



**SCHOOL OF INFORMATION TECHNOLOGY AND
ENGINEERING FALL SEMESTER 2020-2021**

J Component Final Review

**SWE2003 - Requirements Engineering and
Management Course Faculty - Prof. B. Valarmathi
Slot-C1**

**SYSTEM FOR BIOMETRIC AUTHORIZATION OF
VOTERS**

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PROBLEM DOMAIN

These are the problems in the current voting system:

COMPLEX PROCESS FOR VOTERS:

- Procurement and maintenance of Voter ID
- Authentication process is slow and tedious using electoral rolls
- Updating changed credentials

ELECTORAL MALPRACTICES:

- Generation of fake voter ID
- Voting on someone's behave.
- Absence of names from electoral rolls due to some bias.

ENVIRONMENTAL IMPACT:

- Use of paper work.
- Increase of carbon foot print.

COMPLEX PROCESS FOR ECI:

- Maintaining and updating VOTER IDs
- Low voter turn out
- Requirement of diligent employees for making of unbiased electoral rolls.
- Citizens do not provide updated information.

DIFFICULTY IN MONITORING VOTERS:

- Obsolete security system.
- Difficulty in keeping track of votes.
- No proper indication of casted vote.

SOLUTION DOMAIN

The proposed new system will entail the following features:

1. It will access the '**AADHAR issued by UIDAI**' database for details of citizens. Any changes made to the AADHAR Database such as updation of voters address will be taken into account on Election process also.
2. Authentication of user will be enabled by biometric scanning of **fingerprint** and **iris**. The system will match the biometric information of user with biometric information stored in the AADHAR database.
3. Upon scanning, the age and the assembly constituency to which the voter belongs will be verified with the stored **date of birth** and **voter's permanent address** respectively.
4. The system will detect if the voter is authorized and display the same of the voter and the concerned EIC authority stationed at the voting centre. This will prevent many electoral malpractices such as voting more than once and rigging of votes.
5. Since the system uses AADHAR Database, no voter will be disallowed to vote due to the fact that his/her name was missing from the electoral rolls and this leads to a fair elections.
6. Voting will be conducted as usual using Electronic Voting Machine (EVM) and voters will be marked by indelible ink.
7. The system will allow a particular voter to vote only once. We will provide **two** systems per voting centre. One at the **entrance** for **authentication of voter** and one at the **exit** for **confirmation of casted vote**.
8. The voter will scan his/her fingerprint and iris again upon existing the voting area to confirm that he/she was able to cast his/her vote.
9. Upon successfully existing the voting centre the system will register the voter as '**VOTED**' and will not allow him/her to enter the voting centre again at any cost.

10. Upon confirmation a message will be sent on the voter's registered mobile number. This can be used by the voter to verify if any malpractice has taken place.

11. The system will ease the present complex process of voting into few simple steps. This which will encourage more people to participate in voting on Election Day.

5 STEPS PROBLEM ANALYSIS

GAIN AGREEMENT ON PROBLEM STATEMENT

How to write the problem statement?

One of the simplest ways to gain this agreement is to **simply write the problem down and see whether everyone agrees.**

STEP 1: PROBLEM STATEMENT

<u>ELEMENT</u>	<u>DESCRIPTION:</u>
The problem of...	The lack of effective and efficient system to conduct elections seamlessly.
Affects...	Voters, EIC employees and integrity of Indian elections.
And results in...	Laborious and demanding handling of elections and electoral malpractices.
Benefits of a solution....	<div>A new biometric based authentication system will provide:<ul style="list-style-type: none">• Removal of existing voter ID card system and elimination of complex associated processes• Easy authentication of voters• Reduction in electoral malpractices• ECI will not have to maintain a separate database of voter’s information. Can use AADHAR database.</div>

STEP 2: ROOT CAUSE ANALYSIS

WHAT IS ROOT CAUSE ANALYSIS?

- WHAT is the problem?
- WHEN the problem has happened?
- WHY the problem occurred?
- HOW we can ensure that the problem does not occur again?

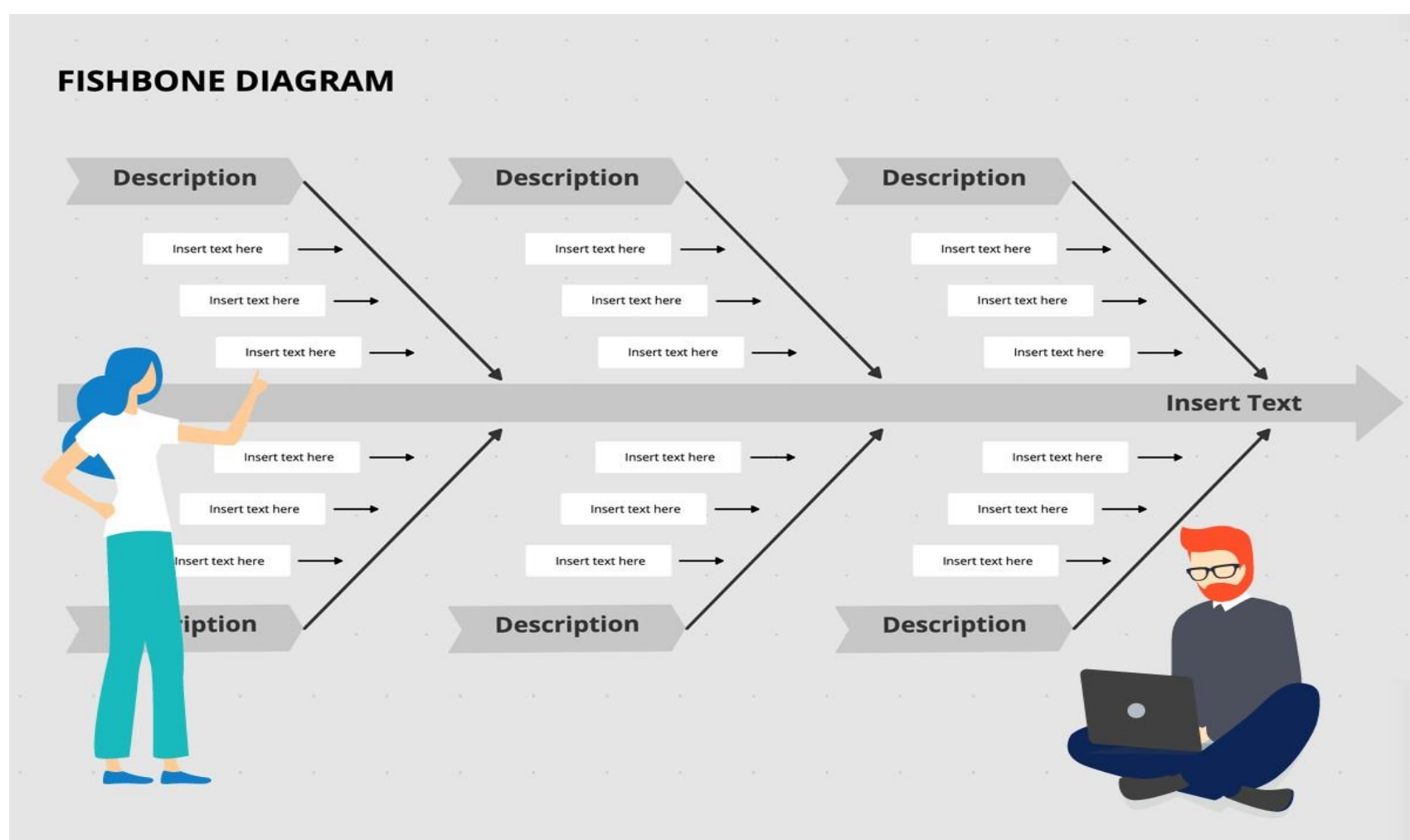
STEPS TO PERFORM ROOT CAUSE ANALYSIS:

1. Define the problem.
2. Collect data relating to the problem.
3. Identify what is causing the problem.
4. Identify solutions to the underlying problem and implement the change.
5. Monitor and sustain.

1. FISH BONE ANALYSIS TOOLS

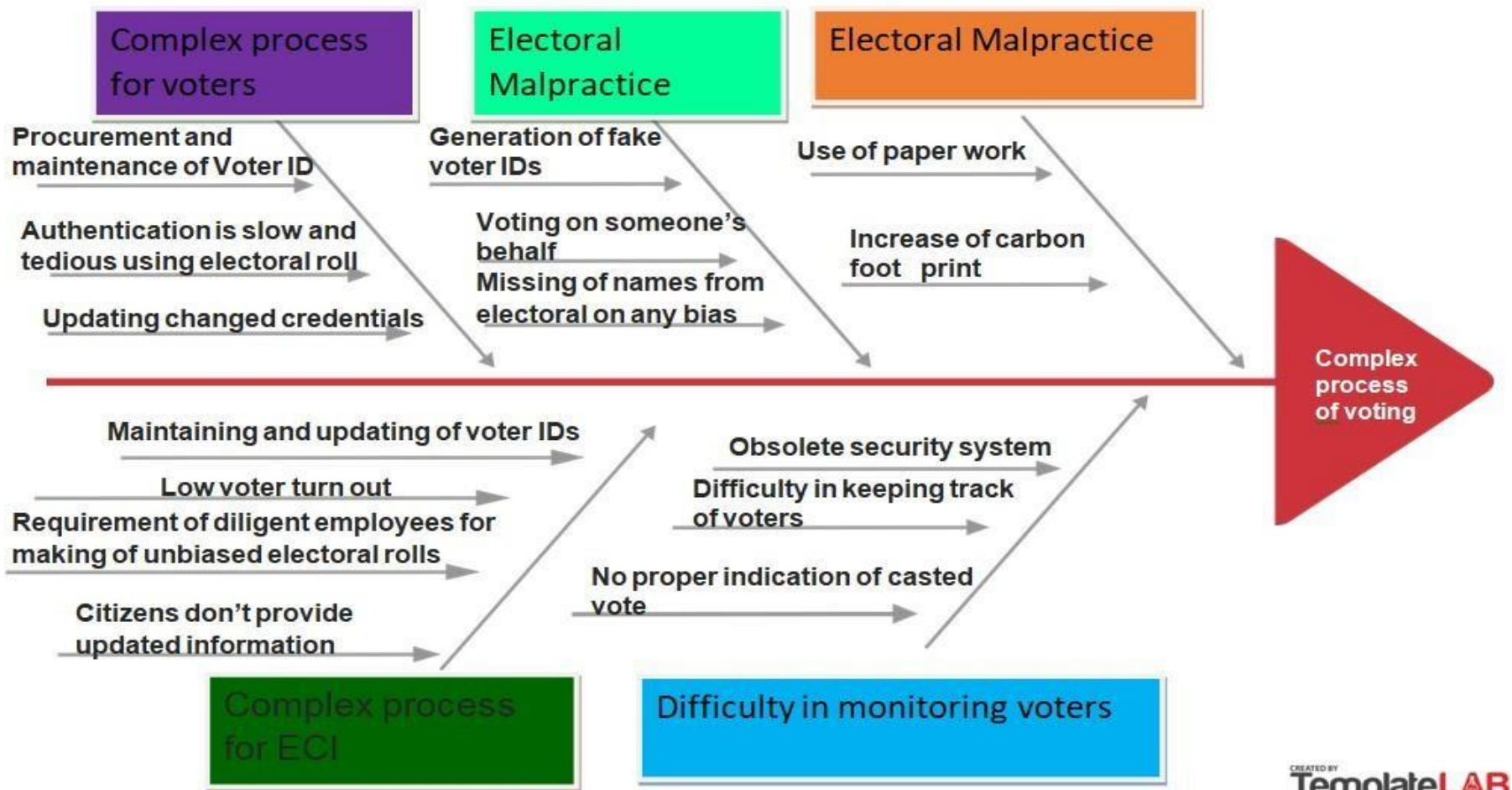
Follow the below steps to create a fishbone diagram:

1. Write the problem at the head of the fish.
 2. Identify the category of causes and write at end of each bone [cause category 1, cause category 2 cause category N]
 3. Identify the primary causes under each category and mark it as primary cause 1, primary cause 2, primary cause N.
- Extend the causes to secondary, tertiary, and more levels as applicable.



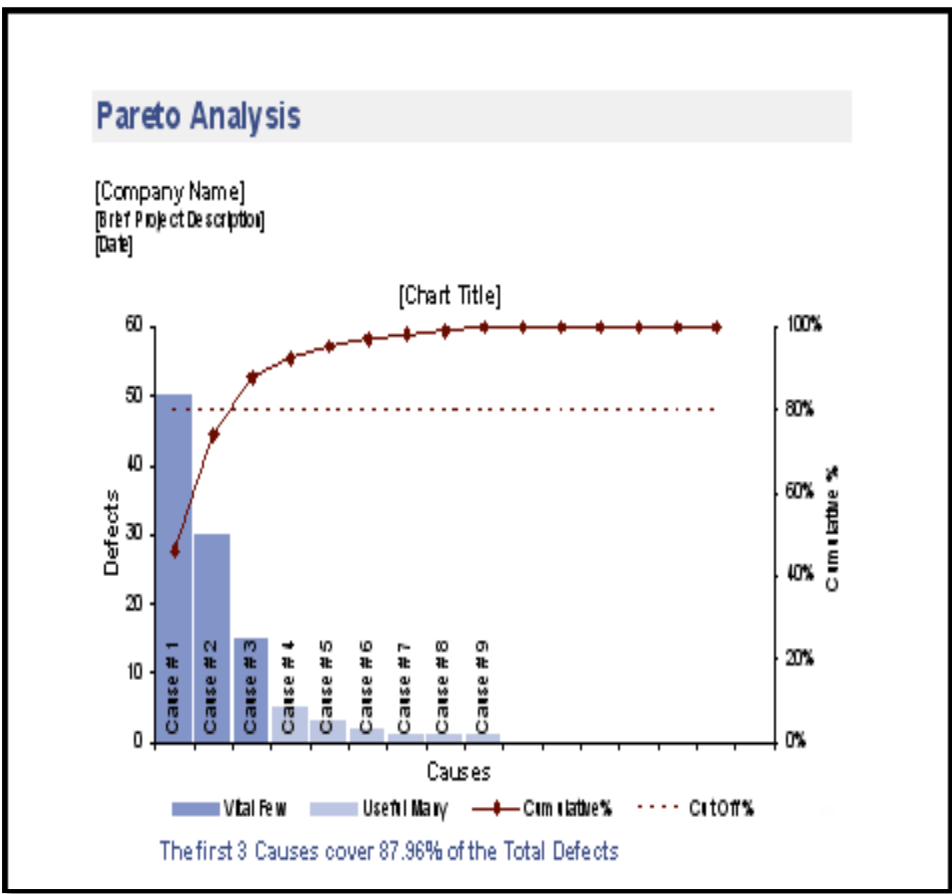
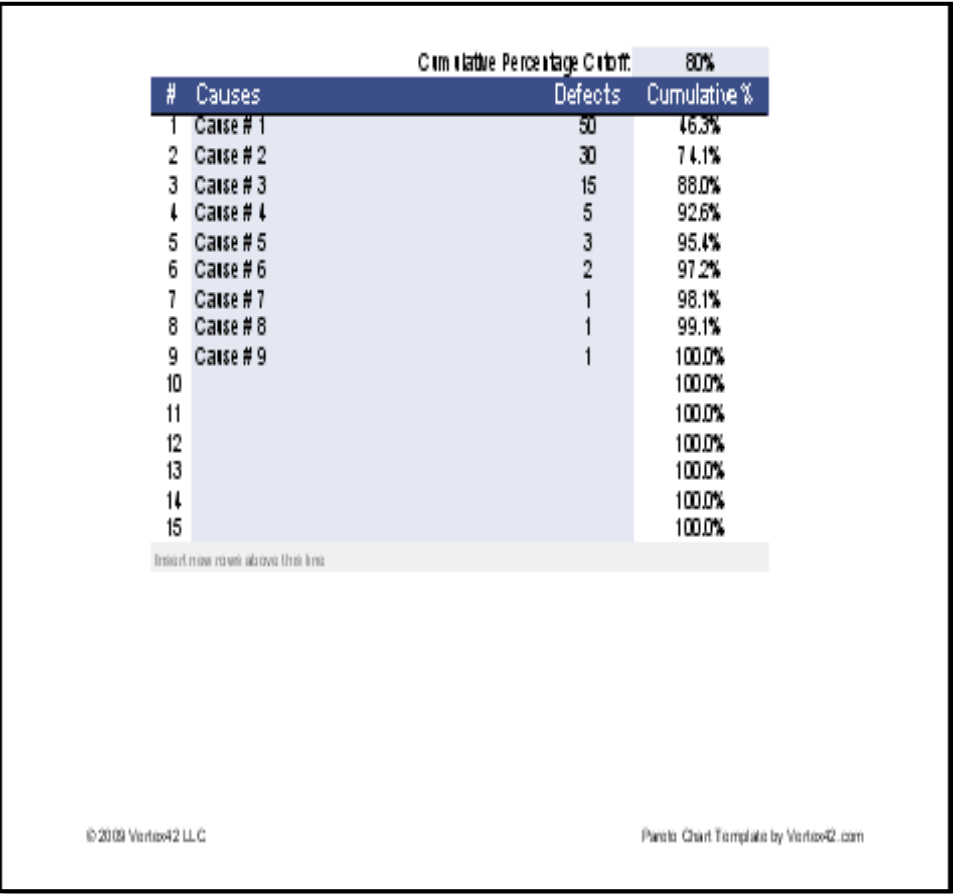
I

FISHBONE DIAGRAM



2. STEPS FOR PARETO CHART ANALYSIS:

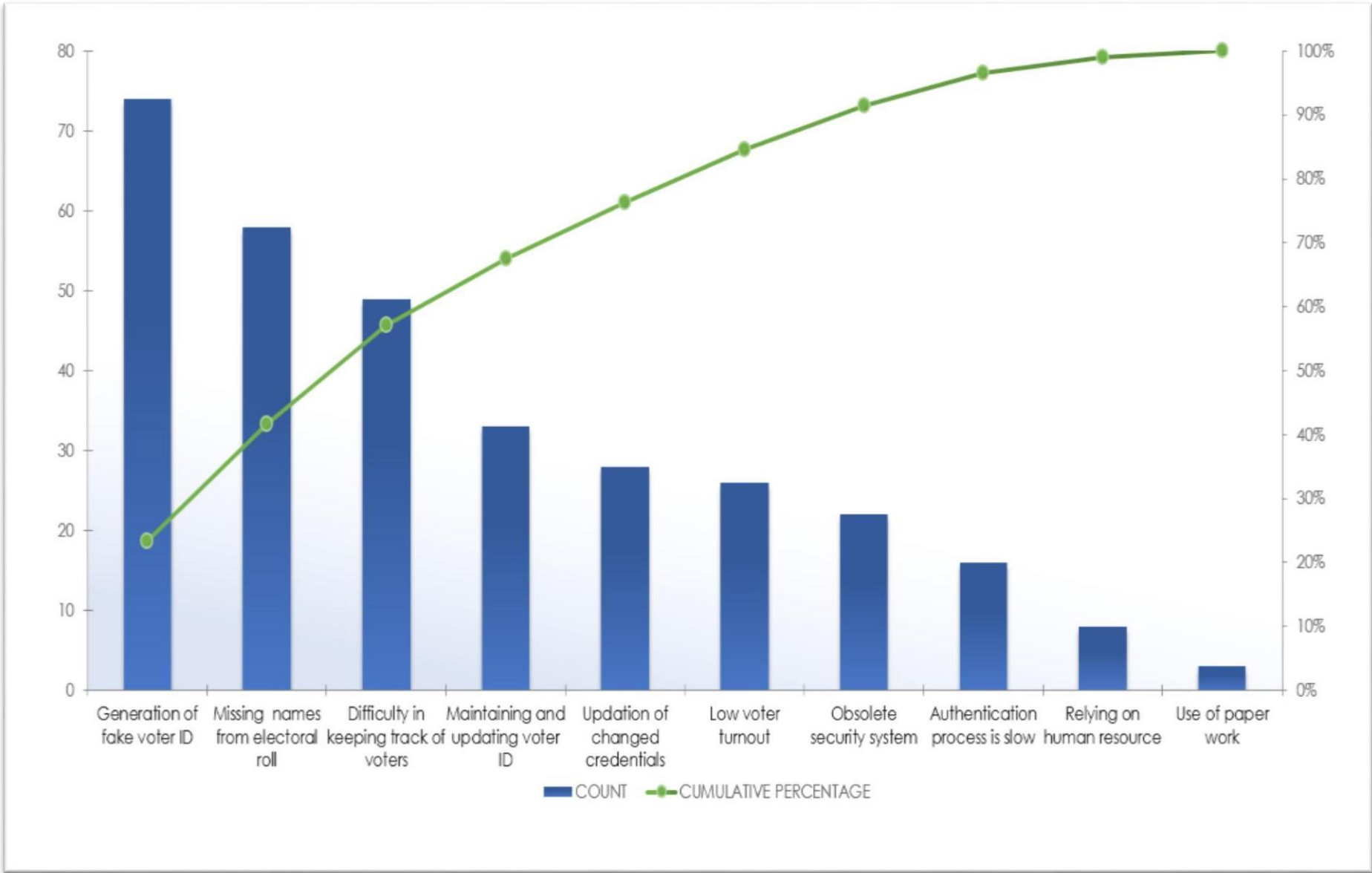
- 1. Create a vertical bar chart with causes on the x-axis and count (number of occurrences) on the y-axis.
- 2. Arrange the bar chart in descending order of cause importance that is, the cause with the highest count first.
- 3. Calculate the cumulative count for each cause in descending order.
- 4. Calculate the cumulative count percentage for each cause in descending order. Percentage calculation: {Individual Cause Count} / {Total Causes Count}*100
- 5. Create a second y-axis with percentages descending in increments of 10 from 100% to 0%.
- 6. Plot the cumulative count percentage of each cause on the x-axis.
- 7. Join the points to form a curve.
- 8. Draw a line at 80% on the y-axis running parallel to the x-axis. Then drop the line at the point of intersection with the curve on the x-axis. This point on the x-axis separates the important causes on the left (vital few) from the less important causes on the right (trivial many)



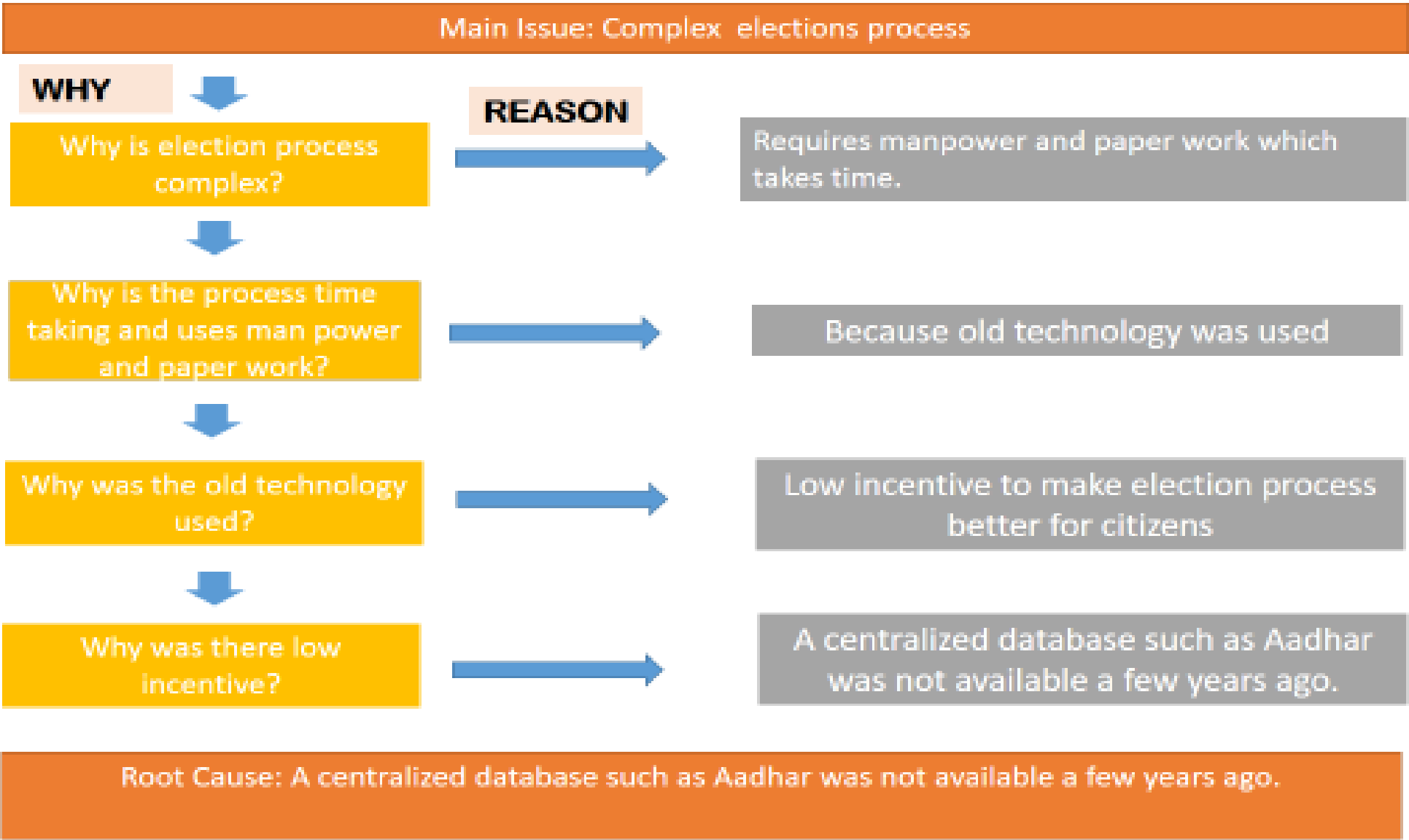
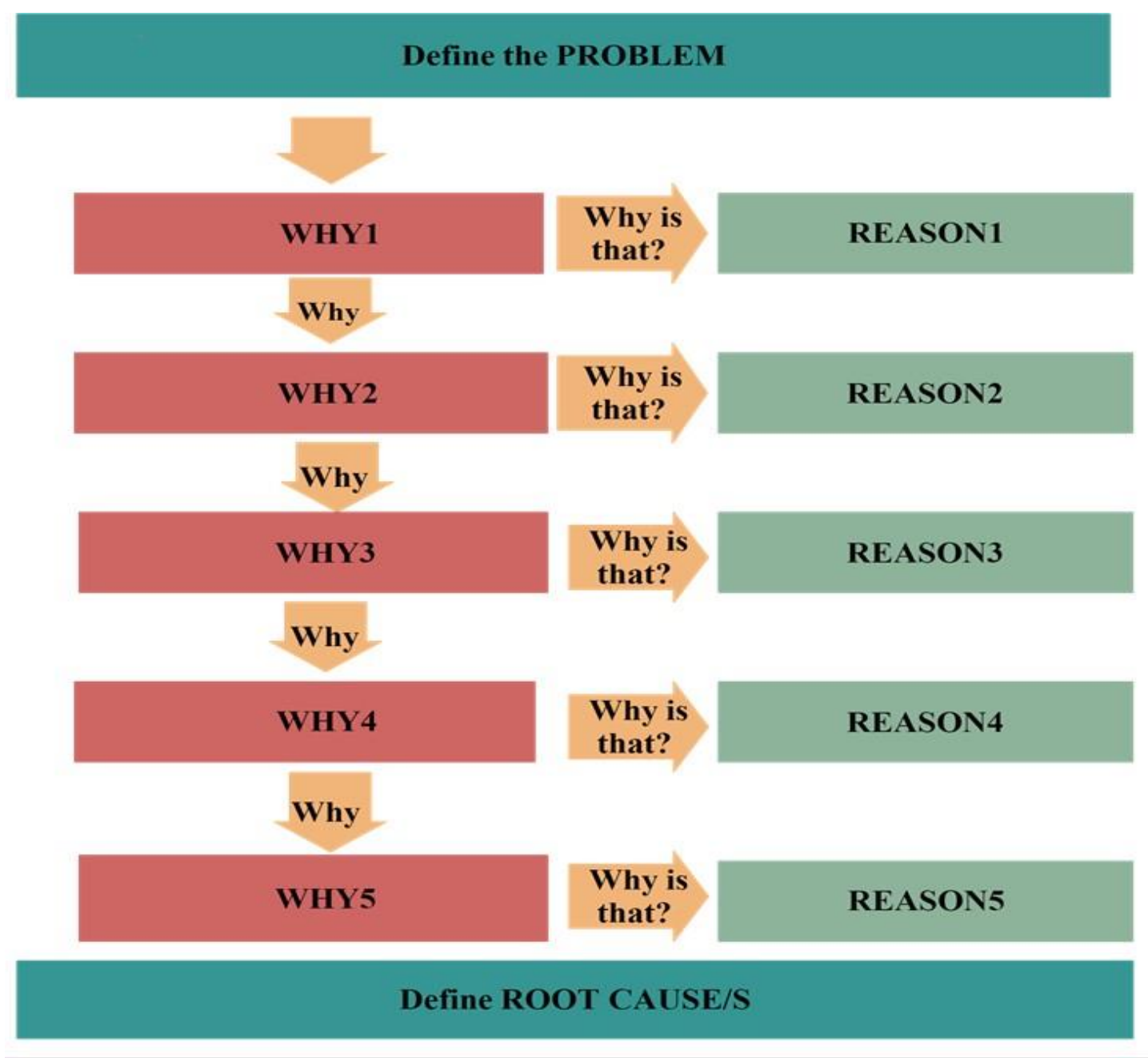
2. PARETO CHART ANALYSIS

The Pareto principle states that, for many events, roughly 80% of the effects come from 20% of the causes.

CAUSE CATEGORY / DESCRIPTION	EFFECT COUNT	CUMULATIVE PERCENTAGE
Generation of fake voter ID	74	23%
Missing names from electoral roll	58	42%
Difficulty in keeping track of voters	49	57%
Maintaining and updating voter ID	33	68%
Updation of changed credentials	28	76%
Low voter turnout	26	85%
Obsolete security system	22	91%
Authentication process is slow	16	97%
Relying on human resource	8	99%
Use of paper work	3	100%



3. 5 WHYS TECHNIQUE



STEP 3: IDENTIFICATION OF STAKEHOLDERS AND USERS

The following questions can be helpful in identifying stakeholders:

- Who are the users of the system?
- Who is the customer (economic buyer) for the system?
- Who else will be affected by the outputs the system produces?
- Who will evaluate and approve the system when it is delivered and deployed?
- Are there any other internal or external users of the system whose needs must be addressed?
- Who will maintain the new system?
- Is there anyone else who cares?

STAKEHOLDERS:

- GOVT. OF INDIA
- ELECTION COMMISSION OF INDIA (ECI)
- UNIQUE IDENTIFICATION AUTHORITY OF INDIA (UIDAI)
- VOTERS
- BIOMETRIC MACHINE ENABLER
- ELECTIONS
- REQUIREMENTS ENGINEER
- SOFTWARE ARCHITECT
- PROJECT MANAGER

USERS:

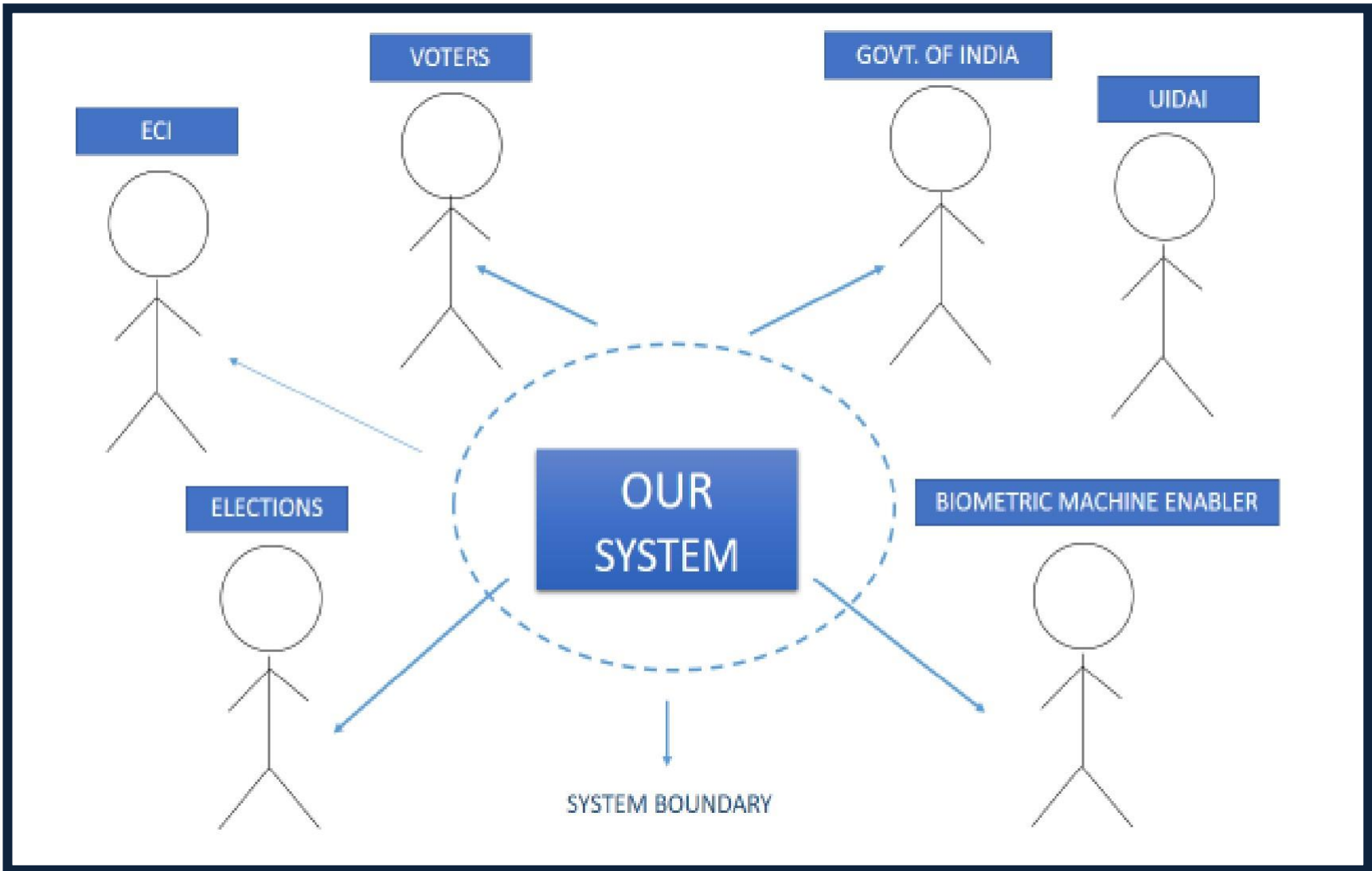
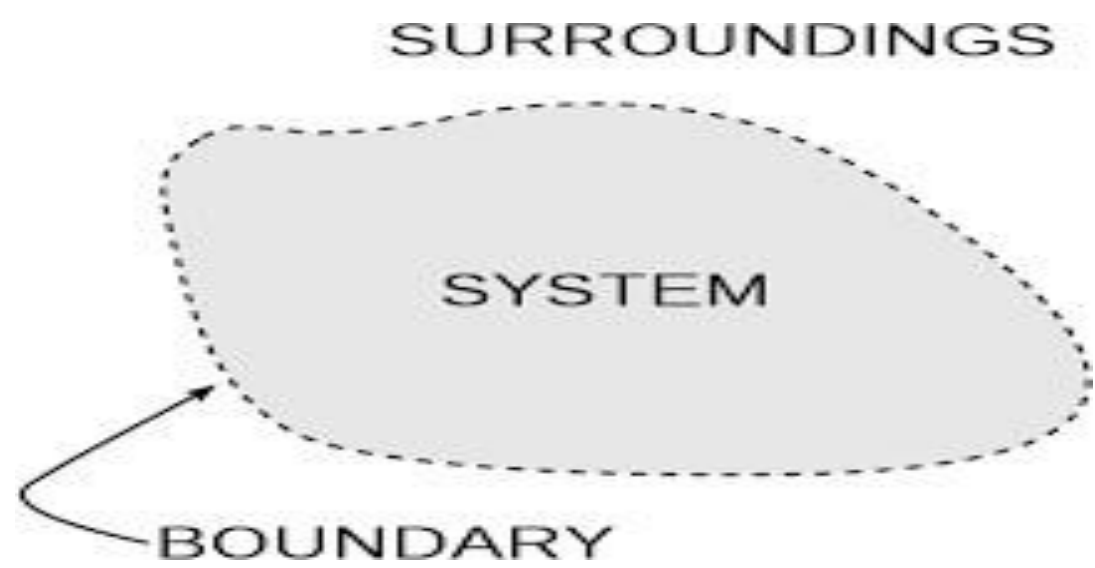
- VOTERS

STEP 4: SETTING A SYSTEM BOUNDARY

SYSTEM BOUNDARY defines the border between the solution and the real world that surrounds the solution.

We divide the world in two:

- 1. Our system
- 2. Things that interact with our system



STEP 5: IDENTIFICATION OF THE CONSTRAINTS TO BE IMPOSED ON THE SOLUTION

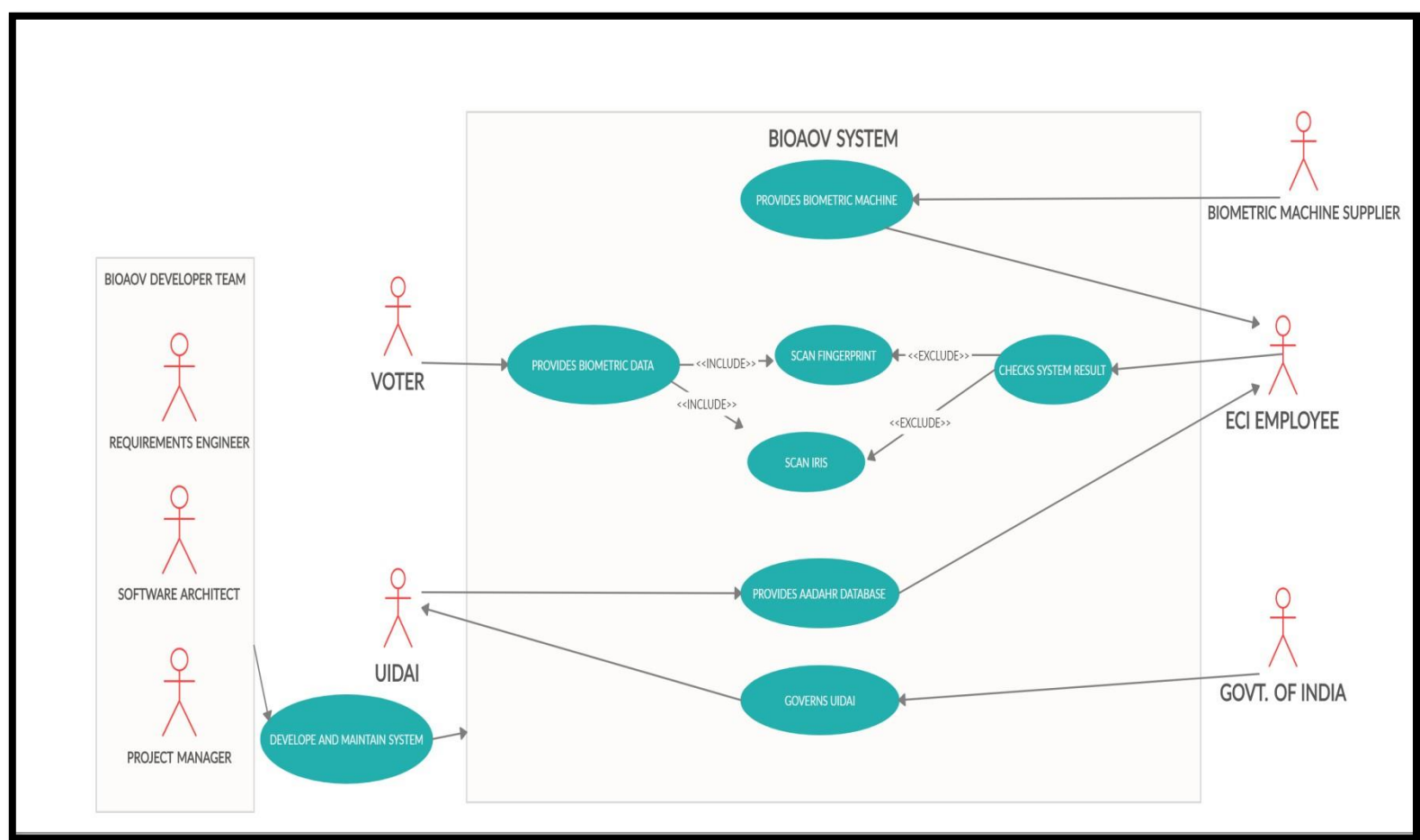
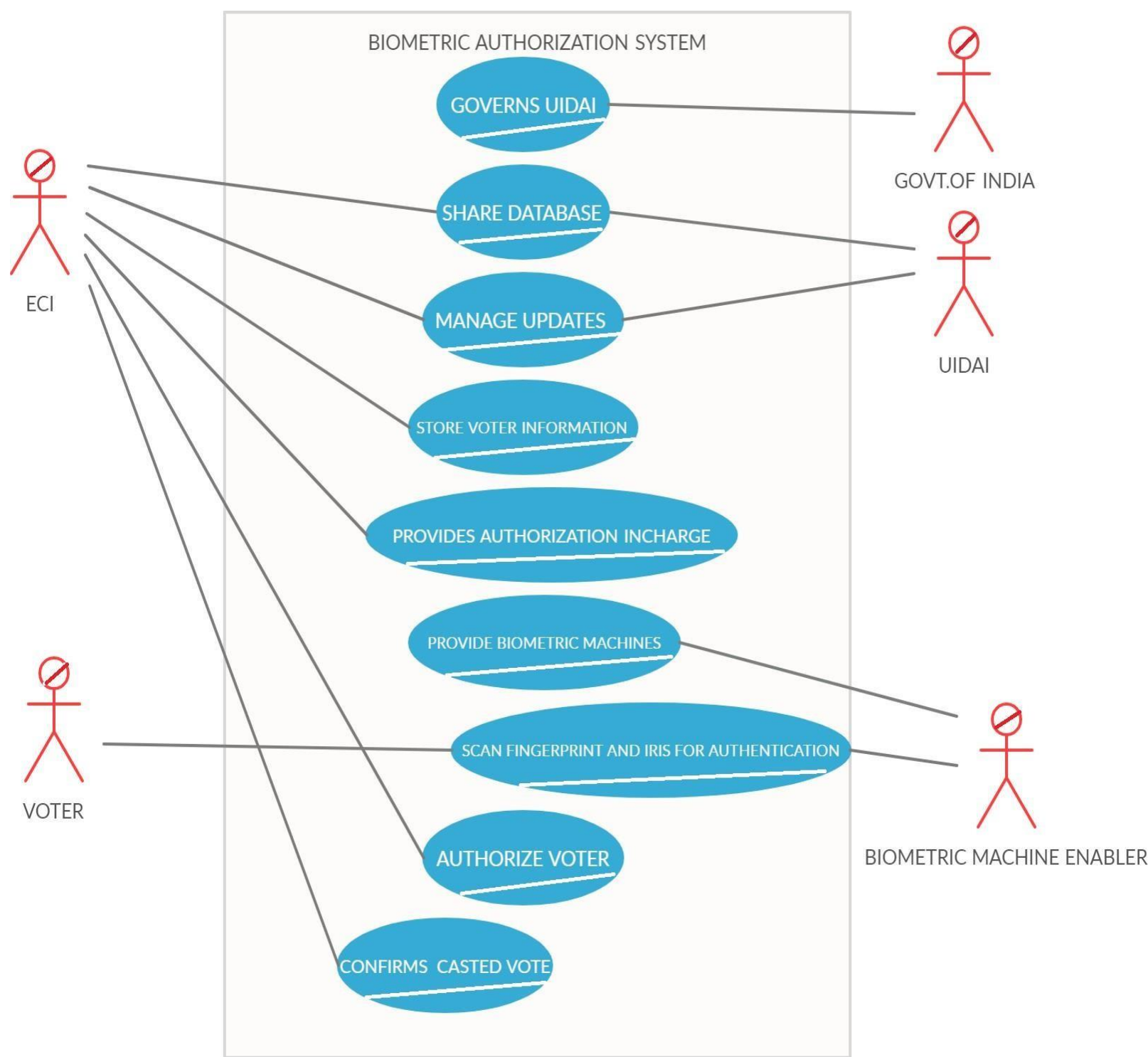
- A constraint is a restriction on the degree of freedom we have in providing a solution.
- A variety of sources of constraints must be considered.

SOURCE	CONSIDERATIONS
ECONOMICS	<ul style="list-style-type: none">• What financial or budgetary constraints apply?• Are there any licensing issues?• Are there costs of equipment's sold and any product pricing considerations?
POLITICS	<ul style="list-style-type: none">• Do internal or external political issues affect potential solutions?• Are there any interdepartmental problems or issues?
TECHNOLOGY	<ul style="list-style-type: none">• Are we restricted in our choice of technologies?• Are we constrained to work with existing platforms or technologies?• Are we prohibited from using any new technologies?• Are we expected to use any purchased software packages?
SYSTEMS	<ul style="list-style-type: none">• Is the solution to be built on our existing systems?• Must we maintain compatibility with existing solutions?• What operating systems and environments must be supported?• Is the solution dependent on integrity of AADHAR database?
ENVIRONMENT	<ul style="list-style-type: none">• Are there environmental or regulatory constraints?• Are there legal constraints?• What are the security requirements?• What other standards might restrict us?
SCHEDULE AND RESOURCES	<ul style="list-style-type: none">• Is the schedule defined?• Are we restricted to existing resources?• Can we use outside labour?• Can we expand resources? If yes, is it temporarily or permanently?

CONSTRAINTS

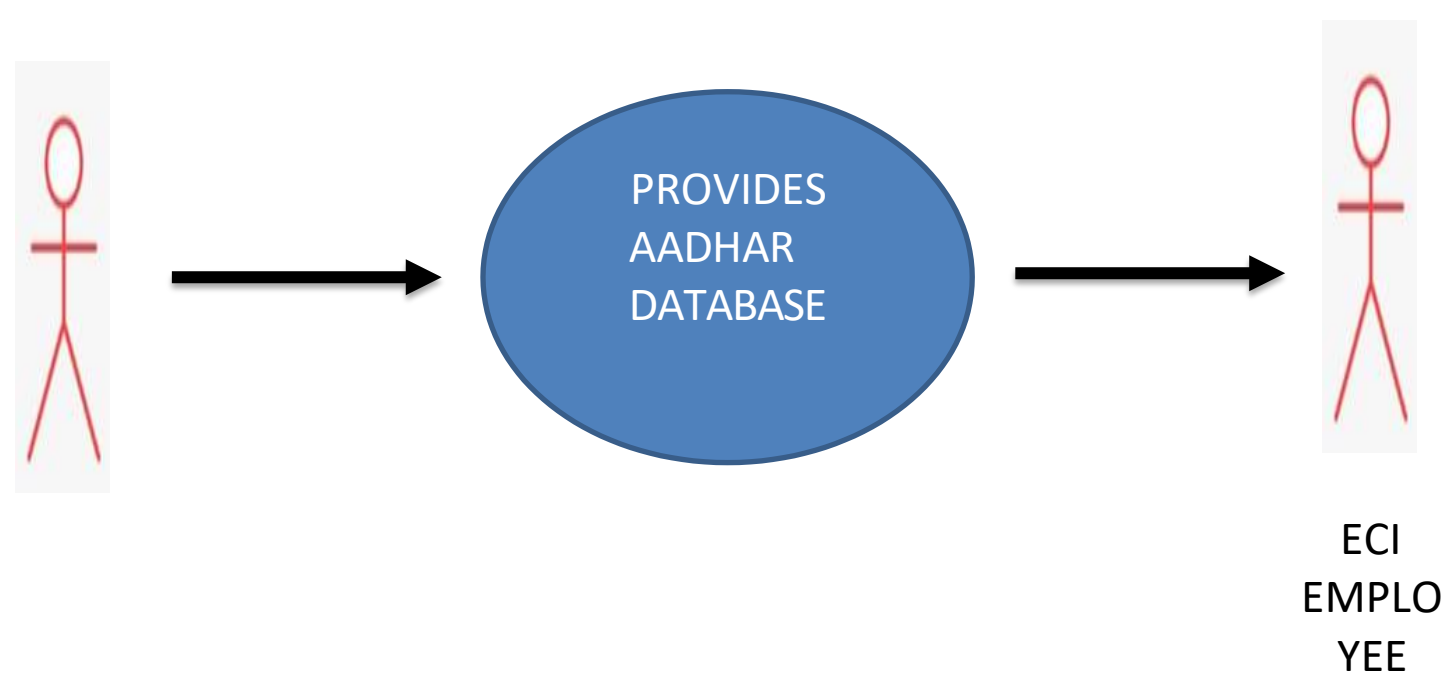
Source	Constraint	Rationale
Operations	An exact copy of sales order data must remain on the legacy database for up to one year.	The risk of data loss is too great; we will need to run in parallel for three months.
Systems	The applications footprint on the server must be less than 20MB.	We have limited server memory available.
Equipment budget	The system must be developed on the existing server and host; new client hardware for users may be provided.	We need to control costs and maintain the existing systems.
Personnel budget	Staffing resources are fixed; no outsourcing is possible.	The current budget calls for fixed operating costs.
Technology mandate	A new object-oriented methodology should be used.	We believe that this technology will increase productivity and increase the reliability of the software.

BUSINESS USE CASE DIAGRAM

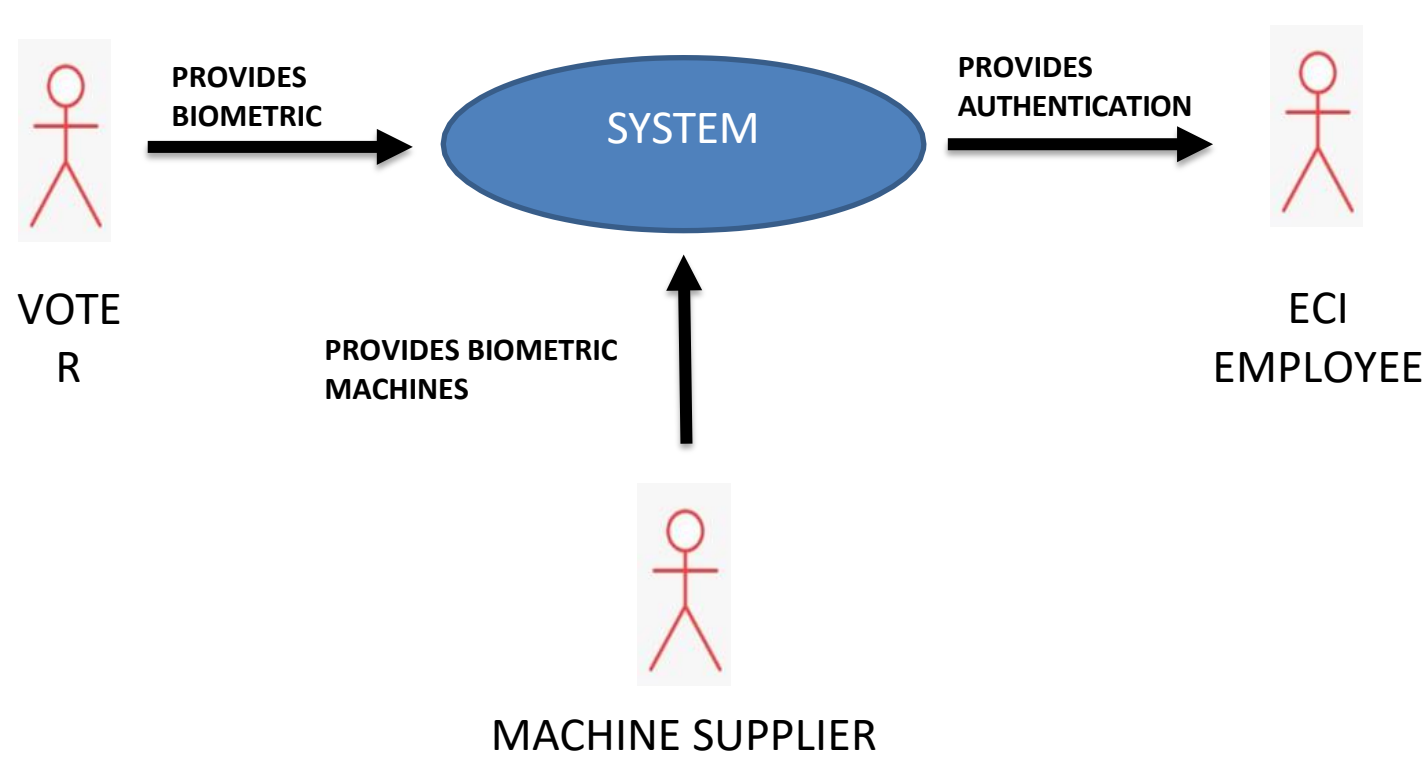


USES CASE FOR SYSTEM FUNCTIONALITIES:

1.1 THE SYSTEM USES AADHAR DATABASE PROVIDED BY UIDAI FOR AUTHENTICATION.



1.2 THE SYSTEM PROVIDES VOTER AUTHENTICATION TO ECI



REFERENCES:

- FISH BONE: <https://templatelab.com/fishbone-diagram-templates/>
- PARETO CHART: <https://templatelab.com/pareto-charts/a>
- USE CASE: <https://creatly.com/.com/fishbone-diagram-templates>

BRAINSTORMING TOOLS

PAIRED COMPARISON ANALYSIS

To make our model effective and well structured, we need to choose the most appropriate database that can handle large data.

We need to choose between the following options:

- Centralised Database
- Distributed Database
- NoSQL Database
- Relational Database



Step 1:

Make a list of all of the options that you want to compare. Assign each option a

letter (A, B, C, D, and so on)

A = Centralised Database

B = Distributed Database

C = NoSQL Database

D = Relational Database

Step 2:
Mark your options as both the row and column headings on the worksheet. This is so that you can compare options with one-another.

	A. CENTRALIZED DATABASE	B. DISTRIBUTED DATABASE	C. NoSQL DATABASE	D. RELATIONAL DATABASE
A. CENTRALIZED DATABASE				
B. DISTRIBUTED DATABASE	A			
C. NoSQL DATABASE	C	C		
D. RELATIONAL DATABASE	D	D	C	

Step 3:
Within each of the blank cells, compare the option in the row with the option in the column. Decide which of the two options is most important, and write down the letter of the most important option in the cell.

	A. CENTRALIZED DATABASE	B. DISTRIBUTED DATABASE	C. NoSQL DATABASE	D. RELATIONAL DATABASE
A. CENTRALIZED DATABASE				
B. DISTRIBUTED DATABASE	A			
C. NoSQL DATABASE	C	C		
D. RELATIONAL DATABASE	D	D	C	

Step 4:

Score the difference in importance between the options, running from zero (no difference/same importance) to, say, three (major difference/one much more important than the other.)

	A. CENTRALIZED DATABASE	B. DISTRIBUTED DATABASE	C. NoSQL DATABASE	D. RELATIONAL DATABASE
A. CENTRALIZED DATABASE				
B. DISTRIBUTED DATABASE	A ,2			
C. NoSQL DATABASE	C ,2	C ,3		
D. RELATIONAL DATABASE	D ,2	D ,1	C ,1	

Step 5:

Consolidate the results by adding up the values for each of the options. You may want to convert these values into a percentage of the total score.

FROM THE TABLE WE GET THAT:

TOTAL =11
A=2/11*100=18.1818 % (3rd Rank)
B=0/11*100=0 (4th Rank)
C=5/11*100=54.545 % (1st Rank)
D=3/11*100=27.272 % (2nd Rank)

Step 6:

Make a decision as per rank.

FROM THE TABLE WE GET THAT:

TOTAL =11
A=2/11*100=18.1818 % (3rd Rank)
B=0/11*100=0 (4th Rank)
C=5/11*100=54.545 % (1st Rank)

$D=3/11*100=27.272\%$ **(2nd Rank)**
The option ‘C’ is NoSQL Database. Therefore, we conclude that **NoSQL** database is most suited for our system.

DECISION MATRIX ANALYSIS

We used the decision matrix analysis to decide which **BIOMETRIC MACHINE SUPPLIER** would be most suited for our system. The factors to consider might be Cost, Quality, Reliability and Maintenance.



Step 1:

List all of your options as the row labels on the table, and list the factors that you need to consider as the column headings.

Factors:	Cost	Quality	Reliability	Maintenance	Total
Weight					
Supplier 1					
Supplier 2					
Supplier 3					
Supplier 4					

Step 2:

Next, work your way down the columns of your table, scoring each option for each of the factors in your decision. Score each option from 0 (poor) to 4 (very good). Note that you do not have to have a different score for each option – if none of them are good for a particular factor in your decision, then all options should score 0.

Step 3:

The next step is to work out the relative importance of the factors in your decision. Show these as numbers from, say, 0 to 4, where 0 means that the factor is absolutely unimportant in the final decision, and 4 means that it is very important. (It's perfectly acceptable to have factors with the same importance.)

Figure 1: Decision Matrix Analysis Showing Unweighted Assessment of How Each Supplier Satisfies Each Factor

Factors:	Cost	Quality	Reliability	Maintenance	Total
Weight					
Supplier 1	4	3	4	4	
Supplier 2	3	2	3	1	
Supplier 3	0	2	1	2	
Supplier 4	3	2	2	0	

Step 4: Now, multiply each of your scores from step 2 by the values for relative importance of the factor that you calculated in step 3. This will give you weighted scores for each option/factor combination.

Figure 2: Decision Matrix Analysis Showing Weighted Assessment of How Each Supplier Satisfies Each Factor

Factors:	Cost	Quality	Reliability	Maintenance	Total
Weight	2	4	3	1	
Supplier 1	8	12	12	4	36
Supplier 2	6	8	9	1	24
Supplier 3	0	8	3	2	13
Supplier 4	6	8	6	0	20

Step 5:

Finally, add up these weighted scores for each of your options. The option that scores the highest wins!

Factors:	Cost	Quality	Reliability	Maintenance	Total
Weight	2	4	3	1	
Supplier 1	8	12	12	4	36 (the highest score)
Supplier 2	6	8	9	1	24
Supplier 3	0	8	3	2	13
Supplier 4	6	8	6	0	20

Supplier 1 has the highest score of 36. **Therefore we shall get biometric machines from supplier 1.**

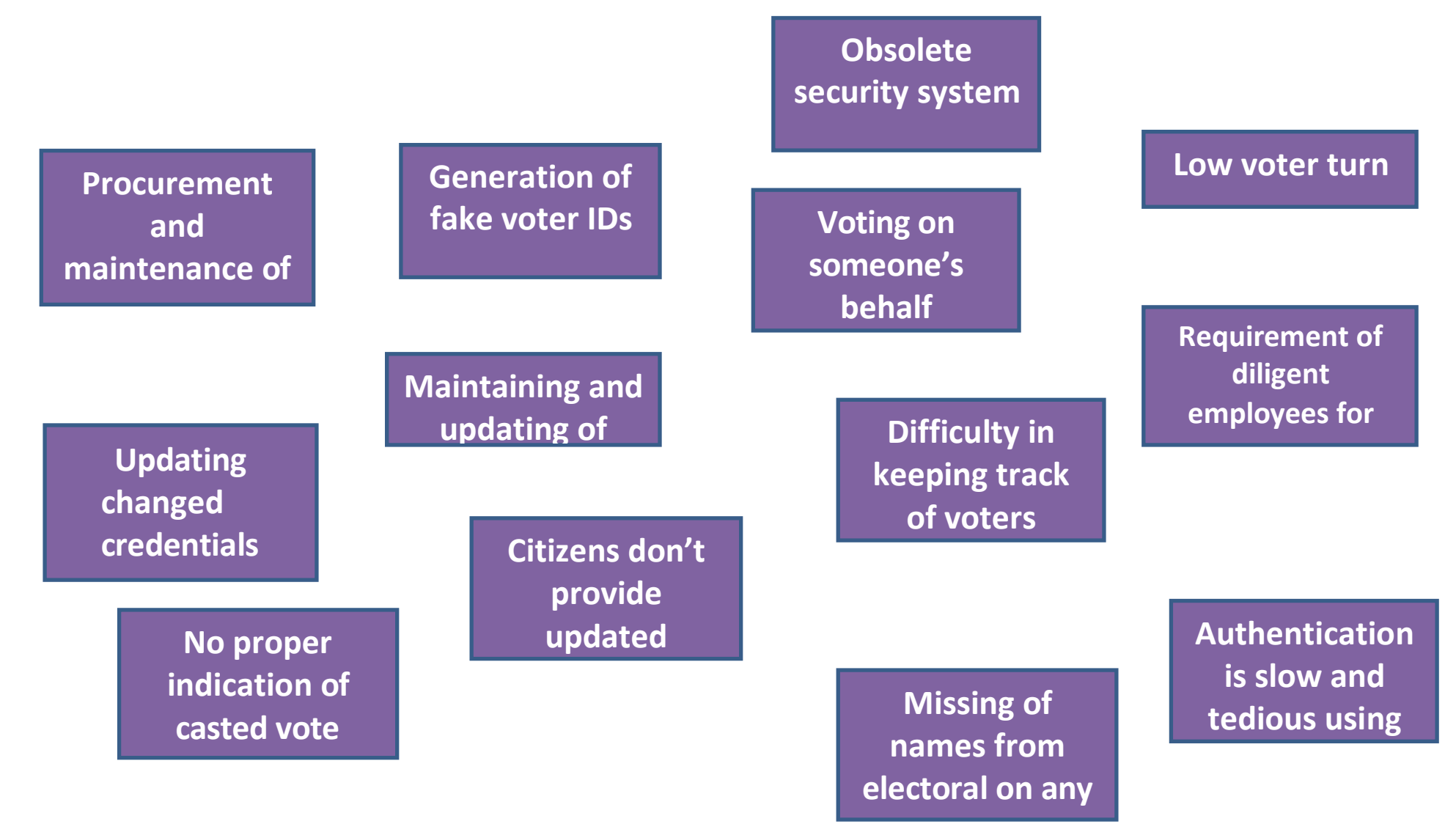
AFFINITY DIAGRAM

A tool that gathers large amounts of language data (ideas, opinions, issues) and organizes them into groupings based on their natural relationships.

Step 1: Transfer Ideas onto Sticky Notes

Write down every piece of information that you need to organize onto a separate sticky note. When you are sure that you have written everything down, stick your notes onto a wall or table. Don't worry about organizing information at this stage – you'll do this next.

Why we are having a COMPLEX PROCESSES in Election Commission of India (ECI) w.r.to identifying **the electoral malpractice, difficulty in monitoring voters and etc.?**

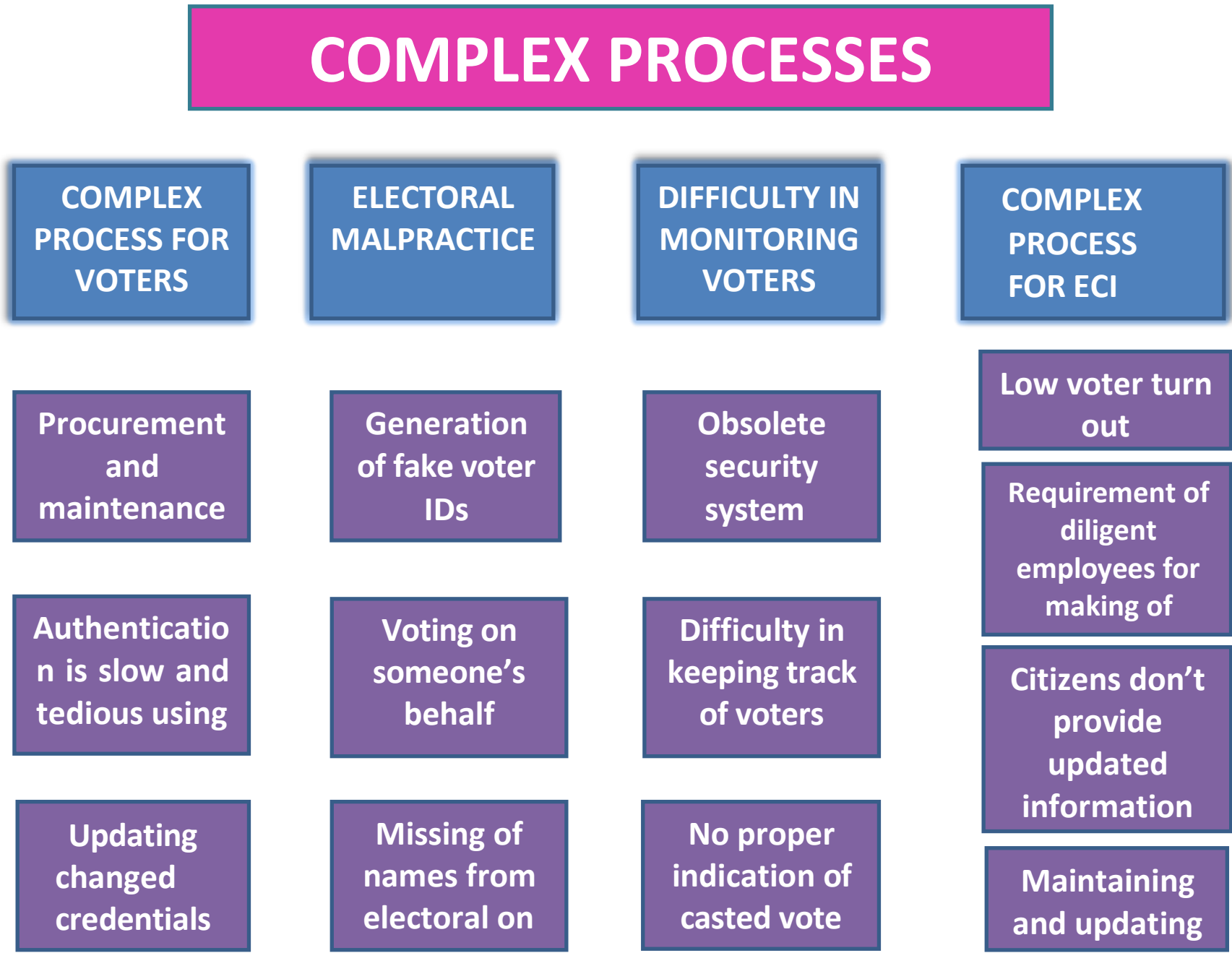


Step 2: Sort Ideas into Themes

Your next step is to sort all the ideas into groups. Start small – look for just two ideas that are similar in some way, and group them together on the table or wall. Then, look for another two ideas that relate to one other, and so on.

For our case, we have identified the four themes and they are given below.

- a) **COMPLEX PROCESS FOR VOTERS**
- b) **ELECTORAL MALPRACTICE**
- c) **DIFFICULTY IN MONITORING VOTERS**
- d) **COMPLEX PROCESS FOR ECI**



BIOAOV WORKSHOP

ATTENDEES:

Karthik is the facilitator for this workshop and he is also a **Project Head** for the system being generated and
The team also decided to have **three development team members** participate in the workshop: **Arpan, the product manager**, and **Laasya and Sabrina, the development managers**.
Other team members would not participate but would simply attend the workshop in order to observe the process, listen to the customers, and see the results immediately.

The team also decided to include representation from:

- 1. An ECI Employee:
Anuj, Head of Election Duties.
- 2. UIDIA Employee:
Sunaina, Head of Database Management
- 3. Biometric Distributor.
- 4. Dheeraj, Supplier.
- 5. Mahi, A first time voter
- 6. Anveshikha, Voter for over 10 years

NAME	ROLE	TITLE	COMMENTS
Karthik	Facilitator	BIOAOV Project Head	
Arpan	Product Manager	BIOAOV Product manager	Project champion
Laasya	Development manager	Software Development Manager	Development responsibility of BIOAOV
Sabrina	Development manager	Software Development Manager	Development responsibility of BIOAOV
Anuj	Participant	ECI Employee	Head of Election Duties
Sunaina	Participant	UIDAI Employee	Head of Database management
Dheeraj	Participant	Biometric Supplier	
Mahi	Participant	Voter	Going to vote for the first time
Anveshika	Participant	Voter	Is familiar with the present voting system
Various members	Observers	Development team	Everyone who was available

WARM-UP MATERIALS

Prior to the workshop, the team put together a warm-up package consisting of

- A few recent magazines articles highlighting **the problems faced in current voting process**
- Copies of selective interviews that had been conducted by journalists during elections.
- A summarized list of the needs that had been identified to date Karthik brushed up on his facilitation skills, and Arpan handled the logistics for the workshop.

THE SESSION

The session was held at a hotel and began promptly at 8 A.M. Karthik, introduced the agenda for the day and the rules for the workshop.



Overall, the workshop was very productive and well conducted. Everyone spoke their minds clearly and everyone was heard patiently.

ANALYSIS OF RESULT:

- **Maintenance and integrity of voter database** was unanimously decided as the most important feature. This was agreed as one of the defining features of BIOAOV.
- It was decided that the supplier of **BIOMETRIC MACHINES** should be authenticated and checked by the ECI at every centre.

ID	FEATURE	VOTES
3	Directly access data from AADHAR database	45
2	Simple and easy biometric scanning	43
4	Automatic updation of information	49
1	Complexity of election reduced	19
8	Old voting system remains same (EVM used)	47
5	Only one time voting is allowed by machine for each person	36
9	Automatic age and constituency verification	25
10	After successful voting message will be sent to every voter to avoid malpractices	14
7	Easy login and logout feature for admin	40
6	All voter ID names present	47

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VISION DOCUMENT FOR BIOMETRIC AUTHENTICATION OF VOTERS (BIOAOV) SYSTEM

1. Introduction

1.1 Purpose

The purpose of this document is to collect, analyse, and define high-level needs and features of the **Biometric Authorization of Voters (BIOAOV) System**. It focuses on the capabilities needed by the stakeholders and the target users, and why these needs exist. The details of how the BIOAOV System fulfils these needs are detailed in the use-case and supplementary specifications.

1.2 Scope

This Vision Document applies to the Biometric Authorization of Voters (BIOAOV) system, which will be developed by the SAL’s Consulting. SAL’s Consulting will develop this system for the Election Commission of India, to improve the existing system of voting. The BIOAOV system will help elections in India to be facilitated in a better way.

1.3 Definitions, Acronyms and Abbreviations

ECI:	Election Commission of India
UIDAI:	Unique Identification Authority of India
SRS:	Software Requirements Specification
Admin:	Administrator at Voting Centre

1.4 References

Applicable references are:

1. Managing Software Requirements: A Use Case Approach, By Dean Leffingwell, Don Widrig
2. Vision Document Project Phase Team Obiwan.

2. Positioning

2.1 Business Opportunity

The current voting system has been in use since 1989 and lacks the capacity to ensure fair elections. There is a need of a simpler system of authentication of Voter for election which doesn't involve:

1. The process of voter ID generation and maintenance by citizen.
 2. Generation of electoral rolls by ECI.
 3. A system which can prevent electoral malpractices such as, Generation of fake voter IDs.
- Fake voter ID cards have occasionally been used fraudulently for other purposes by dubious parties and individuals to suit their personal needs.
 - Voter suppression in the form of excluding certain names from Electoral rolls based on some bias.

- Voting on other people’s behalf

4. A semi-automated system which can relieve The Election Commission of India of the following duties:

- Procurement and maintenance of voter database
- The need for technical sophistication, particularly with computing hardware and software, to maintain and continually update information.

Many software vendors are eager to offer such a system to the ECI. In particular, SAL’s consulting aims to pioneer such an application in this highly burgeoning market by developing the BIOAOV. BIOAOV, with its features aims at creating a trustworthy outlook towards Elections in India.

2.2 Problem Statement

<i>The problem of</i>	The lack of effective and efficient system to conduct elections seamlessly.
<i>Affects</i>	Voters, ECI employees and integrity of Indian elections.
<i>The impact of which is</i>	Laborious and demanding handling of elections and electoral malpractices.
<i>A successful solution would</i>	A new biometric based authentication system will provide: <ul style="list-style-type: none">• Removal of existing voter ID card system and elimination of complex associated processes• Easy authentication of voters• Reduction in electoral malpractices• ECI will not have to maintain a separate database of voter’s information. Can use AADHAR database.

2.3 Product Position Statement

<i>For</i>	Indian Citizens
<i>Who</i>	Participate in elections (state or centre)
<i>The BIOAOV System</i>	Is a software application
<i>That</i>	Enables reduction in electoral malpractices and complex electoral processes
<i>Unlike</i>	The existing Voting system
<i>Our product</i>	Authenticates users by biometric scanning of fingerprint and iris. The system then matches the biometric information of user with biometric information stored in the AADHAR database.

3. Stakeholder and User Descriptions

3.1 Market Demographics

The system is aimed at every Citizen of India who is eligible to vote. This community demands a tool that can overcome the constraints involved in the election processes.

The users are from various social, cultural and educational backgrounds. The registration of users is done by the ECI using the UIDIA AADHAR Database. The ability to get authentication using biometric information stored in AADHAR Database will help citizens to cast their vote in an easier and efficient way.

The BIOAOV works out of the ECI Headquarters building and is distributed to polling booths at the time of elections.

3.2 Stakeholder Summary

Name	Description	Responsibilities
Requirements Engineers	This stakeholder works with customers and stakeholders to translate needs into requirements.	Specifies domain, non-functional, and functional requirements. Refines requirements as needed.
Software Architect	This stakeholder is a primary lead in the development of the BIOAOV	Responsible for overall architecture of the system, and guides overall design and implementation of system.
Project Manager	This stakeholder leads development of the BIOAOV	Plans, manages and allocates resources, decides priorities, coordinates interactions with customers and users, and keeps the project team focused.

3.3 User Summary

Name	Description	Responsibilities	Stakeholder
Voter	Primary End user of the system	Uses application to cast vote	Self-represented
ECI employee	End user of the system	Configure application for the Primary End users. Communicate with the Primary End users with the application	Self-represented

3.4 User Environment

The BIOAOV system will be used by all **Voters** who participate in Indian elections.

3.5 Stakeholder Profiles

3.5.1 VOTER

Description	Voters who uses BIOAOV
Type	Person eligible to vote
Responsibilities	Uses BIOAOV to cast vote in elections
Success Criteria	The success is defined as the ECI continuing to use our system to conduct fair elections.
Involvement	We will have sample customers to evaluate our system which will guide our vision.
Deliverables	None.
Comments / Issues	None.

3.5.2 ECI EMPLOYEE

Description	ECI employee who uses BIOAOV
Type	Stationed at polling booth for inspecting procedures
Responsibilities	The ECI employee is responsible for the authentication voters at voting booths.
Success Criteria	The success is defined as the ECI continuing to use our system to conduct fair elections.
Involvement	We will have sample customers to evaluate our system which will guide our vision.
Deliverables	None
Comments / Issues	None.

3.6 User Profiles

Covered under the previous section.

3.7 Key Stakeholder / User Needs

Need	Priority	Concerns	Current Solution	Proposed Solutions
Data Security	High	Electoral malpractices	Current elections are rigged in the following ways: 1) Fake voter Id 2) Names not included in electoral roles on basis on biases 3) Voting on someone's behalf.	The BIOAOV System will provide the following solutions: 1) Voter ID will be linked to AADHAR database. 2) No need to generate electoral rolls. 3) Only authenticated personnel allowed to enter voting area once.
Low clerical costs	Medium	Clerical effort is time intensive and costly.	Preparation and maintenance of Voter ID database, electoral rolls in done which requires tedious paperwork.	Use of pre-existing AADAHR database.

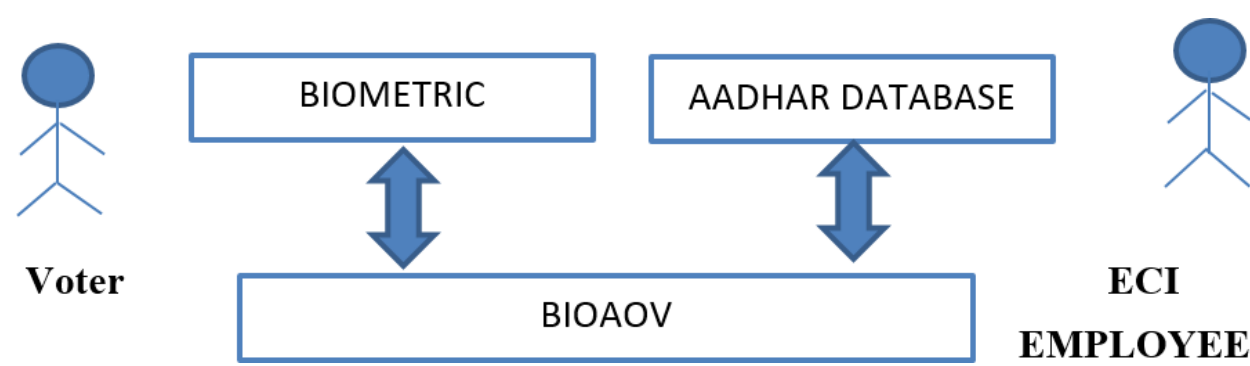
3.8 Alternatives and Competition

None

4. Product Overview

This section provides a high level view of the BIOAOV System capabilities.

4.1 Product Perspective



4.2 Summary of Capabilities

The table in this section identifies the main capabilities of the BIOAOV System in terms of benefits and features. The features are further described in section 7 of this document.

Customer Benefit	Supporting Features
Enhanced ease of election processes	Use of existing database
Up-to-date voter information	Use of existing database
Maintaining integrity of democratic elections	Biometric authorization of voters

4.3 Assumptions and Dependencies

Voters are registered under UIDIA’s AADHAR card and have provided their correct address.

Voters are able to provide either fingerprint or iris scan as biometric input.

5. Product Features

This section defines and describes the features of the BIOAOV System. Features are the high-level capabilities of the system that are necessary to deliver benefits to the users.

5.1System Features

- 1.Start system
- 2.Employee Login
- 3.Employee logout
- 4.Accept Biometric data (fingerprint or iris scan)
- 5.Display authentication result

5.2 Functional Requirements:

1. The BIOAOV system maintains information of voter database.
2. The system should generate its database using the UIDIA database.
3. The system should update its information whenever UIDIA database is updated.
4. The system should be able to get biometric information from a biometric scanner.
5. It should be able to check the entered information from the database and relay the result back to the admin.
6. The system should be able to correctly identify the age and the constituency to which the voter belongs.
7. It should display the authorised voter’s information to the voter and the polling booth admin.
8. The system should also be able to confirm and record the casted vote at the time of voter’s exit from the polling area.
9. The system should be able to send a message to the voters on their registered phone number.
10. The system should detect multiple trials of authentication by a voter and should not permit re-authorization i.e the system should allow a person to vote only once.

5.3 Non-Functional Requirements:

1. Performance: It should be able to authenticate a user within 2 seconds.
2. Usability: It should have a simple and straight-forward user interface that can be used widely.
3. Reliability/Availability: It should be available for the whole duration of elections.
4. Scalability: Should be able to handle growth of voter database.
5. Security: Only authorised personnel should be able to access it.
6. Integrity: It should keep information intact and not let it get hampered by anyone.
7. Reusability: It should apt to changes in election specifications over time.

6. Constraints

- In addition to the assumptions and dependencies listed in Section 6, the following constraints apply to the BIOAOV System:
- The system shall require any Biometric Scanning Devices.
 - The voter information available is limited to the type of data supported by the existing AADHAR Database.

7. Precedence and Priority

Priority	Feature (By Number Above)
High	1,2,3,4,5
Medium	-
Low	-

8. Other Product Requirement

8.1 Applicable Standards

The BIOAOV must comply with existing standards in the Indian Elections.

8.2 System Requirements

The system must run on a Windows 7 OS and higher versions.

8.3 Performance Requirements

None specified.

8.4 Environmental Requirements

None specified.

9. Documentation Requirements

9.1 User Manual

The User Manual shall describe use of the System from the voters and ECI Employees. The User Manual shall include:

- Minimum System Requirements
- Installation of the PC client
- Logging On
- Logging Off
- All System Features
- Customer Support Information

The User Manual shall follow the format as defined in the SAL’s Consulting User Manual template.

The User Manual should range from 50 – 100 pages. The User Manual page dimensions shall be 7 by 9 inches. The User Manual shall be available as hardcopy and through the online help.