TKM Overview

Basic Information:

1. Incorporation : October 1997 Area - 432 Acres
2. Location : Bidadi - Bangalore , Ramanagar District
3. Employees : 6400 Members Average Age - 29 Years
4. No of Dealers : 361
5. No of Suppliers : 119

TKM Product Overview

Product manufactured

Plant 1

INNOVA

FORTUNER

Plant 2

COROLLA

ETIOS

LIVA

YARIS

Camry Building

CAMRY
(Regular & Hybrid)

Product Imported & Marketed

PRADO

LAND CRUISER

PRIUS

Products Exported

INNOVA

ETIOS

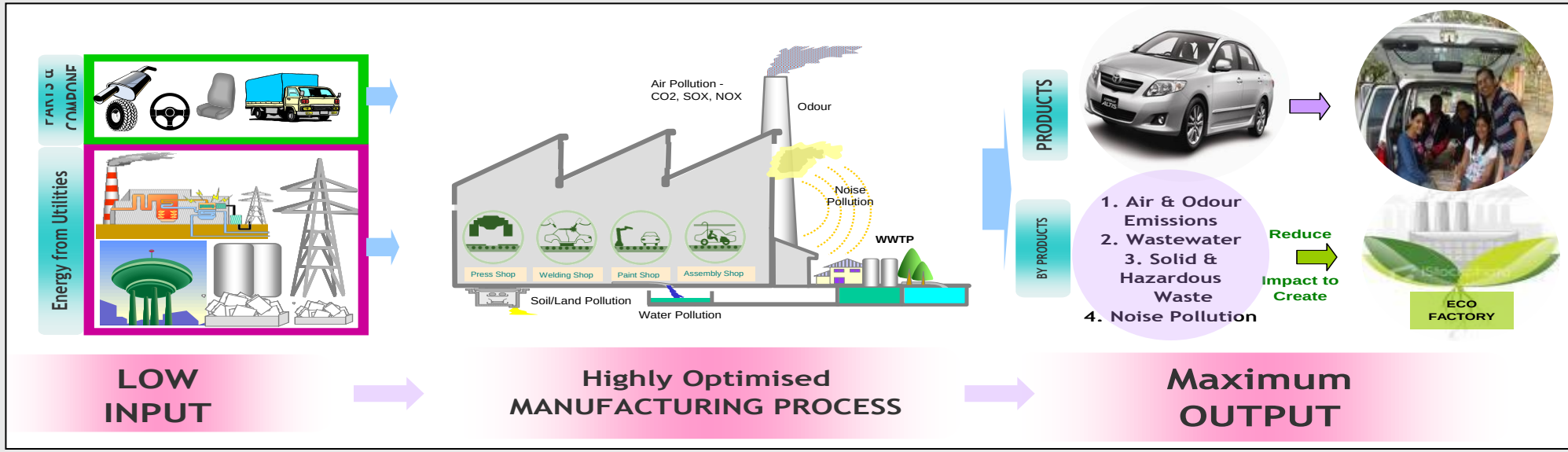
NR Gasoline Engine

Parts Export to Indonesia, Brazil, Argentina, Philippines, South Africa

9500 Hybrid Vehicles sold in India

TKM – Eco factory

The Eco Factory Concept



Manufacturing Process Salient features

Energy efficient Servo Press

Energy Efficient Global Body line for weld shop

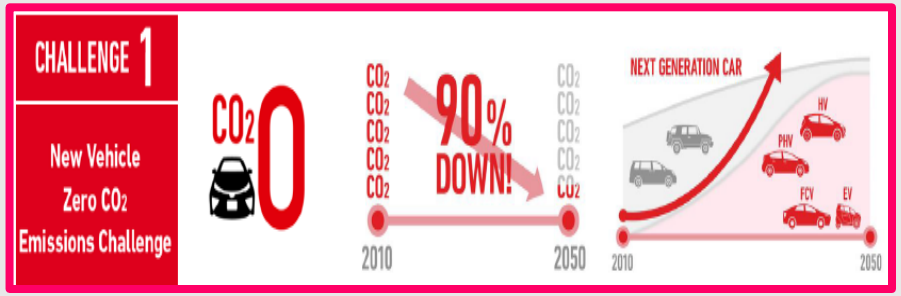
Water Borne Painting & 3 Wet Painting Technology

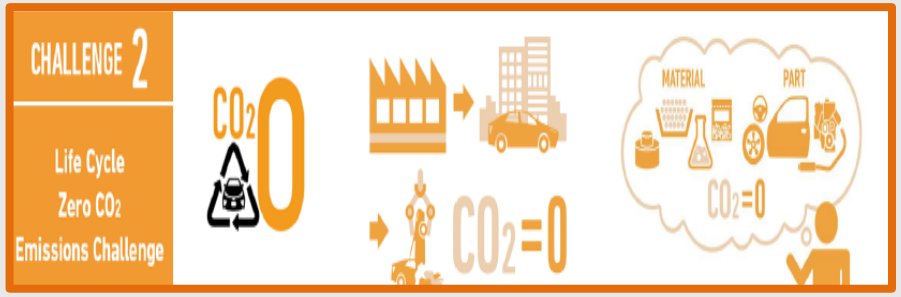
Slim, Simple & flexible production line (Yokonagashi Set up at chassis line)

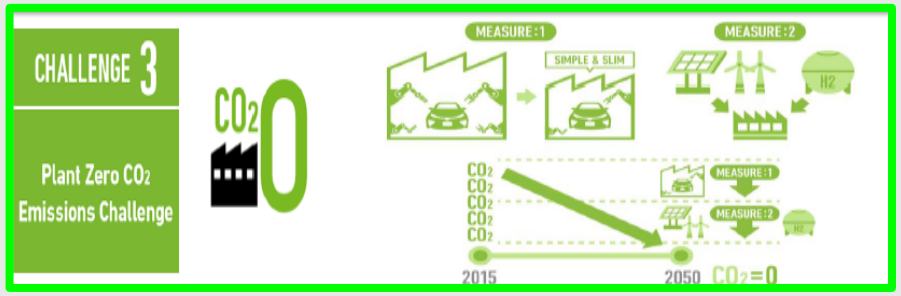
Toyota Environment 2050 Challenge

- **Uchiyamada san announced Toyota's Vision 2050 in Toyota Environmental forum on October 14th 2015**

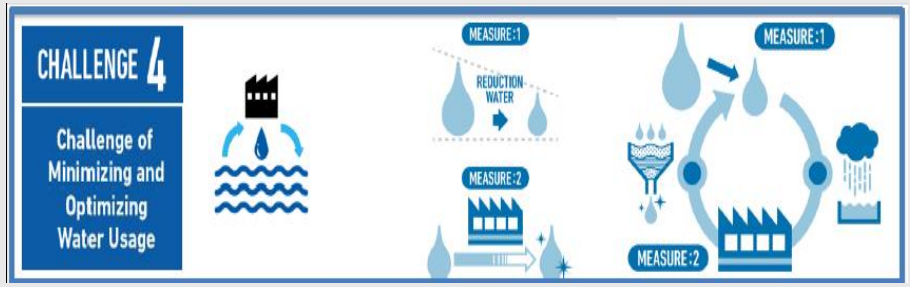
Challenge to Zero



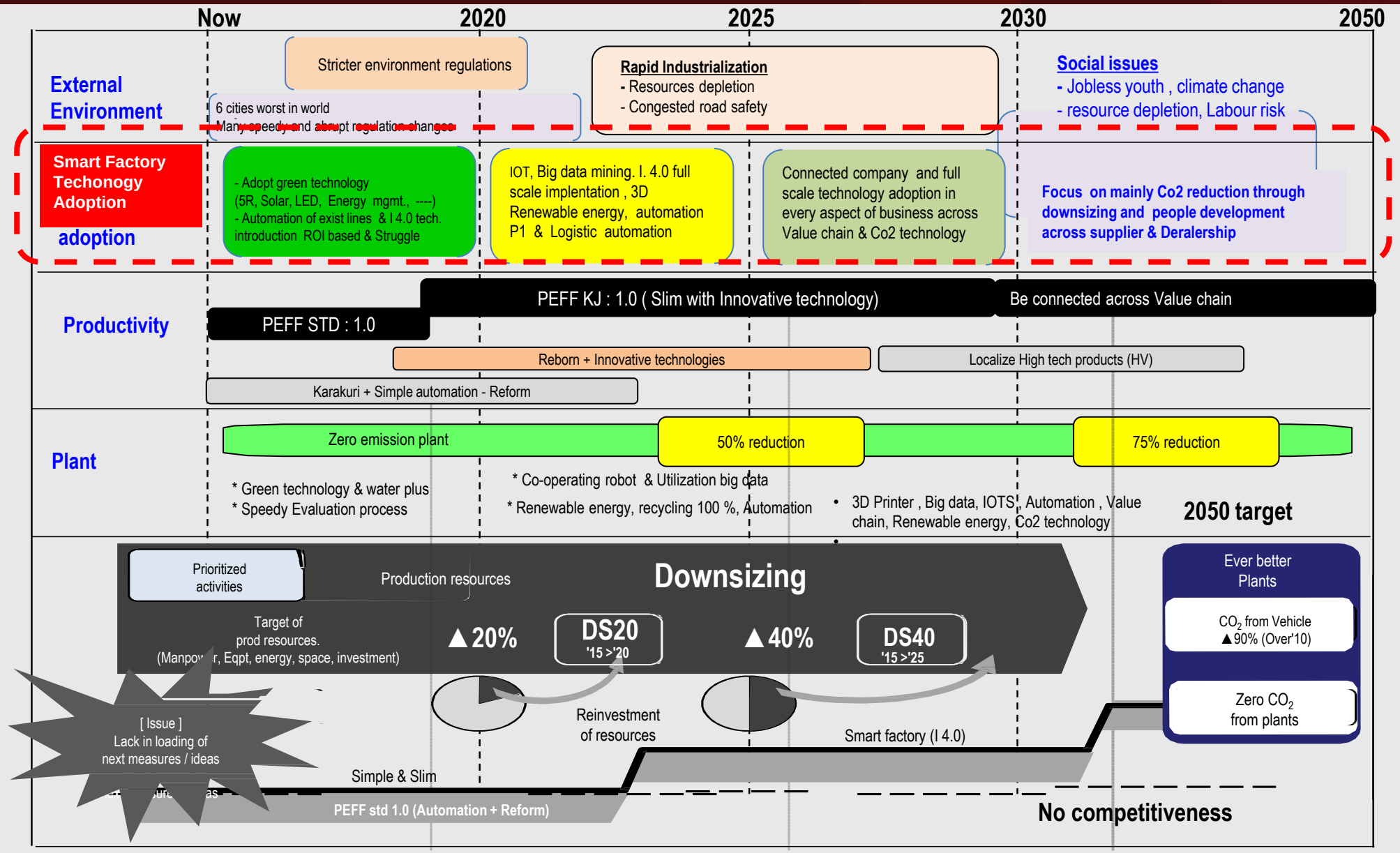




Contribute to Plus



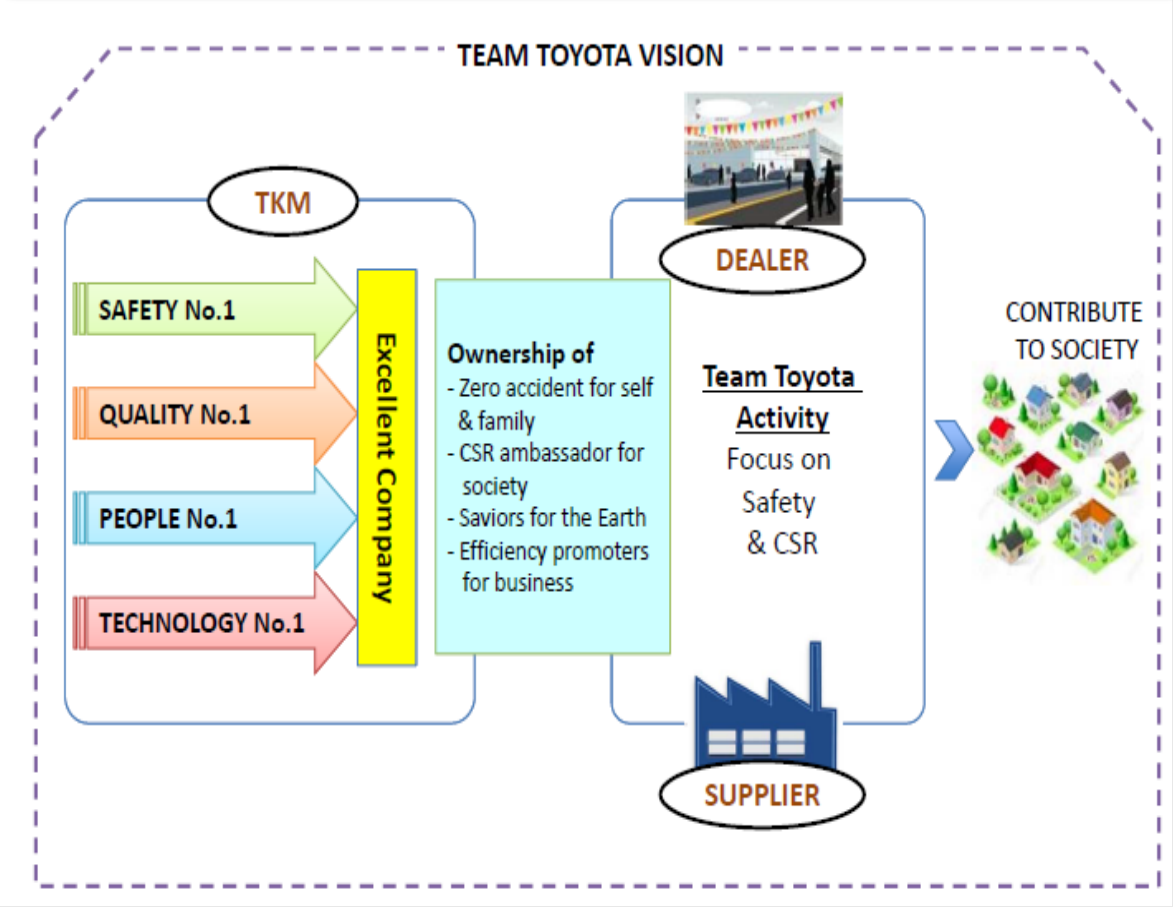
Plant Road Map for 2050 Goal Realiasation: Smart Factory



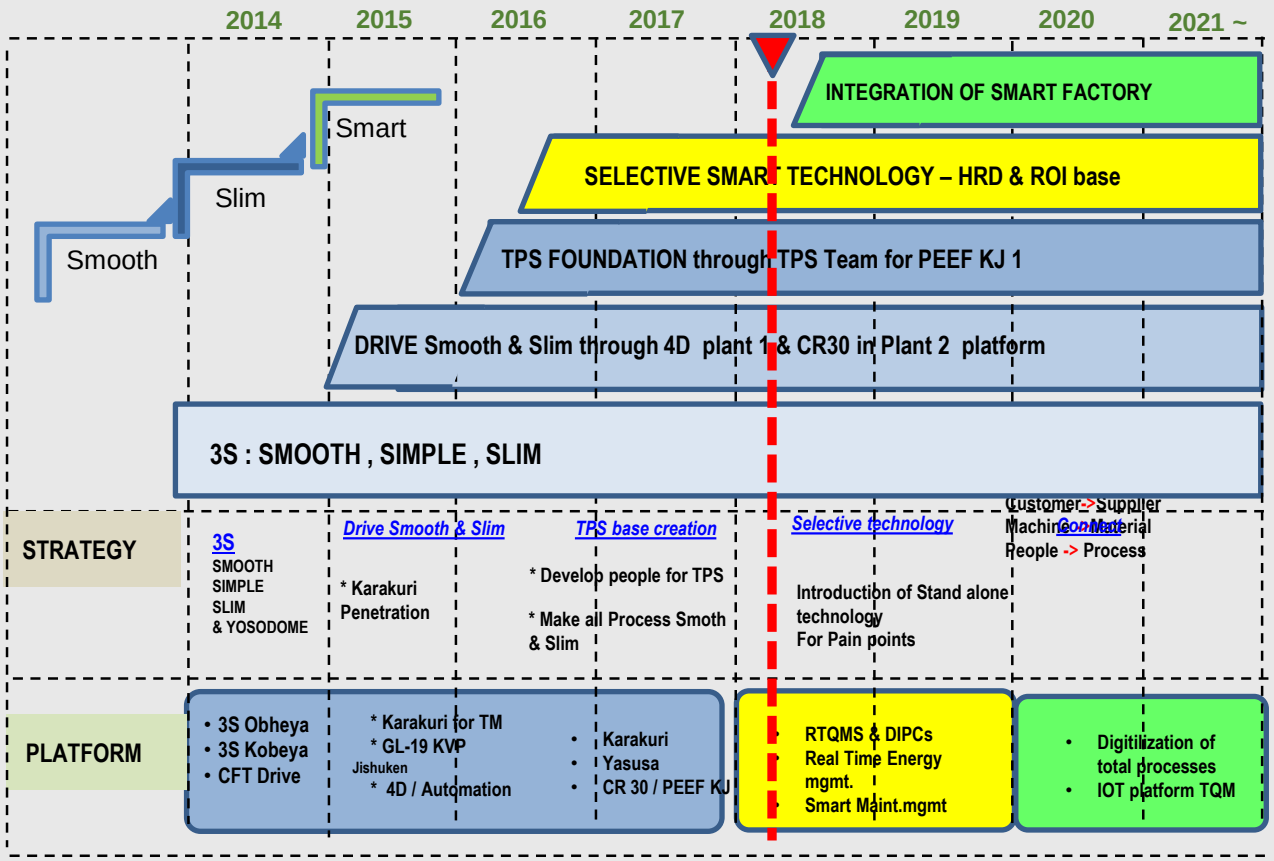
Approach towards SMART FACTORY

➢ Technology Readiness : Industry 4.0

Prioritized Themes for Long term Challenges

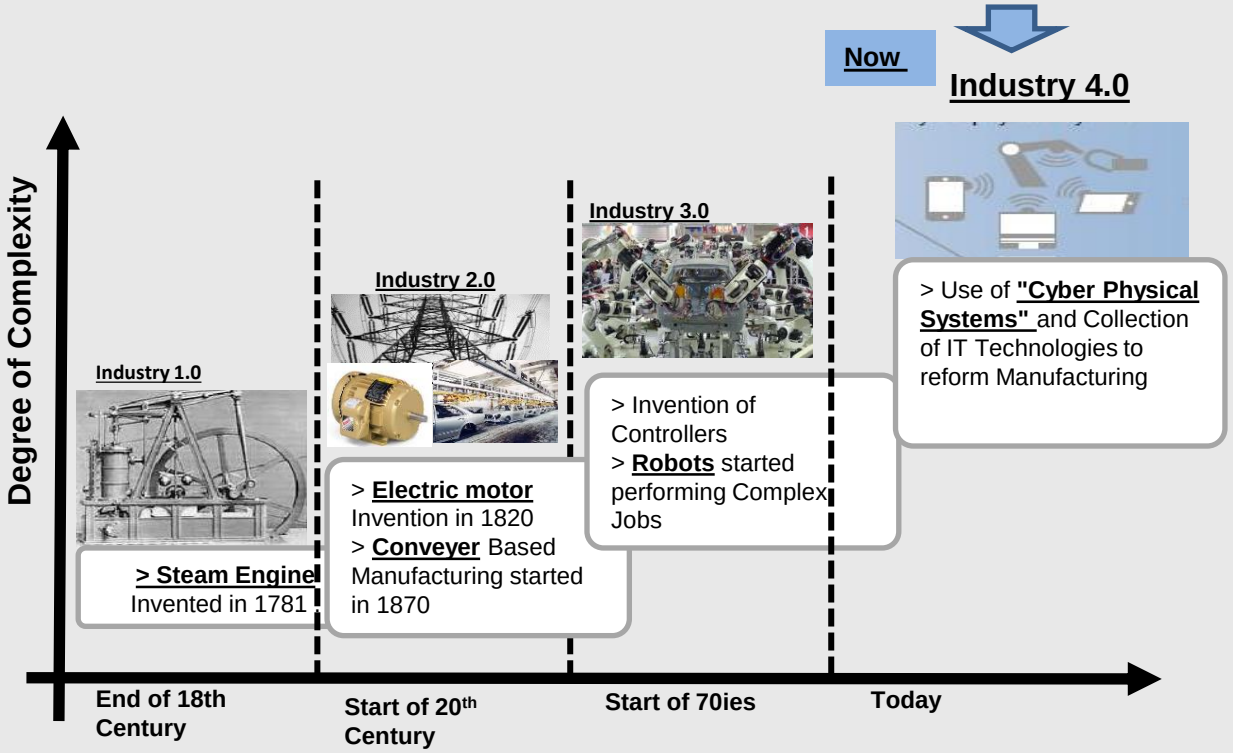


Approach towards Smart Factory - Digitalization



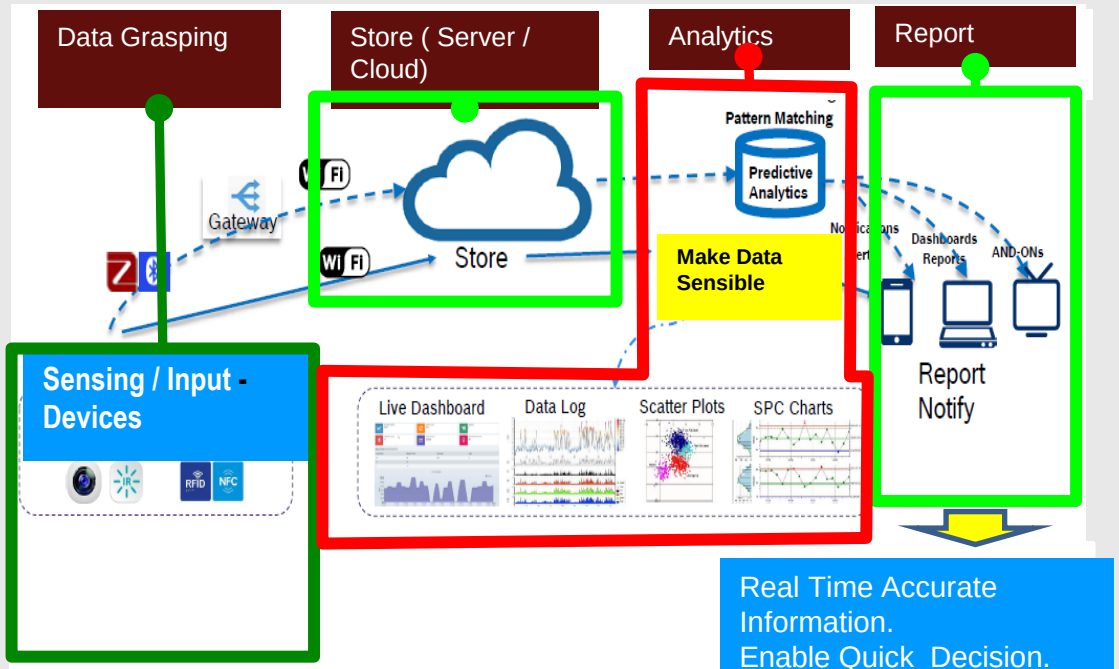
IoT Overview

Revolution of Industry



"Smart Approach" thru "Technology Adoption & Digital Transformation

IoT Overview



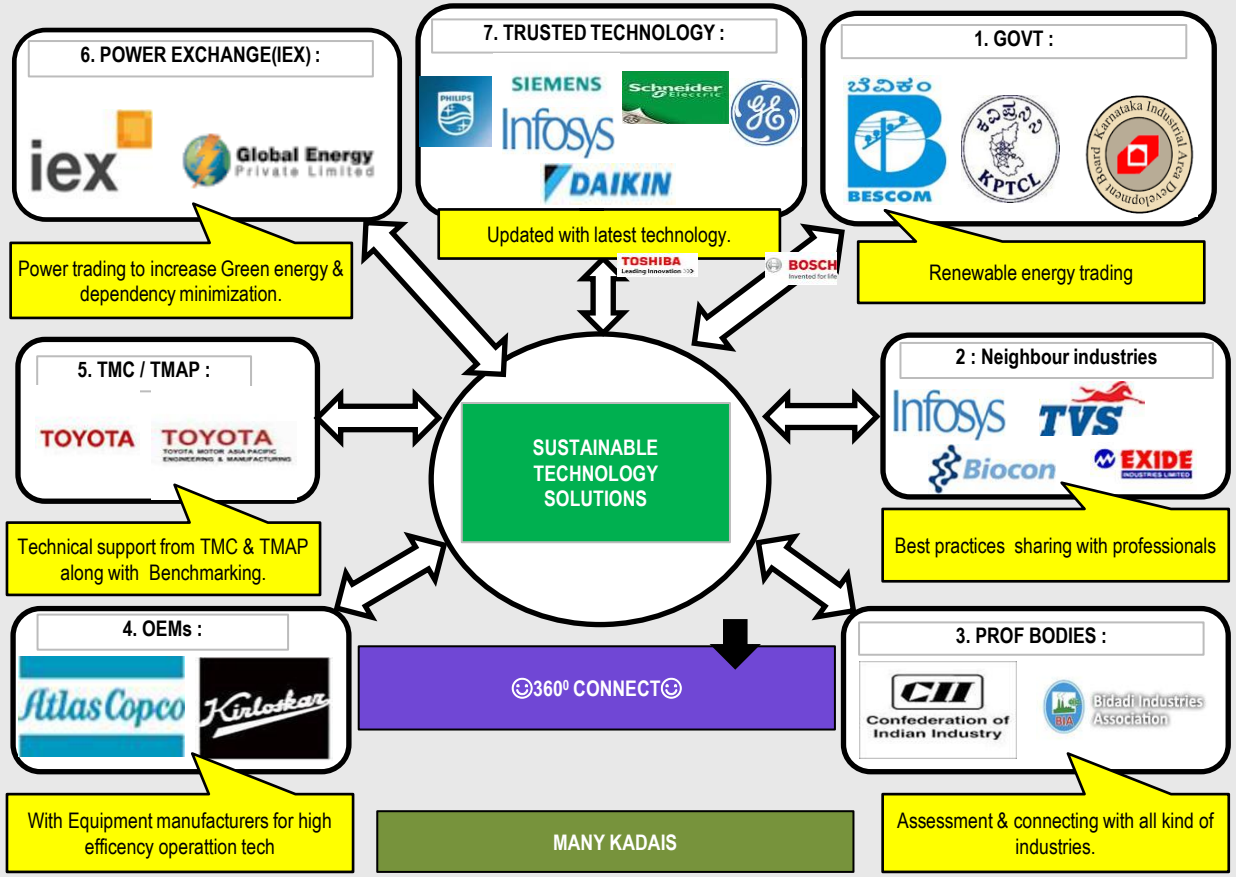
Real Time Accurate Information.
Enable Quick Decision.

For Eg: Parts Tracking , Temperature, Humidity Monitoring etc.

*IoT – Internet of Things

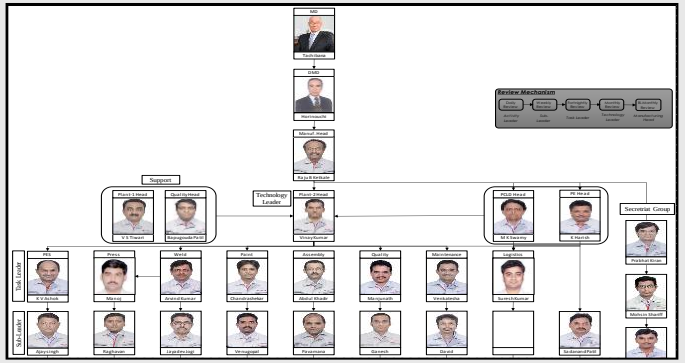
Smart Factory- OBHEYA

Technology Parternership



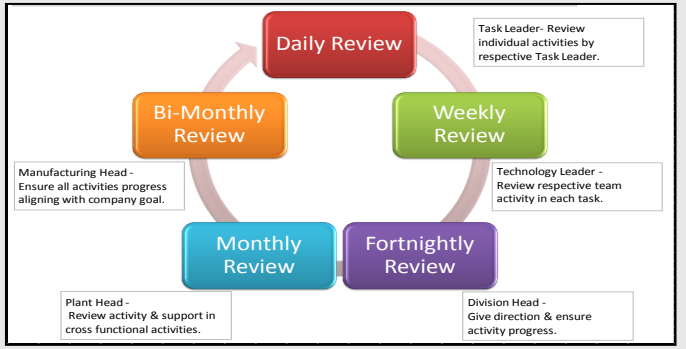
Smart Factory -Obheya Management , Organization & Review

ORGANIZATION



Smart Factory Obeya

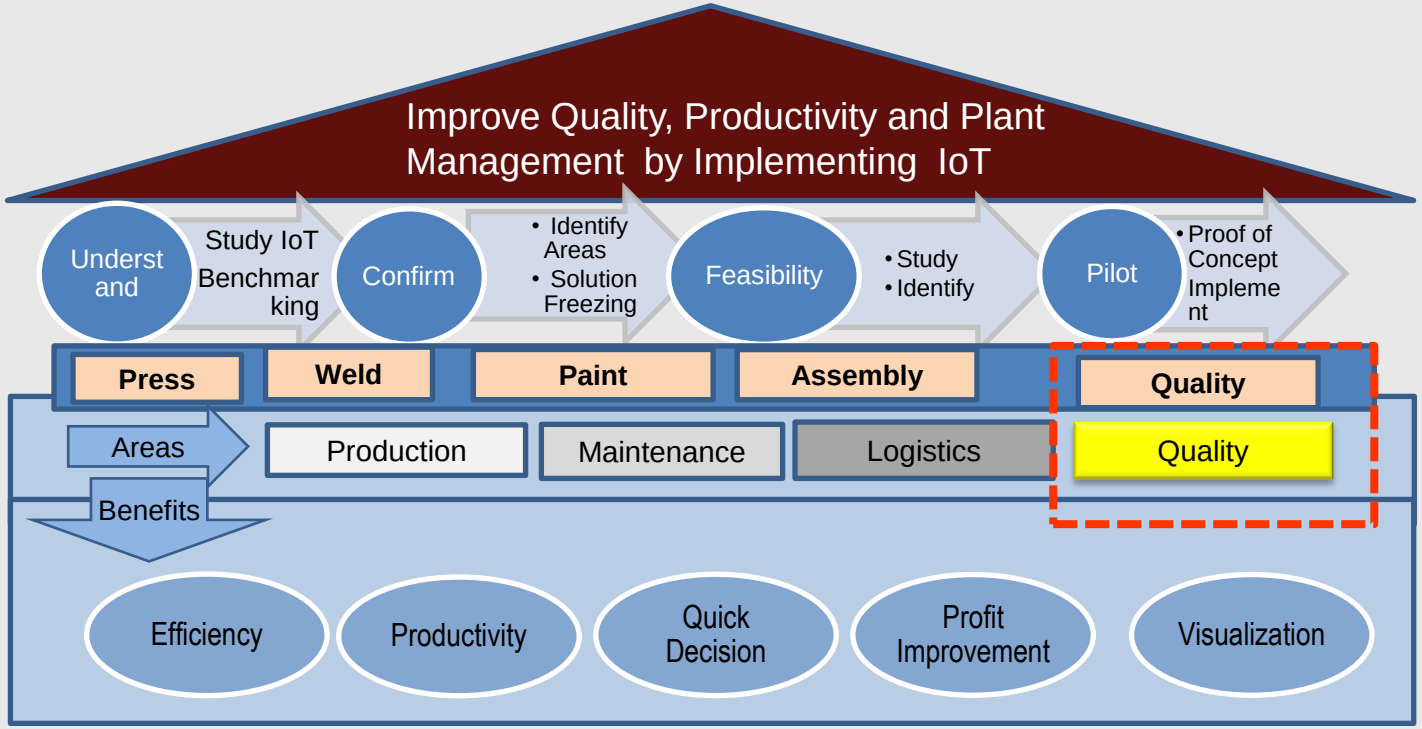
Review Mechanism



Review:

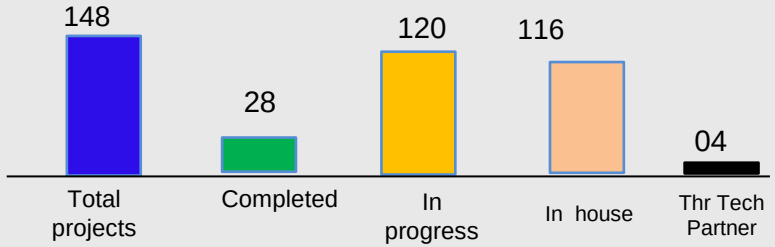
Key Focus - QUALITY

Key Focus Area : **Industry 4.0**



Predictive Analysis, Knowledge based Mining, Failure Probability, Machine Learning, Big Data, Block Chain, Augmented Reality

Smart Project Status



Project with Technology Partners:

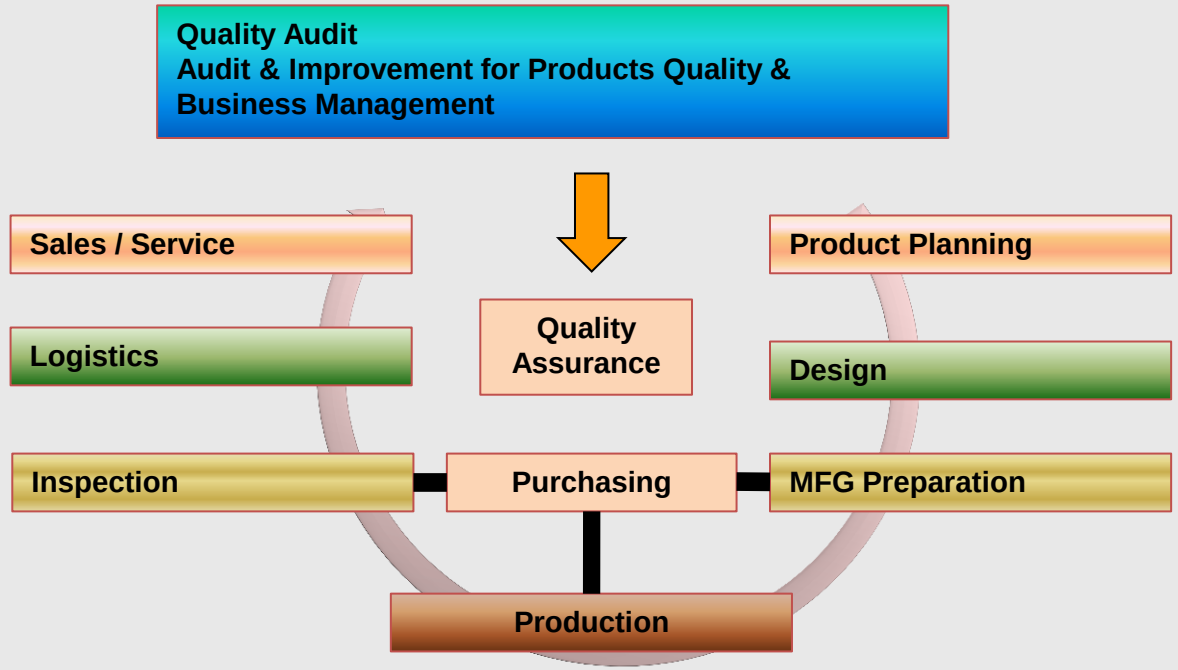
Technology	Projects	Status
Siemens	1.Chillers - Demand & Supply Integration	Completed
Bosch Infosys	2.DIPICS	Ongoing
	3. RTQMS	Ongoing
Infosys	. Sludge Drying Yard	Ongoing
	5. Energy Management	Ongoing

What Quality means to TOYOTA?

- Failure in Cost Management
  => Lose Competitiveness
- Failure in Quality Management
  => Lose Trust
- Failure in Production Management
  => Lose Opportunities
- Failure in Human Resources Management
  => Lose Everything

Stable human relation Is the base for everything

Toyota's Functional Management of Quality

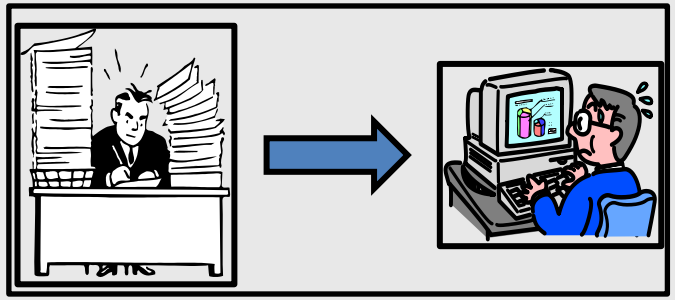


Customer First , Quality First

Smart factory Approach

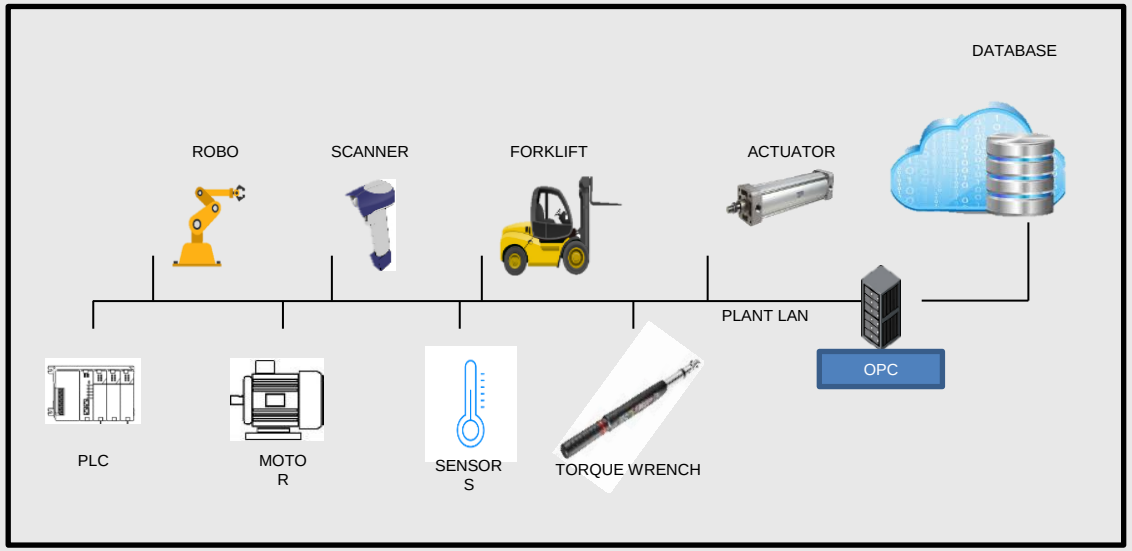
Step-1 [Digitalization]

Digitization, less commonly **digitalization**, is the process of converting information into a digital (i.e. computer-readable) format, in which the information is organized into bits



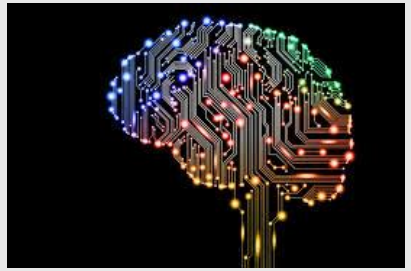
Step-2 [Interconnectivity]

Interconnectivity refers to the state or quality of being connected together, or to the potential to connect in an easy and effective way.



Step-3 [Artificial Intelligence]

Artificial intelligence (**AI**), sometimes called **machine intelligence**, is intelligence demonstrated by machines, in contrast to the **natural intelligence** displayed by humans and other animals.

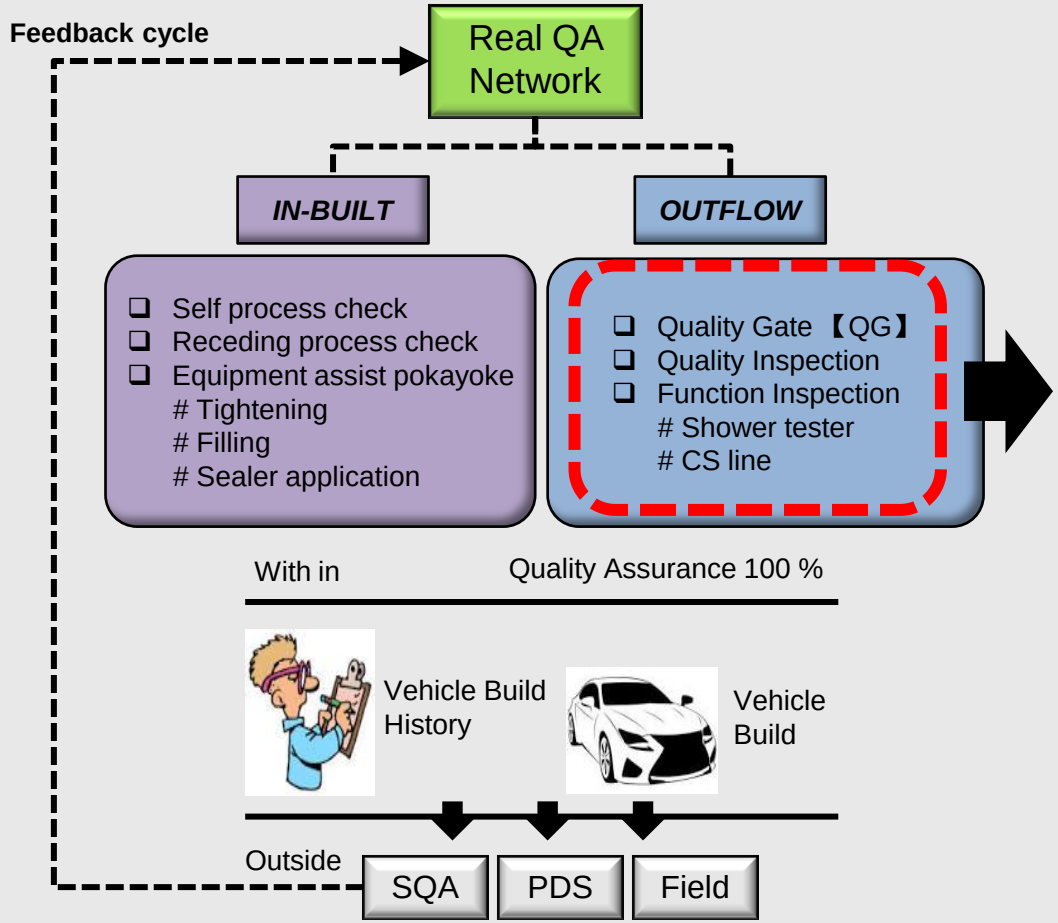


Digital Quality – Human Empowerment

Problem

DOK (Direct OK) enhancement of vehicles by minimizing defects occurrences.

Clarify the problem



Reflections :

- Standardised Work Variation
  [Over Look]
- Communication Gap / Lag
  [Paper / Verbal]
- Defect resolution Lead time more
  [Data Collection & Analysis]
- Repair Delay
  [Defect Image not Clear]
- Reactive / Preventive Management

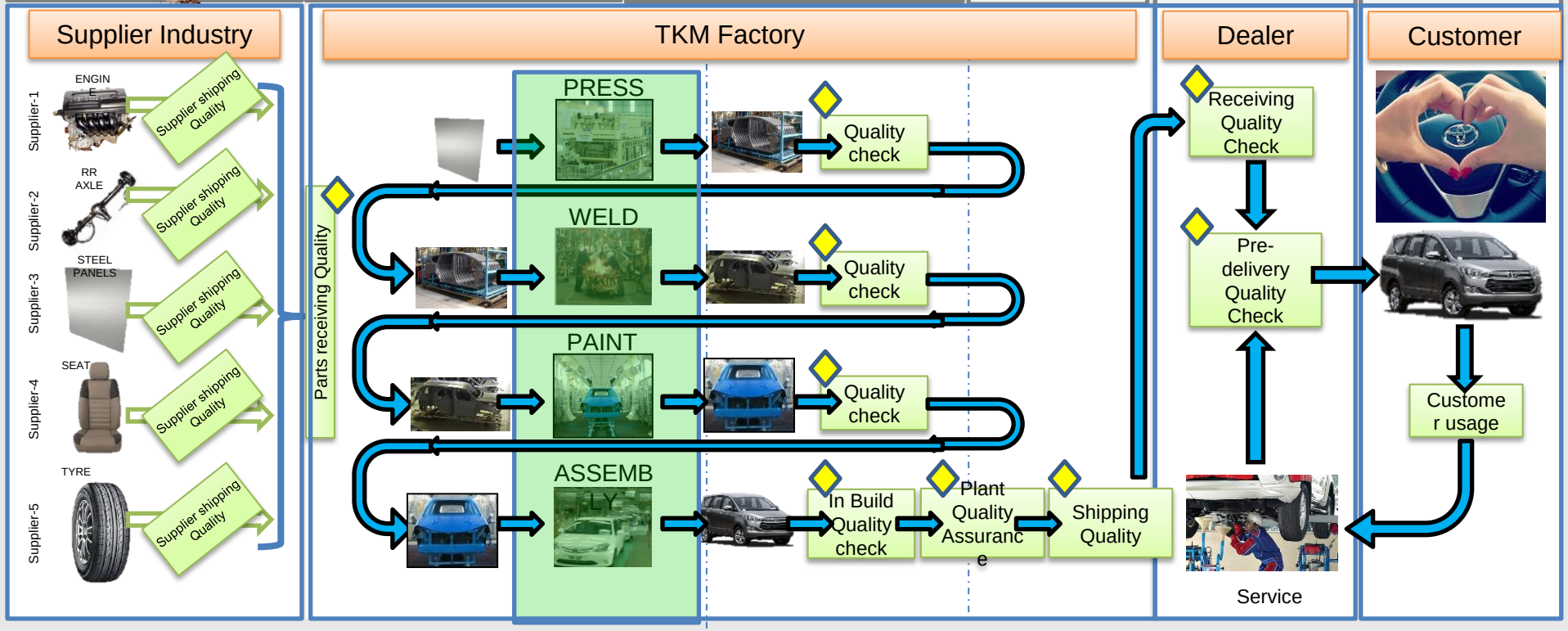
Challenge :

How to Empower Human ???

DIGITAL QUALITY

Digital Quality [Across value chain]

1. Supplier part	2. Production Process	3. Quality Gate	Buy off	4. Dealership	5. Customer
>Part manufacturing quality	>Part assembly >Vehicle spec confirmation	>Defect Classification, Prioritization & Repair > Tablet assisted Defect Recording	>KAKU Check >Delivery check	>Pre delivery quality check >Service History	>Vehicle usage history >Maintenance History



Step-1 Digitalization

1. Supplier Part Assurance

Example 1 – Digital assisted part assembly

Digital assist for the team member to pick right part for right vehicle

Supplier - DENSO

Step-1 Digitalization

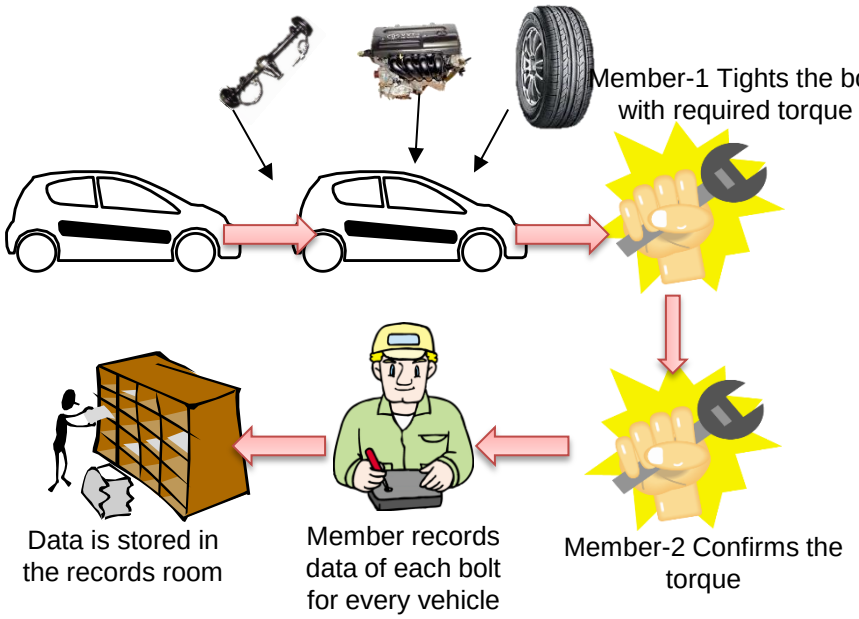
2. Production Process

Example 2 – Digital assist for production Quality Improvement

Before

Manual assurance system

- ~1400 No's Bolt to be tightened
- **~260 No's KAKU** [Important] bolts to be tightened at specific torque
- Each bolt should be maintained at different torque

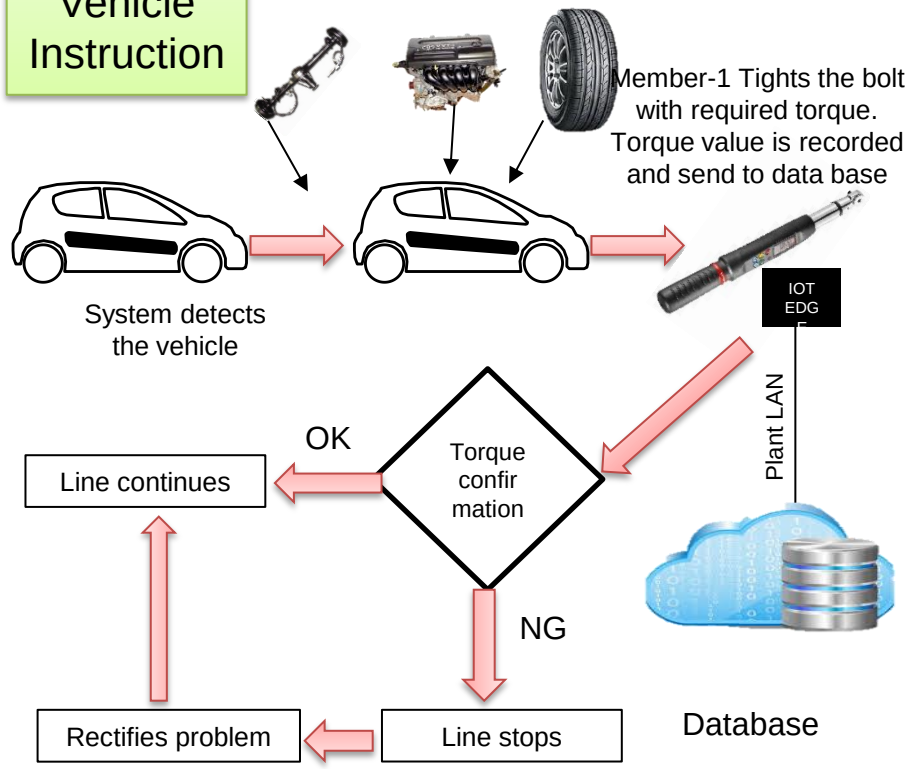


After

Digital assist for production Quality Improvement

AVI System
Assembly Vehicle Instruction

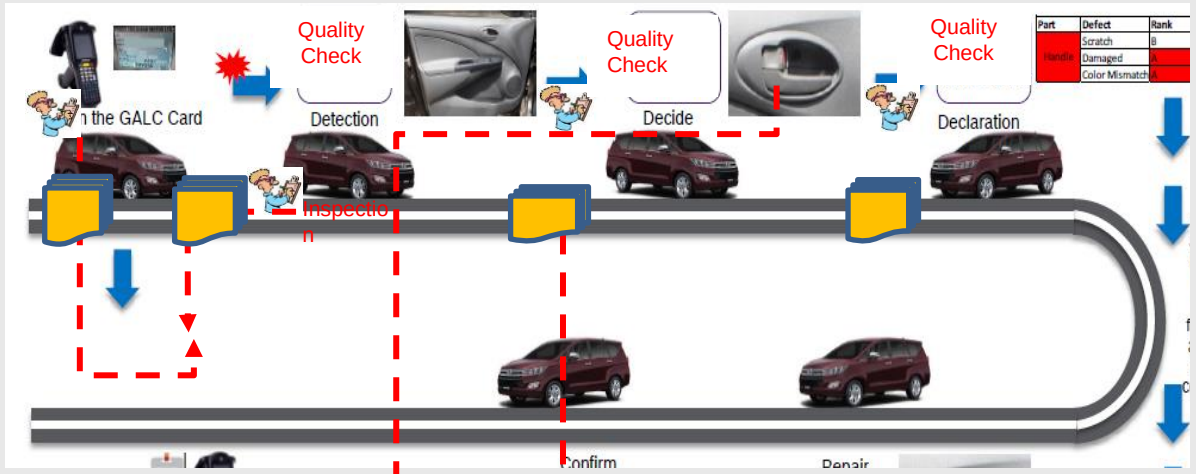
- If required torque not applied for that bolt, line will stop automatically and equipment alert will be generated through ANDON.
- Line will start automatically after rectification



Digital Quality - Architecture

Real Time Quality Network Monitoring System [RTQMS]

Before :



- ➢Data Grasping on Check Sheets Manually.
- ➢Data Compiling is Done Manually. – Not Accurate
- ➢In- Sufficient / Incomplete Inspection.

Impact

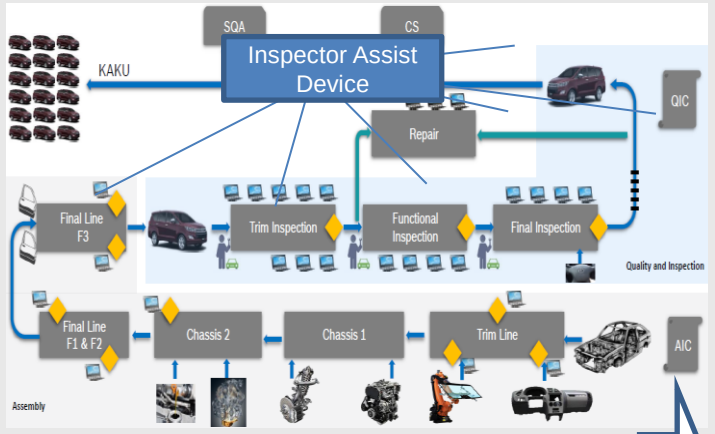
- ➢Communication Gap / Lag
- ➢Defect resolution Lead time more [Data Collection & Analysis]
- Repair Delay [Defect Image not Clear]
- ➢Reactive / Preventive Management

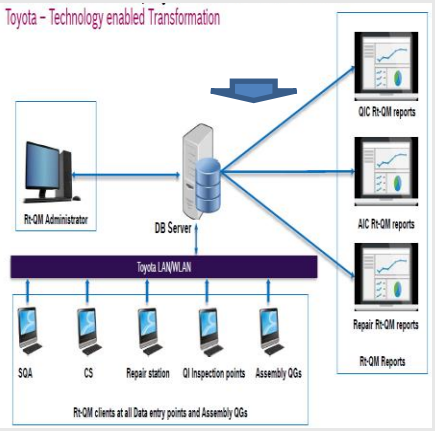
After :

Connected & Live Data Analysis

Real Time Broad Cast
Of **Each Vehicle History**
& **Quality Status**

Base Architect Image:





Base Architect Which is Scalable & Configurable ..

3. RTQMS Benefits & ROI

- Present 2hrs feedback cycle to **REAL TIME** FEED BACK
- Paper based / Manual Database to **CENTRALISED DIGITAL DATA BASE**

I. Improvement in Standardized Work Adherence
II. Process Efficiency up [30%] ↑
III. Process Lead time Reduction [20%] ↓
IV. Defect Reduction [0. 03 DPV] ↓
V. Reduction In Direct Material [100%] ↓

> 5.4 Process Redn [10 Mp Red.]
> ROI : 2.8 Years

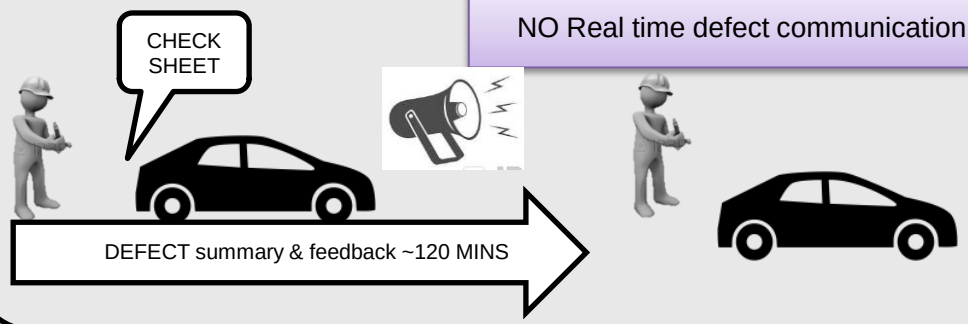
Step-1 Digitalization

3. Quality

Example 3 – Real Time Quality Network Monitoring System [RTQMS] **[Digital Quality to improve build in Quality]**

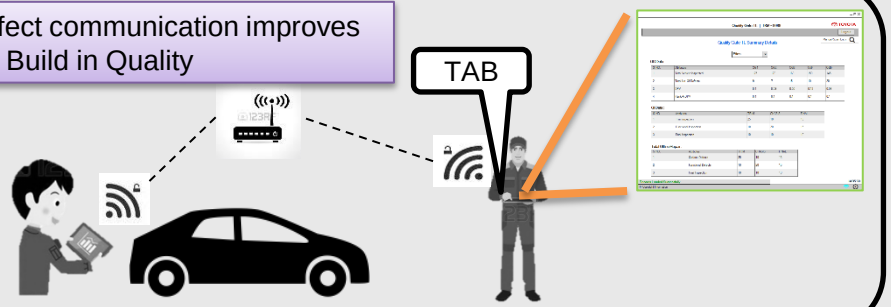
Before condition

NO Real time defect communication



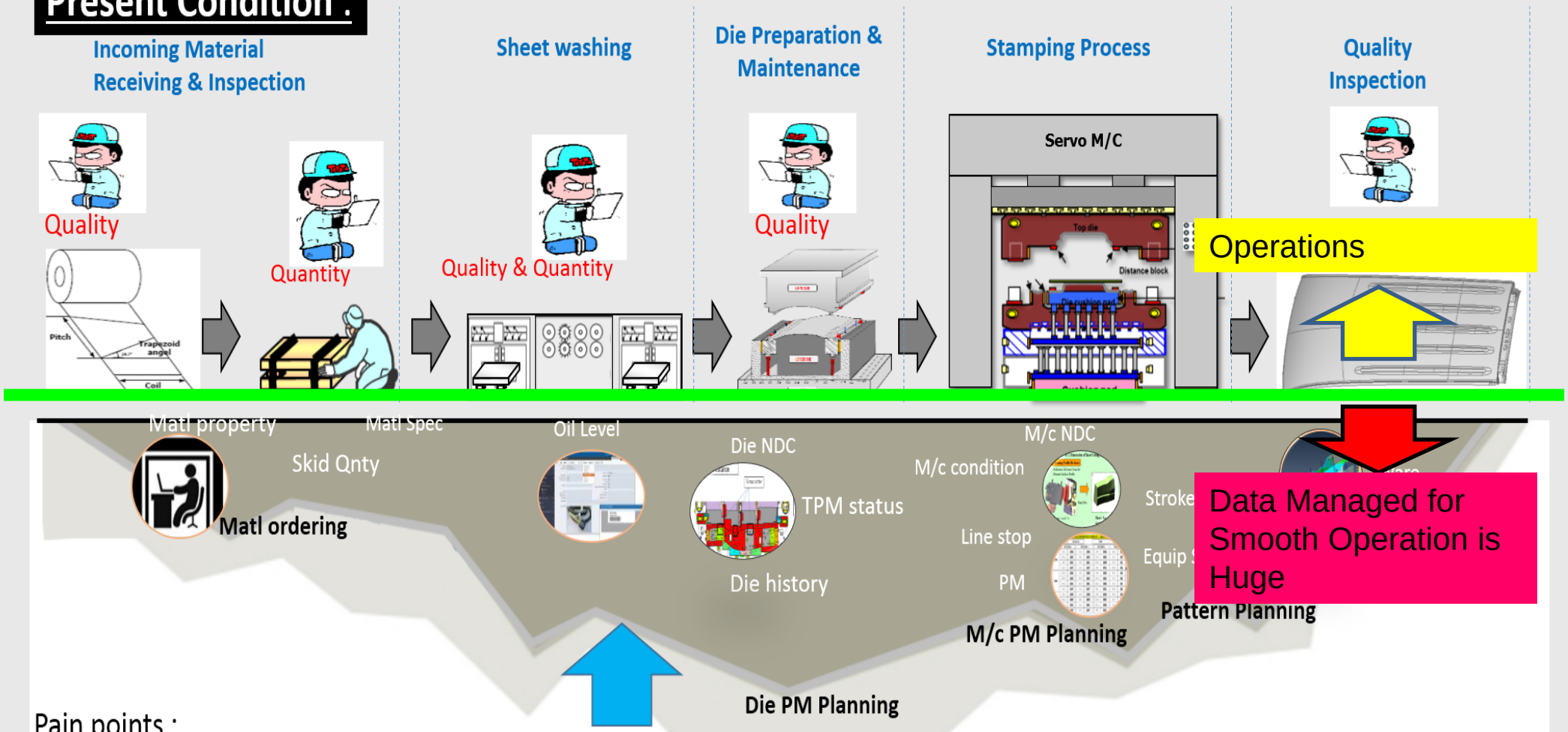
After Digitalization

Real time defect communication improves Build in Quality



Digital Press Information & Control System-[Di-Pics]

Present Condition :



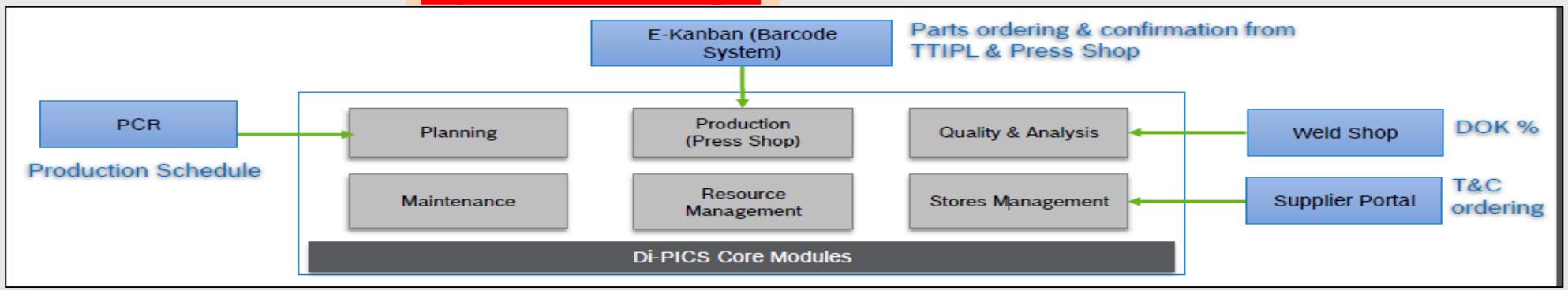
Pain points :

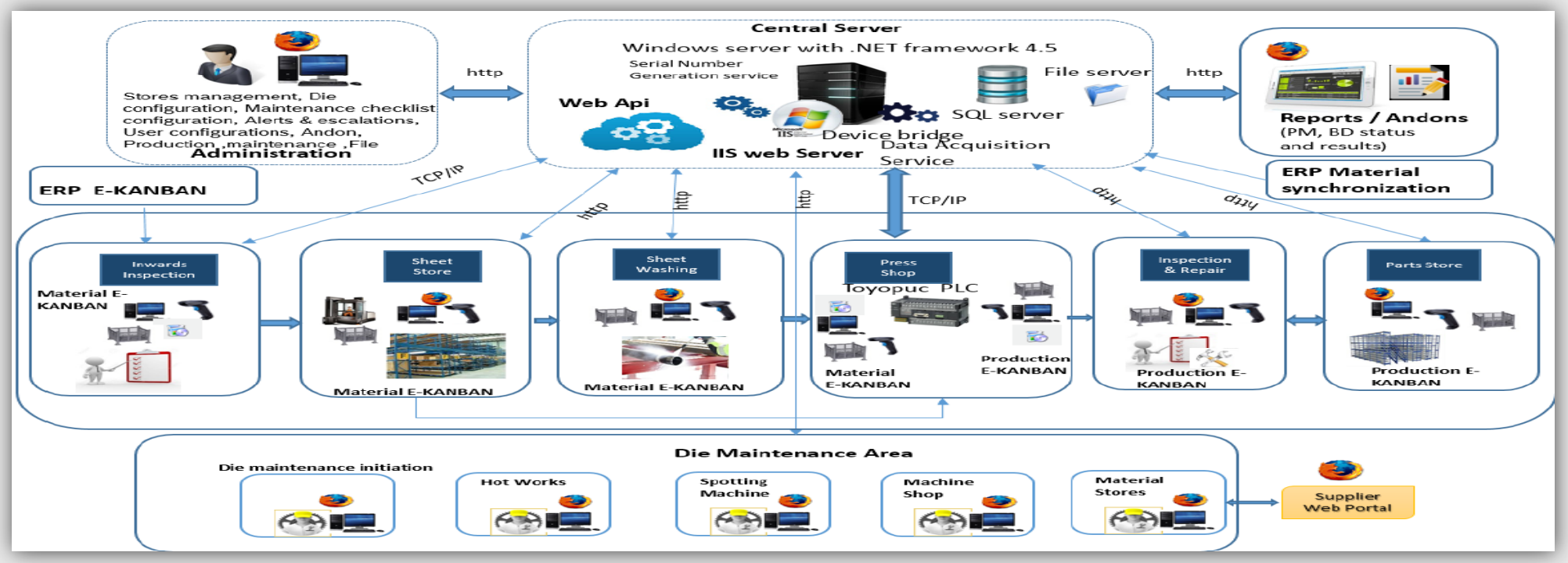
- Manual production planning Control → Die – Machine – FG Co-related and Mgmt is Manual.
- NDC(Material, Die, Machine) monitored manually → Co-relation with Part Quality not clear.
- Huge Data Not Centralized and Organized for Efficient Decision

Digital Press Information & Control System-[Di-Pics]

After Condition :

System Image



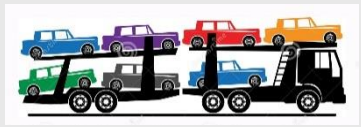


Step-1 Digitalization

4. Dealership Process

Example 4 – Digital C-TDMS

TKM Factory



C-TDMS

Dealership

TOYOTA Connect feature

Sales
1. Customer history
2. Enquiry details
3. Market analysis

After Sales
1. Vehicle Maintenance history
2. Part replacement
3. Spare parts

* C-TDMS – Toyota Dealership Management System,

PDS

Receiving check

Data entry

Analysis by TKM

Service

Service/Warranty claim History

Spare parts

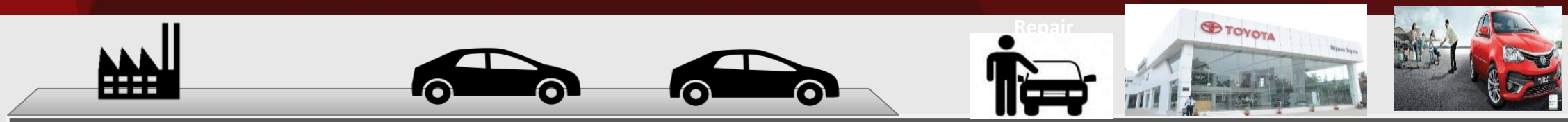
Service data

Customer

TOYOTA Connect INDIA

1. Vehicle service alert
2. Vehicle breakdown alert
3. Vehicle system fault
4. Emergency dialing
5. Service station near by
6. Navigation
7. Vehicle health status

Step- 2 Interconnectivity



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>Part manufacturing quality	>Part assembly >Vehicle spec confirmation	>Defect Classification, Prioritization & Repair > Tablet assisted Defect Recording	>KAKU Check >Delivery check	>Pre delivery quality check >Service History	>Vehicle usage history >Maintenance History

BEFORE

Manufacturing	Dealer	Customer care	Customer
TKM will retrieve the data from records room and share the information	Dealer requests data to TKM, regarding the manufacturing history of X vehicle	Customer care executive receives the information & registers the complaint	Customer faces problem, immediately calls customer care
N+5 Days	Nth Day	Nth Day	Nth Day

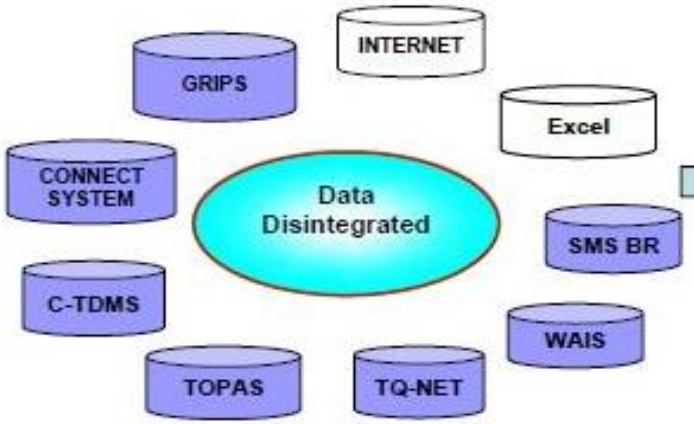
AFTER

Manufacturing	Dealer	Customer care	Customer
TKM will receive the feedback immediately and C/M will be taken	Dealer retrieve the required information immediately from server	Customer care executive receives the information & registers the complaint	Customer faces problem, immediately calls customer care
Nth Day	Nth Day	Nth Day	Nth Day

Step-2 Interconnectivity

Example 5 – Business Intelligence Solution

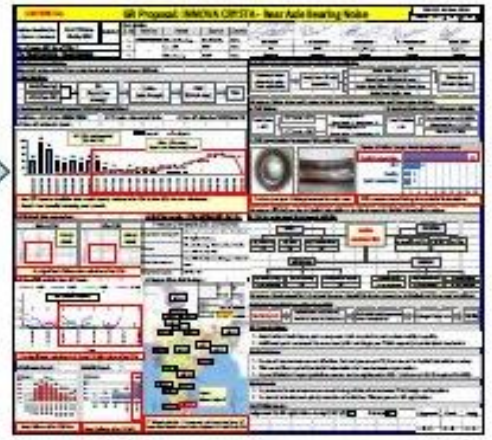
Before Condition



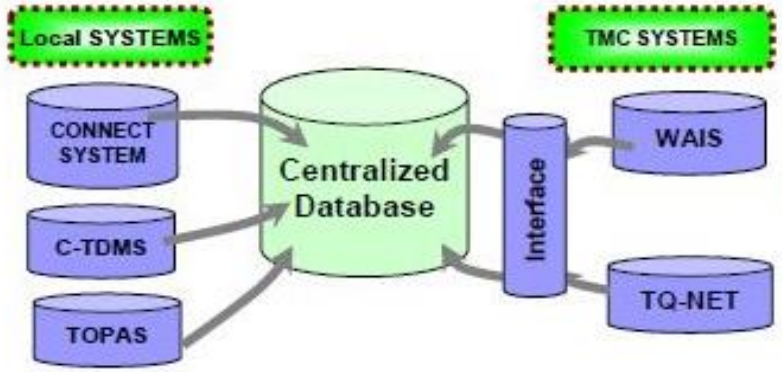
Data Grasping

Segregation & Analysis

Manual Report



After Condition



BI Dashboard

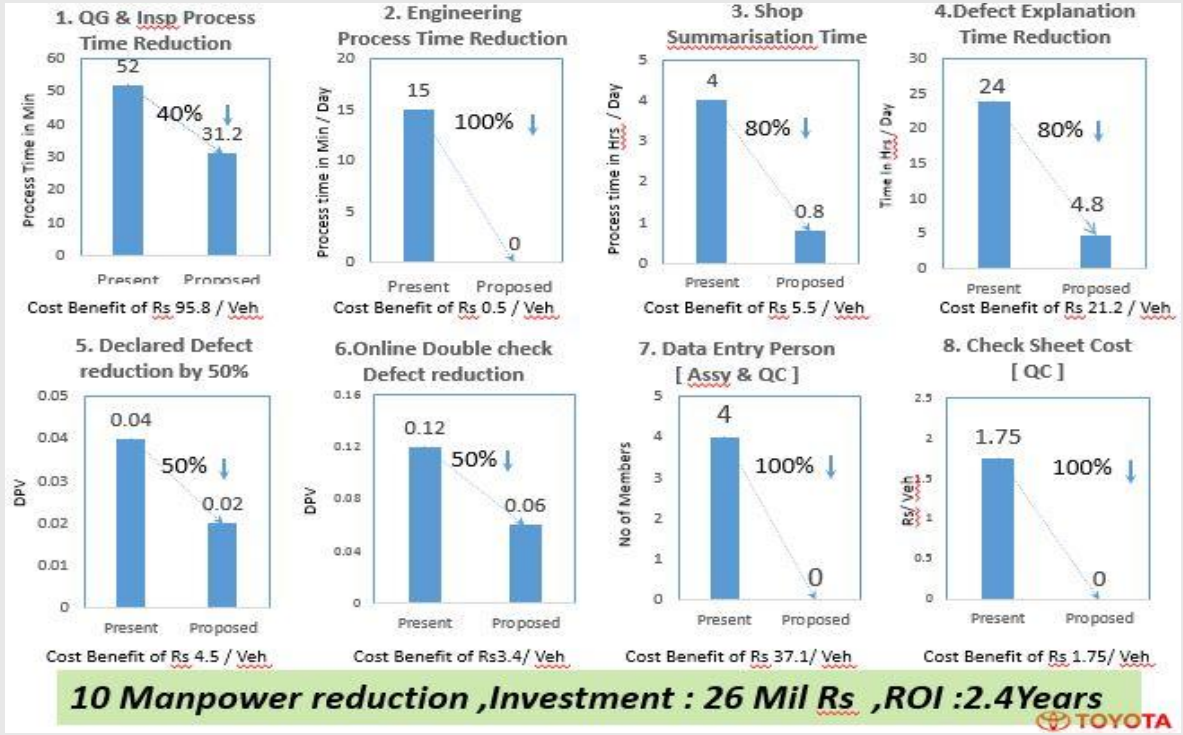
With BI Dashboard, Analysis & Visualisation available dynamically, at the click of a button

Data collection from different systems Manually & generating report Manually

Data collection atomized with Interconnected systems & report generation just by click

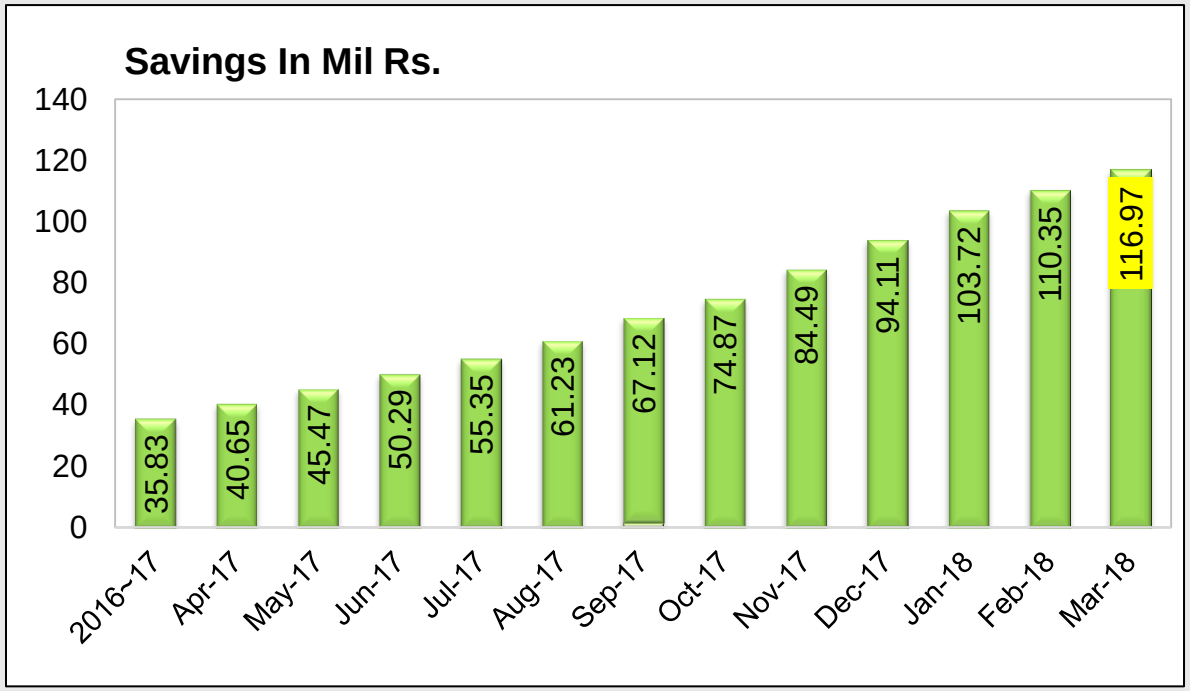
Profitability thru" Smart Activity

Example – Real time Quality Monitoring System [KPI]



All Project approval based on KPI with ROI Approach

Technology projects -Result

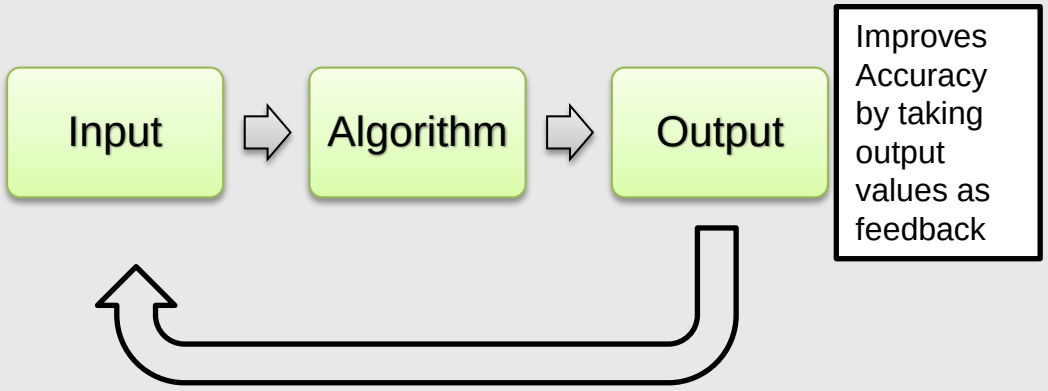


- **Inhouse Projects (112) ROI < 1 year , Overal saving – 116 MRs**

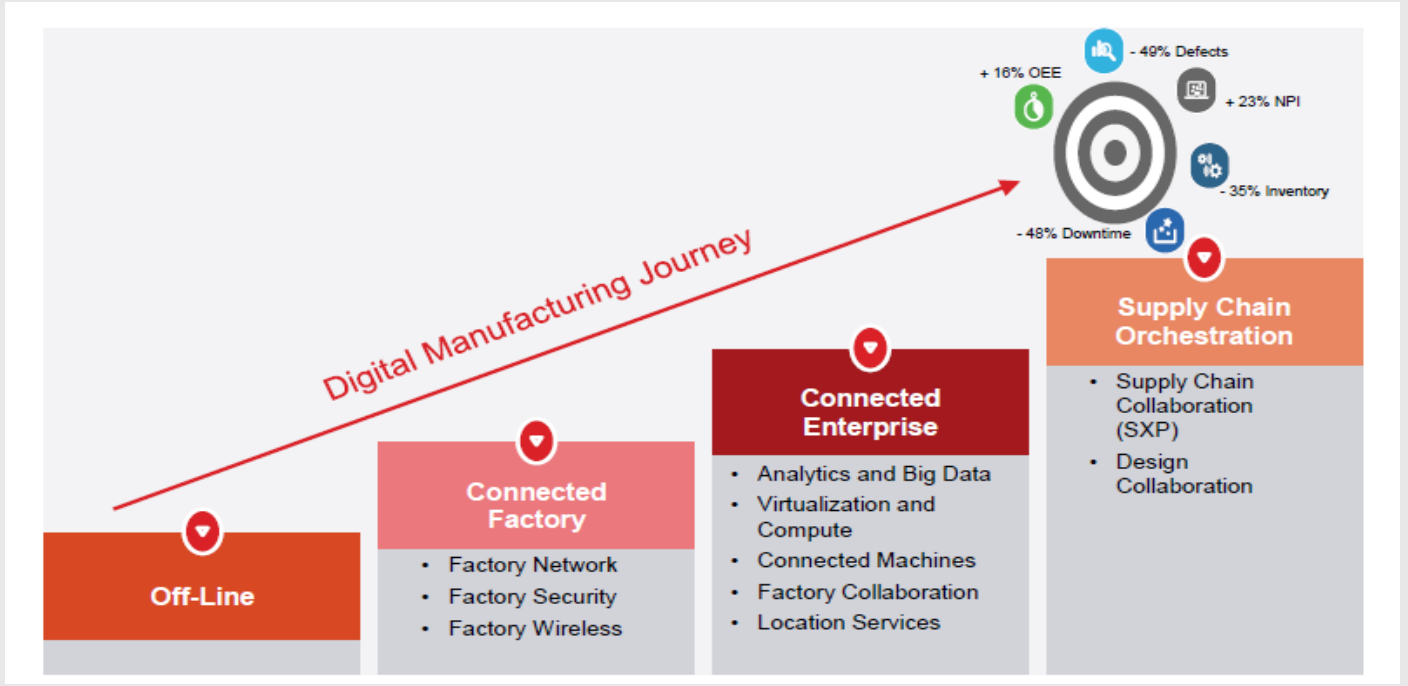
Step-3 Artificial Intelligence

Artificial Intelligence

Artificial intelligence (AI)
The study of computer systems that attempt to model and apply the intelligence of the human mind
For example, writing a program to pick out objects in a picture



Future > Plant – Company – Supply Chain



Overall Summary

- DIGITAL QUALITY – Enhance Built in Quality through standard work improvement, as a result improve Productivity & reliability of operation.
- DIGITAL QUALITY – helps in traceability across value chain which reduces lead time, quick action & reduce inconvenience to customers.
- Before SMART – Smooth & Slim is the key to maximize ROI


THANK YOU
Journey Has Just Begun . . .


?
Q
&
&
A
!