



**33<sup>rd</sup>** Annual **INCOSE**  
international symposium

hybrid event

Honolulu HI USA



## A Viable Systems Model Exploration

# Organizational System Resilience to Disinformation

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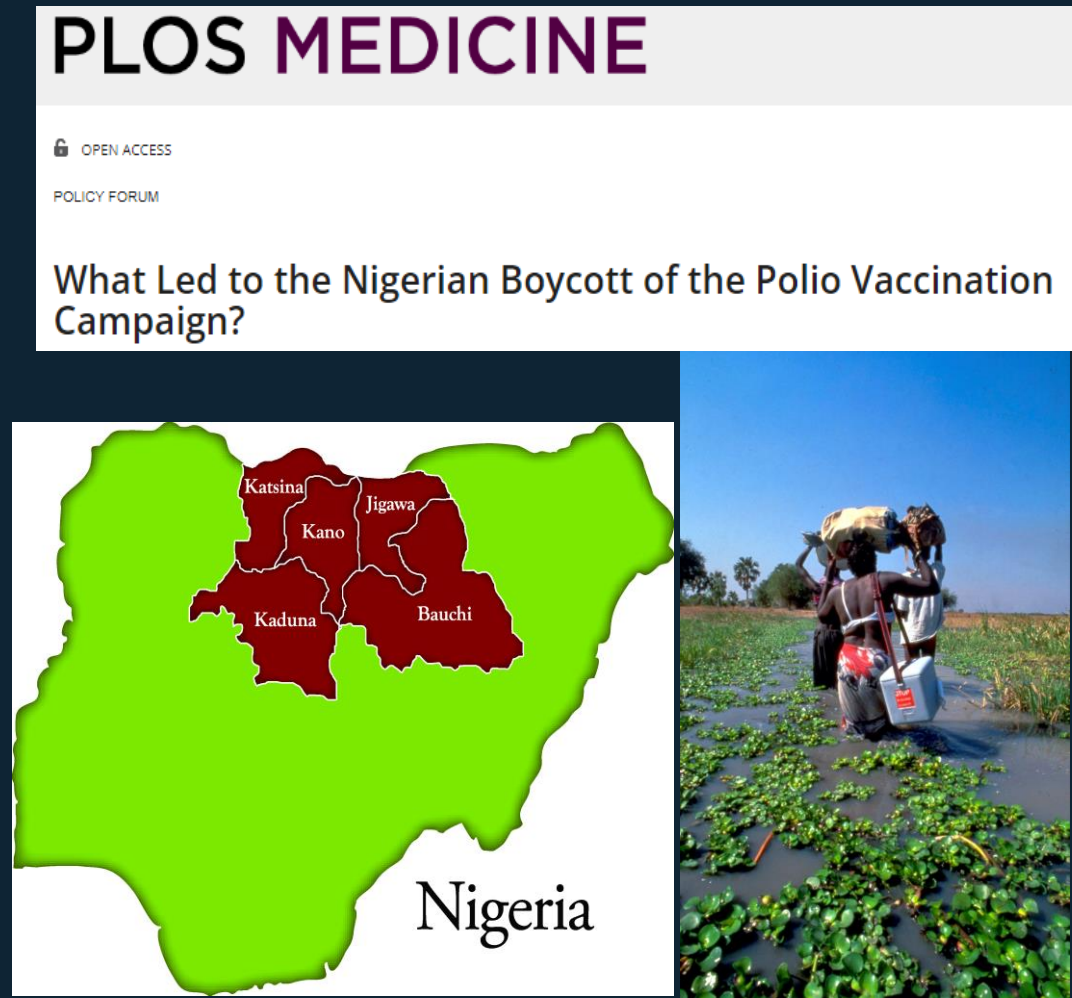


LABORATORY DIRECTED  
RESEARCH & DEVELOPMENT

# Disinformation has impacted organizations' decision-making



Source: [Peace and Security, 2021](#)



Source: [Jegade, 2007](#)



# Knowledge gaps at the intersection of organization and disinformation

## Organizational resilience literature

- Focuses on acute disruptions to business operations
- Has not actively considered disinformation (chronic) influences

## How to Create Organizational Resilience

*The Unsung Hero in Many Organizations*

Service Management Leadership

### 6 Resilience Statistics You Did Not Know

1. One in five businesses haven't considered their business continuity plans and have no disaster recovery strategy.
2. Disaster recovery testing frequency is low – only 50% of businesses test annually.
3. 60% of businesses claim that despite their best efforts, their implemented disaster recovery plans were not effective when facing an emergency.
4. 82% of businesses state their IT infrastructure is not equipped to deal with an incident requiring disaster recovery.
5. In the past five years, 54% of businesses experienced downtime that lasted longer than an eight-hour working day.
6. 75% of companies without a disaster recovery plan close their doors within three years of a cyber attack.

<https://twc-it-solutions.com/blog/disaster-recovery/disaster-recovery-statistics/>

Source: [TWC-IT](#)

## Disinformation literature

- Focuses on automated detections and media disseminations
- Has not actively considered organizational processes



### An Agenda for Disinformation Research

*A Computing Community Consortium (CCC) Quadrennial Paper*

*Nadya Bliss (Arizona State University), Elizabeth Bradley (University of Colorado, Boulder), Joshua Garland (Santa Fe Institute), Filippo Menczer (Indiana University), Scott W. Ruston (Arizona State University), Kate Starbird (University of Washington), and Chris Wiggins (Columbia University)*

#### The Agenda:

#### *Six Strategic Targets of Support and Research*

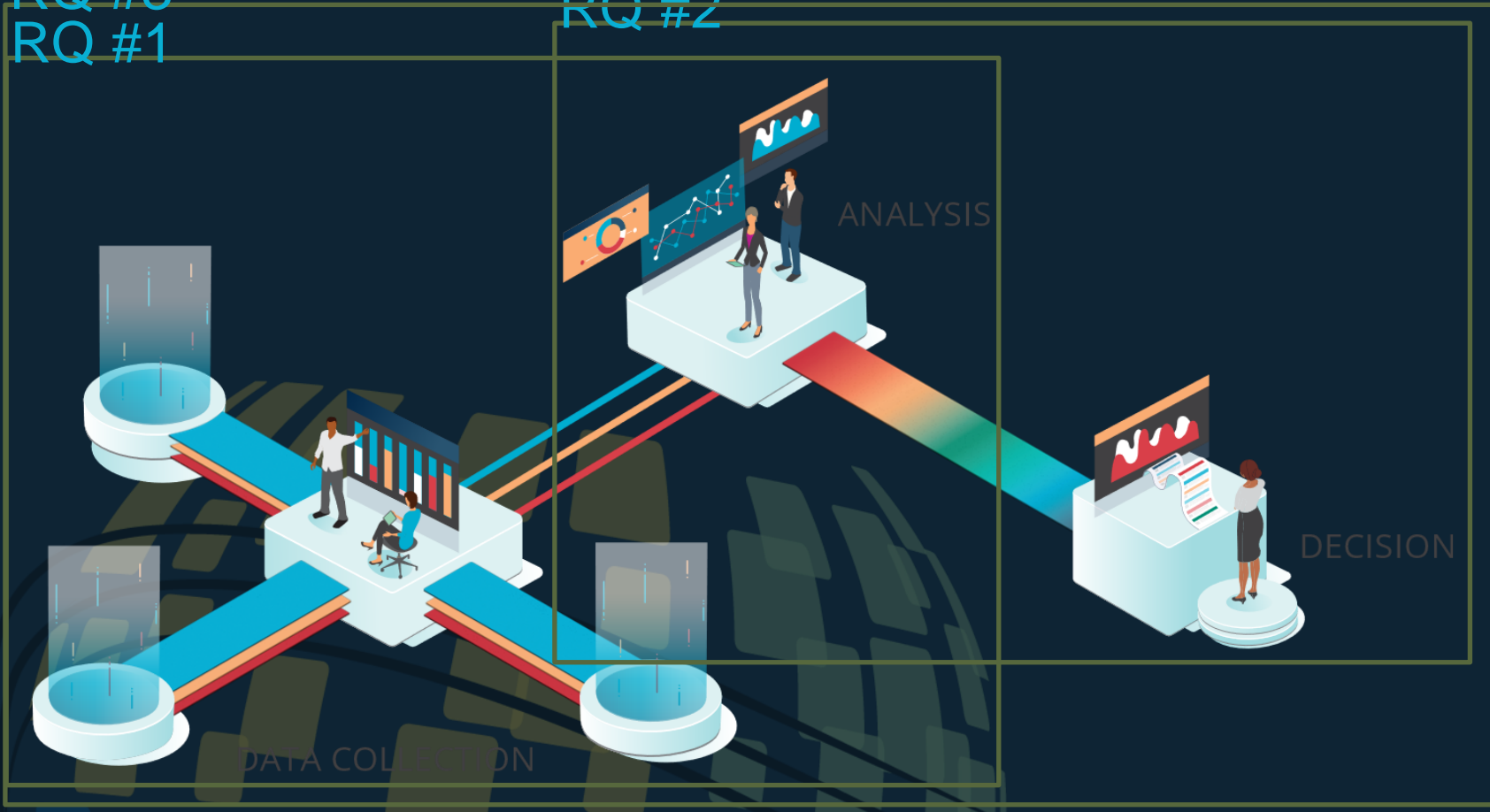
1. Detection of Disinformation at Scale
2. Measures of Impact for Disinformation
3. Open Research Data Infrastructure
4. New Ethical Guidelines
5. Educational Interventions
6. Workforce Training

Source: [Bliss et al., 2020](#)

# Motivating Research Questions span data, simulations, and measurement

RQ #3  
RQ #1

RQ #2



## Research Questions:

1. How can an analyst have effective situational awareness amidst “big data” challenges?  
Hypothesis: A data architecture pipeline that integrates SME insights is critical for building confidence in evaluations
2. How can we advance simulations of organizational behaviors to capture disinformation flow and impacts?  
Hypothesis: Incorporation of organizational modeling and resilience theory can support simulations of an organization’s behavior regarding information use in response to various challenges
3. How could we measure the vulnerabilities and opportunities for improved performance?  
Hypothesis: Quantitative measures (drawn from multiple disciplines) can support resilience characterization and option evaluations

BUILD RESILIENCE

# Motivating Research Questions span data, simulations, and measurement



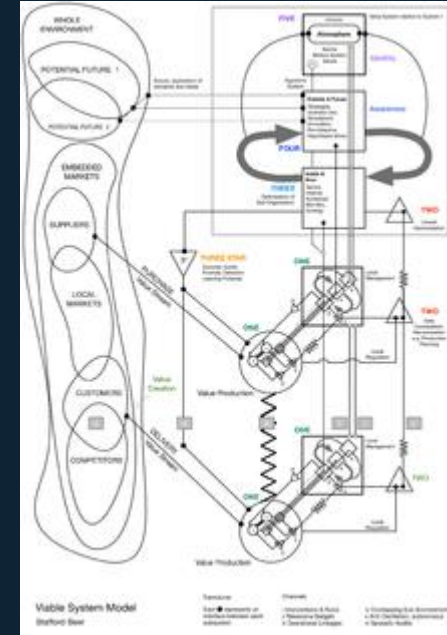
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BUILD RESILIENCE

# Modeling an Organization using a Viable Systems Model Approach

Subsystem (VSM label)	Purpose
Operational Unit (S1)	This is the operational or implementation subsystem that performs tasks directly in support of the overall system objective.
Coordination (S2)	Communicates standards / procedures to the Operation Unit (S1s) and aligns schedules and tasking between each S1. Prevents unnecessary oscillation and conflict within the system.
System Operations (S3) & Audit (S3*)	<p>Maintains the operations of the individual operational units, S1s, within the system and is also responsible for resource allocation and performance accountability.</p> <p>*Ensures operations of each S1 and between the S1 are performing within established expectations. Examines anomalies in performance.</p>
Systems Development (S4)	Scans the environment considering future threats or opportunities—specifically promotes situational awareness and opportunities for innovation. This subsystem also pulls data from the environment for use by the operational unit.
Policy and Identity (S5)	Defines the system's organizational objectives, balances interests of the system, and ensures focus for consistency in decisions, actions, and interpretations.



# Environment

Data useful in the analysis

## Organization Management

Policy and Identity (S5)  
Defines the analysis objective for the operational unit

System Operations (S3)  
Provides resources to support data collection and analysis

Monitoring / Auditing (S3\*)

Coordination Unit (S2)

System development and environmental scanning actions (S4)  
Supports data collection for the operational unit

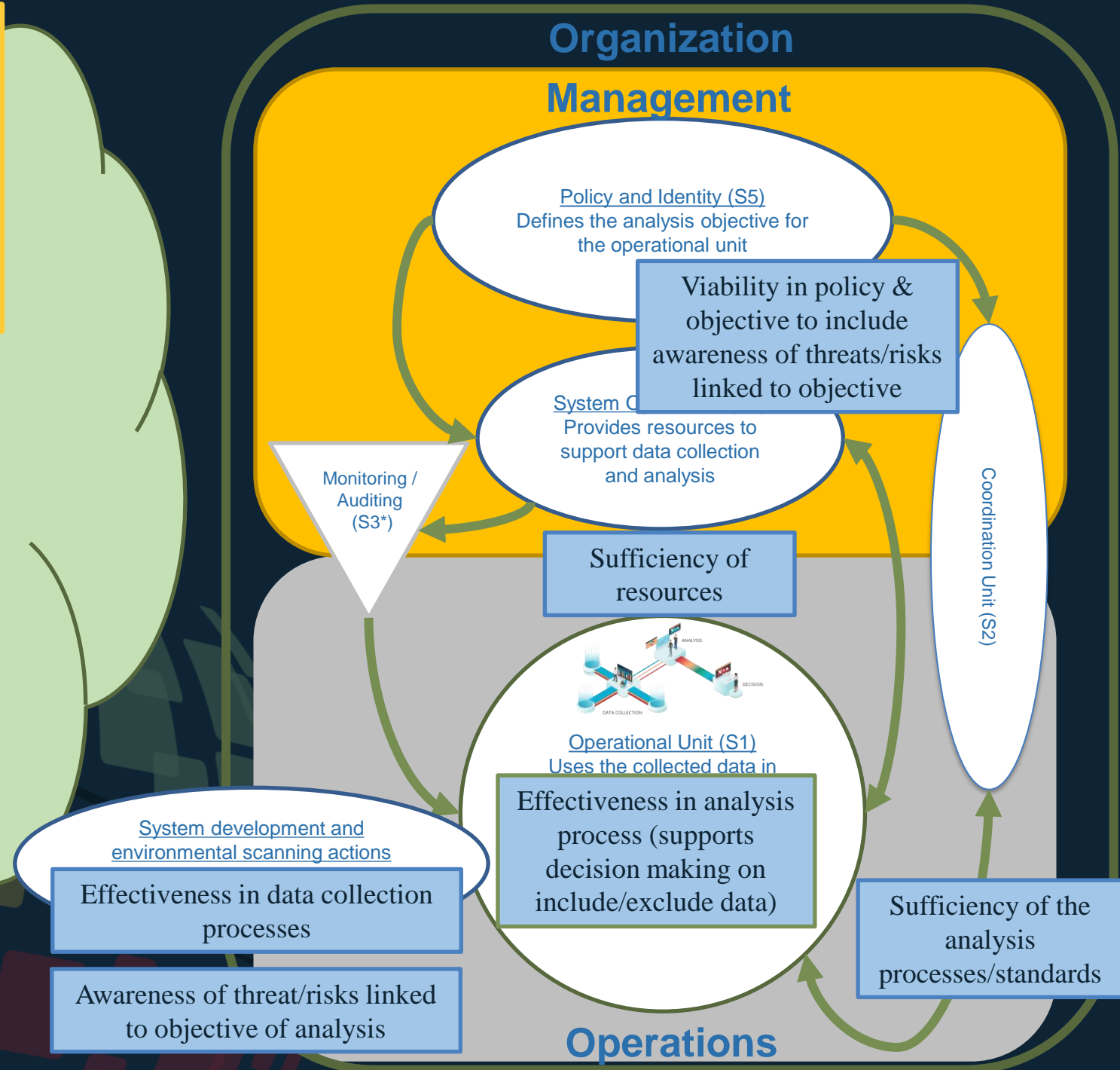
Operational Unit (S1)  
Uses the collected data in analysis (to include making decisions regarding the validity and verifiability of the data before use) and provides analysis results for use by decision makers



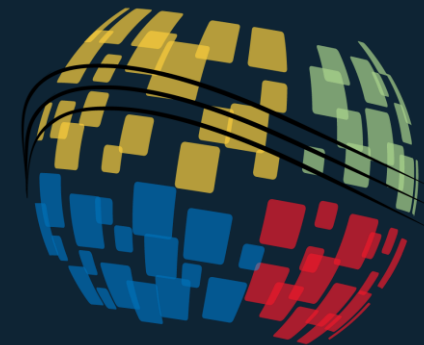
## Operations

# Resilience Theories Linked to our Organizational VSM

Data useful in the analysis







*Face validation considering the OPCW exemplar & KPH exemplar*

## Application of our VSM & Resilience Theories

# OPCW's IIT as a VSM

## Environment

Reports from the Syrian government, States, and individuals, Social media, secondary and tertiary sources (analysis)

Accusations stated that OPCW's findings were based on falsified data

Defined Disinformation Attack:  
Targeted toward the output of the IIT analysis

Impact of Attack:  
Delay in OPCW action

Organizational Question:  
How resilient is the IIT against inclusion of falsified data in their analysis?

## Organization

### Management

Support the CWC  
Investigating allegations of  
Chemical weapons use - Policy and  
Strategy (S5)

Financial supplies  
provided to support  
operations as well as  
resources such as  
analysis tools, and  
equipment (System  
Management  
Units (S3))

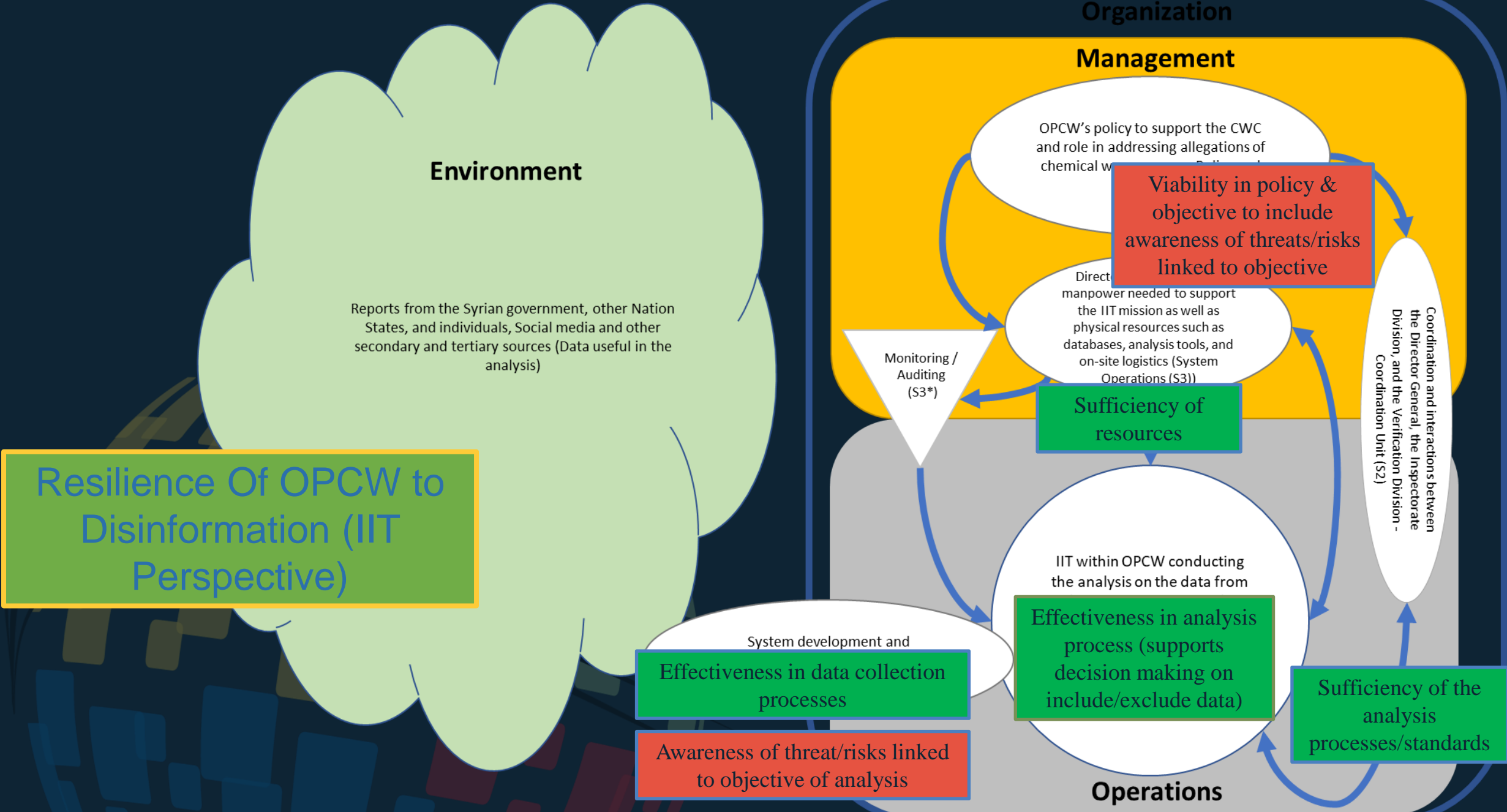
Coordination and interactions between  
the Director General, the Inspectorate  
Division, and the Verification Division -  
Coordination Unit (S2)

Verification Unit  
conducting  
the data from  
environment to make  
recommendations  
regarding the  
status of the Syrian  
chemical weapons  
research 2017 -  
Verification Unit (S1)

## Operations



# OPCW's IIT as a VSM



# KPH as a VSM

Envi

Public Information to  
and other data r

Public information flooded with anti-polio vaccine propaganda resulting in KPH determining to not implement polio vaccination programs in Kano

## Defined Disinformation Attack:

Targeted toward the input of data into KPH

## Impact of Attack:

Caused dismissal of the importance of polio vaccination, children unvaccinated

## Organizational Questions:

How resilient is the KPH against inclusion of falsified data in their analysis?

Organization

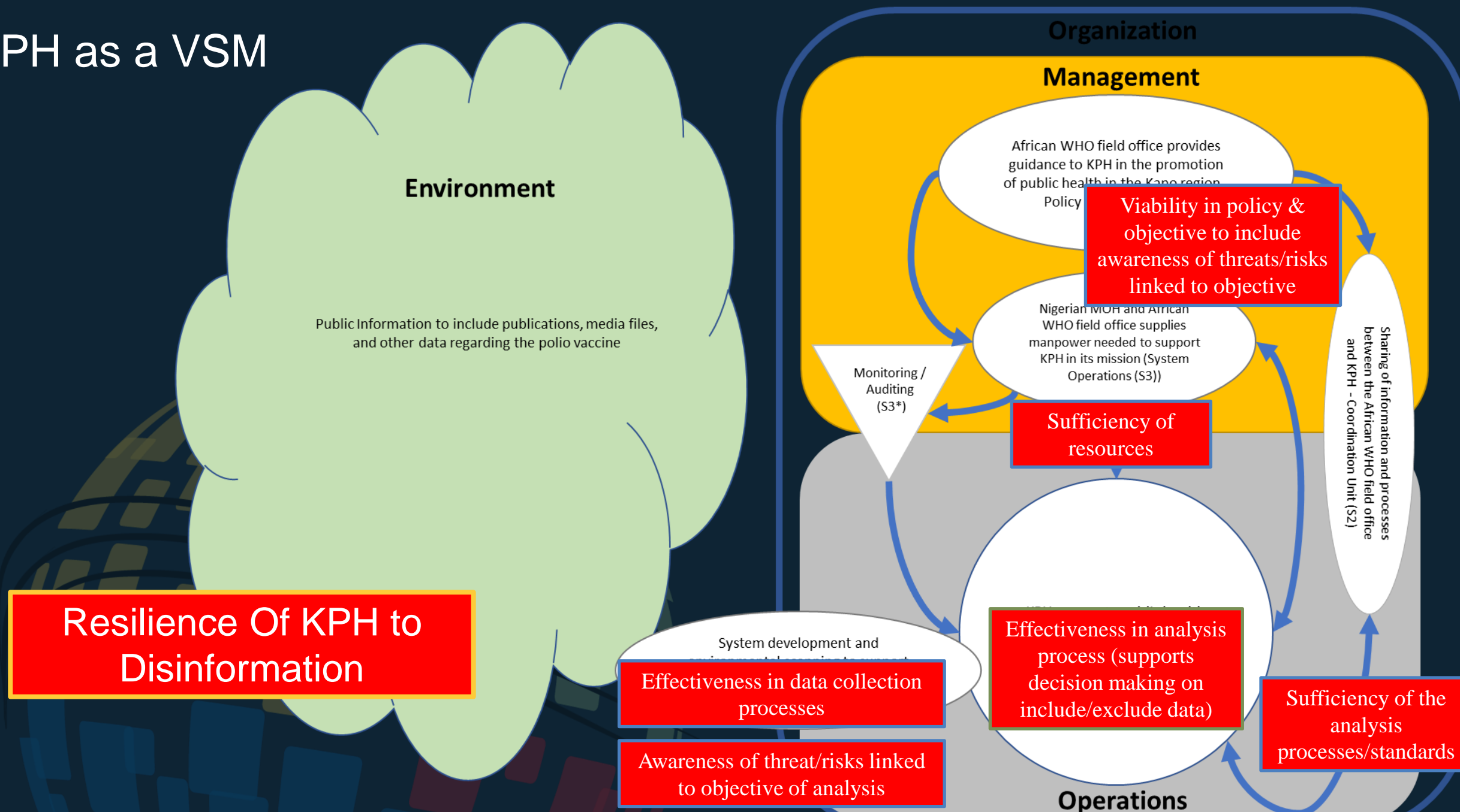
Management

Sharing of information and processes  
between the African WHO field office  
and KPH - Coordination Unit (SZ)

Operations



# KPH as a VSM





# Outcome & Conclusions

- Our VSM Framework has created a powerful and generalization method to consider organizational behaviors in regarding to information processes
  - Simulation based analysis (future work)
  - Review of existing processes without simulation
- Resilience theories linked to framework can support the alignment of formal resilience metrics into this space (future work)



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