks.

3.1.4. What is the practice of e-tender in Oman?

For this fourth sub-question, interviews will primarily be utilized as the data gathering approach. Two logistics consulting organizations, namely Oman Tender Board and Joint Supplier Registration System (JSRS), will be approached to leverage their experience working with clients.

3.1.5. Which system will be the best choice?

Given that they offer insights into the automation of tender processes, many theories from the theoretical framework are applicable to this research. By developing a deeper understanding of these theories, it becomes possible to establish specific and unambiguous specifications for automating manual tender procedures. A crucial aspect of automated tendering is the implementation of edit controls, especially business rules. The intrinsic and contextual aspects of the tender can be leveraged to determine the requirements for successful completion of automated tendering.

To assess manual tender submissions, various methodologies will be employed, including the weighted scoring technique and the MoSCoW approach. These methods enable quantification and consideration of a wide range of factors, facilitating more informed decision-making. The IT department and procurement department will utilize the MoSCoW factors to select the appropriate software.

3.1.6. How can the new platform and process be implemented?

The implementation phase will begin, and a PDCA, SWOT analysis and Gantt chart will be utilised to organise the tasks and responsibilities associated with the project. Also, it would be helpful to get idea from other companies that can prepare interview to discuss the situation and how it has been implemented with focus group.

Validity and reliability

The books, research papers, case studies, and databases that were used to compile the literature reviews and data that will be included in this report come from reputable sources such as the database maintained by the Port of Duqm. The interviews that will be conducted with employees who have a significant influence on the logistics performance of switching to E-tender will provide the foundation for the veracity of the research that will be conducted. Their responses will determine whether or not the investigation is accurate.

3.2. Restrictions

This report paper will not contain any of the interview's transcript that were conducted with the staff members who are responsible for monitoring the tendering process at the Port of Duqm.

Because of the constraints and limitations imposed by the company. Nevertheless, the results chapter of the report will include a summary of the interviews that were conducted.

4. Result

This part of the report will include the analysis of each sub-question to come up with the answer of main question. Firstly, it is started with the logistics concept of Port of Duqm. Then, it shows process of tender in general, tender law in Oman and current tender process in PODC. After that, the report will cover the bottlenecks of PODC tender process. Next, E-tender process practice in Oman will include in result part. Also, process of choosing the system for E-tender in PODC will discuss. Finally, the report will give implementation plan of new platform.

4.1. Port of Duqm logistics concept

According to (Visser & Van Goor 2019), a port of Duqm's logistics concept can be viewed as a plan for how it wants its logistics to function. This illustrates the interaction between the movement of items, money, and data. Typically, dissatisfaction with an organization's current internal and/or external logistics performance is the impetus for the development of a logistics concept. Developing a logistics concept serves three key purposes in these situations:

- To fully grasp the process of commodities management and its flow.
- With the goal of developing a unified strategy.
- The company as a whole needs to learn more about logistics.

Objective

The ambitious SEZAD (Special Economic Zone Authority of Duqm) project in the Sultanate of Oman includes the Port of Duqm. Created to diversify the economy, the port is a Greenfield project quickly becoming a center of economic activity due to its central location field (Duqm, 2023).

Vision

“To be the preferred Multi-Purpose Port of the region” (PORT OF DUQM, 2023).

Mission

To be a customer-focused business that successfully manages a world-class deep-sea port that is also connected with a cutting-edge logistic centre, thereby realizing the full potential of the Duqm special economic zone and contributing to the economic diversification of Oman.

Structure

The Port of Duqm is responsible for ensuring that all marine traffic entering and exiting the port is always conducted safely and efficiently. Aside from providing pilotage, VTS, and tug services, the Port of Duqm also offers various other services, either directly or through one of the multiple agents or sub-contractors in the port. These services include facilitating crew changes, developing, handling, bunkering, ship-to-ship services (within the port basin or at anchorage), fresh water supply, and waste. The process of porting is mentioned in Appendix 1.

The PODC uses a fair and professional bidding process to fulfil its procurement requirements. This necessitates the observance of international best practices for tendering. The best practices used by PODC are described in the chart below.

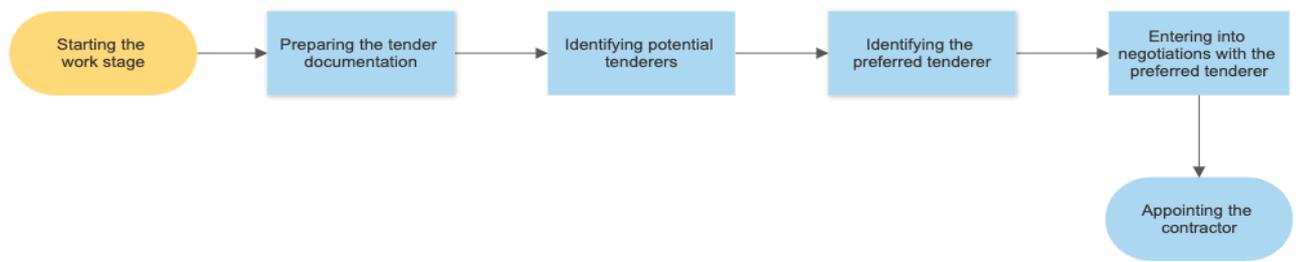


Figure 4 Manual tender process (Manual, 2022)

In most cases, the steps of the tender process comprise a call for submissions, the submission of bids, a process for selecting the winning bidder, and the formulation of the contract. After all of these stages have been finished, the contractor will begin work on the project and see it through to its conclusion.

Control system

Strategists developed by executives are aimed at bringing about the organization's stated purpose. Executives can monitor the organization's progress, pinpoint problem areas, and take corrective measures with the help of control systems.

PODC in supply chain department has push and pull system which the department controls the number of tenders and its types as push. On the other side, there is pull system for the suppliers because they are taking the awarding of tender to implement the projects.

Information system

For information system in the department is used IFS as ERP system. PODC went with IFS due to the team's and the product's extensive knowledge of and ability to work in our specific market. By utilizing IFS Cloud ERP, PODC will be able to cut down on the lead time, downtime, and processing time associated with offshore system production and installation while simultaneously increasing efficiency and quality. An integral part of our effort to become more efficient, productive, and environmentally friendly is IFS.

Personnel organization

As supply chain department, it has a manager reporting directly to CEO. Also, under manager there is two divisions: one for tendering and contracting and the second one for procurement. In each division, there is two employees who are all reporting to the manager. It shows underneath structure for the department as well the port personnel mentioned in appendix 2.

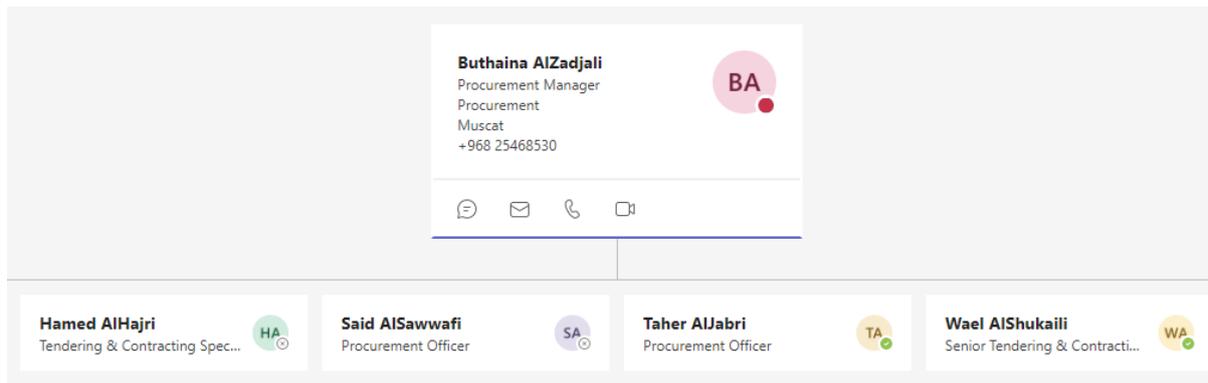


Figure 5 Supply Chain Department Structure

The key performance indicators (KPI's)

Procurement KPIs can monitor all aspects of buying or acquiring products and services. The goal of Port of Duqm is to illustrate how much procurement strategy contributes to business performance and where it falls short. These are the KPIs of tendering process:

- Corrective actions on Contractual breaches: 80% Percentage of cases complaints have been resolved in 30 days for Major and minor 7 - 14 days.
- Tender Cycle form RFQ to awarding: 75% of total tenders to be awarded within 90 calendar days.
- Contract Cycle form RFQ to awarding: 75% of total annual agreement to be converted to PO within 60 calendar days.
- Percentage of Contracts awarded Before Expiry: 95% Agreements Extensions/Renewal/awarding done prior to existing contract Expiry.
- PR to PO cycle achieve actual 80% in 10 days: 80% of total annual PR line items to be converted to PO within 10 calendar days.
- In Country Value (ICV): Number of SME's awarded by the buyer 10% in combination Annual PO's & Agreement
- Delivery: Achieve 95% on time delivery
- Cost Saving: Generate an average of 10% saving from supplier quotation.

4.2. Current tender process

In this sub-chapter, we explore Oman's tendering landscape, covering the country's tender law, different types of tenders, and the current tender process employed by PODC. Understanding these aspects will provide valuable insights into participating in tenders in Oman and the factors influencing contract awards.

4.2.1. Oman tender law

On October 1, 2008, the Sultanate of Oman's new tender law, which was passed by Sultani Decree 36/2008, went into force. This law replaced the old one, which was passed by Sultani Decree 86/1984. In this piece, we summarize some of the key changes and fundamental issues raised by the introduction of the new law. What the new law covers

Importantly, the new law covers a wider range of organizations than the old law did. The new law applies to all parts of the "administrative apparatus of the state," including those that have their own legal status. It also applies to public organizations and establishments, such as government regulatory bodies set up under SD 116/91 that have their own legal status, and to companies that the government owns completely.

The new rule has also made the tender process apply to more types of work and services. Real estate buying and renting is a new thing that has been added. This could have a big effect, as it is likely to be broad enough to include the purchase of land use rights.

From this decree came Oman tender board to organize the process of tendering in Oman.

Tender Board



Figure 6 Oman tender board

The Tender Board (TB) was set up in 1972 to handle all government projects and requests for projects from civil service ministries and other government organizations. Through the ministry's Internal Procurement Committees, projects that cost less than OMR 3,000,000 can be given out. Projects that cost more than that amount must be put out to bid and chosen by the Tender Board (Board O. T., 2012).

From responds of interviews got that a bid can be:

- General (Open Tender): All companies, whether they are in the same country or in another, are told about general bids.
- Limited: The Tender Board invites all qualified companies, both local and foreign, that have been categorized and given a grade. Local businesses must be signed up with the Tender Board. Companies from other countries that want to take part in this offer must finish all registration steps within a month of being given a contract.
- Close to home: for any business registered in Oman (NB: a registered company is a company registered with the Ministry of Commerce and Industry and issued with a Registration Certificate).
- International: Any company from around the world can join. A company from outside the country that wants to take part in a tender must finish all registering steps with the Tender Board within a month of getting a contract.

Vision

The Tender Board tries to do the best job possible at managing and carrying out government purchases and projects. By improving its human resources and administrative processes, it hopes to meet the highest economic goals of the overall development strategy for the 2020 vision of a sustainable future.

Goals

The Tender Board's main job is to organize the bidding process. This includes:

- Signing up the companies that want to take part in a tender.
- Reviewing the bid papers that were sent by the ministries and will be put out to bid.
- Putting out the bid and selling the papers to companies that qualify.
- Putting the tenders on the website <https://etendering.tenderboard.gov.om>, in local newspapers, on radio and TV, in foreign magazines, via SMS and IVR.
- Taking a look at the evaluation report sent by the departments.
- Sending the suggestion report to the Tender Board committee so that the bid can be given.
- Checking the change orders for the jobs that were awarded.

Objectives

- Use cutting-edge tools to improve our relationships with both the private and public sectors. (i.e. internet, mobiles, video conferencing, etc.).
- Make sure that the best technical solution is picked by following the rules and laws for tenders.

4.2.2. Tender

PODC adheres to an equitable and proficient bidding procedure in order to fulfil its procurement requirements. This pertains to the conformity with globally recognized standards in the process of soliciting bids. The following section outlines the optimal methodologies implemented by PODC.

Request for Quotation (RFQ)	The tender approach is employed in procurement processes where the specifications of the requirements and the manner in which delivery or work must be executed are accurately defined and communicated to potential vendors. PODC is soliciting bids primarily for the purpose of conducting pricing comparisons in the aforementioned tenders.
Request for Proposal (RFP)	PODC uses tendering when the solution is unknown. PODC will define the problem or requirement in the RFP and request vendor solutions and price.
Request for Tender (RFT)	PODC uses tenders for procurement where the solution is known and the value is projected to be over RO 100,000/-. PODC will outline the solution it needs in the RFT and request pricing and alternative solutions from vendors.

Table 3 Tender types of PODC

It is PODC's policy to make it a priority to ensure that the method(s) of tendering that are utilised contribute to the highest possible level of competition while also providing equal access to tender opportunities for all potential tenderers.

All tenders that are issued by PODC will Be subject to either the availability of adequate approved budget allocation or upon written approval from the board of directors if there is no such budget available.

For each and every tender that is put out by PODC, there must be a minimum of three (3) bids received. In the event that there are less than three (3) answers, the PODC is required to either

re-solicit bids or request that the ITC waive the requirement that there be a minimum number of bids before moving on with the procedure.

In conclusion, obtaining at least three quotations for an RFQ is important for several reasons. It promotes competitive pricing, allows for the assessment of quality and suitability, mitigates risks, and ensures compliance and transparency in the procurement process. By considering multiple options, decision-makers can make informed choices while encouraging fair competition among suppliers.

4.2.3. PODC tender process

In this section, we explore the tender process of the Port of Duqm. By examining the Port of Duqm's tender process, readers will gain insights into the necessary steps, evaluation criteria, and requirements for successfully bidding and securing contracts within this dynamic port.

The method of procurement will be chosen after considering the amount of money being bid on the item. For purchases above a certain threshold limit, open tendering is required, ensuring a transparent and competitive bidding process. On the other hand, closed tendering will be employed for all other purchases. This approach allows for more targeted and selective bidding among a pre-approved group of suppliers. In cases where exceptions need to be made, the decisions will be subject to ITC approvals, ensuring proper handling and oversight. By implementing this comprehensive procurement strategy, we aim to promote fairness, efficiency, and accountability in our purchasing procedures.

The chart below will show the process of tendering in PODC and underneath description of each stage:

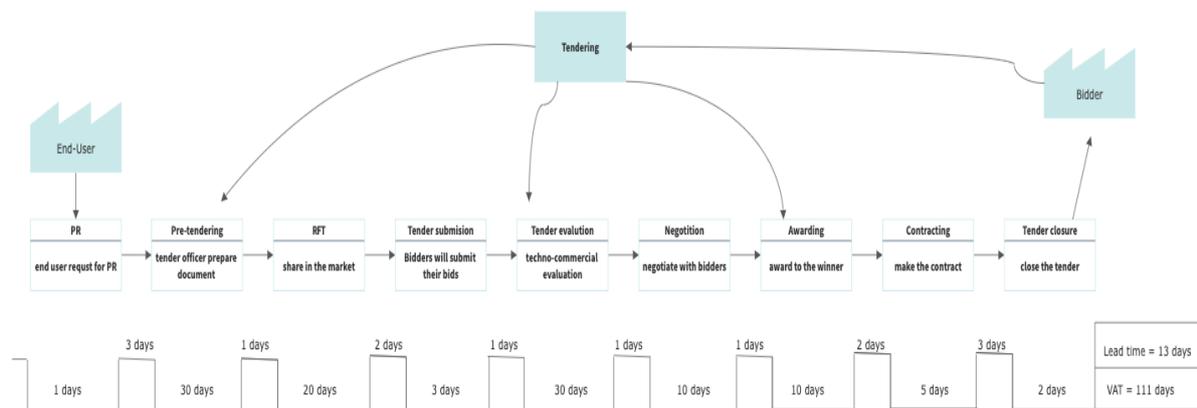


Figure 7 VSM of PODC current tender process

Pre-Tendering

A tender document shall be prepared in order to invite bids from the interested bidders. Tender documents shall be complete, comprehensive, and shall be free from omissions, errors, inconsistencies, and ambiguities as far as possible to communicate PODC's requirements, terms, and conditions to the Tenderers accurately.

The Tender documents shall necessarily include the following:

- Brief background on the Goods/ Services/ Works.
- Definition of type of Tender - Local or International Tender,
- Complete description of the work proposed to be procured.
- Technical Specifications required for the Goods/Services/Works

- Tender Evaluation Criteria which will be used as evaluation method to screen and evaluate the proposals.
- Administrative and Financial Terms and Conditions, which means General Terms and Conditions for Purchase of Goods, Services and Contractors Works & contractual obligations of the Tenderers.
- Penalty clauses, retention sum and tentative date of handing over of project.

Well-defined requirements are important and usually reward the time and effort taken to produce correct specifications with easy, fast, and successful technical evaluation. Therefore, efforts shall be concentrated on defining the correct specifications during the tender document preparation. Any feedback from the ITC if required shall be incorporated into the draft by the Procurement Section.

Request for Tender

For open tenders, PODC shall issue a tender advertisement to notify / inform the interested bidders about the tender floated. The tender advertisement shall be published in daily newspapers of wide circulation - one in English and one in Arabic. The advertisement may also be published in PODC website or international media (foreign dailies, journals, internet etc. as applicable).

The Procurement Section shall be responsible for designing and publishing the Advertisement of the Tender in the media to be chosen by the ITC based on its experience and the type, nature, or characteristics of the Goods/ Services/ Works. However, the approval of the Advertisement shall be obtaining prior to the publishing of the same.

The Advertisement shall include the following Information:

- Clear mention of the Scope on the Goods/ Services/ Works in brief.
- Brief Technical Specifications.
- Fee payable to receive the Tender Documents.
- Last date for requesting clarifications by the bidders.
- Closing dates for the Proposals.
- Submitting Address where the Proposals are to be delivered.
- Class of companies entitled to participate in the Tender Process.

Tender submission

The Tender document shall clearly state the date and closing time for submission of tenders. The mode of delivery shall also be specified in the tender documents. Time for submission of bids shall be determined for each type of tender - Open / Closed - Single / Two-stage, and considering the complexity involved in the procurement. However, the time limit for submission of bids may be increased/ decreased with due consideration of the circumstances. The time for submitting bids shall not be less than 7 days and shall not exceed 60 days. Any extension beyond 60 days must be with the consultation of the ITC. PODC Procurement may grant extensions of tender submission date depending upon the complexity of the procurement, the number of requests received compared to the number of bidders invited/ interested and the time constraints of the procurement.

When PODC has issued clarifications/amendments to the tender, which would necessitate more time for the preparation of the tender, the date of submission may be extended to provide enough time for potential respondents to prepare and submit tenders. The principles of objectivity and equality of treatment of all potential tenderers are always respected. The notification of any change in the schedule shall be sent to all the vendors to whom the Tender document has been issued. The bidders may be advised to submit the tender in 2 separately sealed envelopes/online

submission - Technical Proposal & Financial proposal. The bidders will also be instructed to submit a compliance statement along with the technical proposal.

The Technical proposal shall contain the technical terms and un-priced commercial terms. The Financial proposal shall contain the base price bid as per the terms and conditions of Tender document and alternate price bid, if any. Tenderers shall also be instructed to deliver the bids, in a sealed envelope/ online submission which shall not bear any indication to the name or any other details that will reveal the identity of the Tenderer.

Tender evaluation

Evaluation is the process of assessing and comparing bids in accordance with the predetermined evaluation methodology and criteria as stated in the solicitation documents. The aim shall be to determine the offer that best fits the evaluation criteria, and thus represents best value for PODC. An objective, fair and well-executed evaluation process is critical as it results in a recommendation and a request for award of contract.

In general, PODC shall evaluate all offers based on the principle of best value for money, i.e., the ideal combination of technical and financial factors. Under no circumstances, shall the evaluation criteria be altered during the evaluation process as it would threaten the transparency of the procurement process and the principles of fair and equal treatment of suppliers. Evaluation of tenders shall be undertaken as objectively as possible. Due care shall be taken to finalize the tenders within the validity period of the offer, to avoid any delays occurring in the project timeline.

The tender evaluation shall comply with the following principles:

- **Accountability & Transparency:** The process shall be open, clear, and equal opportunities shall be provided to all Tenderers.
- **Impartiality:** The process shall treat all Tenderers equally without any bias.
- **Objectivity:** Decisions shall be based on objective evidence and subjective judgment shall be minimized.
- **Repeatability & Reproducibility:** Repeated evaluation of the same tender against the same criteria by the same evaluation team or evaluation by a different team shall yield the same decisions.
- **Thoroughness:** Decisions shall be based on competent and comprehensive analysis of all relevant information and shall be supported by rational and logical data.

The details regarding the tender (such as the type of tender, the evaluation committee members appointed, evaluation criteria etc.) shall be documented by the ITC in the 'Pretender form'.

Negotiations

Procurement team may request for "best and final offer" from the vendors with the top 3 evaluation scores (technical + commercial) where there is scope for reduction in price with the Bidders under review. Procurement Manager shall take part in the negotiation process.

Award of tender

The decision of award shall be formalized during an ITC meeting. A 'Letter of Award' shall be prepared and sent to the successful vendor by the Procurement Manager. Subsequently the Procurement Section shall prepare the 'Purchase Order'/Contract with the signature of the designated authority and along with the terms and conditions and will be sent to the successful Tenderer. All contractual documents shall be prepared by the Contract management team of PODC. The Contracts will be reviewed by the Legal department / Consultant prior to execution.

The contracts will be signed by the bidder and ITC will see to the conclusion of the contract and the filing thereof. The signed contract will be final and binding upon PODC and the organization to which the contract was awarded.

The receipt of the above shall be acknowledged by the Tendered and accepted. On receipt of the acceptance, the personnel concerned from the Indenting department shall be informed about the acknowledgement.

4.3. Current tender process bottlenecks

In a manual tender process, there are several potential bottlenecks that may slow down the process or create inefficiencies.

Limited number of suppliers: There are only a few suppliers who can participate in the tender, it may limit the competition, leading to higher prices or inferior quality.

Manual documentation: In a manual tender process, documentation is often done manually, which can be time-consuming and error prone. It can cause delays and create confusion during the tender process.

Complex evaluation criteria: The evaluation criteria for tenders are too complex or unclear, it can lead to confusion among bidders and delays in the evaluation process.

Lack of transparency: The tender process lacks transparency; it can lead to distrust among bidders and may create an environment that is ripe for corruption or favoritism.

Inadequate staffing: There are not enough staff members to manage the tender process, it can lead to delays in responding to bidder questions, reviewing bids, or conducting evaluations.

Inefficient communication: Communication between the stakeholders involved in the tender process is inefficient, it can lead to misunderstandings, delays, or missed deadlines.

To identify the specific bottleneck in a manual tender process, it is important to review the entire process from start to finish and identify any potential areas of improvement. Streamlining documentation, simplifying evaluation criteria, ensuring transparency, and improving communication can all help to mitigate potential bottlenecks and increase the efficiency of the process. In the below swimlane shows the entire process of manual tender process of PODC.

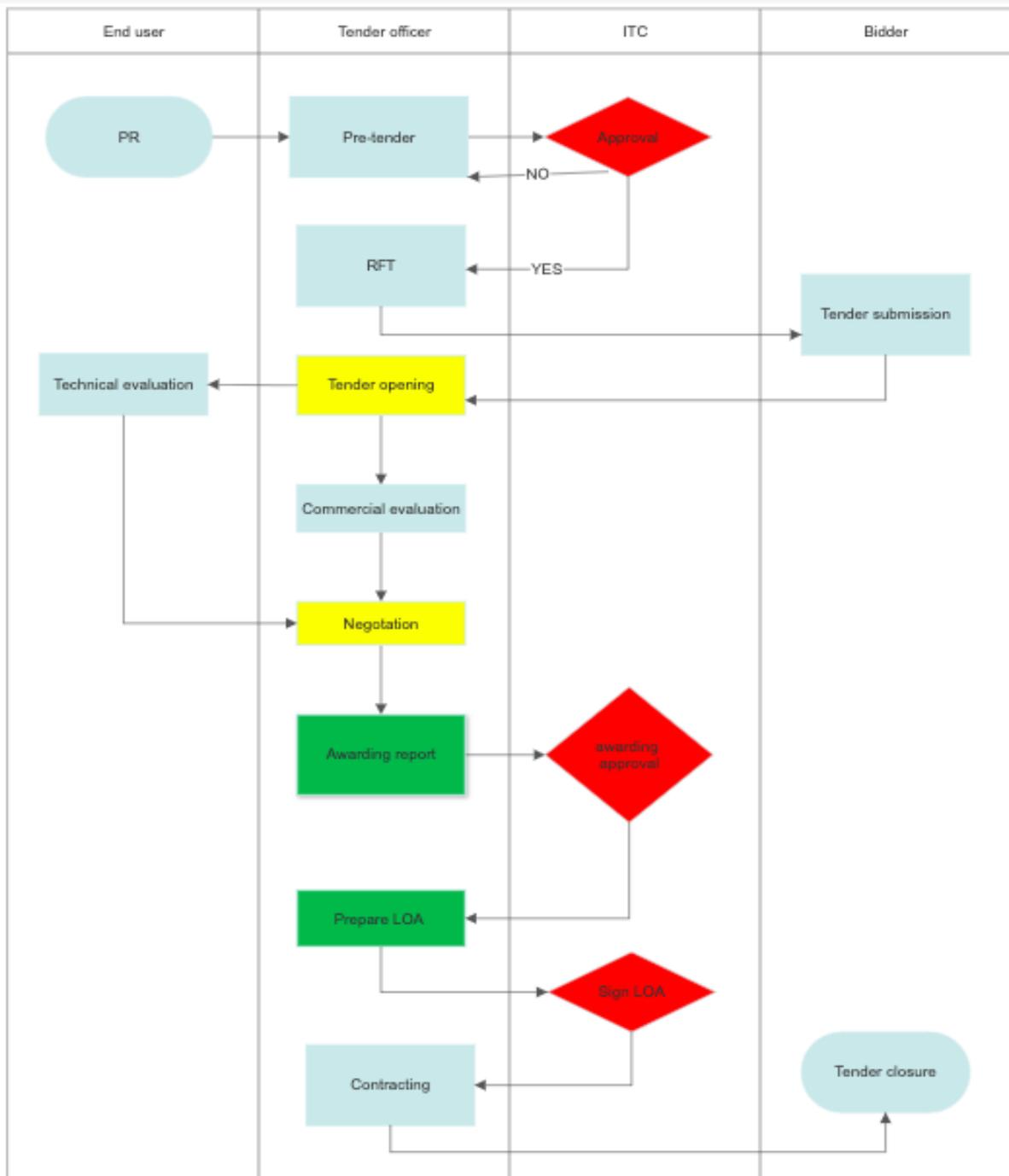


Figure 8 Swimlane of PODC current tender process

From the figure above could see different colures red as delay with approval, green as paperwork and yellow manual analysis these colures will focus on, to improve in E-tender process.

To come up with the summery of tender bottlenecks in PODC in the below fishbone:

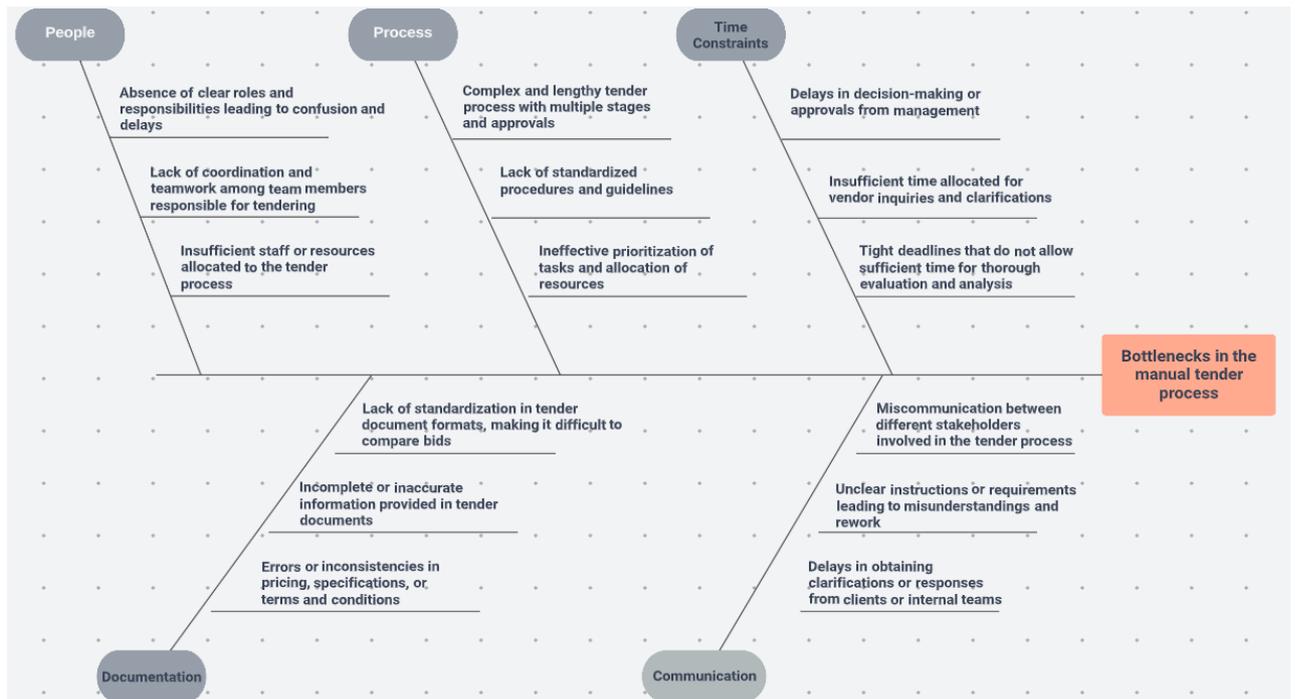


Figure 9 Fishbone of PODC manual tender bottlenecks

To overcome the bottlenecks caused by paperwork and manual processes in the tender process at the Port of Duqm, it is essential to digitize and automate the procedures. By adopting digital platforms and eliminating paper-based processes, the port can streamline operations, reduce errors, and enhance efficiency. This shift will not only save time but also accessibility for all stakeholders involved in the tendering process.

4.4. E-tender process practice in Oman

In Oman, the e-tender process has revolutionized procurement practices, leveraging digital technology to enhance efficiency and transparency. By transitioning from manual bidding to a streamlined electronic platform, Oman has embraced a modern approach that allows businesses and suppliers to participate in tenders remotely and submit bids electronically.

E-tendering, also known as electronic tendering, is a procurement method that uses electronic means to facilitate the tendering process. In Oman, e-tendering is becoming an increasingly popular practice in both the public and private sectors.

The Public Authority for Stores and Food Reserve (PASFR) is responsible for managing the e-tendering process in Oman's public sector. The PASFR has implemented an e-procurement system called "Tender Board" which is used for publishing tender notices, receiving and evaluating bids, and awarding contracts electronically. The Tender Board system is accessible to all registered suppliers and contractors who can submit their bids and proposals online.

In the private sector, many companies in Oman are adopting e-tendering to streamline their procurement processes, reduce costs, and increase transparency. E-tendering platforms such as ProTenders and TenderLink are widely used in Oman's private sector for publishing tender notices, receiving and evaluating bids, and awarding contracts.

Legal framework: E-tendering in Oman is governed by the Tender Law (Royal Decree 37/2008) and its implementing regulations. The law sets out the procedures and requirements for tendering and procurement in the public sector, including e-tendering.

The role of PASFR: The Public Authority for Stores and Food Reserve (PASFR) is responsible for managing the e-tendering process in Oman's public sector. PASFR operates the Tender Board system, which is used for publishing tender notices, receiving and evaluating bids, and awarding contracts electronically.

Registration process: To participate in e-tendering in Oman, suppliers and contractors must first register with the Tender Board system. The registration process involves providing company information, verifying the company's legal status, and obtaining an electronic signature.

E-tendering process: Once registered, suppliers and contractors can access the Tender Board system to view and participate in tender opportunities. The e-tendering process involves submitting bids and proposals electronically, with all communications and documentation exchanged through the system. The Tender Board system also provides a secure and transparent platform for evaluating and awarding contracts.

Private sector platforms: In addition to the Tender Board system, many private sector companies in Oman use e-tendering platforms such as ProTenders and TenderLink. These platforms provide similar features to the Tender Board system but are tailored to the needs of the private sector.

Benefits of e-tendering: E-tendering offers several benefits, including increased efficiency and transparency, reduced costs, improved competition, and greater access to a wider range of suppliers and contractors. E-tendering also eliminates the need for physical submission of documents, reducing the environmental impact and improving the overall sustainability of the procurement process.

Common challenges that Oman can face in implementing e-tendering systems:

Lack of infrastructure: E-tendering requires a reliable and efficient ICT infrastructure, including access to high-speed internet and secure servers. Developing countries or regions with poor connectivity or inadequate IT infrastructure may face challenges in implementing e-tendering systems.

Resistance to change: E-tendering requires a shift away from traditional paper-based systems and may be met with resistance from stakeholders who are accustomed to traditional procurement methods. Resistance to change can result in slow adoption or implementation of e-tendering systems.

Lack of awareness and capacity: The successful implementation of e-tendering requires stakeholders to have the necessary knowledge and skills to effectively utilize the system. A lack of awareness or capacity building initiatives can hinder the adoption and effectiveness of e-tendering systems.

Cybersecurity risks: E-tendering systems rely on digital platforms and can be vulnerable to cybersecurity threats, such as hacking or data breaches. Implementing adequate cybersecurity measures is crucial to ensuring the security and integrity of e-tendering systems.

Legal and regulatory challenges: The implementation of e-tendering systems may require changes to existing legal and regulatory frameworks, particularly in the areas of procurement and electronic transactions. Lack of clear regulations or legal frameworks can create uncertainty and hinder the effective implementation of e-tendering systems.

Therefore, it may be worth implementing e-tendering systems despite the challenges, as the potential benefits can be significant. However, it is important to carefully assess the specific challenges faced in a given context and develop effective strategies to mitigate them in order to ensure successful implementation and adoption of e-tendering systems.

In summary, Oman's E-tender process has revolutionized procurement, improving efficiency, transparency, and competitiveness. It serves as a model for digital transformation in public procurement, showcasing the power of technology in maximizing value and accountability.

4.5. System Choice

The choice of system for E-tender will depend on various factors such as the requirements of the PODC, the complexity of the tender process, the budget, and the level of security required for the transactions.

There are several E-tendering systems available in the market, including both open-source and proprietary solutions. Some popular options include SAP Ariba, Oracle Procurement Cloud, Zycus, and Coupa, among others.

4.5.1. Process of choice

Choosing the right software for E-tendering is critical to the success of the procurement process. Here is a checklist of important factors to consider when selecting E-tendering software, these requirements come up to use MoSCoW tool that from interviews with three employees from IT and two employees from procurement departments:

Functional requirements

- 1- User management: The e-tender software **must** have a system for user management, allowing users to create and manage their accounts, update their profiles, and view their tender submissions.
- 2- Tender creation and management: The software **should** allow authorized users to create and manage tender notices, including the ability to set deadlines, upload supporting documents, and specify evaluation criteria.
- 3- Bidder registration and management: The e-tender software **should** have a system for bidder registration and management, including the ability to view and approve bidder applications, verify bidder credentials, and assign roles and permissions.
- 4- Bid submission: The software **must** allow bidders to submit their proposals online, including the ability to upload supporting documents and make clarifications.
- 5- Bid evaluation: The e-tender software **should** have a system for bid evaluation, including the ability to score and rank proposals, invite shortlisted bidders for further evaluation, and issue notices of award.
- 6- Reporting and analytics: The software **must** be able to generate reports and analytics on tender activities, including the number of bidders, the number of submissions, the time taken to evaluate bids, and the total cost of the tender process.
- 7- Security and privacy: The e-tender software **should** have robust security features, including user authentication and authorization, data encryption, and data backup and recovery.
- 8- Integration with other systems: The software **should** be able to integrate with other systems, such as accounting software and project management software, to streamline the tender process and improve efficiency.
- 9- Accessibility: The e-tender software **should** be accessible to all users, including those with disabilities, and should comply with relevant accessibility standards and guidelines.
- 10- Integration with port operations software: The software **should** be able to integrate with port operations software, such as container tracking systems or customs clearance systems, to provide a seamless tender-to-operations process.

- 11- Performance monitoring: The software **could** have a system for monitoring bidder performance, including the ability to track key performance indicators (KPIs) and issue performance evaluations.

Technical requirements

- 1- Operating system: The e-tender software **should** be compatible with the chosen operating system(s), such as Windows, Linux, or macOS.
- 2- Web server and database: The software **could** be built on a web server that can handle a high volume of concurrent users, and a database that can store and manage the large amounts of data generated by the tender process.
- 3- Programming language: The software **could** be programmed in a language that is suitable for web application development, such as Java, PHP, Python, or Ruby on Rails.
- 4- Security protocols: The software **should** have robust security protocols, such as SSL/TLS encryption, firewalls, and intrusion detection and prevention systems, to protect against cyber threats and ensure the confidentiality and integrity of data.
- 5- Cloud hosting: The software **should** be hosted in the cloud to take advantage of scalable and flexible hosting solutions that can handle large volumes of traffic and data.
- 6- Mobile compatibility: The software **could** be mobile-responsive, meaning that it should be accessible and usable on mobile devices, such as smartphones and tablets, as well as desktop computers.

Operational requirements

- 1- Access control: The software **should** have access control mechanisms that allow administrators to control which users have access to specific features and functions based on their roles and responsibilities.
- 2- Audit trail: The software **must** have an audit trail system that tracks all actions performed within the system, such as user logins, document uploads, and bid submissions, to provide an auditable record of the tender process.
- 3- Document management: The software **should** have a document management system that allows users to upload and manage tender documents, such as specifications, drawings, and bill of quantities, and track versions and revisions.
- 4- Notification and alerts: The software **should** have a system for sending notifications and alerts to users, such as reminders for upcoming bid submission deadlines, or updates to the tender documents.
- 5- Reporting and analytics: The software **should** have reporting and analytics tools that allow users to generate customized reports on tender activity, bidder performance, and other metrics.

Transitional requirements

- 1- Data migration: The software **should** have a data migration plan that outlines how data from the existing tender process will be migrated to the new software, ensuring data accuracy and completeness.
- 2- Testing and validation: The software **should** undergo thorough testing and validation to ensure that it meets the functional, technical, and operational requirements, and that it can handle the expected volume of traffic and data.
- 3- Stakeholder engagement: The software **should** have a stakeholder engagement plan that involves engaging with all relevant stakeholders, such as bidders, procurement staff, and management, to ensure that they understand the new tender process and the benefits of the e-tender software.
- 4- Training and education: The software **should** have a training and education plan that provides training to all stakeholders, including procurement staff, bidders, and other users, on how to use the e-tender software.

- 5- Communication and change management: The software **must** have a communication and change management plan that ensures that all stakeholders are informed about the transition to the new e-tender process, including the benefits and changes to the process.
- 6- Parallel testing: The software **should** undergo parallel testing, which involves running the old tender process alongside the new e-tender process to identify any discrepancies and ensure a smooth transition.

By considering these factors when selecting E-tendering software, organizations can ensure that they choose a solution that meets their specific needs and supports a streamlined, efficient, and secure procurement process.

		Grade		Feedback
		Complete	Clear	MoSCoW
Functional requirements				
1	Yes	Yes	must	This requirement is critical to ensure that the e-tender software can manage user accounts, assign roles and permissions, and control user access to various features and functions.
2	Yes	Yes	Should	it defines the process for creating tenders and managing the tender process electronically. It's important that the system allows for flexibility in creating tenders and defining the terms and conditions of the tender process.
3	Yes	Yes	Should	allowing users to create, manage, and submit bids electronically. It's essential that the system is intuitive and user-friendly to ensure that bidders can easily navigate the system and submit their bids.
4	Yes	Yes	Must	
5	Yes	Yes	Should	ensure that the tender process is fair and transparent. The system should allow for easy evaluation of bids and provide tools for scoring and ranking bids.
6	Yes	Yes	Must	
7	Yes	Yes	Should	ensure that the e-tender process is secure and protected from unauthorized access or manipulation. The system should have robust security features, including encryption, user authentication, and access controls.
8	Yes	Yes	Should	the e-tender software can integrate with other relevant systems, such as ERP systems or document management systems, to streamline the tender process and improve efficiency.
9	Yes	Yes	should	e-tender software is accessible to all stakeholders, including those with disabilities. The system should

				comply with accessibility standards and provide assistive technologies where necessary.
10	Yes	Yes	Should	
11	Yes	Yes	Could	

Grade		Feedback		
Complete	Clear	MoSCoW		
Technical requirements				
1	Yes	Yes	Should	the e-tender software can run on the intended operating system(s) and to provide a consistent user experience across different platforms.
2	Yes	Yes	Could	handle a high volume of concurrent users and store and manage large amounts of data generated by the tender process. The choice of web server and database should be based on the specific requirements of the project and the scalability and reliability needed.
3	Yes	Yes	Could	the e-tender software is programmed in a language that is suitable for web application development, and that the development team is familiar with. The choice of programming language should be based on factors such as scalability, maintainability, and community support.
4	Yes	Yes	Should	protect against cyber threats and ensure the confidentiality and integrity of data. The use of SSL/TLS encryption, firewalls, and intrusion detection and prevention systems are standard security protocols that should be implemented to ensure the security of the e-tender software.
5	Yes	Yes	Should	beneficial to take advantage of scalable and flexible hosting solutions that can handle large volumes of traffic and data, as well as provide a more cost-effective and easily scalable infrastructure compared to traditional on-premises hosting solutions.
6	Yes	Yes	Could	accessible and usable on mobile devices, which is becoming increasingly important as more people use their mobile devices to access the internet. A mobile-responsive design should be implemented to ensure that the e-tender software can be accessed and used on mobile devices without compromising the user experience.
Operational requirements				

1	Yes	Yes	Should	
2	Yes	Yes	Must	
3	Yes	Yes	Should	
4	Yes	Yes	Should	
5	Yes	Yes	Should	
Transitional requirements				
1	Yes	Yes	Should	
2	Yes	Yes	Should	
3	Yes	Yes	Should	
4	Yes	Yes	Should	
5	Yes	Yes	Must	
6	Yes	Yes	Should	

Table 4 Requirements of MoSCoW

There are several software solutions for E-tendering that can be suitable for port operations in the GCC region. Some popular options include:

Company's requirement	SAP Ariba	Coupa Procurement	Oracle Procurement Cloud	Jaggaer	BravoSolution	Proactis	Ivalua	Zycus	Determine	Basware Procurement Solutions
Functional										
1	2	2	2	2	2	2	2	2	2	2
2	1	2	1	1	1	1	1	1	1	1
3	1	2	2	2	2	2	2	2	2	2
4	2	2	2	2	0	0	0	0	0	0
5	2	1	1	1	1	1	1	1	1	1
6	2	2	2	1	2	2	1	2	1	1
7	2	2	2	2	0	2	2	2	2	2
8	2	2	1	0	1	1	1	1	1	0
9	1	1	2	1	2	2	2	2	2	1
10	2	2	2	0	0	2	1	2	0	0
11	2	2	1	1	1	1	1	1	1	1
Operational										
1	2	2	2	1	2	2	2	2	2	1
2	2	0	1	0	2	1	0	1	0	0
3	2	2	2	1	1	1	1	1	1	1
4	2	0	2	1	0	0	0	2	0	1
5	1	2	1	0	1	1	1	1	1	0
6	1	2	2	2	2	2	2	0	2	2
Technical										
1	2	2	2	1	0	2	1	2	1	1
2	1	1	2	0	2	2	2	2	2	0
3	2	2	1	2	1	1	1	1	1	2
4	2	2	2	1	2	2	2	2	2	1
5	2	2	2	2	1	2	1	2	1	2
Transitional										
1	1	2	2	1	2	2	2	2	2	1
2	2	1	2	2	0	0	0	0	0	2
3	0	2	2	0	2	2	1	2	1	0
4	2	1	2	1	0	2	2	0	2	1
5	1	2	1	0	1	1	1	1	1	0
6	2	2	2	1	2	2	2	2	2	1
Score	46	45	48	29	33	41	35	39	34	29

Table 5 Long list software

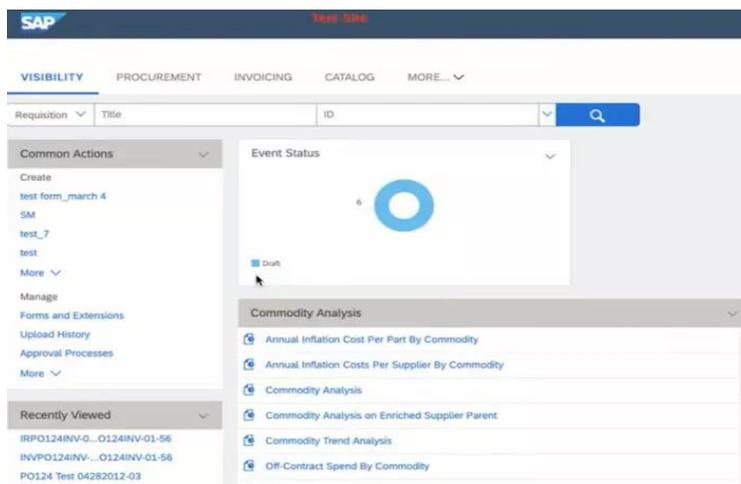
The table presented above displays the list of potential companies considered for selection as the procurement system for the company. The selection process involved identifying and evaluating various procurement systems suitable for small and medium companies. Specific criteria were established to assess how well each company aligned with the PODC's requirements. If a selected procurement system fully matched the requirements, it was assigned a green color (2 points). If

it partially matched the criteria, it received a yellow color (1 point). Conversely, if a procurement system did not meet the requirements, it was marked in red (0 points). Ultimately, only three companies obtained the highest points and satisfied the specified criteria. The following section provides brief descriptions of this shortlisted software and further explanation in appendix 5.

SAP Ariba: SAP Ariba is a cloud-based procurement platform that offers a range of features, including E-tendering, supplier management, contract management, and sourcing. It supports multiple languages and currencies and offers advanced security features, such as encrypted data storage and two-factor authentication (Capterra, 2023).

Features:

- Sourcing: Design sourcing strategies for quicker project collaborations by automating tasks and discovering suppliers in less time.
- Contracts: Directly connect buyers and suppliers to generate, negotiate, execute and manage contracts, without involving brokers.
- Guided Buying: Use an intuitive and compliant interface to access preferred suppliers and items from a centralized space.
- Supply Chain Collaboration: Boost productivity by automating the procurement lifecycle, from data processing to simplified transactions and flexible supply chain models.



Limitations:

- Sending bulk-generated data via email is difficult.
- Additional cost for enhanced support services.
- Steep learning curve.
- Occasional system lag.

Oracle Procurement Cloud: Oracle Procurement Cloud is a cloud-based procurement software solution that offers a range of features, including E-tendering, supplier management, and contract management. It supports multiple languages and currencies and offers advanced security features, such as encrypted data storage and two-factor authentication.

When choosing an E-tendering system, it is important to consider factors such as the user interface, integration with other systems, support for multiple languages and currencies, security features, scalability, and customization options. It is also advisable to evaluate the vendor's track record, customer support, and pricing structure before making a decision.

Ultimately, the choice of system will depend on the specific needs and requirements of the PODC, and a thorough evaluation process can help ensure that the chosen system meets those needs and provides value for money.

Coupa Procurement is a cloud-based application that offers spend management solutions to various industries, including healthcare, retail, technology, and automotive. It helps businesses control their finances and maximize profits by providing real-time visibility into the entire

purchase-to-pay process. From budget management to optimizing expenditure plans, Coupa Procurement streamlines orders and ensures a flexible transaction model.

Key Features:

- **Purchase Requisitions:** Create a guided buying experience that includes discounts, embedded purchasing policies, and operational efficiencies for cost savings.
- **SOW-Based Spend Management:** Implement a standardized purchasing process to track and compare items within a unified space.
- **Spend Guard:** Utilize advanced AI and machine learning techniques to detect fraud and errors in transactions at the user level.
- **Contract Management:** Access and store contracts in an optimized contract management process using customizable templates to ensure spend compliance.

Features Not Included:

- **Accounting Integration:** Supported through partner integrations.
- **Sourcing Repository:** Not supported.
- **Quote Requests from Suppliers for Catalog Items:** Supported with custom development.
- **Intransit Shipment:** Not supported.
- **Budget Reservation for Taxes, Charges, and Discounts on Requisitions:** Not supported.

Limitations:

- Steep learning curve may be required to fully utilize the software.
- Integration process can be complex.
- Customer support is only available via chat.
- Lack of role-specific training may require additional resources or training materials.

Software comparison	SAP Ariba	Oracle Procurement Cloud:	Coupa Procurement
Pricing	Starting from: \$50.00/Per Month	Starting from: \$400.00/Per Month Pricing Model: Per User	Starting from: \$2500.00/Per Month

It was hard to find the specific price for PODC requirement because it needs to send RFQ with PODC requirement to find the accurate price. However, the prices above are given from website the make comparison between the software.

Customized web site

A customized website is a website that has been designed and developed to meet specific requirements or preferences. Instead of using a pre-designed template or theme, a customized website is built from scratch or modified extensively to suit the unique needs of a business, organization, or individual.

Customization allows you to tailor the website's design, functionality, and features to align with your branding, target audience, and specific goals. It provides greater flexibility and control over the website's appearance and functionality compared to using a pre-made template (CSM, 2023).

Key aspects of a customized website include:

Design: You have the freedom to create a unique visual design that reflects your brand identity, including custom layouts, color schemes, typography, and graphics.

Functionality: You can choose and implement specific features and functionalities that are relevant to your business or organization. This can include e-commerce capabilities, user registration systems, interactive elements, and integration with third-party services.

User Experience: By customizing the website, you can optimize the user experience to meet the specific needs and preferences of your target audience. This includes creating intuitive navigation, user-friendly interfaces, and responsive design for different devices.

Content Management: Customized websites often include a content management system (CMS) that allows you to easily update and manage the website's content without extensive technical knowledge. This enables you to add, edit, or remove content as needed.

Scalability: Customized websites can be built with scalability in mind, allowing for future expansion and addition of new features or functionalities as your business or organization grows.

Overall, a customized website offers more flexibility, control, and uniqueness compared to using pre-designed templates. It allows you to tailor your online presence to your specific needs and goals, providing a personalized experience for your website visitors.

4.6. Implementation plan

The Plan-Do-Check-Act (PDCA) cycle is a continuous improvement framework that can be useful in the process of switching to E-tender. For this stage, PODC will go with customize website as more suitable with company budget. The following can be used in each step of the PDCA cycle:

Plan:

To begin with, the first step is to plan. Define the objectives of the E-tender switch and communicate them to all stakeholders. This will ensure that everyone is aligned and working towards the same goals. Identify the key performance indicators (KPIs) that will be used to track the success of the E-tender system. Common KPIs include cost savings, efficiency gains, and vendor participation rates.

Next, create a project team consisting of individuals from different departments, such as procurement, IT, and legal. The project team should have the necessary skills and expertise to develop and implement the E-tender customize website. Conduct a SWOT analysis to identify potential internal and external factors that could affect the success of the E-tender customize website in appendix 6. This analysis should include factors such as the availability of suitable software, the level of digital literacy among employees, and potential legal and regulatory barriers.

Finally, develop a detailed project plan that includes timelines, milestones, and deliverables. Use project management software to manage and track progress throughout the project.

Do:

Once the planning phase is complete, it's time to begin implementing the E-tender customize website. Develop a procurement strategy that outlines the procedures and requirements for using the E-tender customize website. This should include details such as vendor registration, bidding rules, and evaluation criteria.

Train employees on how to use the E-tender customize website, including how to submit and evaluate bids, and how to handle electronic documents and contracts. Use collaboration software to facilitate communication and collaboration between the project team members, as well as with external vendors and contractors. Select appropriate software tools to support the E-tender system, such as e-procurement software, e-signature software, and document management software.

Check:

Evaluate the results of the E-tender switch and track KPIs to identify areas for improvement. Collect feedback from stakeholders on the effectiveness of the E-tender customize website and use error tracking software to identify and resolve issues. Use data analysis software to gain insights into the procurement process and identify opportunities for improvement.

Act:

Based on feedback and results from the Check stage, take corrective actions to improve the E-tender customize website. Use continuous improvement software to identify and prioritize areas for improvement in the E-tender customize website. Manage changes and risks using change management and risk management software to ensure long-term success. Continuously evaluate the performance of the E-tender customize website and adjust the procurement strategy and procedures as needed.

5. Discussion

This discussion will go through the considerations for implementing new software in the e-tender process, explore the future prospects and trends of e-tendering, and identify the key features and qualities that make software suitable for this purpose.

5.1. Consideration for new software

Choosing the right software for e-tendering requires careful consideration of several factors. Here are some steps you can take to choose the most suitable software for your needs:

Determine your requirements: Before you start looking for software, determine what you need the software to do. Consider the size of your organization, the volume of tenders you manage, and the specific features you require, such as digital signatures, electronic submission, and evaluation tools.

Research the options: Once you have a clear understanding of your requirements, research the different e-tendering software available in the market. Look for software vendors that have experience working with organizations similar to yours.

Evaluate the features: Once you have a shortlist of software options, evaluate the features of each product. Look for software that offers the features you need, such as customizable workflows, automated document management, and bid analysis tools.

Consider user-friendliness: Choose software that is easy to use and intuitive. Your team will need to work with the software on a regular basis, so make sure it is easy to learn and operate.

Check for security: E-tendering involves sensitive information, so make sure the software you choose has adequate security features, such as data encryption and multi-factor authentication.

Look for support and training: Make sure the software vendor offers adequate support and training to help you get up and running with the software. Look for vendors that offer online training, user guides, and technical support.

Consider cost: Finally, consider the cost of the software. Look for software that is affordable and offers value for money. Compare the cost of different options and choose software that fits within your budget.

By following these steps, you can choose the most suitable e-tendering software for your organization's needs.

5.2. Future E-tender process

Electronic Procurement (e-Procurement) is the use of information and communication technology (specially the internet) by PODC in conducting procurement processes with the vendors/ contractors for the acquisition of goods (supplies), works and services aimed at open, non-discriminatory, and efficient procurement through transparent procedures.

Other than those procurement cases which require secrecy and strategic considerations that demands confidentiality, all procurement for PODC shall be done through e-Procurement.

e-Procurement System

The e-procurement system at PODC shall cover the following minimum requirements:

- All steps involved, starting from hosting of tenders to determination of technologically acceptable lowest bidder, are covered.
- The system archives the information and generates reports required for the management information system/ decision support system.

- A helpdesk is available for online and offline support to different stakeholders.
- The system arranges and updates the Digital Signature Certificate (DSC) for departmental users.
- Different documents, formats, and so on, for the e-procurement systems are available.

Process

In e-procurement, all processes of tendering have the same content as in normal tendering and are executed, once the necessary changes have been made online as follows:

- Communications: Wherever traditional procedures refer to written communication and documents, the corresponding process in e-procurement would be handled either fully online by way of uploading/ downloading/ emails or else partly online and partly offline submission. In e-procurement, the bid bond and documents supporting tender are submitted in paper form to the authority nominated in the Tender, but scanned copies are to be uploaded - without which the bid may not get opened.
- Publishing of tenders: Tenders are published on the e-procurement portal by Procurement department at PODC. After the creation of the tender, a unique "tender id" is generated by the Tender Administrator/ Manager. While creating/ publishing the tender, the ITC members (hereafter referred to in this section as the 'bid openers') are authorized to open the bids received. As in case of normal tenders, tenders are also posted on the PODC website. The downloading of the tender shall start after the e- publication of Tender and after the completion of the requisite payment(s) by the Vendors as assigned by the Tender Manager. The bid submission may start from the day after the close of clarification issued by PODC and terminate at the date and time specified in the Tender. In case of limited and single tenders, information should also be sent to target vendors/contractors through email by the portal.
- Registration of suppliers on portal: To submit the bid, suppliers must register themselves online, as a one-time activity, on the e-procurement portal with a valid DSC. The registration should be in the name of the supplier, whereas DSC holder may be either the supplier himself or a duly authorized person. The suppliers will have to accept, unconditionally, the online user portal agreement which contains all the terms and conditions of the tender including commercial and general terms and conditions and other conditions, if any, along with an online undertaking in support of the authenticity of the declarations regarding facts, figures, information, and documents furnished by the supplier online. The determination of the validity of the registration period rests with PODC. Further, All vendors are required to notify PODC for any change of vendor information within thirty (30) days of the change. The registration with PODC will become invalid, if they fail to do so. Suppliers applying for registration with PODC shall deposit a non-refundable fee of RO 50/- as one-time vendor registration fee to PODC, exclusive of any relevant taxes. SMEs are exempted from vendor registration fees.
- Tender submission: The suppliers will submit their techno-commercial bids and price bids online. Bidders will have to upload scanned copies of various documents required for eligibility and all other documents as specified in Tender document. To enable system generated techno-commercial and price comparative statements, such statements should be asked to be submitted in Excel formats. The supplier will have to give an undertaking online that if the information/ declaration/ scanned documents furnished in respect of eligibility criteria are found to be wrong or misleading at any stage, they will be liable to punitive action. Bid Bond and tender fee shall be submitted in the electronic format online (by scanning) while uploading the bid. This submission shall mean that Bid Bond and tender fee are received electronically. However, for the purpose of realization, the supplier shall send documents in original to the designated officer by hand to reach by the time of tender opening. In case of exemption of bid bond, the scanned copy of the document in support of exemption will have to be uploaded by the supplier during bid submission.

- Clarifications, modifications, corrections, and withdrawal of bids: All these steps are also carried out online like the normal tendering process. PODC will provide an electronic gateway/ portal for all bidders for sending/ receiving clarification(s). An auto-mail system will also be implemented within the E-procurement system which will send mails to intimate all bidders for any modifications in the Tender or for any new clarification response.
- Bid opening: Both the techno-commercial and price bids are opened online by the bid openers mentioned at the time of creation of the tender online. Bid opening will be after all the authorized ITC members login to the portal and the system verifies the member credentials. Once confirmed, the system will allow the bid download and will generate an electronic signature after downloading. Bid openers download the bids and the reports/ statements and sign them for further processing. In case of opening of the price bid, the date and time of opening is uploaded on the portal and shortlisted firms are also informed through system generated emails alerts - after shortlisting of the techno-commercially acceptable suppliers.
- Shortfall document: Any document not enclosed by the supplier can be asked for, as in case of the traditional tender, by PODC and submitted by the supplier online, provided it does not vitiate the tendering process.
- Evaluation of techno-commercial and price bids: This is done offline in the same manner as in the normal tendering process.
- Award of contract: Award of the contract is done offline, and a scanned copy is uploaded on the portal.
- Return of Bid Bond: Bid Bond furnished by all unsuccessful suppliers should be returned through an e-payment system without interest, at the earliest, after the expiry of the final tender validity period but not later than 30 (thirty) days after conclusion of the contract. Bid Bond of the successful supplier should be returned after receipt of performance security as called for in the contract.

5.3. Suitable software

PODC go along with SAP Ariba is a comprehensive procurement solution that offers a wide range of features and tools to streamline the procurement process for long term. It includes modules for sourcing, contracts, purchasing, and supplier management. Additionally, SAP Ariba can integrate seamlessly with other SAP products such as SAP Financials Cloud and SAP Ariba Project Portfolio Management Cloud, providing a complete end-to-end procurement solution. The software is highly customizable and can be tailored to meet the specific needs of your organization. With SAP's extensive experience and expertise in procurement, choosing SAP Ariba as your e-tendering software can help optimize your procurement operations and drive cost savings.

On the other hand, a custom website can be designed to meet specific requirements of the Port of Duqm company. It can provide information about the company, its products and services, and allow customers to interact with the company. A website can help the company to improve its online presence, attract new customers, and provide a platform for communication and marketing.

In terms of short-term vs. long-term, a custom website can be developed relatively quickly and may be more suitable for short-term needs. However, it may require ongoing maintenance and updates to ensure it remains relevant and functional. SAP Ariba, on the other hand, may require a longer implementation period and may involve more significant upfront costs. Still, it can provide more significant benefits over the long term, such as increased efficiency, cost savings, and better supplier relationships.

Implementing e-tendering with a customized website can help address several bottlenecks associated with manual tender processes in the Port of Duqm. The ways in which e-tendering can alleviate these bottlenecks:

Efficiency and Time Savings: E-tendering streamlines the entire tendering process, eliminating the need for manual paperwork, physical submissions, and manual evaluation. Vendors can submit their tenders online, reducing administrative burdens and saving time for both vendors and the Port of Duqm. The automated process ensures faster tender review, evaluation, and decision-making.

Simplified Documentation and Compliance: E-tendering eliminates the need for physical document submissions and manual paperwork. Vendors can upload required documents electronically, ensuring efficient document management and reducing the risk of lost or misplaced papers. Additionally, the customized website can incorporate validation checks to ensure vendors comply with specific requirements and submission guidelines.

Enhanced Evaluation and Decision-making: Customized e-tendering websites can include automated evaluation tools that enable efficient and standardized assessment of tenders. The system can apply predetermined criteria, weightings, and scoring mechanisms, eliminating manual calculations and providing objective evaluation results. This streamlines the decision-making process and reduces the potential for human error or bias.

Real-time Communication and Notifications: With an e-tendering website, the Port of Duqm can establish real-time communication channels with vendors. Automated notifications can be sent to inform vendors about new tenders, changes in tender status, submission deadlines, and evaluation outcomes. This ensures timely and effective communication, reducing delays and improving overall efficiency.

Ultimately, the decision between SAP Ariba and a custom website will depend on the specific needs of the Port of Duqm company, its budget, and available resources. It may be useful to consult with a software consultant or IT expert to evaluate the options and determine the best course of action.

6. Conclusion and recommendations

6.1. Conclusion

The aim of the research was to analyze and design an automated procurement process for the Port of Duqm company. The driving force behind this study was the company's 2023 Key Performance Indicator (KPI) to transition from manual tendering to E-tendering. The research started with a workshop in February 2023, where employees' opinions on the process were gathered and considered. The Procurement team then presented their proposed approach to the top management for consideration.

The study commenced with conducting interviews with employees across various supply chain teams. Subsequently, the current situation was visually depicted using a Value Stream Mapping (VSM) technique to gain a comprehensive understanding of potential defects and bottlenecks. The primary constraint in a manual tender process stems from the dependence on manual procedures involving paper-based documentation and data entry.

The first step was to identify the bottlenecks in the current system. One of the main issues was the manual entry of order fields by employees, causing delays and inefficiencies in the tender process. The employees were finding it overwhelming, especially considering the fast growth of the Port of Duqm company (PODC) and the new suppliers and projects expected in 2024. To address these challenges, it became crucial to find a more efficient system to manage the tender process effectively.

Prior to selecting SAP Ariba as the procurement software for PODC, interviews were conducted with the supply chain team members. During these interviews, a short-term solution was proposed, which involved utilizing a customized website for e-tendering and supplier registration. Interestingly, the idea of implementing a procurement system was repeatedly brought up by employees, especially those who had previous experience with it in their previous companies.

The implementation of e-tendering at the Port of Duqm has been a transformative step in modernizing the procurement process. The analysis of various logistics tools, including SWOT analysis, MoSCoW prioritization, Value Stream Mapping (VSM), and Swimlane diagrams, has provided valuable insights and contributed to the success of the project.

Initially, PODC chose a customized website as a cost-effective short-term solution for e-tendering, as integrating software like SAP Ariba with their existing ERP system was expensive. However, for long-term success and to align with their vision of becoming the preferred Multi-Purpose Port in the region, implementing SAP Ariba is crucial. It offers advanced features and analytics that can optimize procurement processes, enhance supplier relationships, and drive informed decision-making.

6.2. Recommendations

During the duration of this research, it is not possible to do the implementation plan because PODC is not ready to implement E-tendering with software before 2024. Implementing E-tendering will be a considerable investment, and a good study foundation is required to achieve better results.

Short-term:

In the short term, I recommend going with a customized website for e-tendering due to its cost-effectiveness compared to other software options. It allows for flexibility, scalability, user-friendly interface, integration capabilities, and provides ownership and control over the solution.

Long-term:

For long-term e-tendering and procurement needs, I recommend considering SAP Ariba as a procurement software solution. To automate the procurement process from a customized website to SAP Ariba at the Port of Duqm, follow these steps:

- Plan integration between the website and SAP Ariba.
- Use APIs to establish a connection and enable data synchronization.
- Automate e-tendering by developing a user-friendly interface on the website.
- Integrate purchase order creation and transmission between the website and SAP Ariba.
- Synchronize supplier management data for efficient supplier relationship management.
- Implement reporting and analytics capabilities for procurement performance insights.
- Provide training and support for users of the integrated system.

It's important to note that implementing SAP Ariba requires proper planning, resources, and expertise. Consider conducting a thorough evaluation, including a cost analysis and assessing the specific needs of your organization, to determine if SAP Ariba aligns with your long-term goals and budget.

7. Bibliography

- Standards, R. P. (2010). *e-tendering*. Coventry: the Royal Institution of Chartered Surveyors.
- RICS. (2010). *e-tendering*. Coventry: the Royal Institution of Chartered Surveyors.
- Compass, E. (2022). *Executive Compass*. Retrieved from www.executivecompass.co.uk:
<https://www.executivecompass.co.uk/resources/bid-writing/what-is-tendering-process/>
- KENTON, W. (2022). *investopedia*. Retrieved from www.investopedia.com:
<https://www.investopedia.com/terms/t/tender.asp>
- Martínez, R. (2022). *Assessments in public procurement procedures*. Granada: Isevier Ltd.
- Du, T. C. (2009). *Building an automatic e-tendering system on the Semantic Web*. Hong Kong: Isevier B.V.
- Mahendrawathi, E. (2017). *ERP Post Implementation Review with Process Mining: A Case of Procurement Process*. Surabaya: Elsevier.
- Murphy, K. (2022). *planergy*. Retrieved from www.planergy.com:
<https://planergy.com/blog/bottlenecks-in-procurement-process/>
- GEB. (2022). *gep*. Retrieved from www.gep.com: <https://www.gep.com/knowledge-bank/glossary/what-is-etender>
- Tindsley, G. (2008). *E-Tendering Process Within Construction: A UK Perspective*. Tsinghua: Elsevier.
- Ajam, M. (2010). *Augmented process model for e-tendering: Towards integrating object models with document management systems*. Salford: Elsevier.
- Witteveen, S. (2022). *bearingpoint*. Retrieved from www.bearingpoint.com:
<https://www.bearingpoint.com/en-nl/insights-events/blog/opportunities-for-maximizing-business-value-in-a-tender-management-process/>
- Kenton, W. (2022). *investopedia*. Retrieved from www.investopedia.com:
<https://www.investopedia.com/terms/t/tender.asp>
- Kajewski, S. (2004). *e-Tendering: Benefits, Challenges and Recommendations for Practice*. Brisbane: QUT ePrints.
- CITE, I. p. (2003). *Making e-Business Happen*. Retrieved from Cite: <http://www.cite.org.uk>
- Weippert, A. (2004). *E-TENDERING: BENEFITS, CHALLENGES AND RECOMMENDATIONS FOR PRACTICE*. Brisbane: QUT ePrits.
- Mastor, S. H. (2005). *E-TENDER APPLICATION AND ITS IMPLICATION TO MALAYSIAN CONSTRUCTION INDUSTRY*. Malaysia: Kolej Universiti Teknologi Tun Hussein Onn.
- Board, T. G. (2012). *etendering tenderboard*. Retrieved from www.etendering.tenderboard.gov.om:
<https://etendering.tenderboard.gov.om/product/DefineFAQ?callValue=pubDashLinkContent>
- AZIS, A. Z. (2020). *CHALLENGES IN E-TENDERING IMPLEMENTATION IN MINISTRY OF YOUTH AND SPORTS MALAYSIA*. KUALA LUMPUR: UNIVERSITY OF MALAYA.
- ProcurePort. (2019). *ProcurePort*. Retrieved from www.ProcurePort.com:
<https://blog.procureport.com/4-things-you-need-to-know-about-tender-software/>

- Board, O. T. (2012). *tender board*. Retrieved from endering.tenderboard.gov.om:
<https://etendering.tenderboard.gov.om/product/DefineFAQ?callValue=pubDashLinkContent&switchLangFlag=1&switchLangFlag=1>
- Surrey, S. t. (2023). *supply to surrey*. Retrieved from www.supplytosurrey.co.uk:
<https://www.supplytosurrey.co.uk/procurement-guidance/stages-of-the-tender-process>
- LNG, O. (2023). *Oman LNG*. Retrieved from omanlng.co.om:
<https://omanlng.co.om/en/SuppliersAndContractors/Pages/the-tendering-process.aspx>
- volopay.com*. (2023). Retrieved from volopay.com: <https://www.volopay.com/blog/how-to-tender-successfully/>
- volopay.com*. (n.d.).
- volopay*. (2023). *volopay*. Retrieved from volopay.com: <https://www.volopay.com/blog/how-to-tender-successfully/>
- DONATO, H. (2022). *project management*. Retrieved from project-management.com:
<https://project-management.com/bidding-tendering-process/>
- Royal. (2023). *royal greenwich*. Retrieved from www.royalgreenwich.gov.uk:
https://www.royalgreenwich.gov.uk/info/200209/how_to_do_business_with_the_council/438/the_tendering_process/5
- NTTC. (2019). *tenders on time*. Retrieved from www.tendersontime.com:
<https://www.tendersontime.com/e-tender/>
- procureport*. (2020). *procureport*. Retrieved from blog.procureport.com:
<https://blog.procureport.com/the-5-major-benefits-of-e-tendering/>
- Duqm, P. o. (2023). *port of duqm*. Retrieved from portofduqm.om: <https://portofduqm.om/port-of-duqm/>
- SelectHub. (2021, August 18). 10 Leading eProcurement Software Vendors. Retrieved May 8, 2023, from <https://www.selecthub.com/eprocurement/10-leading-eprocurement-software-vendors/#7>

Appendices:

Appendix 1: Port of Duqm process

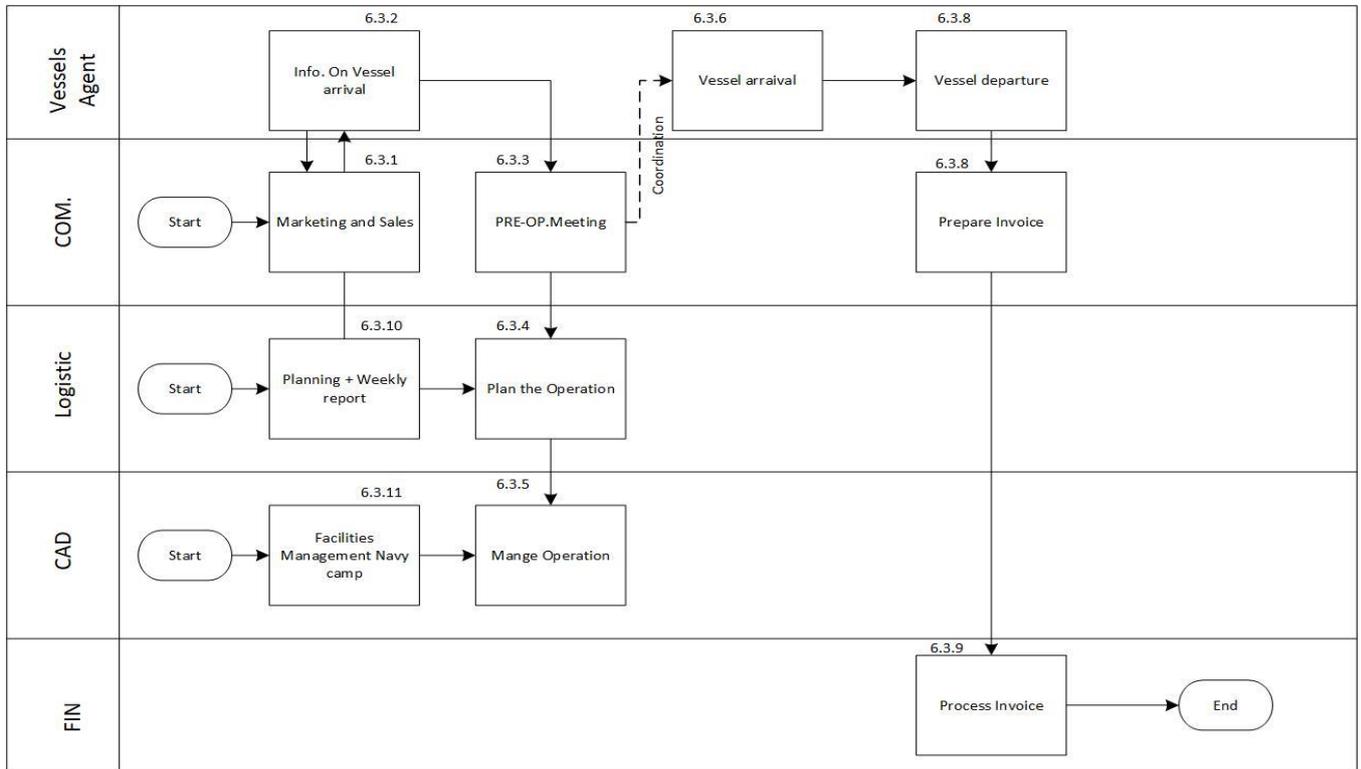


Table 6 Port of Duqm process (Commercial manual, 2022)

Appendix 2: Port of Duqm personnel

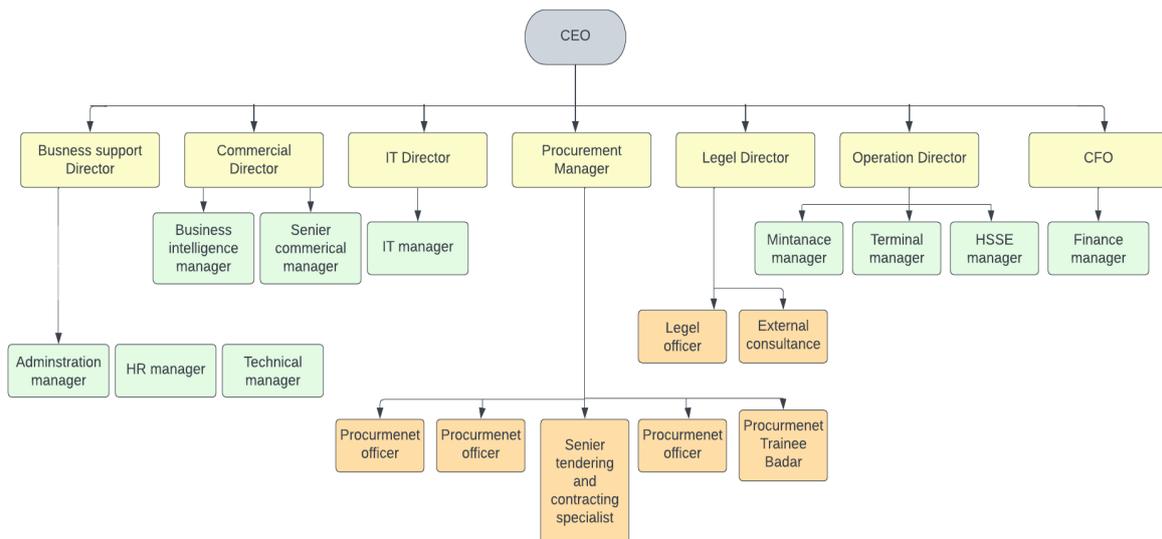


Table 7 Port of Duqm personnel

Appendix 3: Research plan

Research planning with Milestone
Port of Duqm Company SAOC
Switch to E-tender

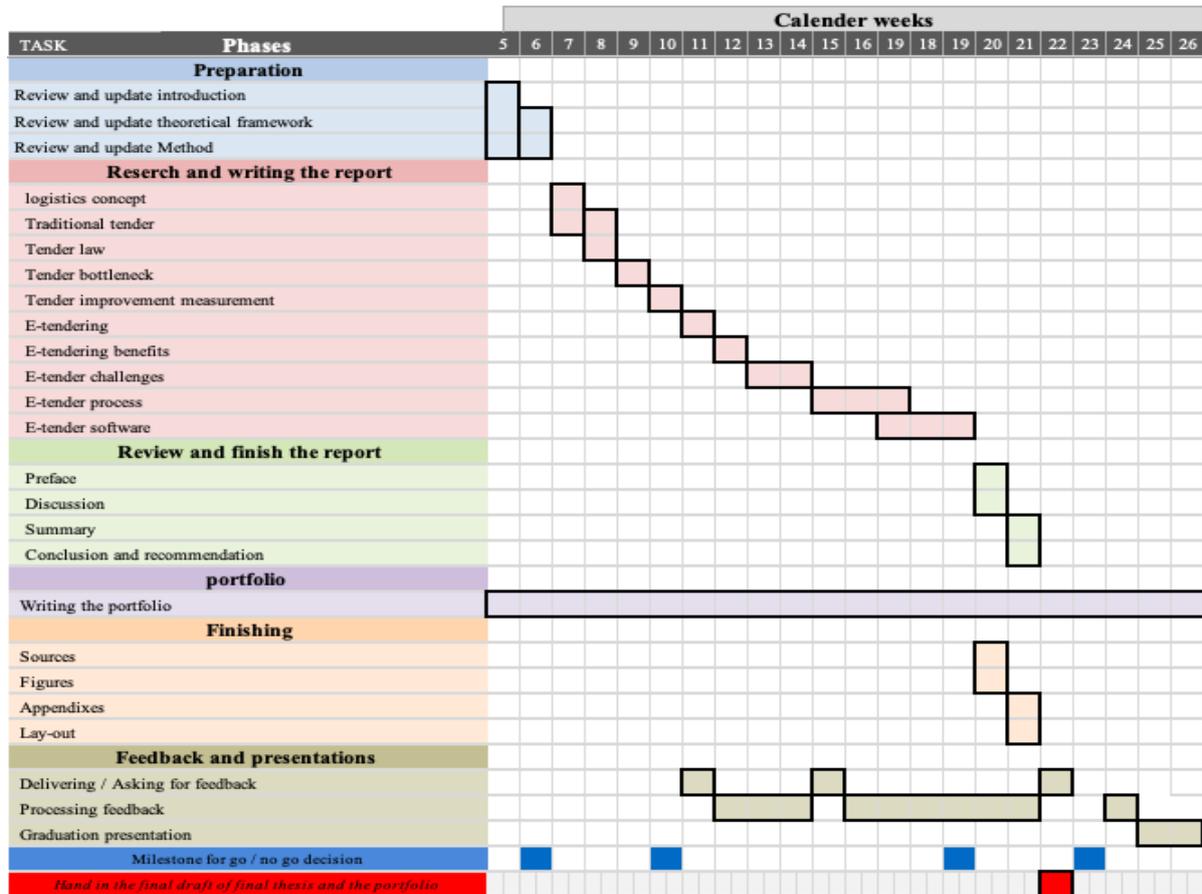


Table 8 Gantt chart of research plan

Appendix 5: Software selection

While there are several procurement software options available for e-tendering, it's important to note that the "best" software can vary depending on specific requirements and preferences. Based on the provided requirements, below are longlist procurement software solutions for e-tendering that are well-regarded in the industry:

SAP Ariba: A comprehensive procurement platform that offers end-to-end procurement solutions, including e-tendering, sourcing, contract management, and supplier management. It enables collaboration between buyers and suppliers and provides a robust marketplace for procurement needs.

Coupa Procurement: Coupa's procurement software streamlines the source-to-pay process, including e-tendering. It offers features such as supplier management, contract management, and e-sourcing capabilities, allowing organizations to optimize their procurement operations.

Oracle Procurement Cloud: Oracle's cloud-based procurement software provides a range of procurement functionalities, including e-tendering, supplier qualification, contract management, and purchasing automation. It offers a user-friendly interface and integrates well with other Oracle applications.

Jaggaer: Jaggaer is a leading procurement software provider offering a suite of solutions, including e-tendering. Their platform supports various procurement processes, including

supplier management, sourcing, contract management, and analytics, catering to organizations of all sizes.

BravoSolution: BravoSolution provides a comprehensive suite of procurement solutions. Their e-tendering capabilities facilitate supplier management, contract management, and sourcing, allowing organizations to optimize their procurement operations.

Proactis: Proactis offers procurement software that includes e-tendering, sourcing, contract management, and supplier management functionalities. It focuses on enhancing procurement efficiency and optimizing cost savings for organizations.

Ivalua: Ivalua's procurement software covers the entire source-to-pay process, including e-tendering. It offers features such as supplier management, contract lifecycle management, spend analysis, and procurement analytics to help organizations streamline their procurement activities.

Zycus: Zycus provides a comprehensive suite of procurement solutions, including e-tendering, contract management, supplier management, and spend analysis. Their platform helps organizations automate and streamline their procurement processes.

Determine: Determine offers procurement software with e-tendering capabilities. Their solution covers strategic sourcing, contract management, supplier management, and procurement analytics, allowing organizations to optimize their procurement operations.

Basware Procurement Solutions: Basware's procurement software offers e-tendering functionality alongside other procurement capabilities such as supplier management, contract lifecycle management, and e-invoicing. It focuses on driving cost savings and process efficiency for organizations.

Company's requirement	SAP Ariba	Coupa Procurement	Oracle Procurement Cloud	Jaggaer	BravoSolution	Proactis	Ivalua	Zycus	Determine	Basware Procurement Solutions
Functional										
1	2	2	2	2	2	2	2	2	2	2
2	1	2	1	1	1	1	1	1	1	1
3	1	2	2	2	2	2	2	2	2	2
4	2	2	2	2	0	0	0	0	0	2
5	2	1	1	1	1	1	1	1	1	1
6	2	2	2	2	2	2	1	2	1	1
7	2	2	2	2	0	2	2	2	2	2
8	2	2	1	0	1	1	1	1	1	0
9	1	1	2	1	2	2	2	2	2	1
10	2	2	2	0	0	2	1	2	0	0
11	2	2	1	1	1	1	1	1	1	1
Operational										
1	2	2	2	1	2	2	2	2	2	1
2	2	0	1	0	2	1	0	1	0	0
3	2	2	2	1	1	1	1	1	1	1
4	2	0	2	1	0	0	0	2	0	1
5	1	2	1	0	1	1	1	1	1	0
6	1	2	2	2	2	2	2	0	2	2
Technical										
1	2	2	2	1	0	2	1	2	1	1
2	1	1	2	0	2	2	2	2	2	0
3	2	2	1	2	1	1	1	1	1	2
4	2	2	2	1	2	2	2	2	2	1
5	2	2	2	2	1	2	1	2	1	2
Transitional										
1	1	2	2	1	2	2	2	2	2	1
2	2	1	2	2	0	0	0	0	0	2
3	0	2	2	0	2	2	1	2	1	0
4	2	1	2	1	0	2	2	0	2	1
5	1	2	1	0	1	1	1	1	1	0
6	2	2	2	1	2	2	2	2	2	1
Score	46	45	48	29	33	41	35	39	34	29

Table 9 Long list software

The table presented above displays the list of potential companies considered for selection as the procurement system for the company. The selection process involved identifying and evaluating various procurement systems suitable for small and medium companies. Specific criteria were established to assess how well each company aligned with the PODC's requirements. If a selected procurement system fully matched the requirements, it was assigned a green color (2 points). If it partially matched the criteria, it received a yellow color (1 point). Conversely, if a procurement system did not meet the requirements, it was marked in red (0 points). Ultimately, only three companies obtained the highest points and satisfied the specified criteria. The following section provides brief descriptions of these shortlisted companies.

Based on the provided requirements, below are the shortlisted procurement software solutions for e-tendering:

SAP Ariba: SAP Ariba offers a comprehensive suite of procurement solutions, including robust e-tendering features. It provides extensive functionality for user management, tender creation and management, bid submission, bid evaluation, reporting and analytics, and integration capabilities. SAP Ariba is widely recognized for its reliability, scalability, and advanced features, making it a top choice for organizations with complex procurement needs.

Coupa Procurement: Coupa Procurement is a user-friendly platform that covers the entire source-to-pay process, including e-tendering. It excels in user management, tender creation and management, bid submission, bid evaluation, reporting and analytics, and integration capabilities. Coupa Procurement's intuitive interface and ease of implementation make it an attractive option for organizations seeking an accessible and efficient e-tendering solution.

Oracle Procurement Cloud: Oracle Procurement Cloud offers a comprehensive suite of procurement applications, including e-tendering functionality. It provides strong capabilities for user management, tender creation and management, bid submission, bid evaluation, reporting and analytics, and integration with other systems. Oracle Procurement Cloud is known for its robustness, flexibility, and seamless integration with other Oracle applications, making it a reliable choice for organizations that prioritize integration and scalability.

These three software solutions stand out for their extensive features, reliability, and industry recognition. However, it's crucial to conduct a thorough evaluation and consider your organization's specific needs, budget, and implementation requirements before making a final decision.

Appendix 6: SWOT

SWOT analysis for using a customized website for e-tenders for the Port of Duqm Company:

Strengths:

- Faster and more efficient tender process: A customized e-tender website can streamline the process of issuing and receiving tenders, which can save time and increase efficiency.
- Increased transparency: A customized e-tender website can improve transparency by allowing all interested parties to view tender information and submit bids.
- Cost-effective: An e-tender website can help reduce costs associated with paper-based tender processes, such as printing and mailing.
- Customization: A customized e-tender website can be tailored to the specific needs of the Port of Duqm Company.

Weaknesses:

- Technical difficulties: A customized e-tender website can be complex to develop and maintain, which could lead to technical difficulties that might impact the tender process.

- Security concerns: An e-tender website may be vulnerable to hacking or data breaches, which could compromise confidential information.

Opportunities:

- Increased participation: A customized e-tender website could potentially increase the number of companies that participate in the tender process, which could lead to more competitive bids.
- Improved efficiency: An e-tender website could help the Port of Duqm Company reduce the time it takes to issue and receive tenders, which could lead to faster decision-making and project completion.
- Better data analysis: An e-tender website can collect data on tenders, which could help the Port of Duqm Company analyze trends and improve the tender process.

Threats:

- Competition: The customized e-tender website could be perceived as a threat by companies that are used to traditional tender processes.
- Technical issues: Technical issues with the website could lead to delays or mistakes in the tender process.
- Data breaches: Data breaches or hacking attacks could lead to a loss of trust in the e-tender process, which could impact participation in the future.