

Nur An Nisa Milyana (4998421)

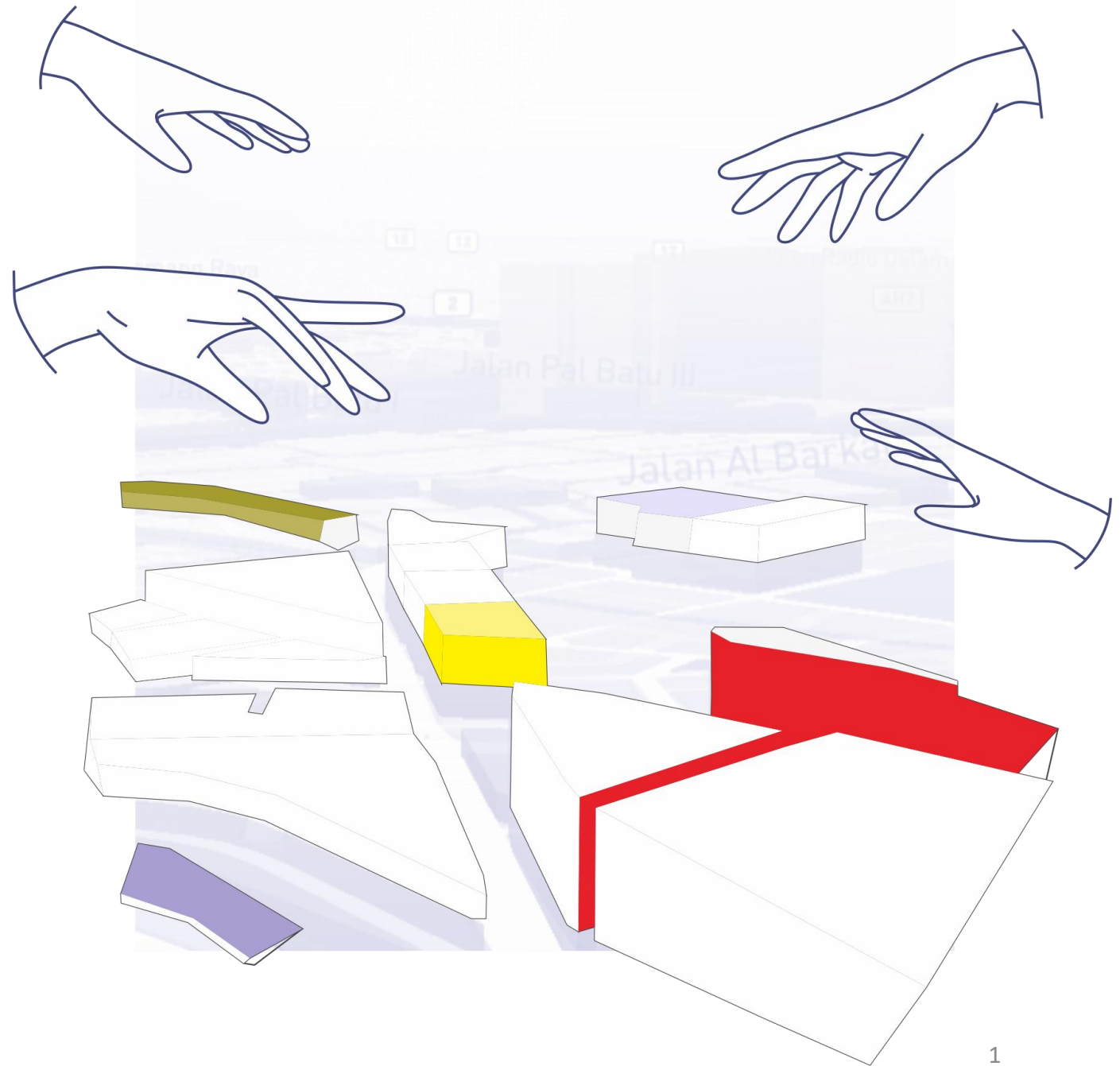
Designing user experience (UX) to support public participation in spatial planning

Case Study: Indonesia

Supervisor 1: Mr. dr. Hendrik Ploeger

Supervisor 2: Dr. ir. Bastiaan van Loenen

Co-reader : Prof. dr. Willem Korthals Altes





modern public participation

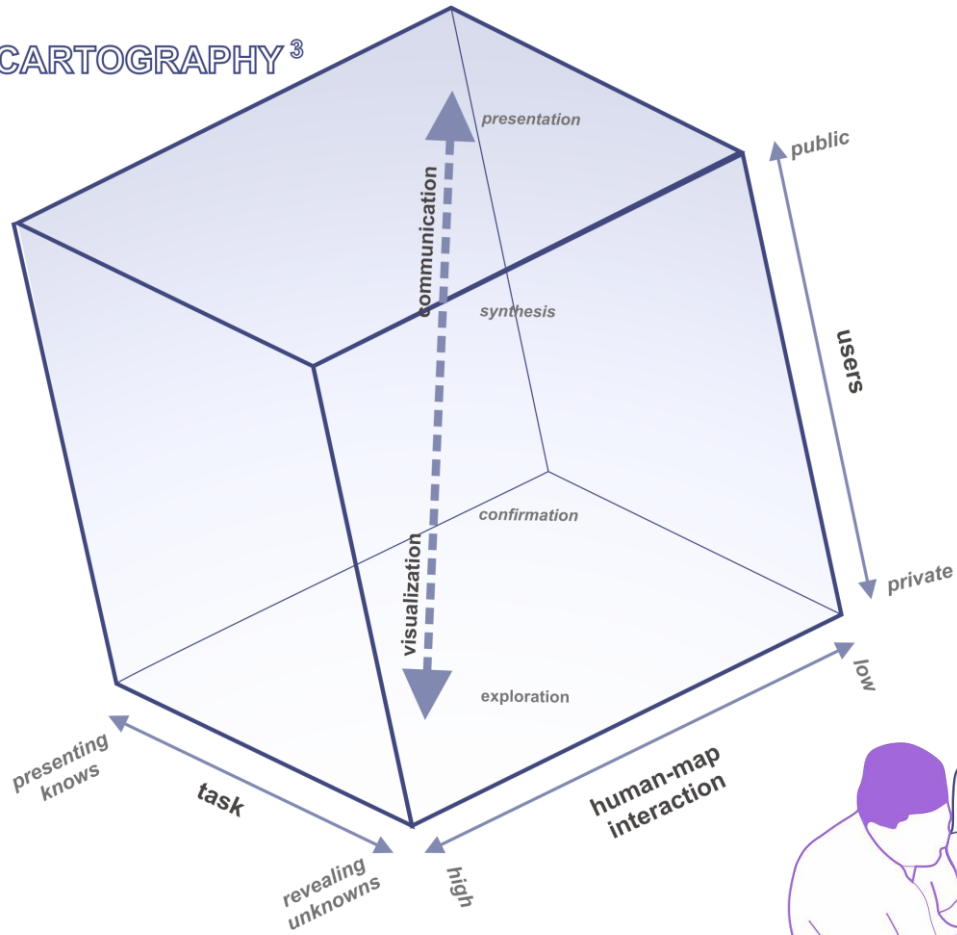


geo-participation
(GIS technologies)



1. Introduction

CARTOGRAPHY³



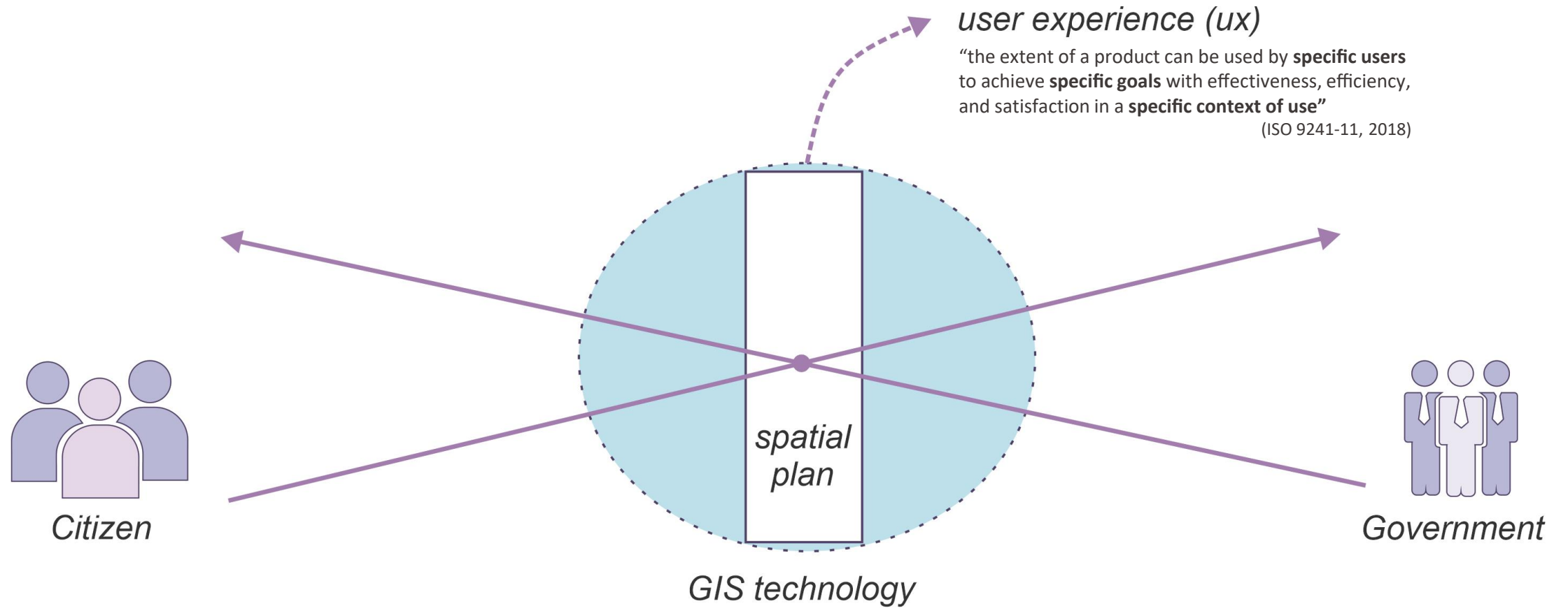
geo-web



Figure 1: Cartographic cube - adapted from (MacEachren and Taylor,1994)

“If the user aspect is left unchecked, GIS could run into an unnavigable ocean of buttons and maps, resulting in **the user becoming frustrated.**”



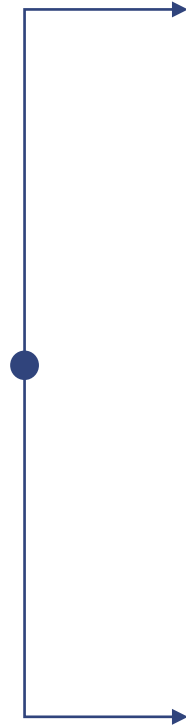


Research Question:

How to design a **User Experience (UX) for geo-web applications to support public participation in spatial planning process?**

Case Study:

Indonesia

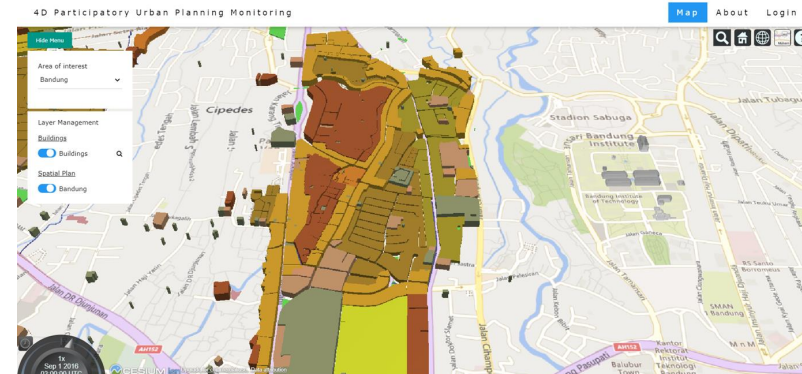


Musrenbang

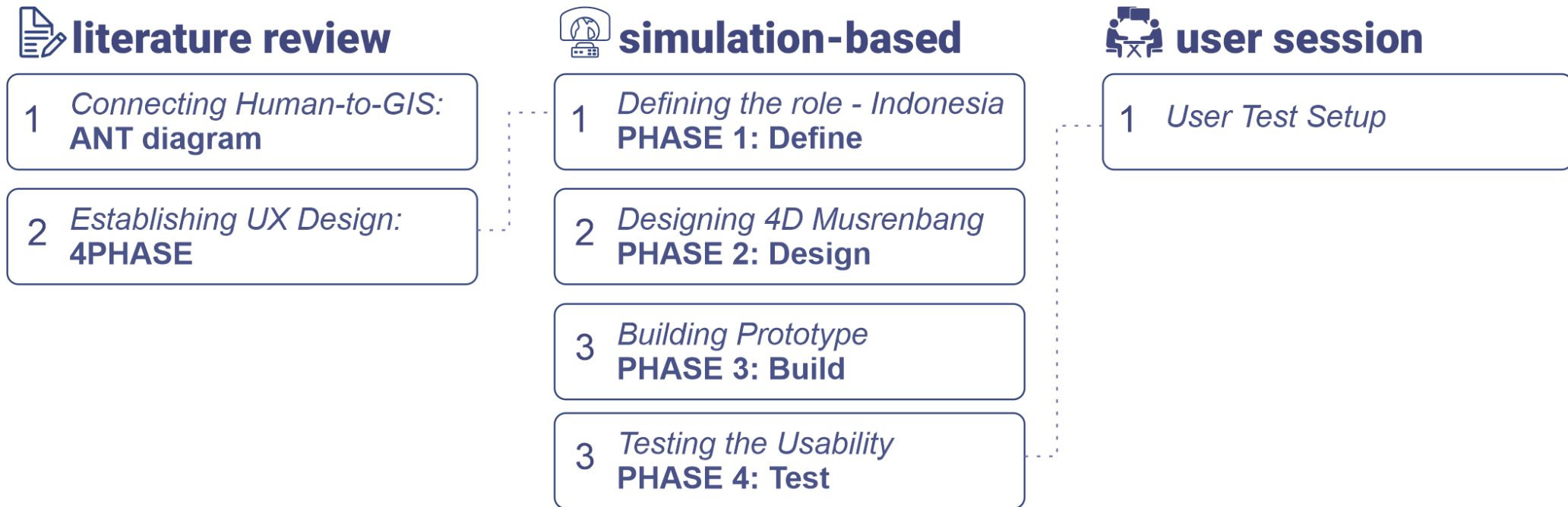


&

4D PUPM

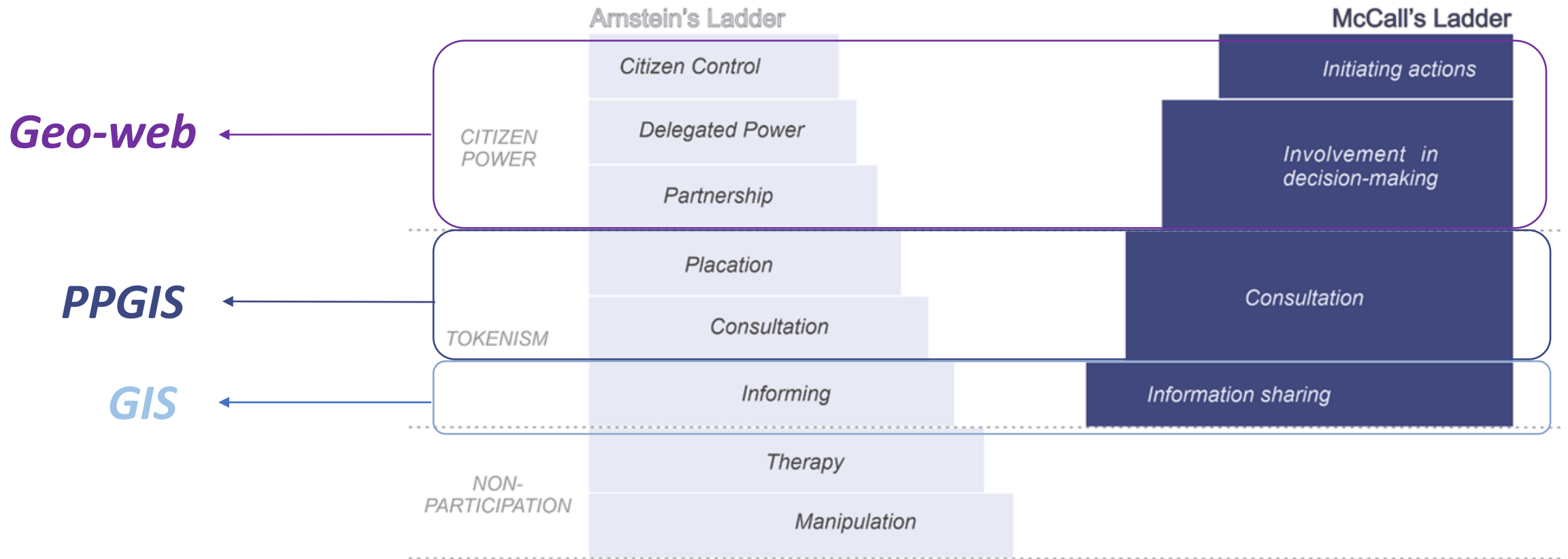


Methodology:



MAKING SENSE OF PARTICIPATION IN SPATIAL PLANNING PROCESS WITH THE HELP OF GIS

Measuring level of participation:



“By exploring the theory of GIS, the conceptualization of GIS as participation tools in the spatial planning process is created to build a conceptual network diagram.”



PARTICIPATION TASK CAPABILITIES

- Data Input
- Visualization and Consultation
- Spatial Analysis
- Database Management
- Validation



SPACE-TIME COLLABORATION SETTING

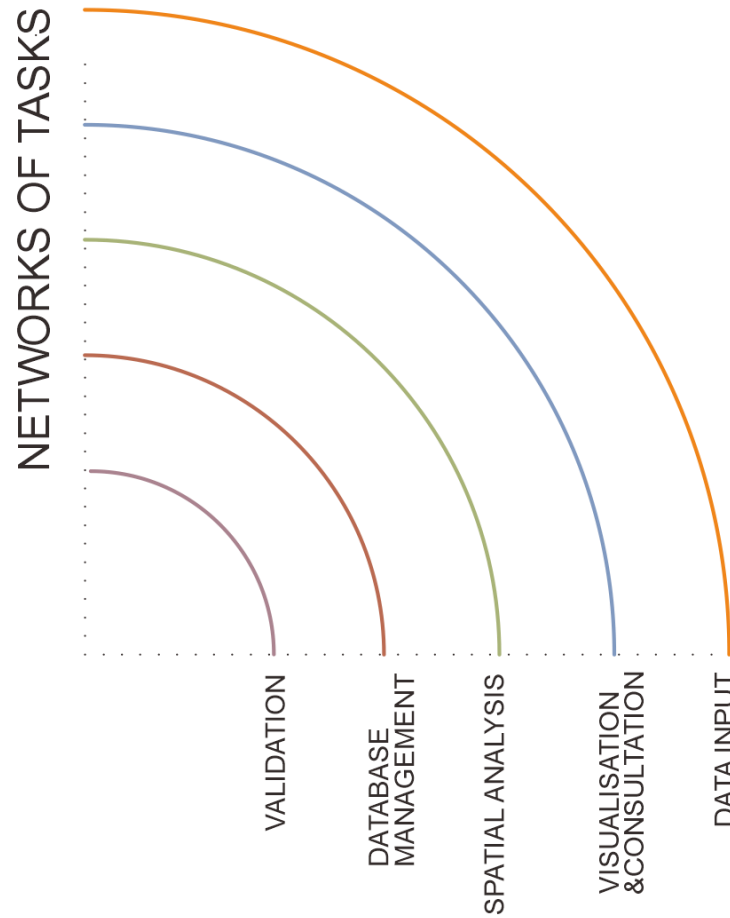
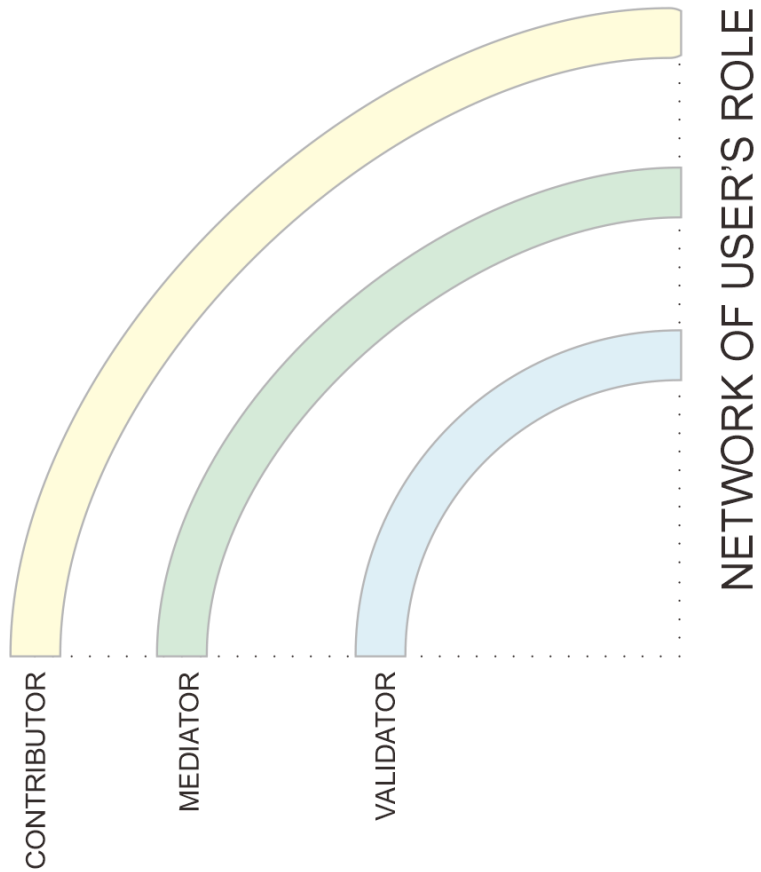
- Co-located synchronous
- Co-located asynchronous
- Distributed synchronous
- Distributed asynchronous



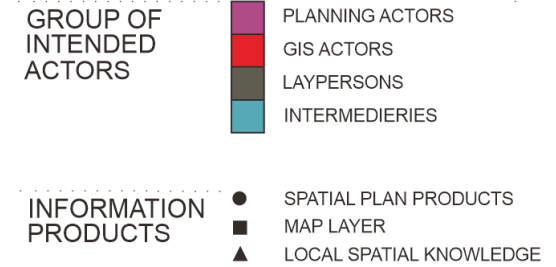
THE INTENDED ACTORS AND USER ROLES

- Planning actor
- GIS actor
- Layperson
- Intermediary

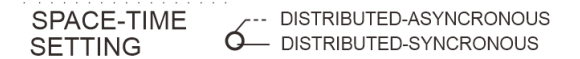
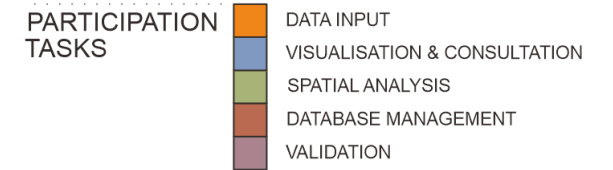
2. Making sense of participation in spatial planning process with the help of GIS



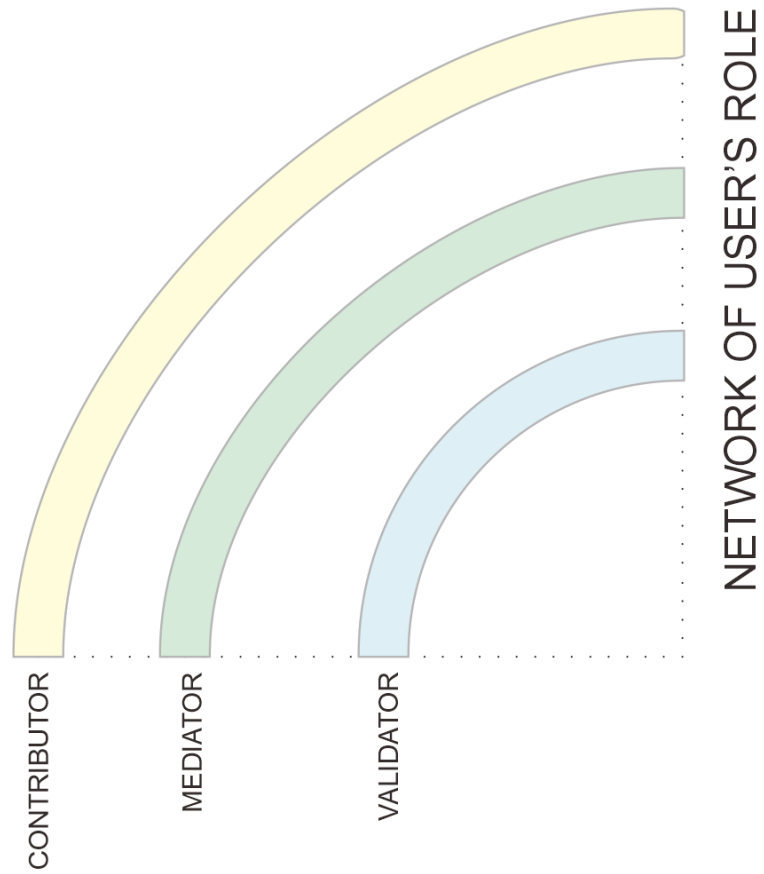
NATURE OF ROLES



NATURE OF TASKS

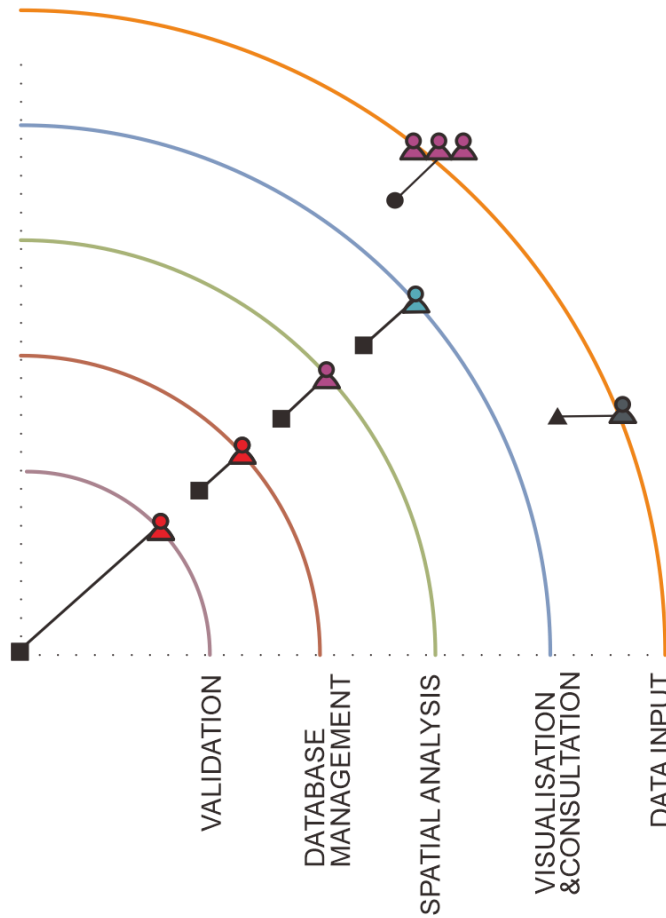


2. Making sense of participation in spatial planning process with the help of GIS



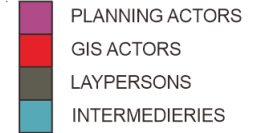
NETWORK OF USER'S ROLE

NETWORKS OF TASKS

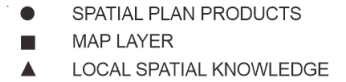


NATURE OF ROLES

GROUP OF INTENDED ACTORS



INFORMATION PRODUCTS



INITIAL MOTIVE



ACTOR'S INVOLVEMENT FLOW



NATURE OF TASKS

PARTICIPATION TASKS



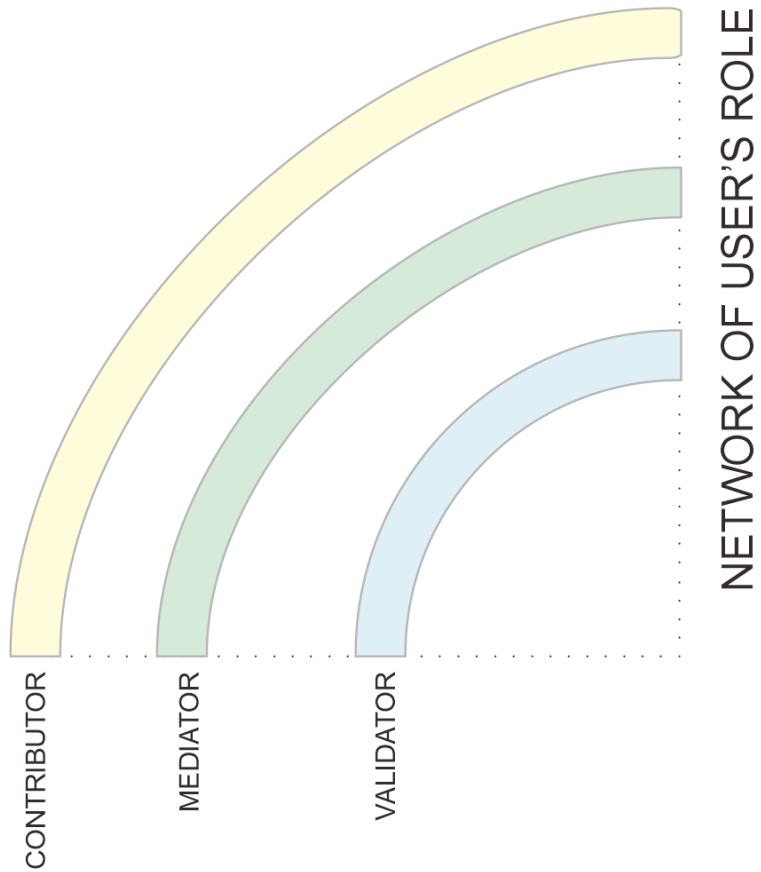
SPACE-TIME SETTING



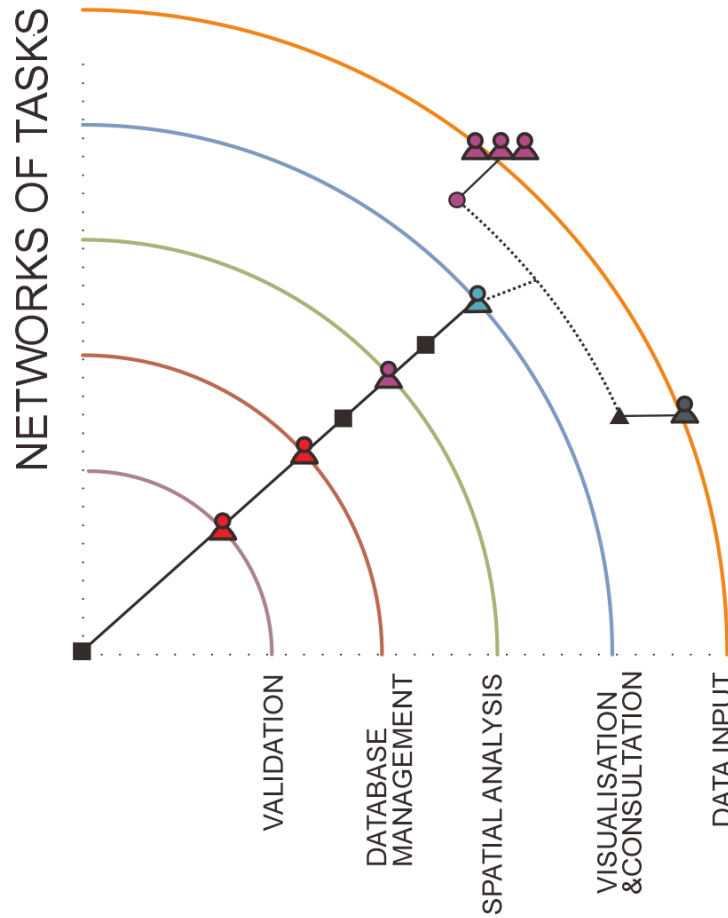
PARTICIPATION FLOW



2. Making sense of participation in spatial planning process with the help of GIS



NETWORK OF USER'S ROLE



NATURE OF ROLES

GROUP OF INTENDED ACTORS



INFORMATION PRODUCTS



INITIAL MOTIVE

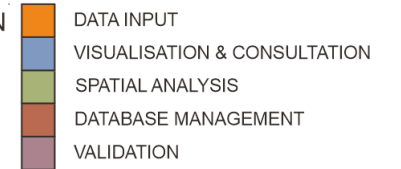


ACTOR'S INVOLVEMENT FLOW

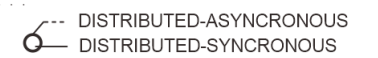


NATURE OF TASKS

PARTICIPATION TASKS



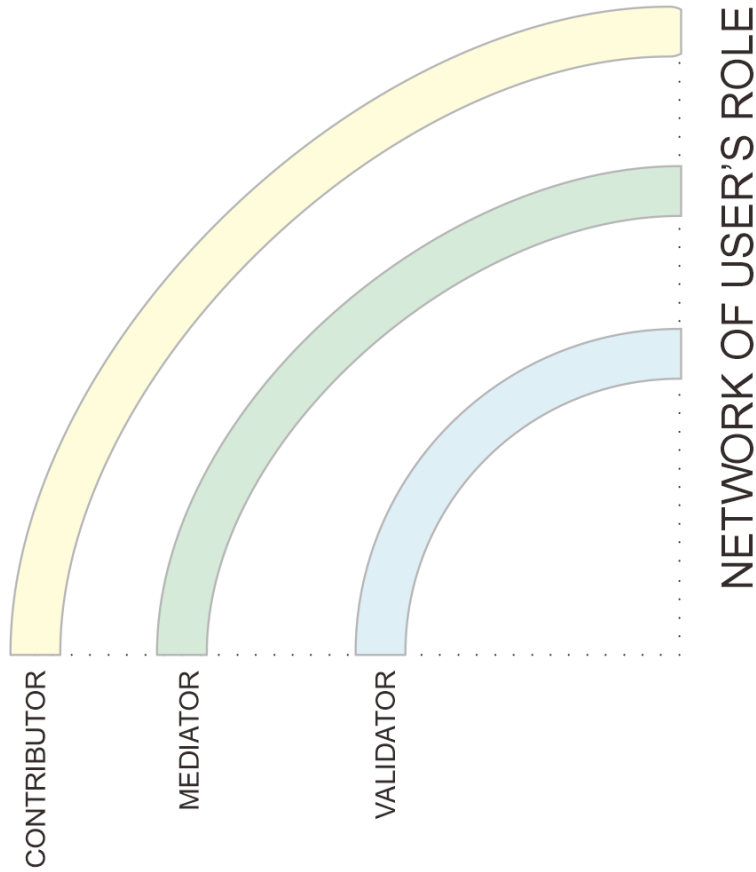
SPACE-TIME SETTING



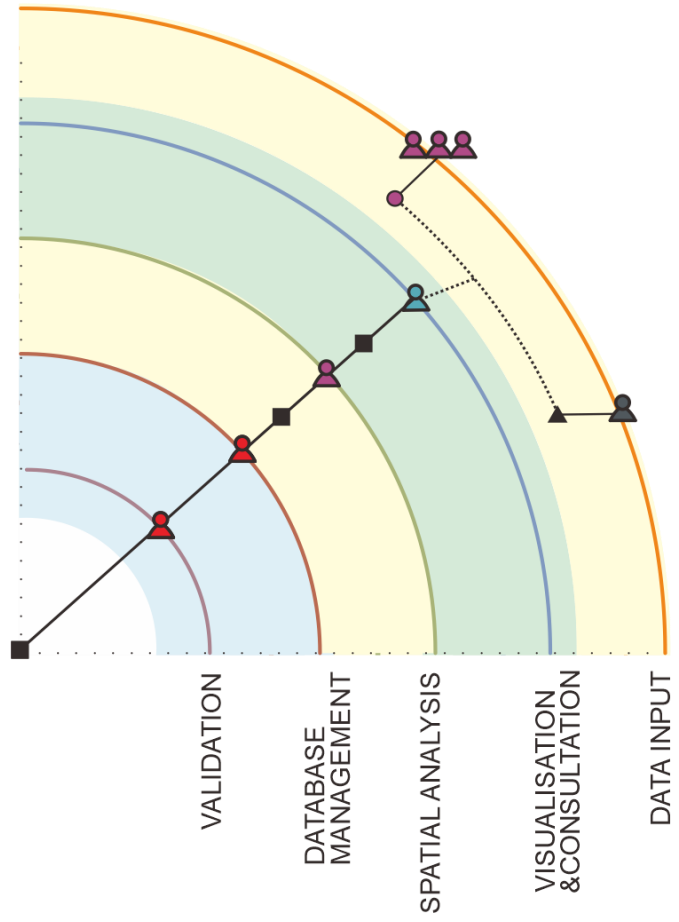
PARTICIPATION FLOW



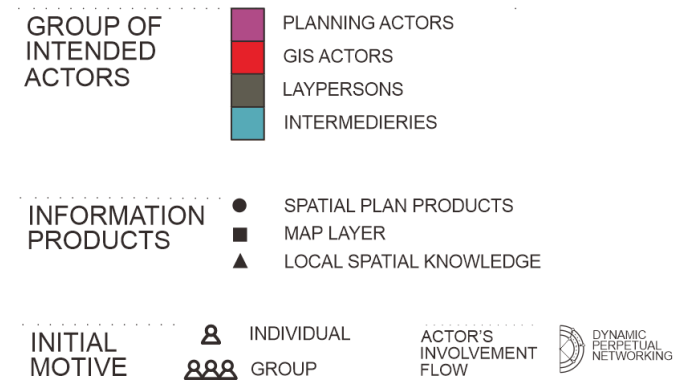
2. Making sense of participation in spatial planning process with the help of GIS



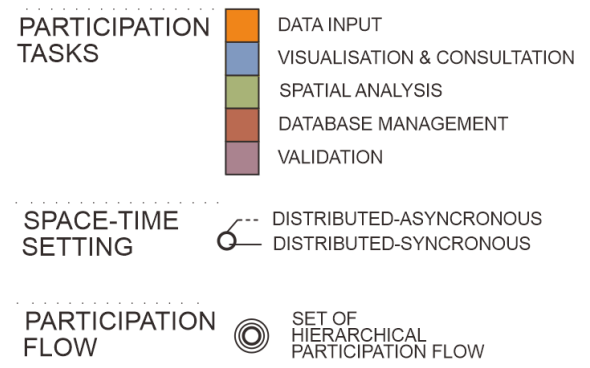
NETWORK OF USER'S ROLE



NATURE OF ROLES



NATURE OF TASKS

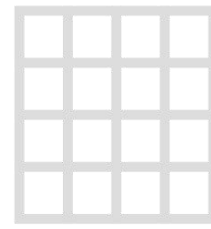


ESTABLISHING **UX DESIGN** FOR **GEO- WEB** APPLICATIONS

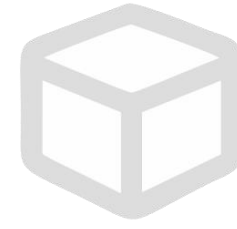
visualization:



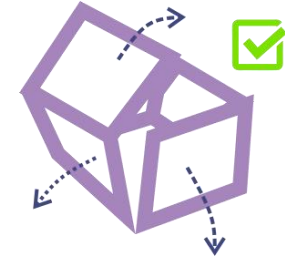
1D



2D



3D



4D

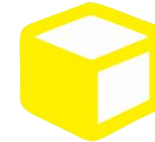


simplified 3D model:

commercial



residential



office

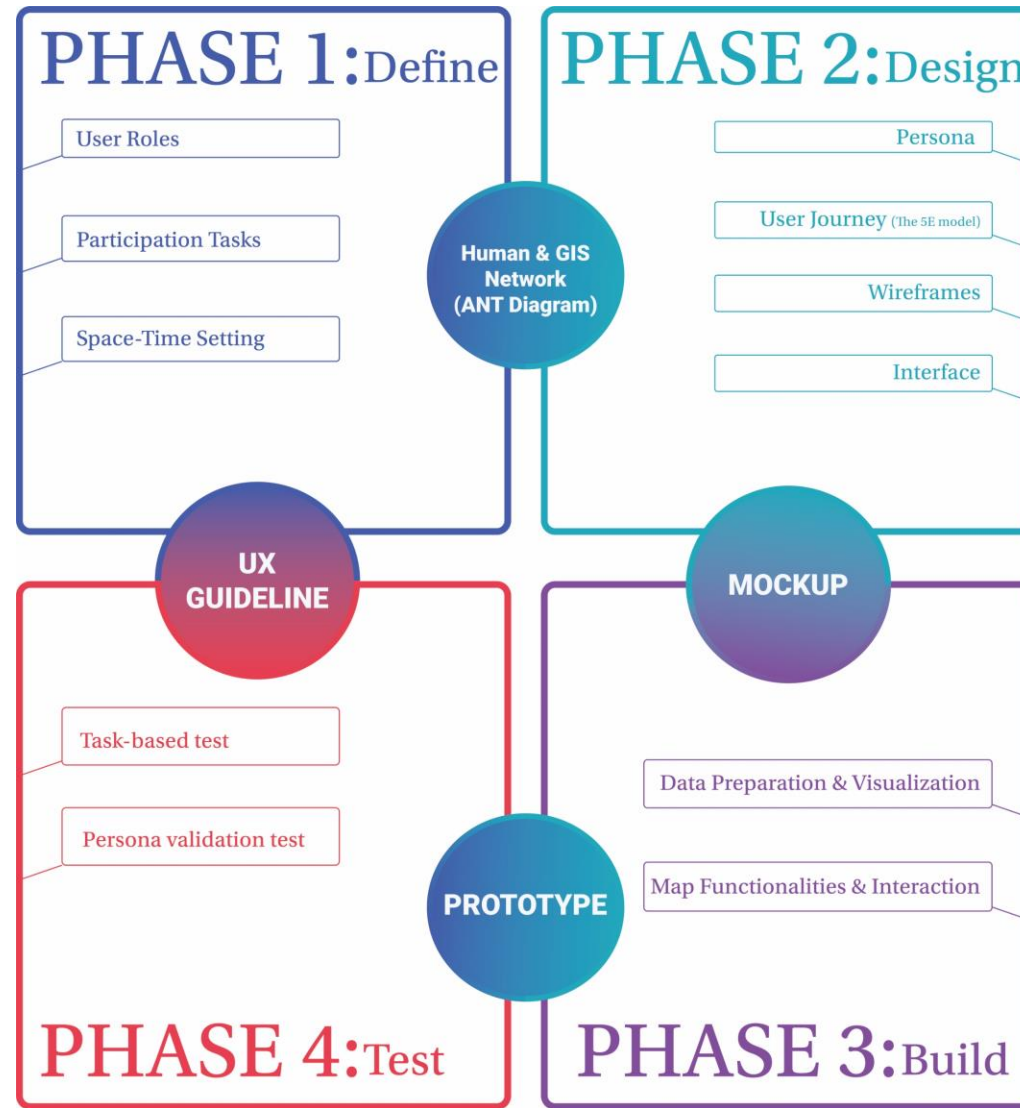


open space



mixed-use

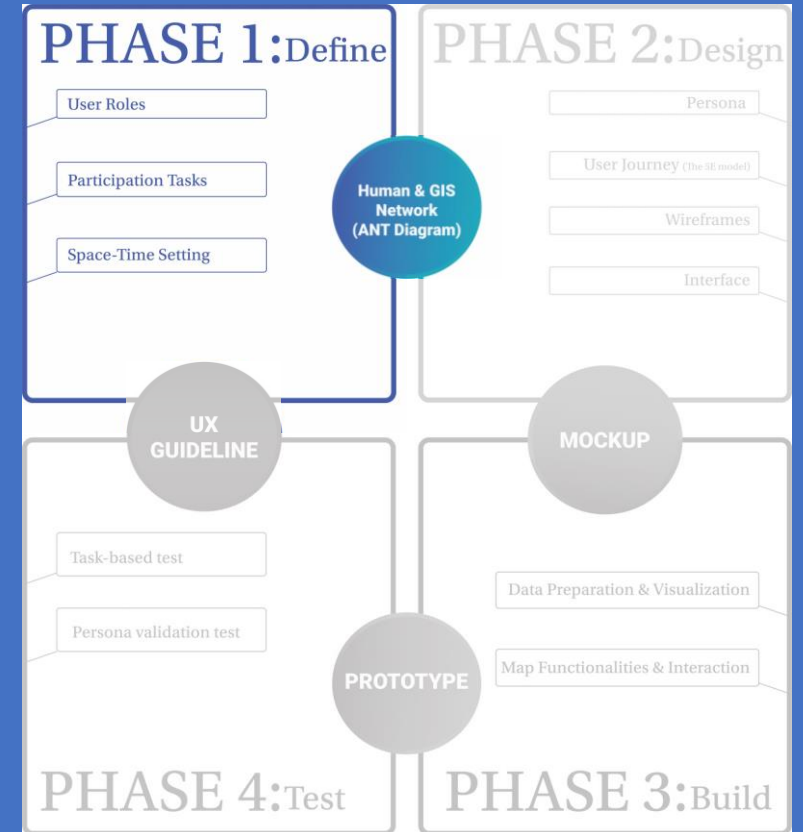




The 4PHASE toolkit

PHASE 1:

DEFINING THE ROLE OF PARTICIPATION TO INDONESIA'S SPATIAL PLANNING PROCESS



Participation Mechanism in Indonesia's Spatial Planning:

formal-institutional force



informal-cultural force

Government Regulation 68/2010:

'citizens contribute to the process of:

1. the plan-making process (*perencanaan tata ruang*),
2. the development promotion (*pemanfaatan ruang*),
3. the development control (*pengendalian pemanfaatan ruang*)

based on their legal rights and obligations'

'Musyawarah'

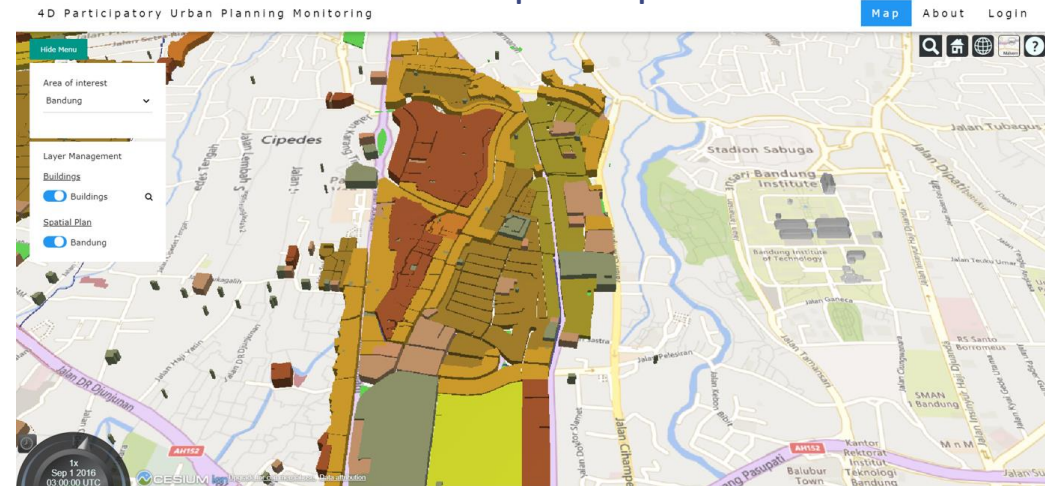
traditional participatory discussion mechanisms in customary practices of consensus decision-making

Musrenbang – traditional participation tool



+

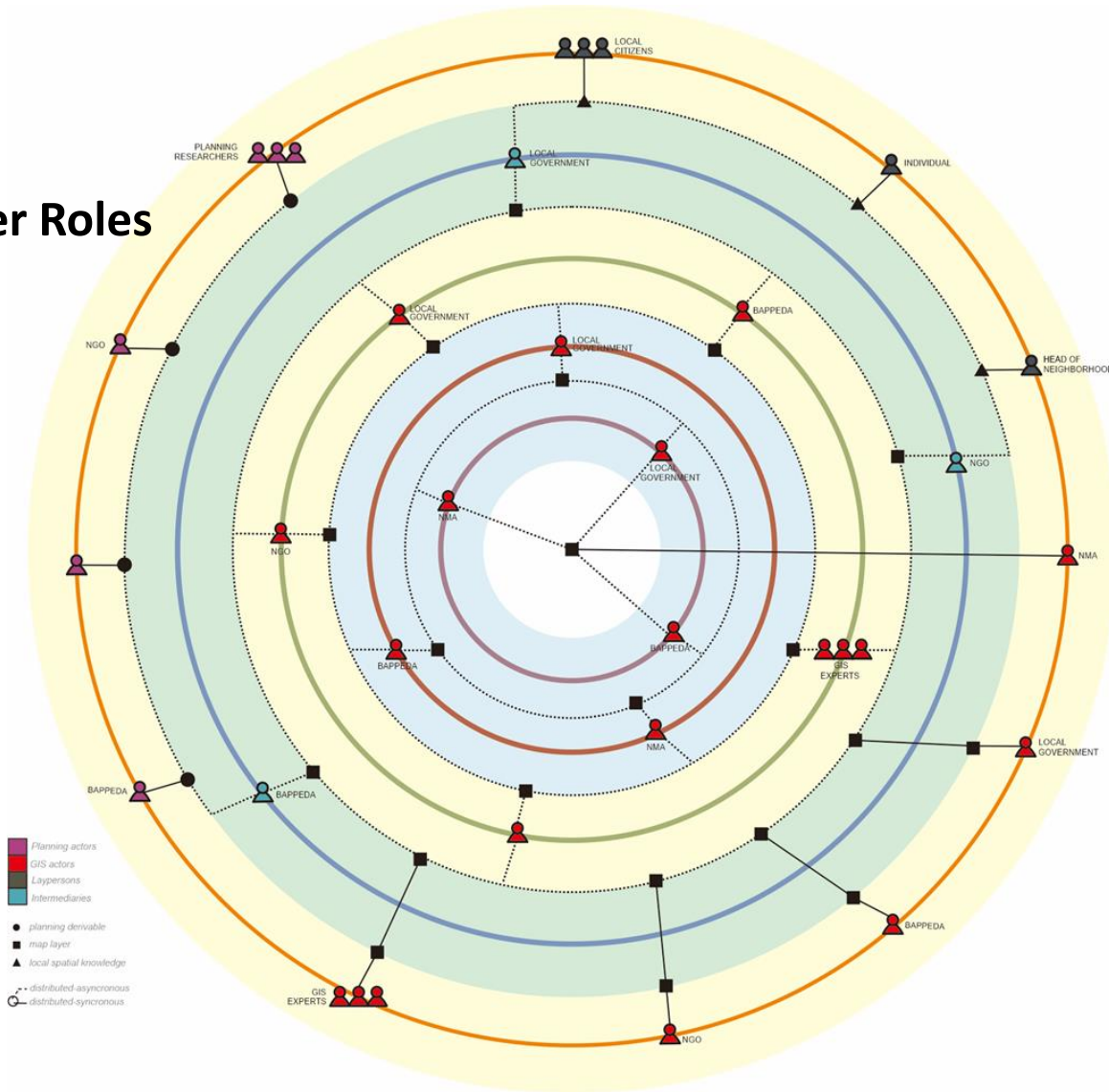
4D PUPM – modern participation tool



Adding traditional Musrenbang as the planning formulation to 4D PUPM platform

4. Defining the Role of Participation to Indonesia's Spatial Planning Process

User Roles



Contributor

	PLANNING ACTORS	BAPPEDA LOCAL GOVERNMENT NGO PLANNING RESEARCHERS
	LAYPERSONS	INDIVIDUAL HEAD OF NEIGHBORHOOD LOCAL CITIZEN
	GIS ACTORS	BAPPEDA LOCAL GOVERNMENT NMA NGO GIS EXPERTS

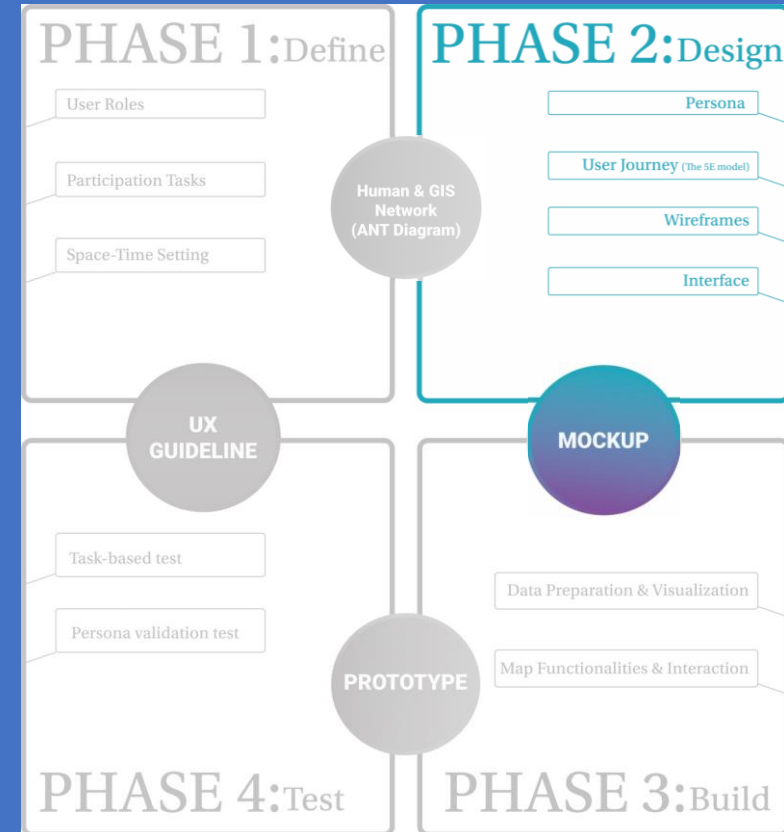
Mediator

	INTERMEDIARIES	LOCAL GOVERNMENT NMA NGO
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Validator

	GIS ACTORS	LOCAL GOVERNMENT BAPPEDA NMA
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PHASE 2: DESIGNING 4D MUSRENBANG



Persona



PLANNING ACTOR

Goals

- Having a platform to facilitate participation with other actors
- Making sure the planning practice is suitable with spatial plan

Frustrations

- Does not have enough background in both GIS technology and existing planning location
- Does not have enough expense to do face-to face participation

Skills

Spatial Planning

Internet

Public Participation

Geography Information System (GIS)

Local Spatial Knowledge



GIS ACTOR

Goals

- To be able to access data from spatial planning participation
- Making spatial analysis from the participation results

Frustrations

- Dataset from spatial planning process is not open
- Rarely to be involved in spatial planning participation

Skills


Spatial Planning

Internet

Public Participation

Geography Information System (GIS)

Local Spatial Knowledge



LAYPERSON

Goals

- To be involved in spatial planning process
- Gives opinion about the proposed spatial plan

Frustrations

- The spatial planning product (eg: zoning map) is not the same as what they encounter in real life
- Both GIS and spatial planning is too complicated to understand

Skills


Spatial Planning Theories

Internet

Public Participation

Geography Information System (GIS)

Local Spatial Knowledge



INTERMEDIARY

Goals

- Translating non-spatial data into spatial data
- Mediating the discussion so every actor can participate fairly

Frustrations

- Participation in spatial planning process is still limited
- The end-product of the discussion is rarely displayed to the public

Skills

Spatial Planning Theories

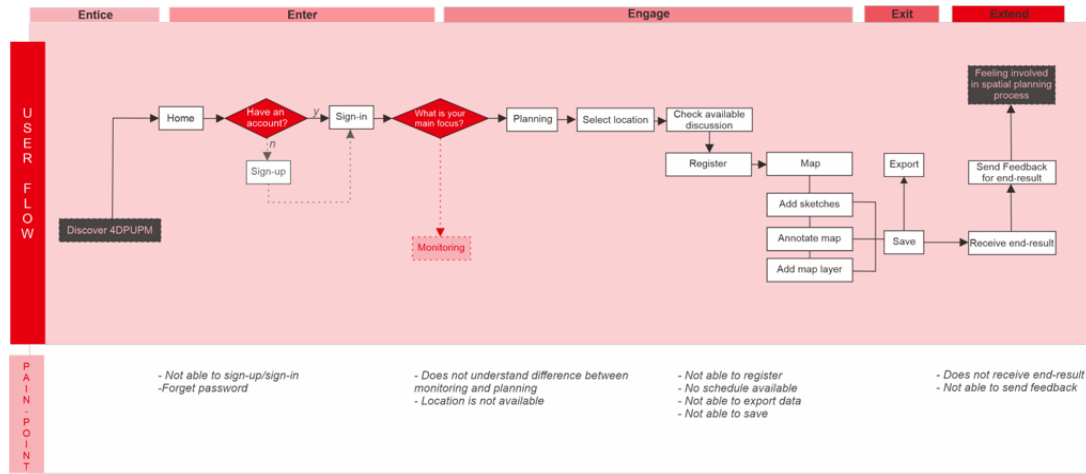
Internet

Public Participation

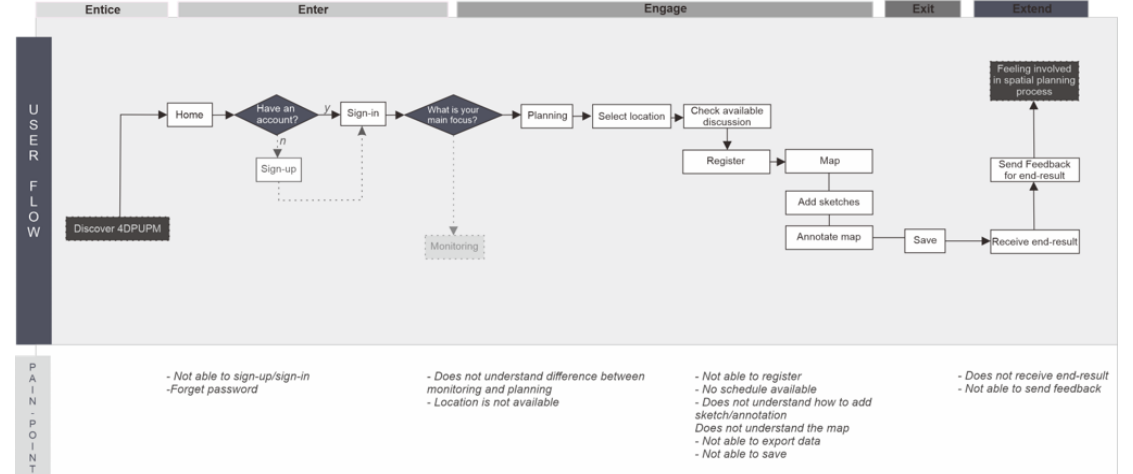
Geography Information System (GIS)

Local Spatial Knowledge

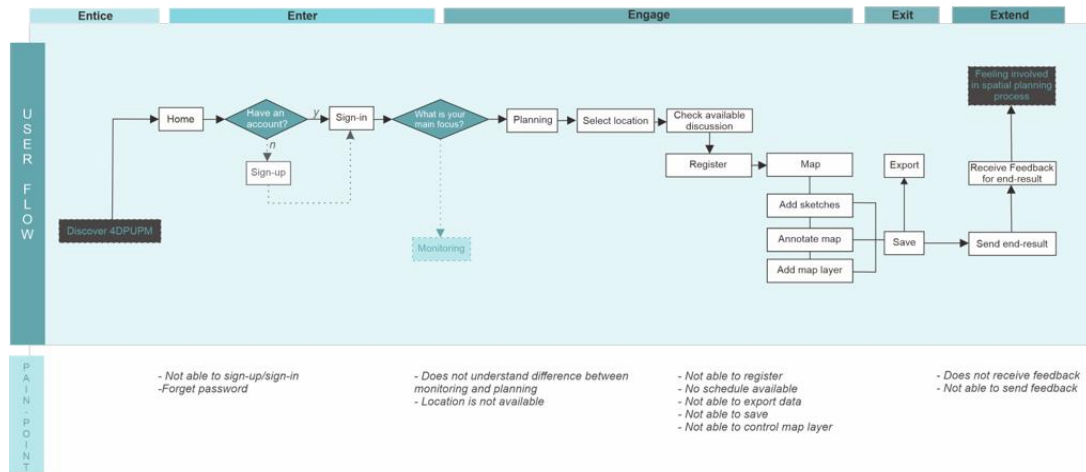
The 5E Model



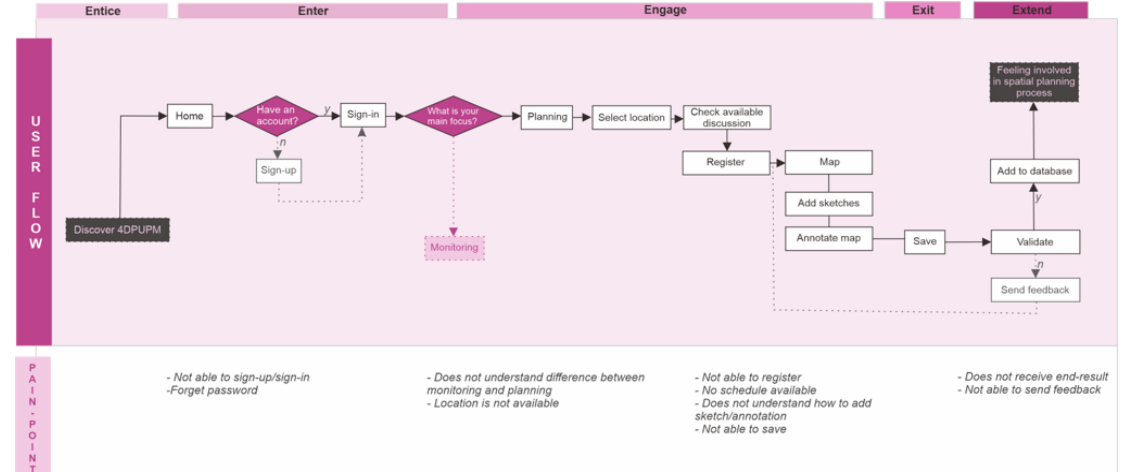
GIS ACTOR



LAYPERSON

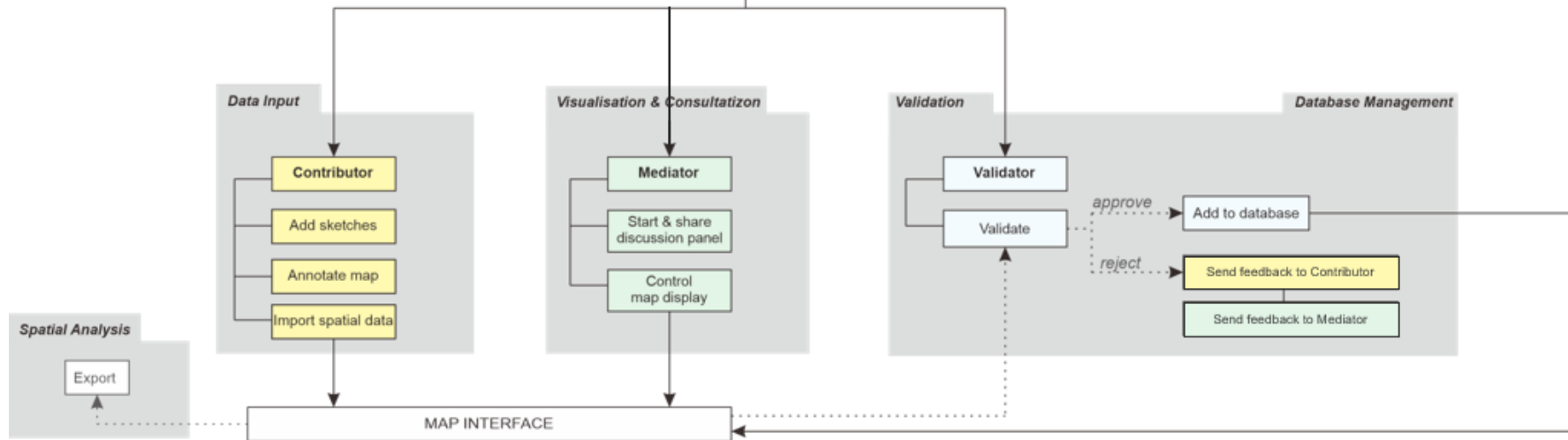
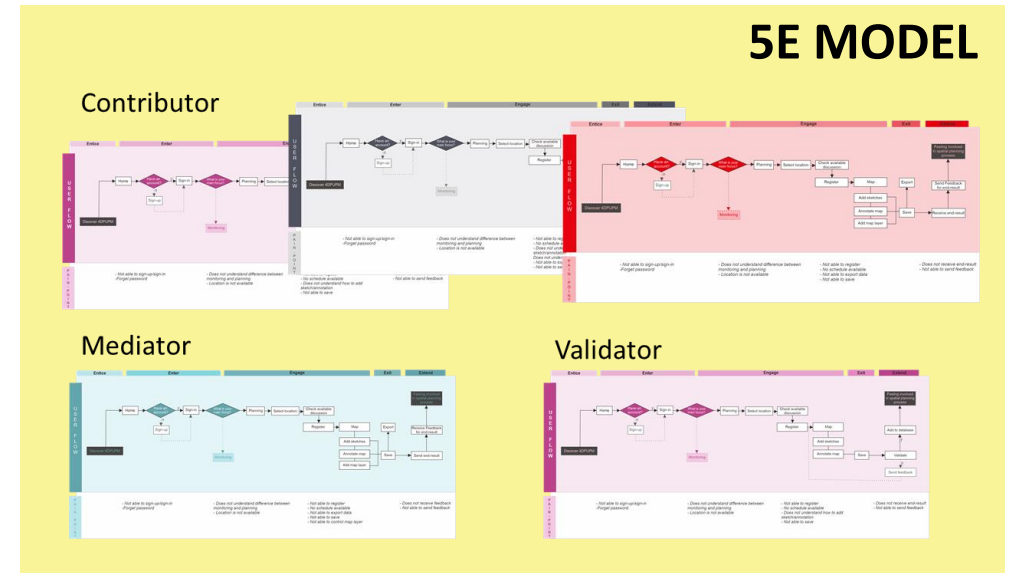
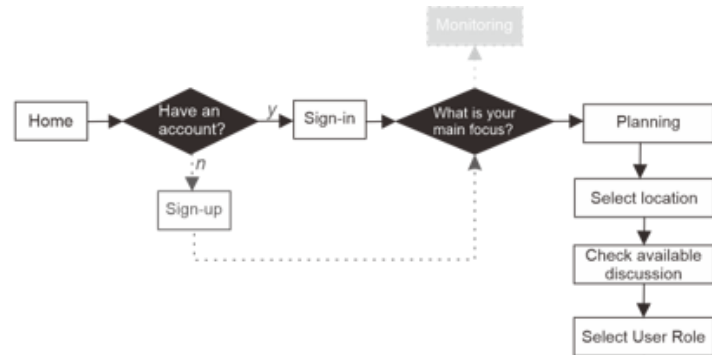


INTERMEDIARY

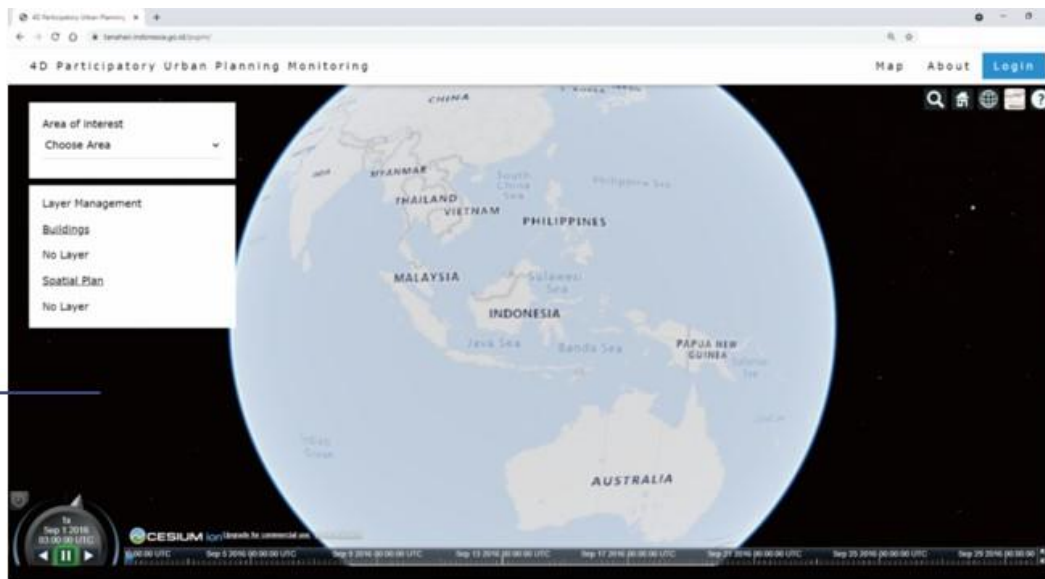


PLANNING ACTOR

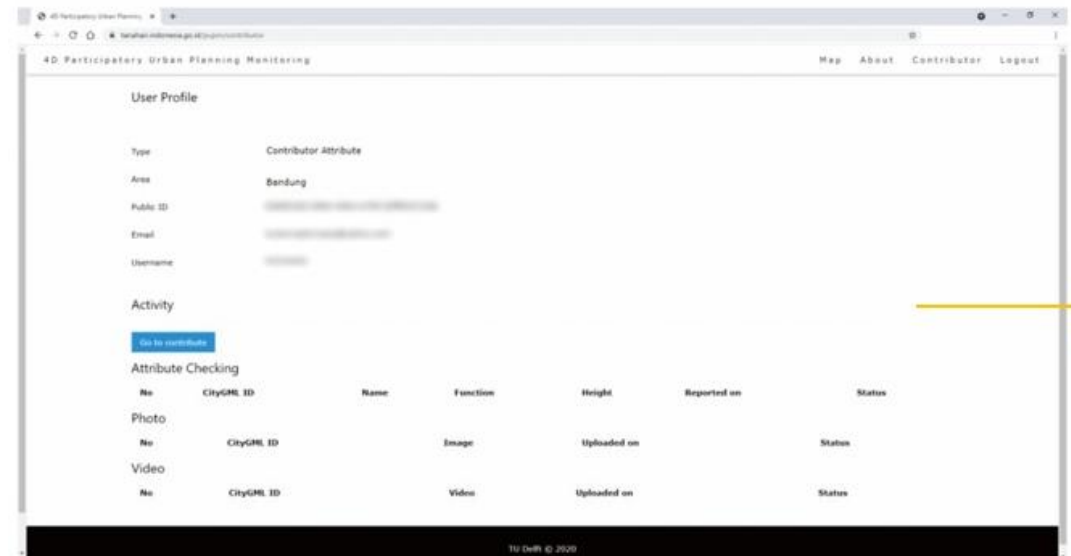
User Flow



Initial design of 4D PUPM:

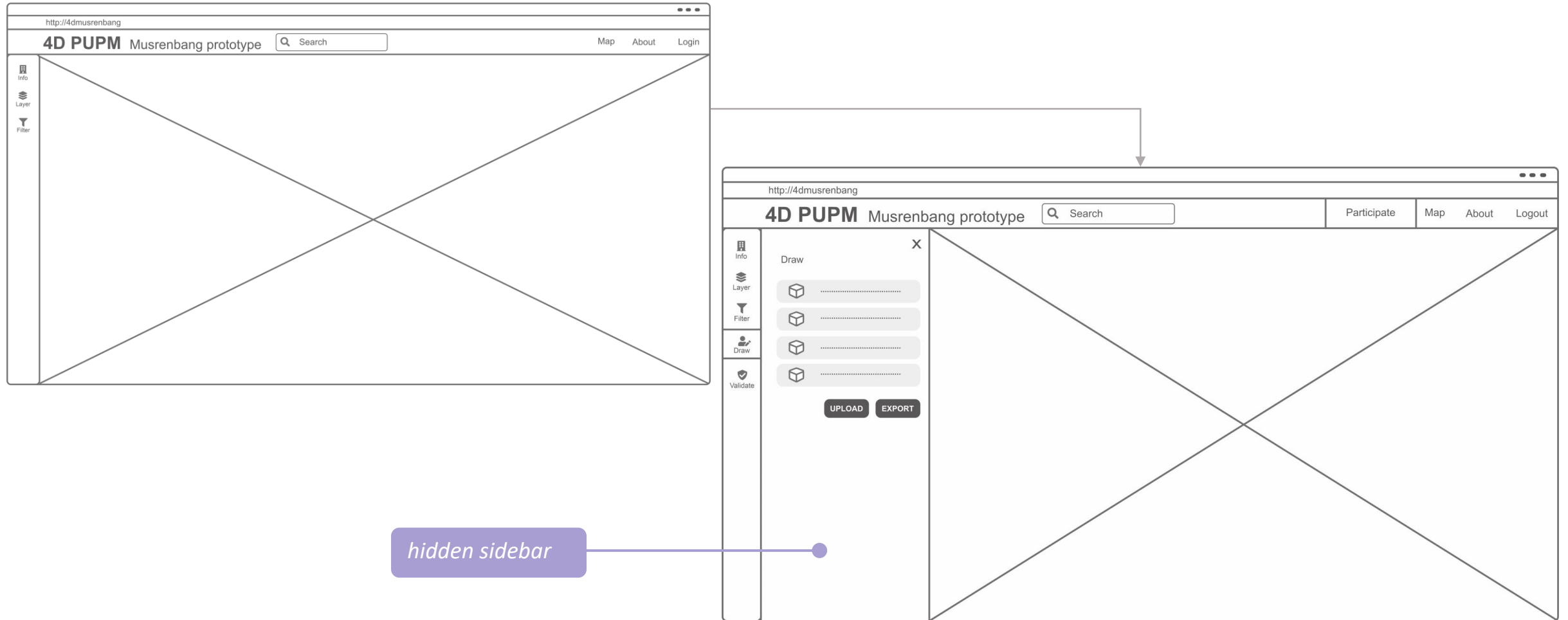


Dynamic Web Interface



Static Web Interface

WIREFRAME – (only) Dynamic Web Interface



WIREFRAME – Dynamic Web Interface

proposed functionalities:

Search

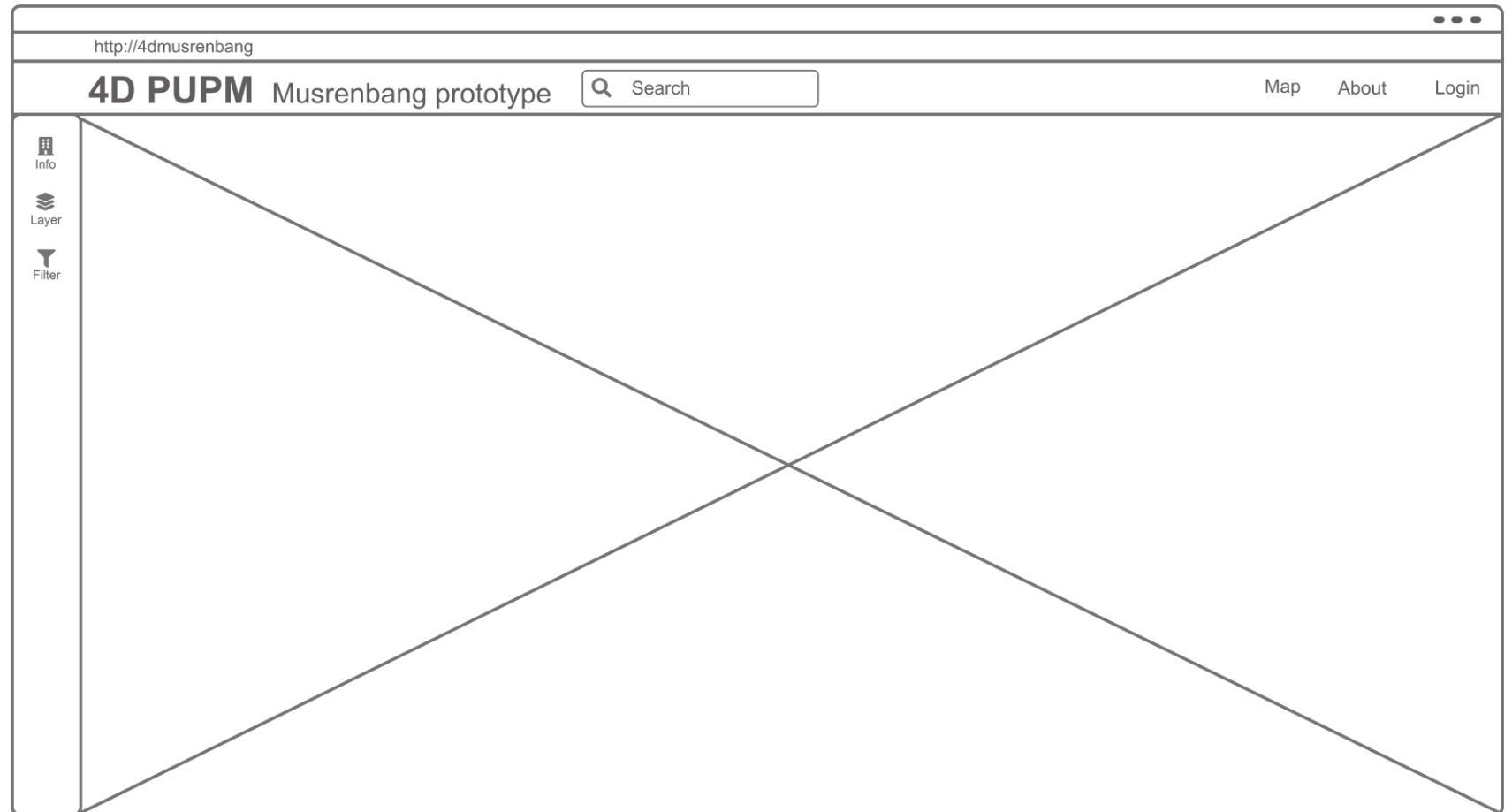
Attribute Information

Layer

Filter

Draw

Validate



WIREFRAME – Dynamic Web Interface

proposed functionalities:

Search

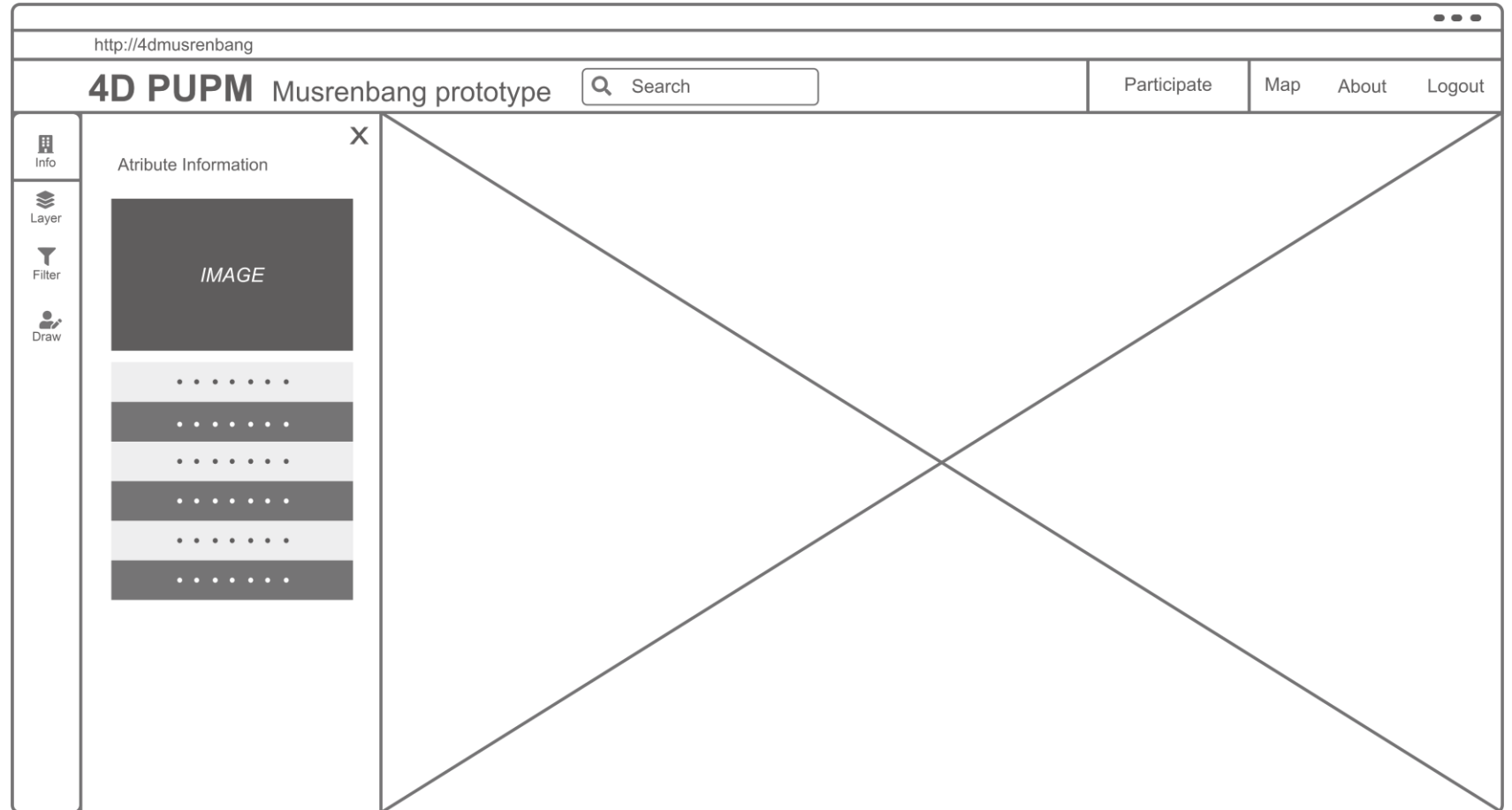
Attribute Information

Layer

Filter

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Validate



WIREFRAME – Dynamic Web Interface

proposed functionalities:

Search

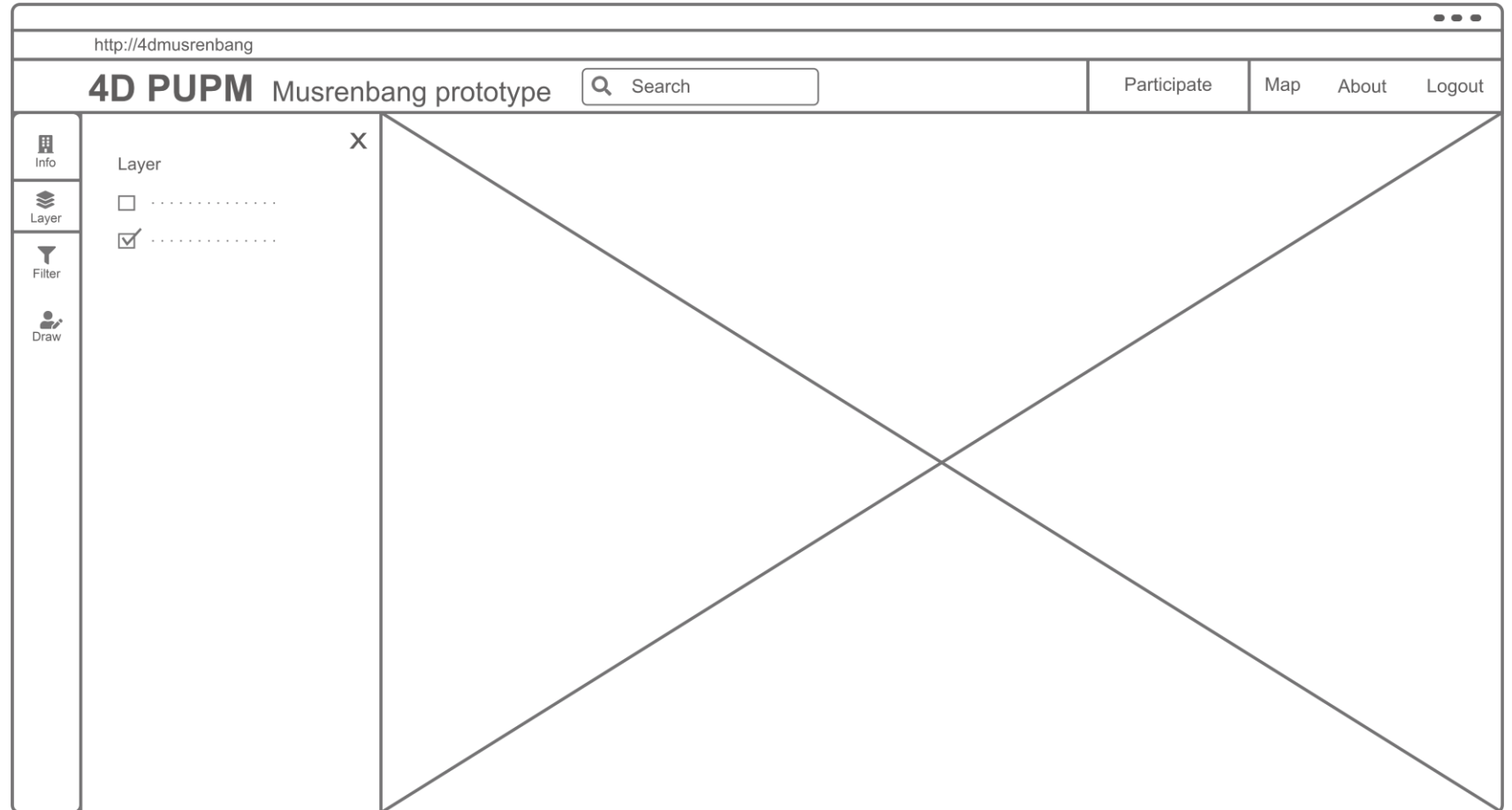
Attribute Information

Layer

Filter

Draw

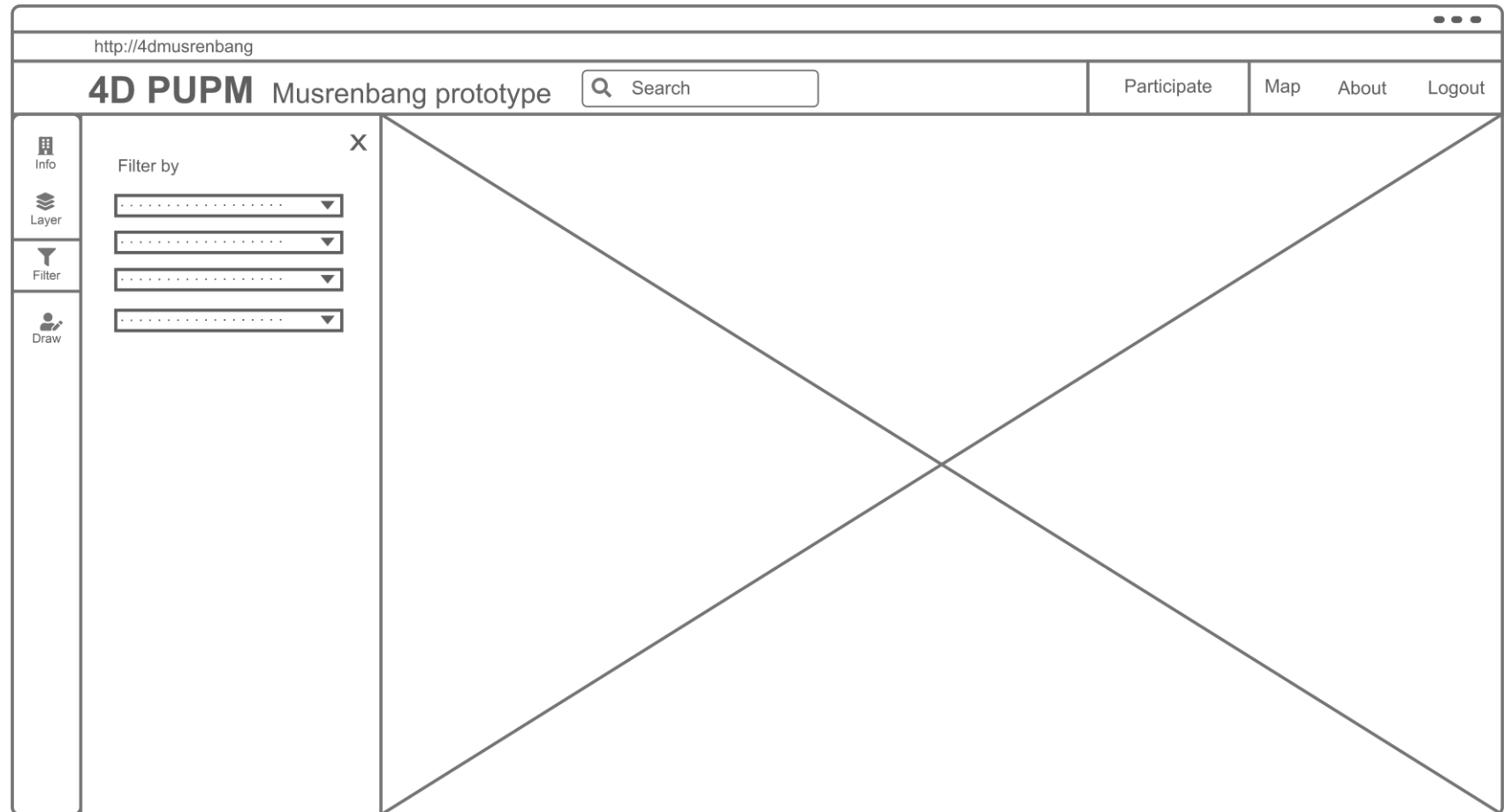
Validate



WIREFRAME – Dynamic Web Interface

proposed functionalities:

- Search
- Attribute Information
- Layer
- Filter
- Draw
- Validate



WIREFRAME – Dynamic Web Interface

proposed functionalities:

Search

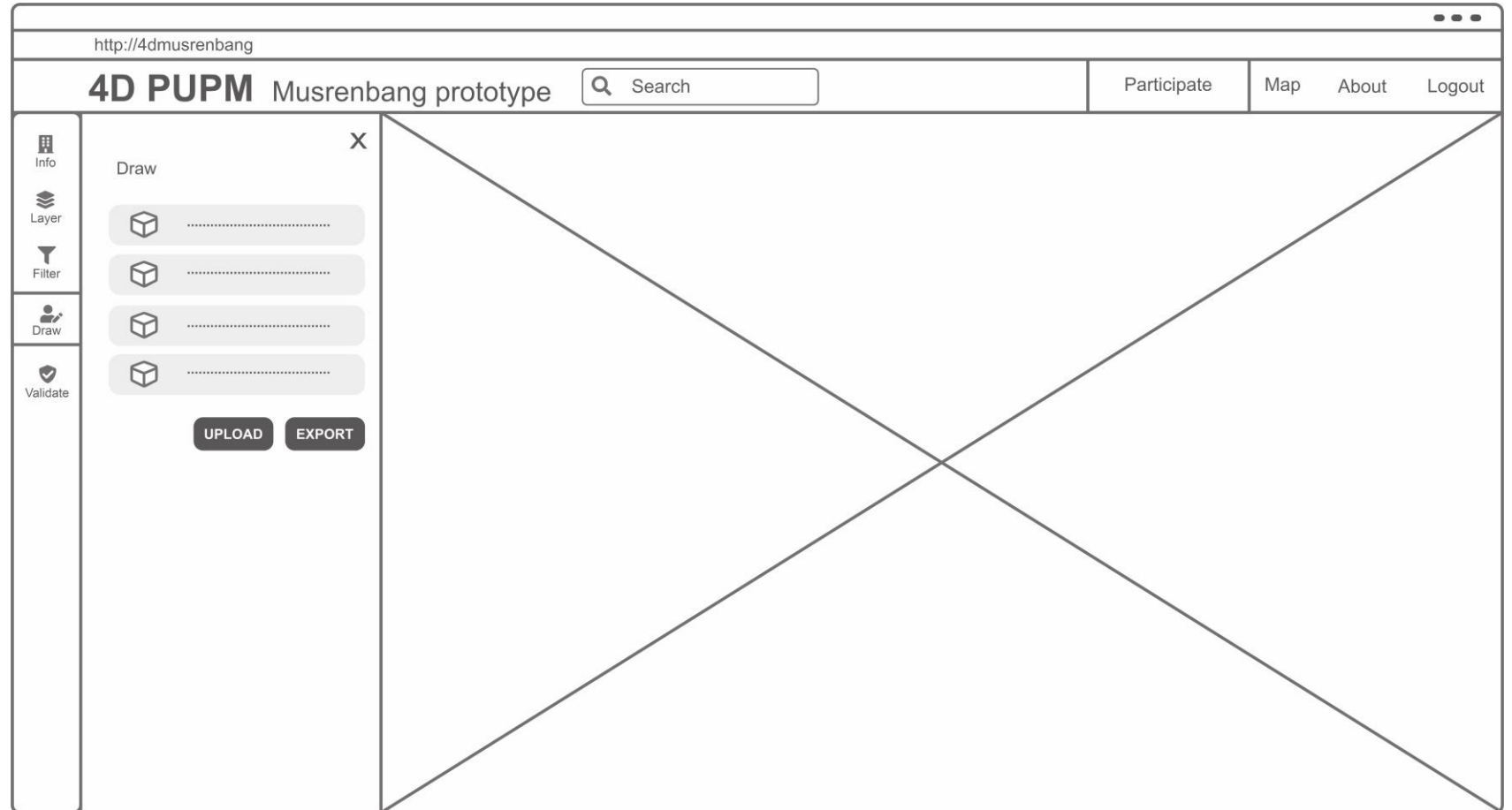
Attribute Information

Layer

Filter

Draw

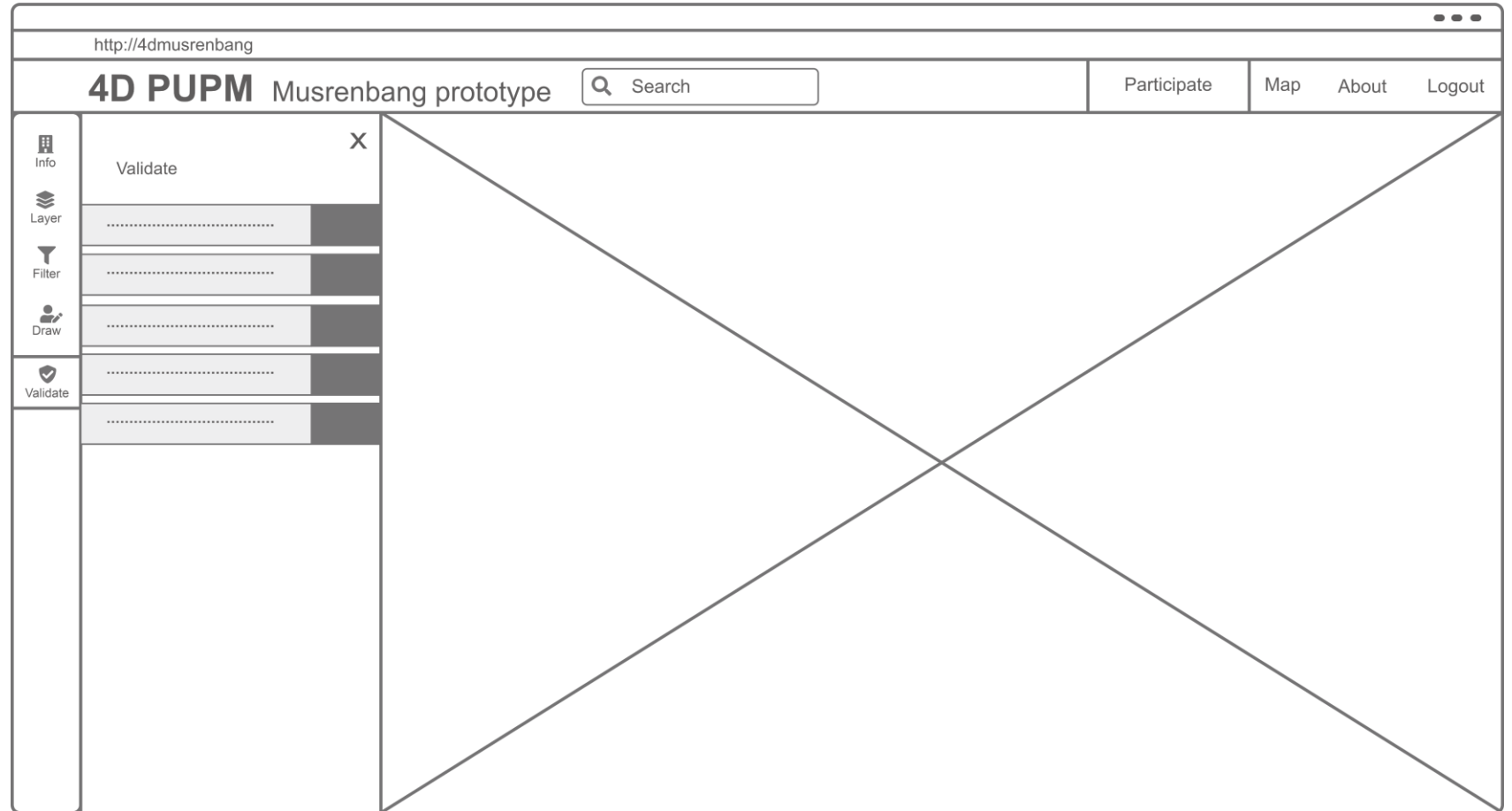
Validate



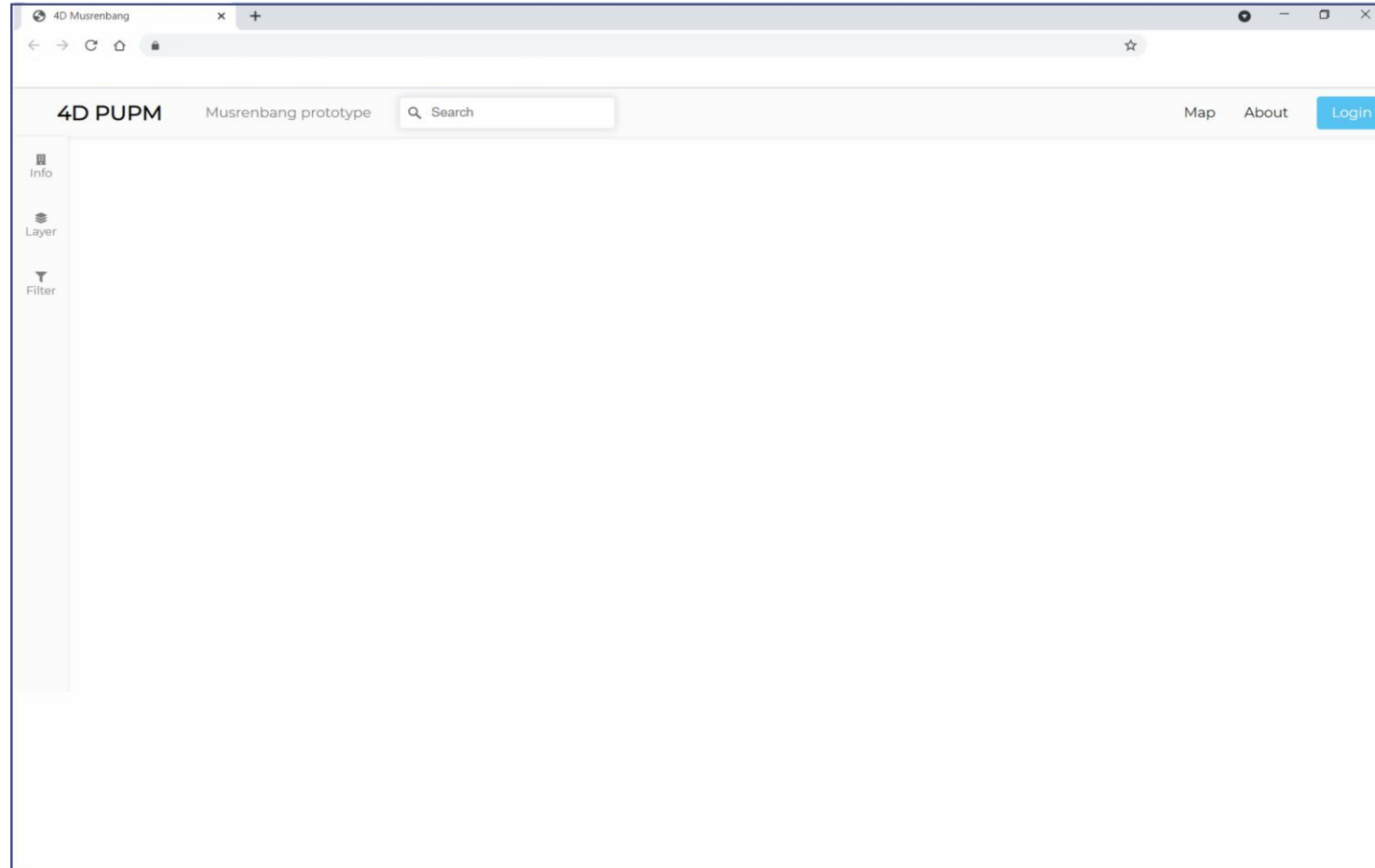
WIREFRAME – Dynamic Web Interface

proposed functionalities:

- Search
- Attribute Information
- Layer
- Filter
- Draw
- Validate

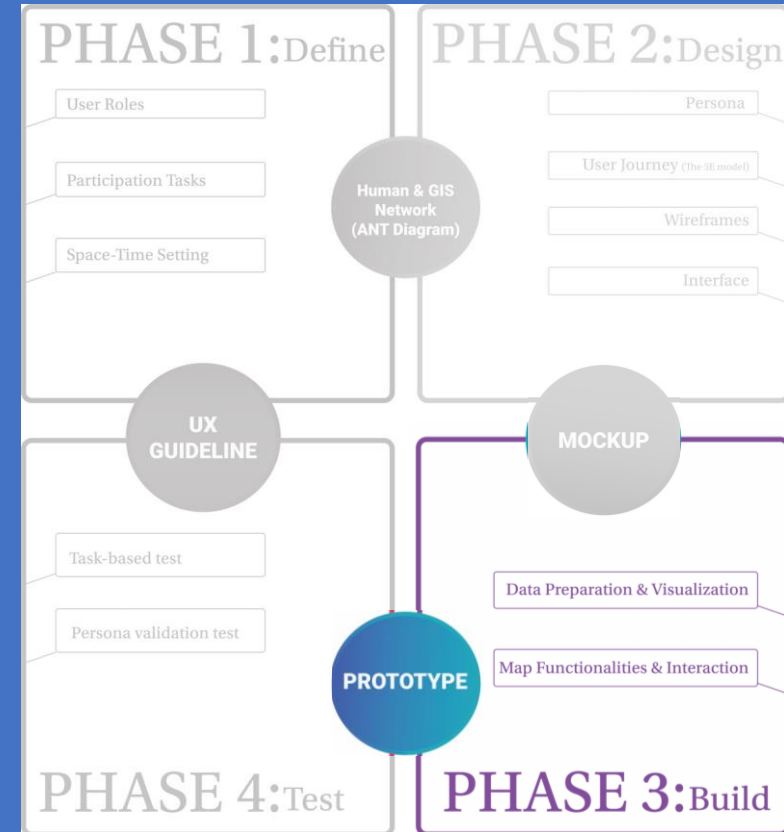


INTERFACE – Mockup of 4D Musrenbang

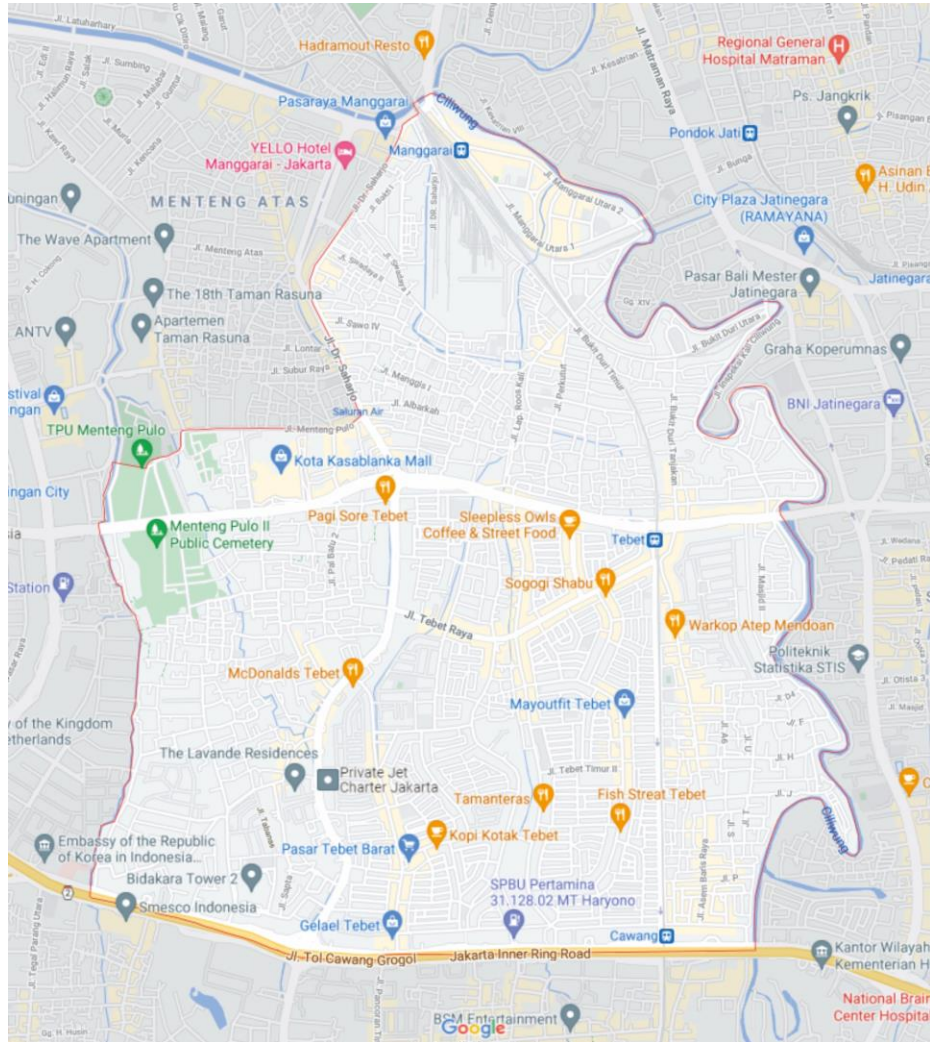


*Due to its environment in HTML and CSS format, the map interface is showed as white space.
This white space can be feeded with map interface using Javascript on Phase 3.*

PHASE 3: BUILDING THE PROTOTYPE OF 4D MUSRENBANG



Tebet District, Jakarta, Indonesia



 ▪ Area of interest

Data Preparation & Visualization:

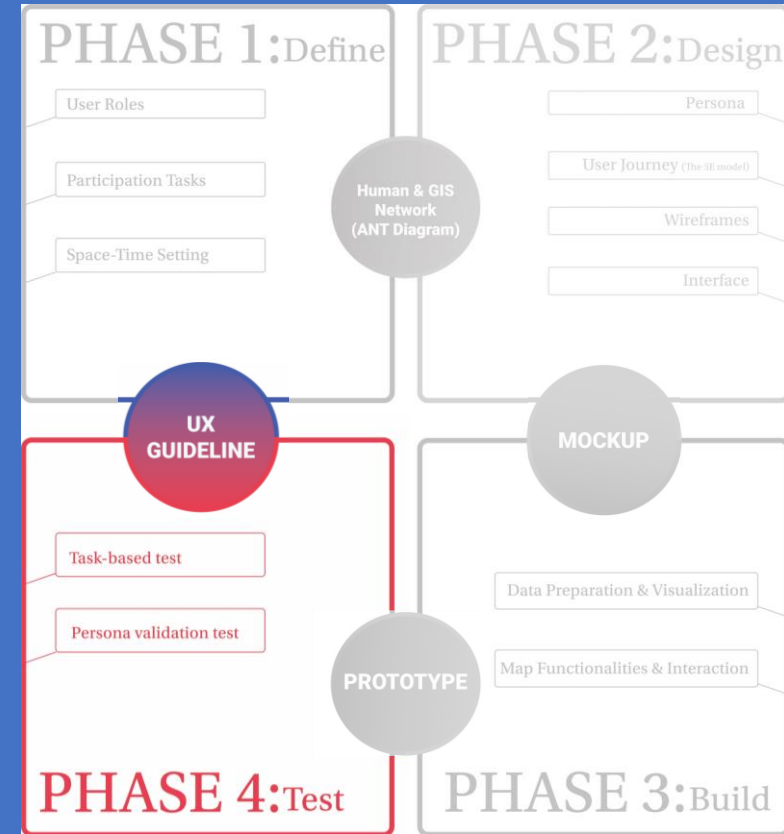
3D Spatial Zoning Plan

3D Building Model

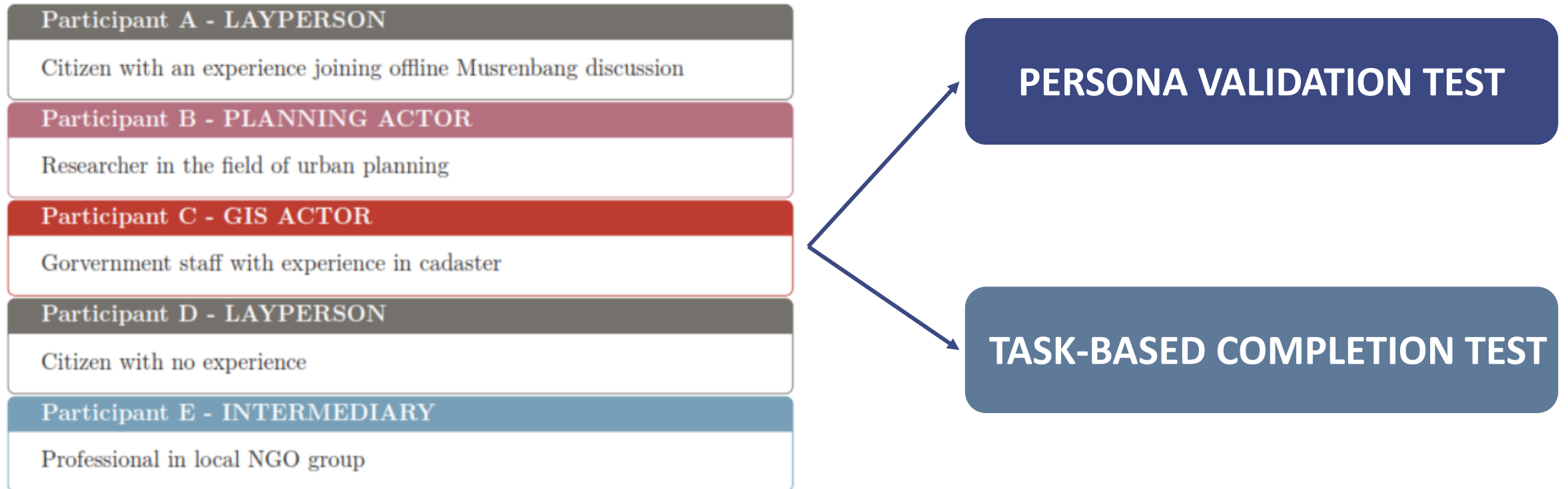
3D Simplified Model

Sky Layer

PHASE 4: TESTING THE USABILITY OF 4D MUSRENBANG

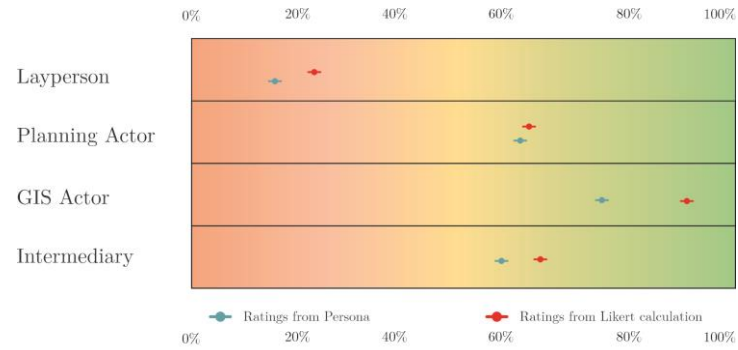


USER TEST SETUP

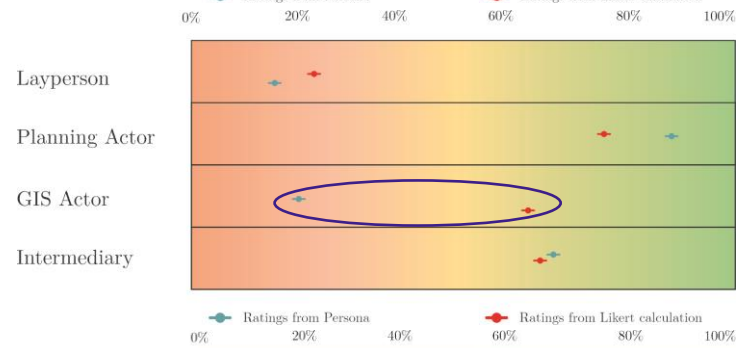


PERSONA VALIDATION TEST

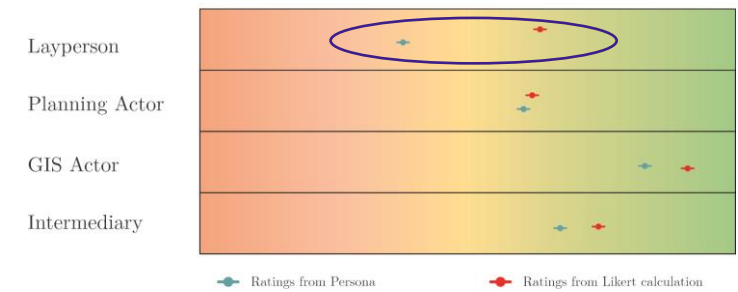
GIS



Spatial Planning



Public Participation



Task 1: Login according to user's role ✓

Participant	User Role	Task Time (m:s)	Success	Error	Satisfaction (1 ~ 5)
Participant A	Contributor	00:45	1	0	5
Participant B	Contributor	00:41	1	0	5
Participant C	Validator	00:40	1	0	3
Participant D	Contributor	00:30	1	1	4
Participant E	Mediator	00:50	1	0	3
SUM		TIME	COMPLETION	ERRORS	SATISFACTION
84.5%		97.3%	100%	8.4%	83%

Task 2: Access the 'Participate' map interface ✓

Participant	User Role	Task Time (m:s)	Success	Error	Satisfaction (1 ~ 5)
Participant A	Contributor	00:25	1	0	5
Participant B	Contributor	00:33	1	0	5
Participant C	Validator	00:23	1	0	4
Participant D	Contributor	00:46	1	0	4
Participant E	Mediator	00:34	1	0	4
SUM		TIME	COMPLETION	ERRORS	SATISFACTION
91.8%		98.9%	100%	0%	91.9%

Task 3: Search an address ✓

Participant	User Role	Task Time (m:s)	Success	Error	Satisfaction (1 ~ 5)
Participant A	Contributor	01:22	1	0	4
Participant B	Contributor	01:14	1	0	5
Participant C	Validator	01:09	1	0	4
Participant D	Contributor	01:54	1	2	4
Participant E	Mediator	01:21	1	0	3
SUM		TIME	COMPLETION	ERRORS	SATISFACTION
82.1%		94.3%	100%	14.9%	83%

Task 4: Display information from 3D spatial plan ✓

Participant	User Role	Task Time (m:s)	Success	Error	Satisfaction (1 ~ 5)
Participant A	Contributor	01:44	1	1	2
Participant B	Contributor	01:04	1	0	4
Participant C	Validator	00:46	1	0	4
Participant D	Contributor	01:24	1	1	3
Participant E	Mediator	01:01	1	0	4
SUM		TIME	COMPLETION	ERRORS	SATISFACTION
74.1%		77.8%	100%	14.9%	54.6%

Task 5: Switch 3D dataset layer ✓

Participant	User Role	Task Time (m:s)	Success	Error	Satisfaction (1 ~ 5)
Participant A	Contributor	00:44	1	1	5
Participant B	Contributor	01:04	1	0	4
Participant C	Validator	00:46	1	0	4
Participant D	Contributor	00:45	1	1	3
Participant E	Mediator	00:31	1	3	2
SUM		TIME	COMPLETION	ERRORS	SATISFACTION
70.1%		92.4%	100%	37.9%	69.4%

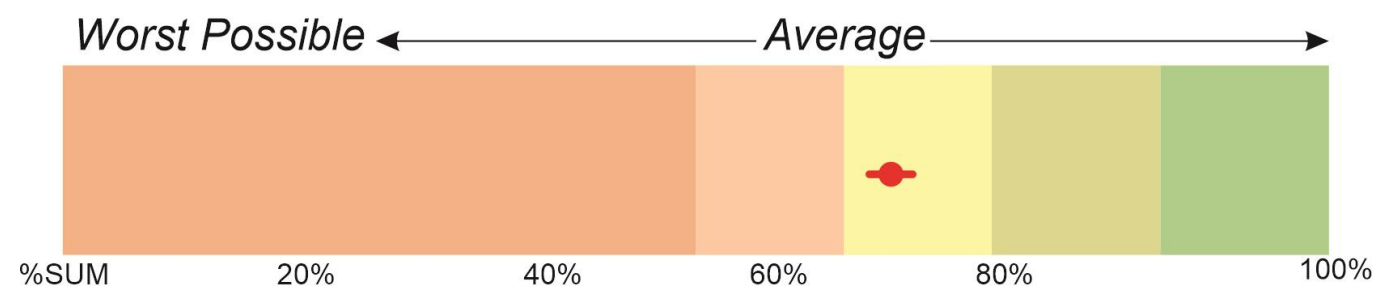
Task 6: Draw 3D Building ✓

Participant	User Role	Task Time (m:s)	Success	Error	Satisfaction (1 ~ 5)
Participant A	Contributor	02:34	1	1	5
Participant B	Contributor	02:34	1	2	5
Participant C	Validator	02:46	1	1	3
Participant D	Contributor	02:45	0	1	1
Participant E	Mediator	01:31	1	0	5
SUM		TIME	COMPLETION	ERRORS	SATISFACTION
65.7%		61.4%	96.4%	50.9%	80.4%

Task 7: Move 3D Building ✗

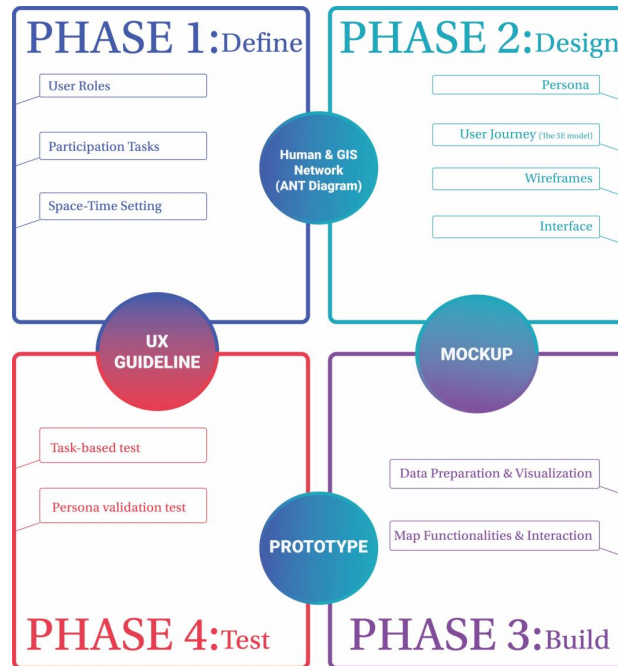
Participant	User Role	Task Time (m:s)	Success	Error	Satisfaction (1 ~ 5)
Participant A	Contributor	02:54	0	1	1
Participant B	Contributor	02:24	1	2	3
Participant C	Validator	02:30	0	2	1
Participant D	Contributor	02:32	0	2	1
Participant E	Mediator	02:31	1	3	2
SUM		TIME	COMPLETION	ERRORS	SATISFACTION
34.7%		61.4%	43.5%	51.9%	20.4%

OVERALL TASK EXPERIENCE



CONCLUSION

How to design a User Experience (UX) for geo-web applications to support public participation in spatial planning process?



- Recognize who are the users and what kind of participation activities that they will perform (**PHASE 1**)
- Visualize each user's personality and flow and determine what feature/functionality should exist on the interface (**PHASE 2**)
- Build functions to the interface so that user can interact with the map interface (**PHASE 3**)
- Test whether the design hypothesis matches with real-life users (**PHASE 4**)

Limitation

1. **Technical problems**: *database, communication tools, adjusting 3D simplified models, etc*

2. The implementation of **4PHASE** is only based on Indonesia's spatial planning process and regulation

3. Possibility of **bias** to the user test results

Future works

1. Finding the best way to design geo-web as a two-way **communication tool** in participation
2. Implementing 4PHASE for **other case studies**
3. Exploring the best way to **visualize** 3D-based spatial information to **Layperson** with no spatial planning or GIS background
4. The role of **intermediary actors as the mediators** in the autonomous geoinformation environment – **still important?**

TERIMA KASIH
THANK YOU

