Strategic Foresight Peru

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National Development Strategic Plan (PEDN) to 2050

Constitution of Peru

Acuerdo Nacional
Unidos para crecer

National Agreement

Agenda 2030

National Strategic Development Plan to 2021

Visión del
Perú al 2050

Vision Peru 2050

PEDN 2050

= opportunities
= opportunities

productivity

+ STI

+ digital transformation

+ territorial approach

People development

Sustainable territory

Competitiveness & innovation

9 Guidelines

+ national defense

+ international cooperation

Risk of disasters

Modern state

4 National Goals

peace

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National System for Science, Technology and Innovation SINACTI

Strategy Definition

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Implementation

Pro CIENCIA

PRO innóvate

Indecopi

INACAL Instituto Nacional de Calidad

Execution

UNIVERSITIES

CNEE CONIDA

IIAP Instituto de Investigaciones de la Amazonía Peruana

IMARPE INSTITUTO DEL MAR DEL PERÚ

IGP Instituto Geofísico del Perú

INSTITUTO GEOGRÁFICO NACIONAL

SECTOR ENERGÍA Y MINAS INGEMMET INSTITUTO GEOLÓGICO, MINERO Y METALÚRGICO

INAIGEM INSTITUTO NACIONAL DE INVESTIGACIÓN EN GLACIARES Y ECOSISTEMAS DE MONTAÑAS

inia INSTITUTO NACIONAL DE INNOVACIÓN AGRARIA Ministerio de Agricultura y Riego

COMPANIES

INICTEL-UNI

MINISTERIO DE SALUD INSTITUTO NACIONAL DE SALUD

Senamhi SERVICIO NACIONAL DE METEOROLOGÍA E HIDROLOGÍA DEL PERÚ

INSTITUTO PERUANO DE ENERGÍA NUCLEAR IPEN

ITP red CITE Instituto Tecnológico de la Producción

PUBLIC RESEARCH INSTITUTES

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Peru's National Technology Roadmap

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K-Innovation Program

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Implementation

01

Team building: Korea-Peru experts
Technology Forecasting

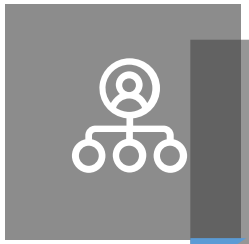
Year 1

02

Engaging local experts
Technology Roadmap: Stage 1

Year 2

03



Technology Roadmap: Stage 2
Institutionalizing innovation programs

Year 3

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Timelines

01 — 2022.06~09.

Team

Peru-Korea experts formed a team: Theories, Case studies

02 — 2022.10~11.

Forecasting

Peru experts developed six tech. forecasting reports.

03 — 2023.03~08.

Delphi

Peru's TRM committee conducted the Delphi survey.

04 — 2023.09~10.

Analysis

Peru-Korea experts developed the (draft) national tech. roadmap.

05 — 2024.07~08.

Delphi 2

Second round – Delphi. Consensus

06 — 2024.09~12.

i-Programs

Peru-Korea experts developed the innovation programs

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Key Figures

+4

Workshops

25

Industry Leaders

+270

Experts

YEAR 1. (2022)
Technology Forecasting

Tech. Forecasting Process (2022)

STEEP Analysis	Discover opportunities and threats
Trend/Issues	Define major trends and issues
Scenarios	Identify the best/worst scenarios
Strategic Prod.	Identify and prioritize strategic products/services
Vision	Set the vision and goals

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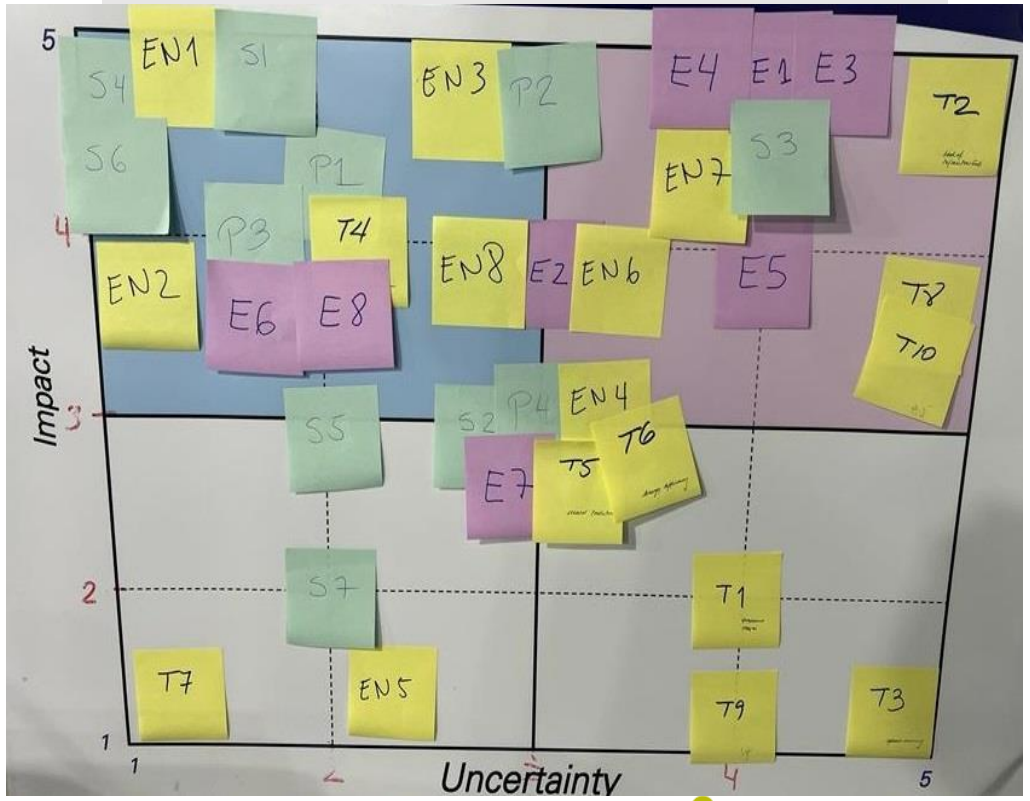
STEEP Analysis

Identify drivers

Social	S1: Demographics S2: capacity …
Techological	T1: Clean material T2: Industry 4.0, Biotech, T3: R&D….
Economical	E1: Foreign investment E2: Labor cost…
Environmental	En1: Climate change En2: Friendly materials…
Political	P1: Insitutional instability P2: Gov incentive P3: IP, right & patents…

Assess impact x uncertainty

Rank the drivers



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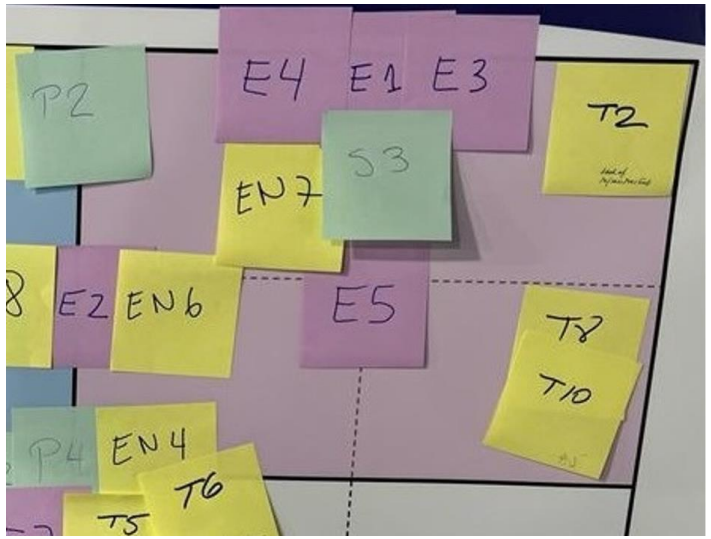
Trend/Issues

Key axes of Uncertainty → **Identify Trends/Issues**

High uncertainty, High impact



Find common trends or issues

T8. Mining without water T10.Reprocessing mining waste T5. Cleaner production T6. Energy efficiency	Innovation in extraction process

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Strategies

Strategies	Opportunities / Threats
• Adopt Industry 4.0 technologies, integrate supply chain.	• Improved efficiency, quality, flexibility / significant investment needed, potential threat of new foreign competitors.
• Implement flexible labor laws, promote formality	• Increased productivity and benefits and protection to workers/ possible abuse of flexibility
• Research, manage and adapt new technology	• Early adoption of new technologies/ obsolete technology compared to foreign competitors.
• Formalization, investment in technology, training programs, access to credit, reduced logistics costs	• Increased access to finance, better working conditions/ resistance from informals and potential threat of foreign workforce.
• Align study plans to industry needs, increase internships, coordinate academia-industry	• Prepared workforce for tech adoption/ interinstitutional coordination needed

Key Technologies
Textile & Apparel Manufacturing & Digital Design
Textile and Apparel manufacturing
Textile Materials
Logistics
manufacturing & Logistics

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Vision Statement

Scenario Writing A (Best)		**Scenario Description**		
Scenario Title	Key axes of uncertainty	to 2030	to 2040	to 2050
Peru emerging as a textile and apparel superpower in 2050	Flexible labor laws	Initial labor regulation reforms	Expanded flexibility and formalization	Optimal flexibility achieved
	Investment promotion	Emergence of startups	Significant investment growth.	Widespread adoption of new technologies
	Abundance of human resources	Increased training programs	Highly skilled workforce	Optimized innovation ecosystem
	Complete new tech and materials expertise	Pilot projects	Advancement in materials and digitization	Global leadership in materials and exports

YEAR 2. (2023)
Delphi Survey

Delphi Survey Process (2023)

2023. 3. — Workshop
Theories and Practices of a conducting Delphi survey

2023. 4-6. — TRM Committee
Composition of the Peru TRM committees;
Collect experts to participate in the Delphi survey

2023. 7-8. — Survey
Conducting online Delphi survey

2023. 9-10. — Analysis
Analysis of the Delphi survey result

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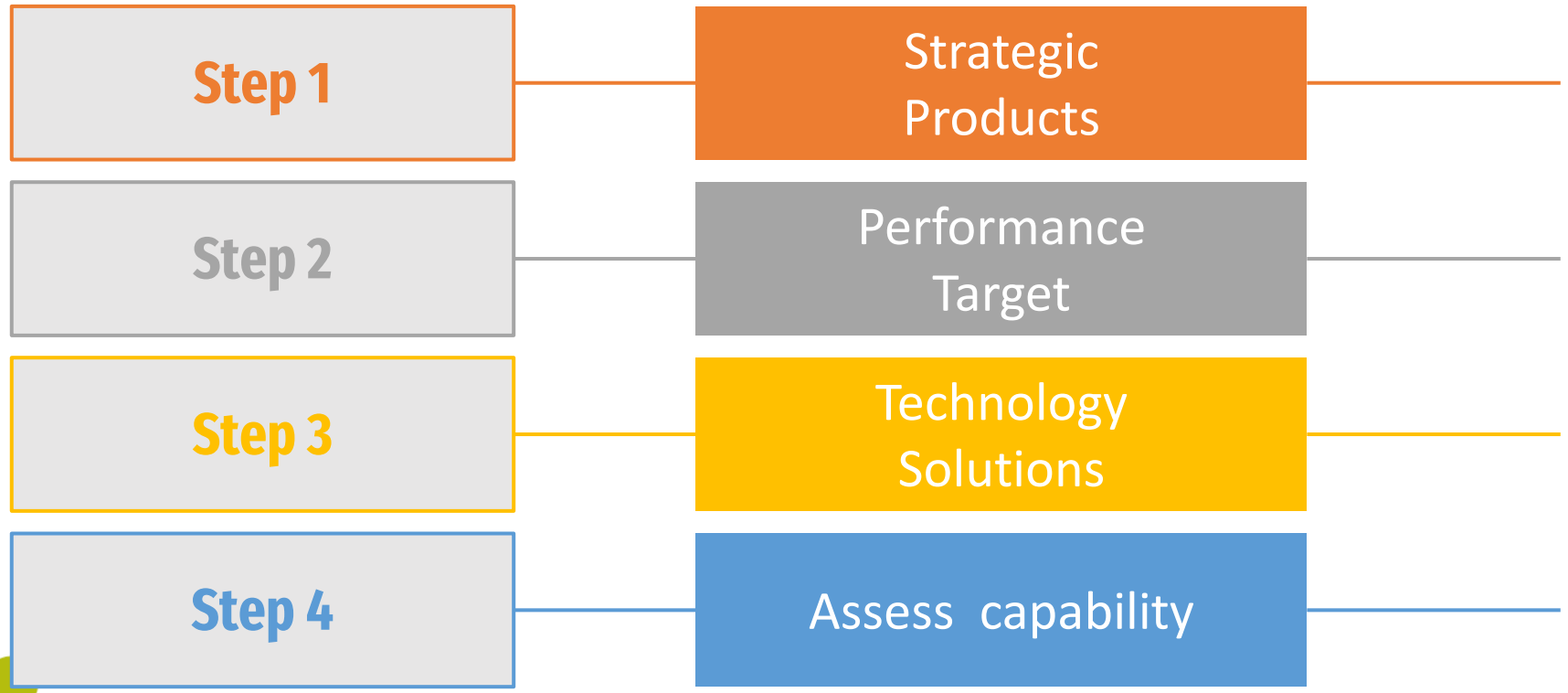
Workshop (exercise)



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TRM Committee

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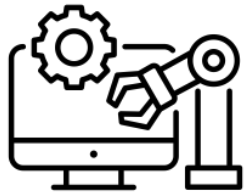
Agribusiness
66

Forestry
24

Mining &
Materials
47

Textile &
Apparel
47



Advanced
Manufacturing
47

Creative
Industry
39

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Survey

- ✓ 270 Peruvian experts
- ✓ 2023. 7. 10 ~ 8. 15.
- ✓ Online (google form)

Technology Assessment

- Economic importance
- HR
- Infrastructure
- Investment

Technology Readiness

- Leading economy
- Time of realization: L. economy & Peru

Policy Measures

- Infrastructure
- Manpower
- Investment
- Cooperation
- Deregulation

Investment Priority

- Domestic R&D
- Intl. R&D
- Licensing
- Training

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Findings

Confident in R&D

Mining (exp. Clean production)
Textile (all)
Agri > Food Processing

Strategic partners

US/EU: Mining and Materials, Creative industry, Agribusiness
E.Asia: Adv. Manufacturing, Textile & Apparel

Underrated industries

Advanced Manufacturing
Creative Industry
Textile/Food Manufacturing

Policy Priority

Infrastructure: Mining and materials, Forestry, Agribusiness
HR: Creative industry,
R&D Investment: Textile and apparel
Low demand for deregulation

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Delphi Survey
Textile

Capability assessment
Leading countries
Technology readiness
Acquisition methods
Policy measures

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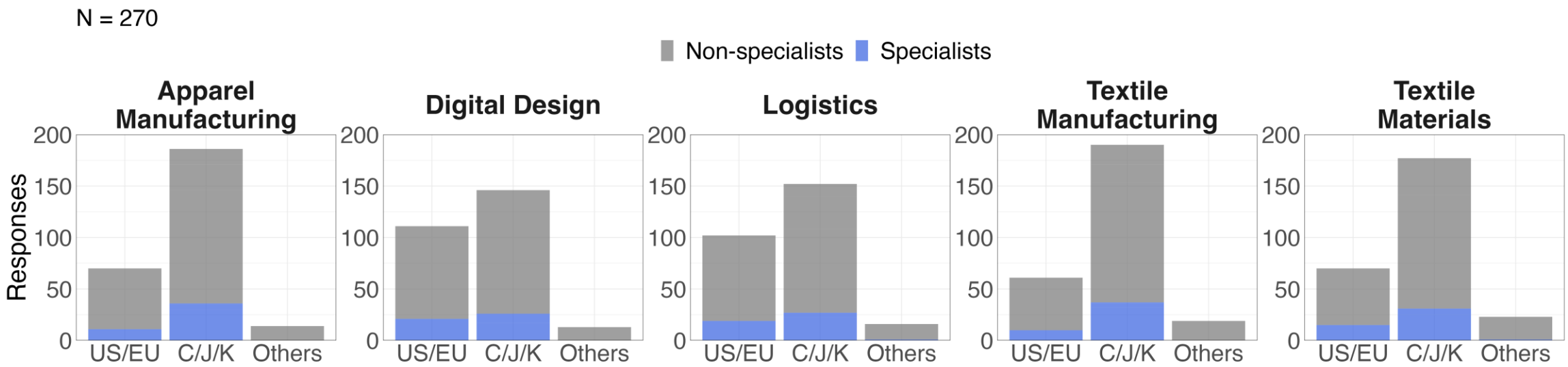
Capability Assessment

as of 2023

- **Specialists** of textile and apparel **assess the capability higher** than non-specialists.
  - Economic importance
  - HR in R&D
  - R&D infrastructure
  - R&D investment
- The **differences are consistent** with statistical significance at α=.05.

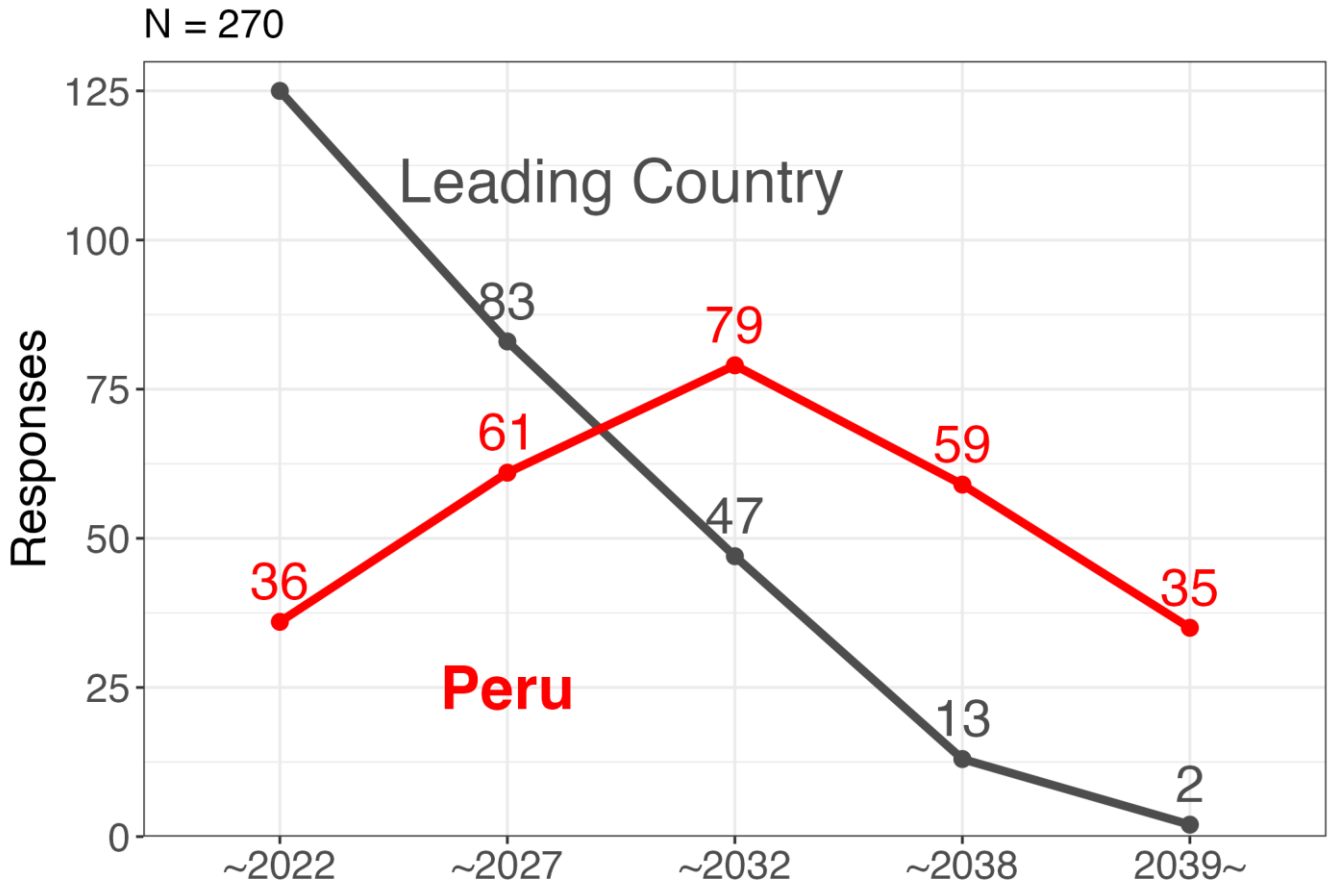
Leading economy as of 2023

- **Specialists** in textile and apparel acknowledge **China, Japan, and Korea are leading** the field.



Technology Readiness

- Technology readiness in textile and apparel has an over **10-year gap compared to the leading economy**.



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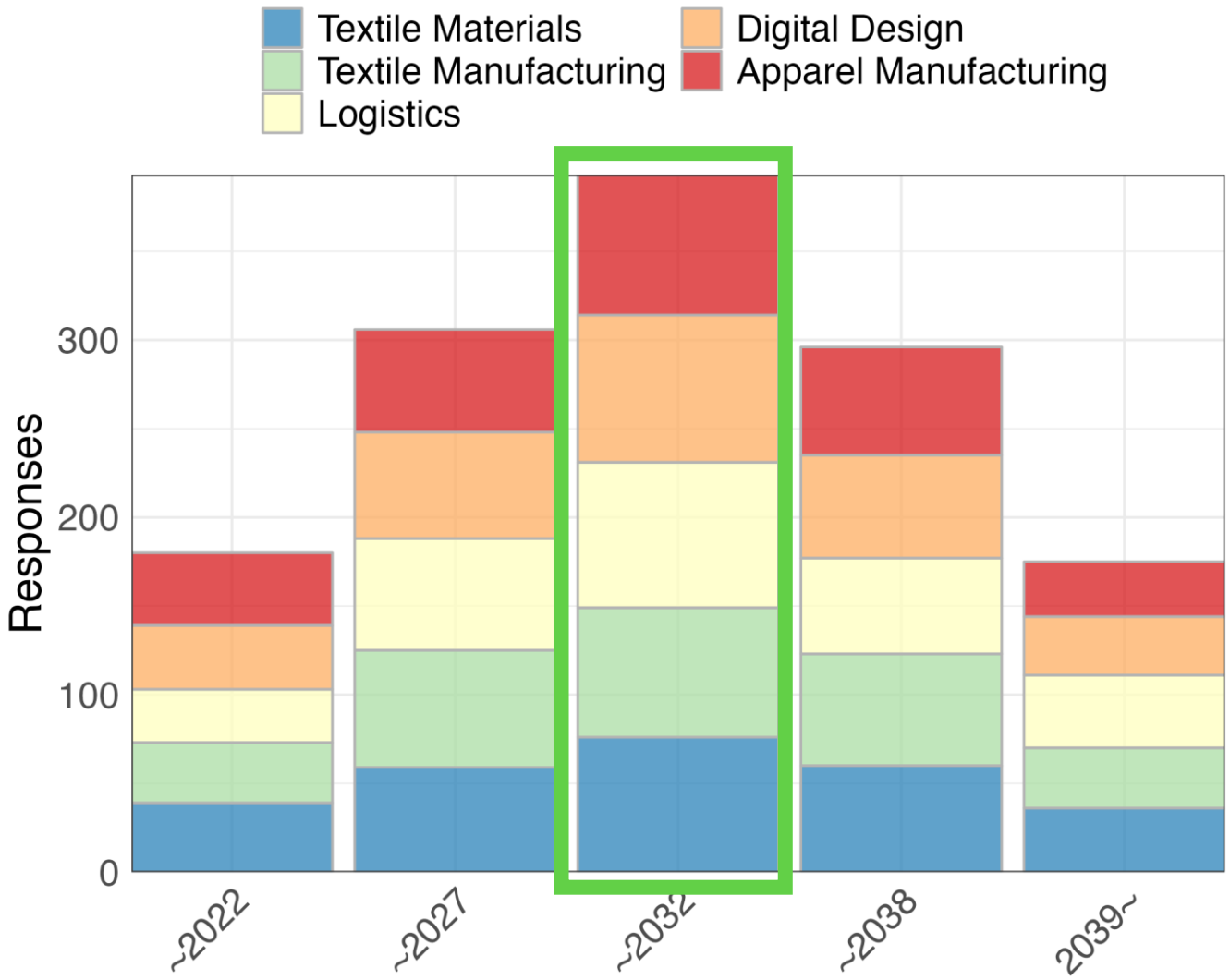
Readiness by Technologies

- **Apparel Manufacturing, digital design, logistics, textile manufacturing and textile materials** are likely to be ready in Peru **from 2032**.



Readiness and Capability by Technologies

Technology	TRL	Capability				Timeline
		Economic Importance	Manpower Capability	Infra-structure	R&D Investment	
Textile Materials	TRL 3-4	**	**	**	**	Mid-term
Textile Manufacturing	TRL 4-5	***	**	**	**	Short-term
Apparel Manufacturing	TRL 3-4	***	**	**	**	Mid-term
Digital Design	TRL 3-4	**	**	**	**	Mid-term
Logistics	TRL 3-4	**	**	**	**	Mid-term

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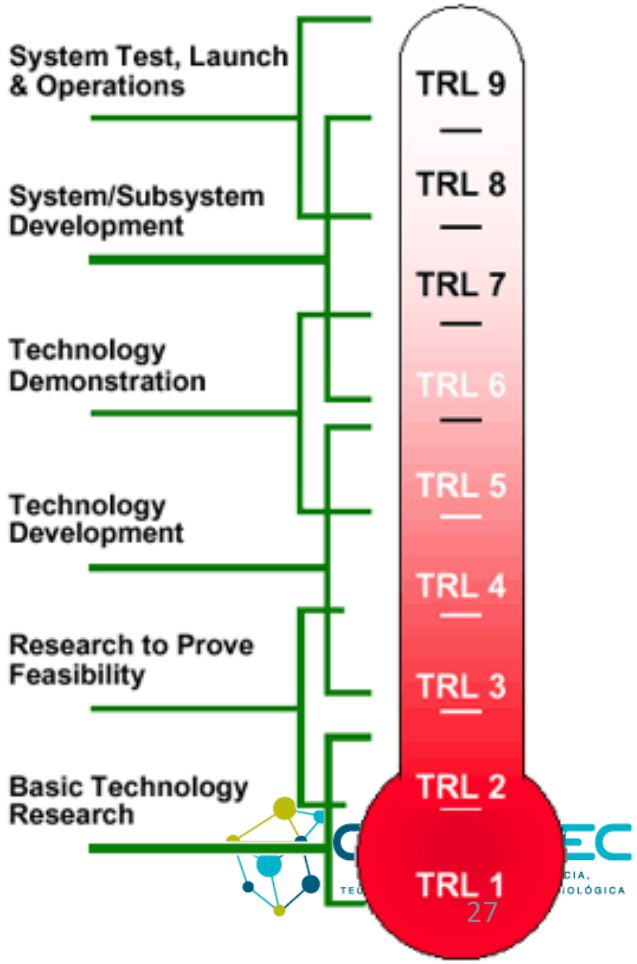
Responses by technologies & readiness

TRL 4-5 TRL 3-4

	~2022	~2027	~2032	~2038	2039~	Total
Textile Materials	39 14%	61 22%	77 28%	60 22%	37 14%	274 100%
Textile Manufacturing	34 12%	68 25%	74 27%	63 23%	35 13%	274 100%
Apparel Manufacturing	41 15%	60 22%	80 29%	61 22%	32 12%	274 100%
Digital Design	36 13%	63 23%	83 30%	58 21%	34 12%	274 100%
Logistics	30 11%	65 24%	83 30%	54 20%	42 15%	274 100%



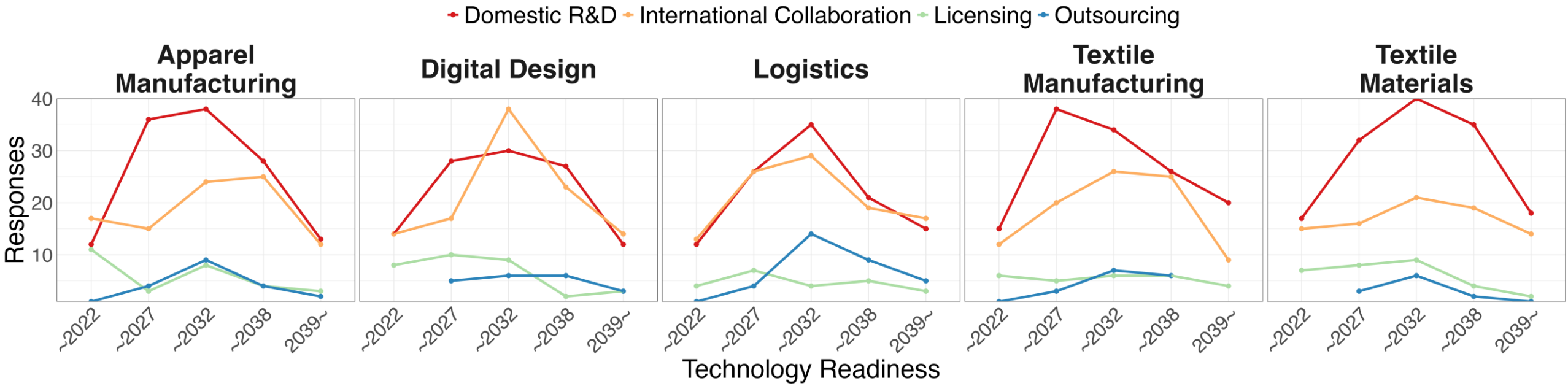
Responses by technologies & capability

- Score (weighted mean) = sum(# of responses * values (1~5)) / N
- *** (>= 3.0, Max 2) > ** (>=2.5) > * (<2.5)

N = 275	Economic	HR	Infrastructure	Investment
Textile Materials	3.37	2.99	2.78	2.67
	**	**	**	**
Textile Manufacturing	3.45	3.17	2.83	2.71
	***	**	**	**
Apparel Manufacturing	3.38	3.22	2.91	2.72
	***	**	**	**
Digital Design	3.29	3.07	2.80	2.70
	**	**	**	**
Logistics	3.30	3.08	2.82	2.66
	**	**	**	**

Acquisition by Readiness

- Strong perception on achieving technologies with **domestic R & D:** Apparel Manufacturing, Logistics and Textile Material Technologies **in the mid term** and Textile Manufacturing technologies **in the short term.**
- Digital Design requires **international collaboration** in the **mid term.**



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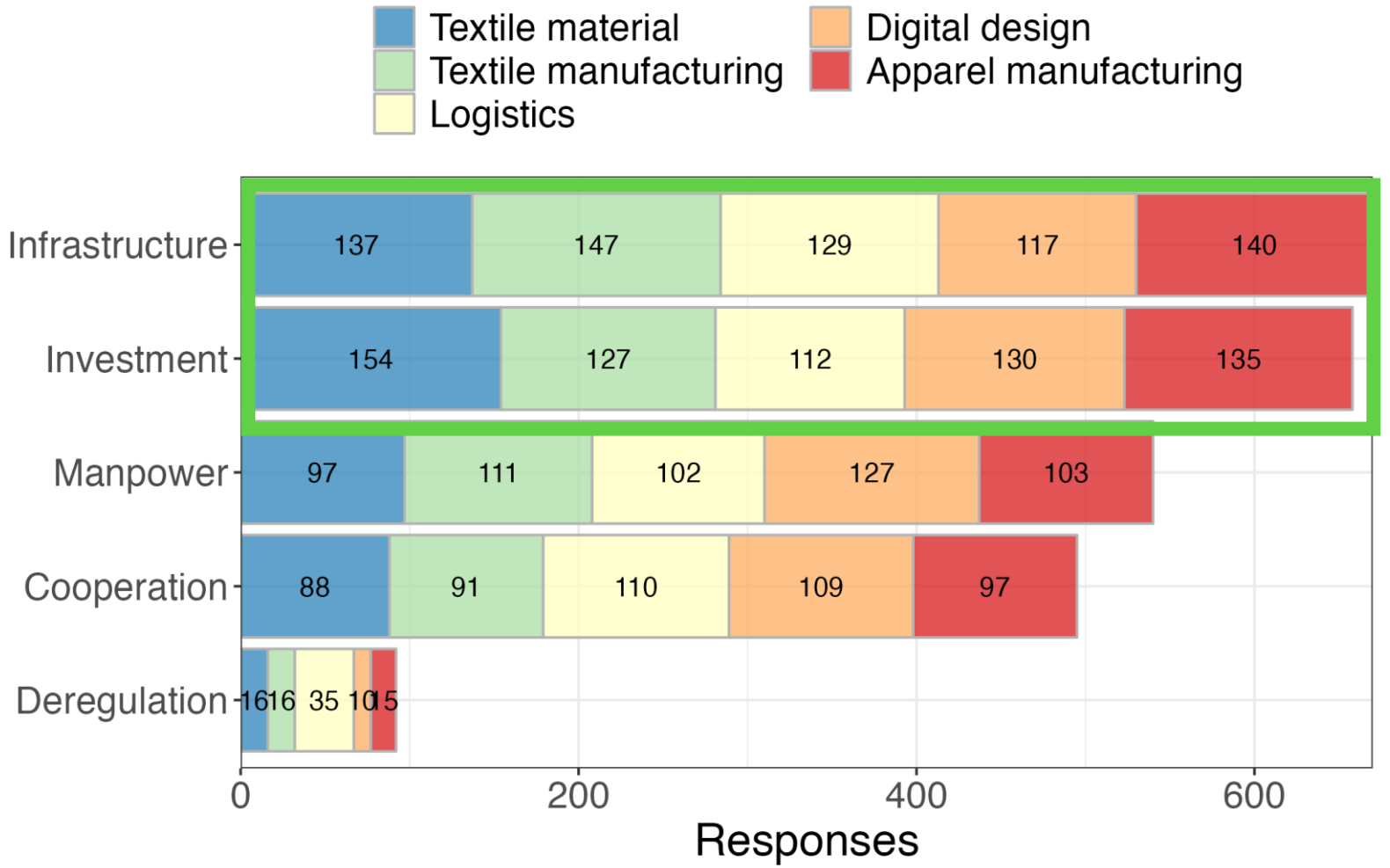
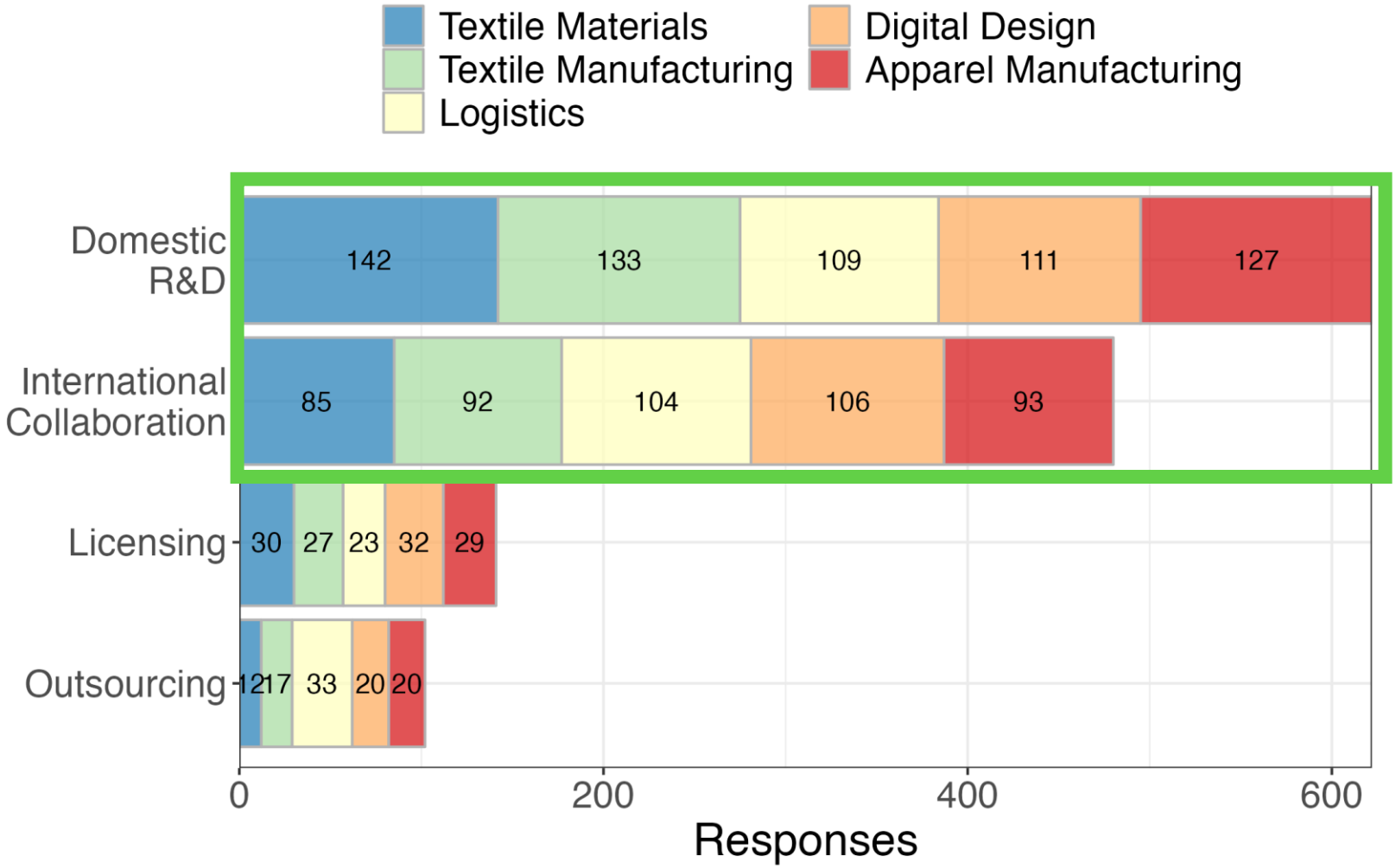
Policy Measures

- **Investing in infrastructure and investment expansion** are the two most urgent requests for **all key technologies**.
- **Manpower** shows significant level of readiness.



Technology Acquisition

- **Technology acquisition through Domestic R & D and International Collaboration Investing** are the two most urgent requests for **all key technologies**.



Technology Roadmap Textile & Apparel

	Goal by 2035	Short (~2026)	Mid (~2030)	Long (~2035)
Textile Materials	90% of manufacturers include new technologies	Domestic R & D	Domestic R & D	Domestic R & D
Textile Manufacturing	80% of manufacturers adopt new technologies	Domestic R & D	Domestic R & D	Domestic R & D
Apparel Manufacturing	80% of manufacturers adopt advanced technology	Domestic R & D	Domestic R & D	Domestic R & D
Digital Design	80% of manufacturers adopt digital design tools	Domestic R & D	International Collaboration	Domestic R & D
Logistics	75% of manufacturers use sophisticated systems.	Domestic R & D / International Collaboration	Domestic R & D	Domestic R & D / International Collaboration

What to do next (2024)

01

In-depth analysis

- Text-mining
- Patent analysis

02

Evaluation

- Run TRM sub-committee meetings
- Align top-down and bottom-up analysis

03

More Experts

- Identify detailed technologies
- Specify technical targets

04

Implementation

- Secure budgets for action plans
- Plan and launch innovation programs

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Gracias

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