# Aligning Societal Health and Productivity

## Integrating People into Operational Excellence Strategies

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19 November 2020

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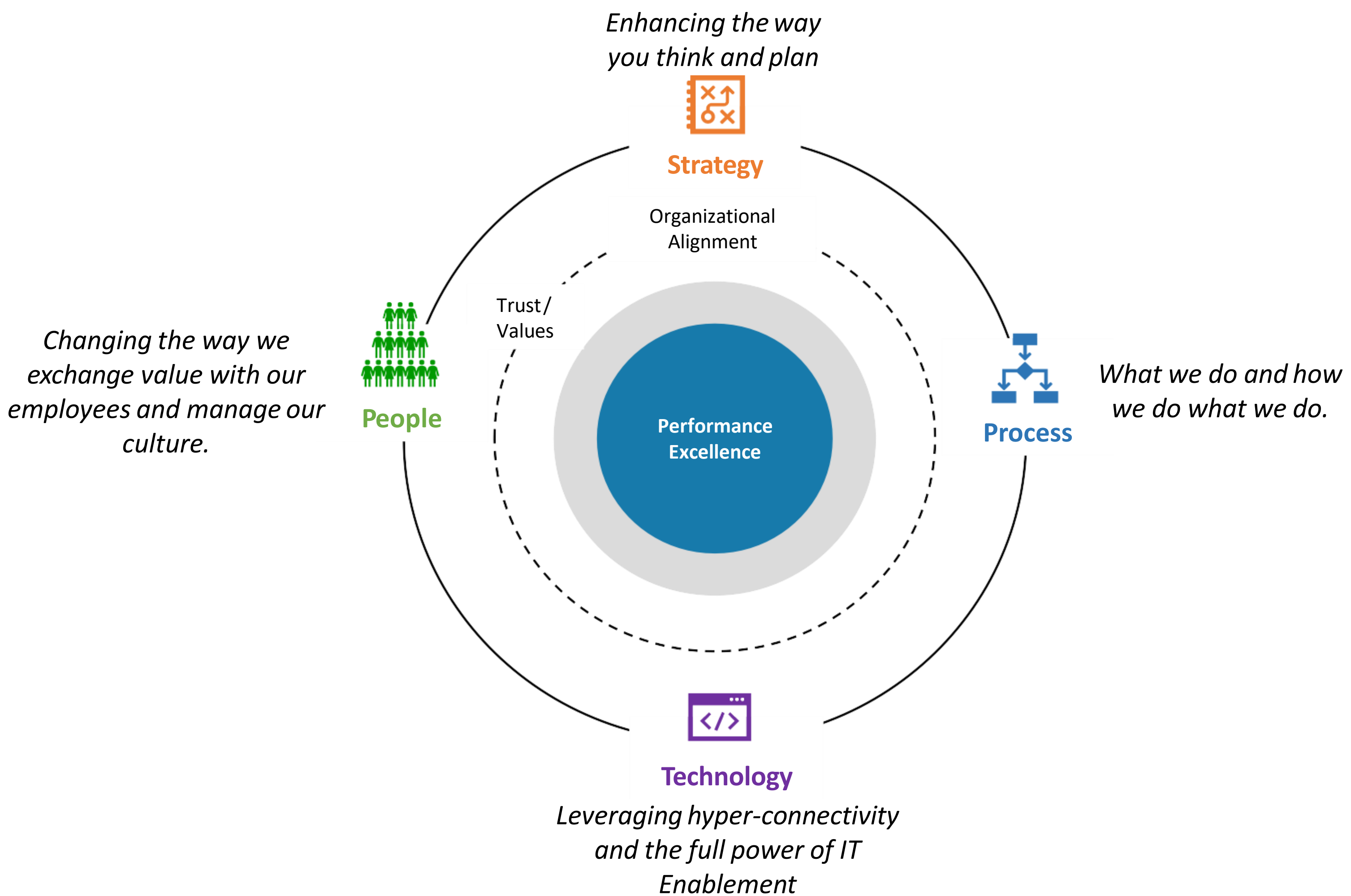

# This Webinar is a Natural Evolution from Recent Global IISE Webinars

- Benchmarking Industry: How to Engineer Performance Excellence
- Pioneering and Engineering a New World
- Creating Cultures that Support Full Potential Performance/Operational Excellence
- How to design and develop and execute Flow Workshops in Healthcare
- Principles for Creating Ideal Behaviors from Employees
- Becoming a Change Master
- Creating and Ensuring Superior Client Experience
- Achieving Full Potential Performance: Managing Transformations in Yourself, Others, in teams and organizations

This Link gets you to these great Archived Webinars in our Virtual Learning Library

https://www.iise.org/details.aspx?id=46729&

# Performance Excellence Track

## Creating Cultures to Support Operational Excellence

David Poirier
President, IISE
CEO, The Poirier Group

Sreekanth
Ramakrishnan
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INSTITUTE OF INDUSTRIAL & SYSTEMS ENGINEERS

Sunday, 1 Nov
11:40-1:00 (Eastern)

# IISE Virtual Annual Conference(s)


- over 850 professionals, academicians, students attended our most recent Virtual Annual Conference
- No Travel, lower registration fees, pick and choose live sessions, have access to session recordings and presentations for up to a year!
- Virtual Networking worked great!!
- Can purchase access to our library of sessions from the conference even if you did not get a chance to attend.

# Housekeeping

A webinar recording will be made available after the session, follow up e-mail you will receive tomorrow.

Download the presentation **DURING** the Webinar, before it ends!! and request extra handouts after the webinar.

Questions? Scott will review them as they come in and integrate into the dialogue as appropriate and time permits

Follow up questions are welcomed and contact information is provided at the end of the presentation.


https://www.iise.org/details.aspx?id=46729

And, the Recording and Presentation pdf will be available on IISE's website for IISE members shortly after the webinar date—Training/Webinars/Performance Excellence. ***Membership Has Privileges!!***

# Aligning Societal Health and Productivity


Dr. Rupy Sawhney

Executive Director of Center for Advanced Systems Research and Education

Professor of Industrial and Systems Engineering

Heath Fellow in Business and Engineering

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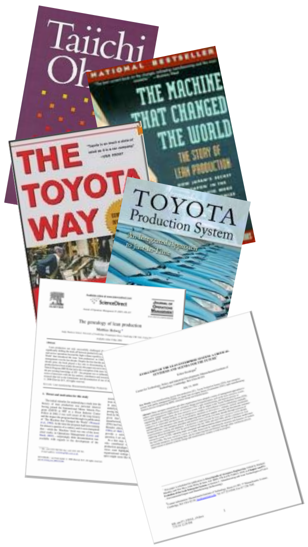
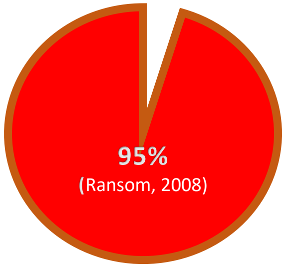
## A New Industrial and Systems Engineering Paradigm:
## Enhance Productivity AND Societal Health

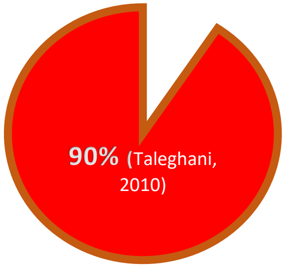
**Source**: Shutterstock, image ID: 240148429

# Our Decision Making has Failed to Sustain Productivity




- Lean is not sustainable within organizations (Smart et al., 2003)
- Lean has not produced the anticipated results (Rubrich, 2004)
- 95% of the Lean implementation fail, while only 5% succeed (Ransom, 2007)
- On an average 60% of Lean transformation efforts fail (Wooley, 2008)

# Our Decision Making has Failed to Enhance Employee Quality of Life

- Greater Stress on the Work Force
- Automation
- Continuous Improvement

*Source:* US Bureau of Labor Statistics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# Are We the Problem?

## Experiential Decision Making

# Decision Making = $f$ (Experience)


Employee Decision Making = $f$ (upbringing, education, experience)

Student Decision Making = $f$ (upbringing, education)

Initial Decision Making = $f$ (upbringing)

Family/Cultural Values

Education

Work Experience

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# Experiential Decision Making

***Source:*** *Associated Press*

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## An Experiential Decision


# Paradigm 1:

Productivity is Based on Employee **Well-being**

# Paradigm 2:

Productivity is Based on Employee **Effort**

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# Did We Create a Fundamental Conflict?

# What Is An Ideal Operational and People Systems?

# The Fundamental Conflict

REQUIREMENTS OF A PERFECT OPERATIONAL SYSTEM

→ Zero inventory between supplier and production
→ Zero starvation between supplier and production

→ 100% Utilization
→ Zero inventory
→ Cycle time = ∑ Process Time
→ Cycle time = Value Added Time

→ 100% on time
→ 100% on quality
→ Zero inventory
→ Zero risk

Employee and Societal Stress

REQUIREMENTS OF A PERFECT PEOPLE SYSTEM

→ SECURITY
- →Provide fair compensation for work
- →Provide job security
- →Provide clarity on financial impact change

→ SAFETY (physical, professional, social, emotional)

→ STRESS
- → Eliminate micromanagement
- → Ensure personal time
- → Ensure skills sets and resources
- → Eliminate constant time pressure
- → Ensure success to meet production expectations

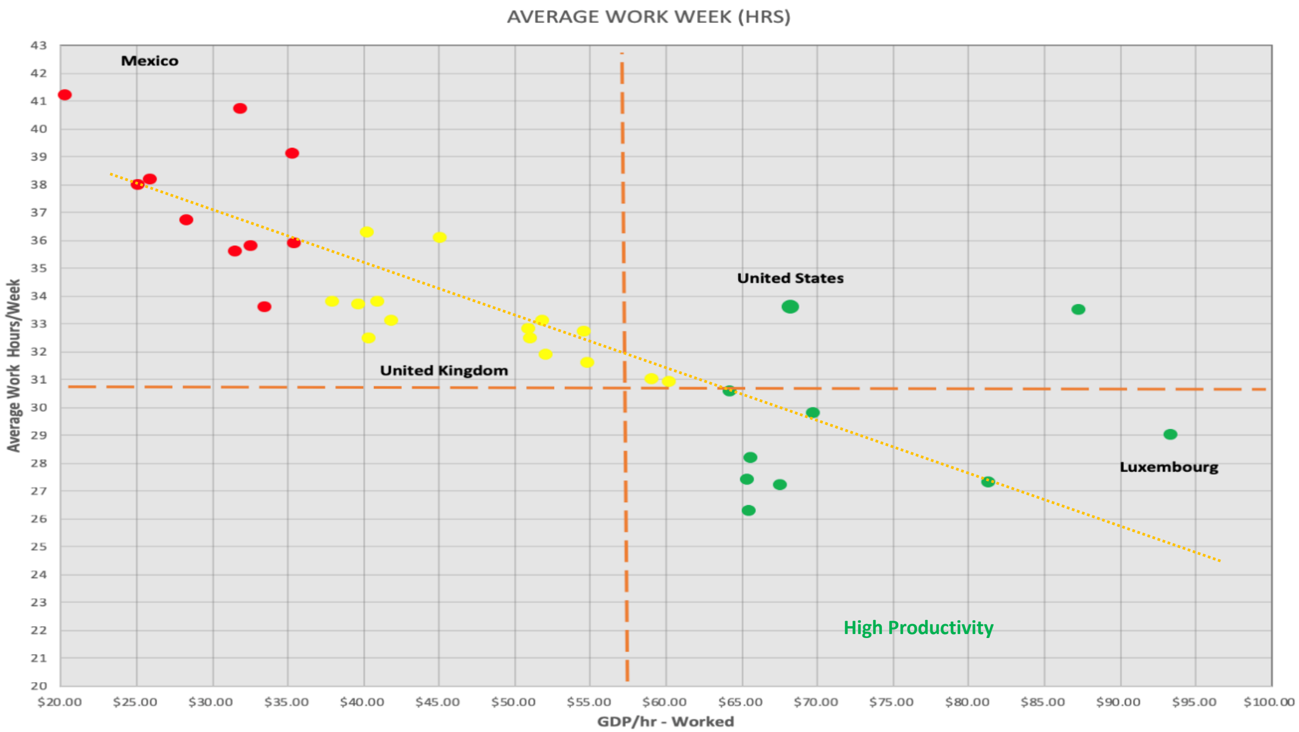
→ ENGAGEMENT
- → Communicate Lean as more than just reduction
- → Communicate and plan employee growth
- → Enhance decision making role
- → Enhance autonomy

→ SELF ACTUALIZATION
- → Leadership role
- → Mentoring opportunity

Ideal operational system vs. Ideal people system

# Can We Learn?

# Productivity vs. Average Work Hours / Week

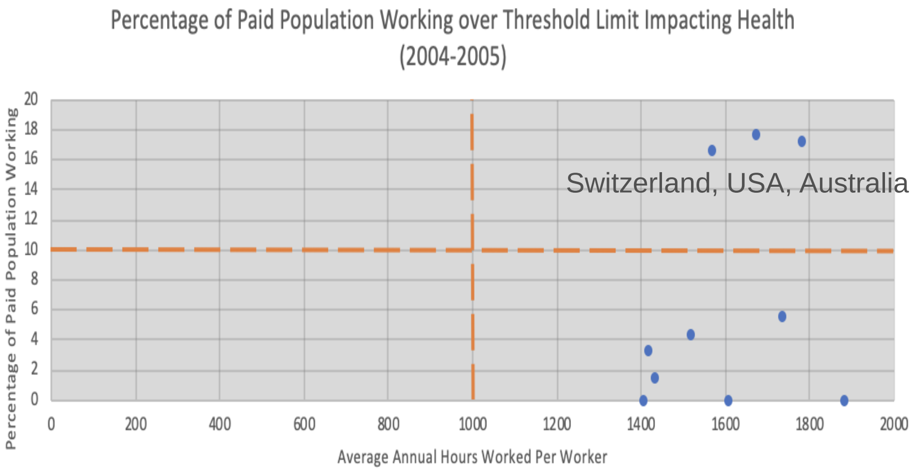


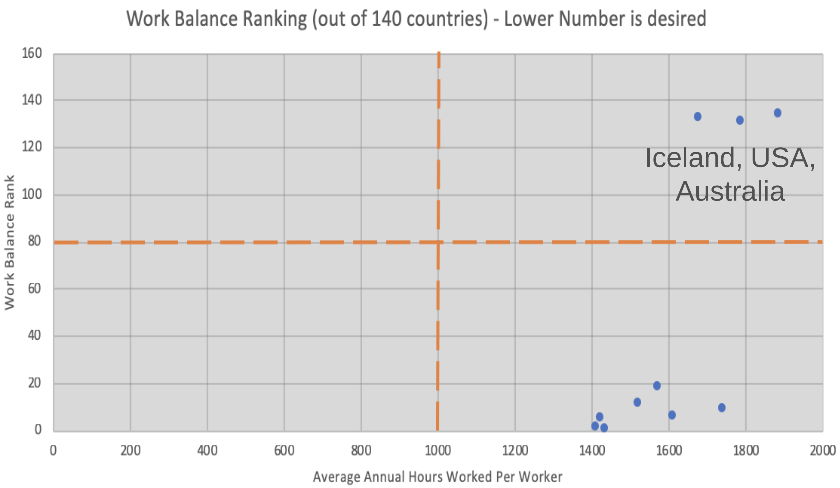

***Source:*** Time Journal

**Out of 35 countries:**

- Top 10 most productive
- Mediocre productive
- Least productive

# Work-Related Metrics




*Source: Ti*Sangheon Lee, Deirdre McCann and Jon C> Messenger, Working Time Around the World; Trends in Working Hours , Laws and Policies in a Global Comparative Perspective….International Labor Office Geneva Routledge Taylor and Francis group, London and New York

*Source:* Organization of Economic Cooperation and Development

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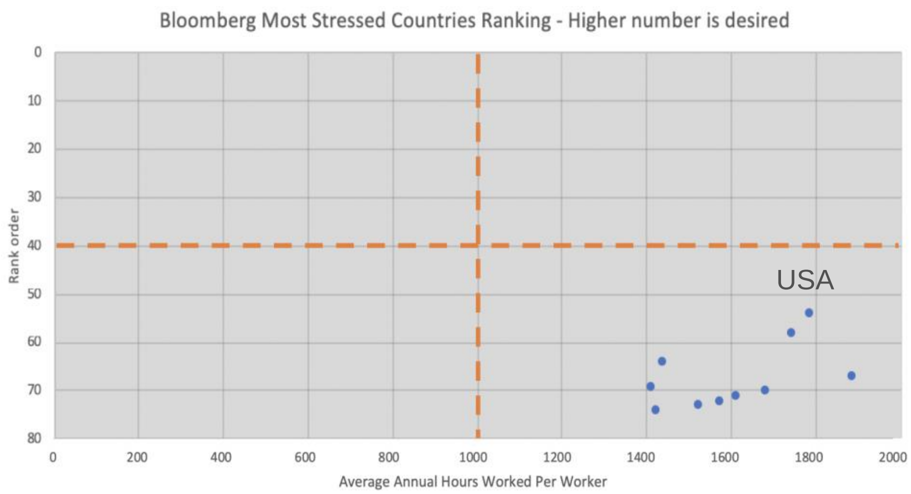
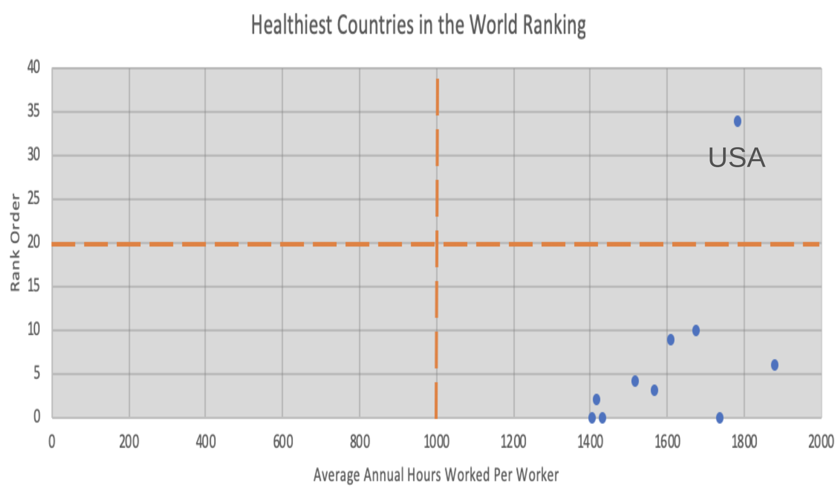
# Country-Related Metrics




*Source:* Bloomberg Most Stressed Countries 2013

*Source:* Thomas C. Frohlich, Alexander Kent and Mark Lieberman, 24/7 Wall St., Healthiest Countries in the World

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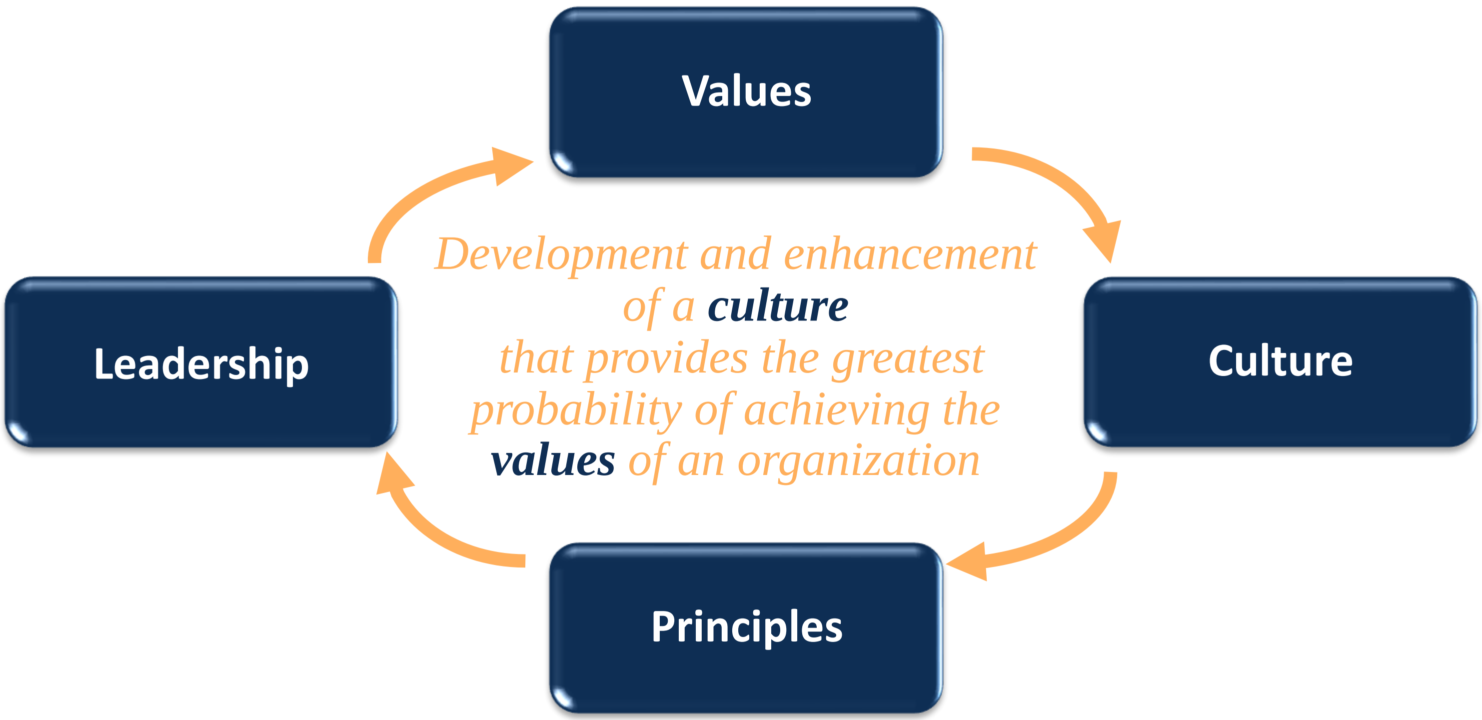
# Can We Innovate?

## Our Definition Has Changed



## Our Paradigm Has Changed

### Technical (Hard Systems) – Factory Dynamics

- **Principle 1 - Reduce Cycle time … Flow:**
  - The goal of the flow is to have a single piece flow under balanced conditions (without disruptions)
- **Principle 2 - Reduce Variation … Variation:**
  - Variability is anything that causes the system to depart from regular, predictable behavior
- **Principle 3 - Reduce Disruption … Reliability:**
  - **Preemptive outages:** downtimes that occur whether we want them to or not
  - **Non-preemptive outages:** downtimes for which we have some control as to exactly when

### Administrative (Soft Systems) – People & Systems Dynamics

- **Principle 4 - Enhance Quality of Life of People:**
  - Improve the Quality of all Stakeholders….including employees

# We Have People Centric Goals

**Goal 1:** **Reduce resource and effort level via strategic problem definition**

- Focus on system-level problem
- Categorize the system-level problem
- Develop effective strategy for addressing system level problem

**Goal 2:** **Align all efforts with system growth and competitiveness**

- Engage management to ensure continuity of support and resources by providing organizational outcomes
- Develop Leading – Lagging Performance System Template

**Goal 3:** **Enhance system reliability based on surgical approach to minimize time and effort of implementation**

- Achieve balanced small lot size *flow* (one piece) for cycle time reduction
- Achieve process *reliability* through *variation* reduction
- Achieve process *reliability* through *disruption* reduction

**Goal 4:** **Enhance employee quality of life**

- Mitigate motivational misalignment
- Mitigate engagement misalignment
- Mitigate cultural misalignment

# Our Platform Has Changed

## DEFINE

### Module 1

**Define a System Based Problem**

| Goal | Develop an effective LP strategy that reduces resources and effort level. |
|---|---|

- Identify critical path
- Classify the critical path based on process attributes.
- Develop an intelligent strategy to enhance throughput

## SOLVE

### Module 2

**Align Continuous Improvement With Desired Organizational Outcomes**

| Goal | Develop a systematic diagnosis that categorizes and connects LP with system growth and organizational competitiveness |
|---|---|

- Define project leading indicators
- Connect project leading indicators to throughput via flow, variation and disruption
- Connect throughput to four levels of lagging outcomes
- Align performance to stakeholder requirements
- Effectiveness of performance measurement system

### Module 3

**Enhance System Throughput Via Disruptions, Variation and Flow**

| Goal | Develop a relevant solution through LP that enhances system's capacity via throughput |
|---|---|

- Deterministic processes focused on minimizing disruptions via Reliability Engineering
- Stochastic processes focused on minimizing variation.
- Conditional stochastic processes focused on enhancing flow

## SUSTAIN

### Module 4

**Sustain Via Employee Buy-in**

| Goal | Engage system stakeholders into LP efforts by enhancing their quality of life |
|---|---|

- Identify employee resistance via Systems Engineering
- Align system requirements with employee skill sets
- Ensuring employee engagement
- Integrating cultural differences into design

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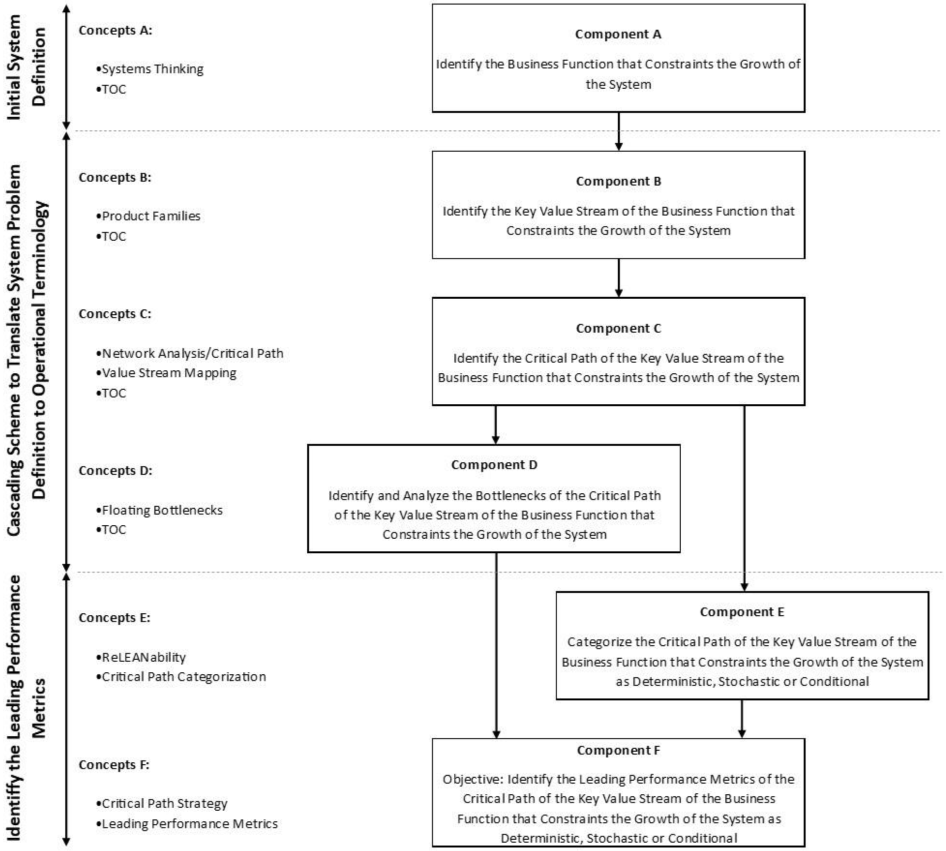
# Module 1:

## Reduce resource and effort level via strategic problem definition

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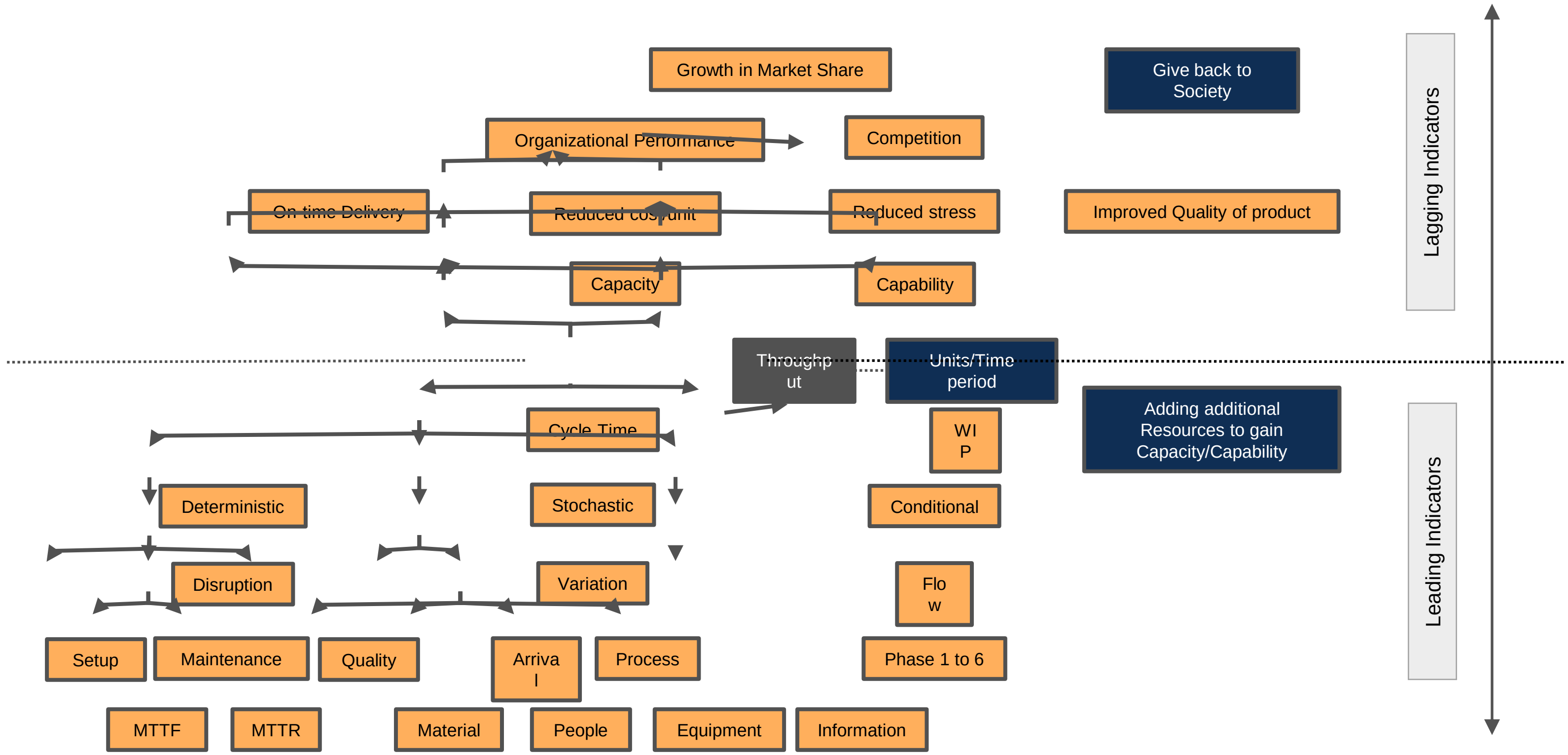
# Module 2:

## Align all efforts with system growth and competitiveness

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# Module 3:

## Enhance system reliability based on surgical approach to minimize time and effort of implementation

## Deterministic:

***Characteristics:*** Repeatable route, minimal variation of arrivals and minimal variation in process time.
***Production Environments:*** Electronic Assembly, Boeing Moving Line.
***Hospital Environments:*** *Surgery* Sterilization Process, Simple Surgeries.

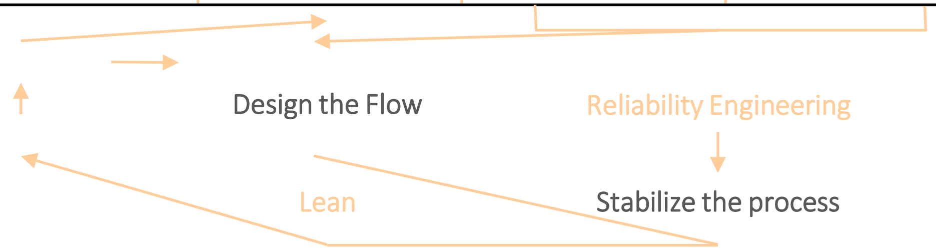
## Stochastic:

***Characteristics:*** Repeatable route, variation in arrivals and/or process times.
***Production Environments:*** Batch Production, High Product Mix.
***Hospital Environments***: Patient Care Departments, Surgery Scheduling, Pharmacy

## Bayesian:

***Characteristics:*** Route based on condition
***Production Environments:*** Job Shop, Custom Shops
***Hospital Environments:*** Emergency Rooms.

| Classification | Flow | Variation | Disruption |
|---|---|---|---|
| **Deterministic** | 3rd | 2nd | 1st |
| **Stochastic** | 3rd | 1st | 2nd |
| **Conditional** | 1st / 4th | 2nd | 3rd |



# Module 4:

## Enhance employee quality of life

### High Performing Workforce Metrics

Cultural Change Metrics

Behavioral Change Metrics

| | |
| --- | --- |
| Peer to Peer Accountability Metrics | Accountability |
| | Perception of accountability |
| | Routine accountability |
| | Project accountability |
| | Team accountability |
| Employee Motivation Metrics | Fair compensation and job security |
| | Physical, professional, and social safety in the workplace |
| | Balance of work-related stress and productivity |
| | Sense of purpose in the workplace |
| | Opportunities to grow and lead |
| Employee Engagement Metrics | Growth opportunities |
| | Value and recognition |
| | Autonomy |
| Cultural Alignment Metrics | Power Distance Index (PDI) |
| | Uncertainty Avoidance Index (UAI) |
| | Individualism vs. Collectivism (IDV) |
| | Masculinity vs. Femininity (MAS) |
| | Long-Term Orientation (LTO) |
| | Pragmatic vs. Normative (PRA) |
| | Indulgence vs. Restraint (IND) |

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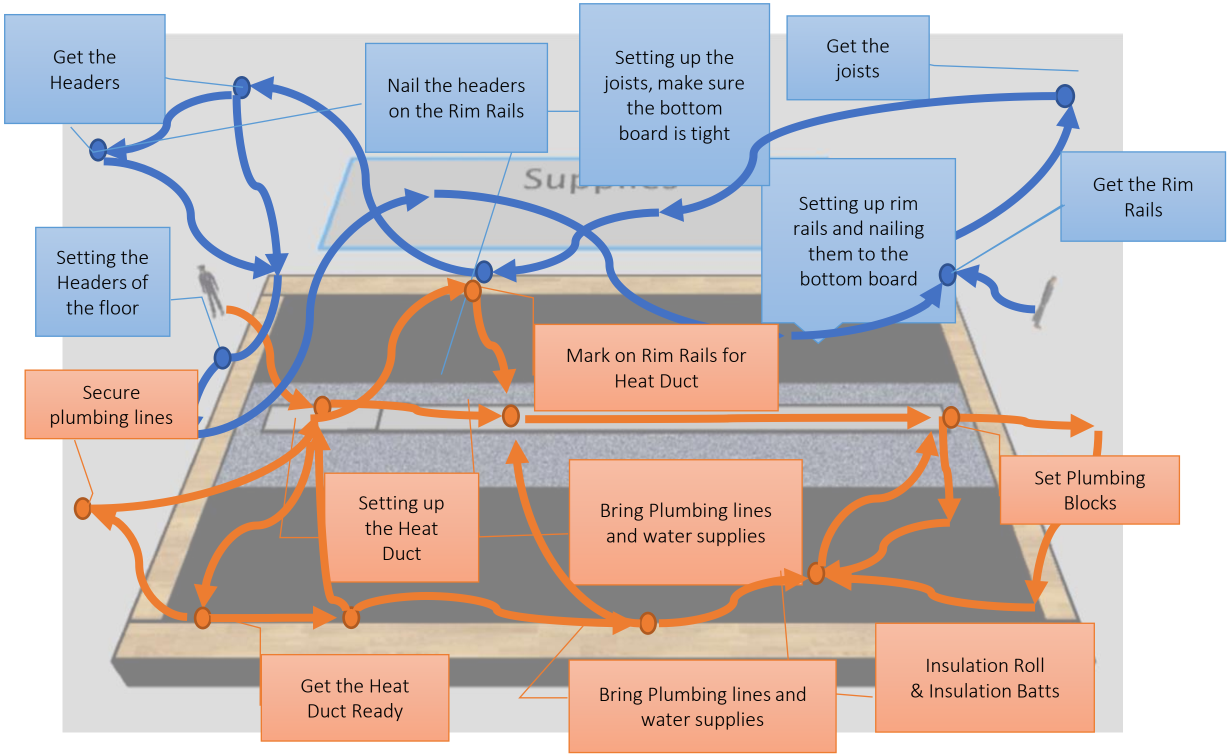
# Can This Actually Work?

# Testing in Industry

| | Module 1 | Module 2 | Module 3 | Module 4 |
|---|---|---|---|---|
| | **Define a System Based Problem** | **Align Continuous Improvement With Organizational Outcomes** | **Enhance System Throughput Via Disruptions, Variation and Flow** | **Sustain Via Employee Buy-in** |
| **BHS Corrugated** | Forecasting and optimization via Simulation of Logistic Operations | Reduce cost, improve service level | Stochastic- Variation | In-progress<br>Cost reduction, increasig service level |
| **Clayton Homes** | Ruthledge, TN production (entire facility) | Increase throughput | Stochastic - Variation | Reduced turnover, reduced stress. |
| **Covenant Health – Fort Sanders 1** | Surgery scheduling | On-time surgery | Conditional – Flow<br>Stochastic - Variation | Buy-in from Physicians |
| **Covenant Health – Fort Sanders 2** | Transport Optimization | Reduction in waitng time | Conditional-Flow | Productivity,workload |
| **Covenant Health – Home Visitation** | Home Visitation Routing and Resource Optimization | Reduction of work hour,miles per visit | Stohastic-Varaition | In-progress<br>Stress, balanced workload |
| **Denso** | Confidential (Assembly Prod. X) | Increase availability of the process | Deterministic - Disruptions | In-progress |
| **England Furniture** | Enhance Throughput via Reliability o f Operations | On time delivery, meeting demand | Stohastic-Variaition | In-progress<br>Stress,Effciency |
| **Jost** | Fifth wheel assembly | Increase throughput | Stochastic - Variation | In-progress |
| **KUB** | Improvement of Service Level for Customer Experience Call Center | Call per hour,no of call attented,customer waiting time | Stohastic-Variaition | In-progress<br>Employee stress, customer satistication |
| **Meritor** | Helical gear | Initiative to enhance throughput and release capacity for new products | Stochastic - Variation | In-progress |
| **TVA 1** | A Study Of Shared Inventory Value Stream Opportunities Via Heuristics and a Stochastic approach | holding cost,transportation cost | Not required for this process | Saving oppurtunities |
| **TVA 2** | Purchase Price Variance | Cost Variance | Deterministic-disprution | In progress<br>Economic approach, decision making |

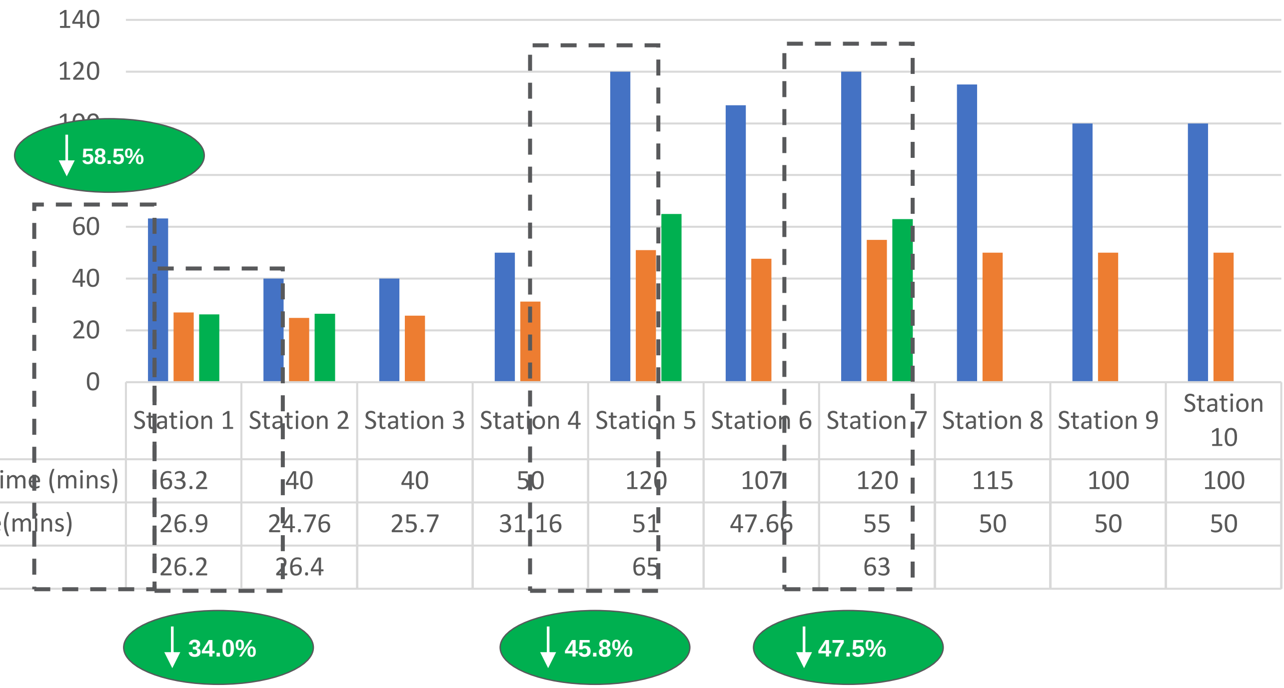
## Case Study:

## A Stochastic Manufacturing Process with a Retention Level of 50%

# Case Study:
# Productivity Results

## CT per Station after Proposed Changes




| | Station 1 | Station 2 | Station 3 | Station 4 | Station 5 | Station 6 | Station 7 | Station 8 | Station 9 | Station 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Current Cycle Time (mins) | 63.2 | 40 | 40 | 50 | 120 | 107 | 120 | 115 | 100 | 100 |
| ZBM Cycle time(mins) | 26.9 | 24.76 | 25.7 | 31.16 | 51 | 47.66 | 55 | 50 | 50 | 50 |
| Pilot Results | 26.2 | 26.4 | | | 65 | | 63 | | | |

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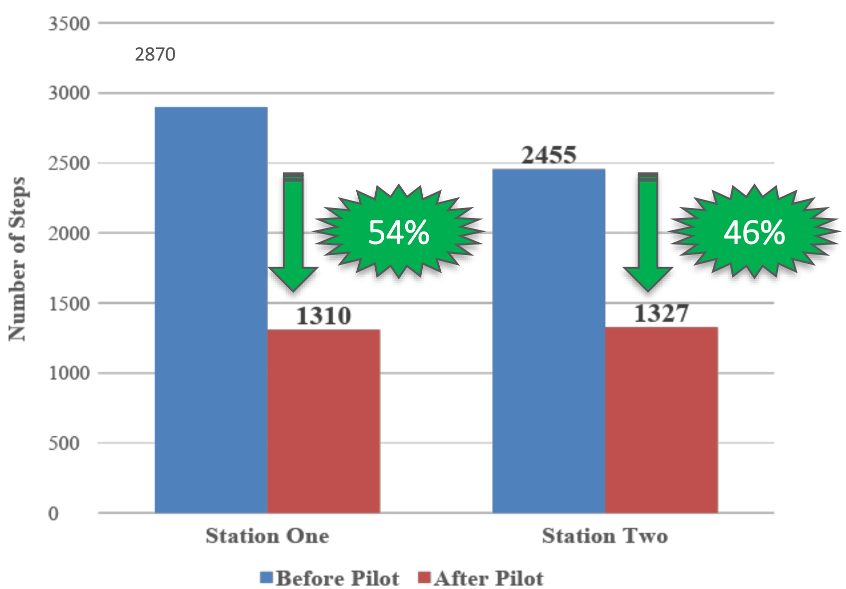
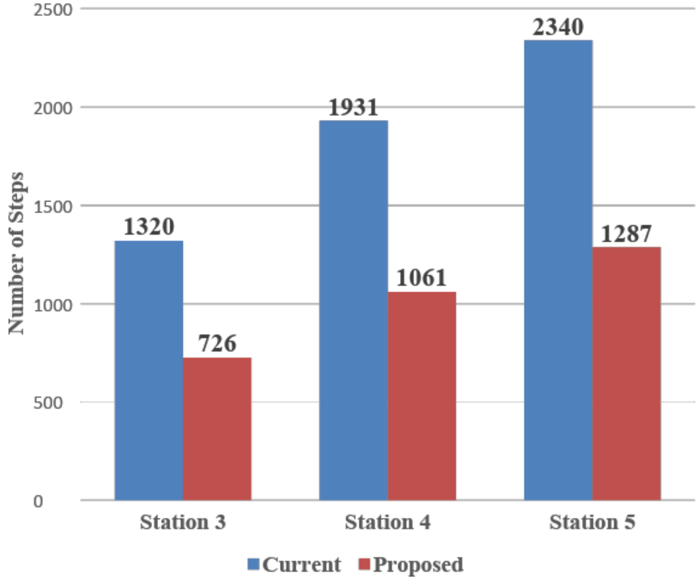
# Case Study:
# Human Quality of Life Results



# THANK YOU!

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How'd We Do?

# Customer and Member Satisfaction and Feedback Survey

## Integrating People into Operational Excellence Strategies

You can download the deck (handouts)
You will receive an e-mail tomorrow with link to recording.
You can go to this IISE link soon and get deck and recording.
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**Teaching Lean: Proven Best Methods in Traditional Applications and for Transactional Processes**
**Tom Devall, Jared Frederici, Scott Sink**
**1 Dec 2020 11-12 am Eastern**

**Registration URL**
https://attendee.gotowebinar.com/register/8678231282386945808

**Disruptive Innovation in Distribution:** From Weeks to Days to Hours
Rodolfo Portillo, Rafjiv Saxena, Bob Pudlo, Russ Meller
9 Dec 1-2 pm

**Registration URL**
https://attendee.gotowebinar.com/register/2576776279188657935

# Thank You!

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## Contact us for More Info or to provide feedback:

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**For IISE Webinar Ideas, Suggestions, Feedback, Requets, Scott Sink:**

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