



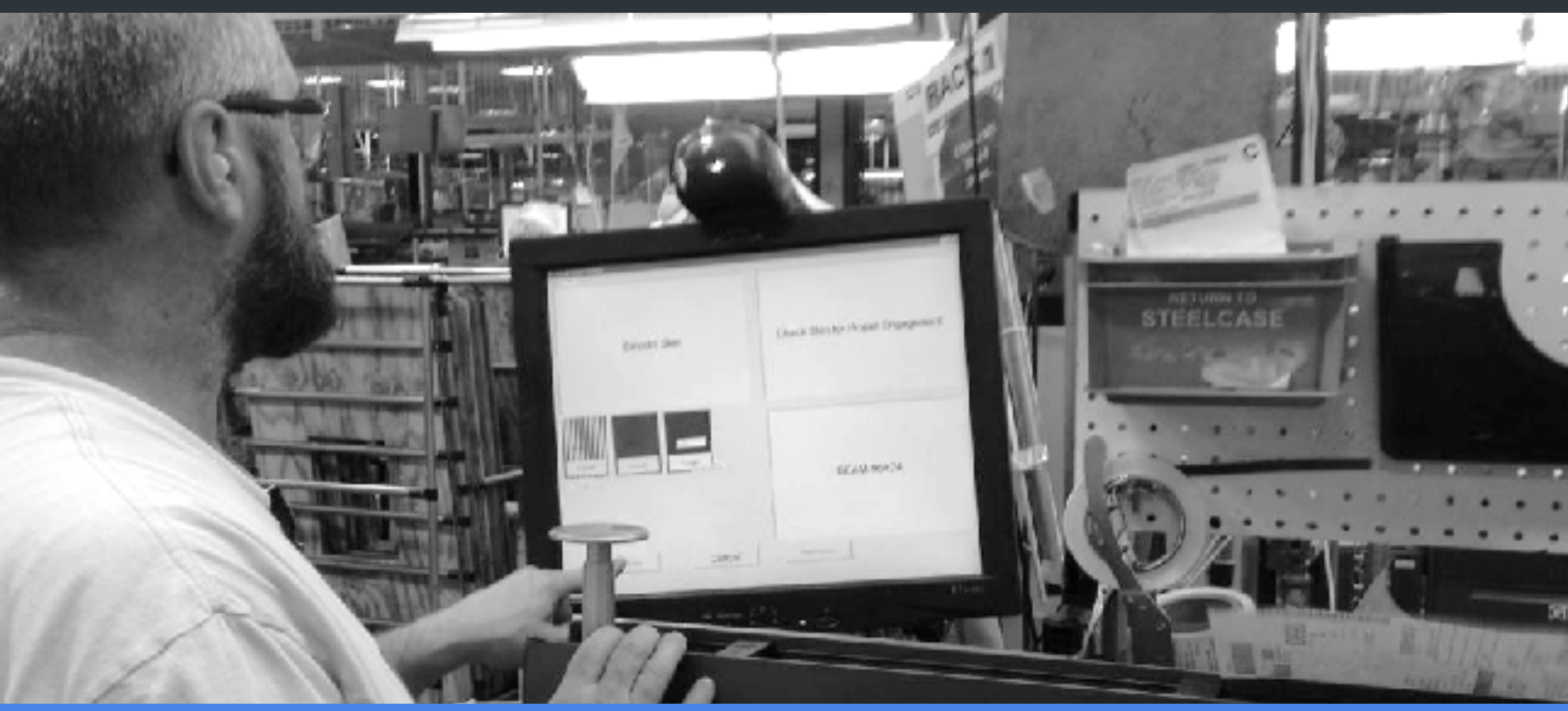
TULIP

DIGITIZE YOUR SHOP FLOOR

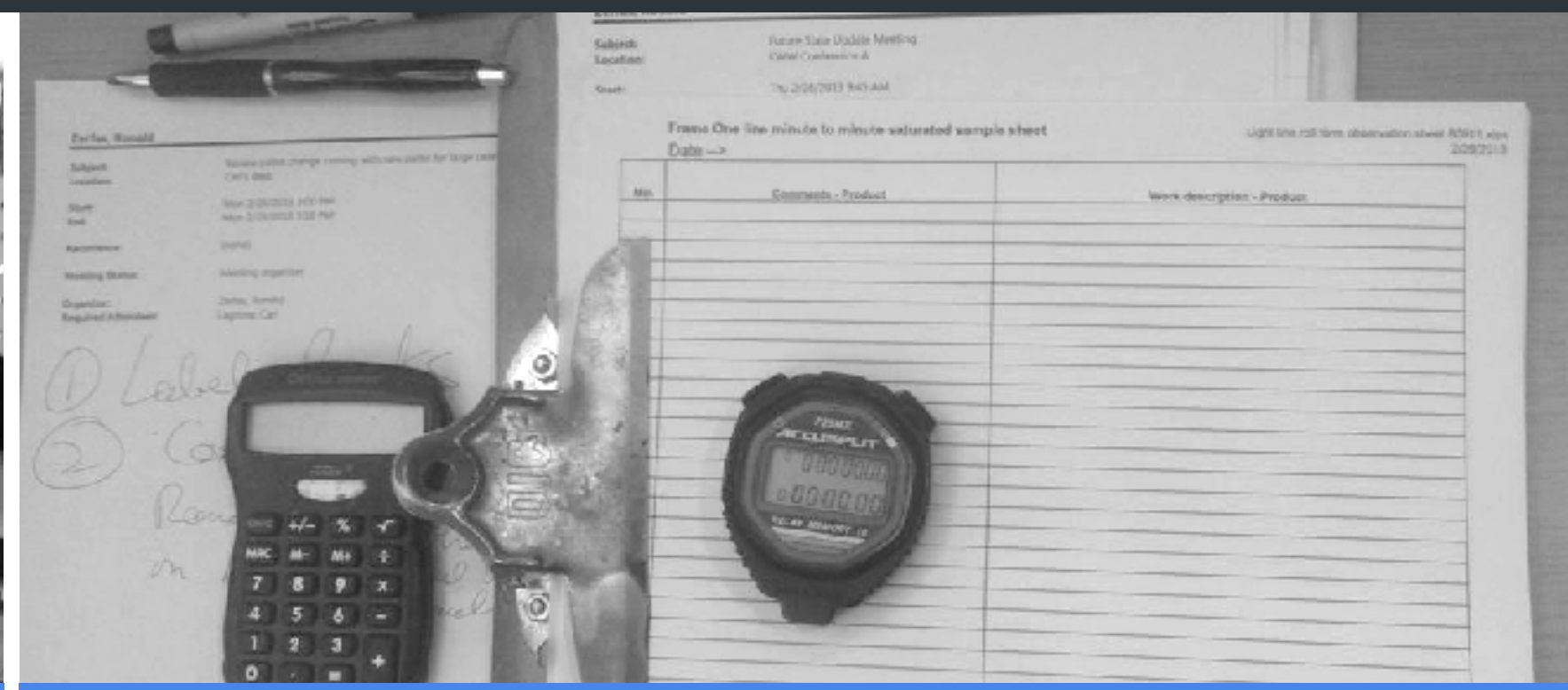
The internet as we know it does not exist in manufacturing



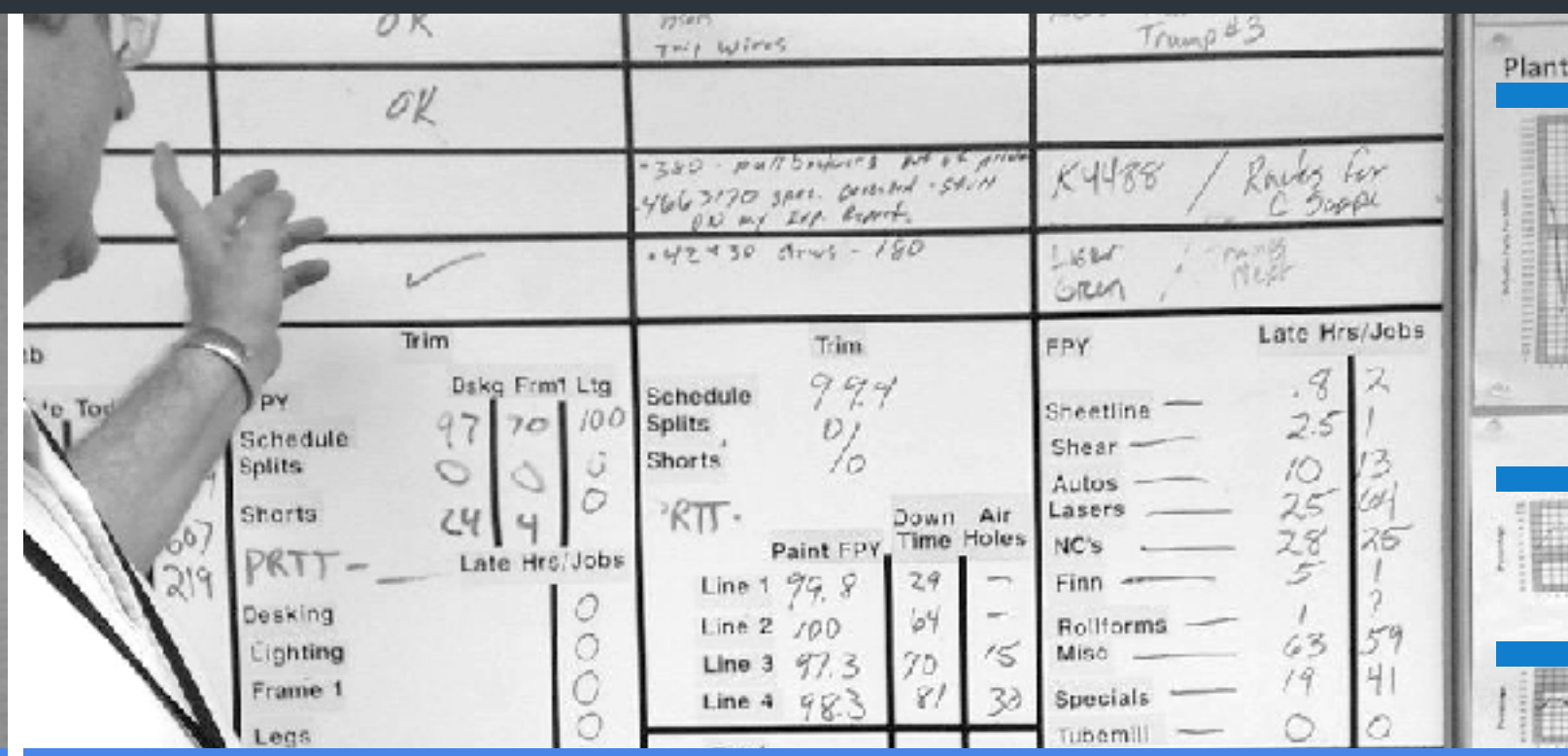
\$65B annual spend on system integration in manufacturing



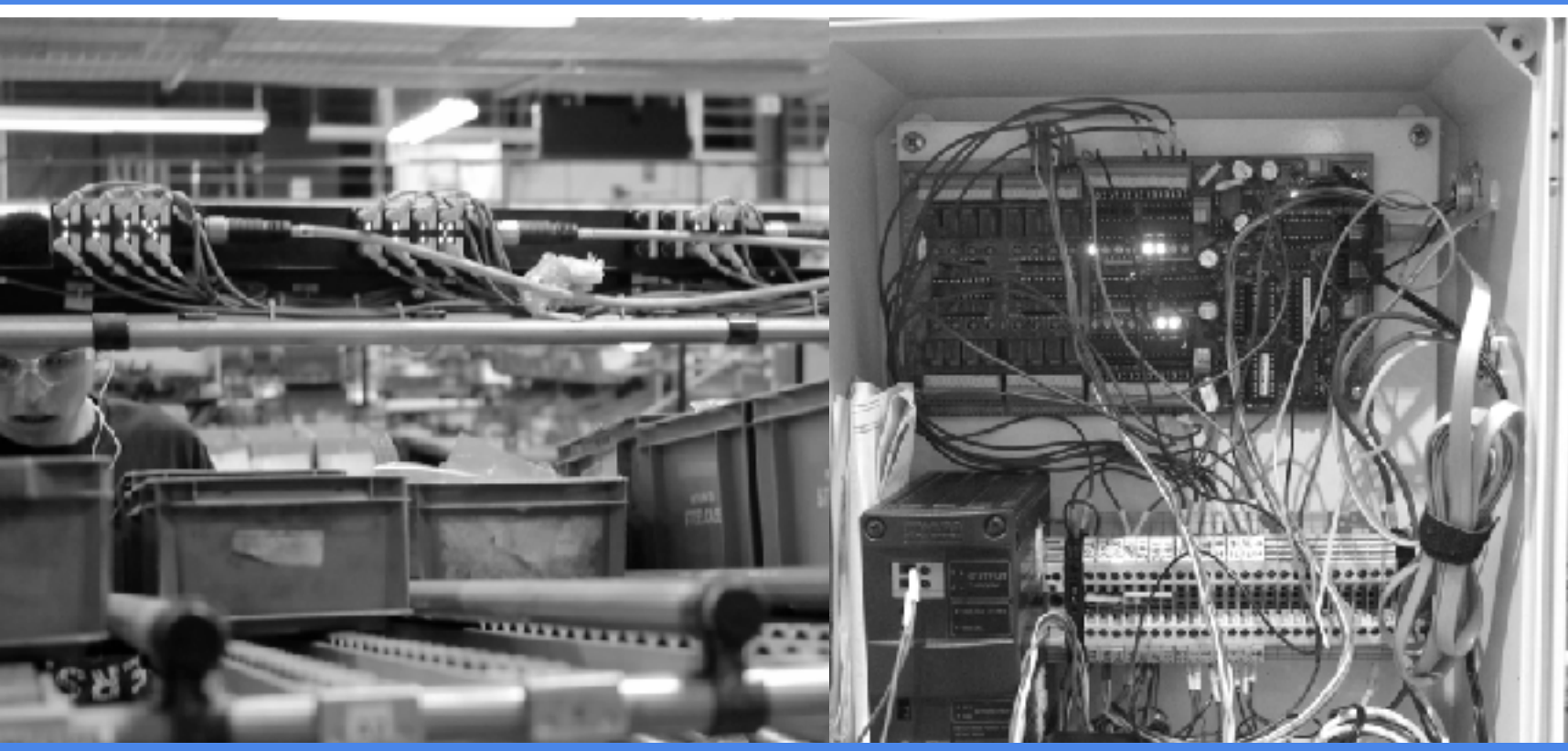
Bad interfaces



Manual time studies



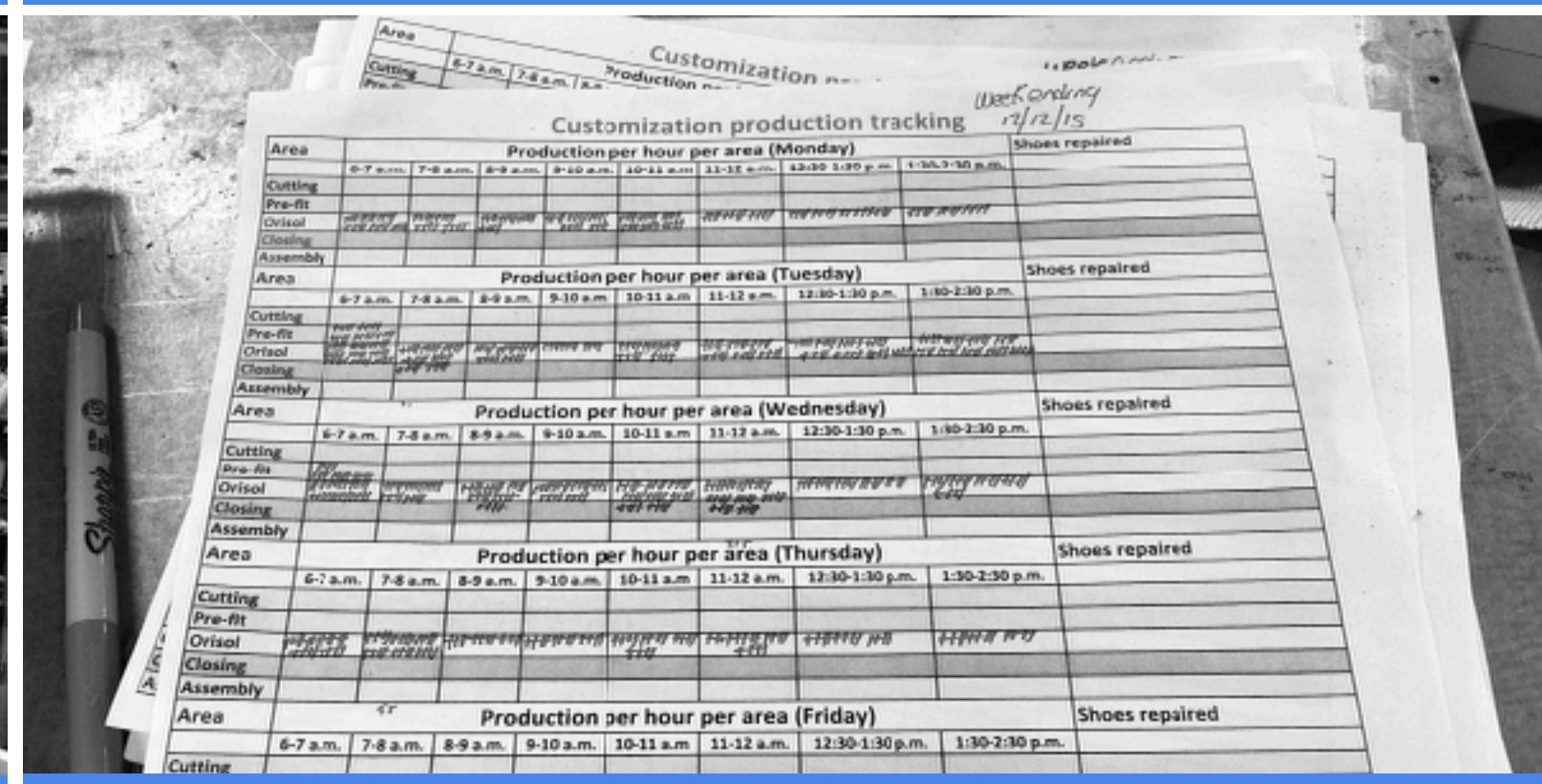
No real-time data



Legacy automation



Complex integrations



Paper & data silos

Process engineers resort to paper, excel and legacy software/automation



Digitize Manual Operations

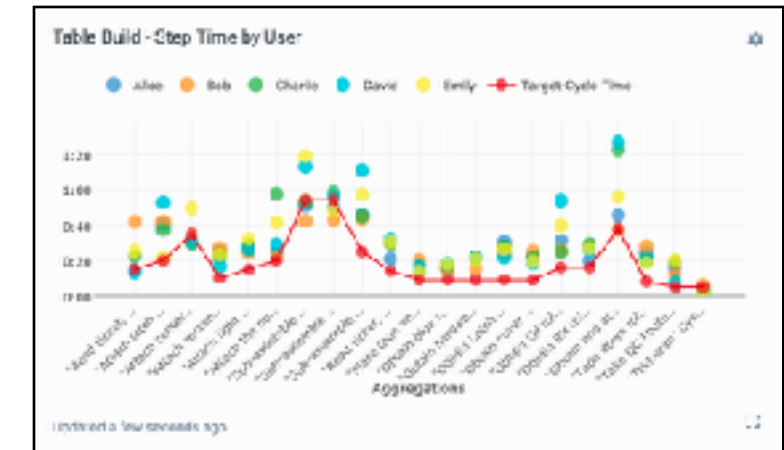
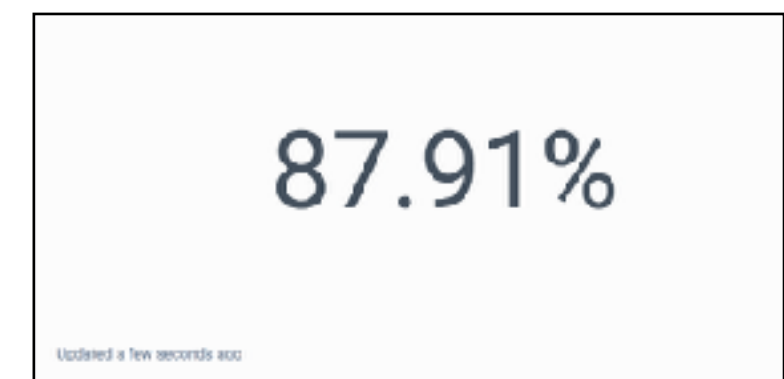
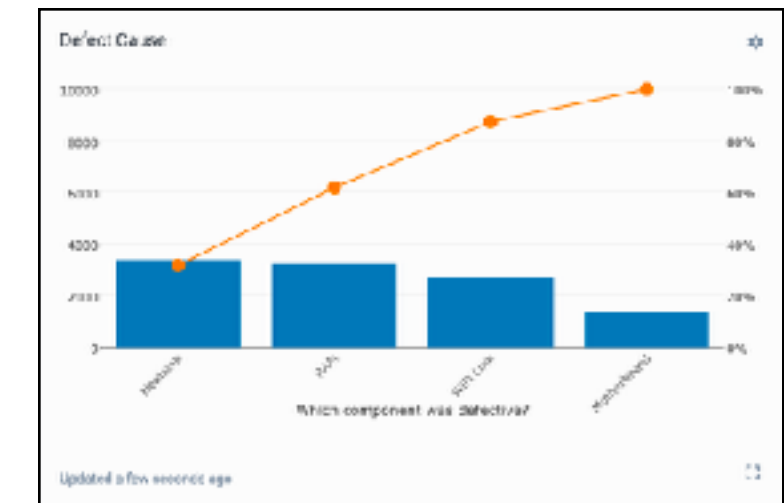
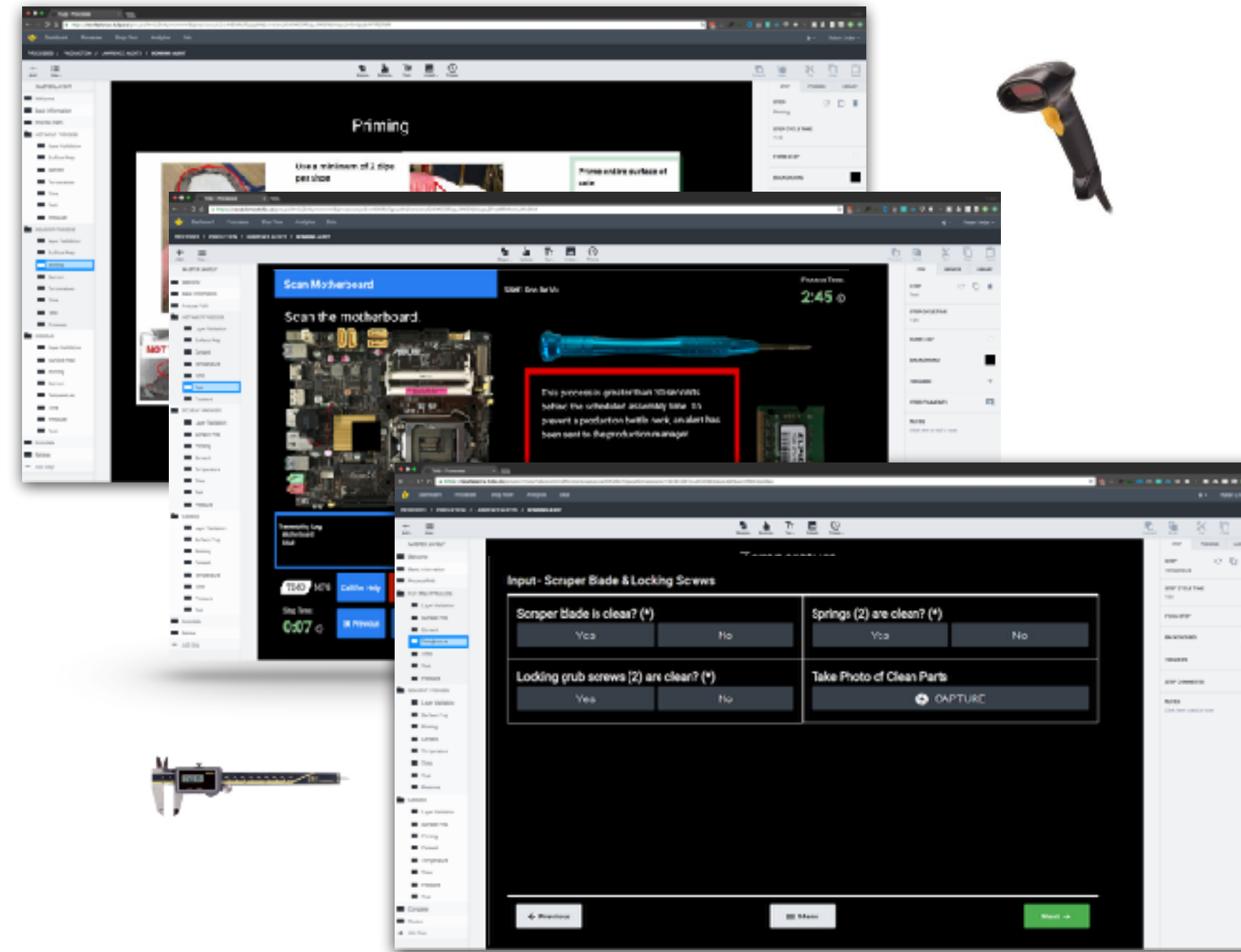
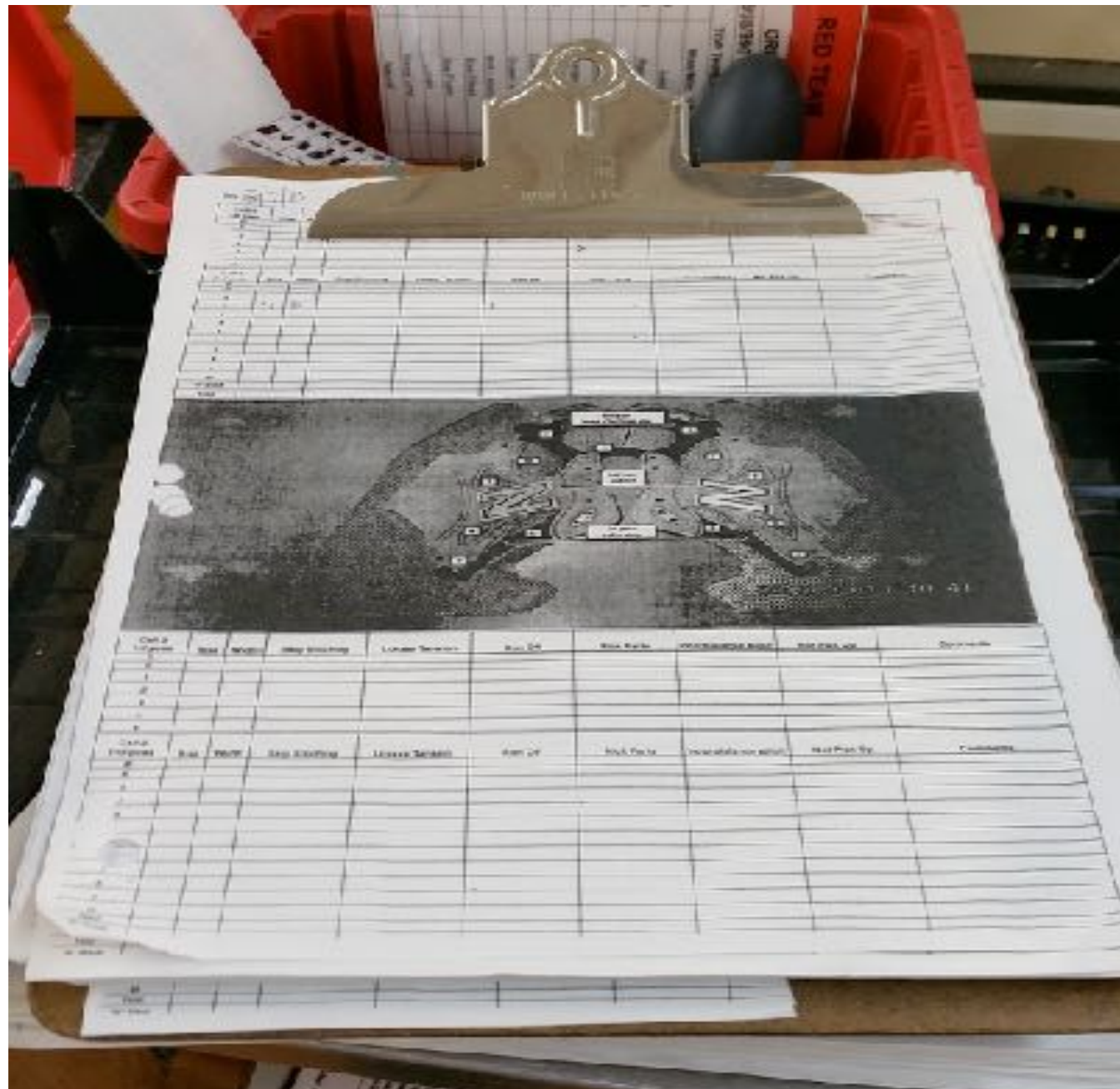
Analog Process



Shopfloor App



Live Data



- ✗ Static, non-guided process
- ✗ Manual, infrequent, error-prone data collection
- ✗ No sensor/machine/smart tool integration

- ✔ Guided environment with built-in workflow
- ✔ Digital QA and Audit forms for easy data capture
- ✔ Built-in sensor integration for in-line QA

- ✔ Real-time previously unobtainable data
- ✔ Unprecedented shop floor visibility
- ✔ Driving continuous process improvement



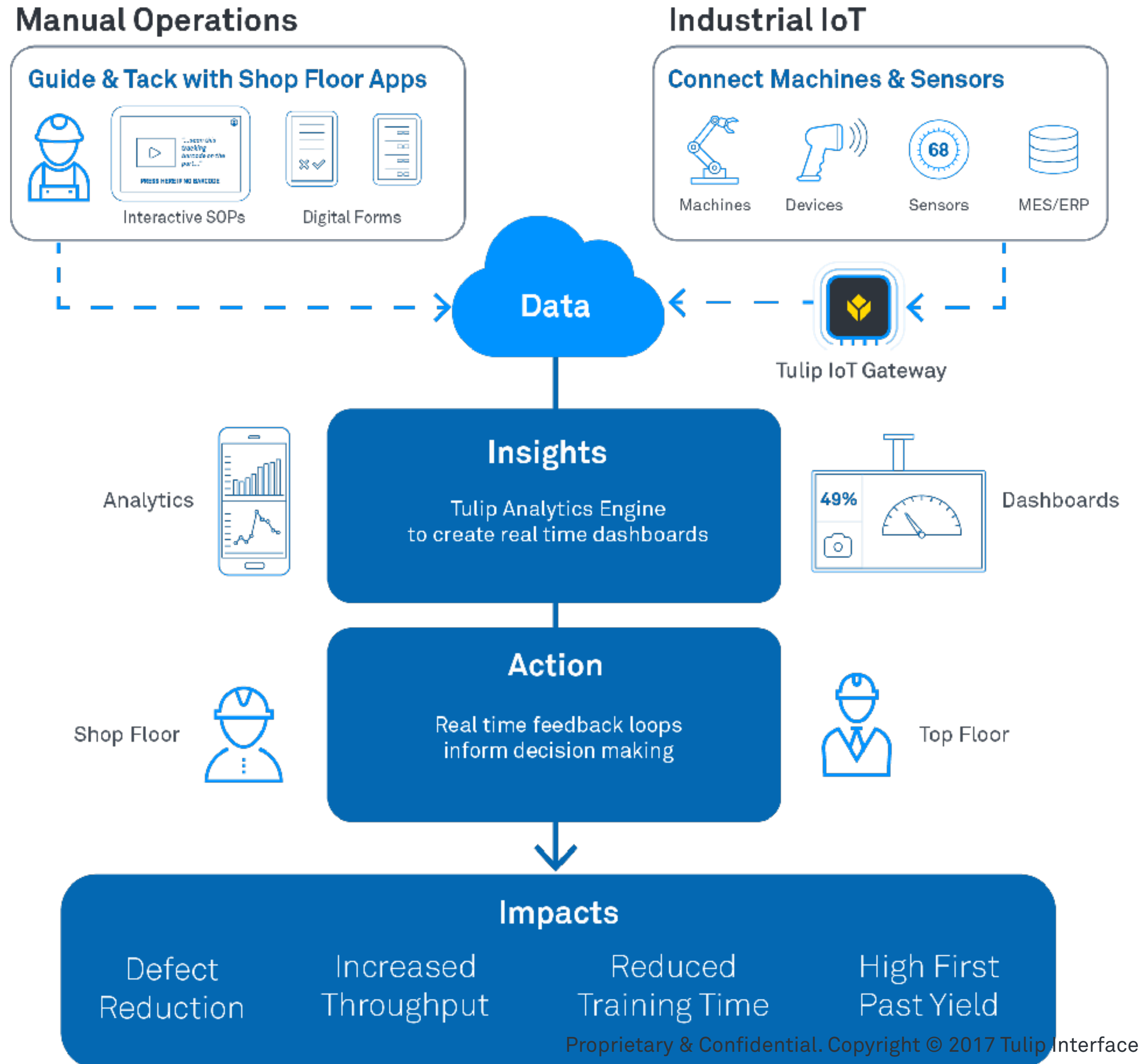
An App Engine for the MFG Shop Floor

TULIP's Approach

Create - Shop floor Apps

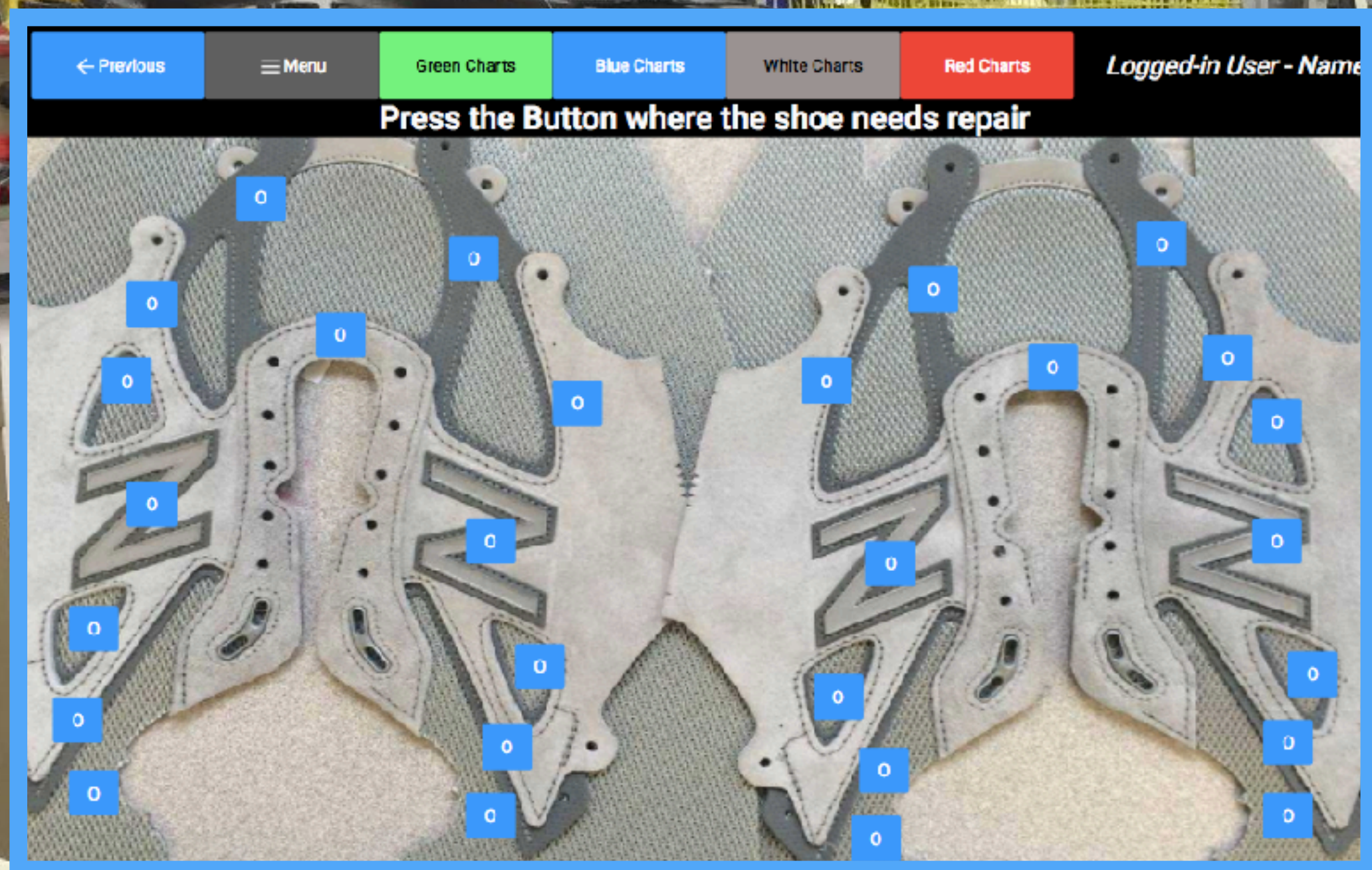
Connect - Machine and Sensors

Optimize - Analytics and Dashboards

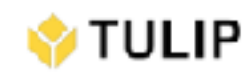




Instrumented Quality Stations



We create significant and measurable value to customers



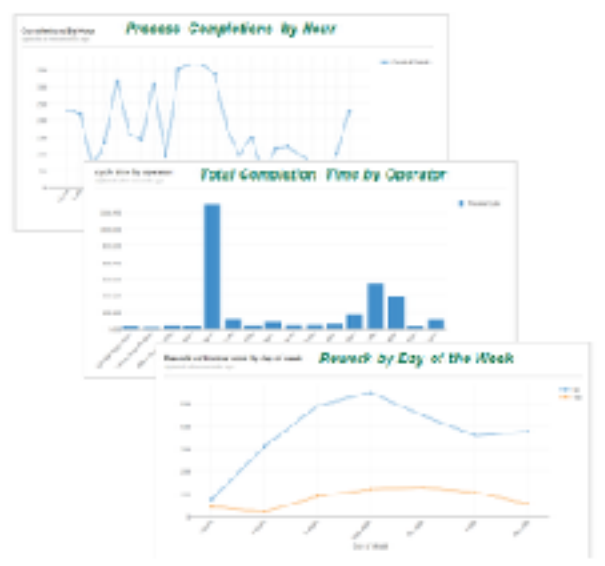
Industry 4.0 Digital Manufacturing System Value Proof

June 2016

THE BOSTON CONSULTING GROUP

1 Electronics Manufacturer: System enabled identification of opportunities for significant productivity gains

Data captured on Tulip's platform provide real-time shop-floor visibility...

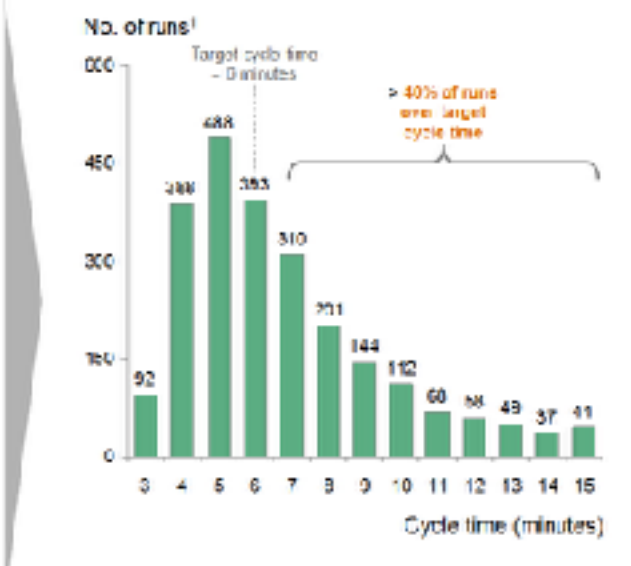


¹ Includes all runs in Sept. 2015 - January 2016. Source: manufacturer's production data.



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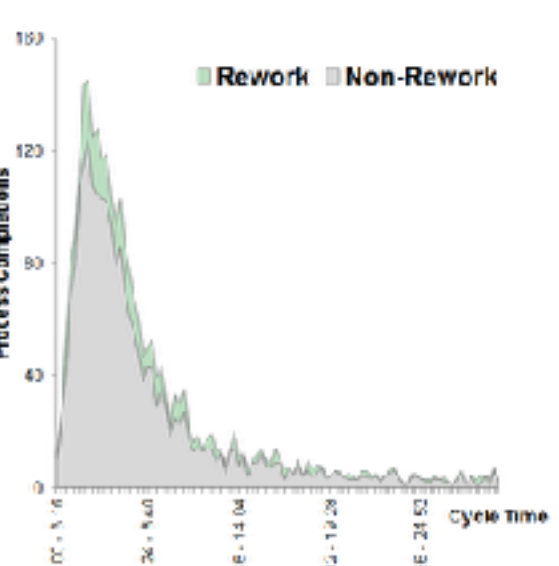
...allowing electronics manufacturer to identify >40% of runs over target cycle time



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1 Electronics Manufacturer: Right-first-time percentage improved by over 10 pp's

Granular process data enabled identification of significant re-work time...

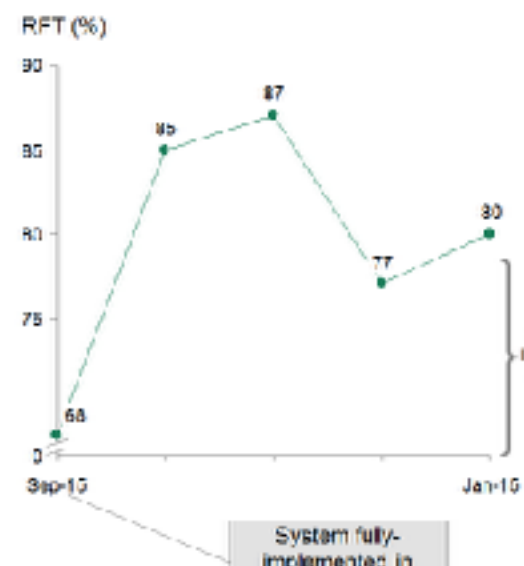


Source: Anonymous Manufacturer from Tulip Interfaces



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...and at the same allowed customer to improve right-first time by over 10 pp's



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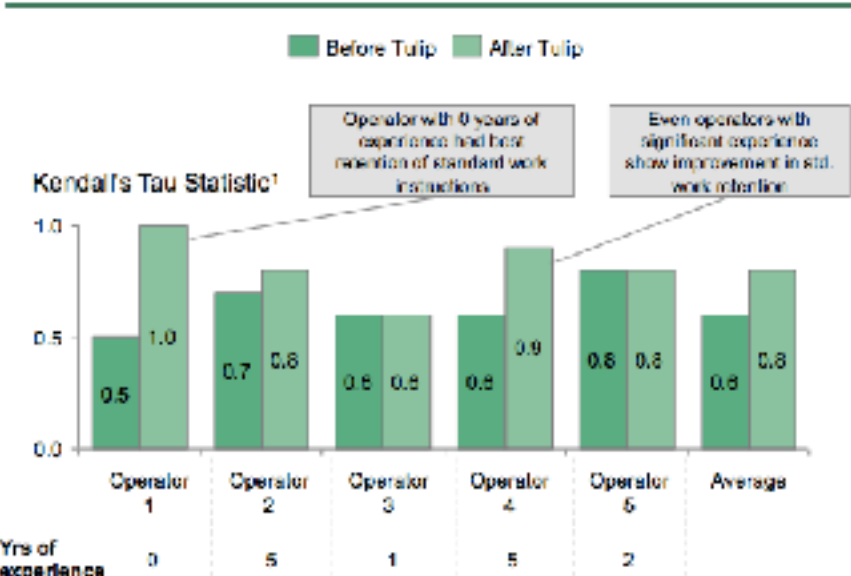
3 Furniture Manufacturer: Digital work instructions enabled enhanced process control and visibility

Tulip system visualized granular operator process data real-time...



Visualization enabled customer to conduct a continuous time study and identify operators that require training as well as high performers / best practices

...and resulted in a ~20 percentage point improvement in standard work knowledge retention



System provides visibility and tools to improve / control process

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Root Cause Analysis

40% of process engineer time saved due to faster root cause analysis

Quality Improvement

60% reduction in manual assembly quality issues within 4 weeks

Knowledge Retention

20% improvement in standard knowledge retention

Faster Audits

65% reduction in audit process time over previous paper-based process

Reduced Training

90% reduction in training time on complex assemblies

Higher First Pass Yield

12% FPY rate improvement from 68% to 79%

Speed to Market (NPI)

30% reduction in NPI defects