A field-driven framework to assess and improve the network flexibility in humanitarian supply chains

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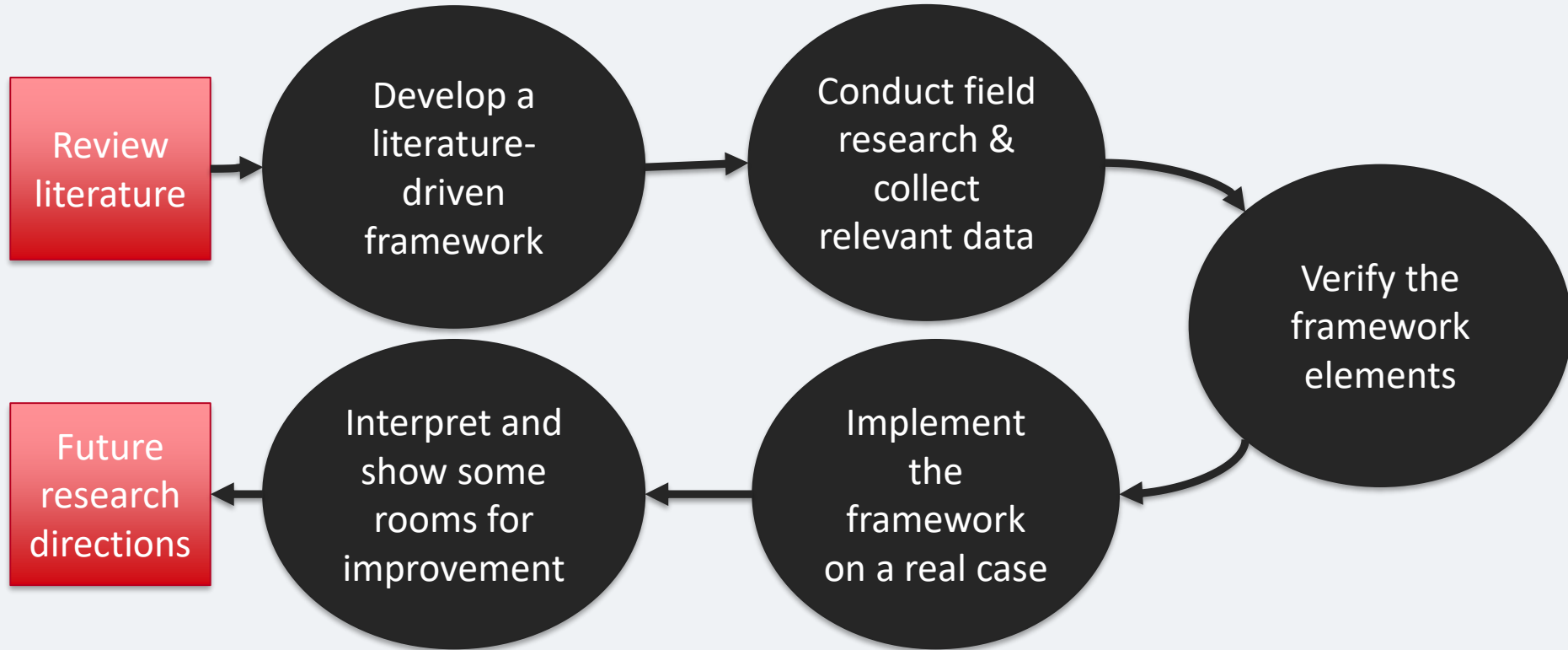Tina Comes
Matthieu Lauras

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Relief distribution problems?

- Delays; backlogs; duplications; ineffectiveness and inefficiency of operations (time, money, resources)

- They are caused by:
  - Uncertainties; unforeseen changes; other sources of disruptions;
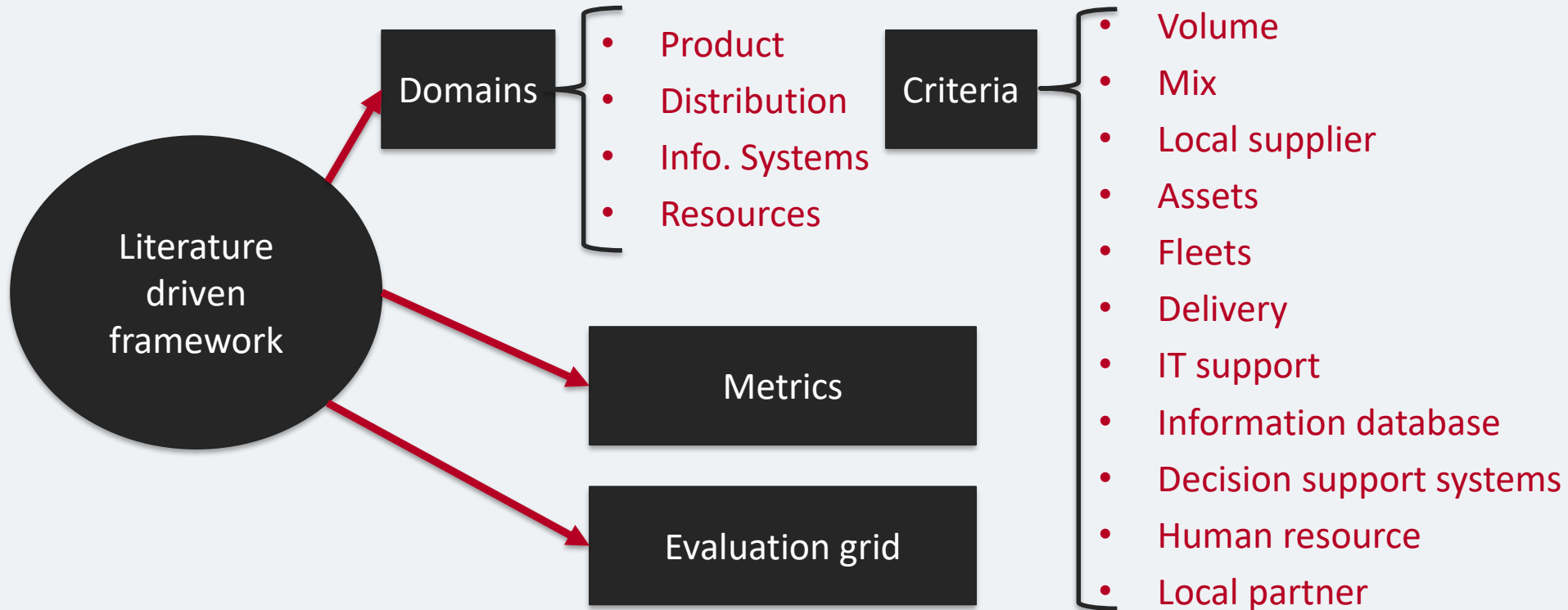
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Recommended Solutions?

- Agility? Resilience?

- Network flexibility

  – What is network flexibility in humanitarian supply chains?

  – How can we measure it?

  ✓ Direct assessment;

  - Through consequences;

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Research Design

Review literature → Develop a literature-driven framework → Conduct field research & collect relevant data → Verify the framework elements → Implement the framework on a real case → Interpret and show some rooms for improvement → Future research directions

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Literature-driven Measurement Framework

Literature driven framework

Domains
- Product
- Distribution
- Info. Systems
- Resources

Criteria
- Volume
- Mix
- Local supplier
- Assets
- Fleets
- Delivery
- IT support
- Information database
- Decision support systems
- Human resource
- Local partner

Metrics

Evaluation grid

Nepal Field Research

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21-29 June 2015

Nepal

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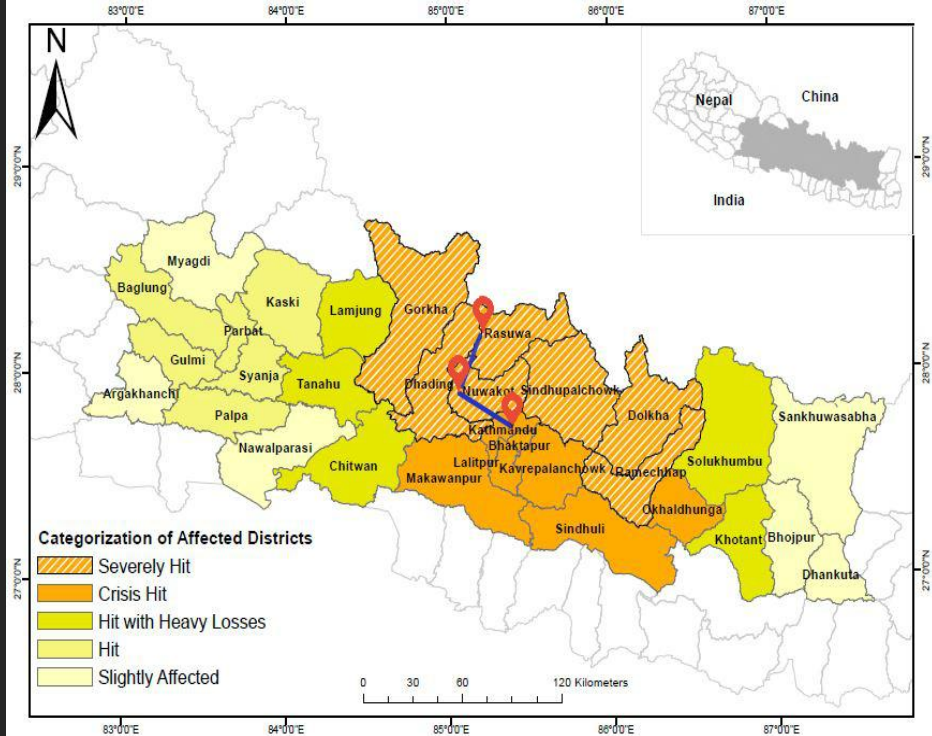
Data collection

- Semi-structured interviews
  - 16; NGOs, iNGOs, UN, RedCross, Government;
  - Country managers, logisticians, information managers;
- Observations
  - Photos and notes;
- Document collection
  - Online sources, newspapers, reports, cluster minutes;

Data analysis

- Qualitative:
  - Content analysis;
- Quantitative:
  - Fuzzy analysis;

Fuzzy analysis (AHP, TOPSIS)

Future research directions
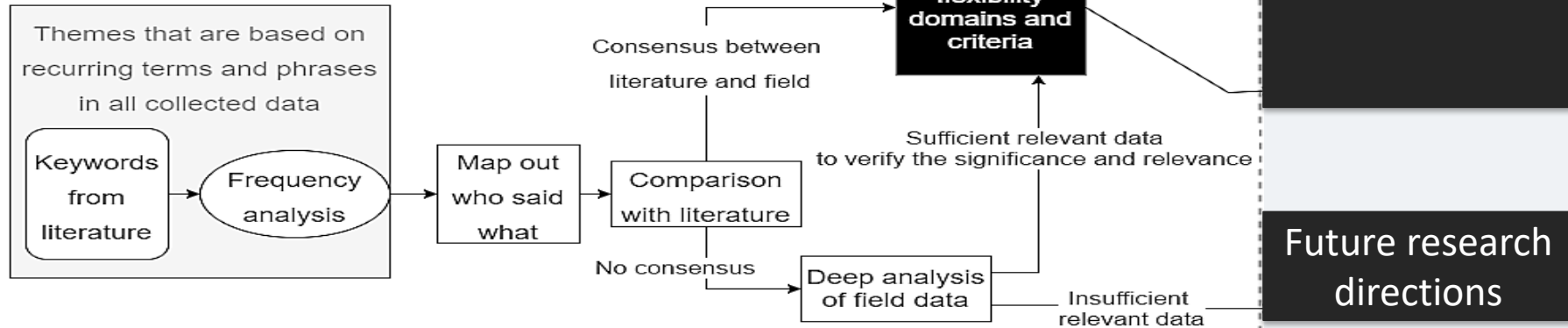
Results

- Verified domains for Nepal case (%impact):

Delivery (23.3%)	IT support (14.2%)
Fleets (12.6%)	Volume (11.7%)
Decision support systems (11.1%)	Information database
Human resource	Assets
Mix	Local sourcing
Local partners	

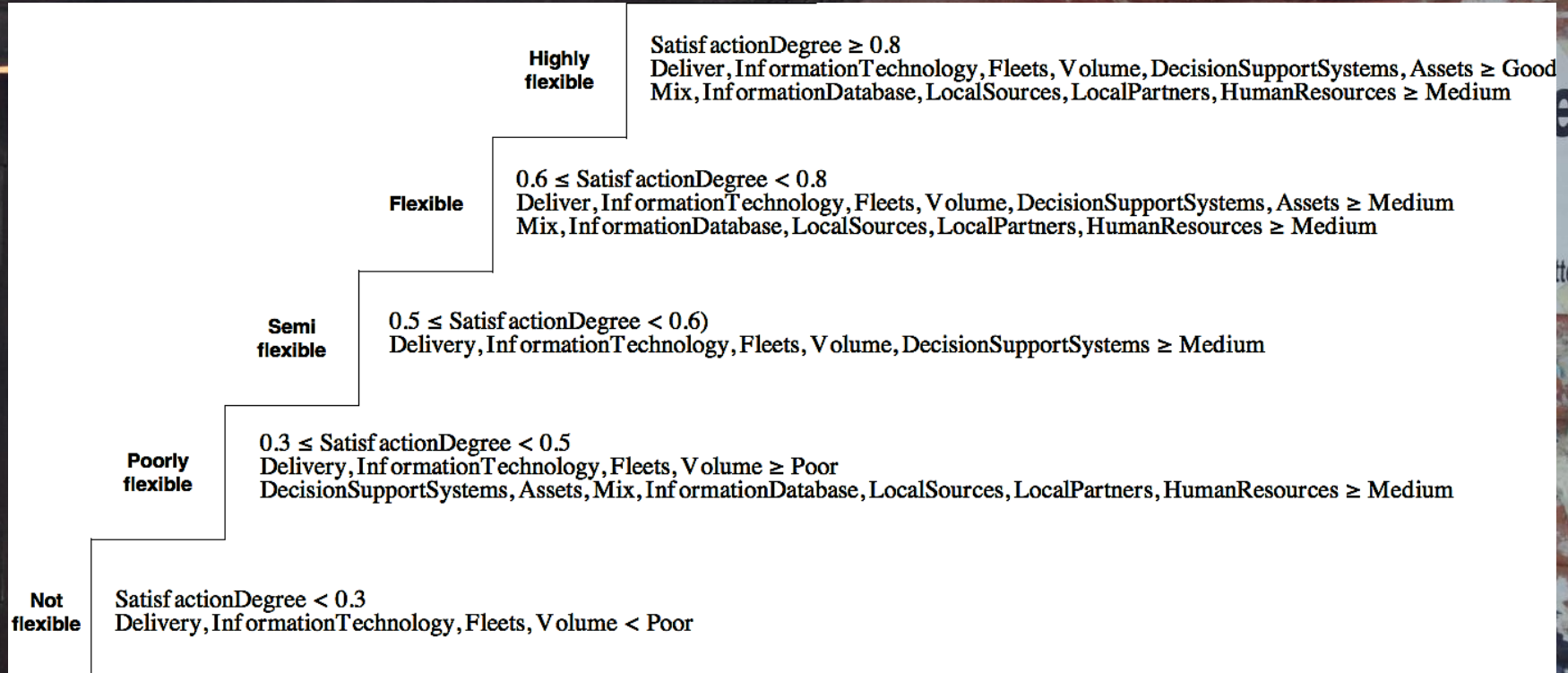- Overall Flexibility level in 9 studied organizations:

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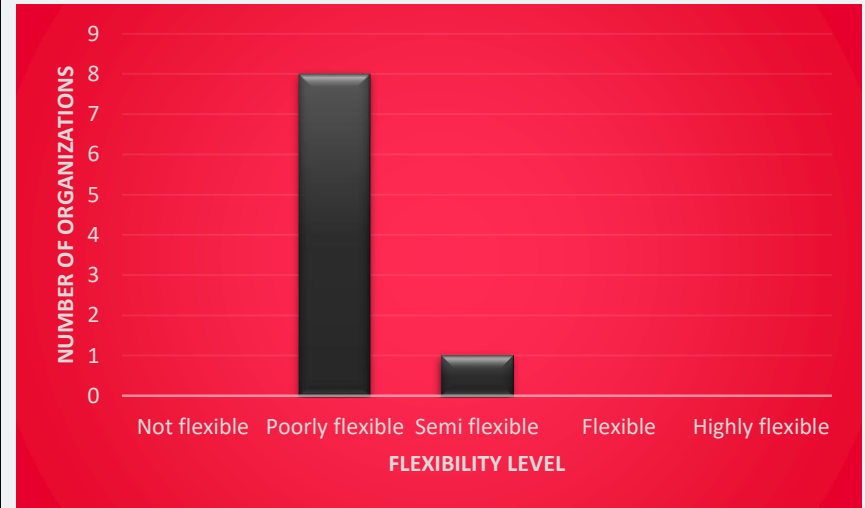
Insights

- Interviewed organizations had major problems in distribution and information related criteria;

- Low levels of flexibility limited possibilities to efficiently respond to environmental, political, and operational challenges;

- HSCs' weakness in providing flexibility hinders achieving resiliency and agility;

Rooms for Improvement

Highly flexible

SatisfactionDegree ≥ 0.8
Deliver, InformationTechnology, Fleets, Volume, DecisionSupportSystems, Assets $\geq$ Good
Mix, InformationDatabase, LocalSources, LocalPartners, HumanResources $\geq$ Medium

Flexible

$0.6 \leq$ SatisfactionDegree < 0.8
Deliver, InformationTechnology, Fleets, Volume, DecisionSupportSystems, Assets $\geq$ Medium
Mix, InformationDatabase, LocalSources, LocalPartners, HumanResources $\geq$ Medium

Semi flexible

$0.5 \leq$ SatisfactionDegree $< 0.6)$
Delivery, InformationTechnology, Fleets, Volume, DecisionSupportSystems $\geq$ Medium

Poorly flexible

$0.3 \leq$ SatisfactionDegree < 0.5
Delivery, InformationTechnology, Fleets, Volume $\geq$ Poor
DecisionSupportSystems, Assets, Mix, InformationDatabase, LocalSources, LocalPartners, HumanResources $\geq$ Medium

Not flexible

SatisfactionDegree < 0.3
Delivery, InformationTechnology, Fleets, Volume $<$ Poor

Summary and conclusion

- Without improving flexibility, humanitarian supply chains are prone to disruptions;
- Shortcuts to flexibility: focusing on delivery, IT support, fleets, volume, decision support systems;
- How? Preparing alternative delivery plans, improving access to information and establishing information sharing platforms, enabling multi-modal transportation, sharing assets, and using IT/ICT solutions;
- By considering context characteristics, proposed framework can be adapted for other cases;

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Backup 1

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