

iDE

04-06-2026

Precision Prototyping: Leveraging AI for Intelligent Site Selection and Rapid Model Iteration in Bangladesh

**Abid ul Huque, Sara Hanan
Chowdhury, Fatima Shehata
iDE Global**

iDE

0. Introduction



Project Background

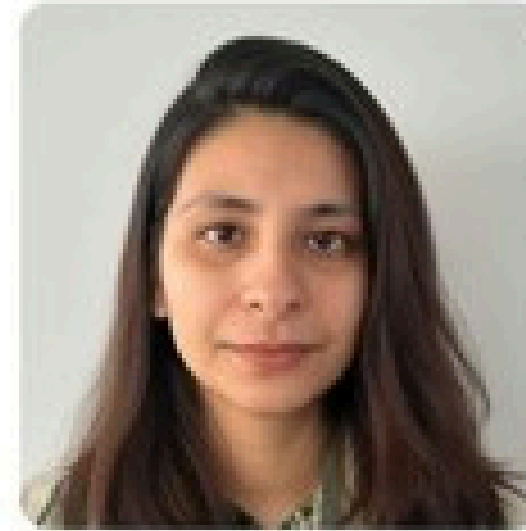
The team conducted a HCD powered Needs Assessment to support the iDE team to empower 1,400 out-of-work women garment workers in Bangladesh by improving their entrepreneurial capacity and financial resilience, as part of this, we used mixed-methods to:

- **Detailing the journeys of former factory workers and women entrepreneurs by exploring their experiences, challenges, key issues, motivations, and drivers, and to use these insights to inform the design of women's entrepreneurship programs and roadmap activities that better support women entrepreneurs, to enter and remain in the sector.**
- **Providing an initial assessment and identification of green sectors with strong potential to engage women entrepreneurs, based on key criteria such as enabling environment in specific locations, sector size, potential impact, accessibility for women entering and remaining in the sector, and overall viability. The assessment will recommend priority sectors for iDE to focus on.**
- **Providing actionable, implementable insights regarding the most promising entrepreneurial models, key personas, and target locations for intervention.**

Who are we?



Guest:
Fatima Shehata
Senior Design Strategist
and Experimentation Lead
iDE Innovation Lab



Guest:
Sara Hanan Chowdhury
Senior Officer , MERL
iDE Bangladesh



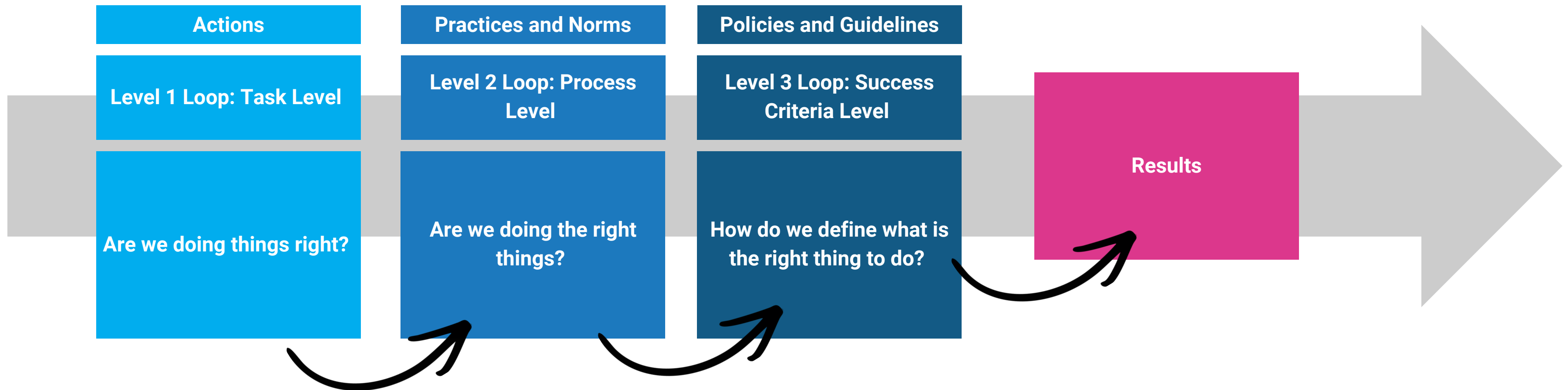
Moderator:
Abid ul Huque
Manager, MERL
iDE Bangladesh



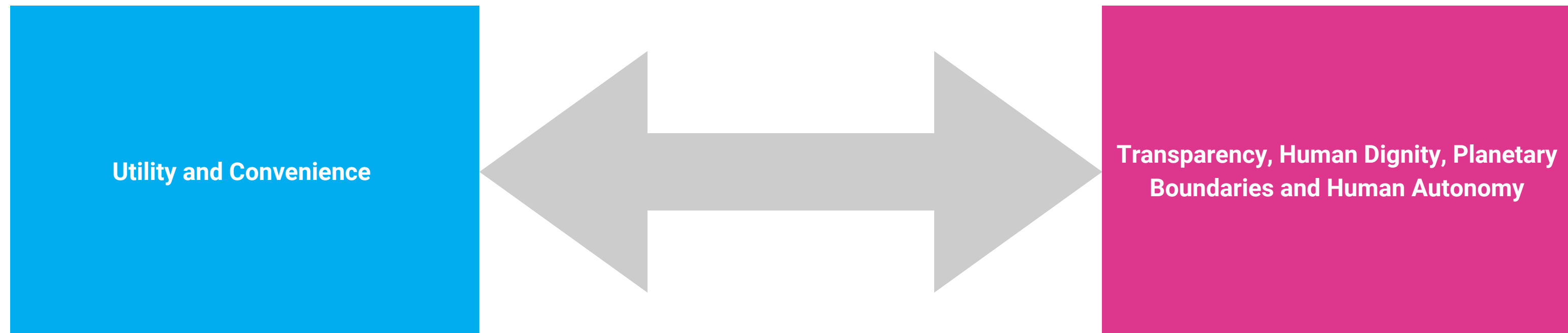
iDE

**1. Principles of AI use for
participatory
Researchers**

Evaluating AI integrations with HCD using triple loop learning



Designer Tip: A systemic designer always starts with the end in mind, so let's look at our Level 3 Loop: Success Criteria for integrating AI with HCD



- What is the trade-off we are signing up for?
- What are the risks and consequences of this trade-off?
- Are these risks and consequences clear and predictable?
- Are these risks and consequences acceptable for us and for others they may impact?

Evaluating AI integrations with HCD using triple loop learning

Level 3 Loop: Success Criteria Level for practitioners when interacting with participants

The Principle	Data Protection, Safety and Informed Consent	Human Data Oversight, Verification and Validation	Dignity and Safeguarding	Dynamic Informed Consent	Minimising Algorithm Driven Colonisation
The Goal	Participant's data must be securely, safely and privately store	Humans must be the ones verifying the data, validating that outputs and processes are correct and ensuring all outputs and inputs are appropriate	Ensuring all images or products created maintain human dignity and do not represent respondents or people in a negative light	Ensuring all participants understand how their data will be used, stored, and who will have access to it, and providing them with options to opt out	Many of the datasets which AI are trained on are from WEIRD contexts, as such they will amplify learnings from those contexts which will not reflect local global South nuances
The Practice	iDE has a google account for Gemini and Notebooklm, so the AI models used are not trained on participant data, all data is de-identified of direct and indirect identifiers, and participants are told how their data will be stored and and handled, and informed of how we use AI	AI processes and tools are used to accelerate, supplement or enhance existing human surfaced knowledge, tools and practices but not to replace them.	AI models are trained on dominant data structures, which can erase indigenous, marginalized, or hyper-local nuances that traditional HCD surfaces, or represent local communities in undignified ways. Inclusion and Dignity must always be at the forefront as a lense.	Participants must first have an in-depth explanation of what AI tools are capable of, especially if they have low tech literacy and literacy, before then being provided consent forms which enable them to opt out or later withdraw their consent.	The real lived realities of global south participants must take precedence, and any and all AI generated products must be verified by and with local communities to sense check their veracity and validity for local contexts

Evaluating AI integrations with HCD using triple loop learning

Level 2 Loop: Process Level

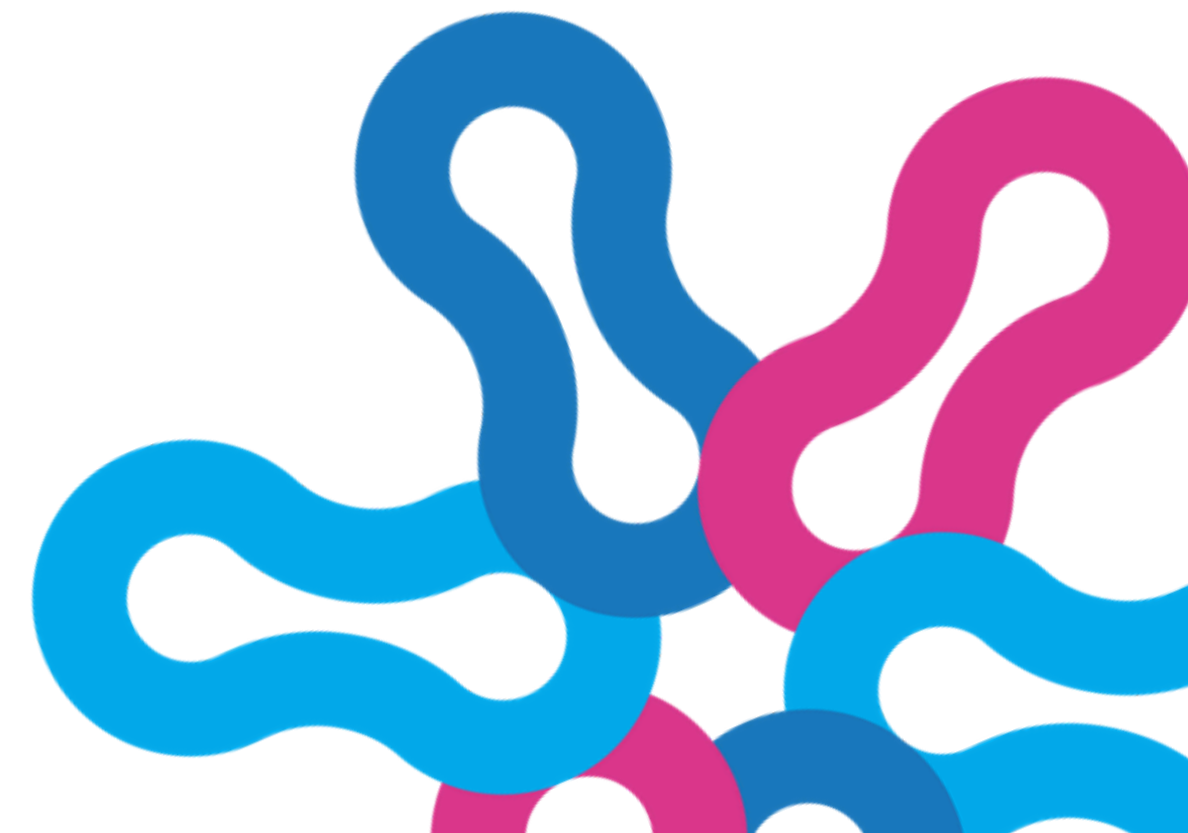
The AI/HCD Use Case	Accelerating the Process	Enhancing the Resolution	Finding Gaps and Patterns in the Existing Knowledge Base	Turning Static Artefacts into Dynamic user interfaces	Automating Entire Multi-step Workflows
The Process Step	Making Synthesis or Prototyping Faster	Making higher resolution prototypes faster so we can rapidly test and collect feedback	Adding missing links or information in existing problem framing trees, location selection or findings, or providing methodological reviews	Turning Static artefacts, i.e. excel financial models, location selection into interactive user interfaces	Automating the translation of field guidelines into Bangla, to be verified only by local team members, and them formatting them for upload into Kobo
The Application	Using Gemini to create and/or refine AI created scenarios and service blue prints to illustrate complex business models and test them with women entrepreneurs			Turning the location selection excel spreadsheet into an interactive dashboard	Translating different guides into a local language, and configuring a Kobo form in one step

iDE

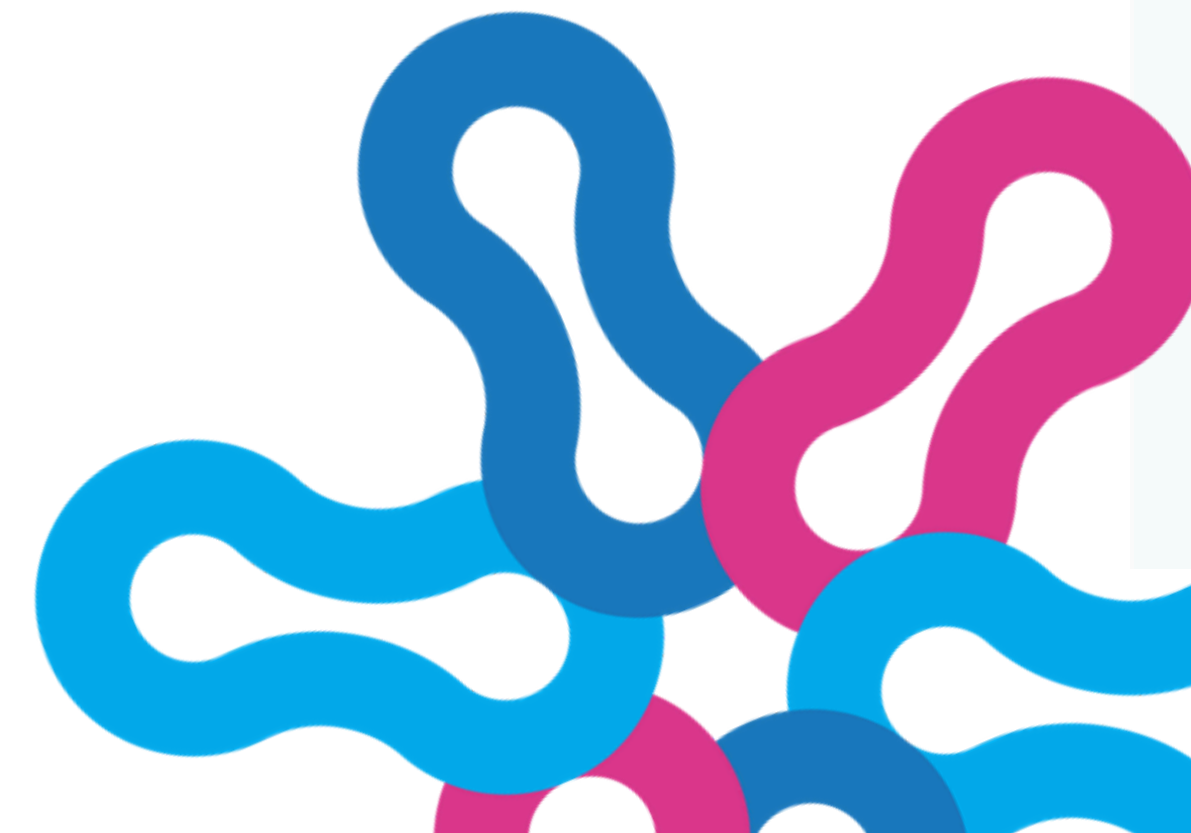
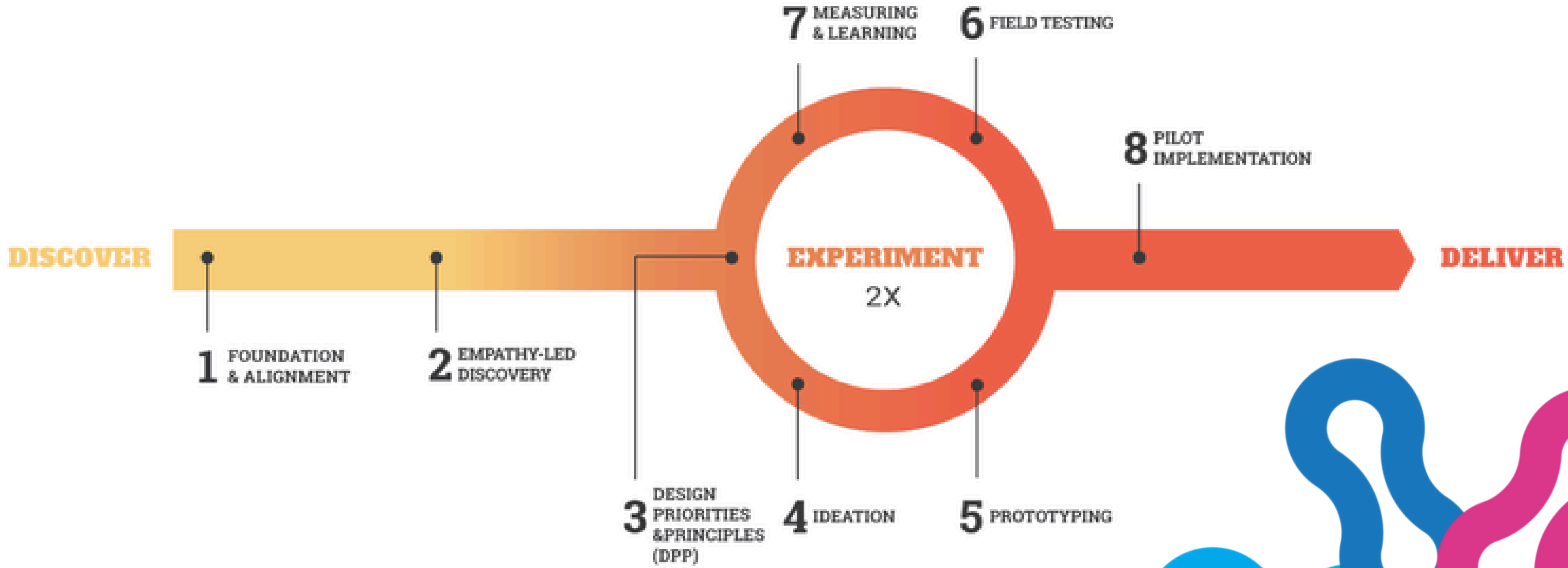
2. Practice of using AI in the Human Centered or Participatory Research Process

Welcome to the Design Process!

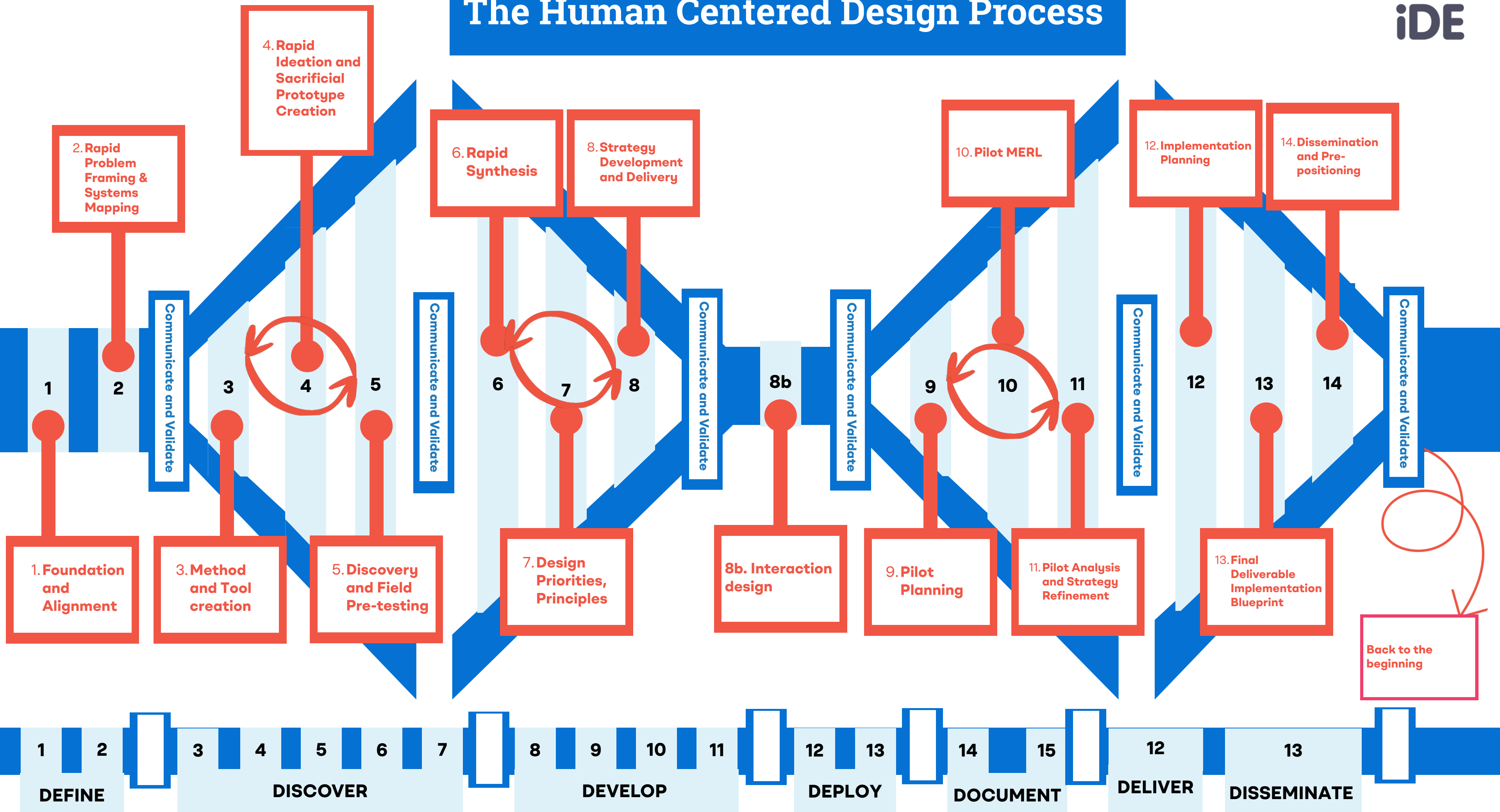
Human Centered and Systemic Design focus on us understanding the Humans at the Center of any issue. So it may seem like a contradiction when we say that we can use AI to accelerate Human Centered and Systemic Design.



The Human Centered Design Process



The Human Centered Design Process



METHODOLOGY

The team used a mix of participatory and visual methods during field work which were designed to create concrete concepts, and move away from abstraction, to enable in-depth discovery, rapid testing of promising concepts and collection of feedback, including:

- In-Depth Interviews
- Focus Group Discussions
- Community transect walk and observations
- Card Sorting
- Scenario testing
- Testing of Real objects

These enabled the team to learn about the lived realities, attitudes and practices of women and men in the target communities related to existing and future possible women-led enterprises, especially in the green sector.



In-depth Interviews

Focus Group Discussions



Community Observations



Scenario Testing



Card Sorts

Fig. 3 Methods used in the Field Research

METHODOLOGY

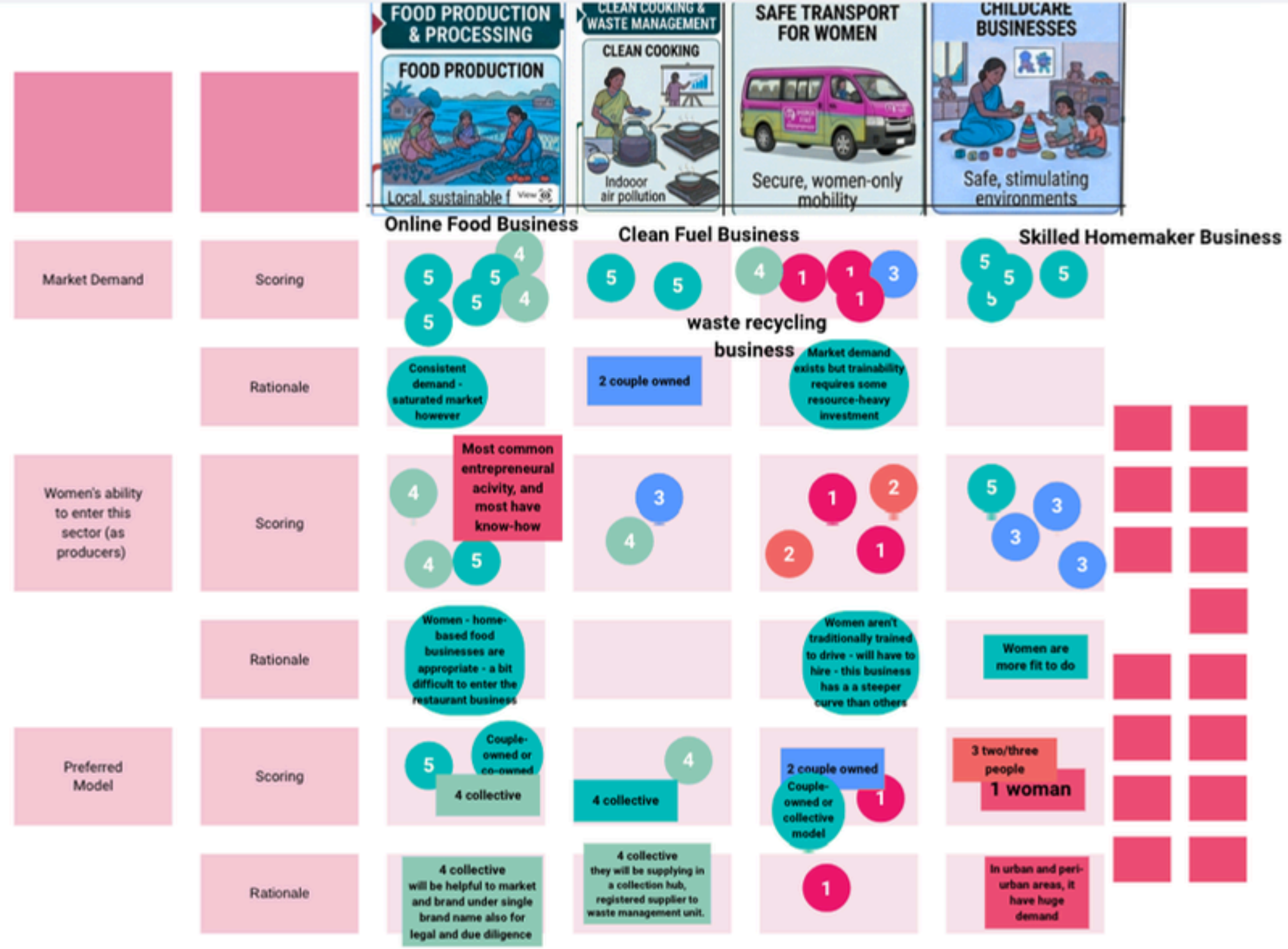
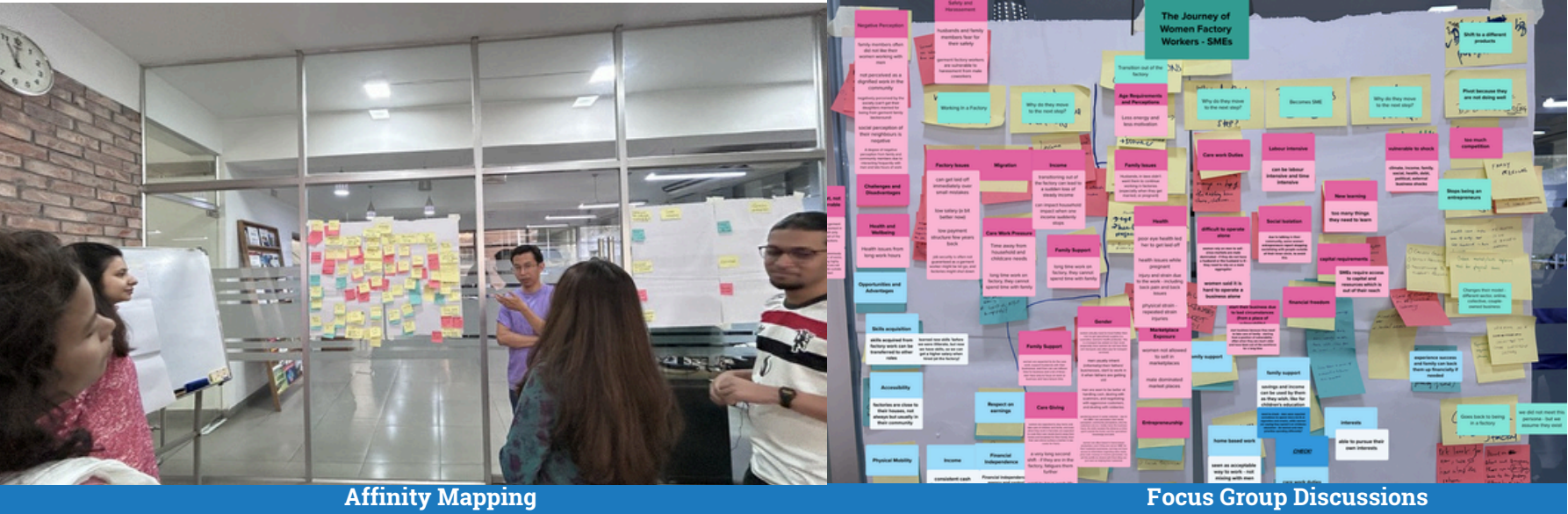


Fig. 4 One of the exercises of the Validation and Co-creation workshop conducted with experts and iDE

The team also conducted additional research with experts to validate key findings and promising concepts from the field, ideate solutions and prioritise key intervention packages through:

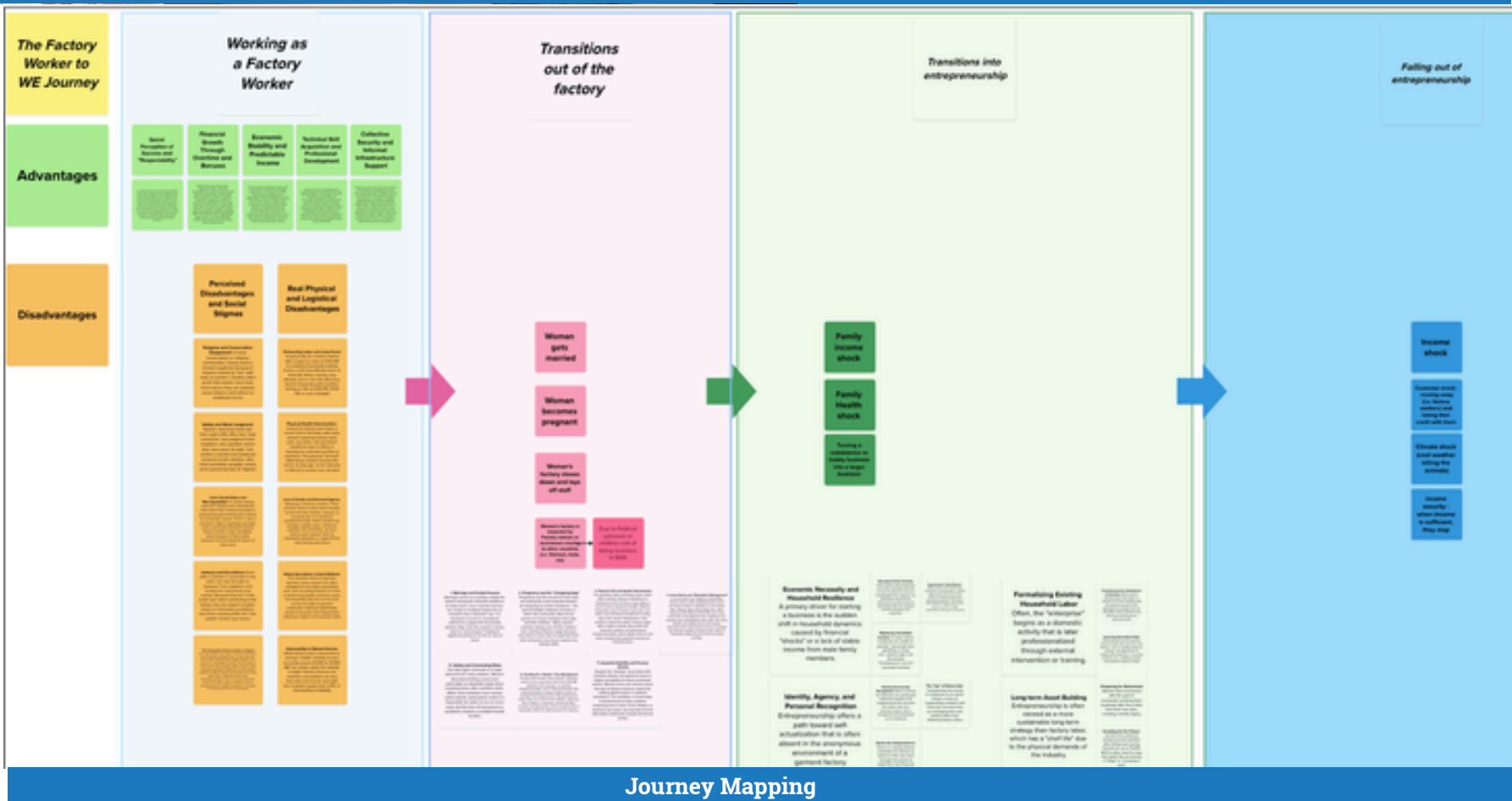
- Expert interviews with four key experts in Women's entrepreneurship in Bangladesh
- A Validation and Co-creation session with 8 experts from iDE and the team to validate key findings from the research, assess the viability of key sectors and make recommendations regarding participant and model selection.

METHODOLOGY

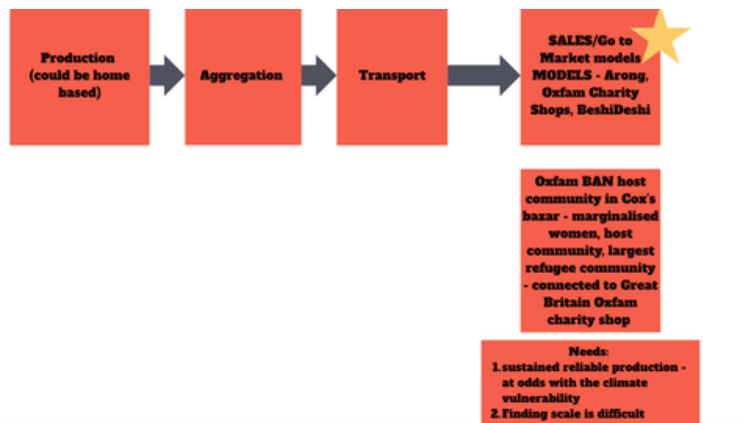


Affinity Mapping

Focus Group Discussions



Journey Mapping



Process Diagrams

In order to analyse the data, the team used a mix of methods, including:

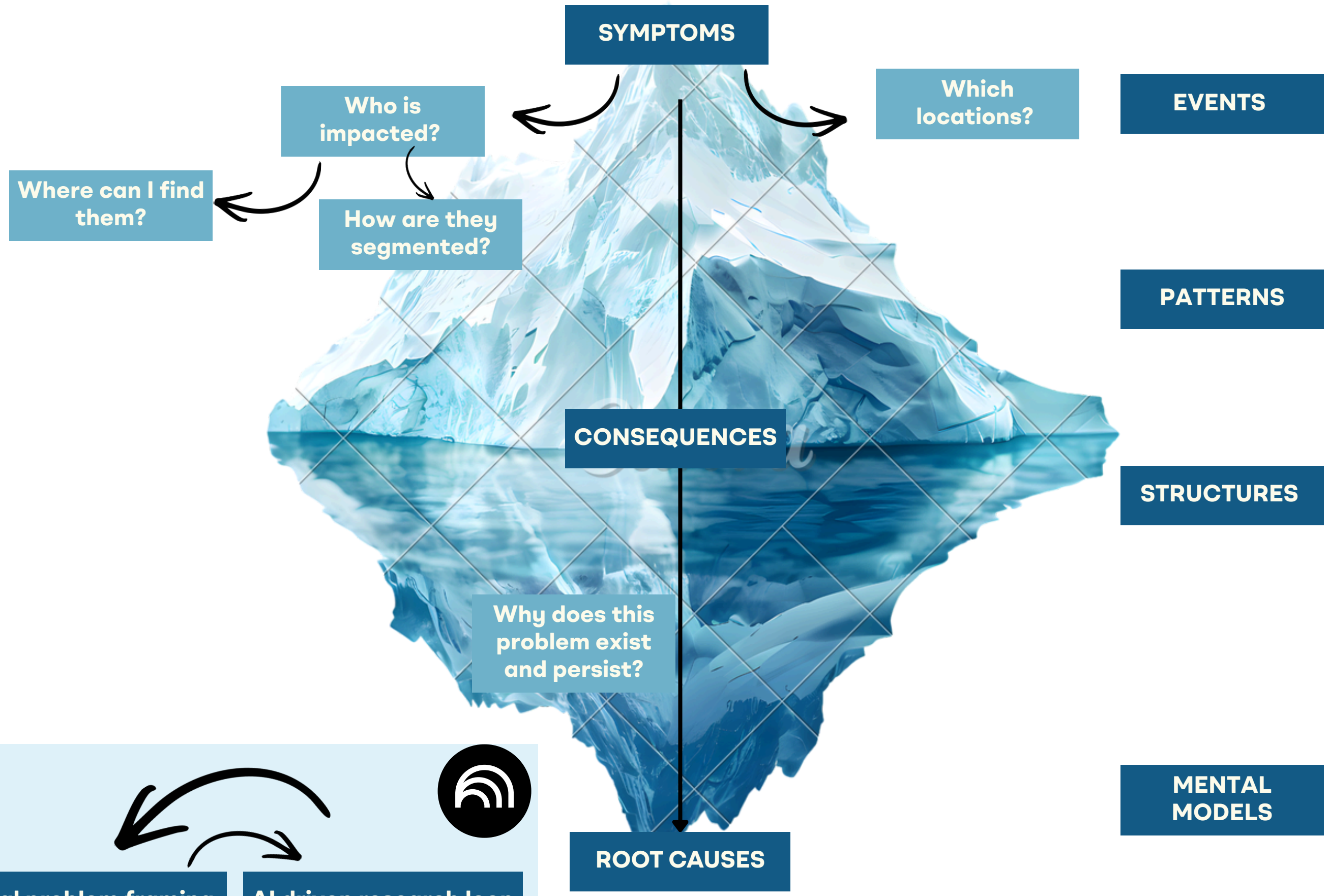
- Persona Creation
- Adoption curve creation
- Journey Mapping
- Systems Mapping
- Affinity Mapping
- Process mapping

Fig. 5 Analysis and Synthesis Methods used for the data analysis

iDE

2.1. Problem Framing

The Human Centered Design Process



The Human Centered Design Process

1 2

DEFINE

PROBLEM FRAMING

what are the main challenges facing women entrepreneurs in Bangladesh

Women entrepreneurs in Bangladesh face a multifaceted web of systemic, cultural, and environmental challenges that significantly impede their ability to start and scale businesses. These barriers are particularly pronounced for ex-garment workers transitioning into entrepreneurship.

1. The Financial "Glass Ceiling"

Access to capital is the most cited hurdle, with nearly 88% of women identifying a lack of capital as their primary impediment [1][2]. Key financial barriers include:

- **Collateral Constraints:** In Bangladesh, land and property are typically held in men's names [3]. Without assets to pledge, women are often excluded from formal bank loans [3][4].
- **The "Missing Middle":** There is a significant gap for "graduate" microcredit borrowers who are too "better off" for microfinance institution (MFI) credit but not established enough to access formal banking systems [5][6].
- **Paperwork Phobia:** Many women operating in the informal "cottage" sector are deterred by the complex requirements for trade licenses, Tax Identification Numbers (TIN), and formal bank statements [7].
- **Loan Terms:** Entrepreneurs are often hesitant about high interest rates and short repayment terms that do not align with their business cycles [7][8].

2. Socio-Cultural Constraints and Patriarchal Norms

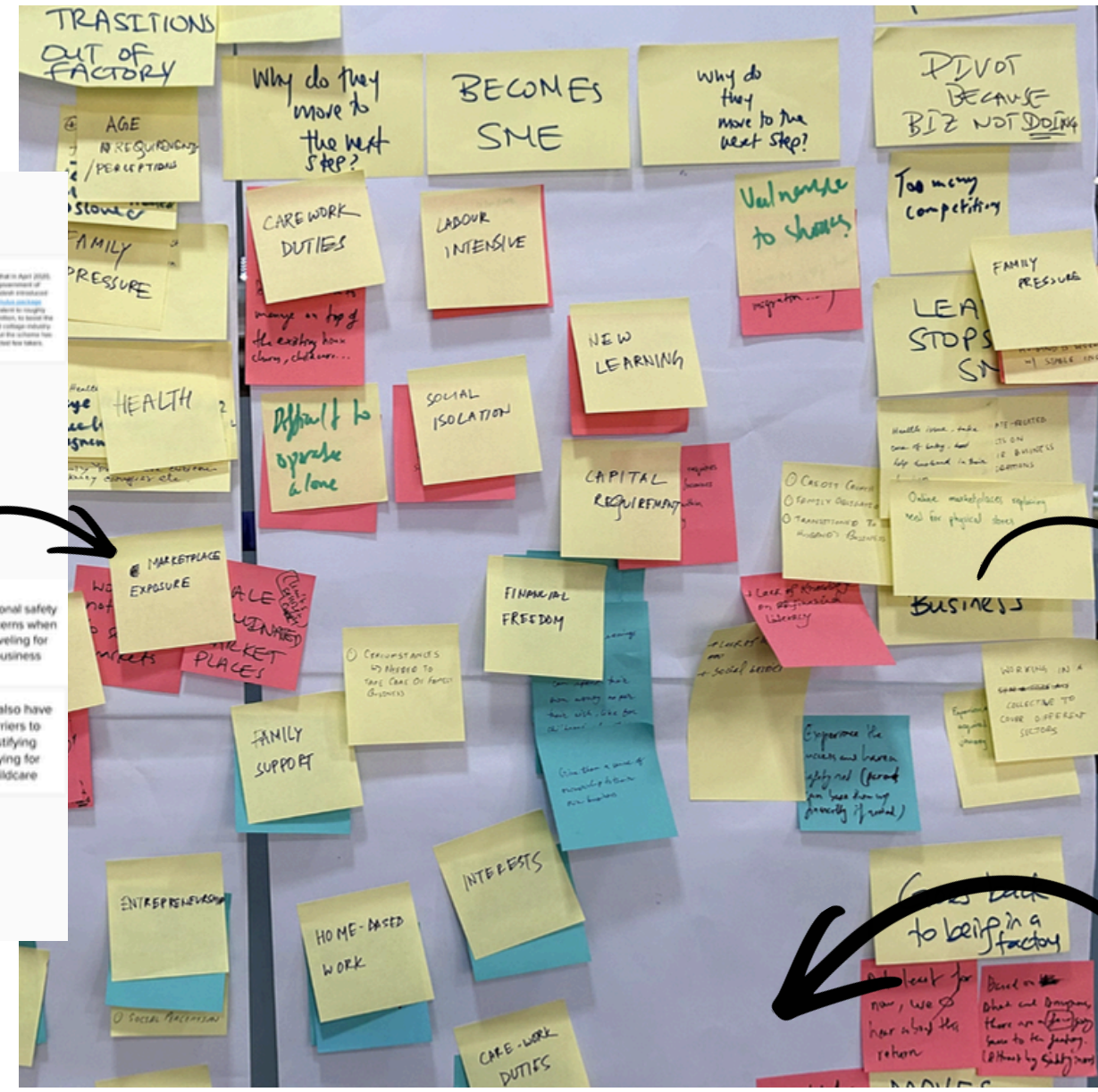
Deeply embedded gender norms restrict women's economic participation and independence:

only 4.5 per cent of the businesses in the country are owned by women.

According to a 2018 study by ILO, International Finance Corporation and UN Women, women-owned businesses constitute just 3.2 percent of the eight million businesses in Bangladesh [10].

Why is this the case?

Financial issues	87% of women identify lack of capital as the biggest impediment to running their businesses	but this is in tension with	the fact that in April 2018, the government of Bangladesh introduced a national strategy to support women to register and scale up their SME and cottage industry work, but the culture has not shifted too far.
Climate Change and Disaster risk			
Pollution and Waste Management			
Transport and Urban Planning	Harassment on Public Transport	• Mobility & Security: Restrictions on movement and personal security concerns, particularly in urban areas.	Personal safety concerns when traveling for business
Gender Norms	Lack of Maternity Leave	Women's care work - lack of childcare	May also have barriers to justifying paying for childcare
Political Unrest		• Work-Life Balance: Struggling to juggle business demands with family life	



Initial research

Initial problem framing

AI driven research loop



The Human Centered Design Process

Future State

Support Female
Garment Factory
Workers to enter and
remain in Micro-
entrepreneurship

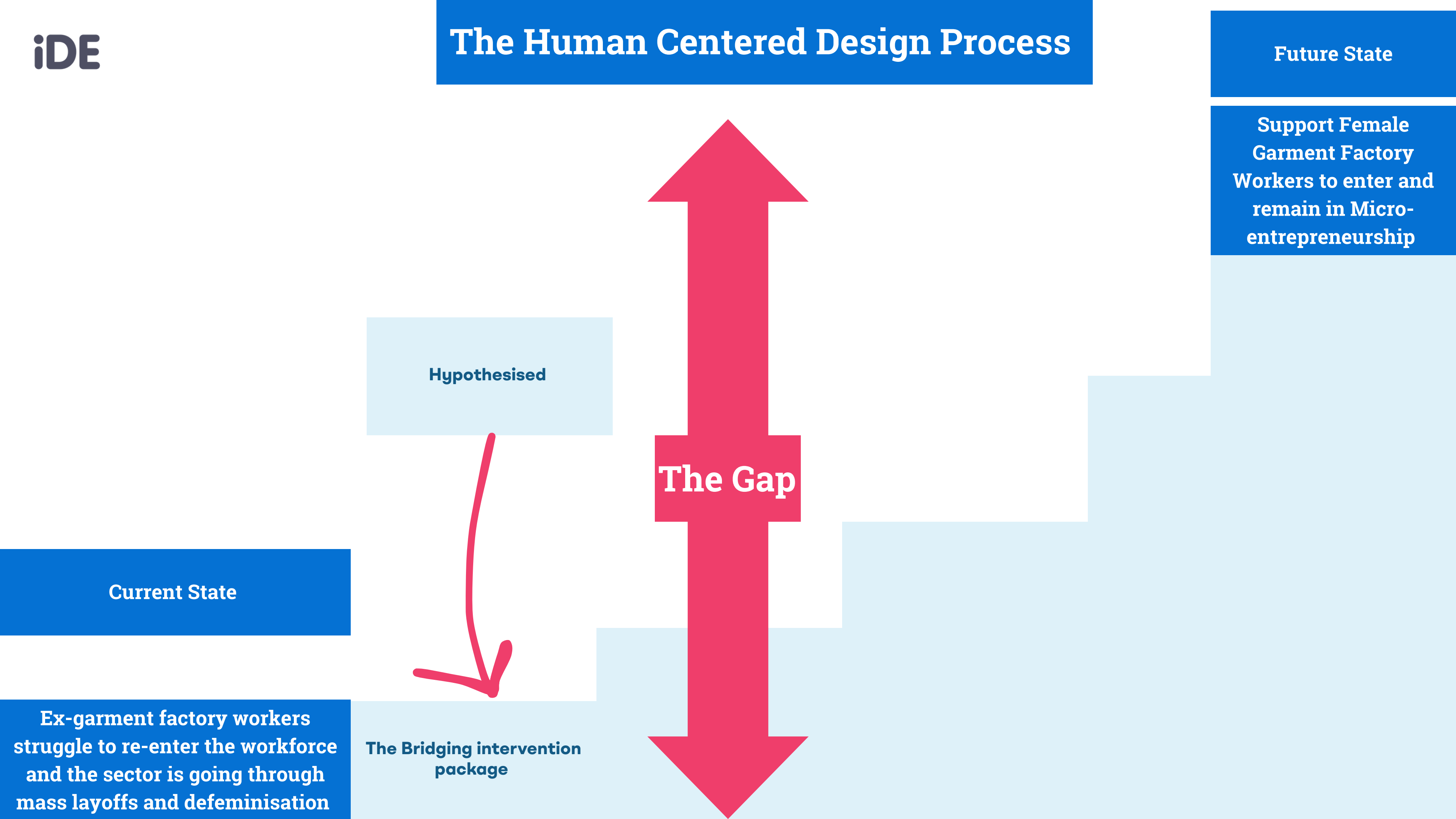
Hypothesised

The Gap

Current State

The Bridging intervention
package

Ex-garment factory workers
struggle to re-enter the workforce
and the sector is going through
mass layoffs and defeminisation



The Human Centered Design Process

1

2

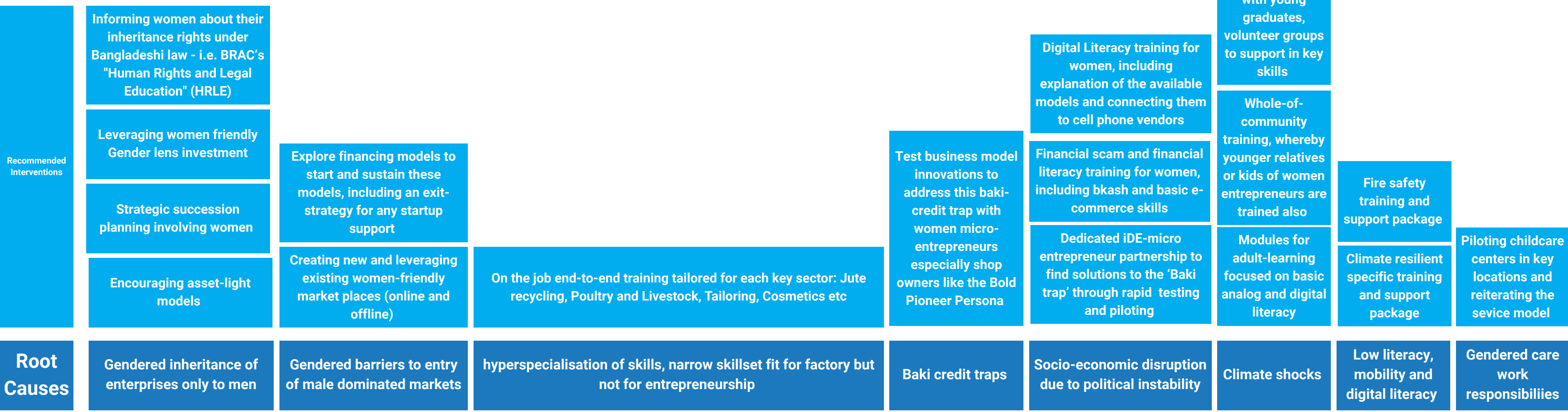
DEFINE

PROBLEM FRAMING

Symptoms

Drop off rate of 40% in SMEs

Approximately 7% of businesses in Bangladesh are women owned



iDE

2.2. Location Selection

1

2

DEFINE

The Human Centered Design Process

FS

Location	Name of village cluster (Peri-urban area)	Village (bigger than wards)	Easiest women entrepreneurs to reach
Gazipur	Tongi (nishat nagar , ershadnagar)	Growth centers - enterprises - density - longevity - peri-urban areas, easy for transport - quite well connected, ease of doing business	-highest income - access to finance, repay, savings, assets - own homes, from Savar/Gazipur - long term residents
	Konabari (most people are not permanent, so high chance of migration)	close to main infrastructure - all wards on either side of road, access , alcohol problem higher among men, they take away the money from their spouses for alcohol purpose which makes it difficult for the entrepreneurs to invest more in business	- factories still going + have a long future
	Baimail	geographically different, rivers , farm based enterprises are higher)	- have businesses and an income source (even if unemployed)
	Gazipur 27 (difficult access to financial services)	hardest to access - blacklisted	In the middle
	Kashimpur	Very limited factories	
	Gachha, kaliakoir, Panshail	Opposite of board bazar (gachha), approx 52 entrepreneurs work with products recycling , kaliakoir (chandra) has renewable energy /solar panel business, Panshail- vermicompost	
	Kapashia, sreepur	A bit conservative, mostly varies from family to family, no huge hindrance	
Savar	Anandapur	Growth centers - enterprises - density - longevity	hardest women entrepreneurs to reach
	Rajashon	GC	
	Bank Town	GC	
	Shadapur	GC - similar to anandapur, but has road construction, making it less easy to move	-lowest income - blacklisted and/or indebted - renters, own, not from location (migrants)
	Battartek, birulia, sadapur, kandina, bhakurta	religiously a bit conservative, if the women were modest clothes while doing business, then it's fine. but no major hindrance in doing business or service, less government primary schools, more madrassa, few private schools	
	Ashulia EPZ	few plastic, tin etc recycling enterprises	
	Ashulia Jamgora	small scale factories closed down, mostly due to political issue)	

IDE Opporajita 2: Market Sizing Explorer

Oporajita 2: Market Sizing Explorer

Green Growth Strategy & Micro-Enterprise Viability (Gazipur & Savar)

Project Target: 1,400 WGWs

About This Interactive Model

This dashboard translates field research data into actionable market sizing estimates for out-of-work Women Garment Workers (WGWs). Use the interactive index on the left to explore specific sub-locations across **Gazipur** and **Savar**. The locations are ranked from easiest to reach to hardest to reach.

Clicking a location will dynamically update the market sizing estimates, showing the potential number of micro-businesses, the total addressable WGW labor pool, and the customer base. It also provides viability notes regarding the specific sectors (e.g., Jhut recycling, Care work, Food & Beverage) best suited for that ward.

Target Locations

Ranked by Ease of Reach & Viability

All

Gazipur

Savar

Tongi

Nishat Nagar, Ershadnagar

Growth centers, high density, peri-urban

Rank 1

Konabari

Close to main infrastructure

Wards on either side of road, factory dense

Rank 2

Baimail

River adjacent

Geographically different

Rank 3

Gazipur 27

Difficult access area

Hardest to access initially

Rank 4

Kashimpur

Rank 5

GAZIPUR Easiest to Reach (Rank 1)

Tongi

Nishat Nagar, Ershadnagar

Est. Micro-Businesses

1,850

Potential viable units

Target WGWs

2,200

Women entering sector

Est. Customer Base

45,000

Addressable local market

Market Viability & Insight

Highest income area. Strong access to finance, savings, and assets. Women own homes and are long-term residents. The market is very mature, especially for Circular Economy (Jhut/Waste) which is a common transition point costing ~15,000 BDT to start.

SWEET SPOT CAPITAL
15,000 – 25,000 BDT

PRIMARY CHALLENGE
High Competition

iDE

2.3. Field Data Collection and Prototyping and Testing

Focus Group Discussion (FGD) Guidelines: Women Entrepreneurs

1. Introduction & Basic Demographics

Establish rapport and capture the baseline profile of the participants.

- **Participant Profiles:** Name, Age, and Education level.
- **Work History:** How long were you working in a factory job?
- **The Entrepreneurial Shift:** * What has your experience been as a woman entrepreneur?
 - What is your main challenge today?
 - **The "Drop-off" Question:** In past programs, many women dropped out. Why do you think that happened?

2. Perceived Power Status & Agency

Exploring shifts in household dynamics and personal freedom.

- **Family Dynamics:** How did things change when you switched from factory worker to entrepreneur?
- **Financial Agency:** How are household financial decisions made now?
- **Mobility & Safety:**
 - How mobile are you (traveling outside the home)?
 - Do you feel safe traveling alone for work or leisure? If not, why?
 - Who do you usually travel with?

type	name	label::English (en)	label::Bangla (bn)
begin_group	metadata	Administrative Info	প্রশাসনিক তথ্য
text	team_name	Team Name	টিমের নাম
text	staff_name	Staff Member Name	স্টাফ মেম্বারের নাম
select_one city_list	city	City	শহর / এলাকা
select_one ward_list	ward	Ward	ওয়ার্ড
text	ward_other	Specify ward if Other	অন্য ওয়ার্ড হলে উল্লেখ :
end_group			
begin_group	basics	Basic Information	প্রাথমিক তথ্য
text	resp_name	What is your name?	আপনার নাম কি?
integer	resp_age	How old are you?	আপনার বয়স কত?
select_one edu_list	education	What is your education level?	আপনার শিক্ষার স্তর কী?
text	occupation	What is your occupation?	আপনার পেশা কী?
integer	individual_income	What is your individual income?	আপনার ব্যক্তিগত আয় :
integer	hh_income	What is your household income?	আপনার পরিবারের মোট
text	wife_factory_exit	How long has your wife/family member been out of	আপনার স্ত্রী/পরিবারের স
text	dilo_resp	Describe a typical day in your life.	আপনার একটি সাধারণ
end_group			
begin_group	transition	Household Context & Transition	পারিবারিক প্রেক্ষাপট ও
text	decision_process	How did the family decide she should leave the fac	কারখানা ছেড়ে ব্যবসা শু
text	hh_differences	What differences have you noticed in household lif	কারখানা থেকে ব্যবসায়
text	hh_setup_participation	How did the family help in the initial setup of the er	ব্যবসার শুরুতে পরিবার
end_group			
begin_group	decision_authority	Financial Authority	আর্থিক সিদ্ধান্ত ও কর্তৃত্ব
text	profit_decisions	How are decisions regarding spending and profits	খরচ এবং ব্যবসার লাভ :
text	female_capital_mgt	Perspective on women managing significant capita	নারী স্বাধীনভাবে বড় অং
text	stability_evolution	How has financial stability evolved since she began	ব্যবসা শুরু করার পর প
end_group			
begin_group	care_work	Time & Care Work	সময় ব্যবস্থাপনা ও গৃহস্থ
text	chores_factory_era	How were chores shared when she worked in the f	তিনি যখন কারখানায় কা
text	chores_biz_era	How are chores shared now that she has a busines	এখন ব্যবসা থাকায় ঘরে
text	domestic_biz_balance	Challenges in balancing domestic duties with busin	ঘরের কাজ এবং ব্যবসার
text	time_prioritization	How does the family prioritize time when both need	যখন ঘর এবং ব্যবসার ক
end_group			
begin_group	social_status	Social Perception	সামাজিক দৃষ্টিভঙ্গি ও ম
text	community_reaction	Community's reaction to women business owner	একটি নারী উদ্যোগ

English language
doc. guide

xls bilingual file

auto input to Kobo
forms

1

2

3

4

5

6

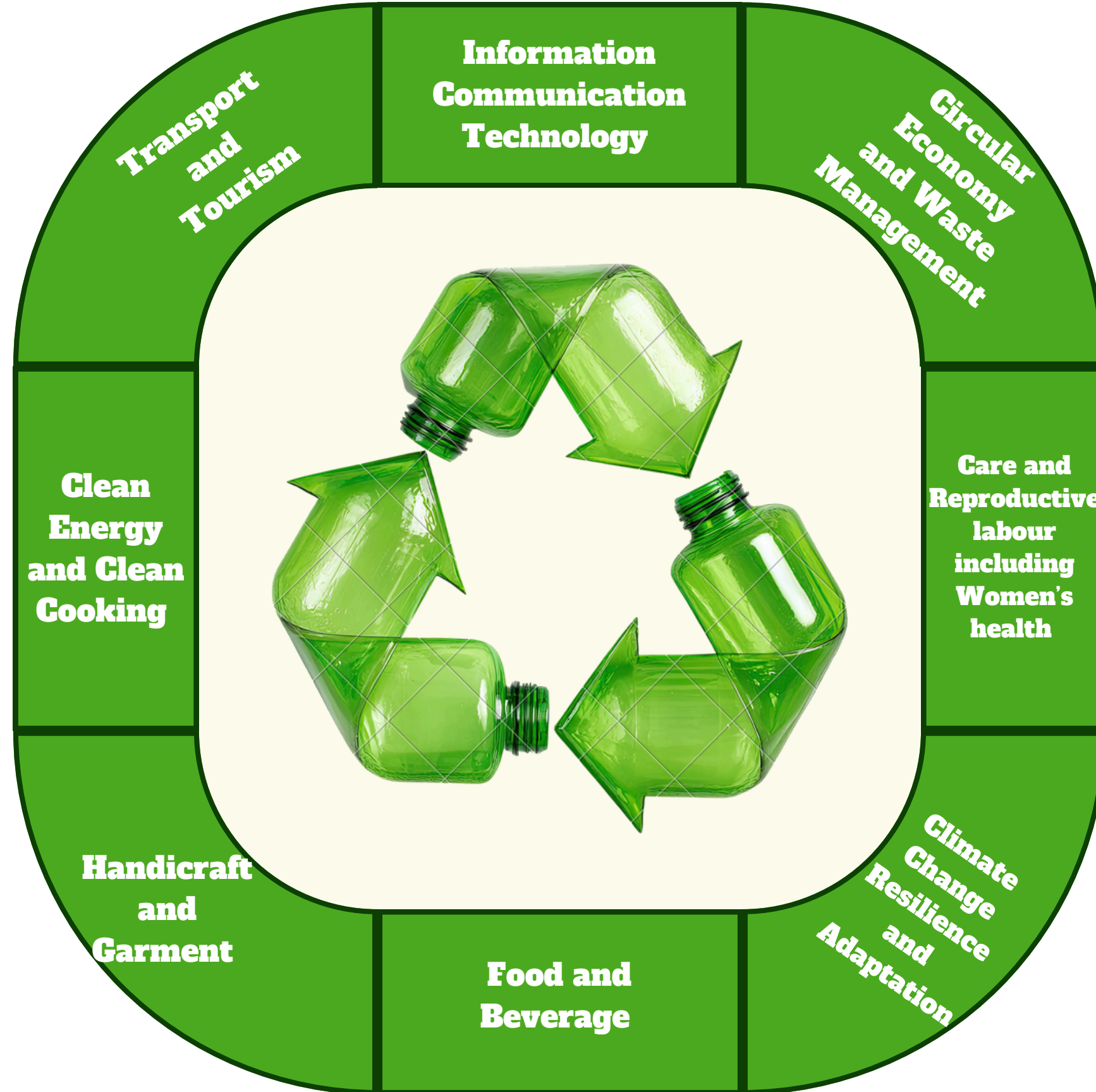
7

DEFINE

DISCOVER

The Human Centered Design Process

SH



1

2

3

4

5

6

7

DEFINE

DISCOVER

The Human Centered Design Process

SH



Abstract concept

concrete and clear visual scenarios

clear and actionable feedback



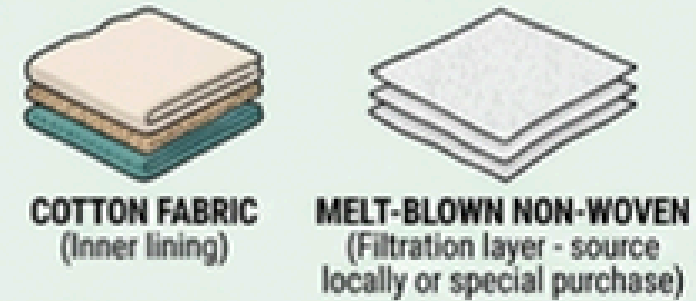
DIAGRAM: BANGLADESH WOMEN ENTREPRENEURS - N95-STYLE MASK PRODUCTION FROM RECYCLED MATERIALS & FABRICS FOR AIR POLLUTION.

MATERIAL SOURCING & PREPARATION

OUTER SHELL (RECYCLED)



INNER FILTRATION & LINING (FABRICS)



ACCESSORIES



STEP-BY-STEP ASSEMBLY

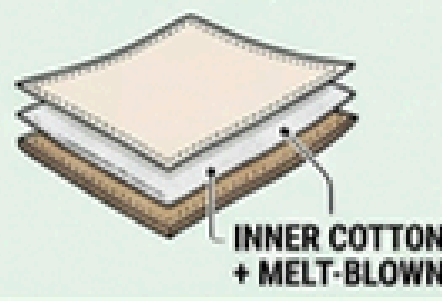
1 PATTERN CUTTING

- Use standardized ergonomic pattern



2 INNER LAYERING

- Sew inner lining to filtration layer



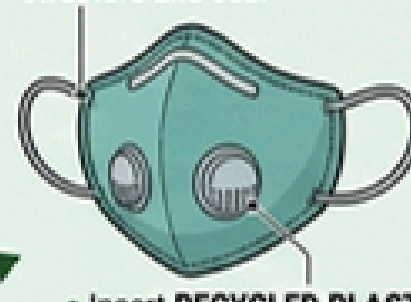
3 OUTER SHELL & ELASTICS

- Attach **OUTER RECYCLED SHELL** (JUTE or PLASTIC)
- Attach **EAR LOOPS** and **NOSE WIRE**



4 FINAL ASSEMBLY & VALVES

- Final stitching for structure and seal



QUALITY ASSURANCE & STANDARDS

- Aim for certifications where possible
- Regular testing

KEY FEATURES & ENTREPRENEUR BENEFITS

A N95-LEVEL PROTECTION

- Filters 95% of fine particles (e.g., PM2.5)
- Protects against urban air pollution

B SUSTAINABLE & CIRCULAR

- Reduces plastic and jute waste
- Eco-friendly product

C ECONOMIC EMPOWERMENT

- Income source for women-led businesses
- Job creation in local community

D SCALABLE & COST-EFFECTIVE

- Uses affordable local materials
- Low initial capital needed
- Model for micro-enterprises

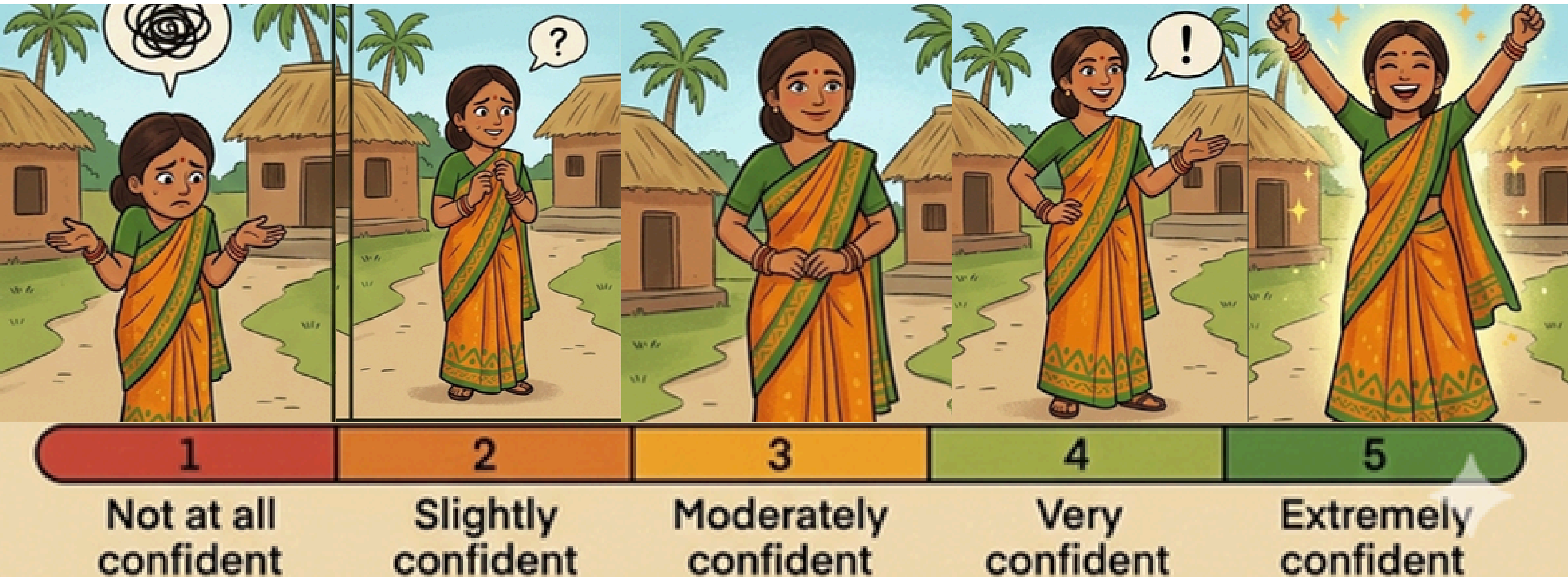
- FIT TEST**
- PARTICLE FILTRATION EFFICIENCY**
- BREATHABILITY**



Scenario testing and sacrificial prototypes

DEFINE

DISCOVER



An application - Humanised Likert Scale- with real images

- religion markers
- Caste markers
- Income and wealth markers
 - Bangles, height, clothes
- Colourism

iDE

3. The Process in Practice

Experience from the Field

FGD Moderation:

- Moderated by the study team instead of field team
- Activity oriented and participatory, instead of just verbal interview
- Semi structured, open ended, encouraged storytelling
- Moving from abstract ideas to meaningful discussions (This is where rapid prototyping became extremely valuable. We used visual scenarios, images, enterprise examples, and concept cards to make ideas tangible)

Field Challenges:

- Recruiting Male Participants for FGDs
- Time constraints and competing responsibilities of participants
- Introducing the concept of green business to participants
- Capturing local nuance of different locations



iDE



global
evaluation
initiative

Thank you!

www.glocalevalweek.org