

Building the Business Case for Robotics/AI in Your Manufacturing Organization

I. Consider the Advantages & Disadvantages of a Robotics / AI System

A. Advantages

1. May increase productivity, due to ability to work constantly for a longer time.
2. May improve quality due to accuracy and repeatability.
3. May shorten cycle time.
4. May improve safety, due to reduction in human fatigue / exposure to hazards.
5. May reduce waste due to scrap and rework.
6. May reduce waste due to overuse of materials (e.g., paint, etc.)
7. May reduce need for human-centric environmental controls.
8. May improve flexibility of production line (e.g., due to reprogrammability).

B. Disadvantages

1. Capital investment cost.
2. Redesign of production line / workflow may be necessary.
3. Redesign of product may be necessary.
4. Inability to compensate for irregular inputs (component parts, etc.); may be a +
5. Additional work space may be needed.
6. Cost of tooling, interfacing with existing eqpt, and peripheral equipment.
7. Employee resistance and safety concerns.
8. Reduction in institutional knowledge as veteran workers are replaced.
9. Higher-cost employees needed for maintenance and programming.
10. Change management necessary.
11. New system may not be optimal for long enough to justify cost.

II. Miscellaneous Items to Take into Account

- A. Design for automation. Design product and process to simplify robot/AI task.
 1. Reduce task complexity from robot / AI perspective
 2. Design of product, fixture, workflow, etc., should be considered
- B. Future proof the new system by designing in flexibility for the production line.
- C. Remember to prepare a solid training program and maintenance system.
- D. Prepare for push-back from various stakeholders.
- E. Prototype the situation when possible.
- F. Consider previously nonstandard solutions like RaaS, cobots, etc.

III. Justification

A. Economic Factors

1. Labor cost savings
2. Material cost savings
3. Product quality improvement
4. Product quality consistency
5. Increased flexibility of production line
6. New product lead time reduction
7. Customer satisfaction improvement
8. Market nimbleness
9. Competitive position enhancement
10. Reduction in scrap & rework
11. Reduction in inventories due to JIT capability
12. Reduction in changeover time
13. High volume production capacity, resulting in:
 - a. Savings in manufacturing costs; and/or
 - b. Enablement of production at volumes needed by customer

- B. Factors That Are More Intangible
 - 1. Solving for a hazardous environment
 - 2. Safety improvement
 - 3. Worker morale (+/-)
 - 4. Worker absenteeism reduction
 - 5. Image (coolness factor)
- C. Compare Alternatives
 - 1. Modification of existing equipment
 - 2. Retraining existing/new workers
 - 3. Compare different robotics/AI solutions

IV. Use Cases

More Likely to Be a Good Application
Undesirable, unpleasant, unsafe
Hazardous machinery or materials
Extreme temperatures
Lighting less than adequate (LTA)
Repetitive and fatiguing tasks
Air quality LTA
Heavy tools/materials
High noise levels
Simple & repetitive tasks

Less Likely to Be a Good Application
Non-standard process
Non-standard parts
Qualitative or intricate assessment needed
Parts / operations difficult to identify
Exceeds robot range of motion / mobility
Complex & nonrepetitive tasks

NOTES:



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