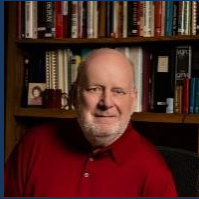


Lean Transformations: The Theory and the Practice (Case Studies)

Developed & Facilitated by:



D. Scott Sink, Ph.D., P.E.
Sr. Advisor, The Poirier Group
Adjunct Prof, Va Tech
Global Perf Excellence
Webinars
Team Lead, IISE

Special Thanks to our Sponsors:

The Council on Industrial
and Systems Engineering
&
The Poirier Group



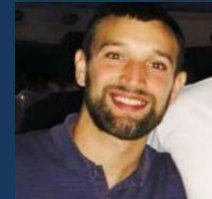
Featured Panelists:

Debbie Nightingale, Ph.D., P.E.
Executive Transformation
Specialist



Gabe Burnett, Dir & Chief
Engineer, Industrial Engineering
Shawn Bolger, Lean Leader
Boeing

Jon Corsetti,
Quality and Ind Engineering
Manager, Sutphen



INSTITUTE OF
**INDUSTRIAL
& SYSTEMS**
ENGINEERS

11 November

Purpose and Agenda

PURPOSE:

To provide Perspectives and Points of View on how Lean can be Designed, Developed and Deployed in Large as well as Smaller and Medium sized organizations.

11:00 **Kick-off the Webinar**

Debbie and Scott: Contextual Framework for thinking about Lean Transformations

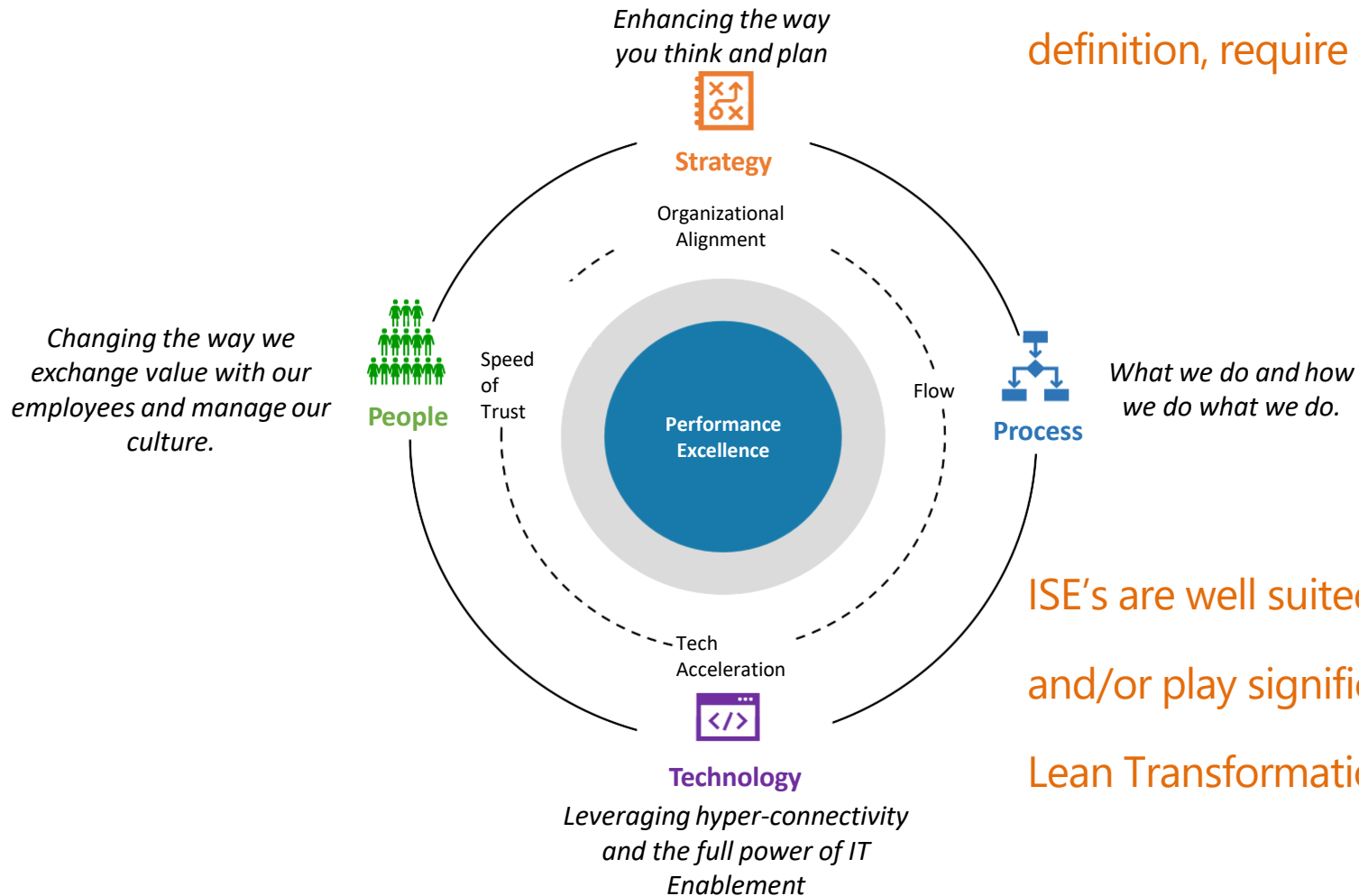
Gabe Case Sharing from Apache Helicopter Plant

Jon Case Sharing from Sutphen

11:55 Close out and Adjourn

ISE's Create Value by Integrating People, Strategy, Process and Technology

Lean Transformations, by definition, require this integration.



ISE's are well suited to lead and/or play significant roles in Lean Transformations.

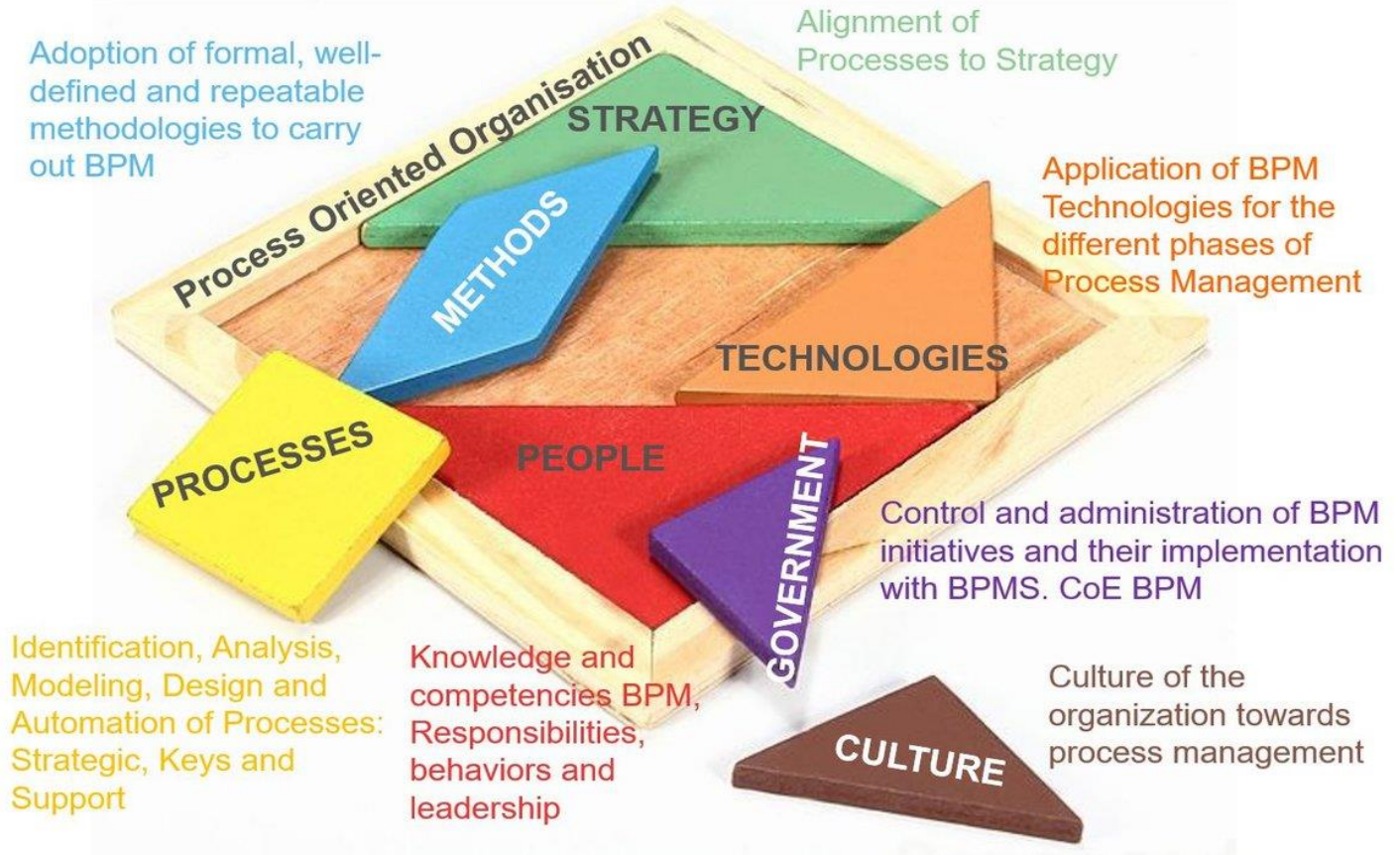
What do we mean when we say Lean Transformation

Lean = The Principles, Strategies, Methods that will create improved flow, reduced waste, improved efficiency, improved 'speed', improved productivity, reduced variation in how things are done, improved quality, optimized inventory, reduced bottlenecks/constraints/choke-points, in service of the Voice of the Customers.

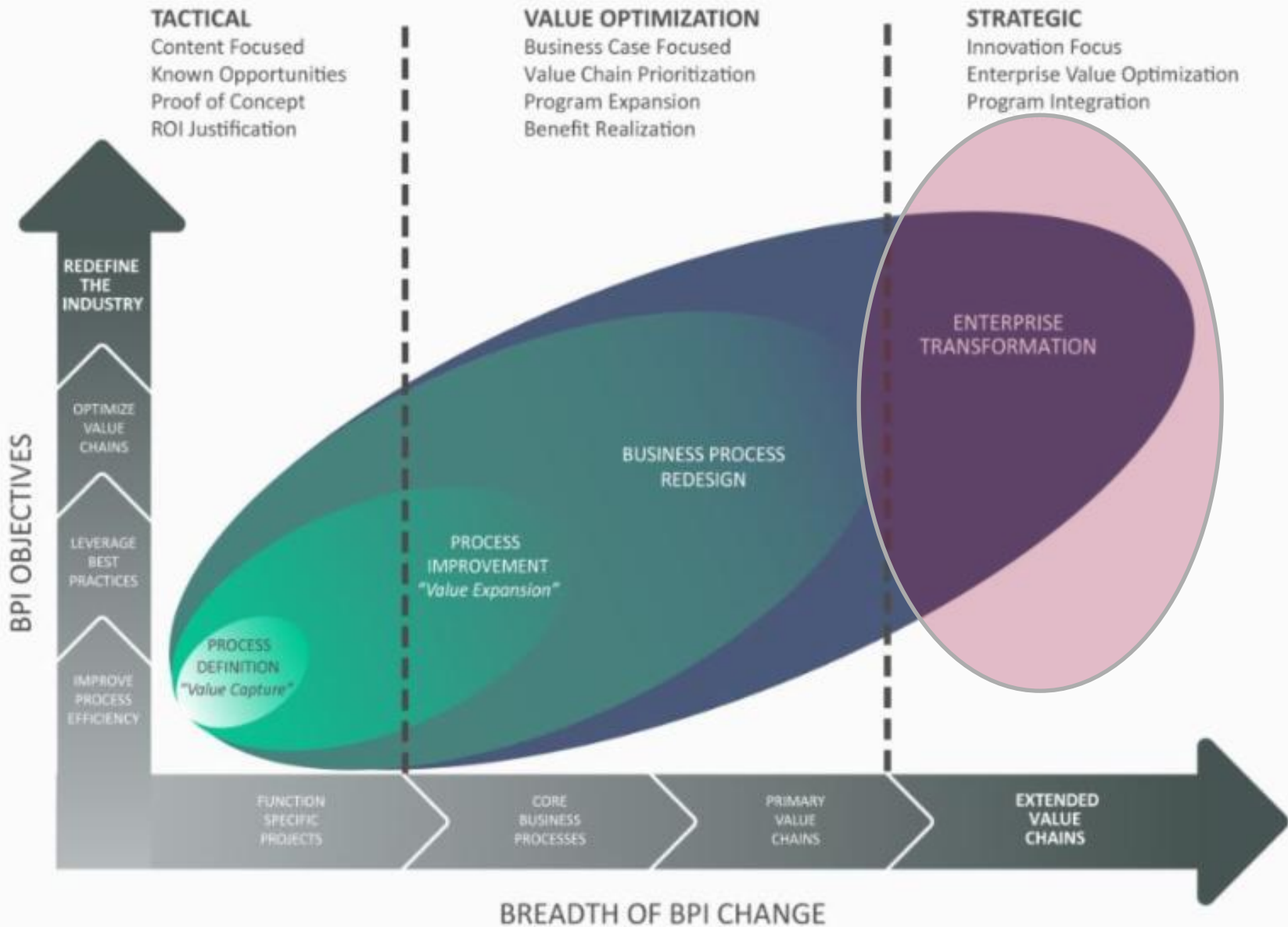
Transformation = a dramatic, significant change in the way leaders, managers, employees think, talk, and behave relative to how we do our work as well as how we **improve** what we do and how we do things. It's a mindset shift and a thought, word, deed shift. New Knowledge and Skills are learned and applied to **fix the system** rather than continue focusing on just fixing the problem.

Lean Transformation requires getting the pieces of the puzzle fit together....

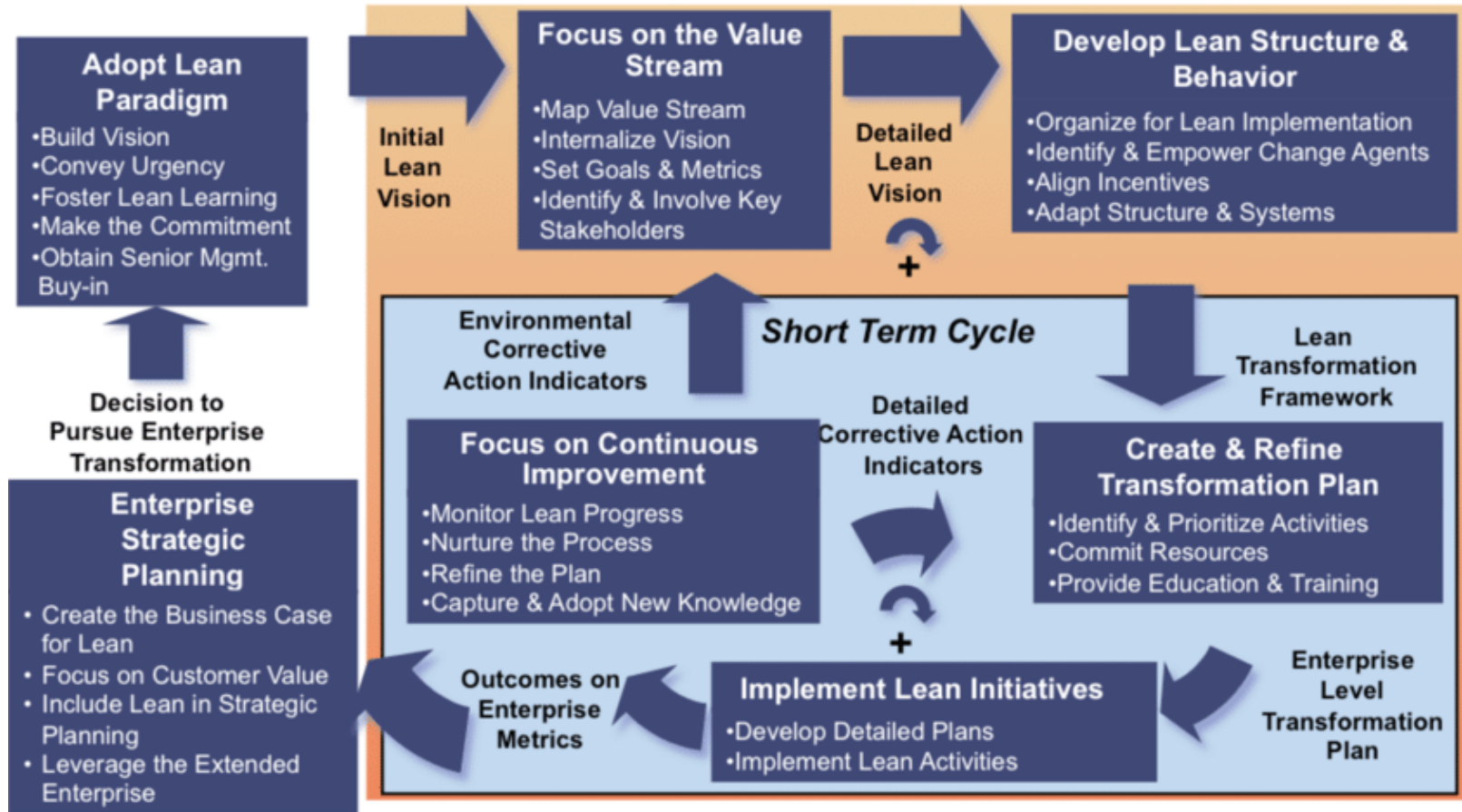
Lean Transformation isn't just doing some Lean projects, it involves an enterprise wide, focused and integrated effort to align many components in the Organizational System.



Lean Transformation begins with Leadership Alignment and Understanding



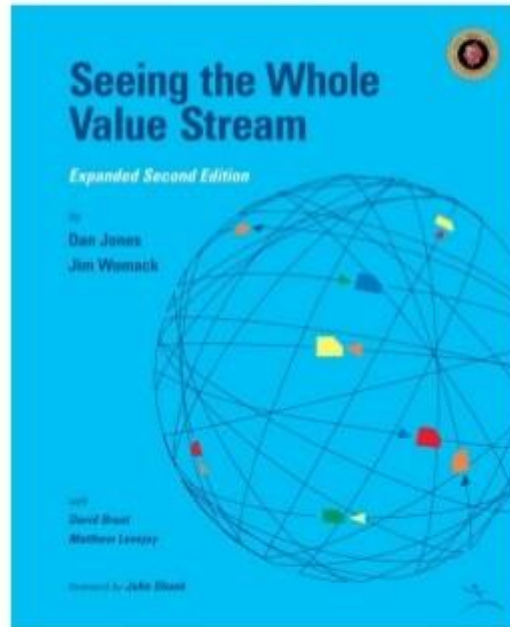
An example of a Lean Transformation Roadmap



Lean requires Systems Thinking, Value Streams and Business Processes

Perhaps the highest level would be an End2End Value Stream Map for the Enterprise

Now Available Seeing the Whole Value Stream



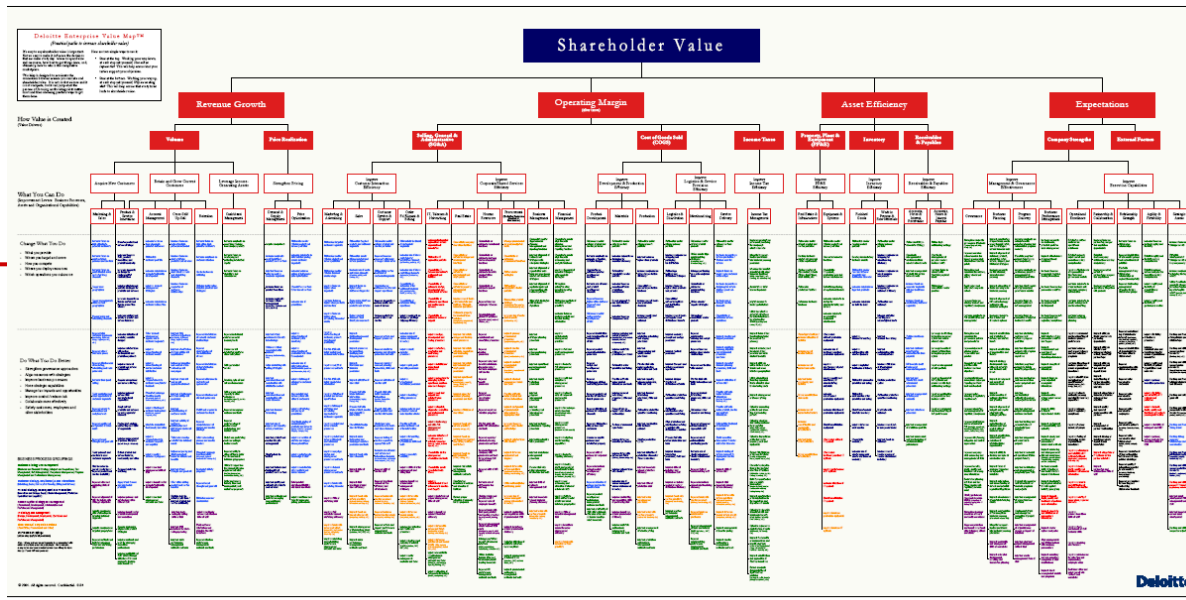
New expanded edition with examples from today's presentation on:

- ✓ Mapping all the way to the customer
- ✓ Mapping in retail
- ✓ Mapping when you have no authority
- ✓ Lean math as a supplement to mapping
- ✓ Extending the tool to network analysis

Available at **lean.org**

Lean Enterprise Institute





The Business Process Groups from the Enterprise Value Map:

- Business Strategy and Management
- Customer Strategy, Relationship & Interactions
- Product Strategy, Development and Make/Buy
- Human Resource Strategy and Management
- IT Strategy and Management
- Other Shared Support Enterprise services

<https://newparadigmadvisors.com/the-importance-of-your-5-10-core-business-processes/>

<https://www.process.st/top-10-business-processes/>

Purpose and Agenda

PURPOSE:

To provide Perspectives and Points of View on the evolution of Business Process Management (The New Industrial Engineering).

11:00 Kick-off the Webinar
Contextual Framework for thinking about Lean Transformation

11:10 Gabe

11:20 Jon

11:30 Debbie

11:40 Scott to lead dialogue, Q&A

11:55 Close out and Adjourn



BDS ISE Spotlight AH64 Program

Gabe Burnett | Enterprise Industrial Engineering
Shawn Bolger | BDS Industrial Engineering



Boeing AH64 Program

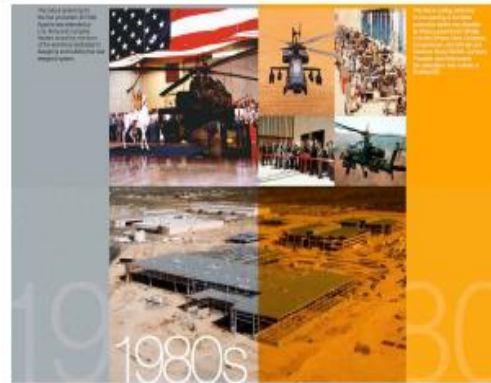
Historical Panels: 1970s through Today

Arizona Manufacturers Council named Boeing the 2018 Manufacturer of the Year. The award recognizes Boeing as a leader, innovator, and one of the globe's most consequential manufacturers.



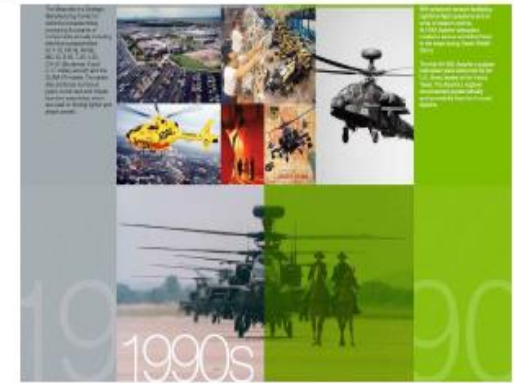
HOW IT ALL BEGAN

- ❖ The inaugural prototype attack helicopter, Hughes YAH-64, was developed and flight tested in the early 1970s in California.



NEW BEGINNINGS IN MESA ARIZONA

- ❖ In 1983, the first production model AH-64A Apache rolled off the production line at Mesa
- ❖ Delivered 500 AH-64As to the U.S. Army throughout the decade



A STRATEGIC MANUFACTURING CENTER

- ❖ The first remanufactured AH-64D for the U.S. Army rolls out of the Mesa facility.
- ❖ U.S. Army AH-64 Apaches reach one million combined flight hours.



NEW PROGRAMS AND PARTNERSHIPS

- ❖ AH-64D Apache Longbow helicopter program in Mesa was the 2005 Shingo Prize winner for excellence in manufacturing.



TODAY, TOMORROW, AND BEYOND

- ❖ In December 2013, the AH-64E Apache helicopter is successfully deployed in combat with the U.S. Army.
- ❖ U.S. Army Apaches surpass 3.5 million flight hours.

OUR VALUES

Apply Lean principles

These principles have served many businesses well, including our own, so we will commit to them across the board. We will encourage continuous improvement in every aspect of our business, working to maximize the value we provide to customers while minimizing waste.

Boeing AH64 Program

Lean Transformation



- ❖ Final Assembly: side-by-side stationary build
- ❖ Pace of production: Prioritization set by most complete aircraft
- ❖ Production System health:
 - Flow: long cycle times and durations with high variability
 - Quality: hidden factory with internal defect quantity and cost
 - Cost: traditional learning curve performance
 - Safety: Lost work case rate and Lost workday rate not benchmark worthy
- ❖ IE applied: non-traditional use, manufacturing supplement

- ❖ Final Assembly: straight mixed-model pulse moving line (98)
- ❖ Pace of production: takt time defined to meet customer demand
- ❖ Lean transformation (98):
 - Focused on entire value stream to reduce flow, drive first time quality, and operate safely
 - Leveraged Shingijutsu kaizan consultants
 - Performed accelerated improvement workshops to balance and transform the line
 - Implemented standard work, 5S, visuals and point of use
- ❖ IE applied (98): lean trained/certified, used to lead kaizan activities and practical lean implementation

- ❖ Final Assembly: straight and u-shaped mixed-model pulse moving lines
- ❖ Pace of production: agile takt time management to adjust to meet current/future customer demand
- ❖ Production System health:
 - Flow: Reduced days by more than 40 percent
 - Quality: Internal defects reduced more than 72 percent; Cost of internal defects (rework, repair and scrap) reduced more than 48 percent
 - Cost: Build hours reduced by more than 47 percent
 - Safety: Lost workday case rate reduced more than 61 percent; Lost workday rate reduced more than 58 percent
- ❖ IE applied: lean trained/certified, used to lead kaizan activities, practical lean implementation and technology insertions

- ❖ Stabilize: Enterprise standardization of the One Boeing Production System
- ❖ Standardize: Leveraging size and resources via communities of practice to share, learn, scale and replicate standards and best practices
- ❖ Simplify: Connecting values to how we operate and how we act ensures accountability and success
 - Starts with engineering excellence – early system, product, process design
 - Putting into practice the best standards for quality, stability and flow
 - Connecting people to the why and the what to innovate the how
- ❖ Continuously Improve: Culture shift ownership toward entire value stream
 - Model based Industrial Engineering

Boeing AH64 Program

Quick Facts

- Total U.S. Army Apache (A thru E Model) Flight Hours: More than 4.8 million
- Total U.S. Army Apache (A thru E Model) Combat Hours: More than 1.3 million
- The AH-64E Apache is the most advanced multi-role combat helicopter for the U.S. Army and a growing number of global defense forces. To date, more than 500 AH-64E model Apaches have been delivered worldwide. The AH-64E features:
 - Advanced digital connectivity
 - Joint Tactical Information Distribution System
 - More powerful T700-GE-701D engines with upgraded face gear transmission to accommodate more power
 - Capability to control unmanned aerial vehicles (UAVs)
 - New composite main rotor blade
- Boeing-built AH-64D Apaches continue to operate around the world, featuring these enhancements:
 - Longer-range weapons accuracy and all-weather/night fighting
 - Detection of objects (moving or stationary) without being detected
 - Classification and threat-prioritization of up to 128 targets in less than a minute
 - Integrated sensors, networking, and digital communications for situational awareness, management of the combat arena in real time, and digital transmission of images and target locations to joint operations battlefield commanders
- Boeing produced 937 AH-64A Apaches between 1984 and 1997. Some remain in service today.





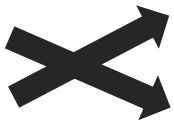
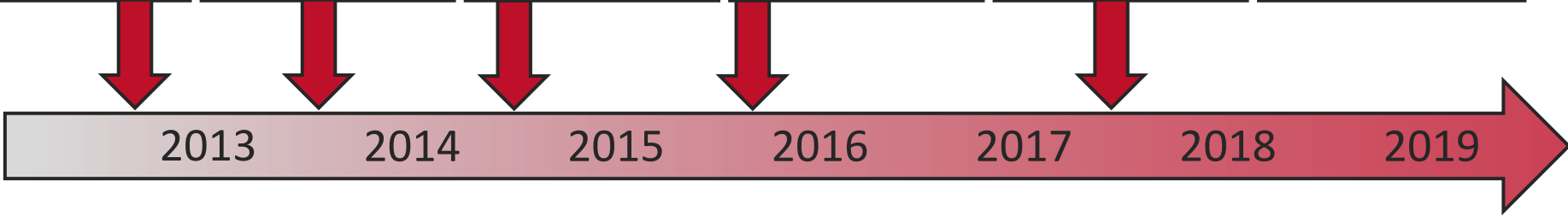
About Sutphen

- 131-Year-old custom fire truck manufacturer
- Largest private, vertically integrated fire truck manufacturer (6th generation family)
- Over 150M yearly sales
- Known as the “Cadillac of fire trucks”
- Growing, taking market share due to ‘Sutphen Experience – family feel’, quality of product and range of customization allowed
 - Just purchased 53 acres of green space for a new Chassis facility
- Extremely high mix-low volume
- Very low process maturity when I started, most processes ad-hoc with some repeatability
- Very old school culture conditioned to resist change, ‘This is how we’ve always done it mentality’
- Teamsters union for production



System History

Pre-2013	2013 - 2014 Jared Walter	2014 - 2015 Jordan Casteel	2015 - 2016 Joseph Francis	2017 - 2018 Hannah Miller	2019 +
<ul style="list-style-type: none"> - Ad hoc inventory management & ordering - Order Forms used for ordering stock parts - Which items are HS determined - Little data collected 	<ul style="list-style-type: none"> - Centralized warehouse and Kanban system - Cards moved manually - Yellow belt project determined which parts were Kanban - Kits created 	<ul style="list-style-type: none"> - Eliminated phantom locations for HS parts (HS0101 → *Z Locations) - Default locations set in AX - HS moved to warehouse except for Aerial Finish, Plumbing, and Body Build 	<ul style="list-style-type: none"> - Physical card movement constrained to within a department - Consolidated data storage to AX - Began to collect good KPI data - Increased transparency between system users 	<ul style="list-style-type: none"> - Reworked OQ and ROP updating system - Set standard card and bin colors for added visibility - Built decision support system (Business Intelligence tool) - Proved usefulness of collected data 	<ul style="list-style-type: none"> - Better match parts with Inventory Delivery Methods - Increase system transparency - Implement “quick wins” to increase capability and keep employees and customers happy





Iterative Stock Item Kanban Ordering System Development

June 2013 State

- 6000 Locations all being ordered with handwritten and filled out order forms
- Ad hoc process to re-order items dependent on the orderer knowledge
- All transactions need to be manually entered into ERP (PO's, transfers)
- Items with multiple locations had multiple orders
- Items with single locations plant wide used in multiple departments movement cause waste
- Data not being collected and aggregated for KPI based decision making

Transformation Timeline

Establish Warehouse, Kanban, and Kitting System
Determine what items to initially stock on Kanban / to Kit from WH

2014

Stabilize and expand system, perform minor Kaizens around process failure modes

2015-2016

Migrate Physical movement of Kanban to scanning to enable better data collection, visibility, and eliminate plant wide card movement

2017

Establish an optimization program for adjusting order quantities, ROP's etc., migrate over to PowerBI with D365 integration

2018-2021

Fully integrate Kanban scanning and processing into D365 ERP with app for scanning and out of the box expansion to other facilities

2021

November 2021 State

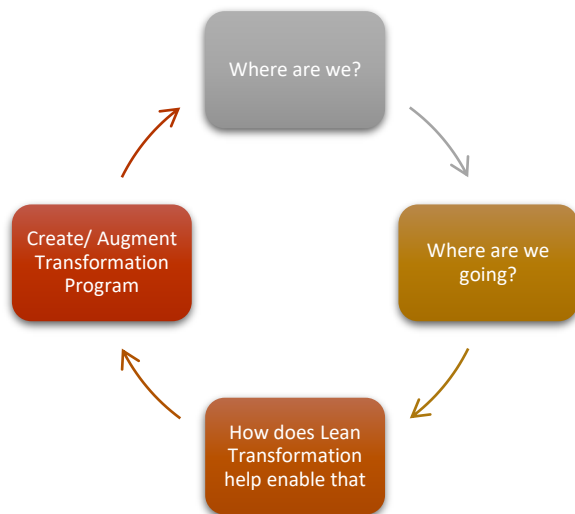
- ~4000 locations being ordered via Kanban either direct to purchasing or replenishment transfer from central warehouse
- 97% all replenishment orders from warehouse filled within a day
- PO's and Transfers and Production orders auto generated from scans in ERP
- App driven scanning (any smart device can be used)
- Defined Order Quantity and Reorder point visible for anyone to see
- Items stocked in all departments needed
- Data collected and aggregated to make data driven decisions around ordering



Sutphen Transformation Overview Notes

Transformation Alignment

Cycle



Stage	Themes	Initiatives Examples
Start (2013)	<ul style="list-style-type: none"> • What can we do now to make an impact? • Iterative 'First who, then what' • LEARN – Seek first to understand, then to be understood • Model the organization and transformation 	<ul style="list-style-type: none"> • CAR Team • Materials Replenishment Kanban System • Transformation roadmap development sessions
Keep it rolling (2015-2019)	<ul style="list-style-type: none"> • Confront the brutal facts but never lose faith • Try a lot and keep what works • Understand the mental models that influence the culture • LeanSigma Projects – large and small • Sustainability very difficult 	<ul style="list-style-type: none"> • Gated quality system • Continued materials system development • Iterative data analysis tool creation • Value stream process development
Initial Breakthroughs	<ul style="list-style-type: none"> • Level 5 leadership emerges • Continued iterations begin to bear fruit • Culture of discipline begins to develop • Re-structuring of value stream teams and production flow redesigns allow for fresh concepts to take root • Make use of data that's taken years to get useable 	<ul style="list-style-type: none"> • Initiatives around how we communicate - feedback loops and closed-loop communication, handoffs and reviews, daily walks and touchpoints • Breakthroughs on BI data tools and Kanban system

2013-2015 – Start journey, lots of energy and ambition, little top-down support, building everything from ground up, small program successes, many failures, often not sure where to go

2019 – 2021 – Major 'First Who' and leadership changes, gain in top down support, restructuring of org, some programs starting to bloom, large scale transformations taking place

2015-2019 – Lots of 'First Who' changes top and middle of org, product and sales challenges, some organizational process development, continued iterations through programs to gain value and sustainability, beating up against a change management wall often, lots of "Confronting the Brutal Facts"



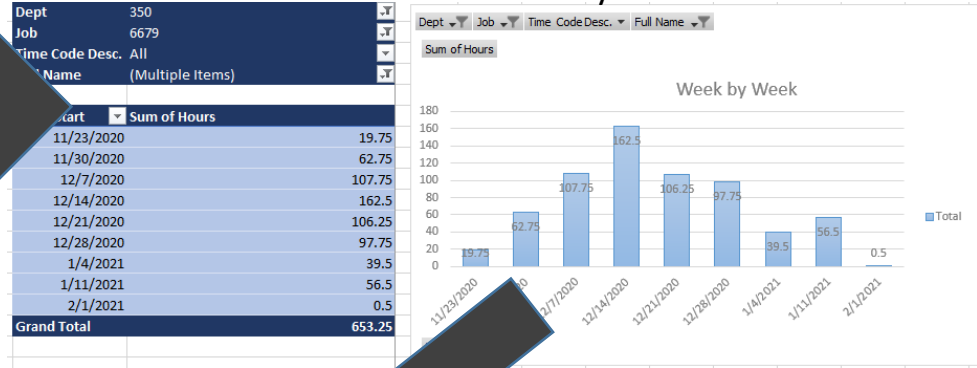
Iterative BI Tool Development

2014 – Process for extracting raw hours data

Dept	File	Last Name	First Name	Job	Op#	Date	HrsType	Hours	Time Code Desc.
100		SHINGLEDECK	XON	7091	106	10/23/2021 05:20 AM	IX	0.00	CHASSIS SET ENGINE EXHAUST
100		SHINGLEDECK	XON	7061	106	10/23/2021 05:21 AM	IX	3.55	CHASSIS SET ENGINE EXHAUST
100		COMRAD	BRANDON	7061	112	10/23/2021 05:32 AM	IX	3.53	FINAL ASSEMBLY
100	650825	MCCLURE	JOSHUA	0	0	10/23/2021 05:30 AM	ID	1.75	Blank Operation
157		REED	EDWARD	0	0	10/23/2021 05:31 AM	ID	3.48	Blank Operation
250	685787	TOOPS	REX	0	0	10/23/2021 05:33 AM	ID	0.25	Blank Operation
250	685980	TOOPS	TERRY L.	0	0	10/23/2021 05:36 AM	ID	0.00	Blank Operation
250	685980	TOOPS	TERRY L.	6807	1416	10/23/2021 05:40 AM	IX	5.00	Aerial Finish Assembly
300		CARPENTER	ALEC	6854	1503	10/23/2021 05:41 AM	ID	5.00	REWORK CORP
157	013509	BROWNING	BENJAMIN	0	0	10/23/2021 05:42 AM	ID	3.30	Blank Operation
450	010197	BOBLITT	ALBERT	0	0	10/23/2021 05:43 AM	ID	5.00	Blank Operation
250		BROOKS	ADAM	0	0	10/23/2021 05:48 AM	ID	0.25	Blank Operation
157		HART	SAMUEL	0	0	10/23/2021 05:51 AM	ID	3.15	Blank Operation
157		HERSHEY	SHAWN	0	0	10/23/2021 05:52 AM	ID	3.15	Blank Operation
303		STEPHENS	BENJAMIN	0	0	10/23/2021 05:52 AM	ID	0.75	Blank Operation
700		CRIST	KEVIN	6932_01_02_0_SvcTask4	10/23/2021 05:52 AM	ID	4.15	Task 4	

2015 - 2020 – PowerPivot based tools

on hours analysis



2021 – PowerBI Launch with Hours and Schedule linked for more intelligent outputs

11/09/2021 **SUTPHEN** V1.2 8/25/2021

PUMPER FINISH STAGE 1 AND STAGE 2 PRODUCTION DASHBOARD

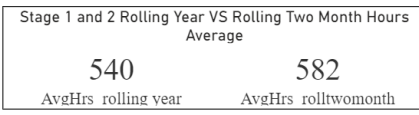
Prod Complete - # Ahead or Behind: **0**

Body Set - # Ahead or Behind: **4**

Average Slip from Original Production Complete - Fiscal YTD: **36**

Current Production Trucks Status - Post Body-Set

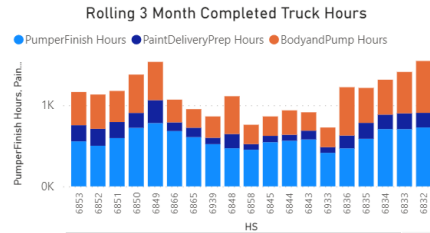
HS	PRODUCTI...	Dublin Hours	Hours Sum	PercentHours	Velocity	PercentVA
6854	11/17/21	1,070.75	443.50	82%	19.00	
6855	11/15/21	986.50	339.50	63%	19.50	
6874	11/17/21	625.00	333.50	62%	13.00	
6877	11/19/21	662.50	302.00	56%	13.00	



Unaccounted for Hours Rolling Month Sum

321

Full Name	IndirectP...
ADAM SALYERS	
JOSHUA BLEEN	
JASON MARSHMAN	23
ALEXZANDER HATEM	22



Op#	Time Code Desc.	Full Name	Sum of Hour
0	Blank Operation	JAMES R. MOCCABEE	8
		JOEL SPURGEON	7.75
		JOHN GARVER	11
		MICHAEL KNISLEY	16.5
		RICHARD W. PHILLIPSON	31.25
		TERRY L. TOOPS	5
		TYLER ROACH	4
	Blank Operation Total		83.5
1336	QUALITY CONTROL GENERAL	JAMES R. MOCCABEE	8
	QUALITY CONTROL GENERAL Total		8
1401	Aerial Raw Body Assembly	RICHARD W. PHILLIPSON	70.75
	Aerial Raw Body Assembly Total		70.75
1402	Aerial Pre Set Body Electric	DAVID RIFE II	4.75
		DONTEZ ADAMS	8
		JOEL SPURGEON	7.75
		JOHN GARVER	34.5
	Aerial Pre Set Body Electric Total		55
1403	Aerial Chassis Electric	DAVID B RIFE	158.75
		DAVID RIFE II	30

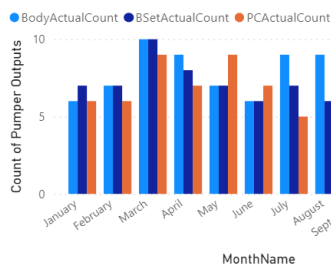
Average Hours - Pumper Finish

Year	Program2	Program3	Total
2019	622.11	960.72	750.55
2020	568.27	715.40	639.04
2021	522.95	539.80	531.62
Total	562.12	672.77	614.96

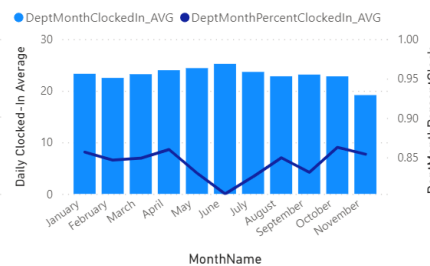
Average Hours - All Dublin

Year	Program2	Program3	Total
2019	999.83	1,598.62	1,226.96
2020	824.23	1,230.90	1,019.84
2021	836.51	1,071.95	957.59
Total	862.71	1,211.17	1,029.11

Count of Monthly Pumper Outputs



Average Daily Attendance Sum and Attendance %





Key Lessons Learned

Do not depend on the hope of results. You may have to face the fact that your work will be apparently worthless and even achieve no result at all, if not perhaps results opposite to what you expect. As you get used to this idea, you start more and more to concentrate not on the results, but on the value, the rightness, the truth of the work itself. You gradually struggle less and less for an idea and more and more for specific people. In the end, it is the reality of personal relationship that saves everything.

- Thomas Merton

Organizational transformations, like personal ones, are cyclical and not straight forward – you will often take 1 step forward and 2 back, the first person through the wall DOES usually get bloody. Any attempt to beat the organization into change creates equal resistance, we must listen and understand first, really get into the situations properly and not from the viewpoint we brought into them.

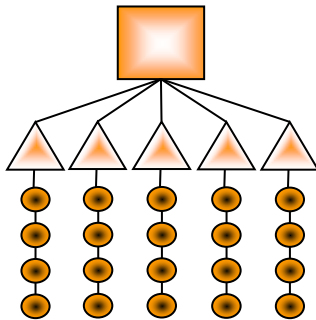
The less you're hyper-focused on the image of the future state that's been created mentally, the more you can enjoy the journey. Let the ends and the means converge.

Questions to cover in the Q&A Module

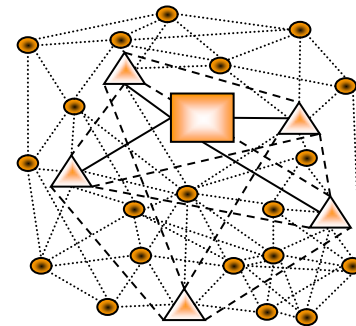
- Gabe and Jon, I know that both of your organizations have been at this for many years (Apache plant 15+, Sutphen going on 10). I encounter leaders today that have what I consider to be unrealistic expectations for how fast a transformation like this can happen. You both have demonstrated patient impatience, how do you manage impatience?
 - Debbie, how can organizations speed up the transformation process? How can ISE's assist with this? How do we make Lean Transformations more Agile, faster, leaner?
 - What would you all prescribe as pragmatic first steps to take if you were in an organization that is a ground zero with all this?
 - What's the difference between Lean Transformation and Integrated LeanSigma Transformation?
 - What single biggest tip or learning would you share with our audience?
-

Thinking Holistically

- Modern enterprises are highly interconnected systems
- Need to integrate management processes, lifecycle processes and enabling infrastructure
- Must balance needs of multiple stakeholders working within and across boundaries
- Lack of holistic thinking creates suboptimal enterprise



PAST
(hierarchical) Enterprise



PRESENT/FUTURE
(networked) Enterprise

Seven Principles of Enterprise Transformation

1.

Adopt a
holistic approach
to enterprise
transformation.

2.

Secure **leadership
commitment** to drive
and institutionalize
enterprise behaviors.

3.

Identify relevant
stakeholders
and determine their
value propositions.

4.

Focus
on enterprise
**effectiveness before
efficiency.**

5.

Address
internal and external
enterprise
interdependencies.

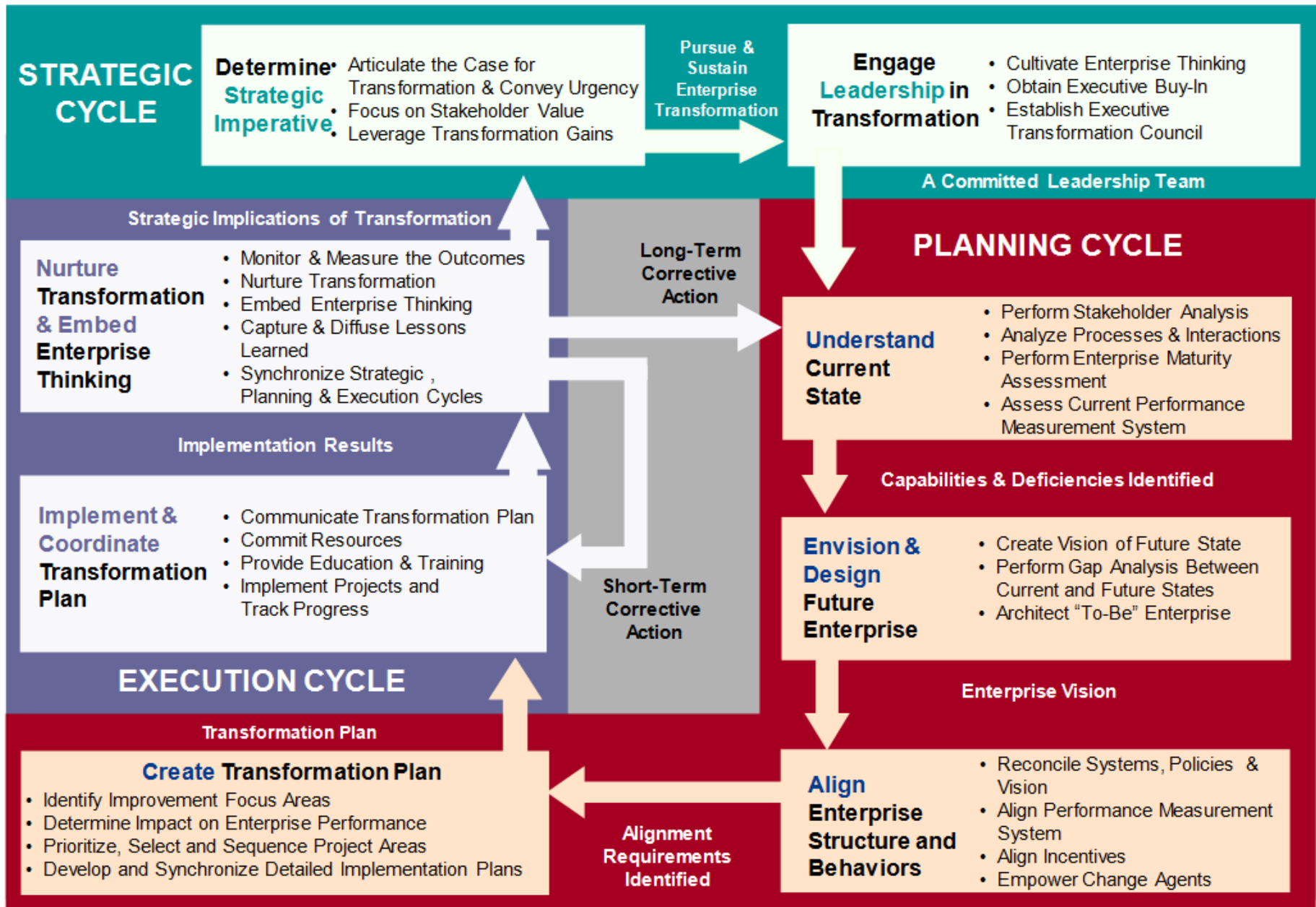
6.

Ensure
stability and flow
within and across the
enterprise.

7.

Emphasize
**organizational
learning.**

Enterprise Transformation Roadmap



Leadership Issues

- Optimization across multiple stakeholder objectives
- Global communication and seamless information flow
- Creating the future “vision”
- Change management and enterprise transformation
- Enterprise “value metrics”
- Organizational effectiveness

Drivers for Enterprise Transformation

- Quest for Improvement
- Market Opportunities
- Economic Changes
- Technology Changes
- Competitive Forces
- Mergers and Acquisitions
- Workforce Factors
- Outsourcing Strategies
- Natural Evolution of the Business

In your enterprise, what drives the need for transformation?

Five Words That Change the Results You Will Achieve

Communication

Creating a shared understanding and the necessary **conditions for alignment**

Alignment

Driving the synergy required to rapidly translate **strategy into reality**

Visibility

Creating a clear link between plans, actions and **results that drives accountability**

Accountability

Taking responsibility for the results I produce

Discipline

Having the perseverance to **always follow through**

65% of organizations have an agreed upon strategy
14% of employees understand their organizations strategy
<10% of organizations successfully execute

**Do we have, at high level, agreed upon strategy?
Do you feel like you understand our strategy?
How do you feel?
Now, how do we ensure we execute successfully?**

How'd We Do?



Customer and Member Satisfaction and Feedback Survey

Lean Transformations:

Perspectives and Experiences from Large and Smaller Organizations



INSTITUTE OF
**INDUSTRIAL
& SYSTEMS**
ENGINEERS

You can download the deck (handouts)
You will receive an e-mail tomorrow with certificate and link
to recording. You can go to this IISE link soon and get deck
and recording. <https://www.iise.org/details.aspx?id=46729>

Thank You!

**Please consider
joining our
remaining
Professional
Development
Webinars the rest
of the year starting
on the 7th of
October.**



Contact us for More Info:

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Where to find our digital library of past Webinars

Over 50 recorded Webinars on a wide spectrum of Performance Excellence Topics are available to members of IIESE by clicking on this link.

Our IIESE TV Channel is allowing you to customize what you have personalized access to.

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

IIESE PERFORMANCE EXCELLENCE WEBINARS



Boost your career. Add knowledge to your ISE toolkit. Select from any (or all) of the IIESE Performance Excellence Webinar tracks below to hone your skillset to its maximum and improve your organization.

Performance Excellence topics include ...



Accelerating Benefits Realization

Dive into agile and other methodologies that speed up operational results and bottom line impact.

- Disruptive Innovation in Distribution: From Weeks to Days to Hours
- Agile Methodology to Enable Rapid Process Innovation and Improvement
- The Agile Scrum Process for Process and Product Improvement
- Rapid (AGILE) Deployment and Execution of Integrated Systems Engineering Principles and Methods in Times of Major Disruption

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Just Ahead.....

18 Nov 11-12 pm EDT

Innovative Planning and Strategies for Supply Chain: Reverse Logistics at During Post-Holiday Return Season

Register here for this Co-Hosted Webinar:

<https://register.gotowebinar.com/register/8822522401836669455>

November-December:

- IISE Annual Conference Seattle-Performance Excellence Track Sneak Preview

December:

- [How to Successfully Deploy Integrated LeanSigma in the context of an Operational Excellence Program](#)
- [Operational Analytics Deployment Strategies and Case Example](#)
- **Operational Excellence:** What does a GREAT Op Ex Program look like and do and how do ISE's fit in to those type of Programs?



An Operational Analytics Certification will significantly enhance your foundational training

Overview

Organizations are swimming in data, colloquially they are data rich and information poor.

Migrating from Data to Information to Insights and Understanding to Decisions/Actions and ultimately to Business Benefits Realization is the end game.

Organizations are losing at this game today because they don't have the right knowledge and skill sets to execute the right strategies to harness the power coming from More Data and the ability to move it faster.

Professionals, perhaps most importantly, students in ISE, that become proficient at Operational Analytics will have unprecedented career opportunities.

This program is focused on building your knowledge and skills in a tiered fashion—Understanding to Principles, Methods, Tools to Application Skill Development as the foundation. This comes from this initial blended training program.

Sitting on top of that base, we'll support your migration to higher levels of Mastery (Analysis, Solution Creation, System Design and Development, Deployment) with the Certification portion of this program.

Advanced Mastery Level
(Advanced Certification)

Reduction to Practice
Skills (Certification)

Foundational Principles,
Methods, Tools
(Certificate)

Investment Requirement

Certificate:

~ 3-6 mos. Elapsed time

~ 220 hours (e.g. equivalent to 1, 3 credit hour U/G level class)

\$450 for ISE Students (must be members of IISE)

\$575 for Professional IISE members, \$725 for professional, non IISE members

Certification:

\$250 for Student IISE members

\$950 for Professional IISE Members, \$1250 for Professional Non-Members of IISE

We had several target audiences in mind when we designed and developed this course:

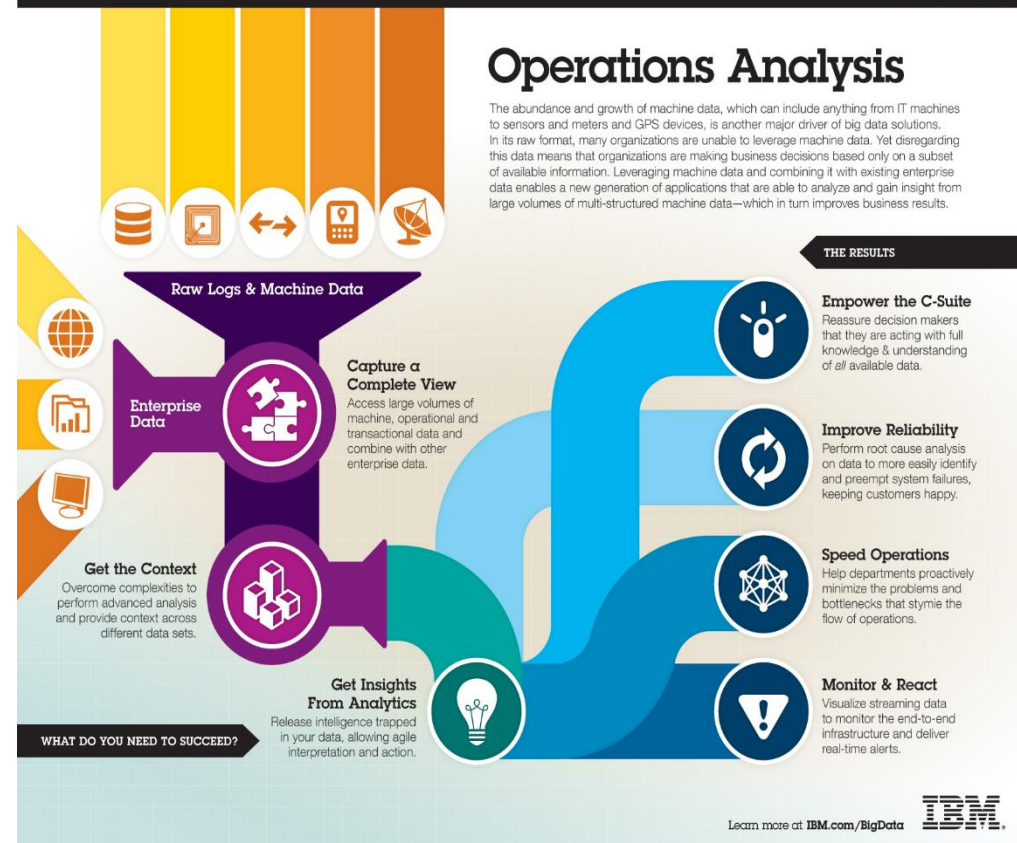
1. Industrial and Systems Engineering Undergrads (Seniors) and Grads who want to augment their BSISE degrees;
2. Young Professionals who want to expand Career possibilities, strengthen Resumes, LinkedIn Profiles and have a strong appetite for Analytics;
3. Business Intelligence Professionals who sense that there is more to Analytics than just creating lots of Power BI Reports and realize the real Leaders and Managers are overwhelmed with Data and frustrated that they can't get IT to support them, as customers, better.

Our Faculty Member, Ben Amaba, likes this slide!!

IBM, Big Data Use Cases

Operations Analysis

The abundance and growth of machine data, which can include anything from IT machines to sensors and meters and GPS devices, is another major driver of big data solutions. In its raw format, many organizations are unable to leverage machine data. Yet disregarding this data means that organizations are making business decisions based only on a subset of available information. Leveraging machine data and combining it with existing enterprise data enables a new generation of applications that are able to analyze and gain insight from large volumes of multi-structured machine data—which in turn improves business results.



Course Modules and Learning Objectives

We have 10 Core Modules in the Course:

1. Course Overview and Guidance
2. Operational Analytics Perspectives and Points of View from Thought Leaders
3. Operational Analytics: The Data Management Role
4. Operational Analytics: The Analyst Role
5. Operational Analytics: The Data Scientist Role
6. Operational Analytics: Business Process Improvement and Integrated LeanSigma Role
7. Visible Measurement Systems, how to deploy to support Study-Adjust
8. Operational Analytics: The Management Systems Engineer Role
9. Operational Analytics: Case Studies
10. Operational Analytics Final Exam

Learning Objectives

- Understand the Fundamentals of Operational Analytics through the Voice of Thought Leaders in this field
- Understand and Practice with the Data Management Role—how to get data, store it, organize it, cleanse it, integrate it...
- Understand and Practice with the Data Analyst Role—how to understand the voice of the ‘customer’, how to understand the fundamental questions that need answered, how to convert data to usable information
- Understand Data Sciences—advanced data capture, data management, data analytics by building intelligence and learning into our ‘machines’
- Understand and Practice with the application of Op Analytics to Business Process Improvement and Integrated LeanSigma
- Understand and practice how to bring all this together in the form of Engineered Management Systems and to integrate in Visible Measurement Systems and effective Study-Adjust processes.



Recently pre-recorded webinar recordings in 60 minute digestible chunks provided by thought leaders and faculty in our program. On-Demand.

Best-in-class Case Studies

- Op Analytics embedded in Process Improvement Projects (6 practical, industry diverse tollgate decks to help you internalize how this works)
- Data Sets from real world projects to aid you in developing reduce to practice skills



The LearnUpon LMS is intuitive and easy to use and has a way for us to Track your Practice work and interact as appropriate.

Practice Tracker Assignment Log

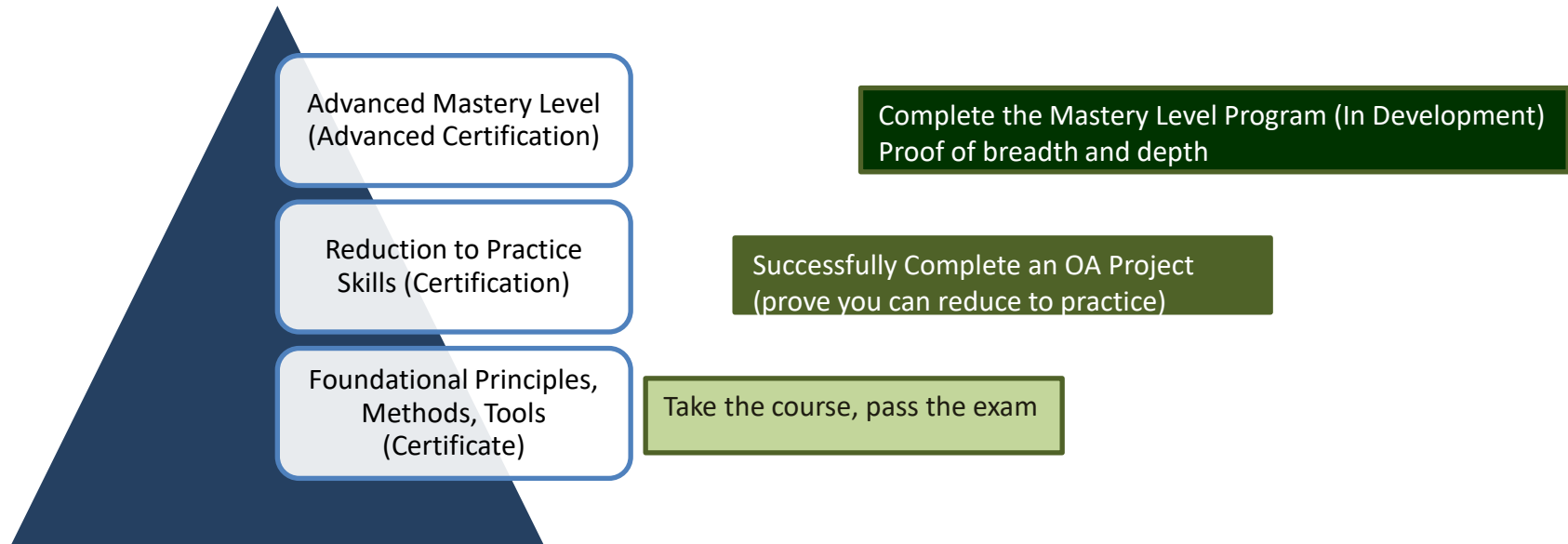


Virtual Coaching Sessions by Module provided by Faculty

Community Q&A/Chat Boards.

Live, synchronous training sessions monthly.

Competency Development Model





Special Offer to Webinar Participants today...

<https://www.iise.org/TrainingCenter/CourseDetail/?EventCode=OAO>

The 10% off Coupon Code is
OpAnalytics10