

Vision Document

ETR [Electronic Tool Rental]

Revision History

Date	Version	Description
20-May-2022	1.0	Deliverable 1 – first phase of the project

1. Introduction

Vision document, in general, is a kind of document which presents compelling ideas, projects, or future states for a specific organization, product, or service. Defining a vision is a high-level overview of what a project or company will look like in terms of key stakeholder needs and desirable attributes. This report is linked to the approval process for the project and serves as information for the business analysis.

1.1 Purpose: This document aims to assemble requirements, evaluate, and specify the high-level characteristics of an Electronic Tool Rental (ETR) website that customers may use to rent electronic tools and equipment within their financial constraints. Moreover, it discusses the goals and responsibilities of the stakeholders as well as the target users, and the reasons for their existence. It is explained in great detail in the use cases and further information about how the learning platform fulfills these requirements.

1.2 Scope

This Vision Document applies to the Electronic Tool Rental website, which will be developed by the author. The scope of Electronic Tool Rental (ETR) is focused on allowing customers who are 18 or more in order to find, rent, and reserve required tools and equipment as per their availability and price rates in nearby stores or on the website.

1.3 References

[1] https://en.wikipedia.org/wiki/Vision_document

[2] Sample reports shared by Professor

[3] Professor notes and slides

[4] <https://www.betterteam.com/customer-service-representative-job-description#:~:text=Customer%20service%20representatives%20help%20customers,having%20a%20role%20in%20sales.>

[5] <https://sg.indeed.com/career-advice/finding-a-job/marketing-roles-and-responsibilities>

[6] <https://asq.org/quality-resources/stakeholders>

[7] <https://corporatefinanceinstitute.com/resources/knowledge/finance/stakeholder/>

[8] <https://uhurunetwork.com/marketing-team/>

[9] <https://www.bmc.com/blogs/sysadmin-role-responsibilities-salary/>

[10] <https://www.cloudflare.com/learning/access-management/what-is-mutual-authentication/>

[11] <https://forceintellect.com/2020/07/14/vision-document-successful-erp-implementation/#:~:text=The%20purpose%20of%20the%20vision%20document%20is%20to,mangers%2C%20end-users%2C%20everyone%20involved%20in%20the%20ERP%20implementation.>

2. Positioning

2.1 Problem Statement

The problem of	Customer convenience of being able to rent tools and equipment online with proper security as well as in store
Affects	Customers, Branch employees
The impact of which is	Customers who are keen on renting tools and equipment as well as dropping by the store. Rather than buying new equipment explicitly, which can be more expensive and over budget, they can get the equipment they want under their budget.
A successful solution would be	Allowing customers to view pricing and availability for tools and equipment in nearest stores prior to visiting the store and make reservations if necessary. Additionally, maintaining and updating inventory tools is beneficial to branch employees as well.

2.2 Product Position Statement

For	Customers
Who	In need of renting machinery and equipment for home repairs and improvements
The Electric Tool rental [ETR]	is a website which can be accessed from both laptop and mobile
That	Providing customers with information on which tools and equipment are available in their local stores and online, along with price quotes, and if required helping them to make reservations in advance
Unlike	Phone calls or in-store visits to gain more information about a tool or a piece of equipment
Our product	It connects users to a platform that enables them to look up electrical tools or equipment, as well as their availability and pricing at a nearby store. The customer is thus led to decide instantly whether to rent it depending on their budget. On top of that, users will be able to reserve their stuff online to avoid going to the store or making a telephonic call, which will save them a lot of time and ensure a seamless online rental shopping experience.

3. Stakeholder Descriptions

3.1 Stakeholder Summary

A stakeholder is a group or individual who is affected by the future system, has the ability to shape it, and bears some responsibility for its acceptability.

Name	Description	Responsibilities
ETR owners	Individuals or organizations who own the website	Runs the business and employs a large workforce to keep it running
ETR Management	A group of professional experts who manage the ETR	Recruited by ETR owners to make major decisions concerning the improvement of the website
Project Sponsor	Individuals or organizations willing to provide funding for the project	Finance the project according to their economic and budgetary constraints

ETR Marketing Team	Team in charge of product advertising and promoting on the website	The goal of their job is to come up with innovative and effective approaches to attract more people to their website as well as upsell items, resulting in increased profits for their business.
ETR Customer Service	Team in charge of resolving customer issues and problems	Their responsibility is to help consumers by providing accurate information about their products and services and to respond as quickly as possible to any complaints or inquiries they may have with suitable solutions
Tools/Equipment Insurance Company	Providers of rental items insurance	Providing insurance coverage for electronic tools and equipment stuff for rental purposes
Project Manager	The person in charge of the project to lead and manage it thoroughly	Outline the project plan, hire and coordinate resources, monitor performance, analyze how well it is done, whether it's on time, etc.
ETR Development Team	Programmers who develop the project by obtaining specifications	They design and develop the system by writing programming codes after assessing and eliciting requirements
ETR Operations Team	Team in charge of bug-free software operation	Responsible for thorough software testing and ensuring that the project's quality standards are met
ETR Branch Manager	Individual in charge of responsible for keeping track of the items in the store	Monitors the availability of electronic tools and equipment on a daily basis and replenishes them according to requirements
Competitors	A similar product-oriented organization.	Introduce an alternate product with a cheaper price, marketing it more effectively, and offering more features than the competition.
Manufacturer and Suppliers	tool and equipment suppliers to the company	provides for the branch store's demand and supply.

Payment Gateway Companies	Financial organization that takes care of customer's payments	Ensure that credit card payments are collected securely and quickly between the company and its customers.
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3.2 User Summary

Name	Description	Responsibilities	Stakeholder
Customers	Who seeks for rentals of tools and equipment	Able to browse rental tools and equipment, look up their pricing information, and even place a reservation in the local store if required. Moreover, they can use the ETR website to rent items by registering themselves.	Self-represented
System Administrator	Who monitors by keeping the website up to date	Tracks an ongoing analysis of the website's performance as well as perform numerous tasks such as adding or modifying or deleting store branches as well as the branch employees to the system, set up accounts for branch personnel by creating their login credentials, troubleshoot issues, upgrade software-hardware etc.	Self-represented
Branch employees	Staff of a specific business location	In charge of maintaining a list of electronic tools and equipment and responsible for adding or removing them from the system ordered by customers from their designated locations. Even branch staff have the ability to add, modify, or delete online rental orders of the ETR consumers. They also hand out the tools or equipment to customers, and take it back from them as well and keep the system updated by keeping track of the tool's status such as whether it is available, rented, out of order, not available etc. However, they won't be able to access the system until the	Self-represented

		administrator creates their login credentials.	
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3.3 User Environment

- There must be a secure and stable internet connection, which has always a minimum necessary speed (5mbps), for all the stakeholders.
- The website will be compatible with different browsers such as Google Chrome, Mozilla Firefox, etc.
- System Administrators must have access to a browser-enabled device, such as a desktop, laptop, or smartphone, in order to view and modify the branch store and its employees' information. They're also in charge of making sure the system is always up to date and running.
- Branch personnel are expected to have a browser-enabled device, such as a desktop, laptop, or smartphone, to keep track of inventory statuses like available, rented, out of stock, and unavailable. They are also responsible for inspecting the available rental tools and equipment in store, placing or removing orders, and providing or collecting items from customers as needed.
- Customers are expected to have a browser-enabled device such as a desktop, laptop, smart phone etc. to be able to find necessary tools and equipment, see their price quotes, and make reservation by registering or logging onto the website.
- Customers must enable pop-ups and notification settings to receive updates about their ordered stuff as well as new stock arriving.
- Without a laptop, desktop, or mobile, it is impossible to access the ETR website.

3.4 Key Stakeholder or User Needs

Need	Priority	Concerns	Current Solution	Proposed Solutions
Easily accessible	High	Potential of providing intuitive guiding navigation for rental shopping	None	Design a user-friendly navigation menu that will lead the user through the application with ease
Convenient to maintain	High	ETR website should be quick and	None	Implement a PHP MVC architecture

		relatively easy manageable without sacrificing user convenience		with a MySQL database structure to accomplish this
Secure Access Governance	High	The information of the users must be kept protected and private	None	Set up two-way authentication and use strong passwords
A robust system	High	Even with faulty inputs, the ETR website must continue to function well.	None	Ensure that exception handling is considered when designing the system
Responsiveness	Moderate	Enable the system to be user-friendly enough that it can be conveniently accessed from a wide range of devices	None	Provide a device responsiveness solution by enabling the system to be accessed by a range of devices so that users can use it at their convenience
Track order status	High	Inability to track progress	None	Provide a solution for tracking the status of every order placed by customers and notifying them about it
Enhancing user experience	High	The moment the customer leaves the website without completing their task, they must restart the process	None	Develop a solution that allows users to leave the website at any time and return without having to start over since the website will carry forward their previous task, save the item in the shopping cart, etc. in order to save them time as well

4. Product Overview

The website is built on the PHP MVC framework as the core framework for connecting to the MySQL database and the back-end server, as well as creating the front-end user interface.

4.1 Product Perspective

- As there is no such existing system, everything must be done from the ground up.
- The ETR is a user-friendly website that allows clients to rent electronic tools and equipment from anywhere using any device.
- The System Administrator will enter branch personnel information as well as new branch information into the system, which will be saved in the Database system.
- Branch employees add, change, or delete customer-ordered products, as well as engage with customers in terms of giving and receiving tools and equipment, and maintain track of the items in their store, which are fetched from the database and displayed on the website.
- The front end of the website will be built with web technologies including HTML, CSS, and JavaScript, and the back end will be built with the PHP MVC framework with presentation, business and persistence(database) layer. MySQL database will be utilized to store the data since it integrates with this tech stack the best. By incorporating additional instances of the programme and databases in the future, the application architecture should be scalable.

A visual representation of the system is depicted below. Our main focus is on demonstrating three main users – Customers, System Administrator and Branch Employees and their interaction with the system. In addition, the data that will be exchanged between the system and the users is also shown here.

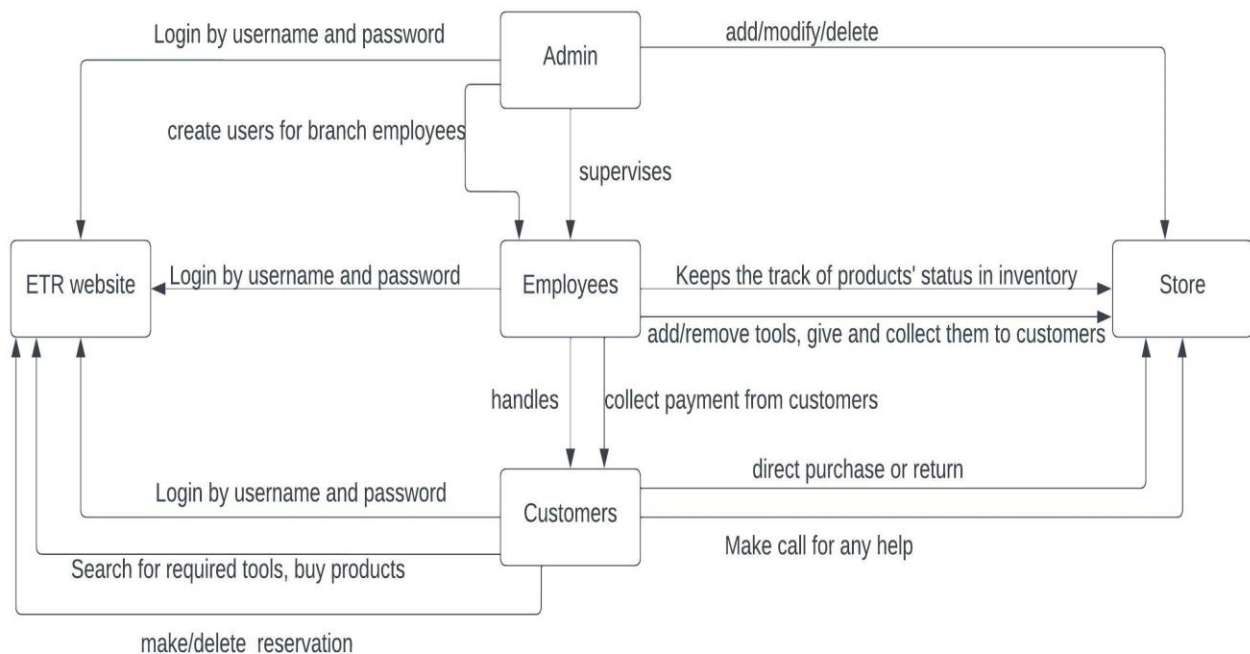


Figure 1: workflow of ETR website

4.2 Assumptions and Dependencies

Here are some assumptions and dependencies associated with the capabilities of the ETR website as outlined in the vision document:

Assumptions	Dependencies
This website will have continuous internet access to function otherwise it cannot be accessible	Stable internet connection accessibility
This website requires a browser-enabled device	All browsers should be supported by the operating system
In order to purchase things from the website, users will have to provide their login credentials	Prior to buying anything from the website, users must first register
The ETR Website should respect Internet Ethnicities	Any internet ethnicity should not be breached by the ETR Website. Thus, it should be fairly straightforward and simple
The ETR website must be functional 24x7	The server should run locally or remotely for 24 hours

5. Product Features

The ETR website shall provide users with the following high-quality functionality that directly meets their requirements and preferences

5.1 User Registration:

System Administrators can create a legitimate username and password for themselves and branch employees to access the ETR website. Once the user has completed their registration, the system allows them to change their password.

5.2 Client Registration:

Customers must be 18 years or older to register with an appropriate username and password for renting/reserving tools and equipment as without registration it is not possible, and they are strongly advised to use a secure password. They also have the flexibility to alter their password at any time. When registering, they must enter their date of birth as well as submit supporting documents such as birth certificates for age verification.

5.3 Login:

Customers, System Administrators, and Branch personnel each have their own sign-in option in the system, and following successful login, the dashboard will appear.

5.4 User Verification:

The captcha verification tool is used to ensure that it is not a bot but a genuine user. This feature improves the system's security.

5.5 System Administrator Dashboard:

System Administrators can view and amend their personal information on the user interface.

5.6 System Administrator – Manageable actions summary:

The system administrators are able to easily navigate through the website in order to add new branches, assign or revoke other administrators and employees, software upgradation, troubleshooting etc.

5.7 Branch Employee Dashboard:

Employees of the branch should be able to access the portal and modify their personal information. They can also amend clients' orders, deliver and collect tools or equipment from consumers in the store, and keep the system up to date by tracking the status of products, such as whether they are available, rented, out of order, or not available.

5.8 Branch Employee Dashboard - Manageable actions summary:

- Employees at the branch may quickly access the website to view and change any information. They are in charge of adding and removing rental orders for tools and equipment placed by consumers.
- They communicate directly with consumers in order to provide or collect rented items.
- They keep the system up to date by tracking product availability, such as if it is available, rented, out of stock, or unavailable.

5.9 Customer Dashboard:

All the information about customers should be viewable and editable on the customer account, including usernames, passwords, email addresses, shipping addresses, credit card information, etc. As well as their prior uploaded identity document.

5.10 Alteration or recovery or forgot Password:

The technology permits users to retrieve, modify, or recover their passwords, allowing them to access the website again if they forget or need to reset it **by sending a verify code to the registered mobile number or a reset link to the registered email.**

5.11 Search for product:

Customers can use the search box to look for any necessary tool or equipment using any key word or the name of the product they desire, which helps them find the item fast and saves them time as well. Furthermore, all the product characteristics, such as product descriptions, availability in the nearby store depending on the customer's address, prices etc., will be visible to customers on the website.

5.12 Age verification:

The website restricts its users to 18 and older. Therefore, renters under the age of 18 are not allowed to rent any items. The system verifies this fact through a valid government-issued photo identification document provided by the shoppers.

5.13 In-store availability:

Due to the fact that not all items are available in every store, customers can check product availability by picking a specific item at an accessible store near them to save themselves a significant amount of time.

5.14 Rental Reservations:

Customers have the opportunity to place a reservation for renting items for which they need up to 30 days from the present date in advance following the next day

5.15 Rental Period:

The system authorizes customers to have the rented items for at least 4 hours, with the option of extending it daily, weekly, or monthly.

5.16 Payment:

For the rent or pick-up of necessary items, the system allows the customers to pay online with a valid credit card.

5.17 Confirmation Email:

A confirmation email with all the details (such as order number, ordered tools, payment history, and so on) will be sent to the user's preferred email address, as well as preserved on the user's portal for future use.

5.18 Refund/Cancellation:

If a consumer changes their mind or is unhappy with the product quality, the system allows them to cancel their order/reservation and receive a refund either to their direct original payment or by providing a store credit.

5.19 Reminder alerts:

Users must receive messages from the system to get informed of their upcoming reservations and the status of their orders.

5.20 Customer Service Assistance:

The system must include assistance for users to swiftly answer and resolve their technical issues via an online chat system or a customer care telephone call.

5.21 Filtering Tools:

To make it easier for clients to choose their desired item, all the tools should be filtered by various criteria, such as user happiness, often purchased items, discounted items, etc.

5.22 Failure to pick up:

Even after a reservation, if the user fails to pick up, the tool will be released to the main inventory for other customers to rent.

5.23 Update Credit Card:

The customer must be able to update their credit card on the website as much as they like.

6. Other Product Requirements

6.1 Security Requirement:

- The system must ensure that user data is secure and private.
- Unauthorized access to the system should not be permitted.

- Ensure that strong passwords and two-way authentication are used. It must contain alphanumeric, special symbols, upper case, lower case etc.

6.2 Performance Requirement:

- The system should be designed in such a way that it can handle high user traffic.
- Multiple screens should be supported without causing the system to slow down.
- Without buffering, the system should respond to the user.
- The time it takes for a consumer to request a webpage should not exceed 5 seconds.

6.3 Platform Requirement:

- The system should be compatible with both Windows and Mac.
- PHP should be implemented to develop the backend of the system and must be compatible with the database version.
- MySQL should be the database in order to save and handle records.

6.4 Robustness:

Despite incorrect inputs from the user, the system must continue to perform.

6.5 Documentation Requirement:

- User guides aren't necessary for this system.
- All the features are simple, clear and uncomplicated.
- Users will have access to general and context-specific support (such as "Contact Us", "Customer Service", "Frequently Asked Questions", "Terms and Conditions" for first-time registration) for all system functions.

6.6 Usability Requirement:

System functions should be straightforward and easy to use so that efficiency and effectiveness can be maximized with minimum effort.

7. Appendix

7.1 Activity Logs

Section	Time Spent (Hours)
Introduction	1
Positioning	2
Stakeholder Descriptions	4
Product Overview	2
Product Features	2
Other Product Requirements	1
Final Review	1
Toltal 13 hours	

Requirements Evaluation and Risk Analysis

[Electronic Tool Rental]

Task 1: Identifying and finding inconsistencies in vision document

➤ 1.1 Defect Table

- Time spent during inspection: 6 hours

Defect #	Location	Defect Type	Classification	Description	Status	Date Corrected
1	Introduction	Minor	Poor Structuring	Introduction section is not properly broken up into subsections, such as objective, purpose, etc.	Closed	07.28.2022
2	Scope	Major	Inadequacy	The project's scope is unclear; is it dealing with all ages of clients or is there any restriction?	Closed	07.28.2022
3	Positioning - Problem Statement	Major	Omission	Only one component 'Need' is acknowledged, but 'Feature' is not stated.	Closed	07.28.2022
4	Positioning - Product Position Statement	Minor	Ambiguity	The ETR application does not specify whether it is a web-based app,	Closed	07.28.2022

				mobile app or both.		
5	Stakeholder Summary	Major	Omission	This section lacks important stakeholders (such as Competitors) who will influence the system's decisions	Closed	07.28.2022
6	Stakeholder Summary	Minor	Noise	Some stakeholders are not considered end users (such as Tools/Equipment Insurance Company) since they are not impacted or benefited by the ETR website.	Closed	07.28.2022
7	User Environment	Minor	Ambiguity	The term 'secure and stable internet' should be defined more specifically. For instance, to view the website, a minimum necessary speed is expected.	Closed	07.28.2022
8	Product Perspective	Minor	Opacity	This application should be scalable by design, but the document fails to	Closed	07.28.2022

				explain how it will be achieved and provides an opaque idea of how it will be accomplished.		
9	Assumptions and Dependencies	Major	Noise	"In order to rent things from the website, users will have to provide their login credentials" - This statement was mislabeled as an assumption, which is erroneous because it is a need.	Closed	07.28.2022
10	Product Features	Major	Poor Structuring	Products are not bifurcated based on user satisfaction, most purchased things, discounted items, etc.	Closed	07.28.2022
11	Product Features	Minor	Inadequacy	'Alteration or recovery or forgot Password ' to regain access to the website is not clearly explained.	Closed	07.28.2022
12	Product Features	Major	Omission	The document does not specify any action to be taken if users do not come to the store to pick up	Closed	07.28.2022

				the reserved tool during rental reservation period. In this case, the system must release the items so that the other users can get them.		
13	Product Features	Major	Omission	The updating option of users' credit cards is not stated.	Closed	07.28.2022
14	Product Features	Major	Omission	It is not clarified how a refund is going to be received (whether it will be credited to a credit card or paid by cash)	Closed	07.28.2022
15	Other Product Requirements	Major	Overspecification	The database version has an impact on this application. If the database requires updating, the PHP version must be updated as well.	Closed	07.28.2022
16	Other Product Requirements	Major	Ambiguity	'Strong password' should be defined explicitly as different people will interpret it differently; whether it should contain	Closed	07.28.2022

				alphanumeric, special symbols, upper case, lower case etc.		
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➤ **1.2 Inconsistency Table**

- **Time spent during inspection:** 6 hours

#	Location	Inconsistency Type	Classification	Description	Status	Date Corrected
1	User Summery	Designation	Weak	Admins authenticate using the system by entering their username and password from the website in order to access the dashboard.	Closed	07.28.2022
2	User Summary	Designation	Weak	Branch employees/ customers log in to the system using their login information to access the dashboard.	Closed	07.28.2022
3	Stakeholder Descriptions	Structure	Weak	Online rental orders and	Closed	07.28.2022

				electronic tools on the website can be added, modified, or deleted by branch employees		
4	Stakeholder Summary	Structure	Weak	Store branches are being added, modified, and deleted by system administrator	Closed	07.28.2022
5	User Summery	Structure	Weak	Adding, modifying, and deleting branch employees is done by the system administrator	Closed	07.28.2022
6	Product Features	Structure	Weak	Reservation/renting for any tool cannot be possible without users' registration.	Closed	07.28.2022
7	Assumptions and Dependencie s	Structure	Weak	ETR website cannot be accessed without internet	Closed	07.28.2022
8	User Environment	Structure	Weak	ETR website cannot be accessed without	Closed	07.28.2022

				laptop/desktop /mobile		
9	Product Features - Client Registration	Structure	Weak	The system must confirm that the customers are at least 18 years old when registering for the first time by entering a date of birth or submitting supporting documentation	Closed	07.28.2022
10	Product Features - Customer Dashboard	Structure	Weak	The user can enter into their account and add, change, or even delete a prior uploaded identity document.	Closed	07.28.2022

1.3 Other Comments:

- No glossary is available to help explain terms.

Task2: Documenting conflicts

- **2.1 Interaction matrix**

S1: Admins authenticate using the system by entering their username and password from the website in order to access the dashboard.

S2: Branch employees/ customers log in to the system using their login information to access the dashboard.

S3: Online rental orders and electronic tools on the website can be added, modified, or deleted by branch employees

S4: Store branches are being added, modified, and deleted by system administrator

S5: Adding, modifying, and deleting branch employees is done by the system administrator

S6: Reservation/renting for any tool cannot be possible without users' registration.

S7: ETR website cannot be accessed without internet

S8: Customers require access to a laptop/desktop/mobile to rent/reserve tools from the website.

S9: The system must confirm that the customers are at least 18 years old when registering for the first time by entering a date of birth or submitting supporting documentation.

S10: The user can enter into their account and add, change, or even delete a prior uploaded identity document.

State ments	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Total
S1	0	1000	0	0	0	0	0	0	0	0	1000
S2	1000	0	0	0	0	0	0	0	0	0	1000
S3	0	0	0	0	1	0	0	0	0	0	1
S4	0	0	0	0	1000	0	0	0	0	0	1000
S5	0	0	1	1000	0	0	0	0	0	0	1001
S6	0	0	0	0	0	0	0	1	0	0	1
S7	0	0	0	0	0	0	0	1000	0	0	1000
S8	0	0	0	0	0	1	1000	0	0	0	1001
S9	0	0	0	0	0	0	0	0	0	1	1
S10	0	0	0	0	0	0	0	0	1	0	1
Total	1000	1000	1	1000	1001	1	1000	1001	1	1	6006

Total number of non-conflicting overlaps and conflicts = 6006/1000

$$= 6.006$$

Conflicts = 0.006

Non-conflicting overlaps = 6

So, here in interaction matrix, there are 6 **Conflicting statements** in total.

Task 3: Conflict resolution

➤ 3.1. Conflict between S3 and S5:

Avoid Boundary Condition:

The purpose of this method is to ensure that the boundary condition for a conflict can never become true

The boundary condition for strong conflict was seen to be 'Admin can delete branch employees' and 'Branch employee can add/modify/delete rental orders and tools on the website'. So it may happen that at the same time, admin deletes the employee, and at that very moment the same employee tries to alter the orders/tools on the system, which can result in conflicts. So, avoiding this boundary condition might be achieved by introducing a new requirement that an admin cannot delete an employee if they are logged and providing employees the ETR employee login portal to login first in order to handle any sort of activities on the system to minimize this friction.

- **Specialize conflict source or target:**

This method will identify the source objects involved in the conflicting statements S3 and S5 and specialize them so the conflicts will disappear.

This conflict between S3 and S6 can be resolved by explicitly clarifying the statement 3 that only **current valid** employees are capable of handling the rental orders placed by customers and thereby directing them login so the system can check whether they are currently employed or not to do any task related to the website.

3.2. Conflict between S6 and S8:

- **Specialize conflict source or target:**

This method will identify the source objects involved in the conflicting statements S6 and S8 and specialize them so the conflicts will disappear.

To expressly state that users must have access to a laptop, desktop, or mobile device as well as their login credentials in order to rent and reserve tools on the ETR website, thus resolving the issue between S6 and S8.

- **Weaken conflicting Statements:**

This method aims to make one or more of the conflicting statements less restrictive so as to resolve the conflict.

This conflict can be weakened by providing a direct access link to ETR's customer login portal in order to eliminate this friction.

3.3. Conflict between S9 and S10:

- **Restore conflicting statements:**

Statements (S9) and (S10) can be retained by requiring the user to show a hard copy of ID proof at the checkout of the branch store despite uploading one to their account.

- **Weaken conflicting Statements:**

This method will resolve the conflict by making one or more of the conflicting statements less restrictive.

The requirement of uploading identification when registering for the first time in statement (S9) can be optional, and an employee at the branch can verify an individual's identity with statement (S10).

Task 4: Conflict evaluation

Using Weighted matrices for evaluating alternative options for the above documented conflicts.

$$totalScore(opt) = \sum (Scores(opt, crit) \times Weight(crit)) \quad crit$$

1. Evaluation for S3 and S5:

Evaluation Criteria NFR	Significance Weighting	Options Scores	
		Option1: Direct to Employee Login Portal link	Option2: Specify the statement clearly
Fast response	0.3	0.9	0.7
Reliable response	0.6	0.8	0.8
Minimal inconvenience	0.1	0.8	0.7
Total	1.0	0.83	0.76

The option1 “**Direct to Employee Login Portal Link**” seems to be a better option according to the above estimates.

2. Evaluation for S6 and S8:

Evaluation Criteria NFR	Significance Weighting	Options Scores	
		Option1: Access through laptop/desktop/m obile along with User registration	Option2: Access through customer login portal
Fast response	0.3	0.9	0.8
Reliable response	0.6	0.7	0.8
Minimal inconvenience	0.1	0.7	0.7
Total	1.0	0.76	0.79

The option 2 “**Access through customer login portal**” seems to be a better option according to the above estimates.

3. Evaluation for S9 and S10:

Evaluation Criteria NFR	Significance Weighting	Options Scores	
		Option1: The user can upload documents for the age verification	Option2: An employee at the branch can verify the ID of the users
Fast response	0.3	0.5	0.7
Reliable response	0.6	0.6	0.8
Minimal inconvenience	0.1	0.5	0.7
Total	1.0	0.56	0.76

The option2 “**An employee at the branch can verify the ID of the users**” seems to be a better option according to the above estimates.

Task 5: Risk management

Risk Identification

Component Inspection:

i) Security Risk: There are currently no encryption techniques used by ETR to protect data. Hence, the chances of a data breach or hack are extremely high.

ii) Communication Loss/ Network Connectivity: Unnatural circumstances can result in data loss or downtime anytime.

iii) Performance Risk: There is a possibility that the server will throw errors such as downtime, which can take longer than 100ms for a page to load when numerous users are attempting to access the same content. In rare instances, the view function takes a longer time than expected to retrieve data.

iv) Database Server Failure Risk: There is a risk that the database component may crash and the replica for the database will not be available, which will render the entire system unavailable.

Risk Checklist:

Risk Checklists are the ones which can be built from risk categories that negatively impact the requirements of the system. Checklists include various elicitation criteria that depend on non- functional requirements of the system such as Cost, Deadline, Confidentiality, Useability etc.

- i) **Confidentiality(Security Risk):** Hackers, cyberterrorists, and others have the ability to steal an authenticated user's ID, password, and other vital and sensitive information. Additionally, hackers prevent authorized users from accessing the system by conducting a DOS (Distributed Denial of Service) attack on it.
- ii) **Cost(Performance Risk):** Making the system platform independent may increase the overall development cost.
- iii) **Time(Performance Risk):** In order to make the system platform independent, the deadline for completing the project on time can also increase.
- iv) **Useability:** With so many functionalities in the system, the user might find it difficult to operate without getting overwhelmed.

Risk Tree:

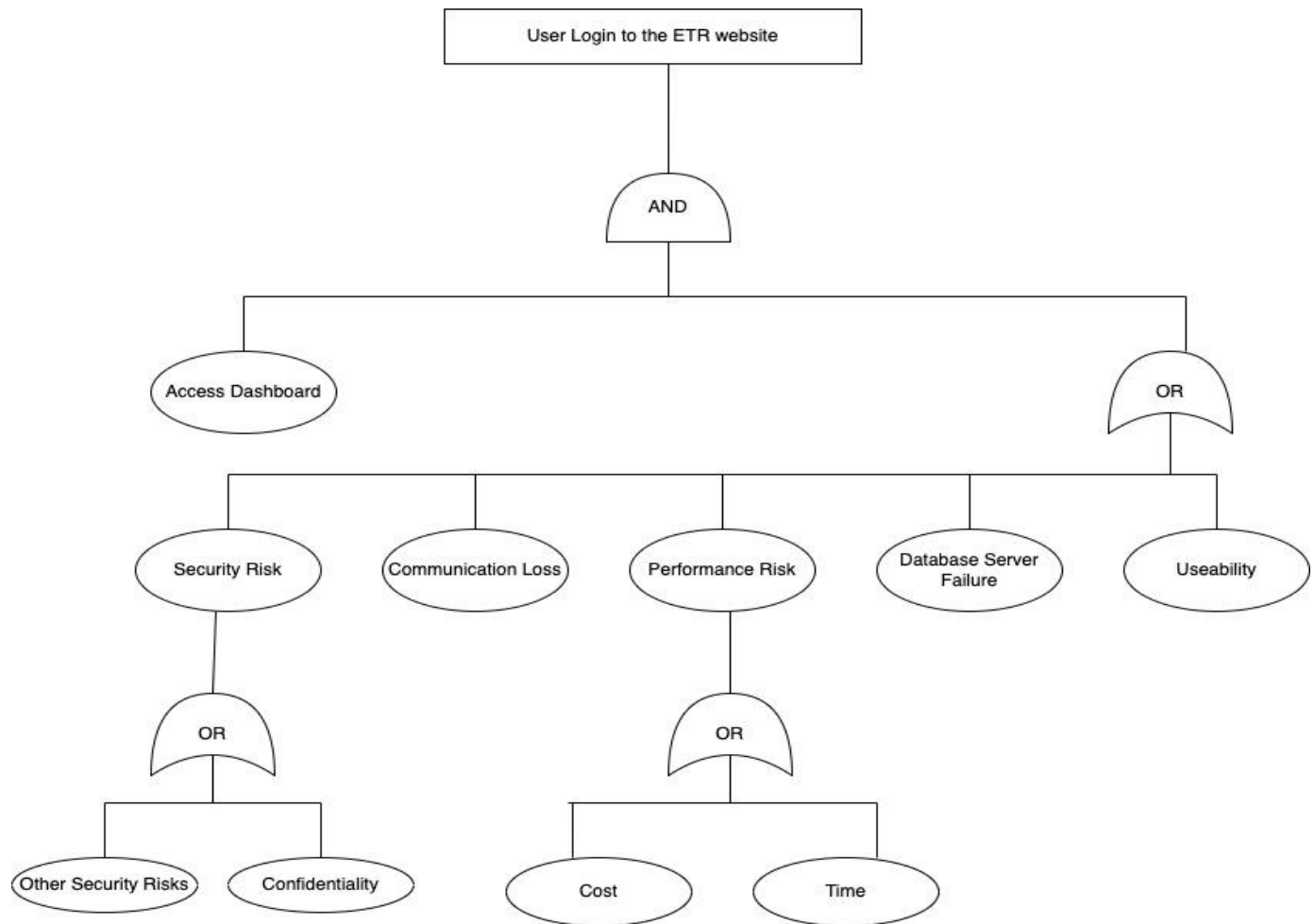


Figure 1: Risk Tree

- **Other Security Risks** – Integrity issues, Availability

Quantitative Assessment of Risk Identified:

Risk	Rationale	Likelihood	Severity (1-10)	Risk Exposure (Likelihood* Severity)
Security Risk / Confidentiality	There are very high chances of data breaches and hacking if not using any	40%	8	3.2

	encryption techniques (LIKELY)			
Communication Loss/ Network Connectivity	A high probability exists of unexpected events resulting in data loss or downtime at any time.(LIKELY)	35%	4	1.4
Performance Risk / Cost / Time	This can lead to numerous errors from the server. It can also take longer than expected for the view function to retrieve data in some cases.(POSSIBLE)	30%	6	1.8
Database Server Failure Risk	There is a risk that the database component may crash while under heavy load.(LIKELY)	35%	7	1.4
Useability	There is a probability that the user might find it difficult to operate the system because of the presence of so many features in the system(POSSIBLE)	15%	3	0.45

Risk Control:

We will be using Risk Reduction Leverage (RRL) to calculate the better countermeasure for a particular risk.

$$\text{Risk reduction leverage (RRL)} = \frac{RE_{\text{before}} - RE_{\text{after}}}{\text{Cost of risk reduction}}$$

$$RE = \text{risk probability} \times \text{amount at stake}$$

1. Security Risk / Confidentiality:

Estimated Cost = \$80,000

Probability of this Risk = 0.40

Risk Exposure = impact x Risk Probability
= \$80,000 x 0.04
= \$32,000

Risk Exposure before = \$32,000

Alternative Option 1: By Reduce Consequence likelihood tactic, this risk can be countered by introducing new requirement as, any information, particularly private information, stored into database must be stored in encrypted form.

Estimated Cost = \$80,000

Probability of this Risk = 0.30

Risk Exposure = impact x Risk Probability
= \$80,000 x 0.30
= \$24,000

Risk Reduce Leverage (RRL1):

Cost of Risk Reduction = \$9000

$$\begin{aligned}\text{Risk Reduce Leverage (RRL1)} &= (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction} \\ &= (32,000 - 24,000) / 9000 \\ &= 0.89\end{aligned}$$

Alternative Option 2: By using the Reduce Risk Likelihood strategy, this risk can be mitigated by introducing new requirements, such as the need for the server to be digitally secure, which can be achieved by purchasing a firewall, securing the system code, implementing Secure Sockets Layer (SSL), limiting uploads, and employing passwords.

Estimated Cost = \$80,000

Probability of this Risk = 0.20

$$\begin{aligned}\text{Risk Exposure} &= \text{impact} \times \text{Risk Probability} \\ &= \$80,000 \times 0.20 \\ &= \$16,000\end{aligned}$$

Risk Reduce Leverage (RRL2):

Cost of Risk Reduction = \$12,000

$$\begin{aligned}\text{Risk Reduce Leverage (RRL2)} &= (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction} \\ &= (32,000 - 16,000) / 12,000 \\ &= 1.33\end{aligned}$$

Here, while comparing RRL of both the alternatives, option 2 looks more promising because the RRL value of option 2 (RRL2) is greater than 1.

2. Communication Loss/ Network Connectivity:

Estimated Cost = \$40,000

Probability of this Risk = 0.35

$$\begin{aligned}\text{Risk Exposure} &= \text{impact} \times \text{Risk Probability} \\ &= \$40,000 \times 0.35 \\ &= \$14,000\end{aligned}$$

Risk Exposure before = \$14,000

Alternative Option 1: Using the Reduce Consequence Likelihood strategy, this risk can be reduced by introducing new requirements such as a good internet connection and the use of the best Internet Service Providers for the users.

Estimated Cost = \$40,000

Probability of this Risk = 0.25

$$\begin{aligned}\text{Risk Exposure} &= \text{impact} \times \text{Risk Probability} \\ &= \$40,000 \times 0.25 \\ &= \$10,000\end{aligned}$$

Risk Reduce Leverage (RRL1):

Cost of Risk Reduction = \$2,500

$$\begin{aligned}\text{Risk Reduce Leverage (RRL1)} &= (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction} \\ &= (14,000 - 10,000) / 2,500 \\ &= 1.60\end{aligned}$$

Alternative Option 2: This risk can be countered using the Reduce Risk Likelihood tactic by introducing new requirements, such as requiring users to use laptops or smart phones with battery backup, so they can remain connected even in case of power failure.

Estimated Cost = \$40,000

Probability of this Risk = 0.30

$$\text{Risk Exposure} = \text{impact} \times \text{Risk Probability}$$

$$= \$40,000 \times 0.30$$

$$= \$12,000$$

Risk Reduce Leverage (RRL2):

$$\text{Cost of Risk Reduction} = \$2,400$$

$$\text{Risk Reduce Leverage (RRL2)} = (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction}$$

$$= (14,000 - 12,000) / 1000$$

$$= 0.83$$

Here, while comparing RRL of both the alternatives, option 1 looks more promising because the RRL value of option 1 (RRL1) is greater than 1.

3. Performance Risk / Cost and Time:

$$\text{Estimated Cost} = \$60,000$$

$$\text{Probability of this Risk} = 0.30$$

$$\text{Risk Exposure} = \text{impact} \times \text{Risk Probability}$$

$$= \$60,000 \times 0.30$$

$$= \$18,000$$

$$\text{Risk Exposure before} = \$18,000$$

Alternative Option 1: Using the Reduce Risk likelihood tactic, this risk can be countered by introducing new requirements that should be introduced as, initially, the system should be designed for only one platform, and then when it performs well or is needed, it can be made platform independent.

$$\text{Estimated Cost} = \$60,000$$

$$\text{Probability of this Risk} = 0.25$$

$$\text{Risk Exposure} = \text{impact} \times \text{Risk Probability}$$

$$= \$60,000 \times 0.25$$

$$= \$15,000$$

Risk Reduce Leverage (RRL1):

Cost of Risk Reduction = \$3,200

$$\begin{aligned}\text{Risk Reduce Leverage (RRL1)} &= (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction} \\ &= (18,000 - 15,000) / 3,200 \\ &= 0.94\end{aligned}$$

Alternative Option 2: A new requirement can be introduced as part of the Avoid Risk tactic to counter this risk. The new requirement is that the system should be developed by experienced developers who are proficient in several programming languages and able to work quickly.

Estimated Cost = \$60,000

Probability of this Risk = 0.20

$$\begin{aligned}\text{Risk Exposure} &= \text{impact} \times \text{Risk Probability} \\ &= \$60,000 \times 0.20 \\ &= \$12,000\end{aligned}$$

Risk Reduce Leverage (RRL2):

Cost of Risk Reduction = \$3,500

$$\begin{aligned}\text{Risk Reduce Leverage (RRL2)} &= (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction} \\ &= (18,000 - 12,000) / 3,500 \\ &= 1.71\end{aligned}$$

Here, while comparing RRL of both the alternatives, option 2 looks more promising because the RRL value of option 2 (RRL2) is greater than 1.

4. Database Server Failure Risk:

Estimated Cost = \$70,000

Probability of this Risk = 0.35

$$\text{Risk Exposure} = \text{impact} \times \text{Risk Probability}$$

$$= \$70,000 \times 0.35$$

$$= \$24,500$$

Risk Exposure before = \$24,500

Alternative Option 1: The Reduce Risk Likelihood tactic counters this risk by introducing new requirements, such as, ensuring the server is capable of handling a greater volume of traffic at a single time and scheduling regular backups of all data to be done on multiple servers.

Estimated Cost = \$70,000

Probability of this Risk = 0.25

Risk Exposure = impact x Risk Probability

$$= \$70,000 \times 0.25$$

$$= \$17,500$$

Risk Reduce Leverage (RRL1):

Cost of Risk Reduction = \$7,500

Risk Reduce Leverage (RRL1) = (RE before – RE after)/Cost of Risk Reduction

$$= (24,500 - 17,500) / 7,500$$

$$= 0.93$$

Alternative Option 2: The Risk Consequence Likelihood tactic can be applied to counteract this risk by introducing new solutions, such as offsite backups, cloud storage, and site duplication to prevent permanent loss of data and operational capabilities.

Estimated Cost = \$70,000

Probability of this Risk = 0.20

Risk Exposure = impact x Risk Probability

$$= \$70,000 \times 0.20$$

$$= \$14,000$$

Risk Reduce Leverage (RRL2):

$$\text{Cost of Risk Reduction} = \$6000$$

$$\text{Risk Reduce Leverage (RRL2)} = (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction}$$

$$= (24,500 - 14,000) / 6,000$$

$$= 1.75$$

Here, while comparing RRL of both the alternatives, option 2 looks more promising because the RRL value of option 2 (RRL2) is greater than 1.

5. Useability:

$$\text{Estimated Cost} = \$30,000$$

$$\text{Probability of this Risk} = 0.15$$

$$\text{Risk Exposure} = \text{impact} \times \text{Risk Probability}$$

$$= \$30,000 \times 0.15$$

$$= \$4,500$$

$$\text{Risk Exposure before} = \$4,500$$

Alternative Option 1: This risk can be minimized by introducing new requirements, such as a good and simple user interface that is intuitive and easy to use for everyone.

$$\text{Estimated Cost} = \$30,000$$

$$\text{Probability of this Risk} = 0.10$$

$$\text{Risk Exposure} = \text{impact} \times \text{Risk Probability}$$

$$= \$30,000 \times 0.10$$

$$= \$3,000$$

Risk Reduce Leverage (RRL1):

Cost of Risk Reduction = \$2,500

$$\begin{aligned}\text{Risk Reduce Leverage (RRL1)} &= (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction} \\ &= (4,500 - 3,000) / 2,500 \\ &= 0.60\end{aligned}$$

Alternative Option 2: The Avoid Risk tactic can mitigate this risk by introducing a new requirement: System should contain a "How-to-use" pdf and a video explaining how to utilize various features of the system.

Estimated Cost = \$30,000

Probability of this Risk = 0.07

$$\begin{aligned}\text{Risk Exposure} &= \text{impact} \times \text{Risk Probability} \\ &= \$30,000 \times 0.07 \\ &= \$2,100\end{aligned}$$

Risk Reduce Leverage (RRL2):

Cost of Risk Reduction = \$2,000

$$\begin{aligned}\text{Risk Reduce Leverage (RRL2)} &= (\text{RE before} - \text{RE after}) / \text{Cost of Risk Reduction} \\ &= (4,500 - 2,100) / 2,000 \\ &= 1.20\end{aligned}$$

Here, while comparing RRL of both the alternatives, option 2 looks more promising because the RRL value of option 2 (RRL2) is greater than 1.

Task 0 - Logging

Tasks	Section	Time Spent(Hours)
Task 1	Identifying and finding inconsistencies in vision document	6
Task 2	Documenting conflicts	4
Task 3	Conflict resolution	3
Task 4	Conflict evaluation	4

Task 5	Risk management	4
Total: 21 hours		

Reference:

[1] Professor notes and slides

[2] Sample projects shared by professor

Rebuttal Form

1. Title: Response to reviewers, teacher assistant and instructor

2. Introduction:

I would like to thank the reviewers and teacher assistant for their detailed feedback and useful suggestions to improve my vision document.

I have carefully considered all the issues raised by my peers. Teacher assistant, and instructor and prepared a revised vision document. This document outlines how I have addressed each comment individually. Each comment has been assigned a number R(1-3).C(1-N), where the number to the right of the R identifies the reviewer, and the number to the right of the C identifies the comment.

My response to each comment is highlighted in blue.

Thanks for the opportunity to improve my vision document.

Sincerely,

Saswati Chowdhury.

Create a table when you identify each reviewer with a unique identifier:

Reviewer	ID
Peer 1(1 comment received in D2)	R1
Peer 2(4 comments received in D2)	R2
Teacher assistant (comments received in D1)	R3

3. Reviewer Comments:

R1.01 Here the conflicting statements have been given but no proper explanation on how these statements are conflicting have been given which would have made the document more readable and easy to understand.

I did not get this point of my peer reviewer as I explained it for every conflict before starting to resolve the conflict resolution.

R2.01 Covered All defects and inconsistencies, classified them correctly and provided proper detailed description

Thank you for the review.

R2.02 Correctly identified and calculated conflicts and overlaps among the requirements statements

I appreciate the review.

R2.03 Conflict evaluation is clearly stated and also proper weights are selected for the evaluation criteria

I appreciate my peer reviewer taking the time to review my work.

R2.04 Some calculations are incorrect

I completely agree with this. I mistyped two figures in two sections, 1) Performance Risk / Cost and Time for Alternative Option 1 RRL 1, 2) Database Server Failure Risk Alternative Option 1 Risk Exposure. I have corrected these in updated vision document.

R3.01 Problem affects the users who wants to rent tools in affordable price rather than buying

By mistake I have mentioned 'purchase' instead of 'rent/reserve' in a couple of places. I have changed it and updated the document.

R3.02 Missing Key Stakeholders

I do agree with it. Hence, I have taken into consideration this comment and in the updated vision document I have added new stakeholders with descriptions. Added Stakeholders are Competitors, Manufacturer and Suppliers, and Payment Gateway Companies.

R3.03 Equipment Insurance Company which cannot be considered as end user stakeholder

I completely agree with this comment. So, I removed this stakeholder from the document and updated it.

R3.04 "In order to purchase things from the website, users will have to provide their login credentials" this is requirement, and it cannot be assumption

My opinion is completely in agreement with this statement. As a result, I removed this from my vision document and updated it.