

Research Brief

R & D IMPERATIVES IN MANUFACTURING

Valentin A. Reyes
Small Outline Package Operations Manager
Intel Philippines Mfg., Inc.

BACKGROUND

I wish to cite four premises in our current situation which would provide vectors for R & D imperatives in the field of manufacturing:

1. We live in the INFORMATION age
 - Information today is both a key resource and a product
 - The communications and computer industries are fast converging into one to serve this basic need
 - installation
2. The world is becoming one big market
 - Free trade agreements and common markets are proliferating
 - Fall of communism has opened new markets previously untapped
 - Manufacturing has become a strategic weapon for competing in these areas
3. Greater awareness of environmental protection and safety
 - Principle of sustainable development has been adopted by many countries worldwide
 - Environmental impact of manufacturing has become a focal issue (systems viewpoint)
 - Human factors engineering is being given increasing emphasis
4. Organizations are undergoing is being given increasing emphasis
 - Knowledge workers
 - Empowerment
 - Borderless organizations

R & D OPPORTUNITIES AND PROBLEMS

1. There is a need to better harness information and the power of the computer in manufacturing
 - shop floor and process control
 - artificial intelligence/expert systems
 - interactive video
 - graphics
 - multi-location communication network
 - vendor and customer feedback/feedforward
2. Continuous improvement needs to occur at an increasing rate to remain competitive
 - benchmarking to the best (bkm's)
 - cycle time reduction
 - time to money
 - build to order
 - process re-engineering
 - JIT-single unit lot
 - transportation/distribution
 - total quality management "best practices"
3. Environmental preservation, health and safety must be viewed as social responsibilities of manufacturing
 - resource depletion rates
 - industries a risk (pollution and waste)
 - ergonomics
4. Human behavior remains a vast field of opportunity for research and development
 - organizational/job design and restructuring
 - training and development of knowledge workers
 - performance motivation and recognition

BARRIERS

1. Computer-integrated manufacturing remains beyond reach for most
 - high investment costs
 - non-standard platforms
 - information overload
2. Manufacturing paradigms that have not been broken
 - output above everything else
 - NIH syndrome
 - short-term outlook (e.g. profits)
 - overdependence on government (protectionism, laws)
 - "just-in-case", not just-in-time
 - money as a prime motivator

3. Environmental issues/impact not well understood
4. Underemphasis/underestimation of human factors in production

SPECIFIC RECOMMENDATIONS

1. Start with an integrated long-term vision, then implemented in modules
 - "copy exactly", when it makes sense
 - involve management/grassroots/customers/vendors
 - dedicate teams
 - continuously review
2. Leverage the customer/market to break paradigms
 - begin with needs analysis
 - compete in export market
 - re-educate manufacturing/operations
3. Embrace the systems approach to manufacturing
 - optimization
 - tradeoffs
4. We must strive to become "masters of change"
 - organizational development is a key tool
 - in-house experts
 - industry-academe linkage/partnership

