TULIP

How Industry 4.0 is transforming Lean Manufacturing

Presented by:
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Tulip Interfaces

Webinar Objectives

- Become acquainted with key ***Industry 4.0 technologies***
- Understand what ***Lean 4.0*** means for manufacturers
- Review ***Lean 4.0 use cases,*** and how they drive efficiency and profitability for manufacturers

What is Industry 4.0?

INDUSTRY 1.0

INDUSTRY 2.0

INDUSTRY 3.0

INDUSTRY 4.0

	18th century	19th century	Mid 20th century	Today
Enabling Technology	Steam power	Electricity	ICTs Electronics	Cyber physical systems, Internet of things (IoT), networks
Production Change	Mechanical production	Mass production and assembly lines	Automation and networked production	Intelligent, flexible, distributed production

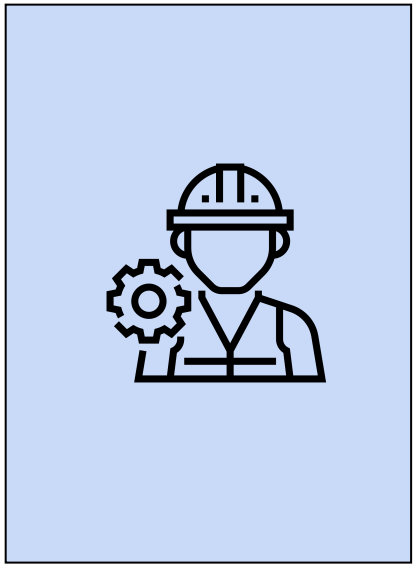
Defining Cyber Physical Systems (CPS):

“CPS are the result of a closed loop of sensor based physical process data acquisition combined with software based cyber data processing & autonomous actuator based process controlling connected with the internet and its data and services”

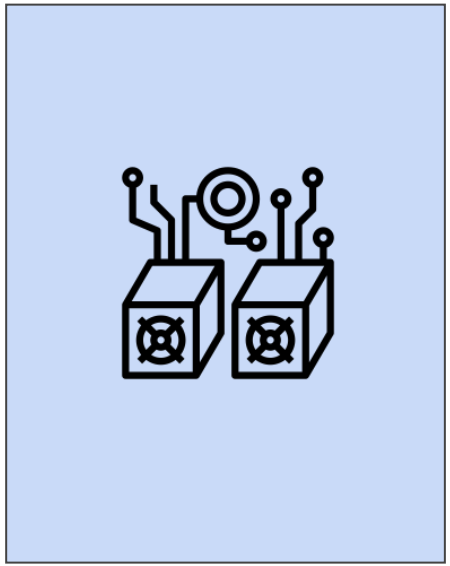
Put simply, connecting & collecting data from production

3 Ways to Collect the Data via CPS

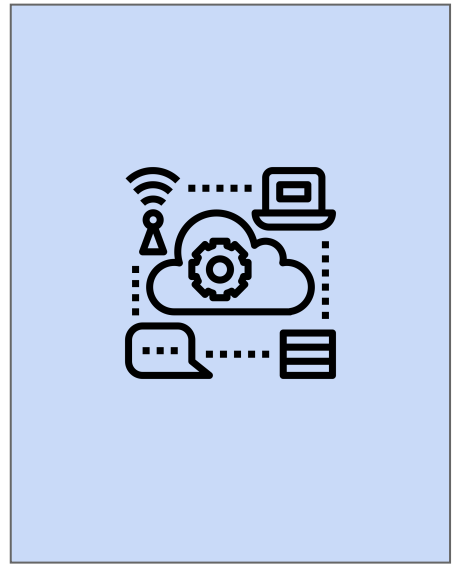
Human to Machine



Machine to Machine

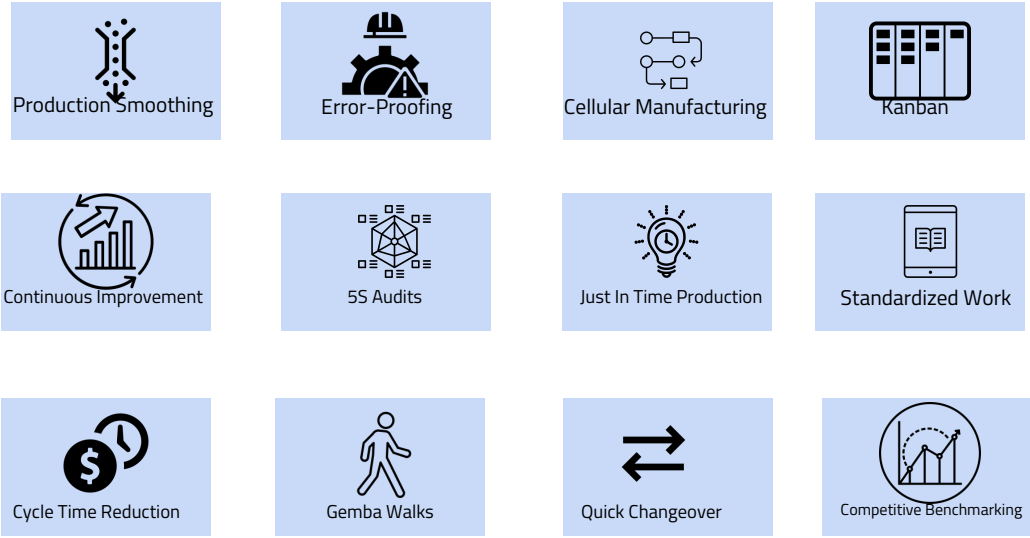


Data Acquisition & Processing



What is the value of the lean methodology for manufacturers?

“Lean Toolbox”



etc...but not the same for everyone

Industry 4.0 + Lean manufacturing = Lean 4.0

Industry 4.0	Lean Manufacturing	Lean 4.0
		
10% - 15% ↓	10% - 15% ↓	+40% ↓

Source: BCG Analysis: http://image-src.bcg.com/Images/BCG-When-Lean-Meets-Industry-4.0-Dec-2017_tcm104-179091.pdf

Value of Lean Manufacturing

	WITHOUT INDUSTRY 4.0 TECHNOLOGY	...WITH INDUSTRY 4.0 TECHNOLOGY
Flexibility	Changeovers are time consuming, or plants require additional production lines	Sensors and software enable more efficient changeovers
Productivity	Machine downtime and resource constraints hurt productivity	Machine data collection improves machine maintenance, enables engineers to easily monitor uptime and downtime
Speed	Data is collected sporadically, used when it's already outdated	Real time data drives production management, truly continuous, accountability
Quality	Operators prone to error and defects are found downstream	Ensures accurate self inspection, removes waste
Culture	Low buy in to continuous improvement programs	Bottom up transformation and optimization from internal stakeholders

Where Industry 4.0 can fail...

Hard/Impossible to use by operators and supervisors

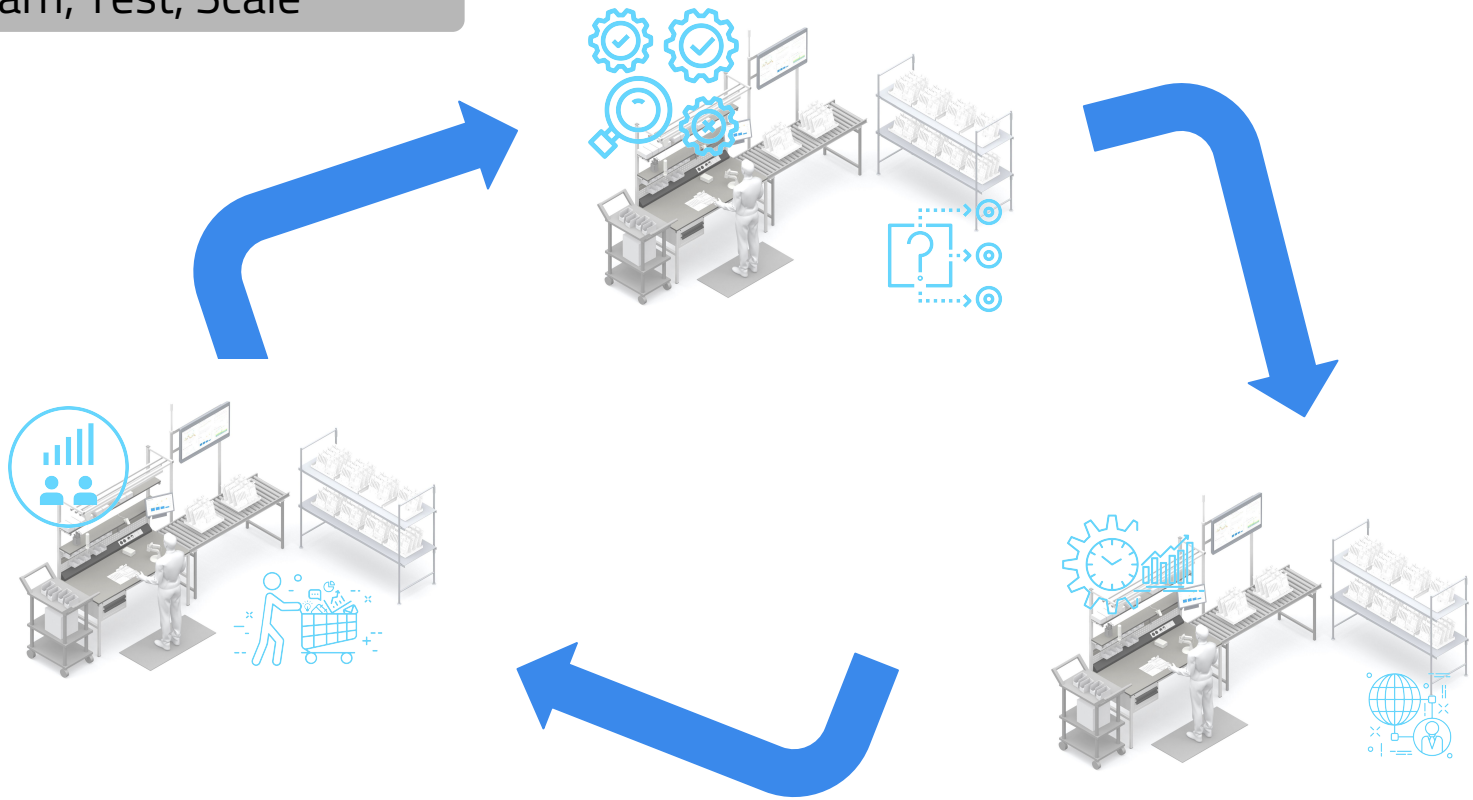
Too rigid and expensive to implement, deploy, and maintain

Rigid solutions based on specific customization. Standardizing a solution is often times impossible

All-or-nothing, high risk implementation approach

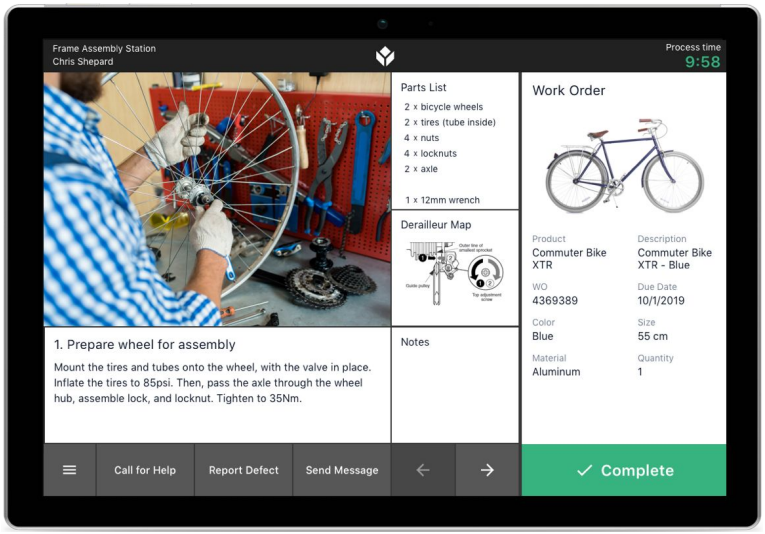
The Continuous Improvement Loop - Lean 4.0

Learn, Test, Scale



Manufacturing Apps: A Definition

Manufacturing App Platform can turn your workflows into instrumented, data collecting, digital processes.



Continuous Improvement, Lean
Create, test, and deploy quickly--then iterate and improve.

Visual
User-friendly interfaces and rich media provide an intuitive experience.

IoT Enabled
Connect with machines, tools, and sensors.

Data-driven
Automatically collect production data.

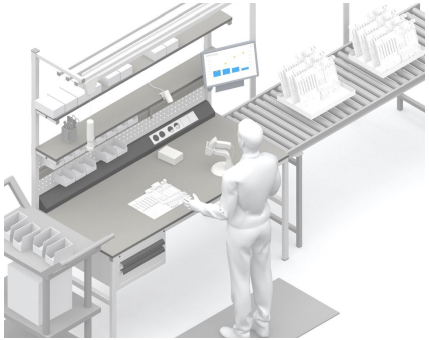
Interactive logic
Guide workflows with dynamic logic.

Lean 4.0 with Manufacturing Apps

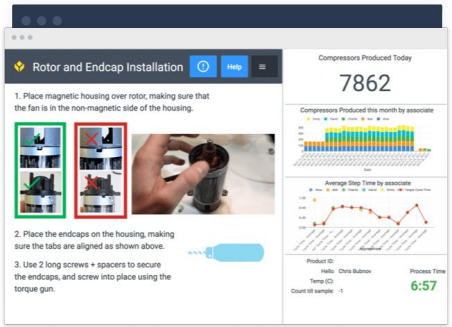
Flexible, bottom up app development and optimization and faster error detection and improvement drive fast return and ensure future continuous improvement

PLAN

SHOP-FLOOR PROCESS

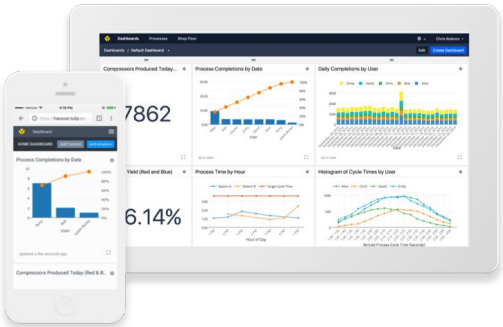


MANUFACTURING APP



COLLECT

REAL-TIME PRODUCTION DATA

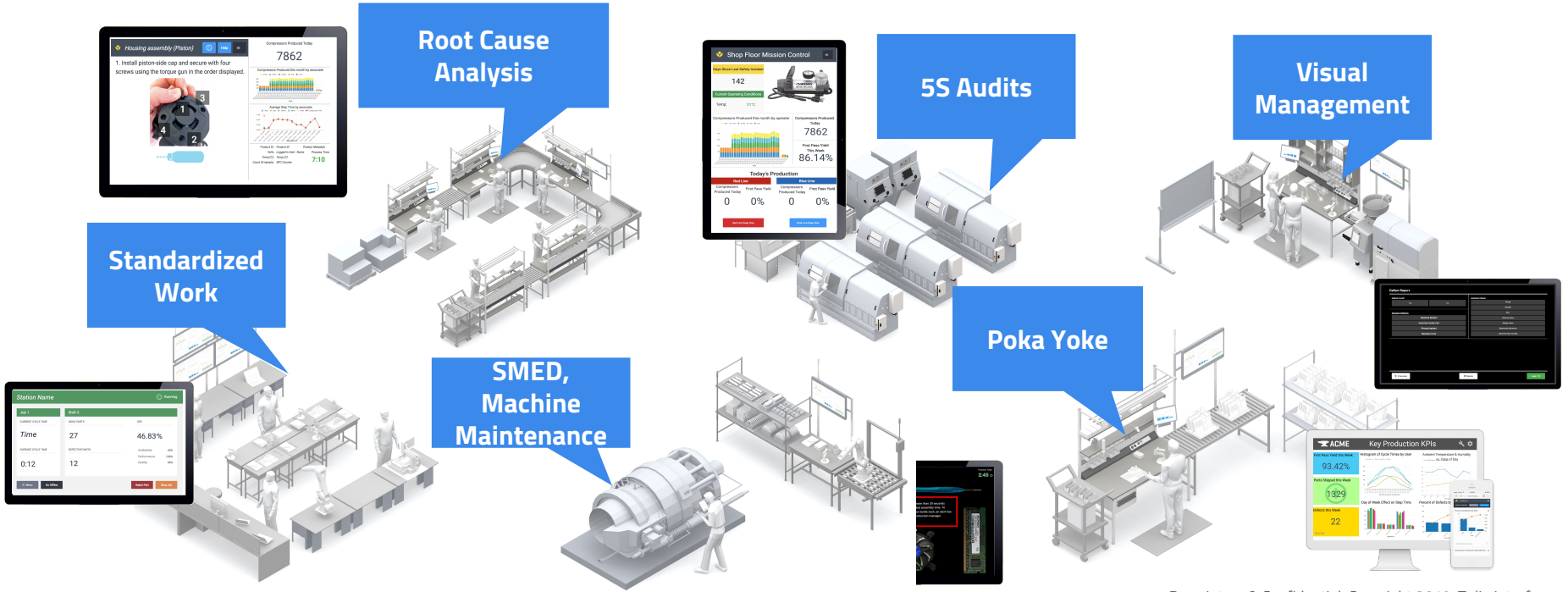


PROCESS OPTIMIZATION

IMPROVE

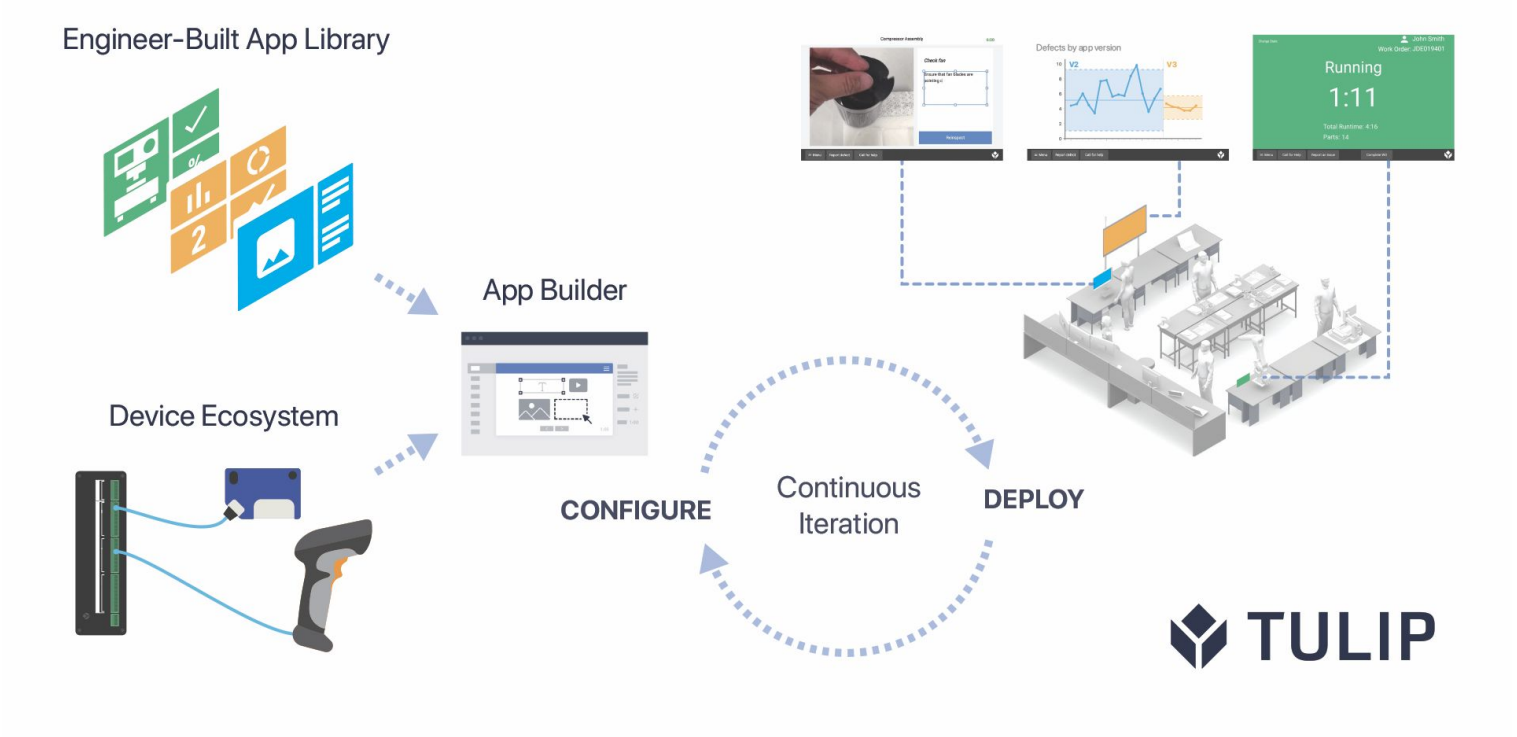
Adopting Apps in Your Operations Digitizes Lean 4.0

From work instructions to quality checks, to the right machine setup, all the lean processes in your shop floor can be managed through apps



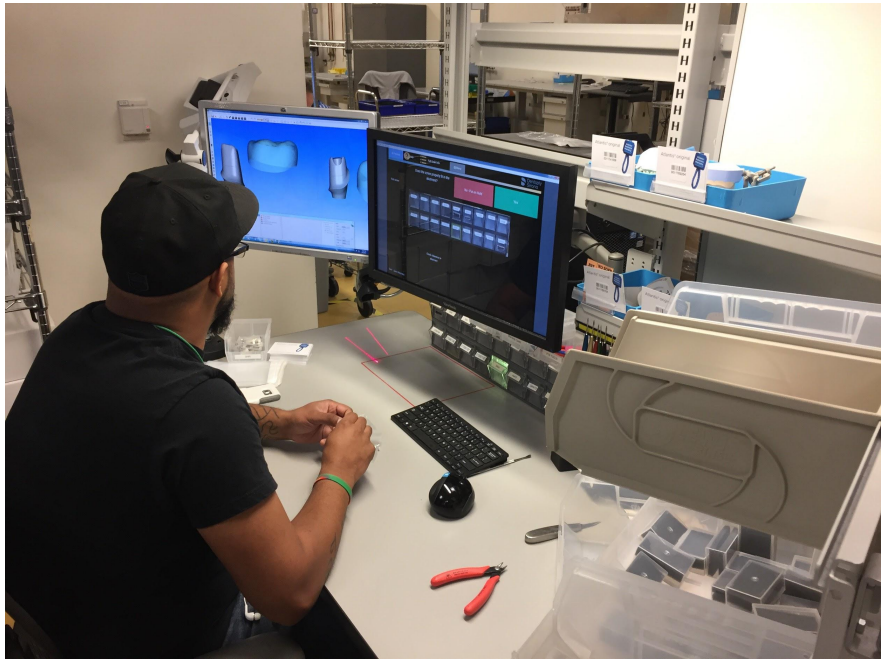
The Continuous Improvement Loop - MFG Apps

Create, Test, Scale



Real-World Use Cases from Customers Using Tulip Apps

Fewer operator mistakes with digital poka yoke



APPS

- VISUAL WORK INSTRUCTIONS
- TRAINING
- QUALITY

DEVICES USED

- BARCODE SCANNER
- CAMERA
- PICK TO LIGHT

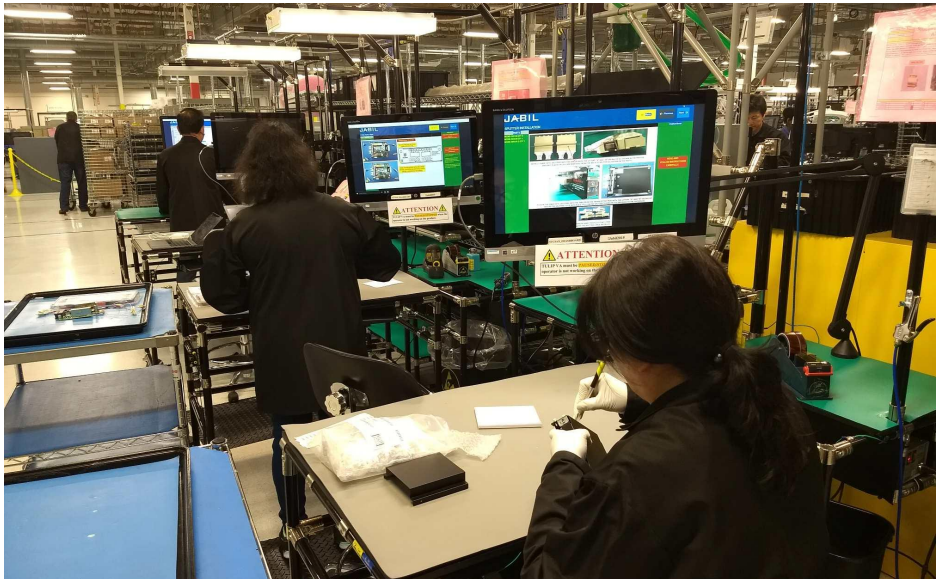
RESULTS

100% ↓ Error Rate

99% ↓ Training Time

"the system allows us to control a highly complex process with hundreds of thousands of variations while leveraging the investment we made in our existing backend systems"
- Sr. Process Engineer

Real Time Data Speeds Up Continuous Improvement



APPS

- VISUAL WORK INSTRUCTIONS
- AUDIT & QUALITY
- TRAINING

DEVICES USED

- BARCODE SCANNER
- CAMERA
- TABLETS

RESULTS

60% ↓ Quality Issues

10% ↑ Production Yield

4 Weeks Time-to-value

"Now we have real-time insights that let us optimize even low volume production runs" - Quality Engineer

Faster root-cause analysis and improvement with better data

RESULTS

50%↓ Time to Market

35%↓ Quality Errors

2 Weeks Time-to-value

"Now we have a lot more confidence in the data, and we can digitize the analysis."

- VP Innovation

APPS

- VISUAL WORK INSTRUCTIONS
- TRAINING
- AUDIT & QUALITY
- LEAN APPS

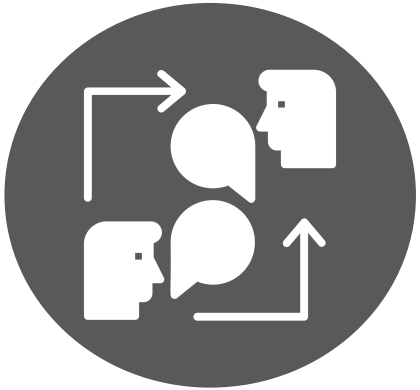
DEVICES USED

- BARCODE SCANNER
- CAMERA
- TABLETS

Cultural Impact of Lean 4.0

Flexible workers

Active Problem Solving



Shared destiny

Prevention vs Reaction

Thank You for Joining!

Register for our next webinar: **Digital Transformation for SMB Manufacturers**, April 8th @ 2PM est/11 AM pst

Learn more: https://tulip.co/

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Tulip, the Manufacturing App Platform, is a no code platform-as-a-service that lets manufacturers build IoT-enabled manufacturing apps without having to write any code. Some of the world's leading manufacturers are already using Tulip to increase the productivity, quality, and efficiency of their operations. Launched out of MIT, the company has customers in over 14 countries, is headquartered in Somerville, MA, with offices in the UK and Germany.

SIEMENS Dentsply Sirona JABIL Schneider Electric TOYOTA

Gartner

"Tulip's distinctive nature is its simplicity."

IDC

"Tulip's key differentiator is its ease of use and time to value."

FROST & SULLIVAN

"The platform's flexible, self-serve, smart manufacturing apps enable people, processes, and machines to work together."

451

"Tulip merges the needs of the human workforce with data-centric IIoT devices."

WORLD ECONOMIC FORUM

"Tulip and its fellow pioneers are front and centre in shaping the ongoing Fourth Industrial Revolution."