"Process Safety to Digital Innovation: Knowledge Sharing Strategies for Occupational Safety and Health in Modern Engineering"

15.8.2026
Saturday

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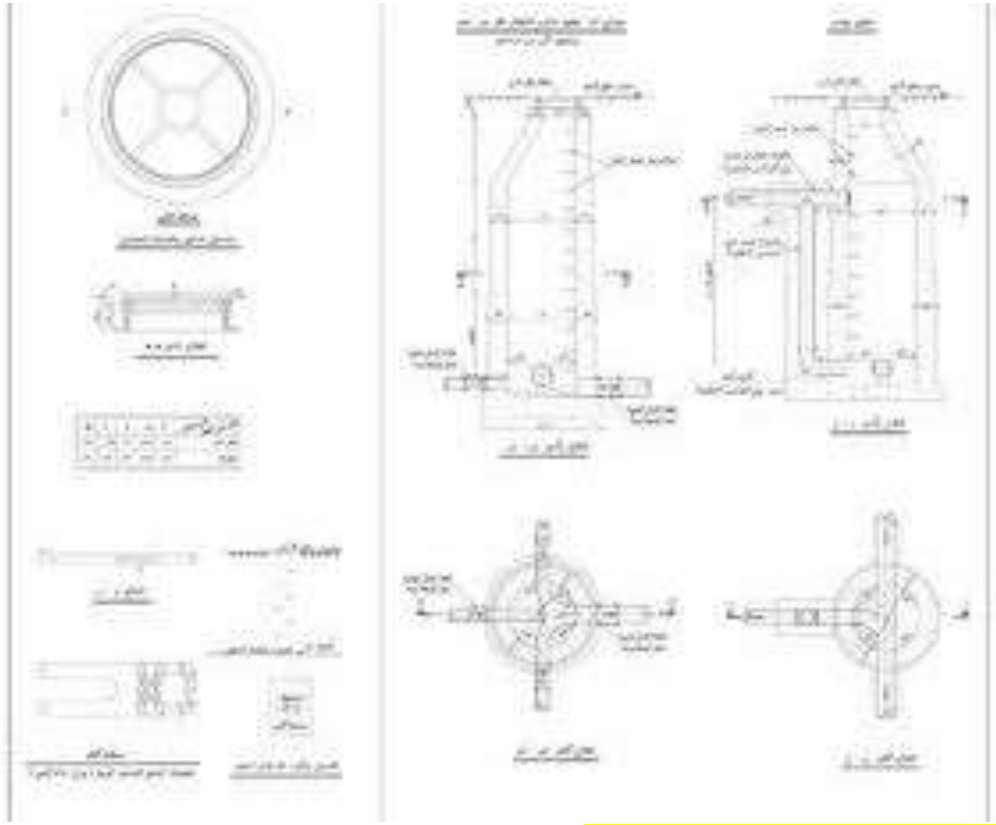
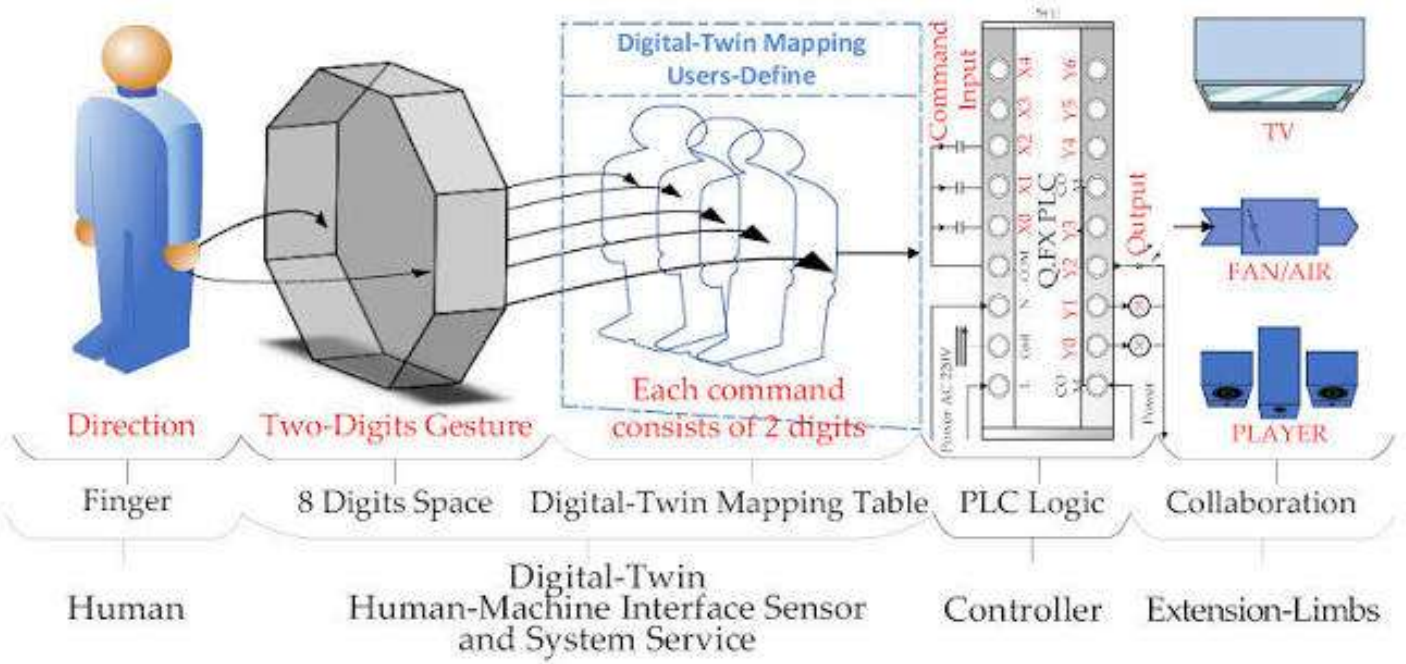
SECTION 1: Opening & Context Setting

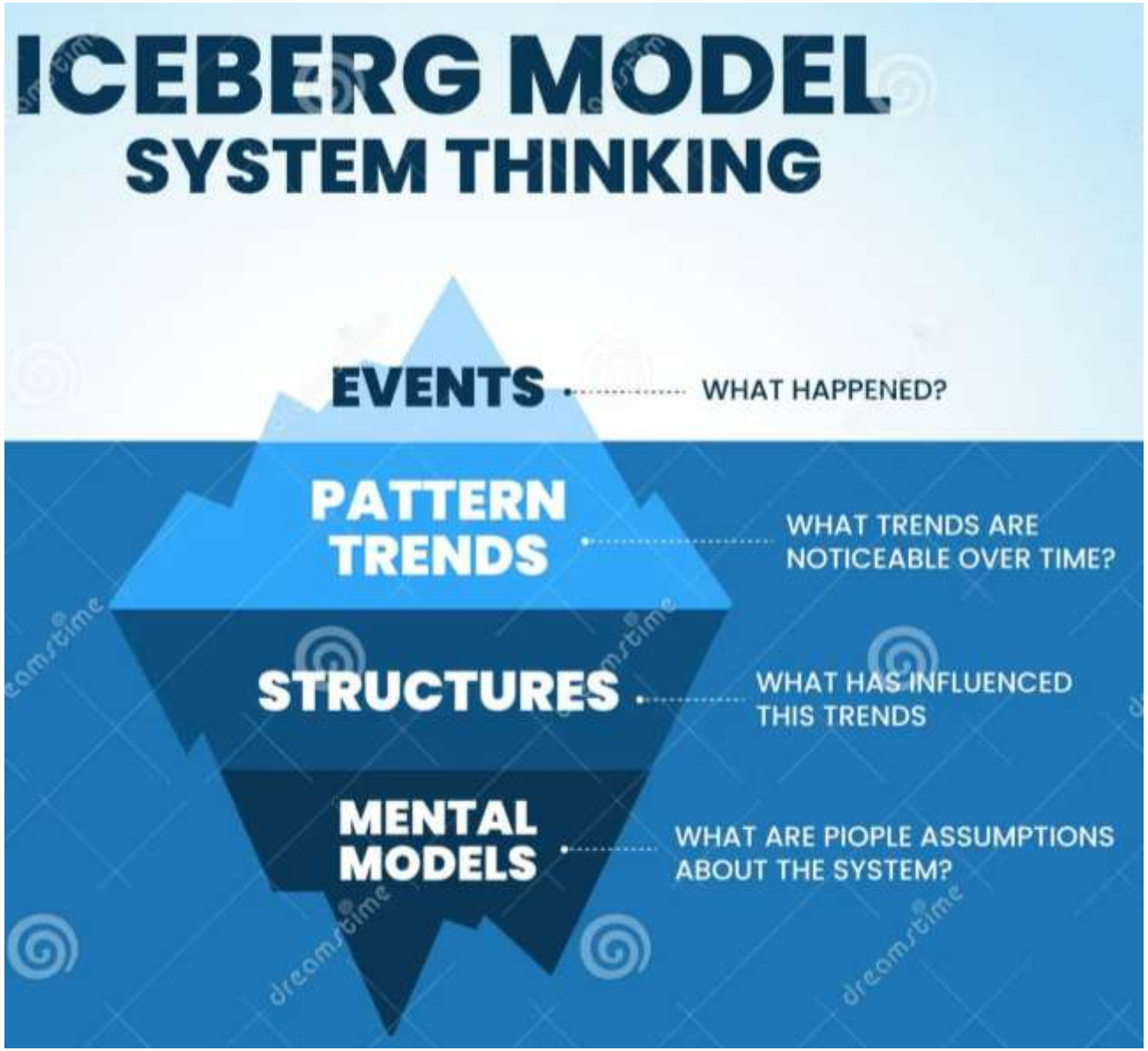




"Today we explore a critical question: how do we ensure that the rapid digitalization of our industry strengthens, rather than undermines, process safety culture? We will examine evidence-based strategies for making safety knowledge accessible to every engineer."

The Knowledge Gap Problem

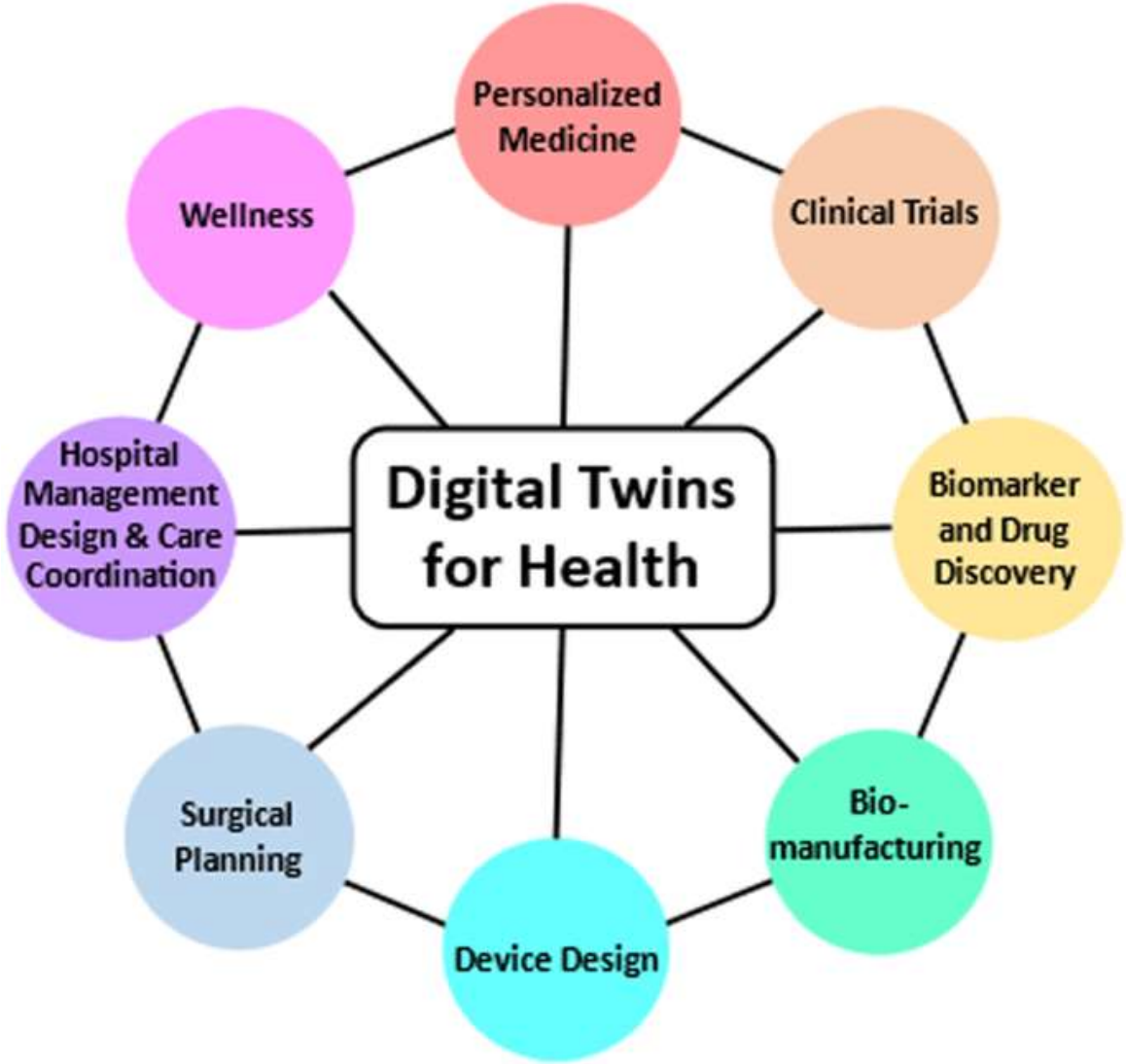
- Knowledge is fragmented across disciplines and experience levels
- Critical insights reside in the heads of senior engineers
- Junior engineers lack access to "lessons learned"
- Result: Organizations repeat preventable mistakes

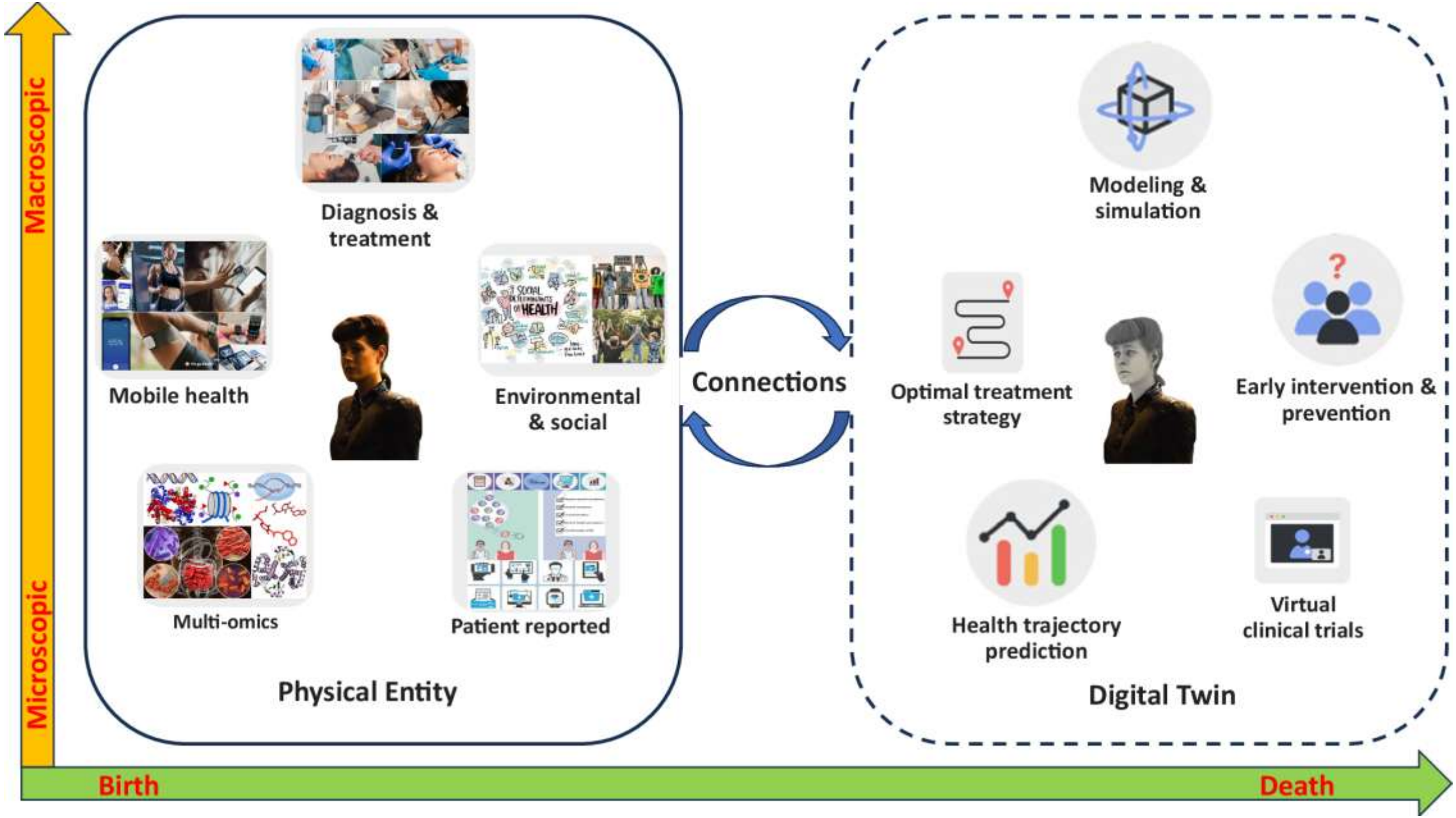


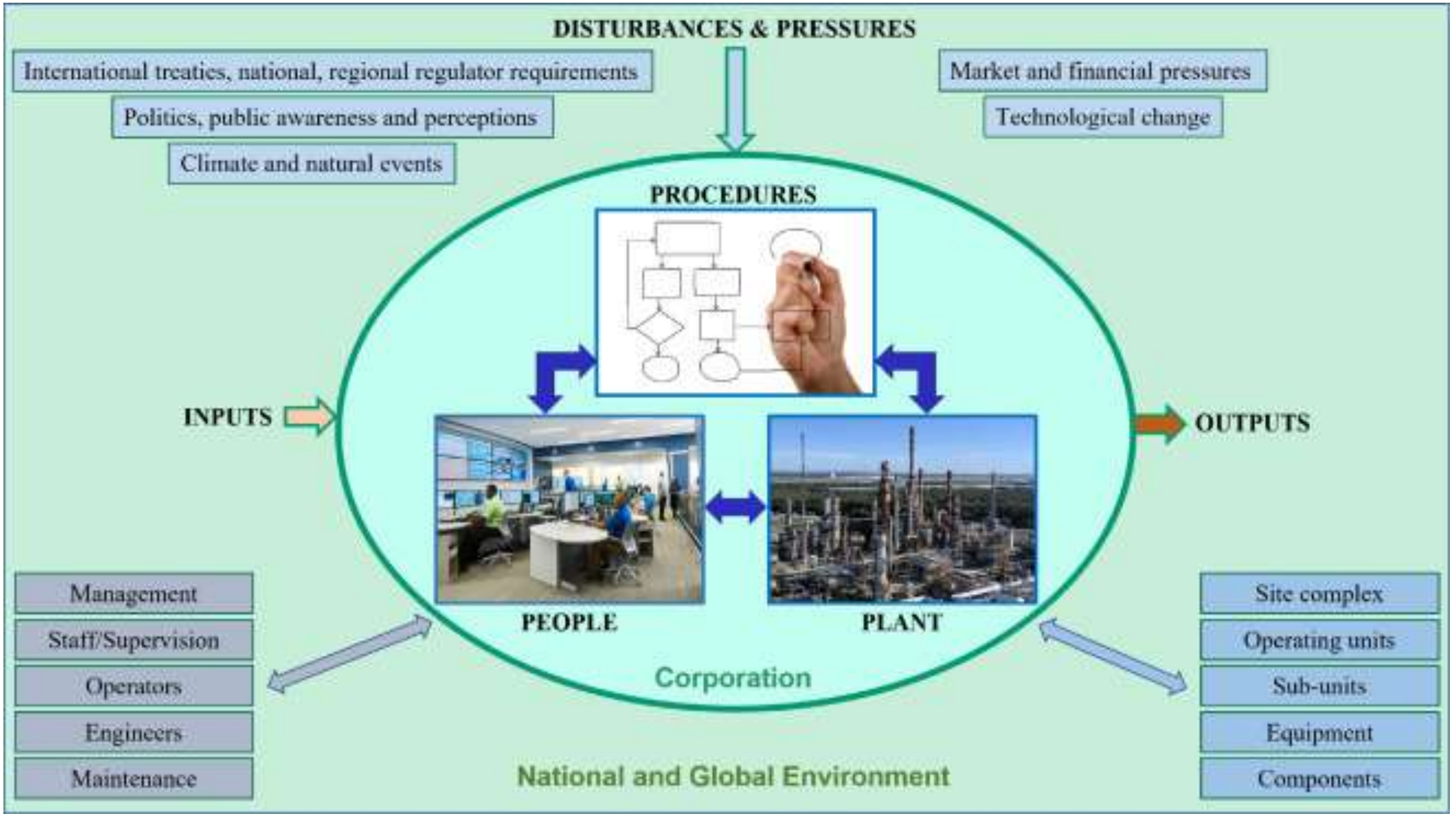
References: AIChE Spring Meeting 2024, Elsevier partnership on process safety knowledge tools.

The Digital Paradox

- We have adopted: AI, Digital Twins, IoT Sensors, BIM
- Challenge: More data ≠ Better safety culture
- Information overload leads to cognitive fatigue
- Digital tools must serve the engineer, not overwhelm them




Macroscopic
Microscopic
Diagnosis & treatment
Mobile health
Environmental & social
Multi-omics
Patient reported
Physical Entity
Connections
Modeling & simulation
Optimal treatment strategy
Early intervention & prevention
Health trajectory prediction
Virtual clinical trials
Digital Twin
Birth
Death


DISTURBANCES & PRESSURES
International treaties, national, regional regulator requirements
Politics, public awareness and perceptions
Climate and natural events
Market and financial pressures
Technological change
PROCEDURES
INPUTS
OUTPUTS
PEOPLE
PLANT
Corporation
Management
Staff/Supervision
Operators
Engineers
Maintenance
Site complex
Operating units
Sub-units
Equipment
Components
National and Global Environment


STEEP
Political
Social
Environmental
Technological
Economic
Partners
Hazards and Risks
Occupational Safety
Safety Regulation
Technology
Workforce


SAFETY POLICY
Our Commitment to a Safe Workplace
WHAT IS A SAFETY POLICY?
A safety policy is a formal statement by management that outlines the organization's commitment to protecting the health, safety, and employees, contractors, and visitors.
KEY OBJECTIVES
• Prevent accidents and occupational injuries
• Provide safe and healthy working conditions
• Comply with legal and regulatory requirements
• Continuously improve safety performance
• Promote a positive safety culture
MANAGEMENT RESPONSIBILITIES
Provide necessary resources and training
Ensure safe systems of work
Conduct risk assessments
Monitor and review safety performance
EMPLOYEE RESPONSIBILITIES
• Follow safety rules and procedures
• Use PPE correctly
• Report hazards and incidents
Participate in safety programs
IMPORTANT
Safety is everyone's responsibility — from top management to frontline workers.
SAFETY First Basit
"Regular Audits Build a Safer Workplace."


SAFETY WORK OBSERVATION
Proactive Safety Culture for a Safer Workplace
SAFETY with Basit
HOW TO CONDUCT SWO:
1 OBSERVE WORK PRACTICES
2 PROVIDE IMMEDIATE FEEDBACK
Coach or correct unsafe practices on the spot
3 ENCOURAGE SAFE BEHAVIOR
Acknowledge and praise workers for safe actions
4 REPORT AND FOLLOW UP
Document findings, follow up on corrective actions
ALWAYS...
Be Respectful and Positive
Focus on Corrective Measures
Praise Safe Actions
Address Unsafe Practices Constructively
KEY FOCUS AREAS FOR SWO:
PPE Compliance
Housekeeping
Use of Tools & Equipment
Lifting & Manual Handling
Working at Height
Observe. Correct. Encourage. Report for Safety!
#SafetyWithBasit
#SCBA #RespiratoryProtection #SafetyFirst


5 SECONDS
THE 5-SECOND SAFETY RULE
STOP, LOOK, THINK, ACT
TAKE 5 SECONDS TODAY – SAVE A LIFE TOMORROW
MOST ACCIDENTS HAPPEN BECAUSE WE DON'T TAKE TIME TO THINK!
BEFORE STARTING ANY WORK, TAKE JUST 5 SECONDS.
1 STOP
Pause before starting the task.
2 LOOK
Check for hazards around you.
Slips, trips, and falls
Moving equipment
Electrical hazards
Falling objects
Unsafe conditions
3 THINK
Ask yourself:
What can go wrong?
Do I have the correct PPE?
Is the area safe?
Do I understand the task?
4 ACT
If everything is safe, proceed with the work.
If not, stop and report the hazard.
REAL-LIFE EXAMPLE
A worker was about to use a ladder but took 5 seconds to inspect it.
He discovered a cracked rung.
He prevented a serious fall accident.
BENEFITS OF THE 5-SECOND RULE
Prevents accidents
Improves hazard awareness
Encourages safe behavior
Protects workers and equipment
Builds a strong safety culture
SAFETY STARTS WITH YOU!
A FEW SECONDS OF ATTENTION CAN PREVENT A LIFETIME OF REGRET.
DO YOU PRACTICE THE 5-SECOND SAFETY RULE BEFORE STARTING WORK?
SHARE THIS POST AND REMIND OTHERS.
SAFETY FIRST
THINK SAFE, WORK SAFE, GO HOME SAFE
YOUR FAMILY IS WAITING FOR YOU.
SAFE TODAY ALIVE TOMORROW

KNOW THE DIFFERENCE ACT SAFELY

UNSAFE CONDITION

- Broken guardrails
- Poor lighting
- Oil spill on walkway

UNSAFE ACT

- Not wearing a helmet
- Climbing without harness
- Ignoring lockout/tagout

SAFE OBSERVATION

- Wearing full PPE
- Reporting a hazard
- Keeping exits clear

RECOGNIZE. REPORT. REACT.

A safer workplace starts with you.

www.experttrainersacademy.com

CAUSES OF ACCIDENTS

Most accidents happen due to unsafe acts and unsafe conditions. Stay alert and follow procedures.

UNSAFE ACTS

- Not Wearing PPE
- Ignoring Safety Rules
- Horseplay & Rushing

UNSAFE CONDITIONS

- Wet or Slippery Floors

- Faulty Equipment

- Poor Housekeeping

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STAY ALERT • WORK SAFE • FOLLOW PROCEDURES

Which Worker Are You?

	Don't Care About Safety	Care About Safety
Don't Know About Safety	 Don't Know, Don't Care	 Untrained
Know About Safety	 Complacent / Irresponsible	 Trained and Responsible

WHY HSE STOPS WORK?

TO PREVENT ACCIDENTS & SAVE LIVES!

1. IMMINENT DANGER TO LIFE OR HEALTH

Risk of Serious Injury or Death

- No Fall Protection
- Unsafe Excavation
- Unsafe Excaliation
- Live Electrical Work
- Suspended Loads
- Suspended Loads

2. LEGAL & REGULATORY VIOLATIONS

Against Safety Rules & Laws

- No Permit to Work
- Invalid Certificates
- No Permit to Work
- Unauthorized Road Closure

3. HIGH-RISK WORK UNCONTROLLED

Unsafe Acts, No Safety Measures

- No PPE
- Untrained Workers
- Faulty Equipment
- Paeying Work

4. IGNORED SAFETY WARNINGS

Repeated Violations

- Repeat Offenses
- Ignoring HSE Instructions
- NCRs Not Closed

5. PROTECTING COMPANY & PROJECT

Avoid Big Accidents & Delays

- Reputation Risk
- Insurance Issues
- Project Shutdown
- Trust Much More

UNSAFE WORK TODAY = ACCIDENT TOMORROW!

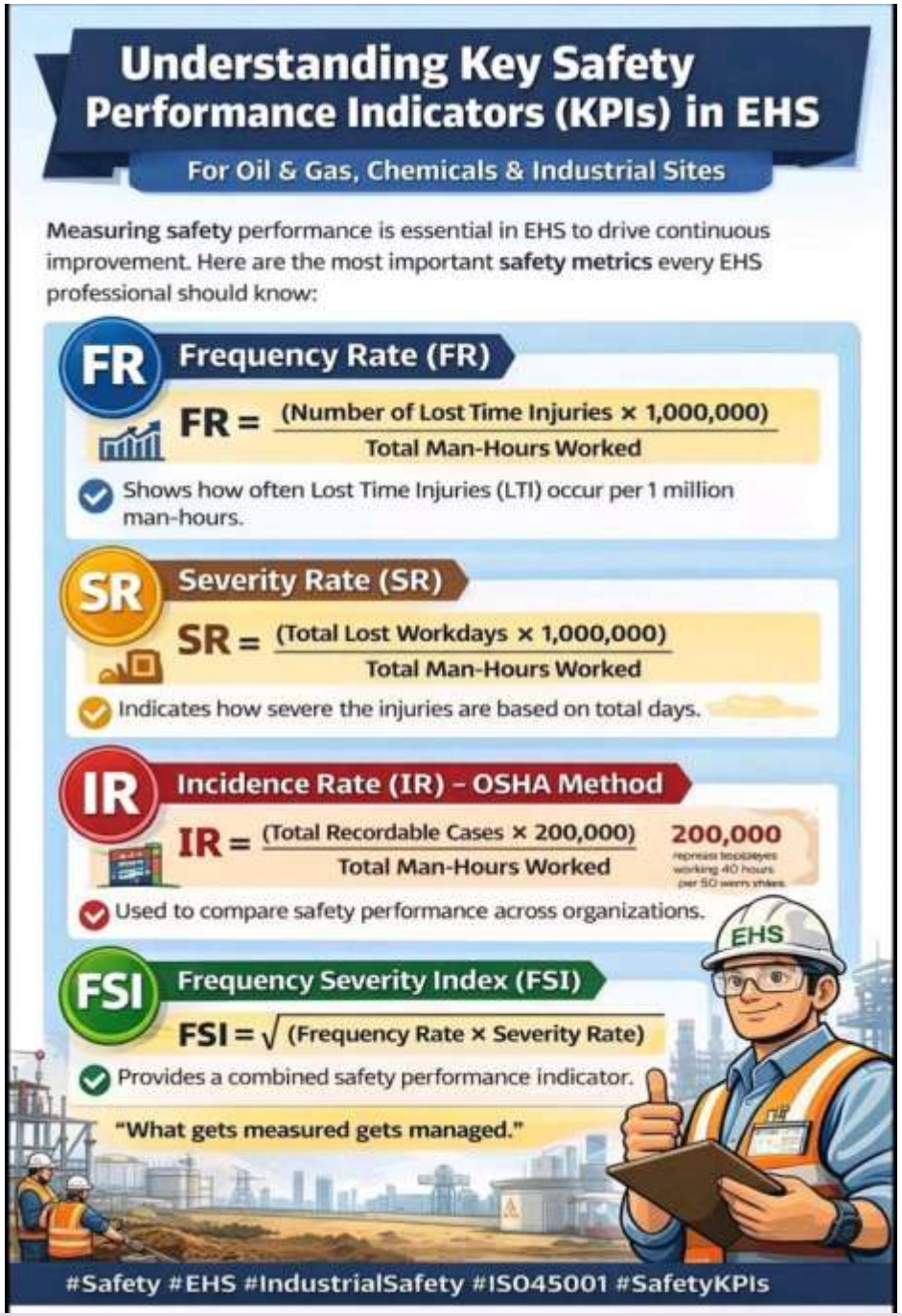
Shared Safety Intelligence

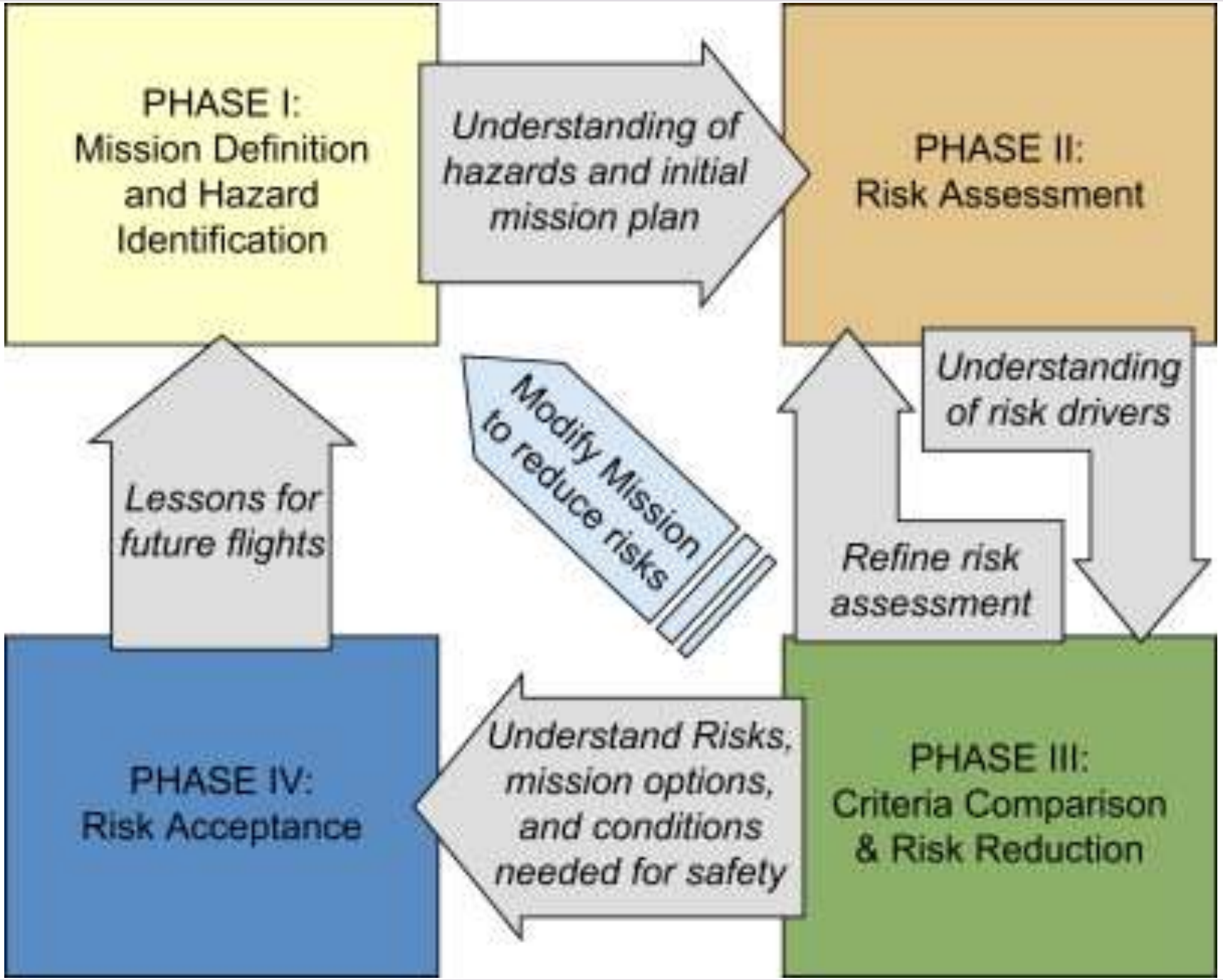
- Goal: Bidirectional knowledge flow across all engineers
- All engineers are both teachers and learners
- Digital innovation must enable collaboration, not replace judgment


Occupational Safety and Health Management System
According to ISO 45001
Hazard Identification & Risk Assessment
Legal Compliance
Training & Awareness
Incident Reporting & Investigation
Emergency Preparedness & Response
Performance Monitoring & Improvement
ISO 45001
Occupational Safety & Health Management System
Safety Culture
Worker Participation
Continual Improvement


OCCUPATIONAL HEALTH & SAFETY MANAGEMENT
1 Management Principles & Safety Planning
Line & Staff Authority
Planning for Safety
Management by Objectives (MBO)
2 Safety Education & Training
Training Needs Assessment
Training Methods & Strategies
Competence Building
3 Employee Participation & Safety Culture
Safety Committees
Toolbox Talks & Kaizen
Safety Awards & Incentives
4 Behavior Based Safety (BBS)
Human Behavior & Motivation
Risk Perception & Response
Conflict & Frustration Management
5 Safety Information Systems (MIS)
Safety Data Collection
Analysis & Reporting
Computer Applications
• SAFETY FIRST • HEALTH ALWAYS •


TYPES OF SAFETY
OCCUPATIONAL SAFETY
Protecting workers from hazards at the workplace
Eg: Properly erected scaffolding to prevent falls on a construction site
PROCESS SAFETY
Preventing major incidents related to hazardous processes or equipment
Eg: Implementing H_2S monitoring in oil & gas facilities
FIRE SAFETY
Prevention, detection, and response to fire hazards
Eg: Installing smoke detectors and conducting fire drills at the workplace
ELECTRICAL SAFETY
Protecting workers and equipment from electrical hazards
Eg: Re-energizing a panel before maintenance to avoid electrocution
CHEMICAL SAFETY
Safe handling, storage, and disposal of hazardous chemicals
Eg: Storing acids and alkalis separately in a chemical warehouse
ENVIRONMENTAL SAFETY
Protecting the environment from workplace activities
Eg: Installing oil-water separators to prevent contamination
ERGONOMIC SAFETY
Reducing strain and fatigue-related injuries
Eg: Using mechanical aids instead of lifting heavy loads manually
ROAD & TRANSPORT SAFETY
Preventing vehicle-related incidents
Eg: Ensuring seatbelt use and speed control in company vehicles
RADIATION SAFETY
Protection from ionizing and non-ionizing radiation
Eg: Following safety protocols during NDT radiography
MACHINE & EQUIPMENT SAFETY
Safe operation and maintenance of machinery
Eg: Using lockout systems before repairing a conveyor belt


Understanding Key Safety Performance Indicators (KPIs) in EHS
For Oil & Gas, Chemicals & Industrial Sites
Measuring safety performance is essential in EHS to drive continuous improvement. Here are the most important safety metrics every EHS professional should know:
FR
Frequency Rate (FR)
FR = (Number of Lost Time Injuries × 1,000,000) / Total Man-Hours Worked
Shows how often Lost Time Injuries (LTI) occur per 1 million man-hours.
SR
Severity Rate (SR)
SR = (Total Lost Workdays × 1,000,000) / Total Man-Hours Worked
Indicates how severe the injuries are based on total days.
IR
Incidence Rate (IR) – OSHA Method
IR = (Total Recordable Cases × 200,000) / Total Man-Hours Worked
200,000
Used to compare safety performance across organizations.
FSI
Frequency Severity Index (FSI)
FSI = √(Frequency Rate × Severity Rate)
Provides a combined safety performance indicator.
"What gets measured gets managed."
EHS
#Safety #EHS #IndustrialSafety #ISO45001 #SafetyKPIs



Overview of Safety Risk Management

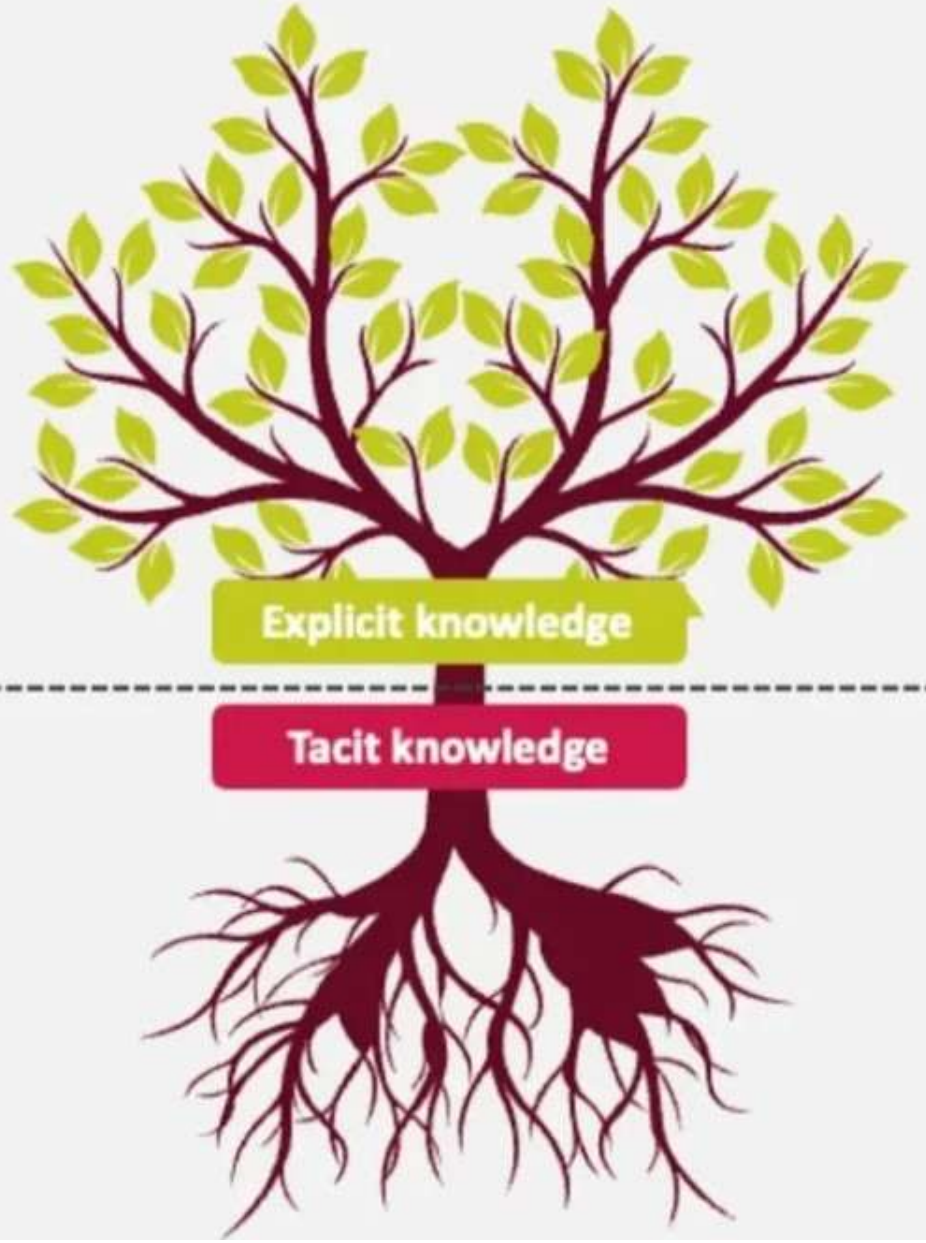
SECTION 2: Strategy Pillar 1 – Capturing Tacit Knowledge

The Tacit Knowledge Challenge

- Tacit knowledge: "Unconscious competence" of experienced engineers
- Traditional methods: static lessons-learned documents
- Problem: Static information fails to capture context and rationale

TACIT VS EXPLICIT KNOWLEDGE

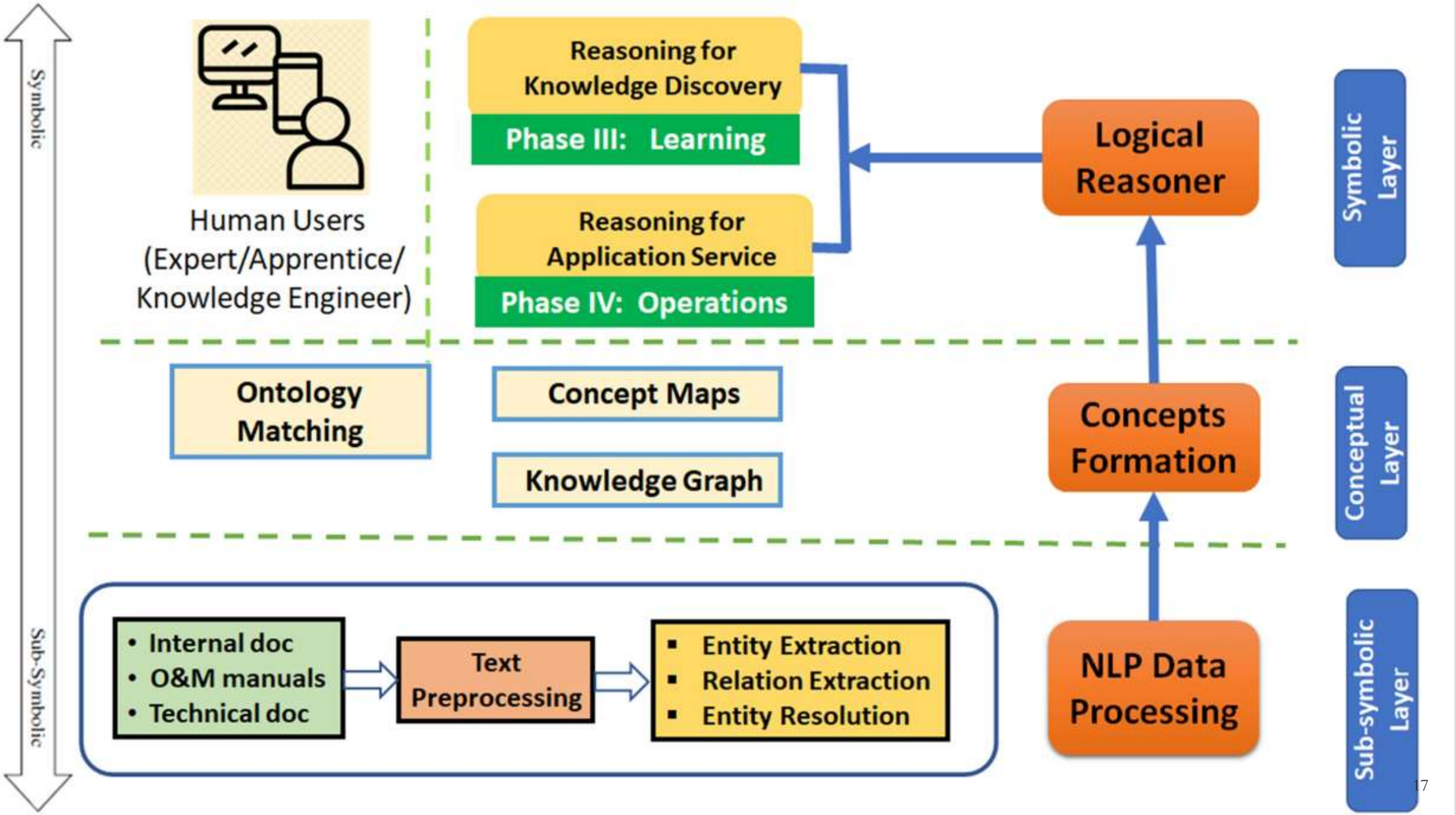
- Manuals
- Documents
- Procedures
- How-to-guide
- Videos



- Databases
- Memos
- Notes
- Records

- Individual skills
- Expertise
- Education
- Experience
- Ideas
- Insights

- Intuition
- Observations
- Cultural beliefs
- Values
- Attitudes
- Mental models


Symbolic
Sub-Symbolic
Human Users
(Expert/Apprentice/
Knowledge Engineer)
Reasoning for
Knowledge Discovery
Phase III: Learning
Reasoning for
Application Service
Phase IV: Operations
Logical
Reasoner
Symbolic
Layer
Ontology
Matching
Concept Maps
Knowledge Graph
Concepts
Formation
Conceptual
Layer
• Internal doc
• O&M manuals
• Technical doc
Text
Preprocessing
▪ Entity Extraction
▪ Relation Extraction
▪ Entity Resolution
NLP Data
Processing
Sub-symbolic
Layer

Tacit Knowledge

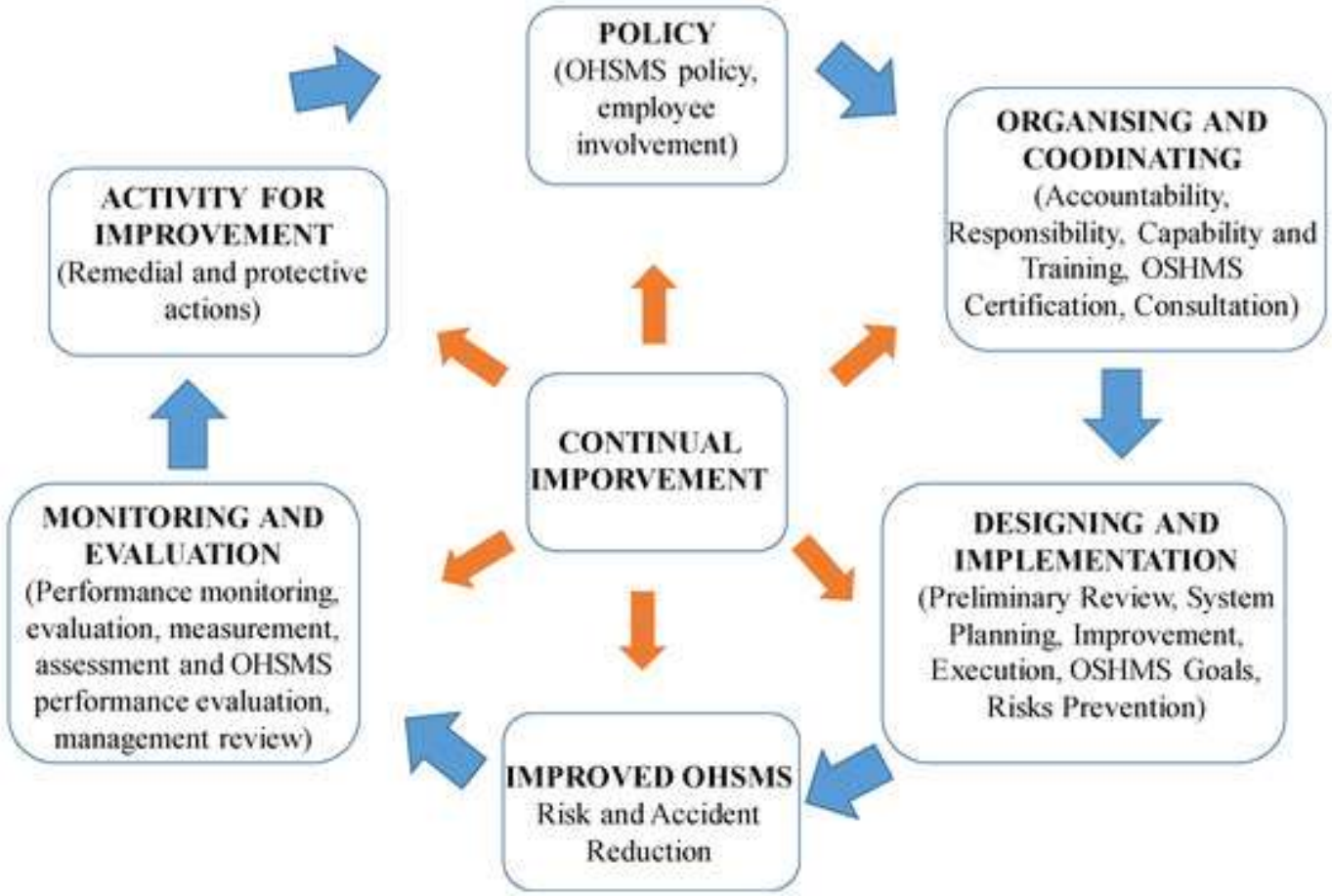
Knowledge that is difficult to express with precision such that it is best learned with direct experience.

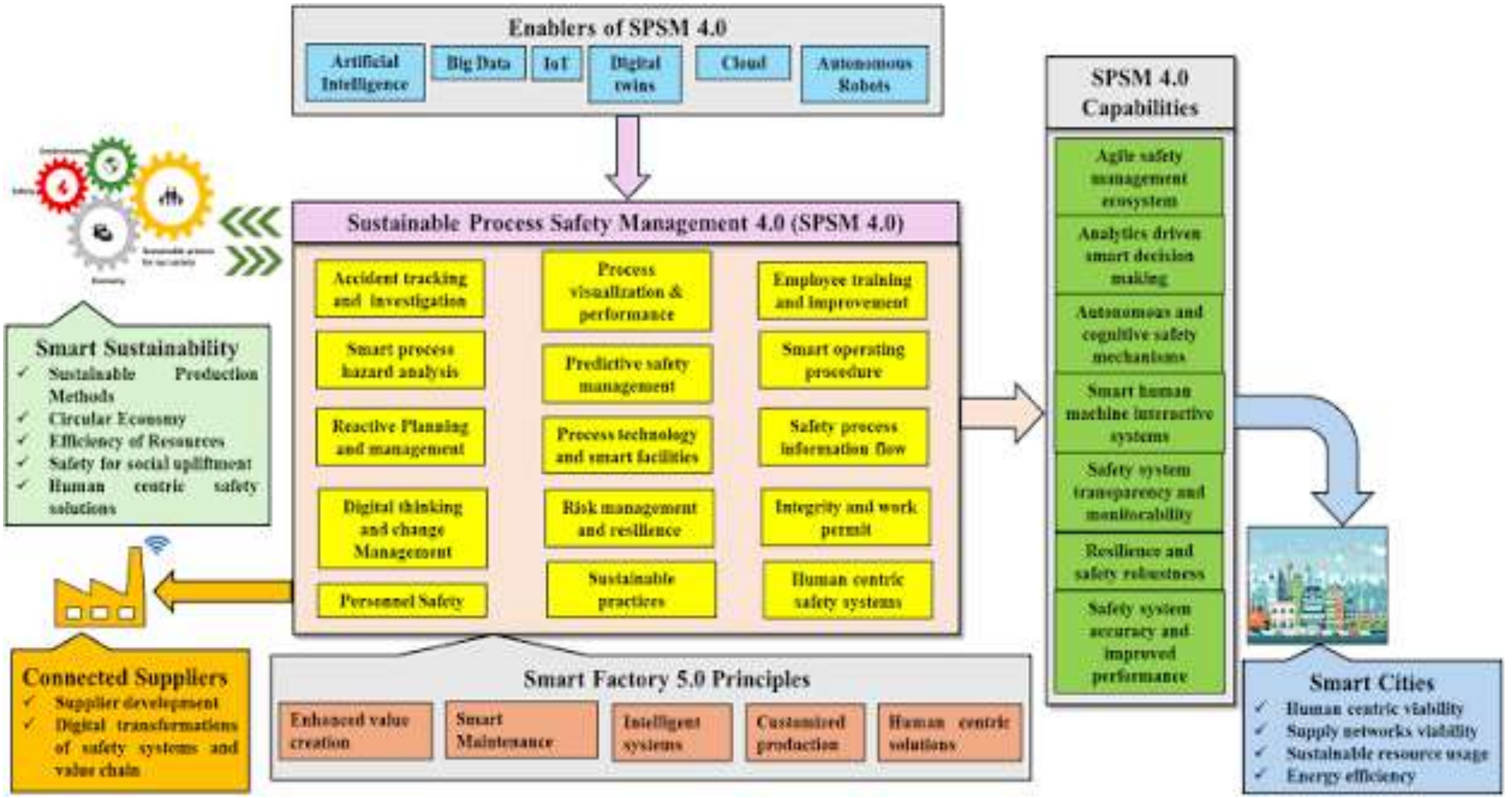
Arts	Cooking	Crafts
Customer Service	Decision-Making	Leadership
Musical Instruments	Negotiation	Performance Arts
Problem-Solving	Riding a Bicycle	Sailing
Social Abilities	Sports	Teaching

Simplicable

Dynamic Knowledge Representation

- Solution: AI-driven knowledge capture from field reports
- NLP techniques identify hidden trends in safety observations
- Creates a dynamic "source of truth" accessible to all engineers

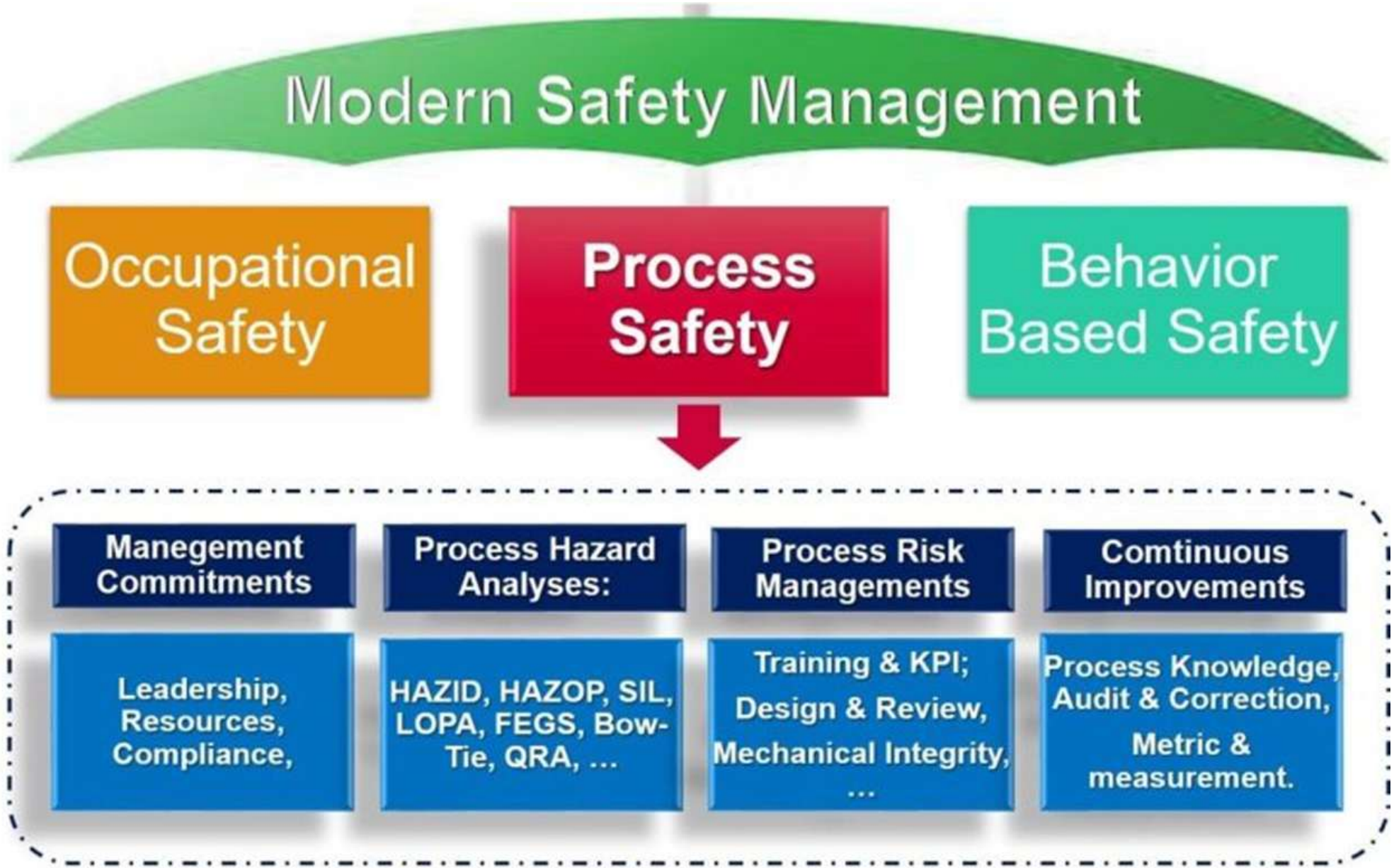



Enablers of SPSM 4.0
Artificial Intelligence
Big Data
IoT
Digital twins
Cloud
Autonomous Robots
Sustainable Process Safety Management 4.0 (SPSM 4.0)
Accident tracking and investigation
Process visualization & performance
Employee training and improvement
Smart process hazard analysis
Predictive safety management
Smart operating procedure
Reactive Planning and management
Process technology and smart facilities
Safety process information flow
Digital thinking and change Management
Risk management and resilience
Integrity and work permit
Personnel Safety
Sustainable practices
Human centric safety systems
SPSM 4.0 Capabilities
Agile safety management ecosystem
Analytics driven smart decision making
Autonomous and cognitive safety mechanisms
Smart human machine interactive systems
Safety system transparency and monitorability
Resilience and safety robustness
Safety system accuracy and improved performance
Smart Sustainability
Sustainable Production Methods
Circular Economy
Efficiency of Resources
Safety for social upliftment
Human centric safety solutions
Connected Suppliers
Supplier development
Digital transformations of safety systems and value chain
Smart Factory 5.0 Principles
Enhanced value creation
Smart Maintenance
Intelligent systems
Customized production
Human centric solutions
Smart Cities
Human centric viability
Supply networks viability
Sustainable resource usage
Energy efficiency

Case Study – Digital SME for Operations

- Challenge: Few Subject Matter Experts (SMEs), overwhelmed by turnover and onboarding
- Solution: "Digital SME" available 24/7
- Operators review and practice procedures before performing them
- Impact: Reduced equipment-specific incidents due to procedure execution errors

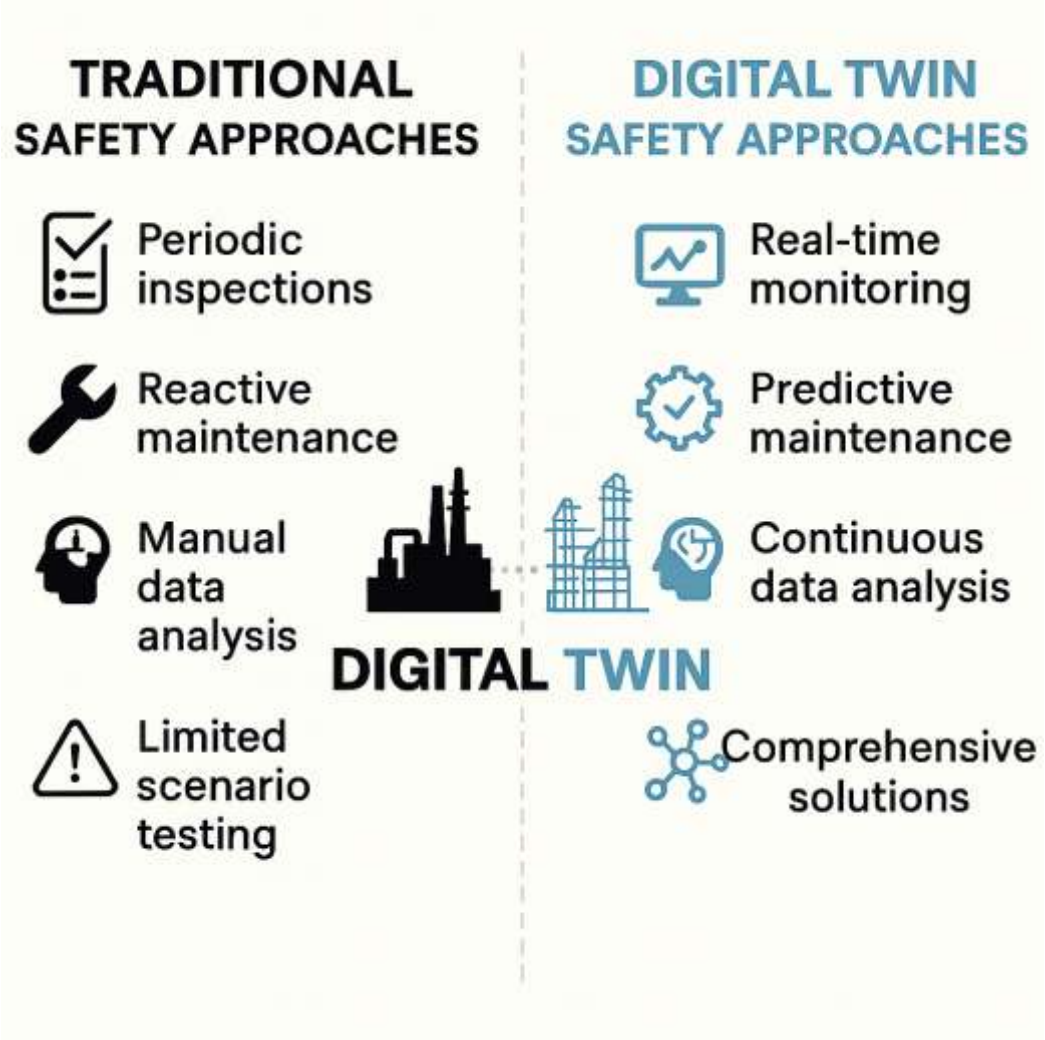

Alert
Detection of degraded barrier
Criticality and Risk Assesment
Degradation
Risk
Digital
Process
Safety
Mitigation strategy decision
Restored barrier
Work Order
MOC
Change evidence
[photos, new componente certificates, work order close-out, formal MOC closure]
Risk analysis of changes


Modern Safety Management
Occupational Safety
Process Safety
Behavior Based Safety
Manegement Commitments
Process Hazard Analyses:
Process Risk Managements
Comtinuous Improvements
Leadership, Resources, Compliance,
HAZID, HAZOP, SIL, LOPA, FEGS, Bow-Tie, QRA, …
Training & KPI; Design & Review, Mechanical Integrity, …
Process Knowledge, Audit & Correction, Metric & measurement.

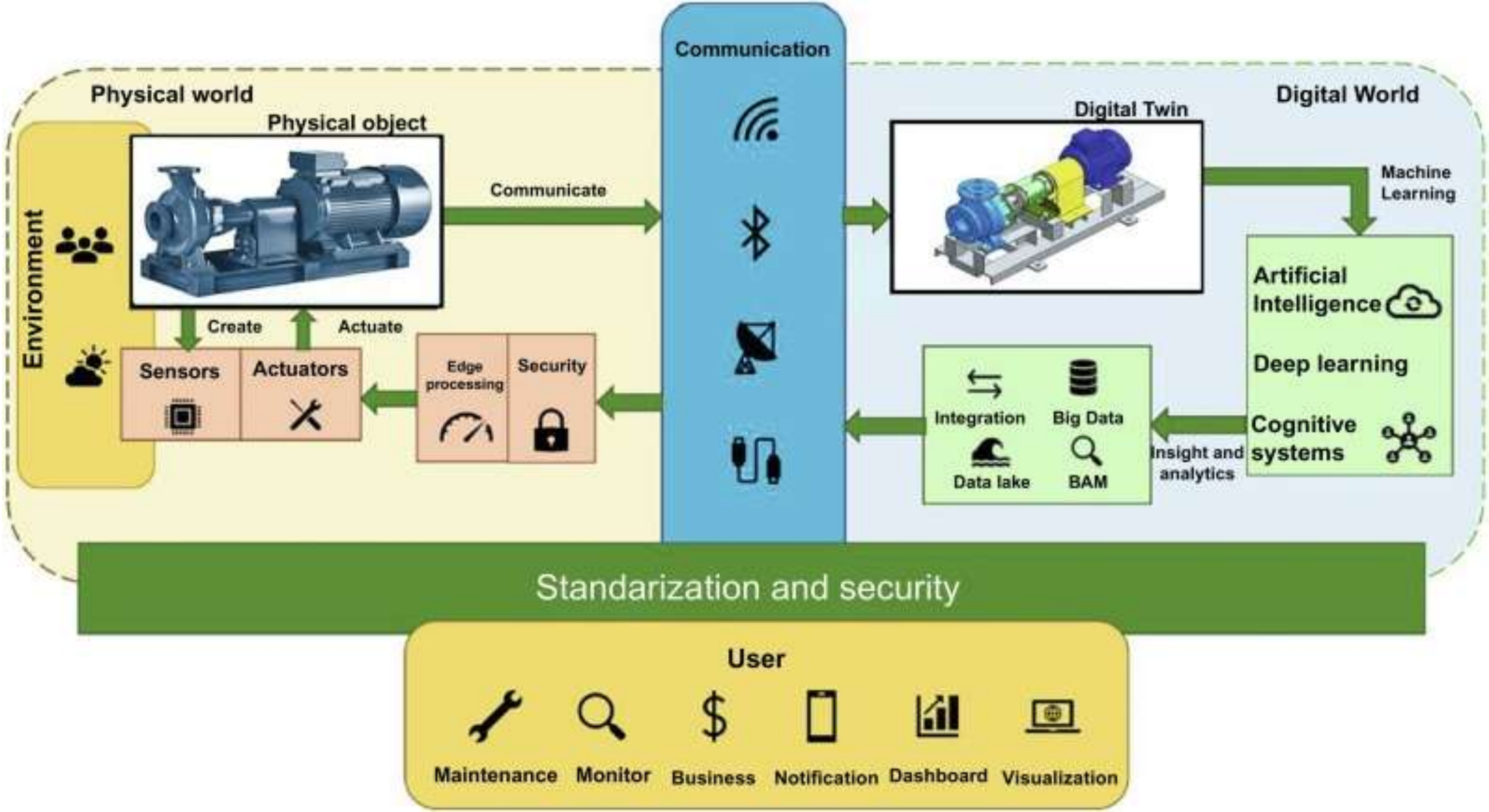
SECTION 3: Strategy Pillar 2 – Digital Twins & Contextualization

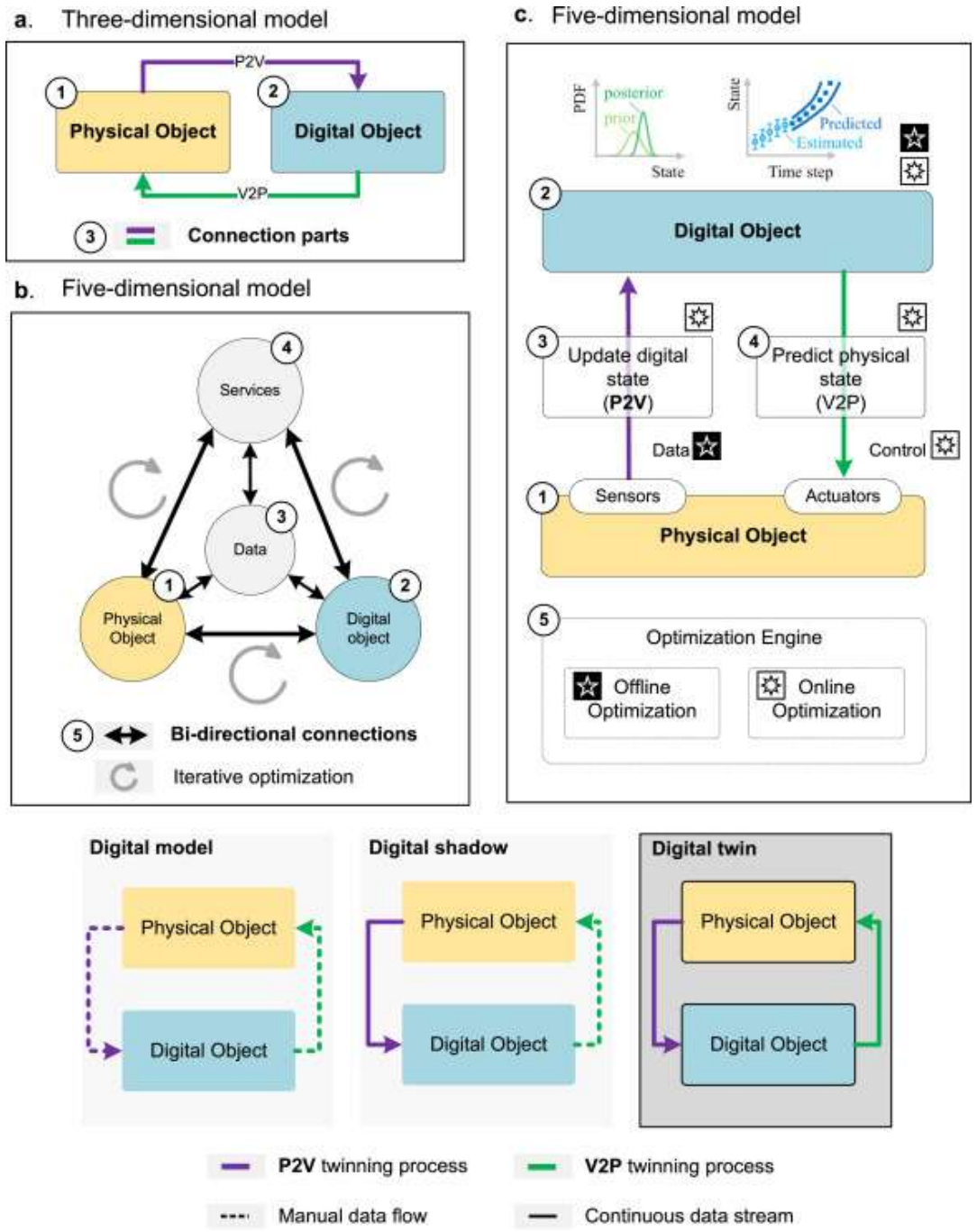
Digital Twins for Safety Visualization

- Digital Twins bridge the gap between data and understanding
- Link historical incident reports directly to assets in 3D models
- Engineers "click" on equipment to see full safety history

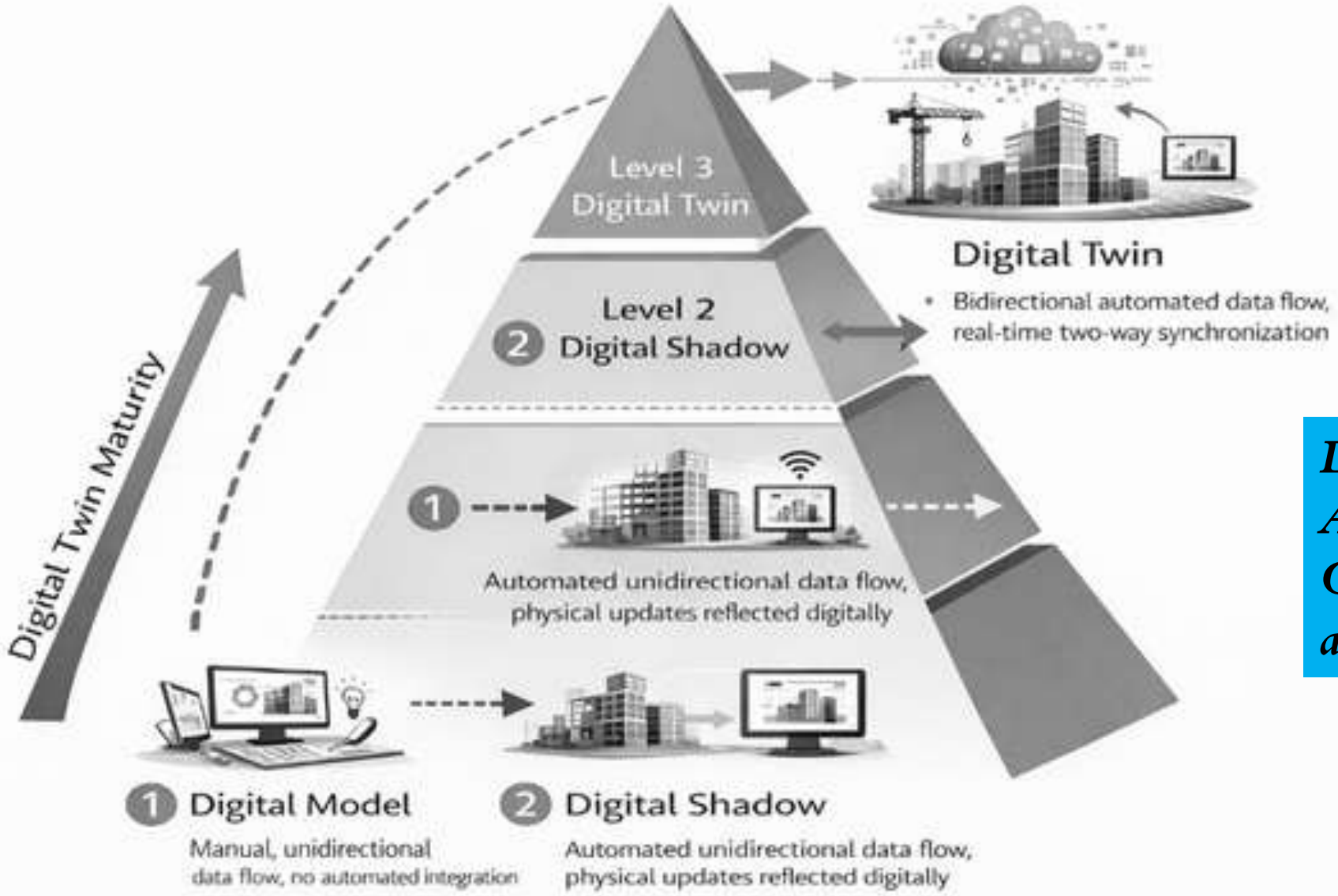


Use of digital twins for process safety management

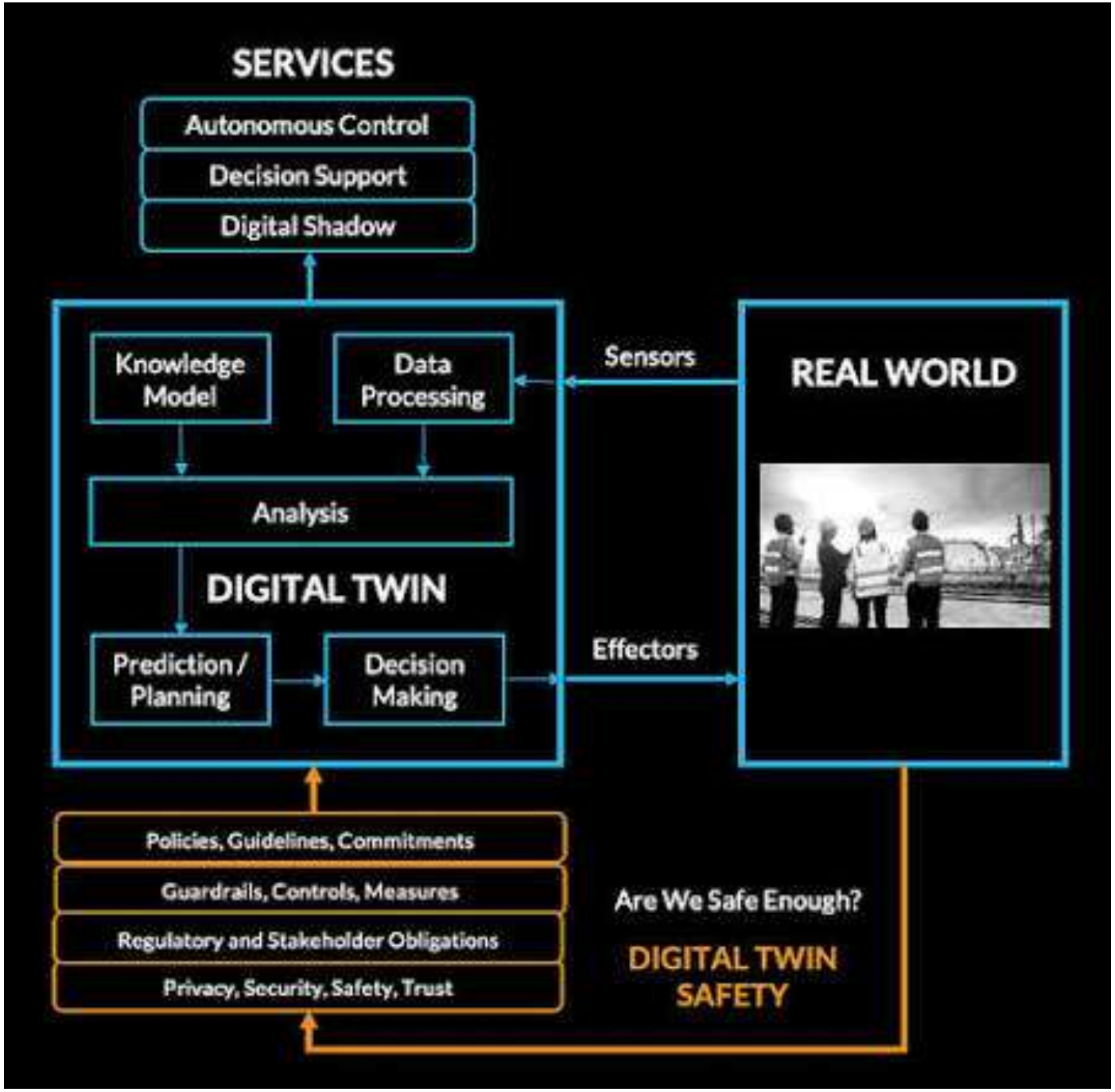




Digital twins in safety analysis, risk assessment and emergency management

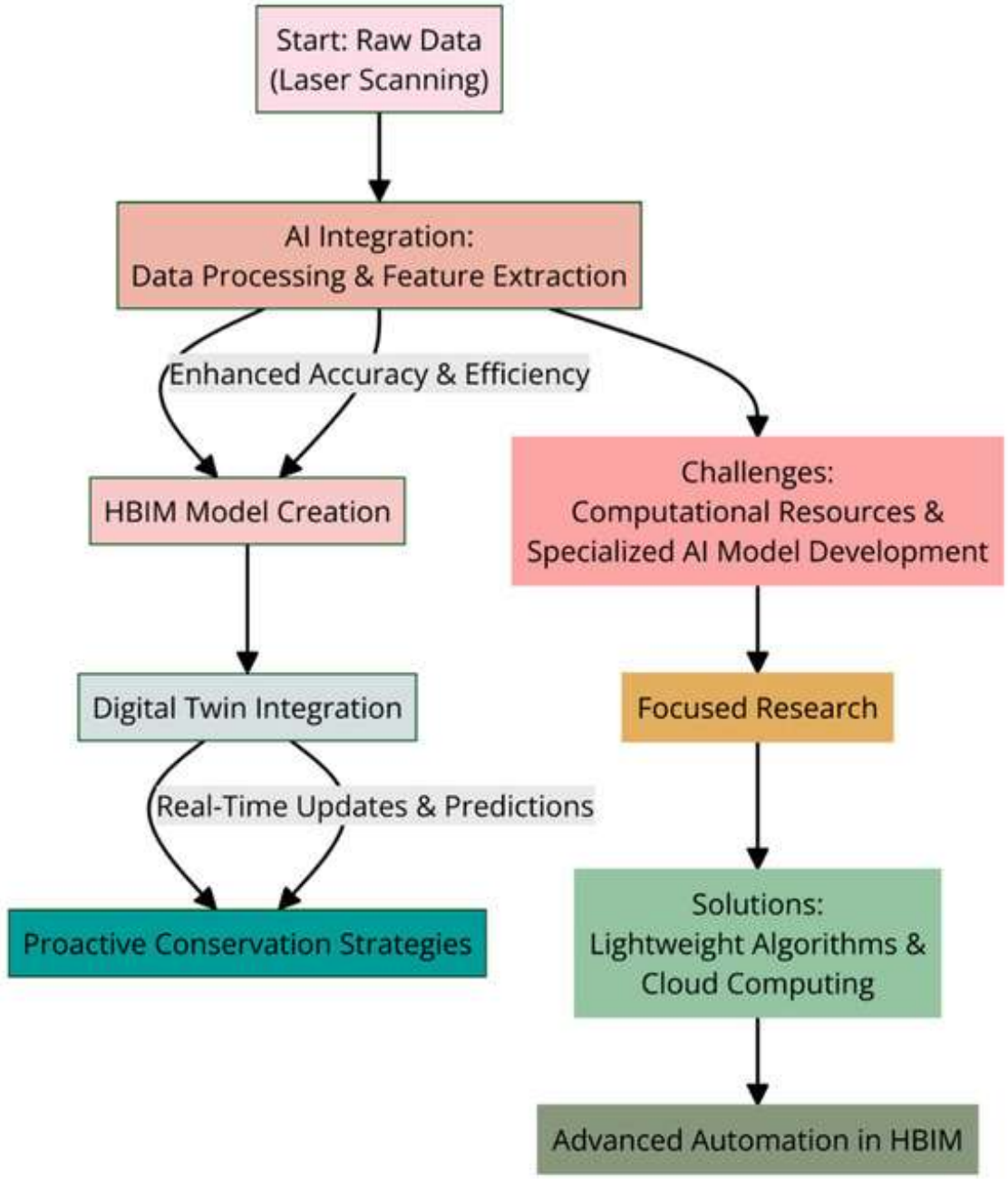


Digital Twins Across the Asset Lifecycle: Technical, Organisational, Economic, and Regulatory Challenges

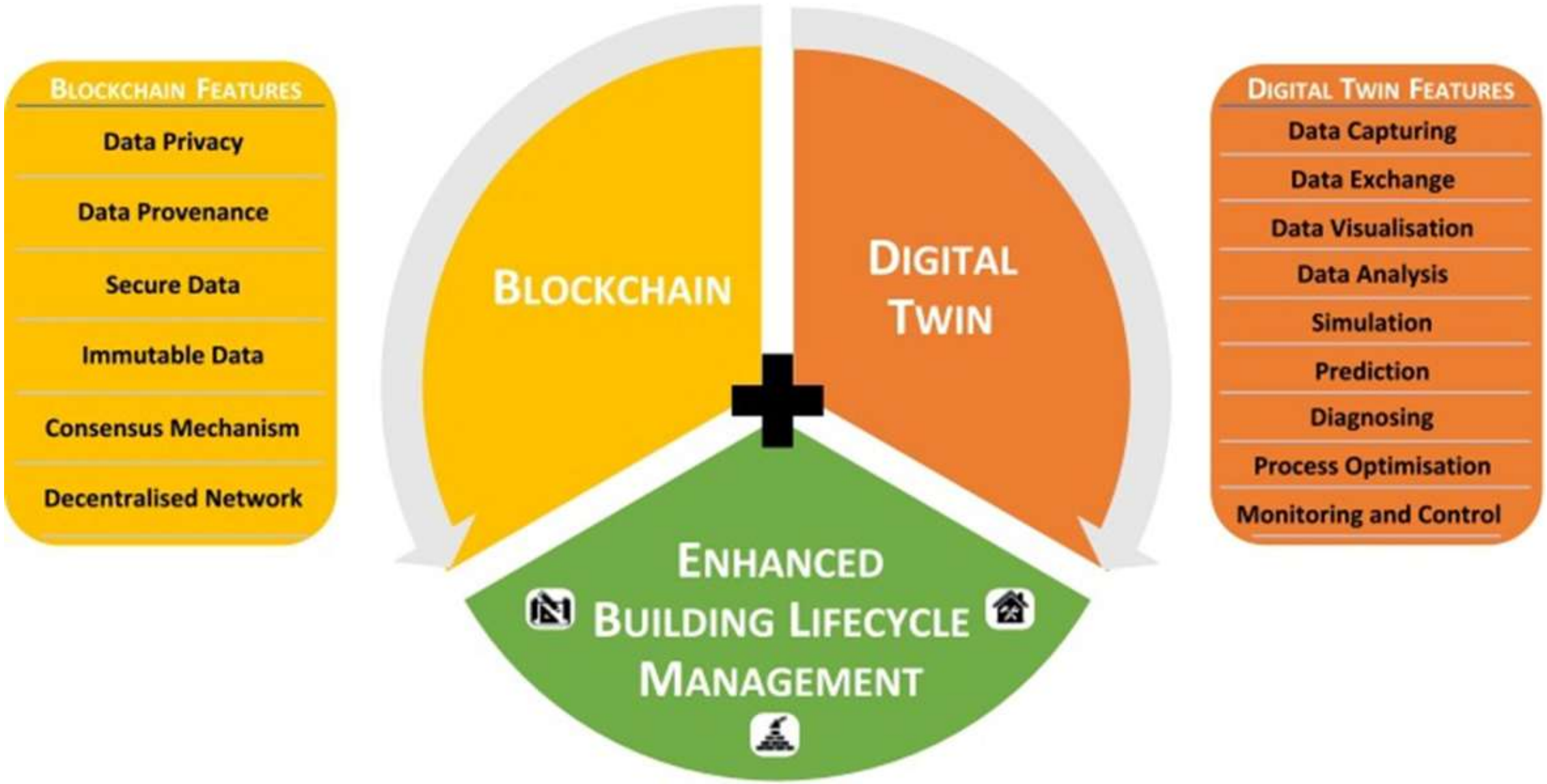

SERVICES
Autonomous Control
Decision Support
Digital Shadow
Knowledge Model
Data Processing
Sensors
REAL WORLD
Analysis
DIGITAL TWIN
Prediction / Planning
Decision Making
Effectors
Policies, Guidelines, Commitments
Guardrails, Controls, Measures
Regulatory and Stakeholder Obligations
Privacy, Security, Safety, Trust
Are We Safe Enough?
DIGITAL TWIN SAFETY

Knowledge Graphs for Safety Intelligence

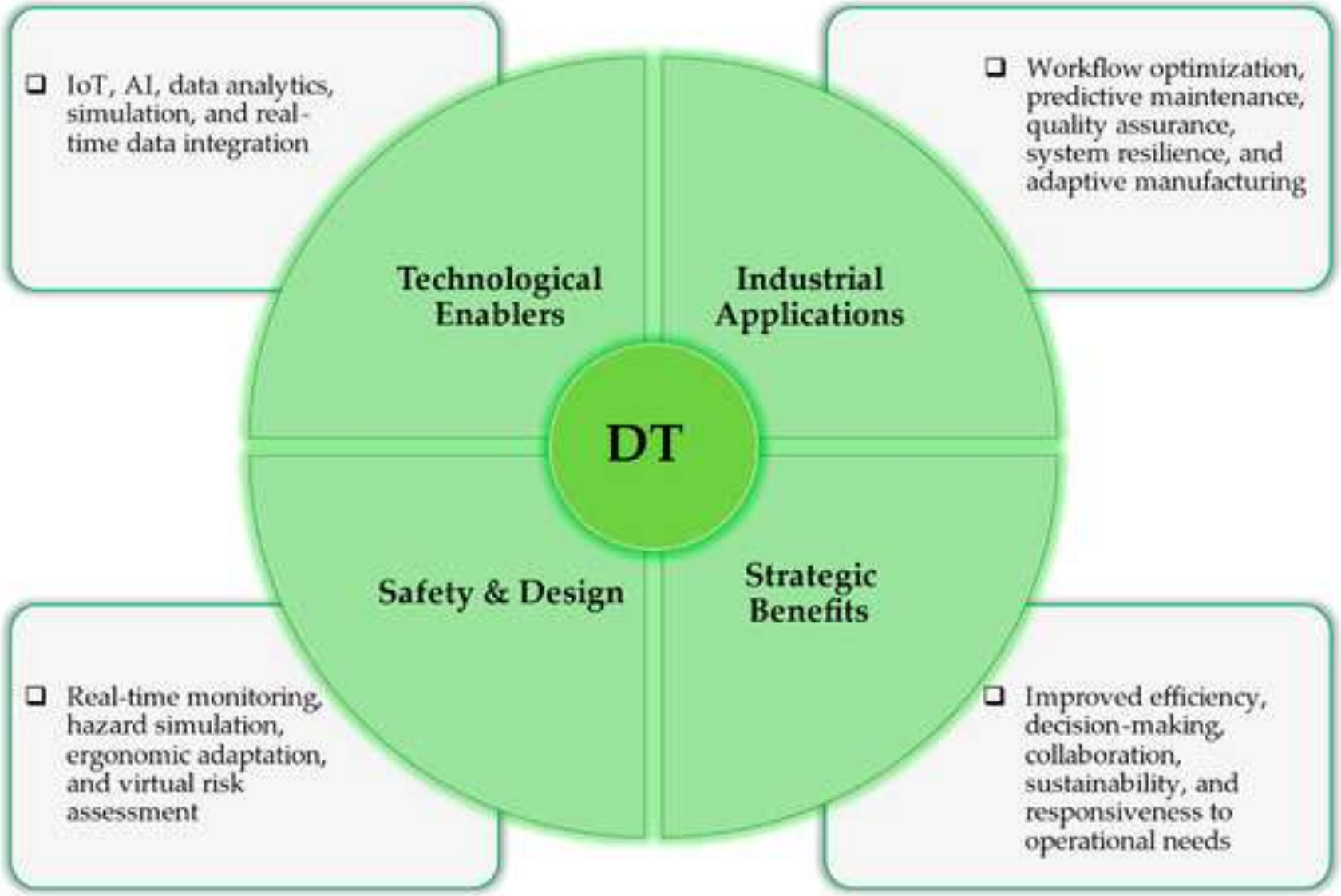
- Knowledge Graphs encode relationships between safety concepts
- Combines SME expertise with AI techniques
- Uncover latent threats and guide optimal decision-making



Digital Twins and Blockchain technologies for building lifecycle management

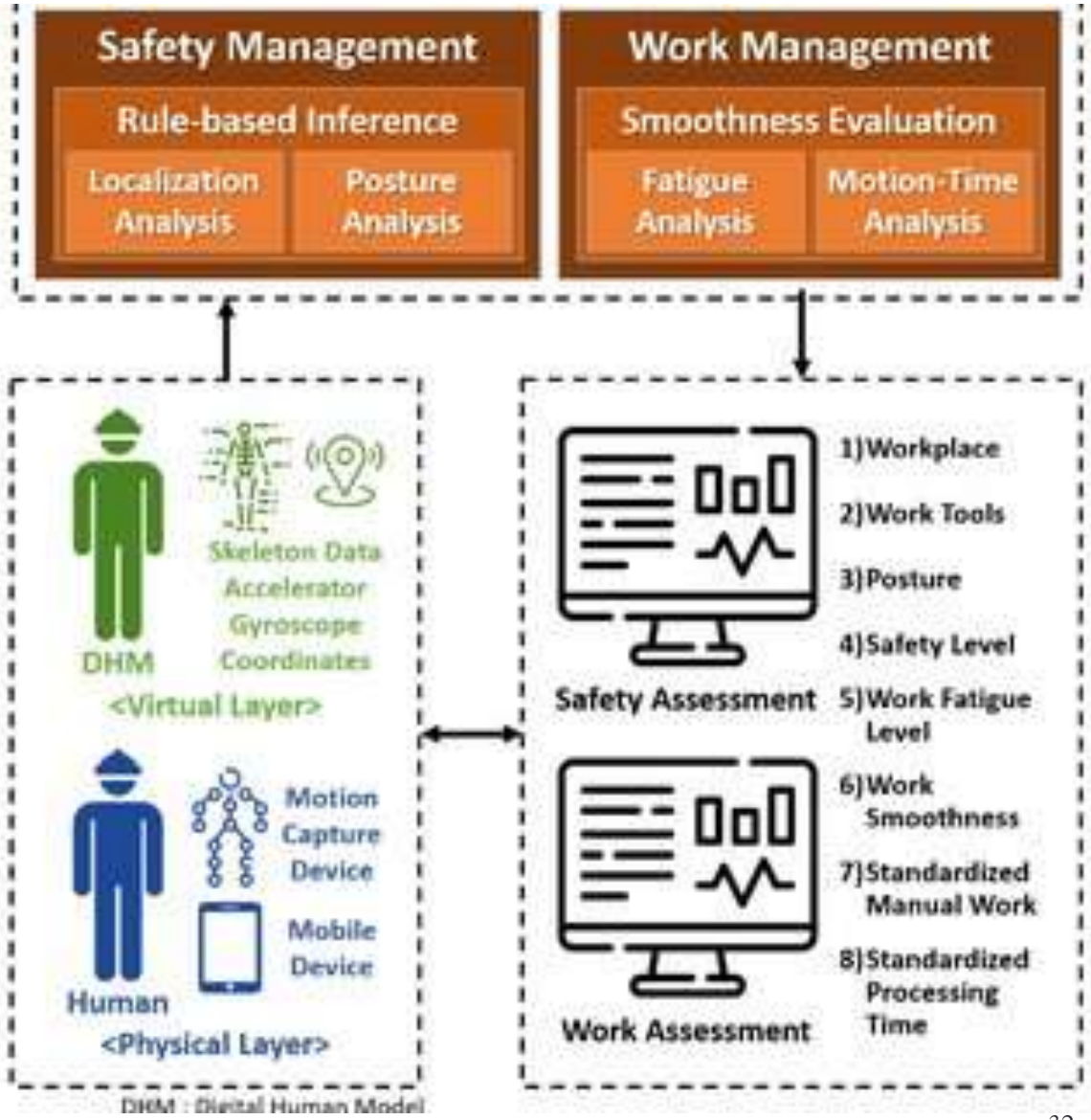


Exploring the Role of Digital Twin and Industrial Metaverse Technologies in Enhancing Occupational Health and Safety in Manufacturing



Phast CFD & Risk Modeling

- Advanced consequence modelling bridges empirical and CFD approaches
- Phast CFD integrates 3D geometry modeling with ease of use
- Enables accurate fire, explosion, and dispersion modeling



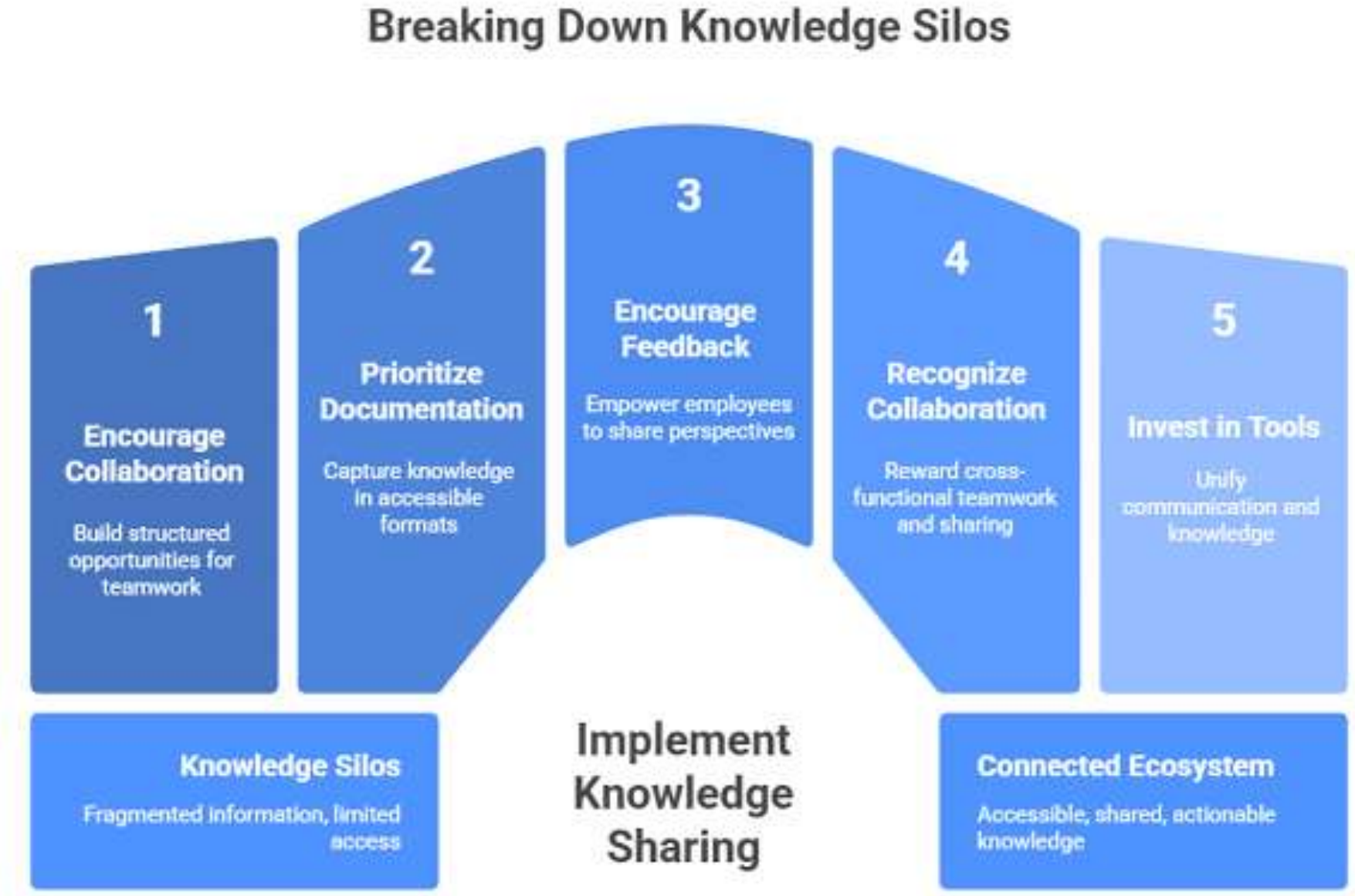
SECTION 4: Strategy Pillar 3 – Breaking Down Silos

The Silo Problem

- Most incidents occur at interfaces between disciplines
- Cross-domain knowledge extraction is difficult
- Information is siloed in proprietary formats

Process Safety Information Ensures Safe Operations

Knowledge Silos: What Are They and How To Avoid Them?

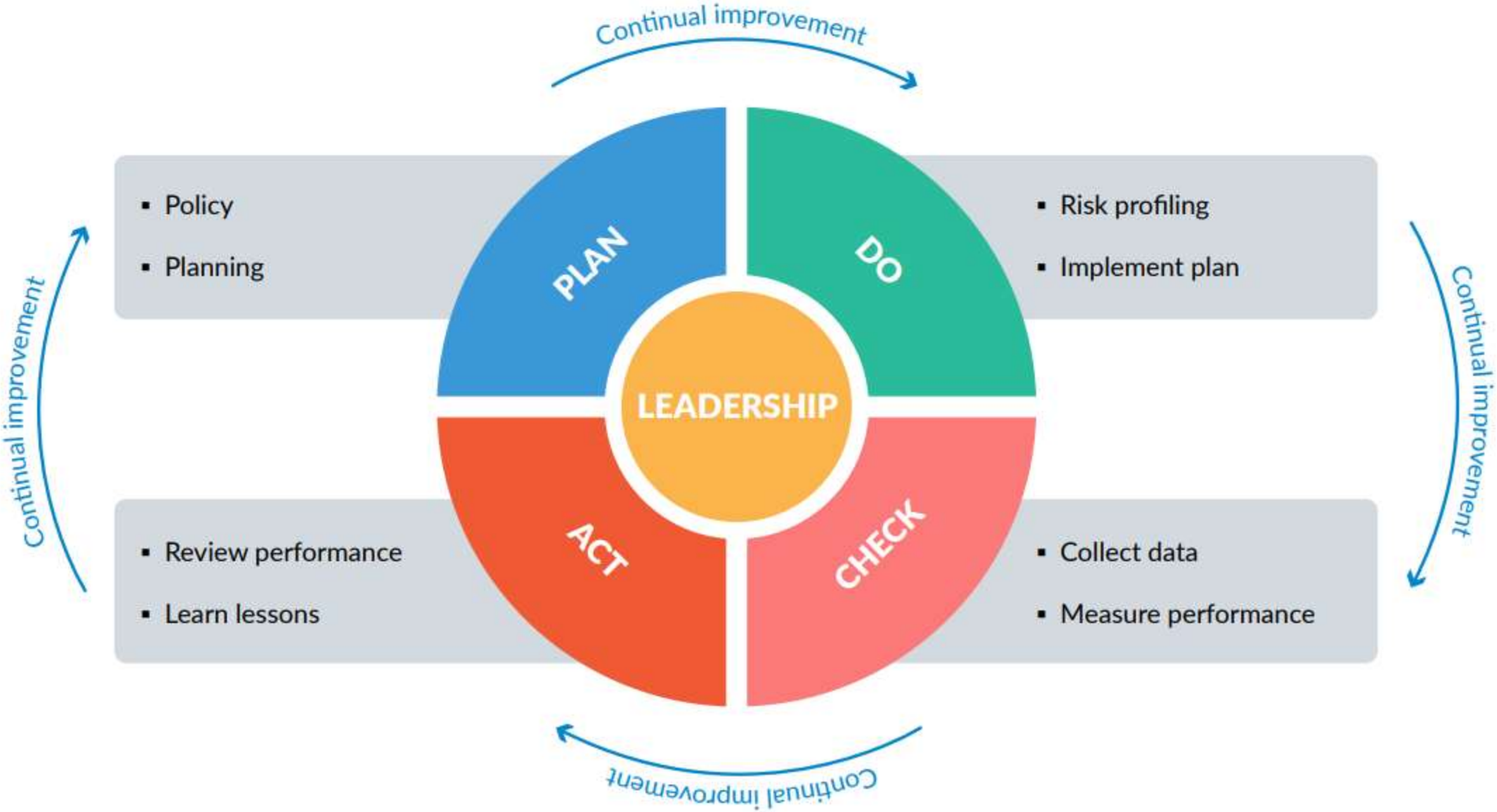


Cross-Functional Collaboration

- Cross-Functional Safety Squads on major projects
- Shared "Project Wikis" for multidisciplinary updates
- Rule: No design change without multidisciplinary digital sign-off

Collaborative Learning Models

- Learning-by-doing approach for safety and maintenance training
- Adapts to different backgrounds: "digital natives" vs. "digital immigrants"
- Mutual collaboration improves weaknesses on both sides


Continual improvement
Continual improvement
Continual improvement
Continual improvement
PLAN
DO
CHECK
ACT
LEADERSHIP
▪ Policy
▪ Planning
▪ Risk profiling
▪ Implement plan
▪ Review performance
▪ Learn lessons
▪ Collect data
▪ Measure performance

SECTION 5: Strategy Pillar 4 – Immersive & Gamified Learning

Immersive Virtual Experiments

- IVE (Immersive Virtual Experiment) for safety training
- Students practice equipment isolation in VR before physical execution
- Result: Better visualization and understanding of safety steps

Examining the Role of Augmented Reality and Virtual Reality in Safety Training

Safety Training

Virtual Reality

V/S

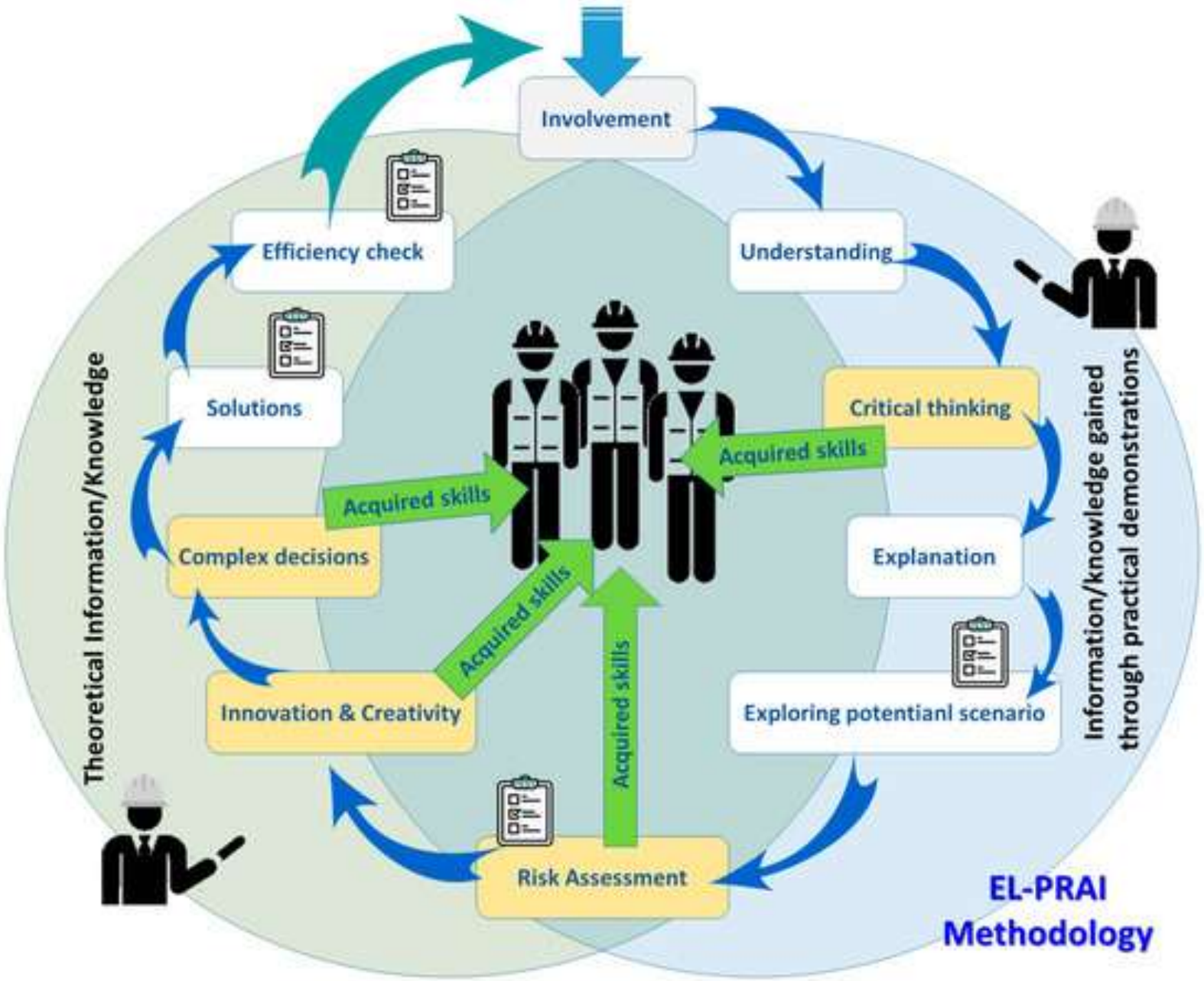
Traditional learning and training methods

Benefits

Increase learners' levels of awareness and their learning outcomes

Requirements

Create highly interactive and realistic experiences



Rapid Risk Assessment in Industry: Increasing Awareness of Worker Safety in Industrial Activities

Gamification for Engagement

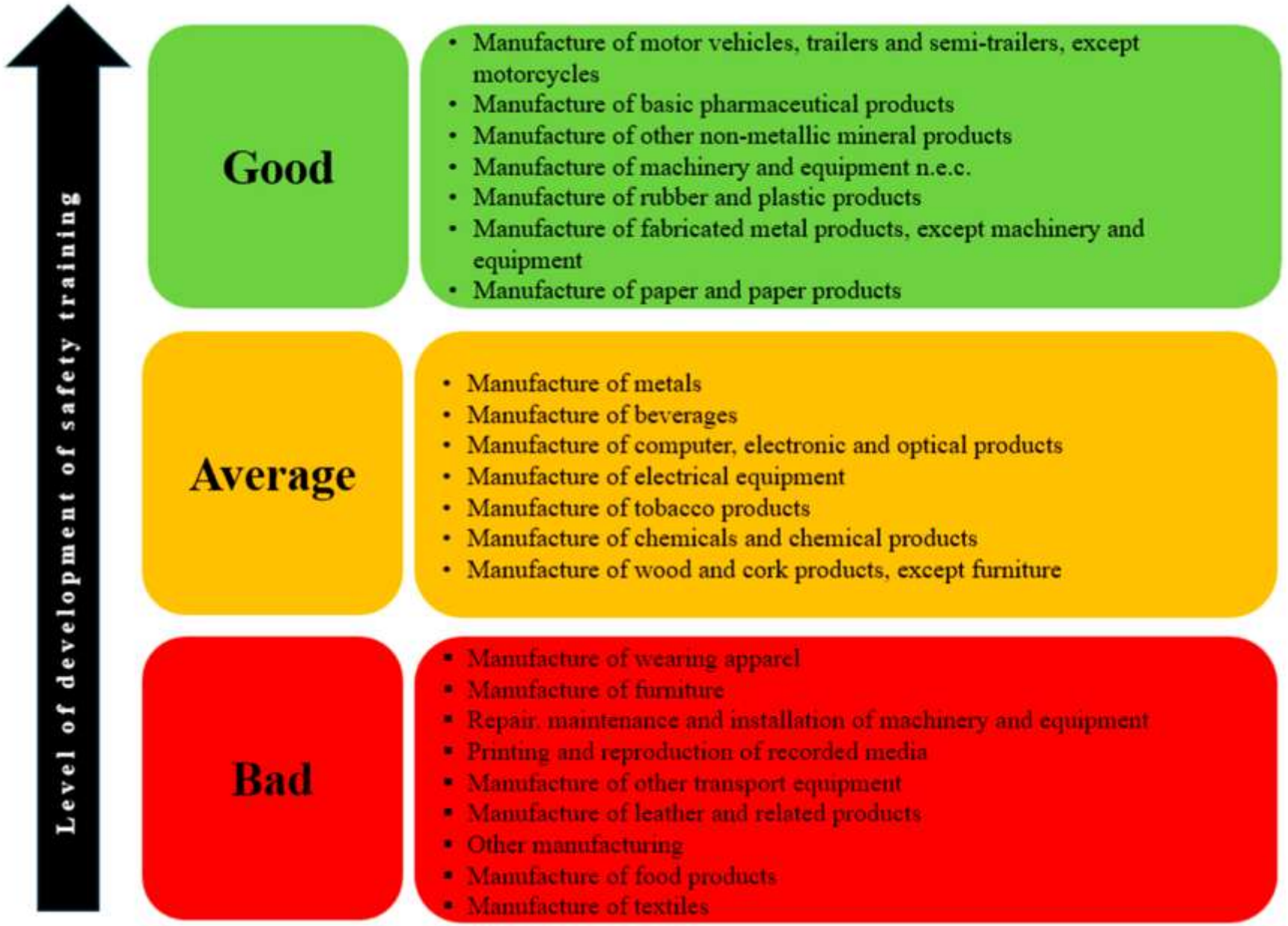
- Shift from annual compliance training to daily bite-sized challenges
- Reward engineers for identifying and sharing near-misses
- Leaderboards foster healthy competition


SAFETY FIRST


HSE

Active Learning Effectiveness

- Active learning strategies outperform traditional lectures
- Cooperative learning activities increase engagement
- Simulation-based learning improves knowledge transfer



Modern Technologies in Occupational Health and Safety Training: An Analysis of Education, Innovation, and Sustainable Work Practices in Industry

Psychological Safety in the Modern Workplace – Touchscreen Talent Recruitment

Knowledge Transfer Results

- Survey findings: Students felt more prepared to transfer learning to physical setups
- IVE enabled visualization and understanding of safety steps
- Plans to expand immersive technology across curriculum

HUMAN FACTOR IN SAFETY

We can have the most advanced protective equipment and the strongest procedures, but the reality is:

80% of workplace accidents are linked to human behavior.

From my field experience, the solution is not only in procedures and technology, but in shaping behavior and building a strong Safety Culture:

- Regular training focused on safe behavior
- Encouraging workers to report hazards without fear
- Leading by example at all management levels

Safety starts in the mind before it starts with equipment.

TOOLBOX TALK

BEHAVIOR BASED SAFETY (BBS)

WHAT IS BBS?

Behavior Based Safety means looking at **OUR ACTIONS** on the job.

SIMPLE EXAMPLES

WHY IT MATTERS

Maybe you worked unsafely 10 times and nothing happened. But accidents don't warn us. Next time could be serious.

WHAT WE ALL MUST DO

- Watch your own actions. Ask: "Am I working safely?"
- Remind your brother. If you see unsafe behavior, say: "Brother, please wear your helmet."
- Accept correction. If someone corrects you, don't feel bad. It means they care about your safety.

CLOSING MESSAGE Tools, machines, and site conditions are important, but the most powerful safety tool is OUR BEHAVIOR. If we work safe, we go home safe.


BEHAVIOUR BASED SAFETY
Think Safe, Work Safe
UNSAFE BEHAVIOURS
Not wearing PPE
Taking shortcuts
Ignoring procedures
Overconfidence
SAFE BEHAVIOURS
Wearing correct PPE
Following procedures
Using tools properly
Communicating hazards
Examples of Unsafe Behaviours
Not wearing PPE
Taking shortcuts
Ignoring procedures
Overconfidence
Examples of Safe Behaviours:
Wearing correct PPE
Following procedures & PTW
Using tools properly
Communicating hazards
SAFETY IS A CHOICE YOU MAKE
ANSARI HSE


SAFETY
WHAT IS SAFETY?
Safety means taking action to prevent harm, injury, or damage to people, property and environment.
SAFETY IS NOT JUST A RULE,
IT'S A WAY OF LIFE.
BE SAFE
STAY SAFE
EVERY DAY
EVERYWHERE
WHY IS SAFETY IMPORTANT?
PROTECTS LIVES
Keeps you and others safe from injuries and accidents.
SUPPORTS FAMILIES
Your safety ensures happiness and security of your loved ones.
IMPROVES PRODUCTIVITY
A safe environment helps in better focus and performance.
PROTECTS PROPERTY & ENVIRONMENT
Prevents damage to equipment, materials and our planet.
BUILDS A POSITIVE CULTURE
Creates trust, responsibility and a respectful workplace.
SAFE BEHAVIOR STARTS WITH YOU
FOLLOW RULES
Always follow safety rules and procedures.
BE ALERT
Stay aware of your surroundings and potential hazards.
USE PPE
Use the right personal protective equipment for the job.
SPEAK UP
Report unsafe acts or conditions. Your voice can prevent accidents.
CARE FOR OTHERS
Look out for your colleagues and help keep them safe.
SAFETY PLEDGE
I pledge to work safely, follow rules, care for others and protect lives, every day, in every way.
TOGETHER,
WE CAN MAKE OUR WORKPLACE
100% SAFE
SAFETY TODAY SUCCESS TOMORROW
SAFETY IS EVERYONE'S RESPONSIBILITY.
WORK SAFE, GO HOME SAFE.
SAFETY FIRST
ALWAYS FIRST

SECTION 6: Strategy Pillar 5 – AI-Powered Knowledge Systems

AI Large Models for Safety Q&A

- Traditional methods: low efficiency, insufficient accuracy
- Solution: AI large-model-based Q&A system
- Combines knowledge graphs + RAG (Retrieval-Augmented Generation)
- Result: Rapid response to complex safety queries

Key Principles

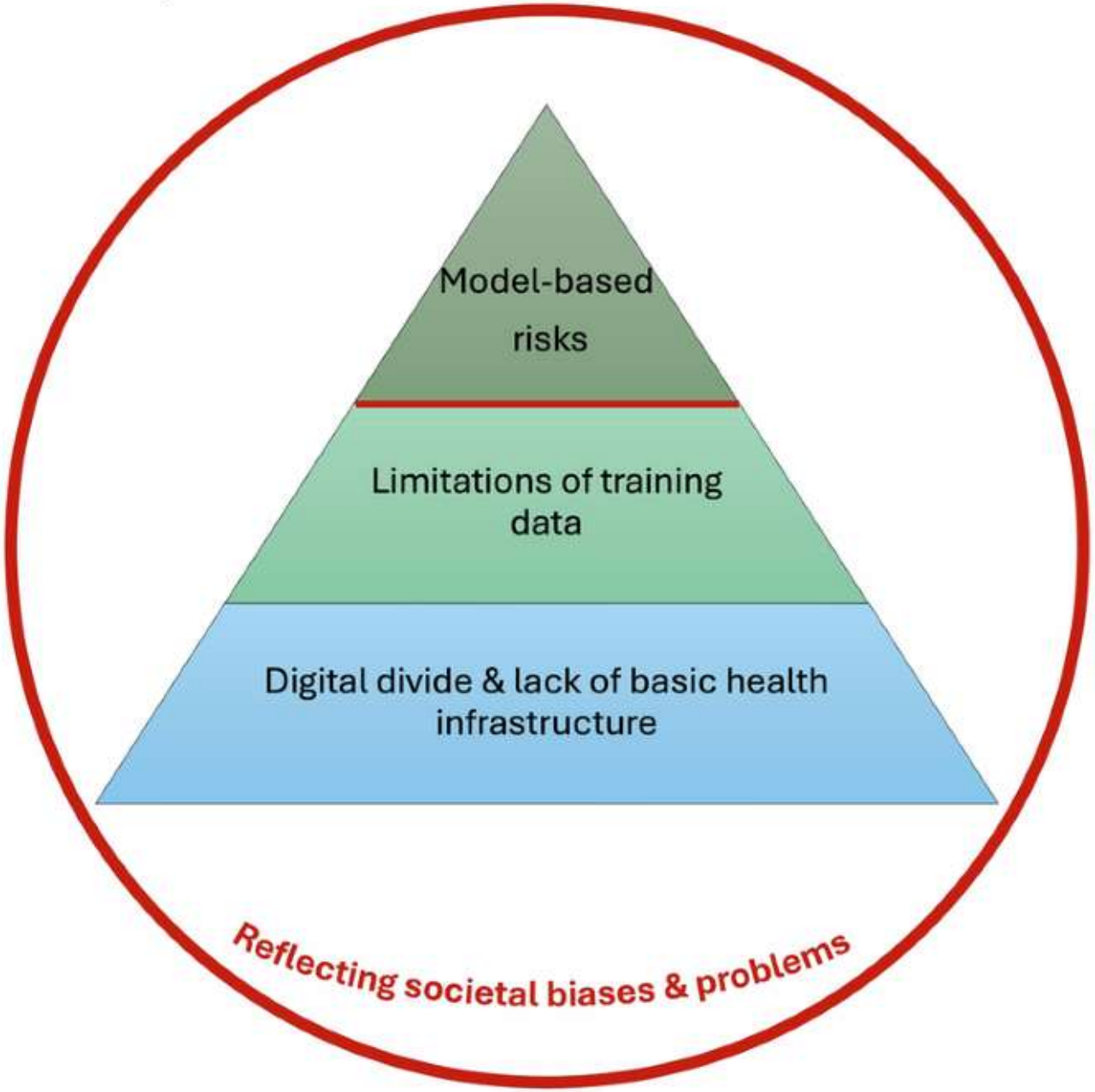
Map potential applications to GenAI strengths

Define and implement evaluation frameworks

Balance safety & potential benefits

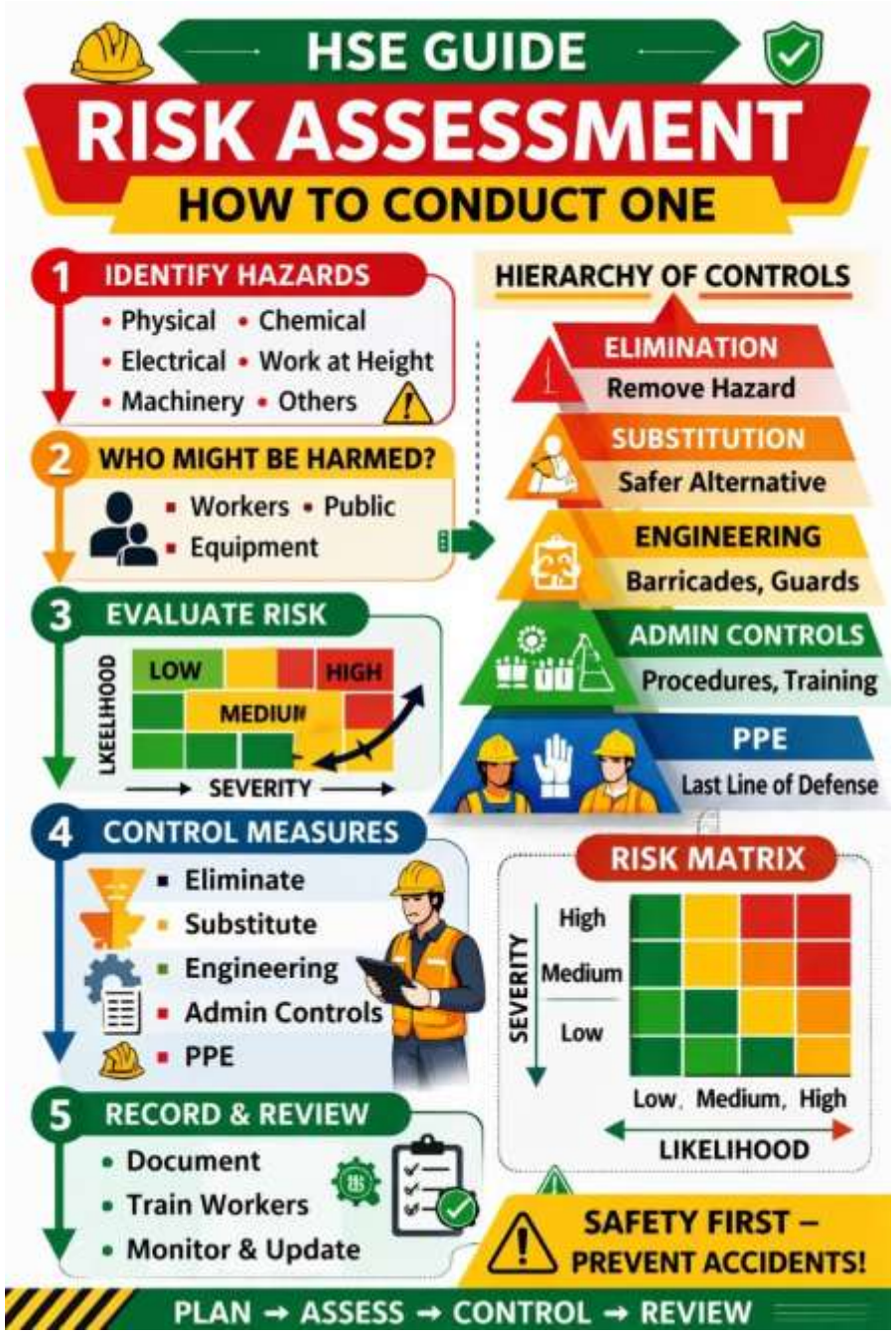
Ensure transparency and knowledge-sharing

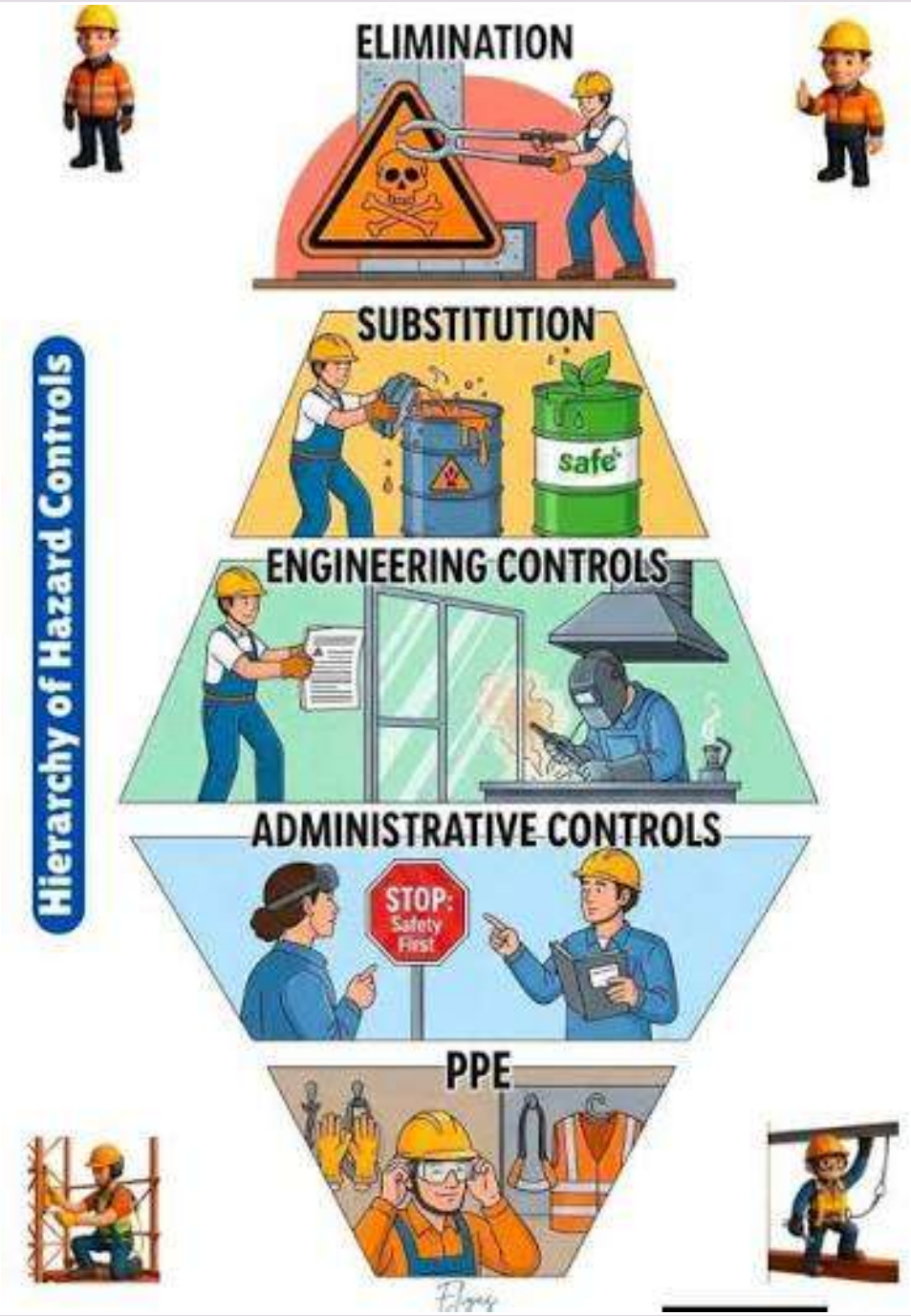
Key Risks



AI for HAZOP Automation

- Long-term goal: HAZOP automation and augmentation
- GPT techniques applied to curated, proprietary engineering datasets
- Predicts initiating events and consequences based on training data




Hierarchy of Hazard Controls
ELIMINATION
SUBSTITUTION
safe
ENGINEERING CONTROLS
ADMINISTRATIVE CONTROLS
STOP: Safety First
PPE


LET'S ENGAGE AND LEARN TOGETHER
THE HIERARCHY OF CONTROL
How do we effectively control hazards in the workplace?
SAFETY with Basit
MOST EFFECTIVE
ELIMINATION
Remove the hazard completely
SUBSTITUTION
Replace the hazard with something safer
ENGINEERING
Isolate people from the hazard by design
ADMINISTRATION
Change the way people work (training, procedures, signage)
PPE
Protect the worker with Personal Protective Equipment
PPE
Protect the worker
LEAST EFFECTIVE
Priority Order: Control hazards at the source before relying on lower levels of protection
SAFETY with Basit

AI Education for Safety Professionals

- Challenge: Most safety professionals lack formal AI education
- Solution: Graduate courses on AI for workplace safety
- Covers: machine learning, deep learning, LLMs, computer vision,VR
- Students propose AI-based solutions to real-world safety risks

What is Safety Culture?

Are You Ready for AI-Based Safety Video Monitoring?

Building a Strong Safety Culture – Step by Step

Everyonee looks out for each other; safety becomes a shared value

Focus: peer-to-peer coaching, cross-department safety collaborat

Conclusion

Framework Summary & Implementation Roadmap

The 5-Pillar Framework:

- Capture: Tacit knowledge to dynamic databases
- Contextualize: Data mapped to Digital Twins & Knowledge Graphs
- Collaborate: Cross-functional teams & learning-by-doing
- Learn: Immersive VR & gamified active learning
- Retrieve: AI-powered knowledge Q&A & HAZOP augmentation

Q&A Session

Suggested Discussion Questions:

1."What is the one piece of safety knowledge you wish you could access instantly?"

2."What barriers to knowledge sharing exist in your organization?"

3."How might AI tools like knowledge Q&A systems change your daily work?"

Recommended Supplementary References (for further reading)

These references from the search results provide additional depth:

- **Forcina, A. et al.** "The role of Industry 4.0 enabling technologies for safety management: A systematic literature review." *Procedia Computer Science*, 180: 436.
- **VanDerHorn, E. & Mahadevan, S.** "Digital Twin: Generalization, characterization and implementation." *Decision Support Systems*, 145, 113524.
- **Agnusdei, G.P. et al.** "A classification proposal of digital twin applications in the safety domain." *Computers & Industrial Engineering*, 154, 107137.
- **Culot, G. et al.** "Behind the definition of Industry 4.0: Analysis and open questions." *International Journal of Production Economics*, 226, 107617.


Thank
you!