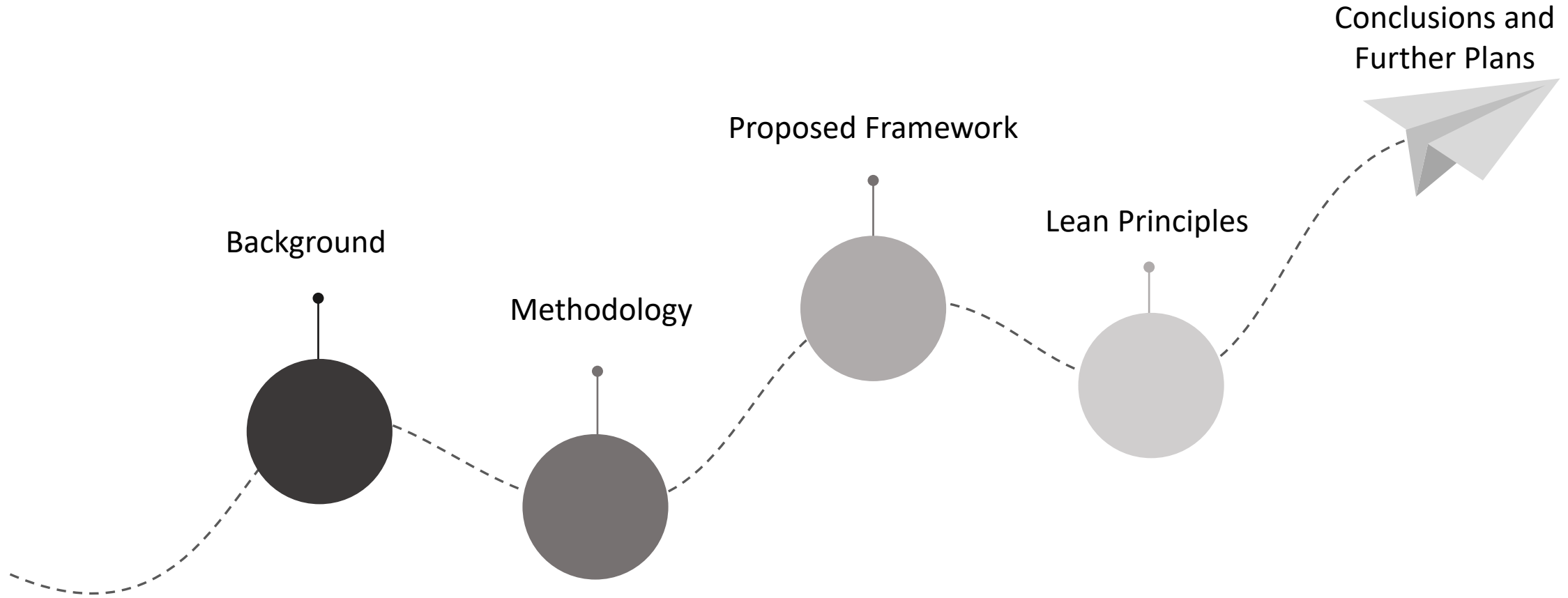


# **REENGINEERING CONSTRUCTION PROCESSES IN THE ERA OF CONSTRUCCION 4.0: A LEAN-BASED FRAMEWORK**

**Makram Bou Hatoum  
Hala Nassereddine, Ph.D.  
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# AGENDA



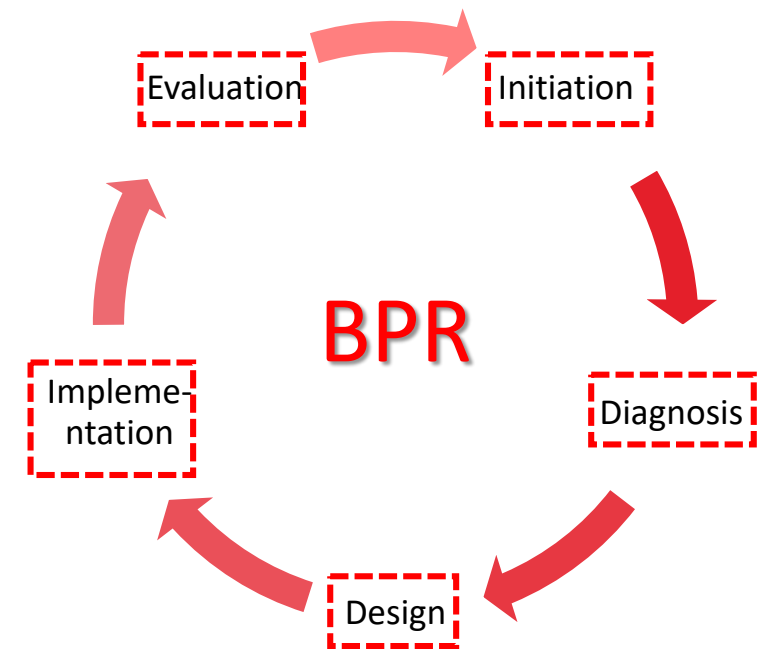
# BACKGROUND



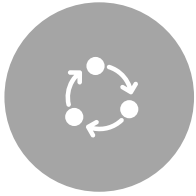
Process  
Reengineering

Different businesses across major industries are constantly undergoing significant changes to make processes more dynamic and responsive:

- Growing global competition
- Increased complexity of business environments
- Added pressure from customer expectations
- Emergence of new technology



# BACKGROUND



Process  
Reengineering



Construction  
Industry

It has been well documented that the traditional business-as-usual in the construction industry has reached a stagnation point – there is a pressing need to:

- increase productivity
- improve project performance
- address the labor shortage
- reduce fragmentation
- introduce standardization
- address resistance to change
- increase collaboration

Lean Construction

Construction 4.0



# BACKGROUND



Process  
Reengineering



Gap and  
Objective



Construction  
Industry

Absence of a framework to reengineer construction processes and properly account for technology integration

&

Existing construction processes have been mostly designed before current technologies were available, and some processes cannot undergo transformations without being reengineered

Need for a framework to  
**reengineer construction processes**  
in the **Construction 4.0 era**,  
while accounting for  
**lean construction principles**



Construction 4.0 Process  
Reengineering framework  
(**CPR4.0**)

# METHODOLOGY

T1

Reviewing the existing research corpus to understand construction industry transformations and highlight gaps in existing process reengineering methodologies

T2

Presenting a new framework to reengineer construction processes

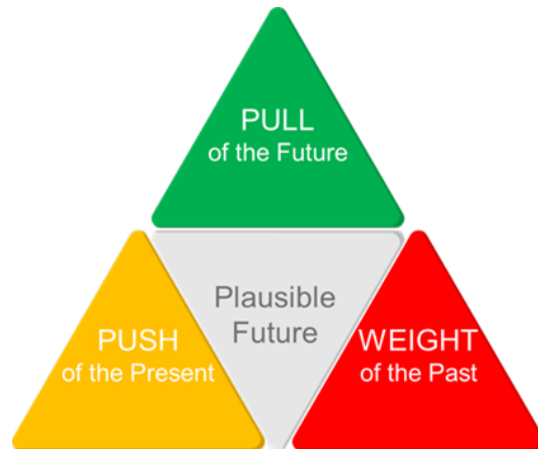
T3

Verifying the framework with subject matter experts through interviews and surveys

T4

Validating the framework through applying it on a real-life construction process

# Framework Underpinning



Futures Triangle

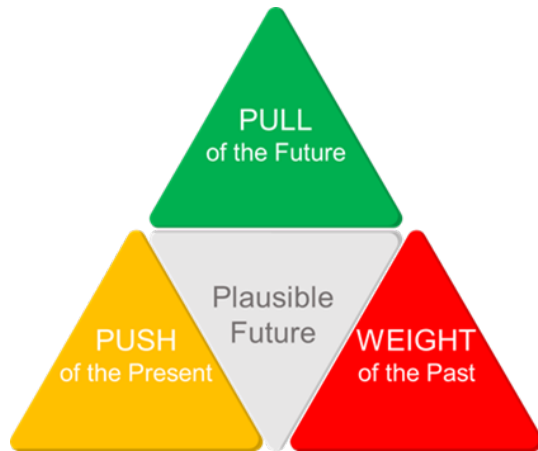
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*Embodiment*

When re-engineering construction processes:

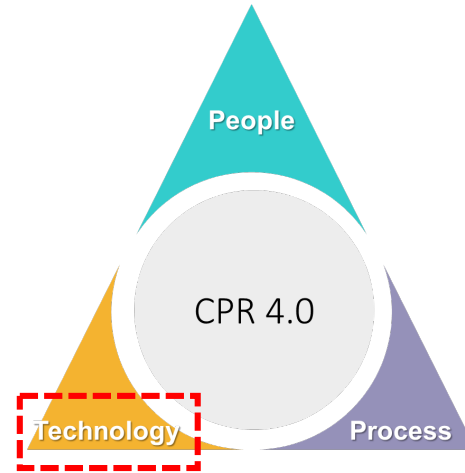
- ✓ **Weight of History** (resistance to change)
- ✓ **Push of the Present** (current trends and quantitative drivers)
- ✓ **Pull of the Future** (construction 4.0 vision)

# Framework Underpinning



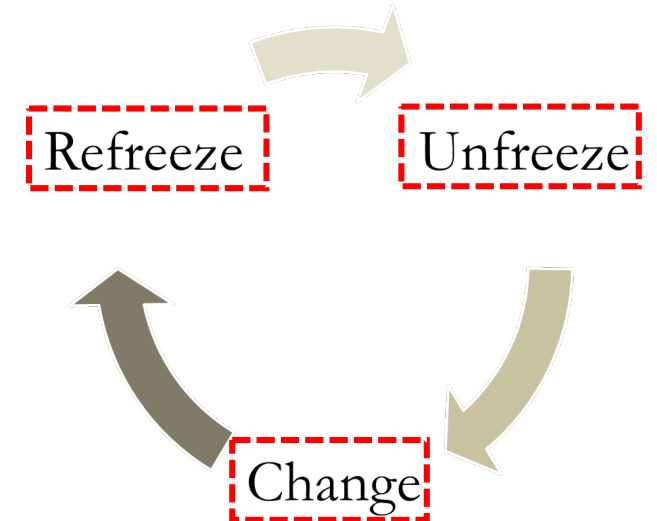
Futures Triangle

*Embodiment*



People-Process-Technology

*Dimensions*

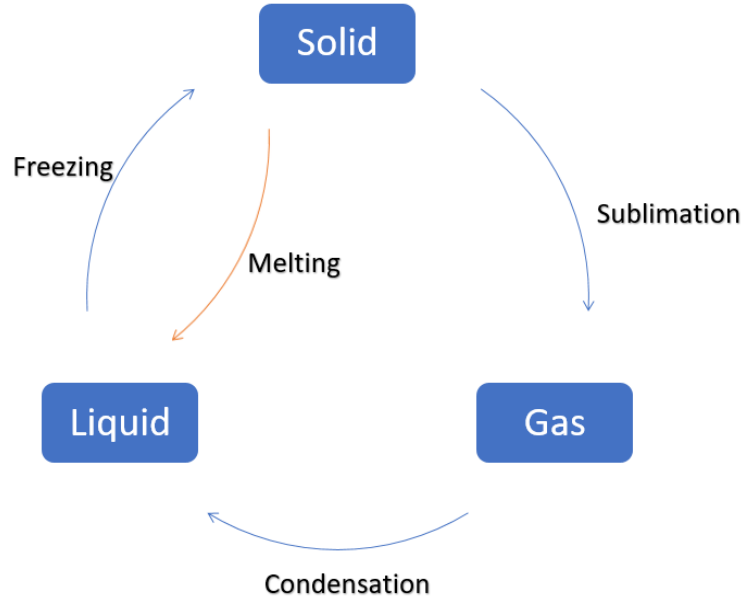


Kurt Lewin Change Management Model

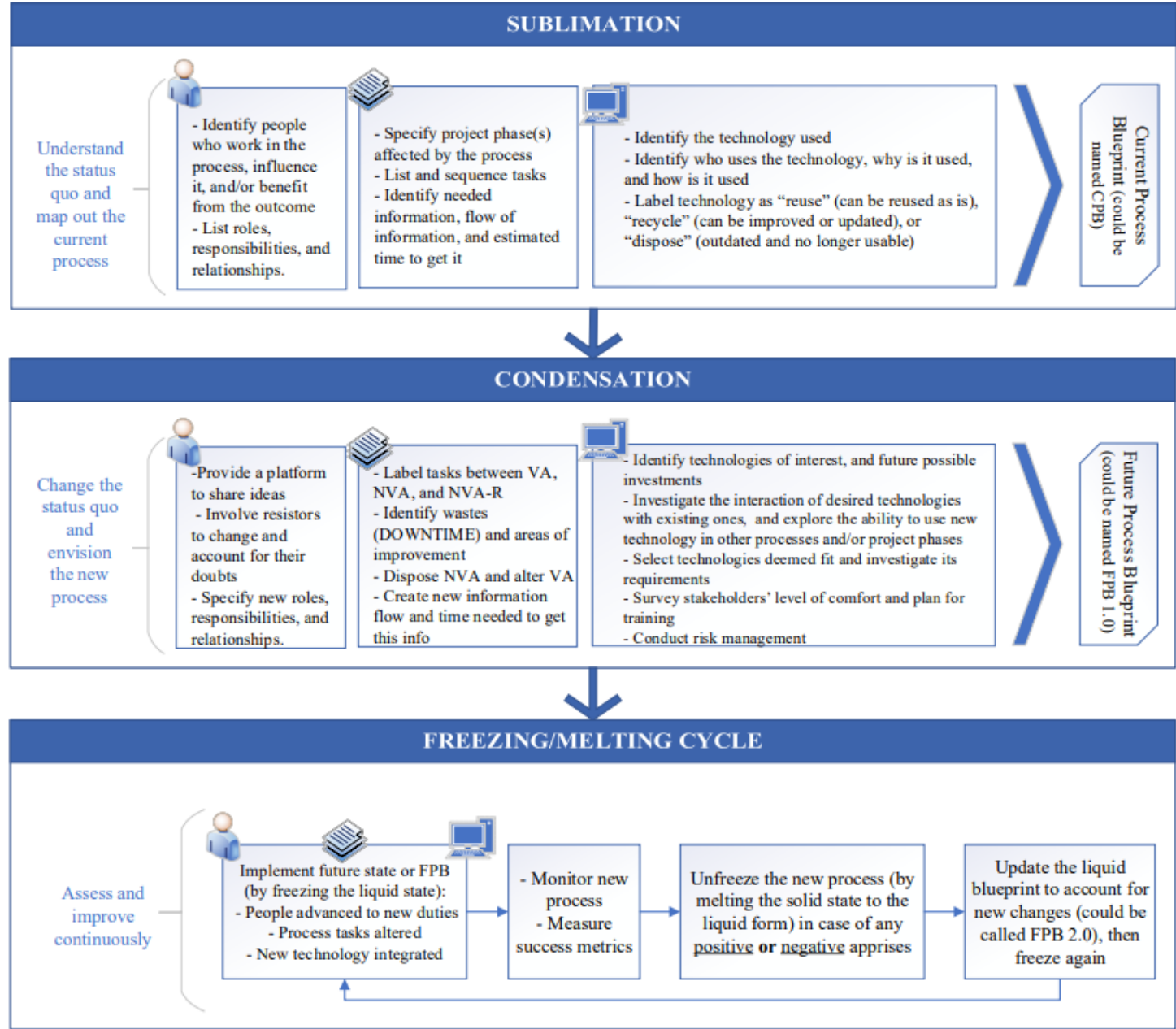
*Inspiration*



# Framework Overview



## Major Phases



# Lean Principles

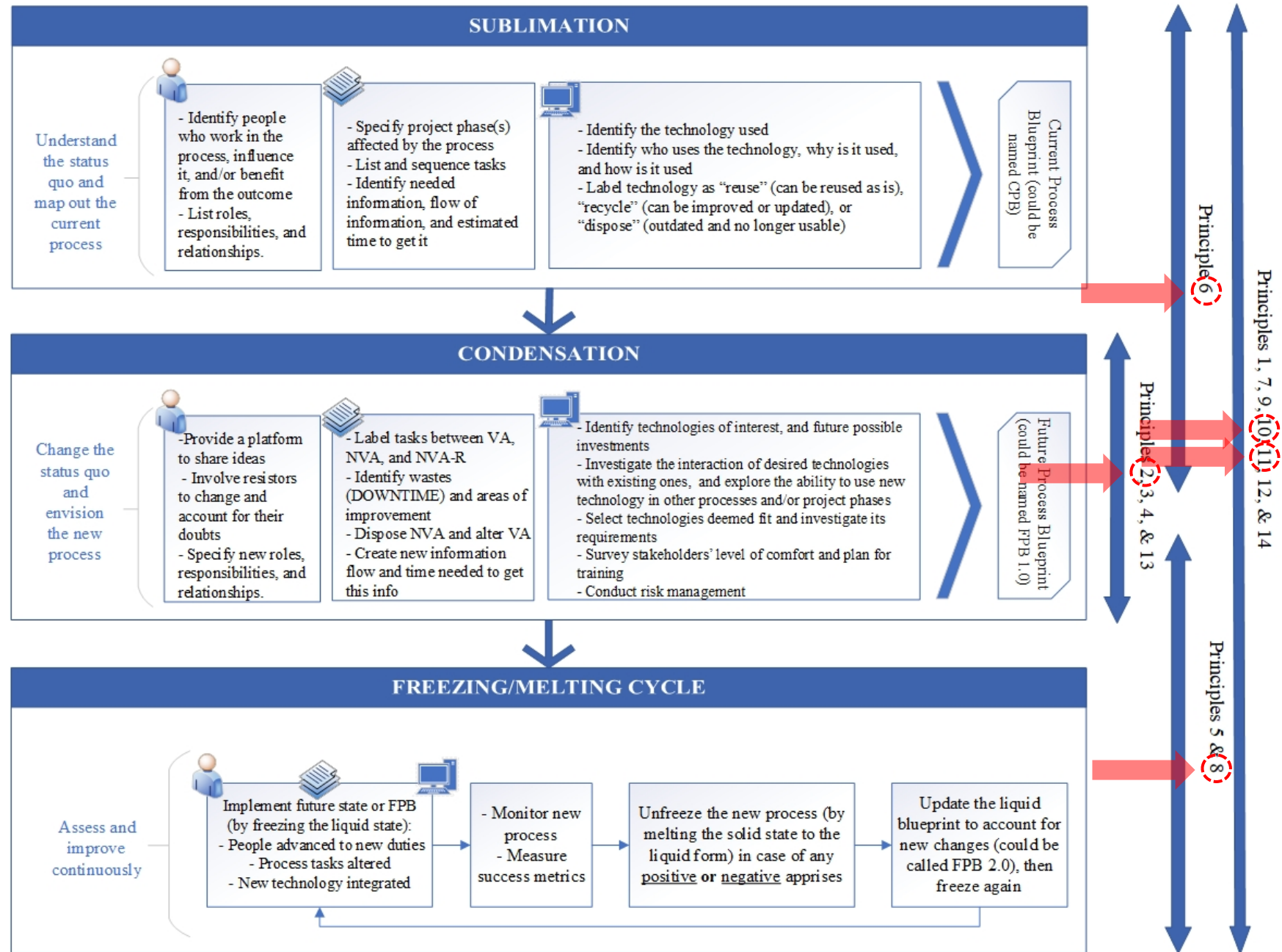
**Principle 2:** Create a continuous process flow to bring problems to the surface.

**Principle 6:** Standardized tasks and processes are the foundation for continuous improvement and employee empowerment.

**Principle 8:** Use only reliable, thoroughly tested technology that serves your people and processes.

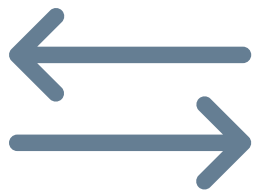
**Principle 10:** Develop exceptional people and teams who follow your company's philosophy.

**Principle 11:** Respect your extended network of partners and suppliers by challenging them and helping them improve.



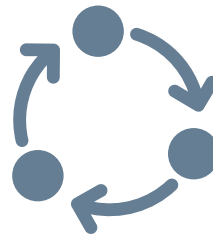
## Major Transformations:

- Lean Construction
- Construction 4.0



## CPR4.0 Framework:

- Futures Triangle
- Kurt Lewin Change Management
- People-Process-Technology



## Further Studies:

- Verify (surveys, interviews, focus groups)
- Validate (case study)





# THANK YOU!

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