



Business Value from the Fourth Industrial Revolution

Dr. Peter Martin, VP Innovation & Marketing

The Evolution of Industrial Revolutions

First Industrial Revolution

Mechanized production

Water and steam power



1800

Second Industrial Revolution

Mass production

Electric Power



1900

Third Industrial Revolution

Analytical production

Digital computing



2000

Fourth Industrial Revolution

RT production/business

IIoT



Life Is On

Schneider
Electric

Industry 4.0: Historical Drivers and Requirements

Industrial Revolution	Industry 1.0	Industry 2.0	Industry 3.0	Industry 4.0
Drivers/ Requirements	<ul style="list-style-type: none"> • Population • Demand • Water & Steam Power 	<ul style="list-style-type: none"> • Urbanization/Demand • Science • Electric Power 	<ul style="list-style-type: none"> • Computers • Efficiency • Labor costs 	<ul style="list-style-type: none"> • Speed of business/Agility • Safety/Environmental • IIoT/Technology
Control Function	<ul style="list-style-type: none"> • Start/stop • Operate 	<ul style="list-style-type: none"> • Logistics • Feedback • Feed-forward 	<ul style="list-style-type: none"> • Efficiency-based • Predictive/Multi-variable • Optimization 	<ul style="list-style-type: none"> • Safety, Security • Asset performance • Profitability
Automation Assets	<ul style="list-style-type: none"> • Mechanical • Steam-Water power 	<ul style="list-style-type: none"> • Pneumatic • Electronic • Electromechanical 	<ul style="list-style-type: none"> • Digital • Unit-based • Centralized • Integration 	<ul style="list-style-type: none"> • Asset aligned • Unified • Enterprise • Value chain
Physical Assets	<ul style="list-style-type: none"> • Steam engines • Machine tools • Rotating gear • Mills 	<ul style="list-style-type: none"> • Electric engines • Sophistication • Complexity • Capacity/storage 	<ul style="list-style-type: none"> • Sophistication • Integrated 	<ul style="list-style-type: none"> • Intelligent • Autonomous • Agile • Cyber Physical Systems
Work Function	<ul style="list-style-type: none"> • Production • Maintenance 	<ul style="list-style-type: none"> • Mass Production • Maintenance 	<ul style="list-style-type: none"> • Efficient Production • Asset Management • Process Safety 	<ul style="list-style-type: none"> • Efficient Production • Reliability • Safety & Security • Profitability

Industry 4.0: Historical Drivers and Requirements

Drivers/ Requirements

- Speed of business
- Safety/Environmental
- Agility
- IoT/Technology

Control Function

- Safety, environment
- Asset performance
- Profitability
- Security

Automation Assets

- Asset aligned
- Unified
- Enterprise
- Value chain

Physical Assets

- Intelligent
- Autonomous
- Agile
- Cyber Physical Systems

Impact of 40 Years of Industrial Digitization



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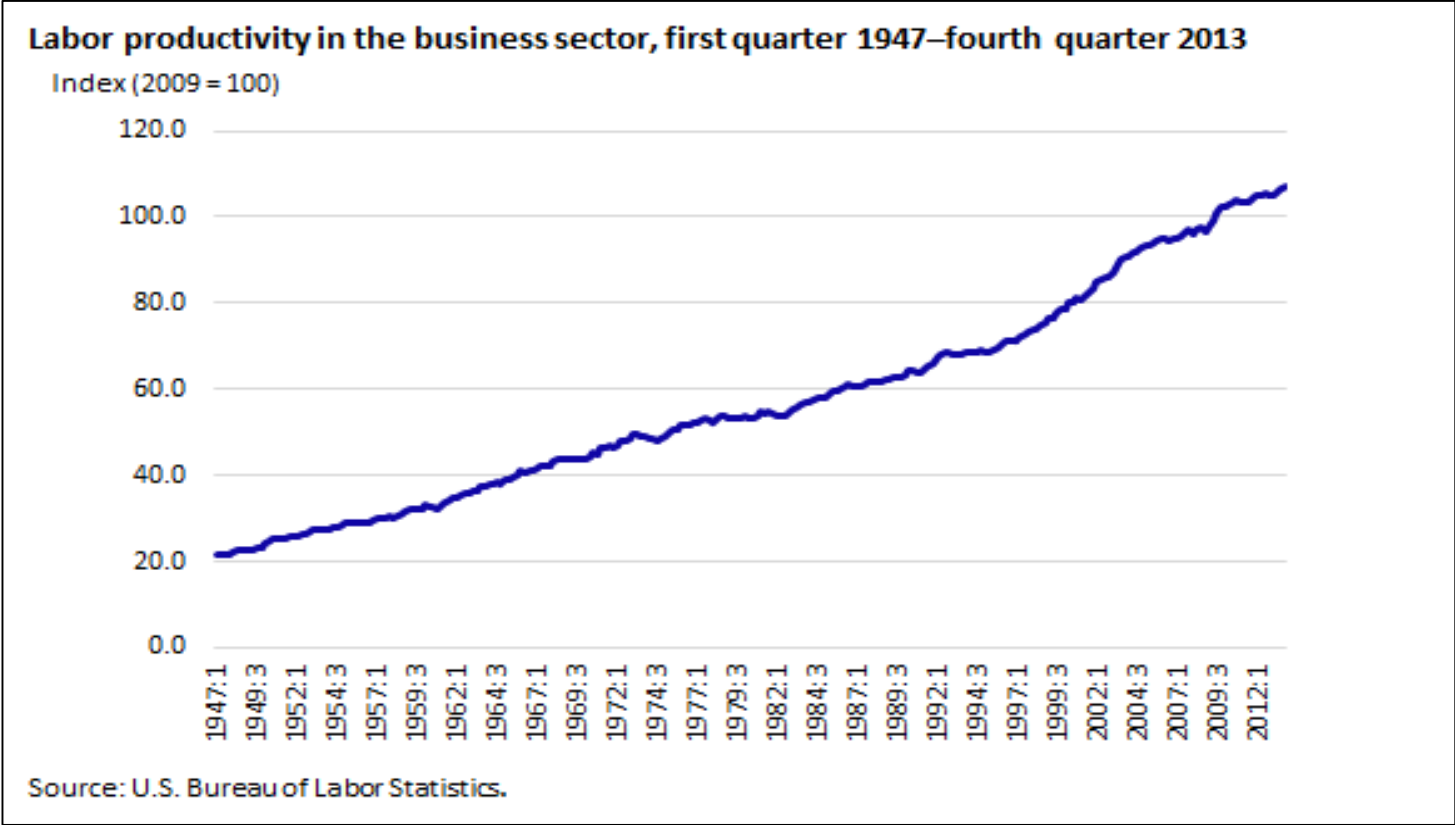


Huge
improvements
in productivity

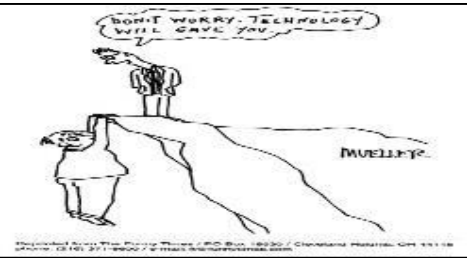
Technology
transition
from a means
to an end

Speed of
business
continues to
increase

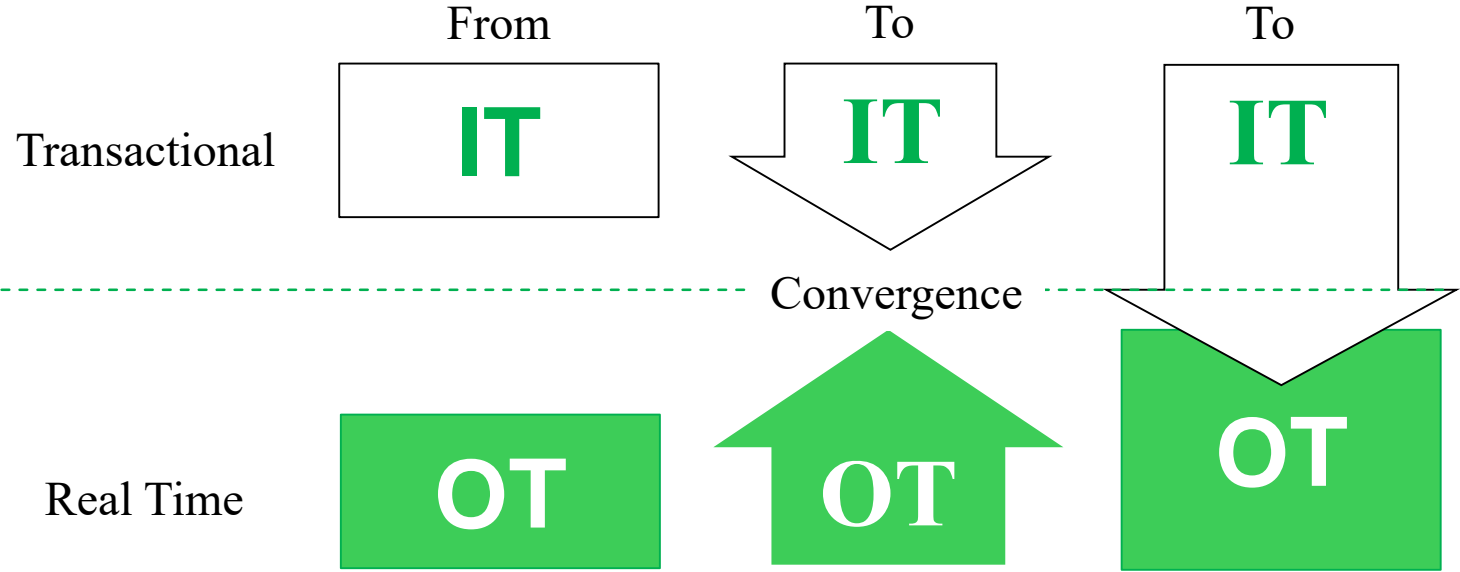
Huge Improvements in Industrial Productivity



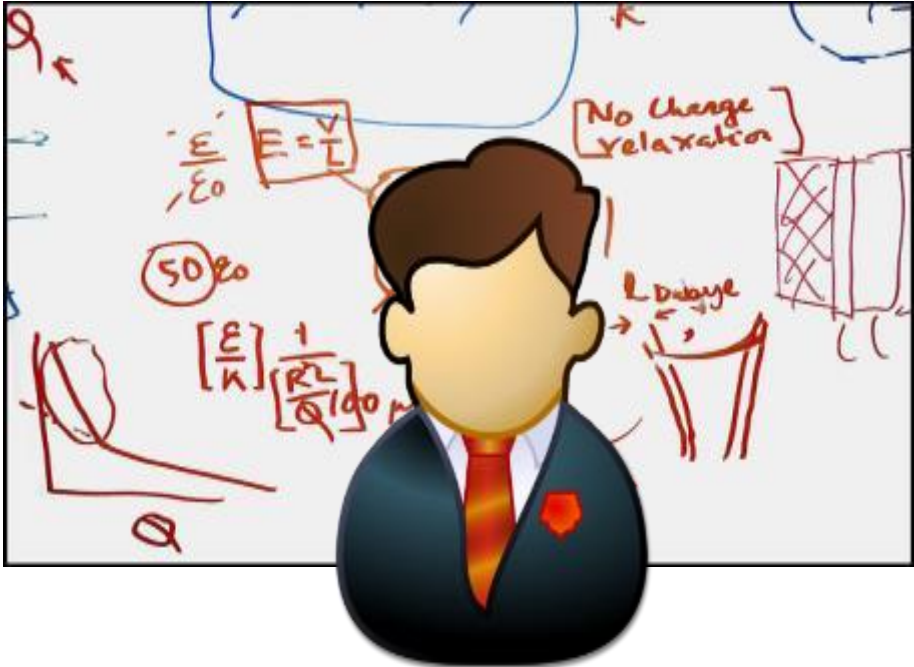
Technology Transitioning from a Means to an End



Increasing Speed of Industry

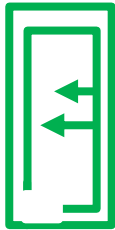


Why Industry 4.0 Now?



Technology no longer constrains solution design!

Emerging Value from Digitization



Extended
real-time
control



Autonomous
industrial
assets



Increased
asset
performance



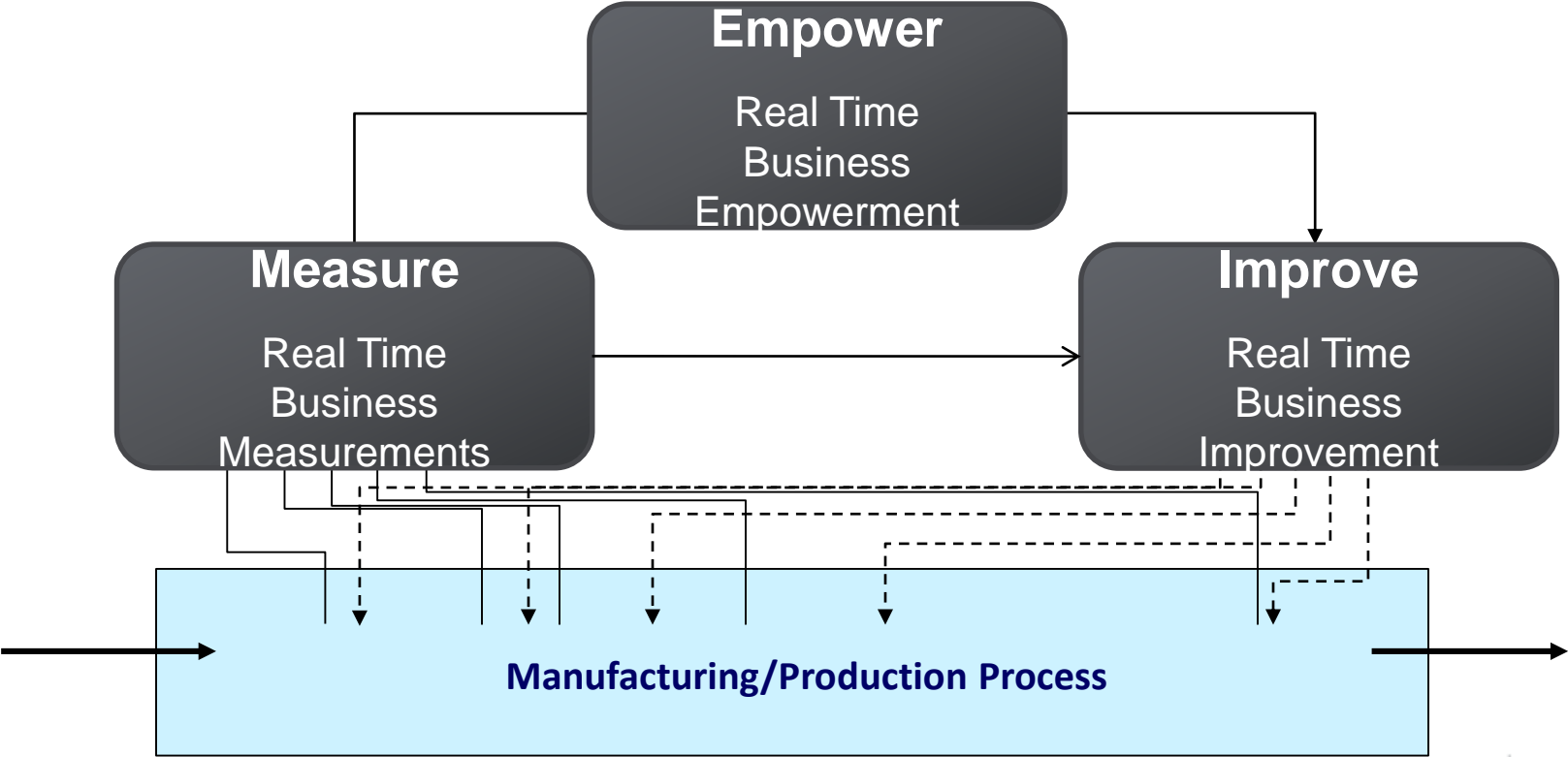
Activated
workforce

Measurably improve operational profitability – safely!

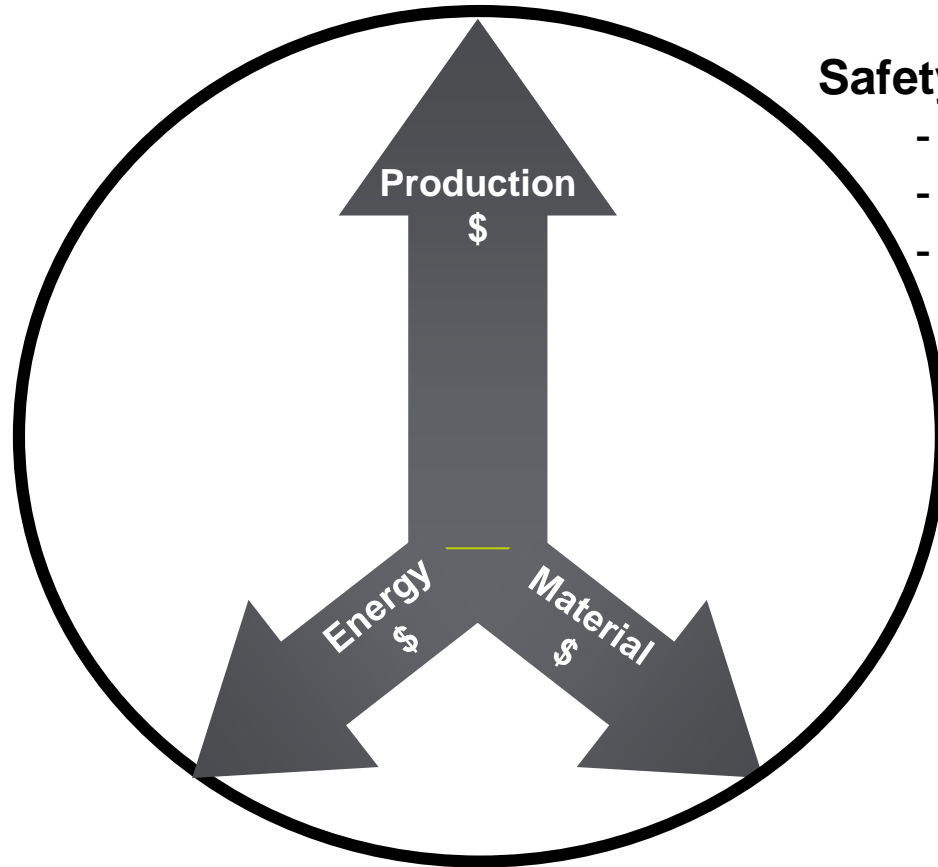
Extended Real-Time Control



Business Value Creation Process



Real-Time Profit Impact Model



Safety

- people
- plant
- environment

Extended Real-Time Process Control



Example: Automobile System of Systems

Engine

- Intake System
- Exhaust System
- Ignition System
- Lubrication System
- Engine Electrical System



Control System



Electrical System



Drive Train System

- Transmission System
- Differential System
- Universal CV Joints



Control System



Brake System

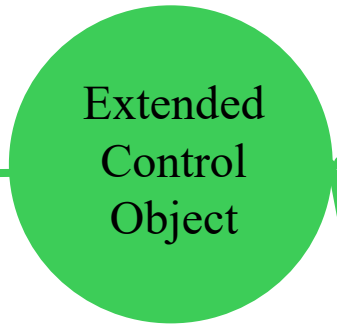
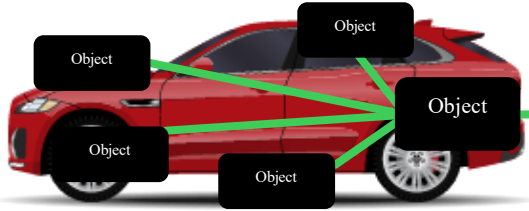


Steering System



Autonomous Industrial Assets

Autonomous
Transportation
Asset



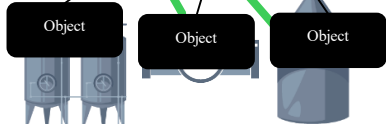
Autonomous
Plant Assets



Autonomous
Area Assets



Autonomous
Unit Assets

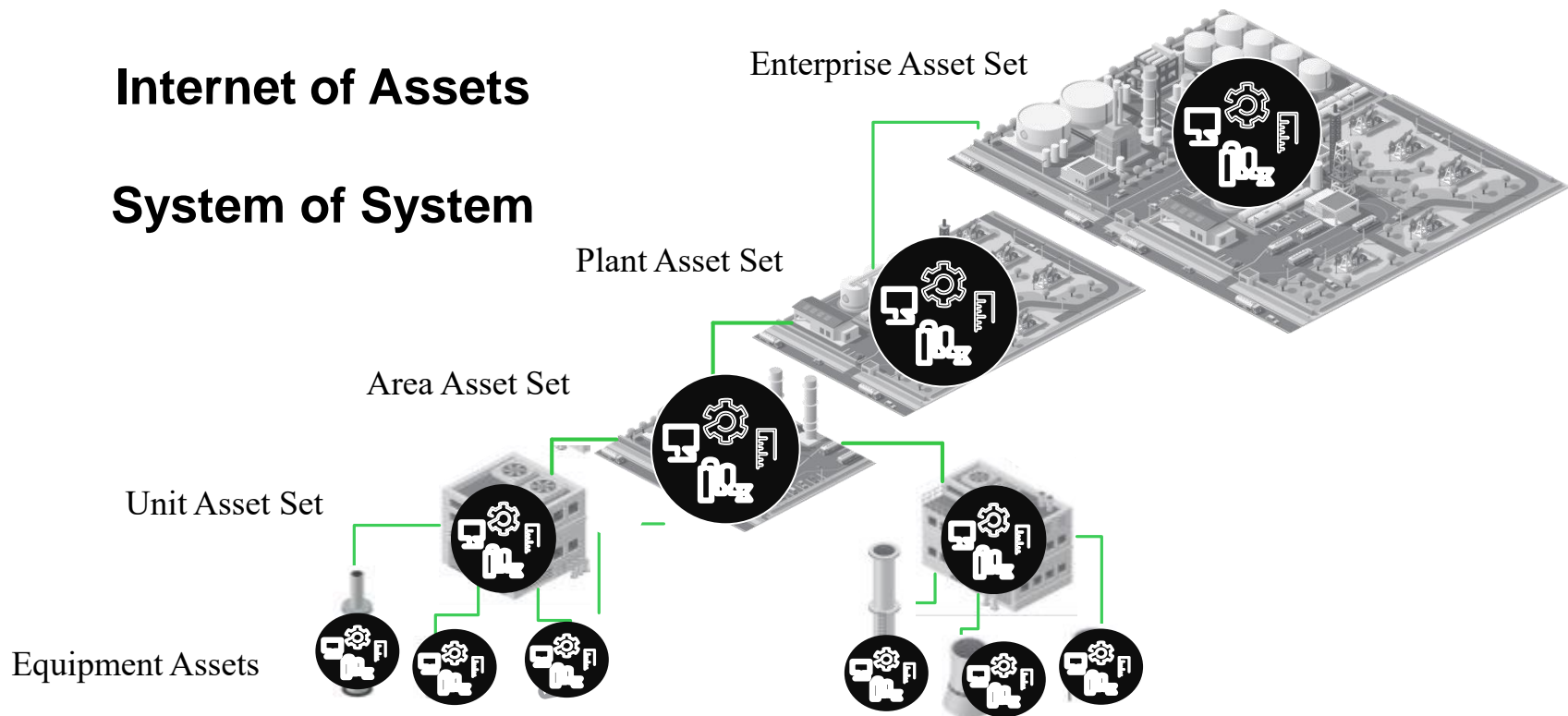


Autonomous
Equipment
Assets

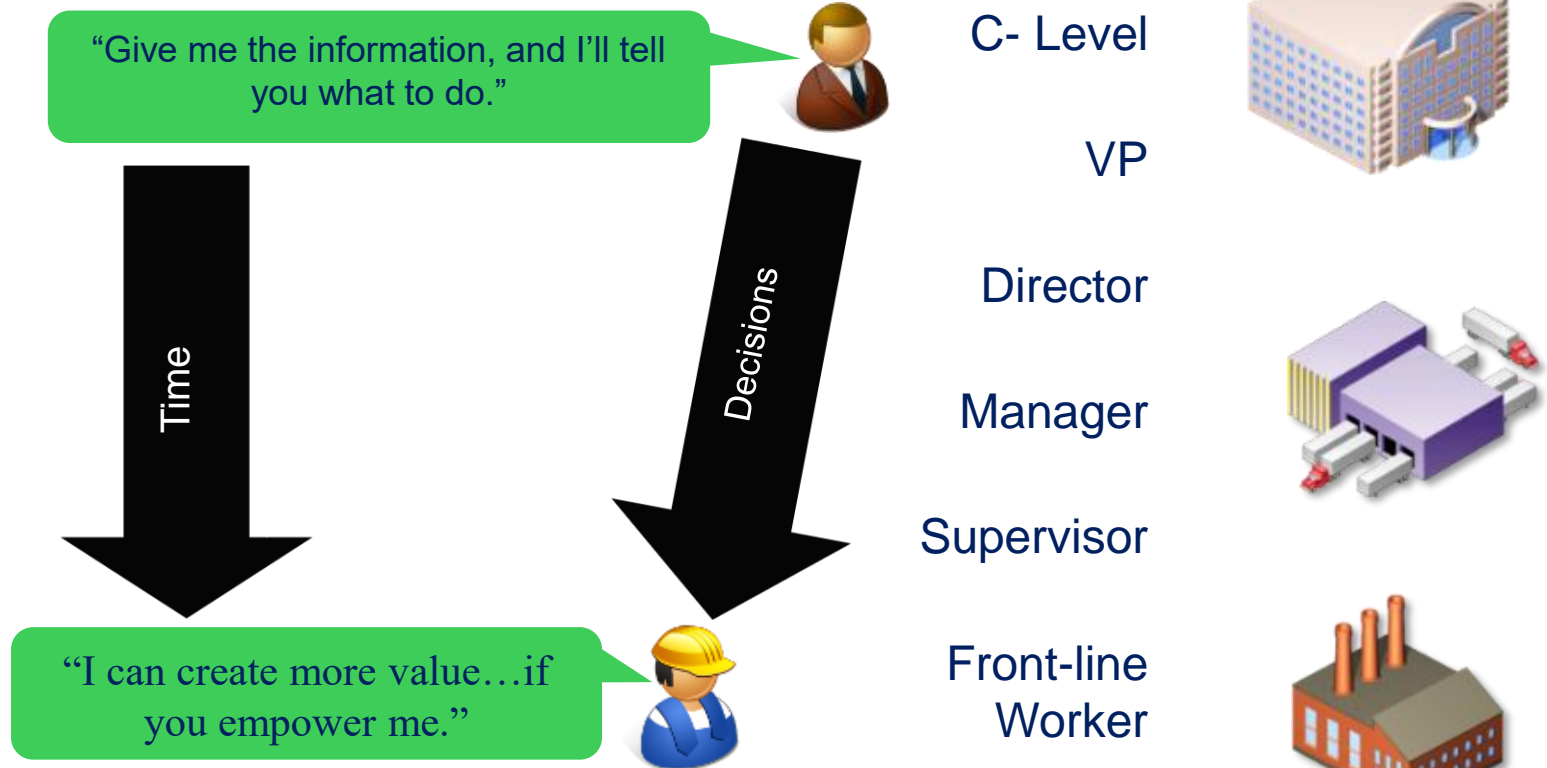
Distributed Extended Asset Control

Internet of Assets

System of System



Activating the Workforce



Summary

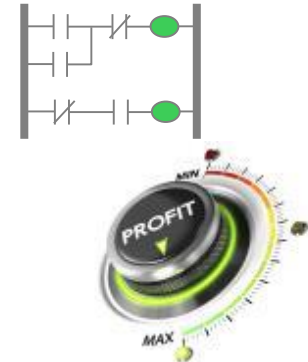
Internet of assets

- Physical model drives system definition
- Automation architecture matches industry architecture
- Physical assets control themselves autonomously
- Assets and asset sets are systematized



Control extended from operational efficiency to business & operational performance

- New real-time measurement & control for improved asset performance
- Profitability, Efficiency
- Reliability risk, Safety risk, Environmental risk & Security risk
- Measureable Business Value



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