



Strategic Relevance of
Industrial Automation
Investments in driving
Manufacturing Excellence.

Manufacturing Excellence



- Minimal variation and can be measured by a set of quantifiable performance criteria.
- Manufacturing Excellence is a combination of:
- disciplined process control (minimum $Cpk > 1.33$);
- process capability and equipment reliability;
- 100% on-time delivery to customer request; and
- a priority focus on safety

Migrating to excellence in manufacturing



- Took a long time to recognize the need.
- Auto industry is a case in point for transformation.
- Pressure from the customers due to opening up of imports.
- Pressure from MNC companies setting up shop/ from overseas companies who are outsourcing their production.
- Dramatic change in access to technology and the power of IT.
- Visible cost advantage and short payback.

Reasons for Automating



1. To increase labor productivity
2. To reduce labor cost
3. To mitigate the effects of labor shortages.
4. To reduce or remove routine manual and clerical tasks
5. To improve worker safety and health standards.
6. To improve product quality
7. To reduce manufacturing lead time
8. To accomplish what cannot be done manually
9. To avoid the high cost of not automating
10. Ensure tracking through the system.
11. Online production information, plugging in to ERP.

Top Management commitment



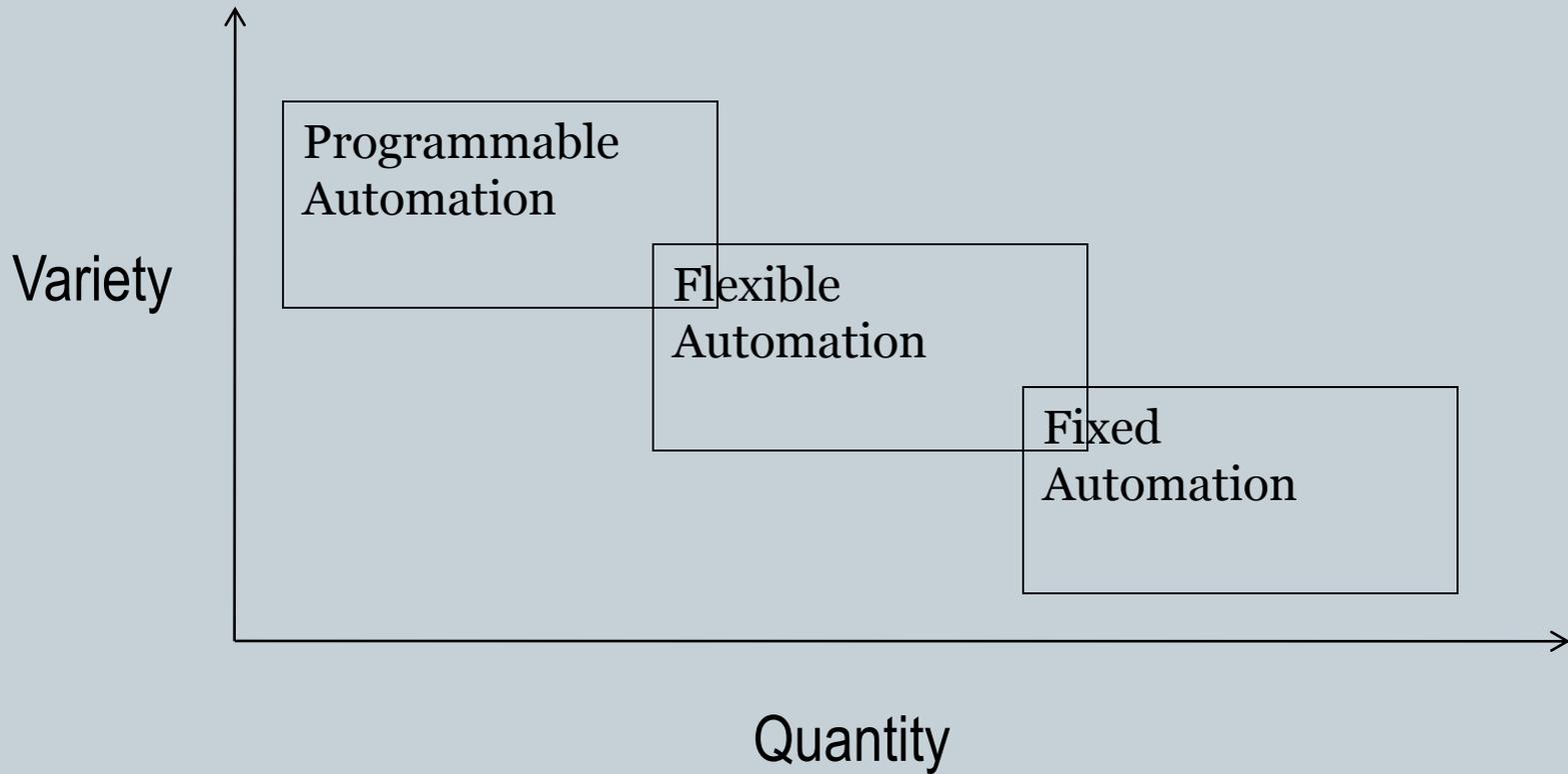
- Key to automate.
- To take a holistic view.
- Valuing all the hard and soft advantages.
- Value safety/ avoiding drudgery/ ensuring health standards/ etc to be also key drivers.
- Ensuring high capacity utilization.

How much to automate?



- Frugal automation? – Japanese and the Chinese success.
- Balancing the parameters.
- Optimizing Capex.
- Taking the team along.
- Obviously meeting the requirements of excellence.
- To avoid automation for its own sake.
- Needs of each industry is different – semiconductor/hazardous/food processing/auto/steel/ etc.

Three Automation Types



Programmable Automation



Capability to change the sequence of operations through reprogramming to accommodate different product configurations

Typical features:

- High investment in programmable equipment
- Lower production rates than fixed automation
- Flexibility to deal with variations and changes in product configuration
- Most suitable for batch production
- Physical setup and part program must be changed between jobs (batches)

Flexible Automation

System is capable of changing over from one job to the next with little lost time between jobs

Typical features:

- High investment for custom-engineered system
- Continuous production of variable mixes of products
- Medium production rates
- Flexibility to deal with soft product variety

Fixed Automation



Sequence of processing (or assembly) operations is fixed by the equipment configuration

Typical features:

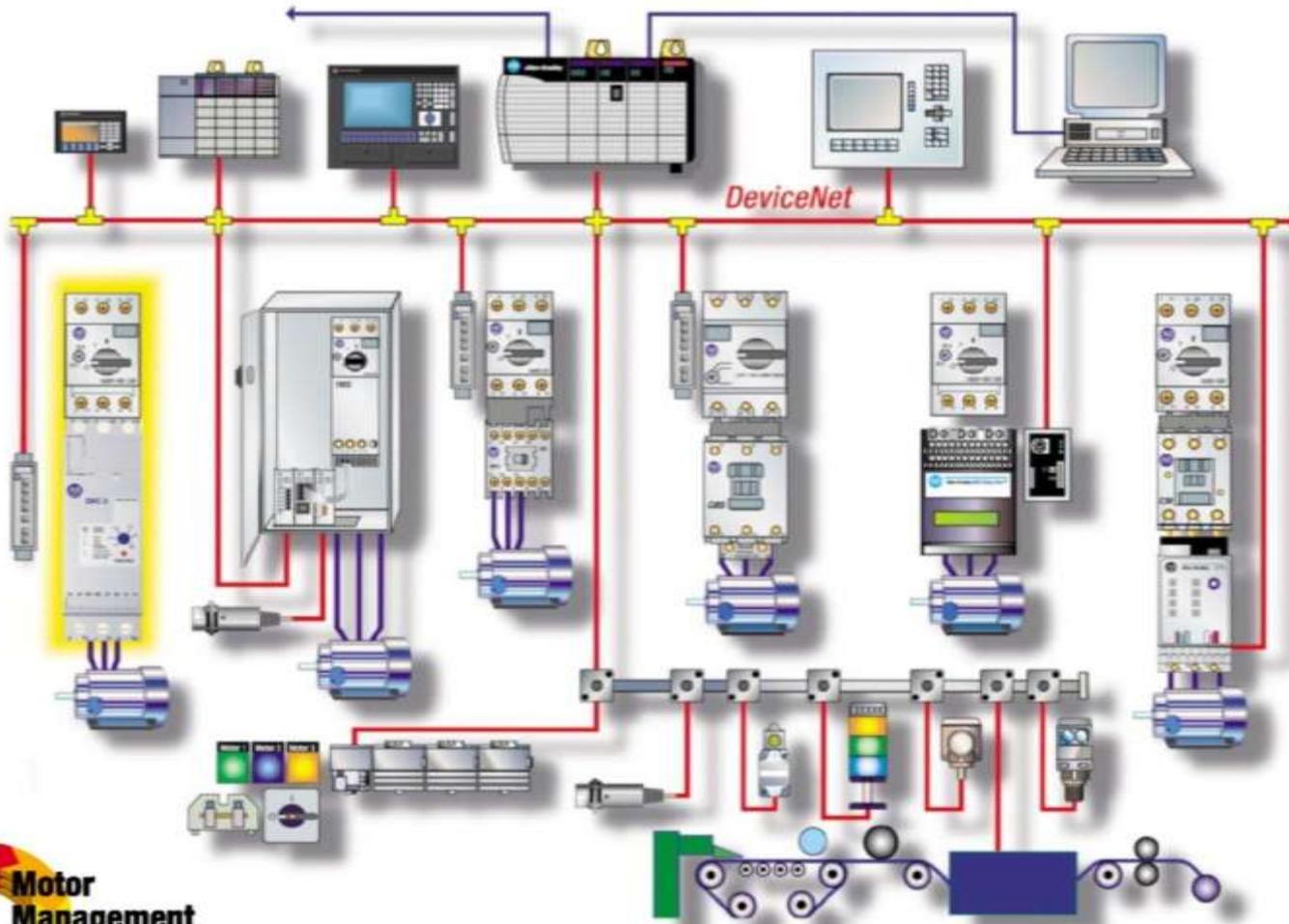
- Suited to high production quantities
- High initial investment for custom-engineered equipment
- High production rates
- Relatively inflexible in accommodating product variety

Industrial Automation - Machines



- Storage Systems
- Handling Systems
- Assembly Lines
 - Assembly Cells
 - Machines
 - ✦ Actuators
 - ✦ Sensors
- Production Lines
 - Production Cells
 - Machines
 - ✦ Actuators
 - ✦ Sensors

Industrial Automation - Computing



- Computers
- Controllers
 - Actuators
 - Sensors
- Software
- Tracking software

Case Studies



1. Meeting all the parameters.
2. Short payback
3. Sharp reduction in manpower
4. Improved safety and health standards.
5. Meeting the goal of manufacturing excellence.

Automation is no more optional, it is part of the process and a driver of excellence and profitability.